

**Boulder Feeder Canal Trail
Community and Environmental Assessment
Process (CEAP) Report**

January 2006

Prepared by a City of Boulder and Boulder County Staff Team

Boulder Feeder Canal Trail CEAP

Executive Summary

January 2006

This report documents the Community and Environmental Assessment Process (CEAP) for the Boulder Feeder Canal Trail - a proposed multi-use trail along approximately 11.5 miles of the Boulder Feeder Canal from Boulder Reservoir to State Highway 66 just south of the Town of Lyons. See [Attachment A](#) for a map of the area and general trail location. Approximately one mile of the proposed trail will be designed and constructed by the city's Open Space and Mountain Parks Department and the remaining 10.5 miles will be designed and constructed by Boulder County Transportation.

The purpose of the CEAP process is to identify potential impacts of a public project, consider alternatives and propose mitigation measures to address impacts. The CEAP analysis and this report were completed by a city and county staff team and reflect a consensus recommendation of the team. The CEAP will be considered for approval by the City Council, following review by the Water Resources Advisory Board, Open Space Board of Trustees, Parks and Recreation Advisory Board and the Boulder County Parks and Open Space Advisory Board. Once approved, the document will provide direction for the next steps of trail planning and establish requirements for more detailed trail design and construction.

The questions for decision-makers at this stage in trail planning are:

- Does the CEAP adequately identify issues at a conceptual level?
- Does the recommended mitigation address the impacts to the best degree that can be known at this time?
- Should staff proceed with trail planning including the recommendations outlined in this report?

Primary Issues:

The primary issue to be addressed in this CEAP is to identify potential impacts of the proposed trail on the city's drinking water supply and to evaluate the ability to mitigate those impacts. Other major issues specific to this trail include visitor safety and wildlife habitat.

Drinking Water

The trail is proposed to run adjacent to the existing Boulder Feeder Canal which carries water in an open channel to the Boulder Reservoir Water Treatment Plant which provides drinking water to approximately 30 percent of Boulder households. Tests have shown that water quality diminishes significantly between Carter Lake and the Boulder Reservoir Treatment Plant, with periodic high levels of bacteria present in the water. The drinking water quality could potentially be further impacted by development of a trail along the canal because the introduction of more people and domestic animals might increase the likelihood of additional pathogens and other contaminants entering the water.

Three alternatives for addressing the potential impacts to drinking water were considered in the CEAP. These include:

- A. Delaying trail development until additional treatment facilities are implemented or a piped system is constructed for delivering city water;
- B. Proceeding with trail development in the near term including mitigation measures to prevent future impacts to the water supply including prohibiting dog-walkers and equestrians from using the Boulder Feeder Canal Trail.
- C. Proceeding with trail development in the near term including mitigation measures to reduce existing contaminants and prevent future impacts to the water supply. This alternative allows horses and leashed dogs and includes additional mitigation to address the potential impacts of domestic animals on the water supply.

The staff recommendation is to proceed with trail development in the near term as outlined in Alternative C because it presents a comprehensive series of mitigation measures to address existing and potential impacts to the drinking water and will further the city and county goal of developing a trail along the canal in the near term without restricting use by those with domestic animals. The following mitigation measures are included in Alternative C:

- Modifications to trail design to include limited fencing, the redirecting of drainage away from the canal, and the separation of the trail from the canal where feasible;
- Sanitary facilities, trash facilities, dispensers for dog waste and educational information provided at trailheads;
- Improved water quality monitoring and cooperative management of water-contamination response between trail management and water treatment staff; and
- Modification of water source selection at Boulder Reservoir Water Treatment Plant to draw water primarily from the Boulder Reservoir Basin instead of directly from the Boulder Feeder Canal.

Also included in Alternative C is on-going monitoring of water quality, an important long term component to detect potential contamination of drinking water and set in motion additional protection measures, if necessary. Attachment B includes water quality analysis and recommendations for water protection, outlining in detail the recommended mitigation measures.

Safety

Having a trail along an open water canal could pose a safety risk to humans and animals if they were to enter the water in the canal. Constructing a trail designed for recreational use including safety measures is a primary objective of this project. Trail design that incorporates safety measures including signs, fencing, screening and possibly other safety features could educate people about the risks as well as keep them away from the water and dangerous areas. Staff recommends that these or other safety measures be pursued and incorporated where feasible.

Wildlife Habitat

Sections of the canal corridor are within high quality habitat for wintering raptors and breeding birds. There may be disturbances to habitat from construction activities and introducing more people in the area using the trail. There are areas where the canal is intersected by areas with suitable habitat for the Prebles' Meadow Jumping Mouse.

Recommendations to protect wildlife habitat include: incorporating system-wide winter raptor and breeding bird habitat planning; requiring trail visitors to stay on trail using education and

enforcement; and monitoring the area for nests and using seasonal closures as appropriate. Staff will work to determine if trapping surveys for the Prebles' Meadow Jumping Mouse may be needed and how to avoid and minimize impacts to potential habitat area.

Next Steps

The next steps in trail planning would incorporate recommendations outlined in this report (see Table 1 on page 6) and focus on developing specific trail alignment alternatives, documenting and incorporating issues raised in the public process into the analysis, conducting an environmental review and final trail design. Specifically these steps include:

- Evaluation of potential alignment alternatives;
- A public input process to present alignment alternatives and impacts to the public;
- Local, state and federal environmental review, depending on jurisdictional requirements;
- Preliminary trail design, final design and construction.

This report includes:

- I. Introduction, Background, Description of Major Issues, Alternatives Considered and Recommendations
- II. Goals Assessment
- III. CEAP Checklist Questions, Impacts and Recommended Mitigation

Attachments

- A Map of General Trail Location
- B Water Quality Analysis and Recommendations for Drinking Water Protection
- C Resource Inventory and Report, prepared by LREP, Inc. (2002)
- D Health and Safety Analysis Report, prepared by Brown & Caldwell (2005)

Section I. Introduction, Background, Alternatives Considered and Preferred Alternative

1. DESCRIPTION AND LOCATION OF THE PROJECT:

The city of Boulder and Boulder County propose to construct a multi-use trail along approximately 11.5 miles of the Boulder Feeder Canal. This CEAP is a general assessment of a trail along the right-of-way (ROW) of the Boulder Feeder Canal from north of the Boulder Reservoir to just south of the Town of Lyons. Alignment alternatives for the actual location of the trail will be developed in the next steps of trail design. These may vary from the canal ROW to address physical constraints within the ROW, avoid environmental impacts or conflicts with adjacent land uses, and utilize other publicly owned land.

The proposed trail would be a multi-use (non-motorized uses: pedestrians and bikes), soft-surface path built to either city or county trail standards. It would connect the trails near the Boulder Reservoir to the county's planned St. Vrain Regional Trail south of Lyons. Approximately one mile of the proposed trail would be constructed by the city's Open Space and Mountain Parks Department and the remaining 10.5 miles constructed by Boulder County. See Attachment A for a map of the area and general trail location.

The Boulder Feeder Canal is managed by the Northern Colorado Water Conservancy District (NCWCD) under an agreement with the U.S. Bureau of Reclamation who owns most of the land. Current NCWCD policy regarding the construction of recreational trails along their canals contains stipulations for location of trails, allowed uses, patrol, maintenance and closure plans. Trails must be located on the opposite side of the canal from the existing maintenance road except in areas where physical constraints to locating the trail on the opposite side of the canal exist. The exact trail alignment will be determined in the next phase of trail planning which will incorporate the recommendations outlined in this report as well as involvement with NCWCD and neighboring property owners.

2. PURPOSE OF THE CEAP

The purpose of the Boulder Feeder Canal Trail CEAP is to assess potential issues of project alternatives at a conceptual level to further inform future trail planning and design.

The primary issues to be addressed in this CEAP include:

- Drinking water quality
- Safety
- Wildlife habitat

If approved, the recommendations in the CEAP will provide a basis for directing city and county staff to proceed with trail design and construction including the mitigation

outlined in the CEAP report. The environmental analysis in the CEAP will provide information for the federal review process required for approval of the trail on Bureau of Reclamation property or other environmental analysis as required.

The process for developing the Boulder Feeder Canal Trail is anticipated to proceed in four steps as outlined in Table 1 below:

- Step 1 – CEAP;
- Step 2 – Trail Design;
- Step 3 –Bureau of Reclamation and Northern Colorado Water Conservancy District review; and
- Step 4 – Final Trail Design and Construction.

Boulder County would be the lead agency for steps 2 – 4. Specifically these steps include:

- Evaluation of potential alignment alternatives;
- A public input process to present alignment alternatives and impacts to the public;
- Local, state and federal environmental review, depending on jurisdictional requirements;
- Preliminary trail design, final design and construction.

3. DECISION-MAKING PROCESS:

CEAP recommendations were developed by the staff committee and are based on two consultant studies¹ and on staff expertise in drinking water treatment, open space management and multi-use trail design. The recommendations represent the consensus of the inter-jurisdictional staff team including city staff from Planning, Open Space and Mountain Parks, Utilities, Transportation, and Parks and Recreation as well as county staff from Transportation, Parks and Open Space, Public Health and Land Use. Other stakeholders were involved as needed, including representatives from the Northern Colorado Water Conservancy District, U.S. Bureau of Reclamation and adjacent property owners.

Typically, the CEAP report and comments from the public are forwarded to the city board with responsibility over the project area for approval of the CEAP. For this project, the Water Resources Advisory Board, the Open Space Board of Trustees, the Parks and Recreation Advisory Board, and the County Parks and Open Space Advisory Committee will review the report and make recommendations to City Council and the Board of County Commissioners.

¹ *Two reports by consultants were commissioned to study the impacts of this trail. These were: Boulder Feeder Canal Resource Inventory and Report (Dec. 2002), prepared by Michael Figgs, LREP, Inc., included in Attachment C and Boulder Feeder Canal Trail Proposal Health and Safety Analysis (Sept. 2005) prepared by Brown & Caldwell, included in Attachment D.*

Table 1. Boulder Feeder Canal Trail Anticipated Development Schedule and Process

STEPS:	1. CEAP	2. Trail Design	3. Bureau of Reclamation / NCWCD* Review	4. Final Trail Design and Construction
	Lead Agency: City Planning coordinating with multi-jurisdictional city and county staff	Lead Agency: County Transportation and city OSMP	Lead Agency: County Transportation	Lead Agency: County Transportation and city OSMP
Estimated Timing	February '06 Advisory Board Review; March '06 City Council and Board of County Commissioners	May '06 – December '06	6-9 months following completion of preliminary design	To be determined following agency review
Purpose	General issue identification and recommended mitigation of impacts. Major issues include drinking water, environmental and safety. Informs next steps in trail planning and provides baseline agreement for design and management.	Develop trail alignment alternatives and analysis. Identify benefits and costs of alternative alignments including input from general public and stakeholder groups. City and county to develop a draft trail management and operations plan including funding sources.	Request approval to develop trail in canal ROW and conduct environmental review of alignment alternatives. Environmental review process will be necessary to permit use of canal property for trail. It will consist of either a federal Environmental Assessment or other process.	Final trail design and management plan. Construct trail.
Public Input	Open Houses Advisory Board Public Hearings	City process to include: open houses and Advisory Board hearings. County process to include public meetings and outreach to stakeholders.	Issue scoping and public involvement process as required by environmental review.	
Board Review	Review and recommendations by Advisory Boards (WRAB, PRAB, POSAC, OSBT)	Periodic updates to Advisory Boards	Northern Colorado Water Conservancy District Board	
Decision makers	Decision by City Council; County Commissioners	Periodic updates to City Council and County Commissioners.	Bureau of Reclamation, NCWCD Board	City Council / County Commissioners approval of capital and operating funding through the budget process.

*Northern Colorado Water Conservancy District

Normally, the boards' actions would be final unless called up by City Council. In the case of the Boulder Feeder Canal Trail proposal, due to joint city and county responsibility for constructing the trail, as well as the number of advisory boards involved, the boards will provide a recommendation to the City Council. After City Council consideration and action on the CEAP, it will be scheduled for Board of County Commissioners consideration. The board and Council reviews include public hearings.

Once the CEAP process is complete and trail design is finalized, Boulder County along with the city of Boulder will submit a trail proposal to the Northern Colorado Water Conservancy District and the U.S. Bureau of Reclamation to begin the federal NEPA (National Environmental Policy Act) process to review a change of use on federal property since the canal right-of-way is currently owned by the Bureau of Reclamation. The federal process would require an Environmental Assessment (EA) be completed. A rider containing direction to the Bureau of Reclamation to transfer title of the Boulder Feeder Canal and other southern delivery facilities out of Bureau of Reclamation oversight to ownership by NCWCD has been included in a current bill before the US Congress and may be considered as early as March 2006. If NCWCD is the owner of the Boulder Feeder Canal, a federal Environmental Assessment under NEPA would not be required, however in either instance standard practice for city of Boulder and Boulder County trail design and construction includes an environmental review and public process that would build on the issues identified in the CEAP process.

City and county staff will work with NCWCD staff and board as trail planning continues to ensure that the preliminary trail design meets their needs for operations and maintenance as well as to determine the potential approval process if NEPA is not required.

4. EXISTING CONDITIONS / BACKGROUND

The canal delivers city drinking water from Carter Lake to the Boulder Reservoir Water Treatment Plant and agricultural water to other water users during the irrigation season (April through October). A gravel maintenance road runs along the canal. The adjacent land uses along the canal and maintenance road include agricultural (crops and pasture), city and county open space, livestock corrals, roads and large lot residential.

The quality of the water transported in the Boulder Feeder Canal degrades from Carter Lake to the Boulder Reservoir Treatment Plant and testing indicates periodic high levels of bacteria in the water. Probable sources of contamination include runoff from adjacent land that includes agricultural, residential and recreational uses, direct contamination from animals entering the canal and possible intentional disposal of materials into the canal.

The Boulder Reservoir Treatment Plant currently meets federal and state safe drinking water standards for all regulated contaminants. If source water contaminant

levels continue to rise, changes to current treatment facilities may be required to meet standards in the future. For this reason the Water Utility is working to identify and reduce contaminant sources. The Water Utility's long-term plan for protection of this water source includes evaluating the construction of a pipeline to transport the water from Carter Lake, which may reduce or eliminate the need for additional treatment plant improvements. A feasibility study for the pipeline is currently underway. Construction would not occur until 2010 if the project is approved and financing is secured. The pipeline would be located in a different location than the existing canal and would carry only a portion of the water that is currently transported in the canal. The city would continue to use the canal to carry the portion of Boulder's water intended for delivery into Boulder Creek. This is about half of the amount of water that the city presently has delivered through the canal. In addition, there would still be agricultural and other user's water transported in the Boulder Feeder Canal.

In 2000, the NCWCD Board of Directors approved a policy that would conditionally allow using portions of their 98-mile-long canal system for recreational trails. There has been significant use of the maintenance road along the Boulder Feeder Canal for recreation despite signs and gates at access points indicating that the area is closed to the public. The canal and water delivery infrastructure pose safety risks for people and animals. Since this is not a designated and maintained trail, there are limited restroom facilities available to those using the maintenance road.

In 2001, county voters approved a 1/4-of-one percent sales tax to fund a list of specific transportation improvement projects. The Boulder Feeder Canal Trail was included on that list as a part of the Regional Trails Projects.

5. PURPOSE AND NEED FOR THE PROJECT:

The Boulder Feeder Canal has long been identified as a critical north-south trail connector from Boulder to Lyons. For decades the Boulder Feeder Canal has been on the Boulder County Comprehensive Plan and the Boulder Valley Comprehensive Plan Trails maps as a proposed trail alignment. Other plans include:

- ❑ The 2005 Open Space and Mountain Parks Visitor Master Plan, Priority New Trails and Improvements Map shows the Boulder Feeder Canal as a priority new trail.
- ❑ City of Boulder Open Space and Mountain Parks 2004 Trails Assessment lists the Boulder Feeder Canal as the top priority new trail.
- ❑ The 2003 Boulder County Regional Trail Committee report lists the Boulder Feeder Canal as a "top priority trail."
- ❑ The 2001 Colorado State Parks Department, Front Range Trail Corridor Plan shows the Boulder Feeder Canal as part of the Front Range Trail.

6. SUMMARY OF MAJOR ISSUES

A. Drinking Water

The Water Utility employs a multiple-barrier approach to water protection because treatment alone cannot successfully remove all contaminants. When there are more pathogens in the source water, the potential pass-through of those pathogens in the final treated water is likely to be higher as well. When the quality of the raw water is compromised, additional treatment chemicals must be used to ensure that treated water meets safe drinking water standards. This increase in chemical use raises overall treatment costs and may increase the level of other regulated contaminants in the finished water, such as chlorinated chemicals.

The impact of a trail on this drinking water supply is not fully known; studies have concluded that dispersed recreation use may negatively affect the quality of surface drinking water supplies, but it is difficult to quantify. Adding more people in the watershed increases the risk of unanticipated contamination entering the water. The standard practice for water quality protection is to limit uses near source water that have the potential to increase risk.

The analysis prepared by Brown & Caldwell for this CEAP (report included in Attachment D) suggests that introduction of more people and animals along the trail could raise the likelihood of increasing contamination of the water supply. Construction of the trail would permit direct access at more locations along the canal and people and animals could introduce fecal contamination, pathogens and trash to the canal and adjacent areas. Although waste receptacles will help reduce the amount of human waste, fecal waste from horses and dogs is not always removed from trails. Parking areas adjacent to the canal could introduce organic chemicals (e.g. oil, fuel, antifreeze) through runoff and infiltration and increased canal access can increase the likelihood of vandalism and illegal dumping into the canal.

The city Water Utility is pursuing measures to address existing pollution including redirecting drainage from adjacent lands and educating land users to minimize pollution. Also, the Utility has made changes to the Boulder Reservoir intake system to be able to take water from the reservoir more often. Taking water from the Boulder Reservoir Basin instead of directly from the canal can allow pathogens or other contaminants to settle out or become diluted but introduces minerals and other contaminants that are difficult to remove, requires more chemicals to treat and requires pumping.

Other communities that have recreational trails along canals or drinking water sources have employed fencing, educational signs and safety measures to ensure that people and animals have no contact with the water and minimize pollution entering the water. Trail design and management approaches have the potential to reduce or prevent impacts to the water supply. Alternatives considered and the recommended approach for addressing the potential impacts to the water supply are outlined below in the next section.

B. Safety

The water running in the canal is cold and fast moving. There are underwater baffles which could create a safety hazard if a person or animal fell into the canal. The canal contains siphons to convey water under roadways, wetlands and other drainages. People or animals swept into a siphon could easily drown. Constructing a trail designed for recreational use including safety measures is a primary objective of this project.

Northern Colorado Water Conservancy District, the agency which manages the canal operations has outlined requirements for trail use which include: animals must be leashed; children under 16 must be accompanied by an adult; signs describing safety hazards and requirements must be installed and maintained at trailheads and dangerous areas and the trail must be regularly patrolled and regulations enforced. Specific safety features have been used in other canals and should be explored with NCWCD to assist someone that falls into the canal. Roadway crossings will need to be signed for both the safety of the trail visitors and to minimize impacts to road traffic.

Recommended mitigation measures for safety are described in detail in Section III, J. Safety. These include: educational signs, screening or fencing in dangerous areas, and hanging chains or ladders to help people get out of the water. Staff recommends that these safety measures be pursued and incorporated where feasible.

C. Wildlife Habitat and Vegetation

The Boulder County Parks and Open Space Department commissioned the Boulder Feeder Canal Resource Inventory and Report (Dec. 2002), prepared by Michael Figgs, LREP, Inc. that addresses three key issues surrounding the potential use of the Feeder Canal property for a recreational trail. This report is included in Attachment C. The issues include:

1. Identification of potential ecological conflicts and opportunities related to passive recreational trail uses along the corridor, with recommendations for mitigation and avoidance of potential adverse impacts.
2. Identification of resource management needs and opportunities.
3. Identification of specific sections of the canal that present management challenges.

Ecological Inventory

The report's Ecological Inventory identifies significant plant communities and species along the Boulder Feeder Canal that would be adversely impacted by development of a recreational trail within the existing canal corridor and also makes recommendations to minimize damage to native vegetation.

Ecological recommendations include:

1. Re-seed all areas disturbed during trail construction with competitive grass species. Small areas of native upland vegetation might be disturbed by new trail construction. In these areas, we recommend re-seeding with native plant species that grow on site.
2. Control noxious weeds. Control noxious weeds at trail construction reclamation sites, especially while seeded plant species are becoming established.
3. Mitigate for any loss of wetlands. Construction of a new trail may necessitate filling small areas of wetland, about 0.01 acre in aggregate. Where avoidance is not possible due to location of the wetlands in the narrow trail corridor, construction techniques that minimize impacts to wetland functions will be used. Mitigating any wetland loss will be pursued, perhaps by removing fill in upland areas and planting wetland species.

Winter Raptor Survey

The Winter Raptor Survey was conducted to document habitat use by winter raptors along the Boulder Feeder Canal, assess potential adverse impacts upon winter raptors by construction of a recreational trail along the Canal, and formulate recommendations for mitigation and/or avoidance of those potential adverse impacts.

Recommendations for winter raptor habitat include:

1. Segment Specific Recommendations: The report included a series of recommendations for each segment of the potential trail alignment.
2. Raptor mitigation: The report found “limited opportunities for site specific mitigation for winter raptors,” and concludes that “any mitigation will probably have little positive effect. It would be more effective to take most of that mitigation effort and put it into planning and maintenance of system-wide effective habitat for winter raptors as an element within the existing grassland management plan on both city and county Open Space.”
3. Require that trail visitors stay on trail in order to avoid adverse impacts on adjacent winter raptor habitat. Use appropriate education and enforcement measures.

Breeding Bird Survey

The breeding bird survey presents a general assessment of the breeding bird habitat along the Boulder Feeder Canal, assesses potential adverse impacts upon breeding birds by construction of a recreational trail along the canal and formulates recommendations for mitigation and/or avoidance of potential adverse impacts.

Recommendations include:

1. Monitor the study area for raptor nests during trail construction. Implement nest monitoring and seasonal closures as deemed appropriate, and as required by state and federal regulations.
2. System-wide habitat efforts: Continue planning and maintaining system-wide effective habitat for breeding raptors as an element within the existing grassland management plan on both city and county Open Space.
3. Require that trail visitors stay on trail in order to avoid adverse impacts on adjacent breeding bird habitat. Use appropriate education and enforcement measures.
4. Avoid the Cemex property, particularly along the Swede Ditch, because this area has some of the best riparian habitat for neo-tropical migrants in the entire study area.

Prebles Mouse Assessment

The proposed Boulder Feeder Canal project has the potential to affect both habitat and populations of the Prebles mouse, which is protected by the Endangered Species Act. An evaluation was conducted of the Boulder Feeder Canal corridor to determine if potential mouse habitat was within the corridor, and to assess if there might be potential effects to this habitat from the proposed project.

The Boulder Feeder Canal is a gravel-lined channel and does not have significant Preble's habitat patches on its banks. However, there are areas where the canal is intersected by small, natural drainages or small ditches, or where ditches with suitable habitat are in close proximity to the canal. In particular, the Swede Ditch in the northern half of the corridor has several segments with potential habitat.

Many of these habitat patches are small and isolated and would not require further consideration. There were a few areas where Preble's populations were possible, most notably: 1) the area just north of Hygiene Road, 2) the area near Foothills Reservoir, 3) potential Lykins Gulch trail crossings (marginal potential impacts, but connected to a larger drainage), 4) the area just east of Haystack Mountain. There may be additional areas near the Swede Ditch that could be affected, depending on the nature of the impacts.

Staff will work to determine if trapping surveys for the Prebles' Meadow Jumping Mouse may be needed and how to avoid and minimize impacts to potential habitat area. Recommended mitigation measures to minimize these impacts are described in Section III, A. Natural Areas and Features.

7. DESCRIPTION OF WATER QUALITY ALTERNATIVE(S) AND STAFF RECOMMENDATION

Three alternatives were considered providing a range of mitigation measures aimed at addressing potential impacts of the trail on the drinking water supply. They are:

Alternative A – Delay trail development until additional treatment facilities are implemented or a piped delivery system is constructed for the city’s drinking water.

Alternative B - Proceed with trail development in the near term including mitigation measures to reduce existing contaminants and to prevent future impacts to the water supply including prohibiting dog-walkers and equestrians from using the Boulder Feeder Canal Trail.

Mitigation measures include:

Trail Design / Facilities

- Design trail and parking lots to drain away from canal.
- Construct and maintain restroom and trash facilities.
- Separate visitors from water and away from dangerous areas (such as siphons), using distance, fencing or other types of screening.
- Coordinate trail design with existing efforts to redirect outfalls that presently flow into the canal.

Education

- Implement education programs and install signs to increase public awareness of water supply and appropriate behaviors to protect the water supply and keep visitors safe.

Monitoring

- Implement additional remote monitoring and field observation of water quality along the length of the canal to increase the warning time of potential contamination.

Source Selection

- Use the Boulder Reservoir Basin as primary intake for the Water Treatment Plant instead of primarily taking water directly from the canal.

Alternative C - Proceed with trail development in the near term including additional mitigation measures to reduce existing contaminants and prevent future impacts to the water supply. This alternative allows horses and leashed dogs and includes additional mitigation to address the potential impacts of domestic animals on the water supply.

In addition to the mitigation measures listed for Alternative B, additional mitigation measures include:

Trail Design / Facilities

- Construct limited fencing near certain trailheads to reduce the ability of dogs and horses to access the canal (see Attachment B for description of fencing locations).
- Construct and maintain dispensers for bags for dog excrement.

Education / Enforcement

- Require and enforce on-leash requirement for dogs (required by NCWCD if dogs are allowed).

Staff recommends proceeding with Alternative C because it is the best alternative for meeting the recreational needs of the project and includes a series of mitigation that address the potential impacts to drinking water quality.

Alternative A was considered based on the city Water Utility's standard source water protection practice of restricting uses that could increase risk to the water supply. Developing a trail and increasing the number of people in the area adjacent to the source water has the potential to increase risk to the water supply. The amount of additional risk due to trail use is difficult to quantify because of the various existing factors contributing to vulnerability and degradation of this water supply.

The potential to prevent new impacts and address some existing sources of pollution if mitigation measures are employed lead staff to determine that impacts to drinking water should not preclude trail development in the near term. Alternatives B and C provide options for developing a trail including essential mitigation measures to address potential new impacts to the water supply.

Alternative B was considered because it would restrict domestic animals from the trail and eliminate the potential for animals or their feces entering the water. This alternative represents a cautionary approach of initially restricting domestic animals at least for the first few seasons the trail is open to monitor water quality and effectiveness of mitigation efforts. Staff felt that the restricting domestic animals on the trail would be difficult to enforce as well as contentious with the public. It is a goal of the project that a regional trail of this length be open to as many visitors as possible, including those with leashed dogs and horses. Dogs are currently allowed on the trails near the Boulder Reservoir and these visitors would likely want to access the Boulder Feeder Canal Trail as well.

Alternative C was selected as the recommended approach because staff feels that the full series of mitigation, as well as the additional mitigation to keep animal waste away from the water will be effective at preventing impacts to the water. Designing the trail to prevent run-off into the canal, providing educational signs and dispensers for removal of dog waste and providing fencing in certain locations near trailheads to prevent animals from accessing the canal should minimize any increased risk to the water from domestic animals. Educating trail visitors about appropriate behavior and providing sanitary facilities should prevent new impacts from increased human presence.

An important component of this recommendation is to eliminate other existing sources of contamination entering the canal to offset any potential increase in risk due to introduction of additional people and domestic animals near the water supply. The threat to water quality posed by trail visitors, leashed dogs and horses is likely to be less than other threats such as stormwater runoff from existing grading and direct outfalls into the canal, and feces from wild animals and domesticated livestock. The recommended additional monitoring will provide information over time on the true impacts from the trail. If needed, restrictions on trail access by domestic animals or other restrictions may be considered depending on the impacts observed.

8. COSTS FOR MITIGATION MEASURES AND ON-GOING MAINTENANCE

The following table describes preliminary cost estimates for mitigation measures related to water quality protection and safety. Many of these measures are essential to address water related impacts but will also be required by NCWCD to address safety of trail visitors and trail management. Total capital costs for the trail will be developed as trail design occurs.

As the trail design and trailheads are determined, city and county staff will work to develop agreements on funding for capital costs and on-going management which will include staff from city Utilities, Parks and Recreation, Open Space and Mountain Parks and Boulder County.

Table 2 Preliminary Cost Estimates for Water Quality Mitigation

Mitigation	Description	Capital Costs	On-going Costs (annual)
Construct restroom facilities	Expanded Portolets	\$2,500-\$35,000 each	\$5,000-\$10,000
	Vault Restrooms	\$35,000-50,000 each	\$3,000-\$5,000
	Improve facilities at Coot Lake / Tom Watson	\$10,000	-
Construct fencing near certain trailheads	Fencing and related design or construction costs to ensure separation from trail and canal	\$35,000 - \$40,000 for entire length	
Provide signs and dispensers for dog waste	Sturdy signs for safety, water protection education and dispensing bags for dog waste should be located at all trailheads and road crossings where there is access to the trail.	\$10,000 - \$20,000 for entire length.	
Slope trail away from canal in trail construction	Will include drainage analysis and require additional drainage facilities.	Approximately \$20,000-30,000 for entire length.	
Additional patrol / ranger staffing	OSMP staff, Parks and Recreation, Utilities, and County Parks and Open Space Staff		Additional FTE needed will be determined depending on NCWCD requirement for patrol and agreement between agencies for staffing
Educational Programs	Responsibility to be determined; would include additional staff resources and time and may be shared between city and county depts.		Additional FTE needed will be determined, possibly shared with patrol/ranger staffing
Additional remote monitoring	Mechanisms and staff	\$10,000- \$50,000	\$1,000- \$5,000
Use of Boulder Reservoir Basin as primary intake for the WTP	Increased energy costs for pumping and changes to chemicals for treatment of basin water		\$75,000

9. PUBLIC INPUT TO DATE:

The Boulder Feeder Canal Trail has been on both the city and county comprehensive plans for decades. The public process for updating the Boulder Valley and Boulder County Comprehensive Plans Trails Maps have included numerous opportunities for public review and comment.

The Boulder Feeder Canal Trail was one of twelve regional trail connections considered by the Regional Trail Committee (RTC) during the selection of specific trails projects to be included in the 2001 ballot initiative for county-wide transportation funding. The Regional Trails Committee (RTC) consisted of representatives of Boulder County and all seven of the jurisdictions within the County. The RTC was formed to prioritize regional trails within Boulder County and to identify trail segments that should be funded with the 2001 Countywide Transportation Improvement Sales Tax (approximately \$4.0 Million dollars over seven years specifically earmarked for regional trail construction).

Development of the Regional Trails Plan included a series of four open houses that were held in 2003 to solicit public input on the prioritization process. The RTC used public input & prioritization criteria to make a recommendation on trail prioritization. The RTC recommended selecting the Boulder Feeder Canal Trail as one of five top priority trails. This was taken to the Open Space Board of Trustees, Boulder County Parks and Open Space Advisory Committee & the Board of County Commissioners for input and was approved by the County Commissioners in April 2003.

Public Process for the CEAP

On July 21, 2004, an open house was held to gather input from the public. Approximately twelve adjacent landowners attended as well as approximately ten others who were interested in development of this trail. Many people indicated support for a trail along the canal and described the current use of the maintenance road for recreational purposes. Concerns included: current and future conflicts between visitors and ranching operations, safety of the trail visitors (keeping people and animals out of the canal especially around the siphons where it is particularly dangerous), increased risk to the city's drinking water supply and impacts to neighborhoods from trailheads, parking and restroom facilities.

A public open house was held on Oct. 6, 2005 to gather input on the CEAP report and staff recommendations. Approximately 40 people attended the open house. Many of the attendees were adjacent or nearby property owners; some were interested potential trail visitors. Many of the people with property adjacent to the canal had questions and comments about the impacts of a trail to their property and neighborhood. Comments included: concern about where trailheads, parking areas and facilities would be located; impacts to livestock; increased human and animal presence; and losing the rural nature of the neighborhood. Comments have been received via email from members of the public who did not attend the open house. All public comment will be forwarded to advisory boards and decision-makers.

10. STAFF PROJECT MANAGER

The city’s overall project manager for the Boulder Feeder Canal Trail proposal is Jean Gatzaj. She may be contacted at 303.441.4907 or via email at gatzaj@ci.boulder.co.us

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Section II. Goals Assessment

1. Using the Boulder Valley Comprehensive Plan (BVCP) and department master plans, describe the primary city goals and benefits that the project will help to achieve.

The proposed trail will help to achieve multiple city and county goals by creating a new opportunity for outdoor recreation and a multi-use transportation connection while protecting natural features and resources.

Visitor use and trends evaluated in development of the Open Space and Mountain Parks Visitor Master Plan indicate that recreational trail use will continue to increase. The increase in trail use is not only due to greater numbers of people but also likely from more frequent visits. Trails provide a low-cost opportunity to enhance quality of life and contribute to the mental health of the county's citizens. Trails allow for chances to recreate, exercise and relieve stress, balancing lives with leisure activities.

The project implements the following BVCP and departmental master plan goals:

- a. Trails Facilities
- b. Transportation
- c. Water Quality Protection
- d. Environmental Protection

Trails Facilities

Development of the Boulder Feeder Canal Trail supports the Trails Facilities goals of the BVCP particularly policies 3.13 Trails Functions and Locations, 3.14 Trails Network.

“The city and county will coordinate with other trail providers and private landowners in trail system planning, construction, management and maintenance. Where compatible with environmental preservation goals and conservation easement agreements, trail connections will be developed to enhance the overall functioning of the trails network.” BVCP, Policy 3.14

The Boulder Feeder Canal Trail will provide a north –south connection between many city of Boulder trails around the Boulder Reservoir, Boulder County trails near Lyons and the St. Vrain Greenway Trail. Development of a trail in this location would provide a new, well-designed, multi-use trail in an area where unauthorized recreational use has been occurring for a long time. The proposed trail will improve safety and make critical connections that provide greater variety of trail options than the existing trail system currently provides, especially for those seeking longer-distance travel by an off-street trail.

Transportation

Development of the Boulder Feeder Canal Trail supports Transportation goals of the BVCP particularly policies 6.01 All-mode Transportation System and 6.03

System Completion.

“The city and county shall work together to develop a balanced transportation system including completed networks for each mode and safe and convenient connections between modes.” BVCP Policy 6.01

The Boulder Feeder Canal Trail will provide an off-street connection between Lyons and the northern Boulder area that may serve commuters or others seeking a regional alternate mode connection.

Drinking Water Protection

There may be impacts to the drinking water supply from increased recreational uses along the canal. Including mitigation measures in trail design and management to prevent water quality impacts due to the trail and addressing existing sources of contamination support the water quality goals of the BVCP, particularly Section 4.19 Protection of Water Quality, 4.20 Water Resource Planning, and 4.21 Drinking Water Protection. Provision of safe drinking water and protection of water supplies is not only a goal of BVCP but is required by federal and state law.

“The city and county shall protect the quality of its water sources and shall meet all Colorado primary drinking water standards and source water protection requirements.” BVCP Policy 4.21

Environmental Protection

The BVCP stipulates that the environment is a critical asset to be preserved and supports policies, programs and projects that ensure a sustainable environment. (BVCP Policy 4.06 Natural Ecosystems) The Boulder Feeder Canal Resource Inventory and Report (2002) evaluated the environmental resources in the area along and adjacent to the proposed trail location. The recommendations for addressing impacts to habitat, vegetation and wetlands contained in that report and this CEAP report aim to appropriately mitigate any negative impacts as well as improve the environmental condition where feasible. Specific improvements will include removing noxious weeds, planting native vegetation and maintaining large blocks of habitat in the area.

Locating an important north-south regional connection in this location will preserve sensitive habitat in other locations that might have been considered for locating a north-south trail connection. Other city and county open space properties closer to the foothills have significant environmental constraints for trail development. The Boulder Feeder Canal provides a previously disturbed area with existing significant human and vehicle access, limited wildlife habitat and no significant plant and animal native species. Also, other potential north-south trail alignments have significant acquisition issues that could make them impossible to implement.

Community Design, Economy, Housing, Social Concerns and Human Services

The project is unlikely to have significant direct or indirect effects on these goals.

2. What are the trade-offs among city policies and goals in the proposed project alternative?

The benefit of developing a new regional trail includes potential trade-offs related to

- a. Water quality protection
- b. Habitat protection
- c. Funding for trail management and impacts

For many years, progress on developing this trail was delayed due to the need to create a process that could address the potential impacts on the city's drinking water. It is the city water utility's operating practice not to recommend changes in land uses adjacent to drinking water supply facilities that could increase contamination and additional pathogens to the water supplies, absent sufficient mitigation actions and monitoring. The impact of a trail on this drinking water supply is not fully known. We feel the recommended mitigation measures should maintain or improve conditions, but if there are additional impacts, other steps may need to be taken to ensure that drinking water quality is not compromised.

There will be increased human presence in areas where there are existing winter raptors and breeding birds which may have an impact on the viability of the habitat for these species. Recommended mitigation includes additional monitoring and continued planning and maintenance for system-wide effective habitat protection including areas without trails on city and county lands.

Tradeoffs in funding priorities may be incurred as development of this trail progresses. Funding for long term operating or management costs may require budget trade-offs or development of inter-departmental cost sharing options.

3. Is this project referenced in a master plan? If so, what is the context in terms of goals, objectives, larger system plans, etc.?

A trail along the canal has been included in the Boulder County Comprehensive Plan and on the Boulder Valley Trails Map since 1978. This trail is planned to serve as a connection between three Boulder County Open Space properties west of Lyons, Boulder, and the residential communities along the Diagonal Highway south of Longmont, such as Niwot and Gunbarrel. The section of trail north of Hygiene Road will coincide with the western alignment of the St. Vrain Regional Trail and will serve as a western connection between the St. Vrain Trail and Boulder.

The Boulder Feeder Canal trail is listed as a priority trail in the Open Space and Mountain Parks Visitor Master Plan (2005). The 2004 OSMP Trails Assessment and Prioritization Report ranks the Boulder Feeder Canal Trail as number 1 out of 45 suggested new trails. This was based on use levels (anticipated level of attraction) and environmental impacts (level of ecological sensitivity).

The Open Space and Mountain Parks North Boulder Valley Management Plan (1997) recommends "working with the Northern Colorado Water Conservancy District,

Boulder County Parks and Open Space and other City of Boulder departments to explore creating a trail corridor along the Boulder Feeder Canal. This trail corridor could provide a long distance trail to Lyons and other public lands north and west of Open Space (Heil and Hall Ranches).”

The Boulder Feeder Canal Trail is part of the Colorado Front Range Trail (CFRT) project that has been developed by Colorado State Parks and Great Outdoors Colorado in partnership with local governments. The trail would connect Ft. Collins with Trinidad. Completion of the Boulder Feeder Canal Trail connection, along with two additional trail segments connecting the St. Vrain Trail with Rabbit Mountain Open Space and Larimer County and the Boulder Reservoir Trail with South 63rd Street, will complete the CFRT alignment through Boulder County.

4. Will this project be in conflict with the goals or policies in any departmental master plan?

Drinking Water Protection

Increasing access to areas adjacent to a drinking water supply is in conflict with the standard practices of the city water utility to reduce or eliminate sources of potential water contamination from water supply areas as much as possible. It is also counter to the current trend within the drinking water industry to increase source water protection as an important component of efforts to meet tightened drinking water treatment standards. The utility is required to provide a safe and reliable drinking water supply by federal and state statutes and by internal city policies. Source water protection, in addition to water treatment processes within the water treatment plant, is an essential component of providing safe drinking water.

Various reports, including the Heath and Safety Report by Brown and Caldwell, commissioned for this CEAP, indicate that that development of a trail along the Boulder Feeder Canal would increase potential risks to the city’s drinking water. The staff recommendations for proceeding with trail development include that the trail must be designed and managed with mitigation measures to protect drinking water quality in order to not be in conflict with goals and policies in the Treated Water Master Plan, Raw Water Master Plan and water quality protection goals in the BVCP.

Because we will not know the true impacts of the trail on the drinking water supply until the trail is in place, this CEAP analysis includes outlining an adaptive management approach for ongoing monitoring of water quality as well as communication and decision-making procedures for continuing mitigation.

Environmental Impacts

Another issue is the effect of trail use on wintering raptors and breeding birds. There may be some effect on wintering raptors and breeding birds, but this is minimized by building the trail within an area already disturbed by ditch and recreation activity and should be offset by preserving larger habitat areas. This larger habitat approach is consistent with the Open Space and Mountain Parks Visitor Master Plan.

5. List other city projects in the area that are listed in a departmental master plan or the CIP (or County Plans)?

The Boulder County On-Street Bikeways Plan (Sept. 2004) identifies critical bicycle links that should be improved to accommodate bicycle use. Two of these routes (Nelson Road and Niwot Road) bisect the potential alignment for the Boulder Feeder Canal Trail and one (63rd Street) parallels the proposed trail. (See Attachment A for map of area). Boulder County is planning to complete shoulder improvements along all three of these facilities by the end of 2008.

A trail connection is proposed from Gunbarrel to Boulder Reservoir via IBM (under the Diagonal Highway) to Tom Watson Park. There are issues related to access, underpasses, wetlands and prairie dogs habitat that will need to be addressed prior to trail development.

A project feasibility study for constructing a pipeline to deliver water from Carter Lake is in progress and should be completed by early 2006 and will be evaluated for further consideration.

6. How will the project exceed city, state or federal standards and regulations?

Trail Development – The trail would be a multi-use (pedestrians and bikes), soft-surface path built to either city or county trail standards. Intersection crossings will be signed and striped as warranted by city OSMP and /or county traffic engineering standards that meet or exceed federal standards.

Water Quality – The Water Utility will continue to provide a safe and reliable drinking water supply as required by federal and state statutes and by internal city policies. The measures recommended in this report will contribute to protection of the drinking water supply by preventing or mitigating new impacts and addressing some existing sources of pollution.

ADA Access - The project will be designed for trail development as specified by current state, federal and local access standards.

Wetlands - The project will meet the requirements for wetland mitigation for unavoidable impacts from the culvert installation and trail construction. All necessary permits including floodplain and wetland permits will be obtained for the project.

Stormwater – Construction projects which disturb over 1 acre are required to obtain a Stormwater Construction Discharge Permit from the State's Water Quality Control Division. This permit will be prepared and submitted in next phase of project approval.

Section III Checklist Questions, Impacts and Recommended Mitigation

Checklist

- + Positive effect
 - Negative effect
 0 No effect

Boulder Feeder Canal Trail	Development of a Trail along the Canal
A. Natural Areas or Features	
1. Disturbance to species, communities, habitat, or ecosystems due to:	
a. Construction activities	-
b. Vegetation removal	0
c. Human or domestic animal encroachment	-
d. Chemicals (including petroleum products, fertilizers, pesticides, herbicides)	0
e. Behavioral displacement of wildlife species (due to noise from use activities)	-
f. Introduction of non-native plant species in the site landscaping	0
g. Changes to groundwater or surface runoff	0
h. Discharge of sediment to any body of water	0
i. Wind erosion	0
2. Loss of mature trees or significant plants?	0
B. Riparian Areas/Floodplains	
1. Encroachment upon the 100-year, conveyance or high hazard flood zones?	0
2. Disturbance to or fragmentation of a riparian corridor?	0

C. Wetlands	
1. Disturbance to or loss of a wetland on site?	-
D. Geology and Soils	
1. a. Impacts to unique geologic or physical features?	0
b. Geologic development constraints?	0
c. Substantial changes in topography?	0
d. Changes in soil or fill material on the site?	0
E. Water Quality (Define as groundwater or Creeks – impact to drinking water source described in Section III Recommendations for Drinking Water Protection and Trail Construction.)	
1. Impacts to water quality from any of the following?	
a. Excavation	0
b. Change in hardscape	-
c. Change in site ground features	0
d. Change in storm drainage	0
e. Change in vegetation	0
f. Change in pedestrian and vehicle traffic	-
g. Use or storage of chemicals	-
2. Exposure of groundwater contamination from excavation or pumping?	0
F. Air Quality	
1. Short or long term impacts to air quality (CO2 emissions, pollutants)?	
a. From mobile sources?	0
b. From stationary sources?	0
G. Resource Conservation	
1. Changes in water use?	0
2. Increases in energy use?	0
3. Generation of excess waste?	0

H. Cultural/Historic Resources	
1. a. Impacts to a prehistoric or archaeological site?	0
b. Impacts to a building or structure over fifty years of age?	0
c. Impacts to a historic feature of the site?	0
d. Impacts to significant agricultural land?	0*
<i>*There may be impacts to adjacent agricultural land uses. See description in section "N. Other Impacts" below.</i>	
I. Visual Quality	
1. a. Effects on scenic vistas or public views?	+
b. Effects on the aesthetics of a site open to public view?	+*
c. Effects on views to unique geologic or physical features?	+
<i>*There may be aesthetic impacts to adjacent property owners. See description in section "N. Other Impacts" below.</i>	
J. Safety	
1. Health hazards, odors, or radon?	0
2. Site hazards?	-
3. Visitor Safety?	-/+
K. Physiological Well-being	
1. Exposure to excessive noise?	0
2. Excessive light or glare?	0
3. Increase in vibrations?	0
L. Services	
1. Additional need for:	
a. Water or sanitary sewer services?	-
b. Storm sewer/Flood control features?	0
c. Maintenance of pipes, culverts and manholes?	0
d. Police services?	-
e. Fire protection services?	-
f. Recreation or parks facilities?	-
g. Library services?	0
h. Transportation improvements/traffic mitigation?	+ / -

i. Parking?	-
j. Affordable housing?	0
k. Open space/urban open land?	+
l. Power or energy use?	0
m. Telecommunications?	0
n. Health care/social services?	0
M. Special Populations	
1. Effects on:	
a. Persons with disabilities?	0
b. Senior population?	0
c. Children?	0
d. Restricted income persons?	0
N. Other	
1. Effects on:	
a. Neighboring agricultural properties?	-
b. Neighboring residential properties?	+/-

City of Boulder

Community and Environmental Assessment Process

Checklist Questions

A. Natural Areas and Features

1. Disturbance to Species, Communities, Habitat, or Ecosystems Due to:

a. Construction Activities

Disturbance to species, communities, habitat or eco-systems during trail construction is anticipated to be minimal since most of the trail will likely be within the fenced canal Right-of-way in previously disturbed areas. Construction of the Lefthand Creek crossing will require some construction activity to take place in the riparian area, however, disturbance will be minimal, especially compared to current impacts of low-water crossing.



Left-Hand Creek – Low-Water Crossing

b. Vegetation Removal

The 2003 “Boulder Feeder Canal Resource Inventory and Report” (Resource Inventory) found the “vast majority” of the corridor contained no native plant species. Areas that did contain these species are identified in the report and will be considered during trail design and construction. No rare plants were observed along the corridor and several species of noxious weeds were identified.

All areas disturbed by trail construction will be revegetated using seed mix approved by either the County Parks and Open Space or the City Open Space and Mountain Parks. Existing patches of prairie cordgrass (*Spartina pectinata*) should be used to propagate along the corridor. The seed mix should be aggressive enough for establishment. City and county staff will work with NCWCD to control noxious weeds using integrated pest management strategies that minimize or eliminate herbicides while seeded plants are becoming established.

c. Human or domestic animal encroachment

Trails are vectors for weeds spread by recreational activity such as hikers, dogs or horses transporting seeds, disturbance of ground and natural forces such as wind. The trail's alignment is already highly disturbed from canal construction and maintenance and revegetation of the trail corridor may improve current condition.

d. Chemicals (including petroleum products, fertilizers, pesticides, herbicides)

Some chemical use currently exists in the canal corridor. Herbicides are applied periodically by the Northern Colorado Water Conservancy District (NCWCD) during the spring-to-fall irrigation season. The city Water Utility and NCWCD have agreed to some modifications of this operation for 2005 to increase protection of the drinking water supply.

The Water Utility will continue to work with NCWCD to reduce chemical use, modeling on the existing city-county protocol for management of noxious weeds on the Caribou Ranch Open Space. Chemicals associated with trail maintenance will be addressed in coordination with NCWCD's practices to meet water protection criteria and avoid over-application.

Possible new chemical impacts associated with trail maintenance may include fertilizers, herbicides and other vegetation management chemicals, as well as gasoline and oil for maintenance vehicles. Wastes from public toilets and trash facilities will be transported periodically during maintenance activities. Impact from all of these sources can be minimized through appropriate maintenance operation procedures.

e. Behavioral displacement of wildlife species (due to noise or human and animal presence.)

Wintering Raptors

The Resource Report identifies sections of the canal corridor as current high quality habitat for wintering raptors and indicates potential adverse impacts from trail construction and use. Given the length of the canal, and a 400 meter wide band of disturbance along the length of the canal, the potential adverse impacts include approximately 3.0 square miles of winter raptor habitat. A discount factor should be included for areas within subdivisions and rural development; the precise amount of area has not been determined, but the net result is probably still in the range of 2.0 – 2.5 square miles of potential disturbed habitat.

The report presents options for alternative routes for trail development that could reduce impacts to winter raptor habitat. The feasibility of these will be explored in the next steps of trail planning. The effectiveness of alternate routes would be dependent on the ability to close the canal maintenance road to recreation use and would require strict enforcement of the closure on the canal maintenance road; otherwise there will be two trails with additional impacts upon winter raptor habitat. The study concludes that if recreational use of the canal maintenance road has likely impacted raptor

habitat and if this continues, not building the trail will not prevent future adverse impacts.

Recommendations and mitigation measures for winter raptor habitat include:

- Due to limited opportunities for site specific mitigation for winter raptors and the limited positive effect, it would be more effective to concentrate on planning and maintenance of system-wide effective habitat for winter raptors as an element within the existing Grassland Management Plan on both city and county Open Space. Habitat conservation areas should include large blocks of un-fragmented habitat.
- Require trail visitors to stay on the trail in order to avoid adverse impacts on adjacent habitat by using appropriate education and enforcement measures.

Breeding Birds

The Resource Inventory Report identifies breeding bird habitat along the canal, specifically findings of various neotropical migrants, grassland breeders, raptors and species of concern. The primary concern for breeding birds is that the canal is within 200 meters of four Red-tailed Hawk nests on the Cemex property, two nests on the Caribou Springs Ranch property, one nest site near the Hygiene Hogback, and one site south of Nelson Road. If the canal is not used as a trail corridor on the Cemex property, adverse impacts to these nest sites could be avoided. Avoidance or mitigation of adverse impacts to the other nest sites may not be feasible, since these sites are on private property adjacent to the canal and re-routing of the trail would probably not be feasible.

The Resource Study predicts minimal impacts to breeding birds other than raptors with nests near the canal since the canal right-of-way is currently altered habitat. Conversely, if trail visitors move off trail, particularly into adjacent wetland and riparian areas near the canal, there could be locally significant adverse impacts.

The Resource Study recommends several potential mitigation measures along each section of potential trail for protection of breeding birds. These recommendations will need to be considered during trail planning and design. Trail wide recommendations include:

1. Incorporate effective system-wide breeding bird habitat planning into future updates of the city and county grassland management plan. Habitat conservation areas should include large blocks of unfragmented habitat.
2. Require all trail visitors to stay on trail to avoid adverse impacts on adjacent winter raptor habitat. Use appropriate education and enforcement measures.
3. Monitor the area for nests and use seasonal closures as appropriate. Implement seasonal closures as deemed appropriate and as required by state and federal regulations.
4. Avoid building the trail adjacent to the canal through the Cemex property due to some of the best riparian habitat for neotropical migrants in the entire study area.

Prebles' Meadow Jumping Mouse

The Boulder Feeder Canal is a gravel-lined channel and does not have significant Prebles's habitat patches on its banks. However, there are areas where the canal is intersected by small, natural drainages or small ditches, or where ditches with suitable habitat are in close proximity to the canal. There are four locations where the canal intersects Mouse Conservation Zones (as submitted as part of the city and county's draft Habitat Conservation Plan). These include:

- Along the Swede Ditch parallel to the canal,
- At Hygiene Road north of the conservation easement on Caribou Springs PUD,
- Lykins Gulch crossing of the canal, and
- North of Hygiene Road where an unnamed tributary crosses over the canal. This site is in a portion of the Caribou Springs PUD conservation easement.

Construction of a new trail or service to the existing maintenance road may affect these potential habitat areas. If so, trapping surveys would be needed to determine presence or absence of the mouse in the most likely potential habitat. If the mouse was found, or if suitable mouse habitat is confirmed on the ground, disturbance of habitat would require obtaining a Section 10 limited take permit from the US Fish and Wildlife Service until such time as the city and county have their habitat conservation plan, currently in draft form, approved by the Service. It is recommended that staff work with project biologists to determine the need and location of live-trapping surveys, and work to avoid and minimize impacts to potential habitat areas.

A determination regarding the necessity for trapping rests with the USFWS, which issued a determination letter on September 9, 2003 that listed the types of activities that will and will not require additional review by them. However, the Boulder County Land Use Department has been referring development proposals within the seven conservation zones to USFWS since the mouse was listed. In most cases, USFWS has issued written findings of "no adverse impacts" for those activities without requiring trapping based on their analyses of information and photographs submitted to them that described the project, the current on and-off site land use conditions, and proximity of the project to potentially affected habitat areas. This site-by-site approach may be acceptable and appropriate for the trail proposal given the isolated and discontinuous nature of the sites that have been designated as Mouse Management Areas. A consultation with USFWS about options should be initiated if the trail plan is approved.

Prairie Dogs

NCWCD actively controls prairie dogs in the canal right-of-way to minimize potential impacts to the canal. The city and county would defer to NCWCD for prairie dog management measures in these areas. For trailheads constructed and maintained by the city, the city will attempt to site and construct trailheads where there are no prairie dogs. If prairie dogs pose a conflict post-construction, the city will follow its own policies and protocol for management or removal. Similarly the

county would follow existing protocol for removal or control of prairie dogs within their jurisdiction.

f. Introduction of non-native plant species in the site landscaping – see above A.1.b.

g. Changes to groundwater or surface runoff –

The Water Utility is currently conducting a preliminary assessment in conjunction with the NCWCD to determine the feasibility of addressing the most problematic areas that drain into the canal prior to trail construction. The feasibility of changing drainage will continue to be explored during trail design to determine if it will be possible to reconstruct some of these outfalls to drain into adjacent land or across the canal. This includes identifying appropriate solutions to where the run-off will go. Each site will have to be assessed to determine feasible options for rerouting the runoff. In some cases no acceptable option may be found.

h. Discharge of sediment to any body of water – There may be changes to existing stormwater drainage as part of trail development but it is not anticipated to impact species, communities, habitat or ecosystems. Changes to drainages are only anticipated for run-off or drainage into the canal, no other bodies of water. These changes would be designed to improve the quality of the run-off and will be further addressed in the environmental review.

i. Wind erosion – No Impacts

2. Loss of mature trees or significant plants? None

B. Riparian Areas and Floodplains

There may be impacts to riparian areas along Left Hand Creek and Swede Ditch. Construction of the Lefthand Creek crossing will require some construction activity to take place in the riparian area; however, disturbance will be minimal, especially compared to current impacts of low-water crossing. Trail design will incorporate best management practices and other mitigation if necessary. A bridge crossing at Left Hand Creek should address both impacts to the riparian area and potential safety issues.

C. Wetlands

The 2003 Resource Study found several areas of wetlands and riparian areas along the canal corridor. According to the study, most would be undisturbed by construction of a new trail on the western side of the Canal, however a new trail would impact three wetland areas, with a total surface area of about 0.01 acre. Where avoidance is not possible due to the location of the wetlands in the narrow trail corridor, construction techniques that minimize impacts to wetland functions will be used. In addition, wetland best management practices as outlined in the City of Boulder Wetland Best Management Practices Manual will be followed during trail construction.

Wetland disturbance may include 250 square feet of cattail wetland at mile marker 9.12 that would be impacted by construction of a trail. This area presents the best opportunities for mitigating unavoidable impacts through the removal of existing fill in upland areas and planting of wetland species. It is recommended that such mitigation be incorporated into the trail design.

D. Geology and Soils

The project will not impact any geologic or physical features. This area was previously impacted due to canal construction, except in the areas of Caribou Ranch and the Cemex where the trail alignment would be outside the canal ROW.

The soils along the canal are typically derived from shale and have high clay concentration. This makes the soils very slippery and muddy when wet. The soils have significant shrink-swell potential in many locations. The nature of the soils is a design consideration for trail construction. The new trail should be comparable in quality and durability to the existing maintenance road in order to encourage the public to use the new trail rather than the existing maintenance road. (2003 Resource Report)

E. Water Quality (*This section addresses groundwater, creeks, lakes, and ponds – Drinking water quality is addressed Attachment B, Water Quality Analysis.*)

Impacts to water quality could occur during trail construction. However utilizing appropriate erosion control measures and revegetation to stabilize work surfaces after construction can minimize impacts. Changes in pervious surface area and/or slope and drainage ways may change local stormwater flow patterns. Addressing any short or long term changes in localized flow, which may result from the trail construction during the trail design phase can minimize adverse impacts to adjacent water bodies. No long term significant adverse impact is anticipated. Areas where current bank stabilization is needed may result in an overall decreased sediment load.

Trash, debris, animal waste and other human-caused pollutants associated with recreational use have the potential to impact water quality in the vicinity of the trail. Appropriate control measures such as trail visitor education, trail use regulations, providing refuse disposal containers, and routine trail maintenance can minimize impacts from this source.

Possible impacts associated with trail maintenance may include fertilizers, herbicides and other vegetation management chemicals, as well as gasoline and oil for maintenance vehicles. Impact from all of these sources can be minimized through appropriate maintenance operation procedures.

F. Air Quality

Impact on Air Quality is negligible. The project may improve air quality if trail is used by commuters to decrease impact of auto use.

G. Resource Conservation

The project will not use water or energy, or generate waste. Initially, plantings will need to be watered to ensure establishment and survival. Native plantings will be selected based on the water requirements of the plant and conditions.

H. Cultural/Historic Resources

The area has low potential for prehistoric archaeology. No structures will be impacted. The area for trail construction would have been disturbed when the canal was constructed. The areas of the CEMEX property would have been previously disturbed due to limestone mining. In areas where the trail would be outside the canal right-of-way, further analysis may be necessary. The environs around Haystack and Table Mountains are designated as Archaeologically Sensitive Areas in the Boulder County Comprehensive Plan. Any possible finds will call for a cessation of activities until the finds can be examined by a qualified archaeologist.

The project would not remove any existing agricultural lands; however increased human activity adjacent to existing ranching operations may create impacts to the existing uses. See description of ‘impacts to neighboring properties’ in Section N. below.

I. Visual Quality

The trail will provide outstanding views. There will likely be impacts to some residents in close proximity to the canal which will be addressed in the next phases of trail design. Additional fencing or landscaping may be needed to screen the trail from existing residential properties. See description of ‘impacts to neighboring properties in Section N. below.

J. Safety (*This section addresses safety of trail visitors. Drinking water safety is addressed Attachment B, Water Quality Analysis.*)

The water running in the canal is cold and fast moving. There are underwater baffles which could create a safety hazard if a person or animal fell into the canal. There have been incidents of dogs and other animals perishing in the canal. NCWCD’s policies outlining requirements for trail use include a requirement for animals to be leashed and children under 16 to be accompanied by an adult. Signs describing these safety hazards and requirements should be installed and maintained at trailheads.

The Boulder Feeder Canal contains at least 60 pipes along its entire extent, ranging from 6 inches to 24 inches in diameter. The tops of the pipes lie at grade; therefore, people hiking along the canal could be tempted to walk across these pipes from one side of the canal to the other. The pipes present a potential safety hazard because it would be easy for people to slip or fall into the canal while traversing them.

The canal contains four siphons to convey canal water under roadways, wetlands and other drainages where the canal does not have any surface easements. The siphons are well signed as dangerous to people. In addition, each siphon has a series of installed chains running across the canal, hanging from an overhead cable down to the bottom of the canal that adults in the canal could possibly grab and avoid being swept into the

siphon. Children would probably not be able to grasp and hold the chains and thereby prevent themselves from being swept into the siphons. People who are swept into a siphon could easily drown, even though they might spend less than a minute submerged while being swept through the siphon. Safety features that should be explored with NCWCD to assist someone that falls into the canal, such as hanging chains to grab or racks that could catch someone and keep them above water for rescue. Examples include ladders or check structures to close sections in case of emergency.

The trail will cross seven public roads between Boulder Reservoir and Hwy 66. Crossings will likely include both at-grade and grade-separated depending on roadway traffic, site distance, and other topographical or geographical constraints. Roadway crossings will be designed to meet all state and national standards for pedestrian and bicycle crossings. Speed limits on the public roads may need to be adjusted.

It is expected that provision of a trail specifically designed for recreational use will address safety issues and will help keep trail visitors away from NCWCD maintenance and operations.

K. Physiological Well-being

Trail use will enhance physiological well being by providing an outdoor recreational opportunity and alternative transportation options. Excessive noise during trail construction or operations, above and beyond that required for typical trail construction is not anticipated. Some heavy equipment operations are likely during construction, but will be limited to weekdays during daylight hours.

There may be increases in noise due to trail use, especially if the trail is used for special events.

L. Services

Additional need for:

a. Water or sanitary sewer services?

There will be a need for new restroom (portolet or vault) facilities for trail visitors, trash facilities and a system for maintaining these. The facilities will not be connected with the city's wastewater treatment plant or city water lines. (See Attachment B, recommendations for potential locations of new restroom facilities.) The increased need for water utility staff for monitoring is described in Attachment B.

b. Storm sewer / Flood control features? No impact.

c. Maintenance of pipes, culverts and manholes? No impact.

d. Police services?

There will be an incremental need for ranger patrol and enforcement that will be assumed by the city Open Space and Mountain Parks, Parks and Recreation and the county Parks and Open Space rangers that will be determined as trail planning and approval proceeds.

e. Fire protection services?

There will be a limited incremental need for rescue, response to medical or trauma incidents. There are safety hazards particular to the water infrastructure along this trail. Coordination with both the city Fire Department and the respective Volunteer Fire Protection Districts is recommended.

f. Recreation or parks facilities?

The trail will provide a new facility adjacent to existing parks trails. No new parks facilities will be required; however there may be impacts to existing city parks facilities use. There is likely to be a potential increase in visitors and impacts to the Coot Lake Wetlands, Tom Watson Park and the south shore of the Boulder Reservoir if one or both of these areas becomes the “de-facto” southern terminus of this trail. A comprehensive plan for visitor management (education and enforcement) for the entire trail corridor should be developed and include the lands managed by the Parks and Recreation Department, OSMP, city Utilities and Boulder County. This could be accomplished either through MOU’s or contractual agreements with other agencies/departments.

g. Library services? No impact.

h. Transportation improvements / traffic mitigation?

The trail will provide new north – south regional connection between the Boulder Reservoir trails, Lyons and the St. Vrain Trail. There may be an increased use of the road crossing at Coot Lake / Tom Watson Park, which is currently a hazardous crossing for pedestrians and bicyclists.

i. Parking ?

Trailheads and associated parking lots to provide multi-modal access to the Feeder Canal Trail will be necessary to accommodate anticipated visitors. Potential trailhead locations will be considered at Niwot, Nelson and Hygiene Roads if land can be accessed and other impacts addressed. Access is also possible from existing trailheads within the Boulder Reservoir trail system and from possible future trailheads on the St. Vrain Greenway Trail.

k. Open Space or Urban Open Lands?

The Boulder Feeder Trail is the preferred alternative to other north/south trail alignment on open space. If the trail is able to be located within the canal right-of-way impacts to Open Space land will be minimal.

M. Special Populations

The Boulder Feeder Canal Trail will be designed to achieve the lowest feasible slope and to meet ADA requirements to ensure adequate use and participation in the trail system by persons with disabilities, seniors, and children accompanied by adults. The potential for an ADA trail from the proposed Feeder Canal Trail to the existing Coot lake

ADA/Interpretive Trail does exist. A formal trail design assessment and cost analysis would need to be completed to determine the feasibility of this option.

N. Other – Impacts to Adjacent Properties or Uses

There are several ranching operations adjacent to the canal. Reports from property owners in these areas indicate that existing use of the trail for recreation or maintenance activities has impacted these uses. In the next phase of trail design, staff will work with these property owners to develop mitigation options to address the impacts and decrease trail visitors impact to the ranching uses. This may include fences, signs or other mitigation measures.

There are several areas where the trail would be developed in close proximity to residential properties and homes. In the next phase of trail design, staff will work with these property owners to develop mitigation options to address potential impacts. These may include landscape buffering or fencing. Development of a trail will also benefit nearby residential property owners by providing a new safe trail.