Twin Lakes Stakeholder Group
May 19, 2016 – 4 pm to 7 pm
Agenda
***Location:** Boulder Rural Fire Protection - 6230 Lookout Road*

4:00 pm **Welcome and Introductions**

4:05 pm **Group Questions for Staff (Continued from Previous Meeting)**

5:15 pm **Break**

5:25 pm **Hydrology at Twin Lakes**
- City staff information and perspectives
- County staff information and perspectives
- TLAG contractor information and perspectives

6:15 pm **Hydrology Discussion and Question/Answers**

6:45 pm **Next Steps**
- Does this group want to meet again?
- If so, what's the agenda for the next meeting?

7:00 pm **Adjourn**

STAKEHOLDER INTERESTS AT TWIN LAKES
- Meet housing needs.
- Provide affordable housing needs for workers of BVSD and other entities.
- Utilize land that is near existing infrastructure and jobs.
- Plan both sites of Twin Lakes together.
- Create program synergies between BVSD and BCHA.
- Create broad community support.
- Protect the environment and wildlife.
- Develop neighborhood amenities.
- Develop property to meet community interests and needs.
- Retain teachers and other employees throughout the County.
- Develop a vision and plan for Gunbarrel.
- Avoid setting regrettable legal precedents.
- Be able to offer permanent affordable housing as a recruitment tool for new teachers.
- Protect the rural-residential feel of the neighborhoods and surrounding lands.
- Collaborate on the creation of information and entire discussion.
- Base decisions in facts and science.
- Allow for a transparent process and open discussions.
- Allow all parties to remain up-to-date and informed on the progress of the process.
- Protect homes that already exist.
- Ensure ability to maintain infrastructure.
- Preserve agricultural lands.
- Move the process along at an appropriate pace.
- Learn from and improve on past projects.

Recommendations Regarding the Proposal Submitted by Martinez Associates

May 3, 2016

To: Three Party Facilitation Members (TLSG)

In response to the facilitated negotiation on April 24th, 2016, TLAG had an action to make comments and recommendations based on the Request for Proposal for Geotechnical and Hydrological Investigation #6426-16, we present the following recommendations:

As both land use requests 35 and 36 were both moved forward, all studies should be conducted with an equal objectivity regarding land use suitability for housing construction and sustaining wetlands / open space. The following should be included in the scope of work:

- More monitoring wells are needed to properly characterize groundwater conditions. 12-20 for the combined properties.

- Wells should be monitored monthly, for a full year minimum. Water level should be compared to precipitation and snowfall, and to water levels in the ditches located near Twin Lakes. If possible, monthly monitoring beyond one year and especially through the irrigation season of year two would provide a more comprehensive data set that could provide a more realistic characterization of the groundwater under the properties

- On-site slug tests should be conducted on wells that are representative of differing soil types and alluvial aquifer thickness conditions across the sites.

- All boreholes should be continuously sampled to bedrock with extracted soils described by a qualified geologist/engineer. Subsets of the borehole soils that are representative of larger intervals should be submitted for geotechnical testing.

- Samples should be collected from soils representative of shallow (0-4 ft) and deeper (approx. 5-10ft) intervals from each borehole, and at least 2 sample locations should be from the clay-rich (Longmont clay; LoB) soil present across the middle of the BVHA property. Soils near and above the water table should receive the most testing.

- The soil tests recommended in the GroundEngineering and CTL Thompson are an appropriate minimum set of geotechnical tests.

- The reports should include at a minimum a description of field and laboratory procedures used, a map of sampling locations, summary tables of data and results, logs of borehole soils identified at each site, well completion diagrams for each well, hydrographs for each well of water levels over time and maps of the water table surface for each measurement period, a discussion of how soils vary in key properties across the site and how groundwater levels varying over time and by location, a discussion of how the different shallow soils will be affected by building loads for each likely foundation type, and a

TWIN LAKES STAKEHOLDERS GROUP MEETING

MAY 19, 2016

TWIN LAKES ACTION GROUP

Charter

To protect the zoned rural-residential *look and feel* of our neighborhoods, and adjacent land.

Is ANY development appropriate on these parcels?

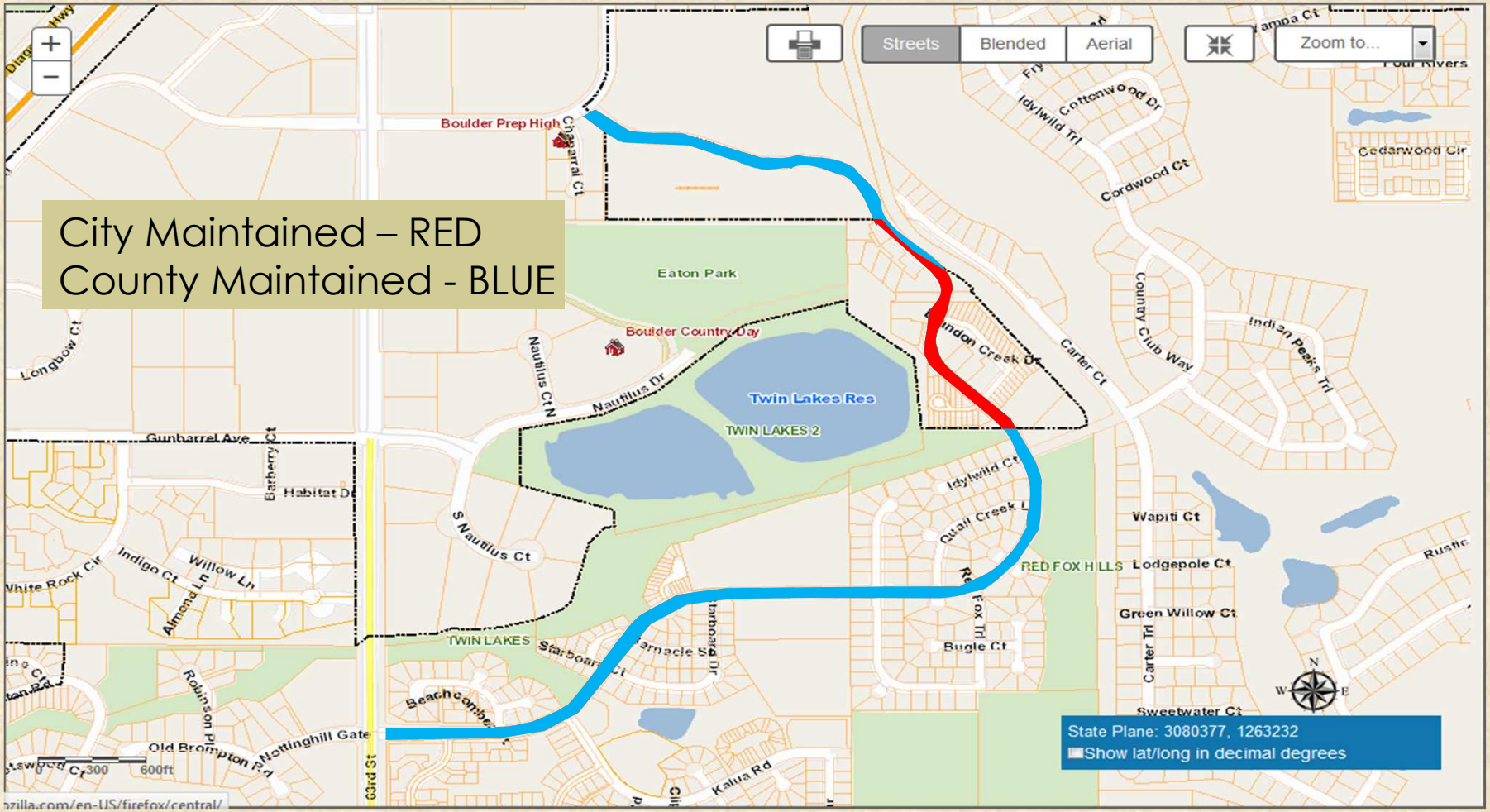
OVERVIEW – TLAG HYDROLOGY

- Infrastructure Concerns
- BVCP and City Codes
- Hydrologic Setting – Dr. Gordon McCurry, P.G.
  - Site Hydrology background
  - Wetlands
  - Storm Water System in Red Fox Hills
  - TLAG Concerns w. Higher-density Development
- RFPs
- Next Steps

INFRASTRUCTURE

- 10 water main breaks in RFH
- Questions on repairing water pipes vs. paving the roads?
- Who "owns" what infrastructure
  - How is multi-jurisdictional maintenance going improve?
- What's the liability for issues and who pays?

INFRASTRUCTURE



INFRASTRUCTURE

INFRASTRUCTURE

CONFORMITY TO BVCP

- The change to MXR contradicts 19 specific aspects of the BVCP, but specifically:
- 3.28 Surface and Ground Water
  - Surface and groundwater resources will be managed to prevent their degradation and to protect and enhance aquatic, wetland and riparian ecosystems. Land use and development planning and public land management practices will consider the interdependency of surface and groundwater and potential impacts to these resources from pollutant sources, changes in hydrology, and dewatering activities.

CODES ON HYDROLOGY

- Code: Storm Water Design - Chapter 7:
  - 7.02-7.05 Details the Studies and Designs Required for any consideration
  - 7.12 Storm Water Detention
  - 7.13 Storm Water Quality and Monitoring
- City Code Section 9-3-9
  - Sub-Section 9-3-9(c)(5), mitigation plans, regulated areas (see section 9-3-9(b)), and riparian areas.

HYDROLOGY PRESENTATION
DR. GORDON McCURRY, P.G.

PRESENTATION OUTLINE

- Speaker Introduction
- Site Hydrologic Setting
- Stormwater System in Red Fox Hills
- TLAG Concerns w. Higher-density Development
- Next Steps

1. SITE HYDROLOGIC SETTING

- Topography and Hydrology
- Local Hydrologic Features
- Hydrologic Properties of Site Soils

SITE TOPOGRAPHY AND HYDROLOGY

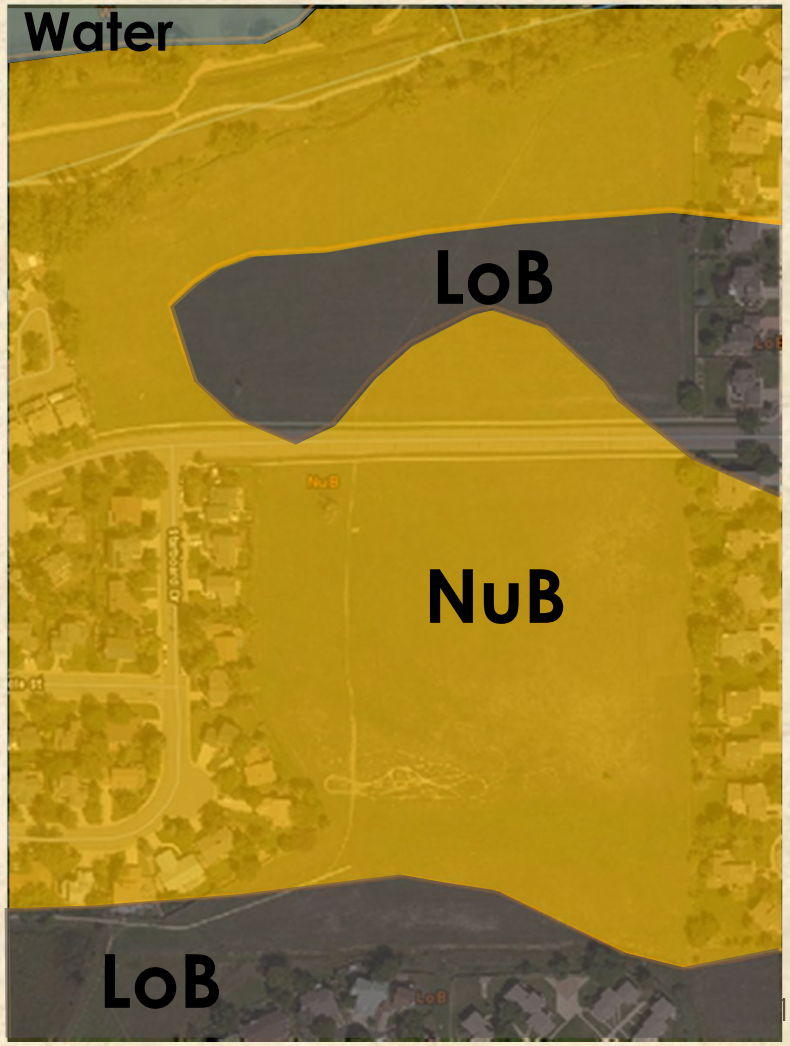
- BCHA property slopes gently to the SE, away from Twin Lakes and towards RFH neighborhood
- Precipitation is about 18 inches/year, with much coming in Spring in intense storms
- The site hydrology is highly influenced by infiltration from nearby lakes and ditches

LOCAL HYDROLOGIC FEATURES

- Twin Lakes
- Irrigation Ditches
- Boulder Feeder Canal
- Wetlands
- Ephemeral stream
- Water flow to the SE

HYDROLOGIC PROPERTIES OF SOILS

- Site soils are Nunn clay loam (NuB) and Longmont clay (LoB)
- Are poorly draining, low-permeability soils
- Have high shrink-swell capacity when wetted then dried
- Have shallow water table, seen by nearby wetlands



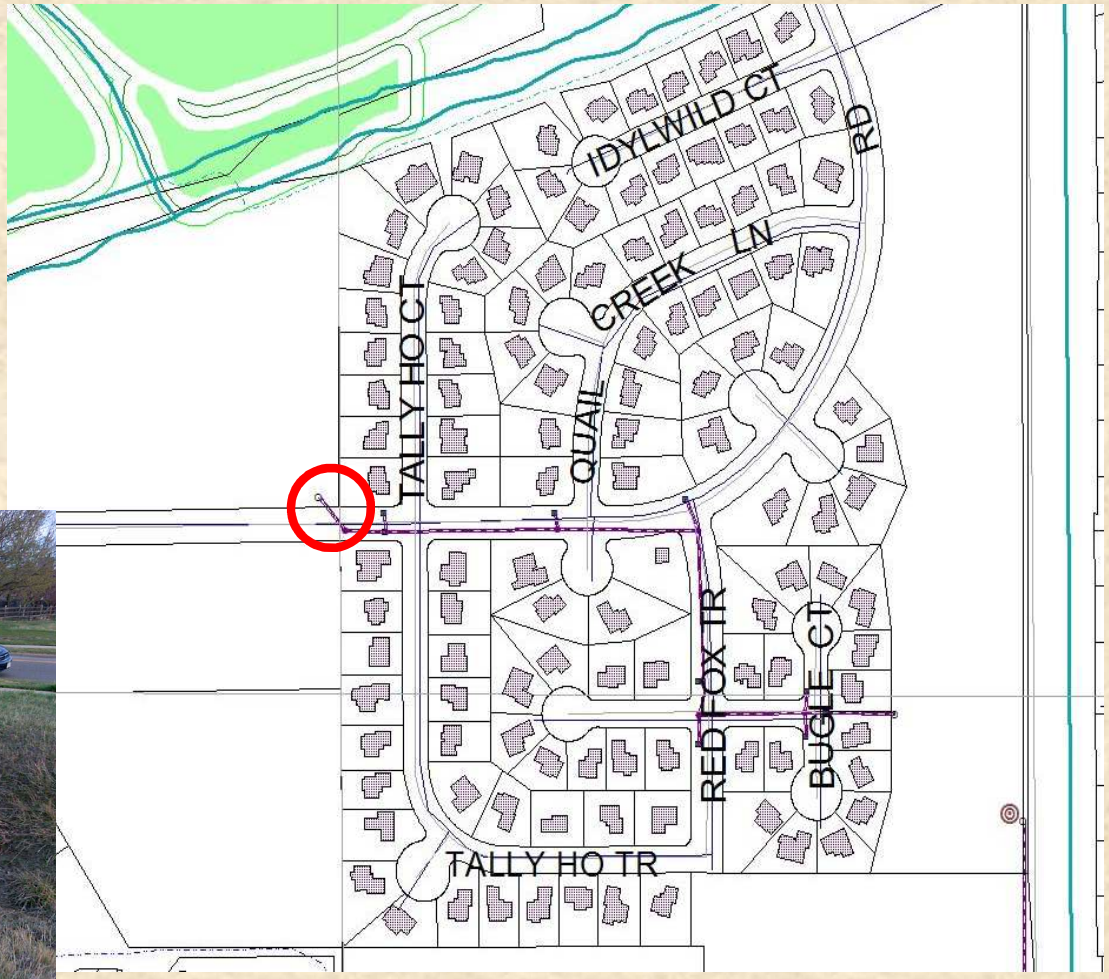
POOR SOIL DRAINAGE – MARCH 2016

2. RFH STORMWATER SYSTEM

- Developed to collect and route runoff to reduce the risk of flooding
- Assumes an upstream drainage area of 15 acres, including BCHA property
- System designed to handle runoff from a 100-yr rainfall event
- Runoff from 100-yr event designed to overtop curbs in SE side of RFH neighborhood (Red Fox Trail and Bugle Ct) and encroach 18 ft onto private properties
- Design calculations for runoff timing are for current undeveloped conditions in the upstream area; development will affect timing
- Design allows for no more than the historic runoff to leave the RFH neighborhood

RFH STORMWATER SYSTEM

- Stormwater system in purple, center of streets
- Note upstream inlet on BCHA property



3. TLAG CONCERNS FOR HIGH-DENSITY DEVELOPMENT OF BCHA PROPERTY

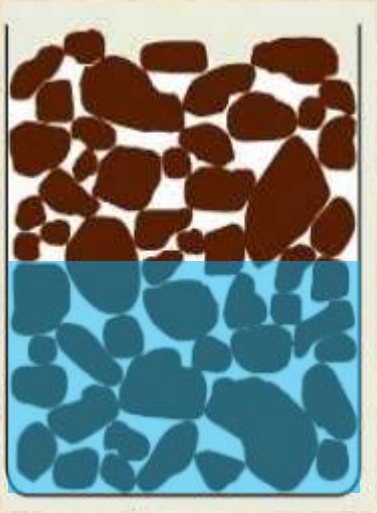
- Increased risk of home flooding due to higher water table
- Increased risk of surface flooding due to new stormwater runoff conditions
- Adverse impacts to wetlands due to altered groundwater levels, runoff and water quality

TLAG CONCERNS – INCREASED RISK OF HOME FLOODING

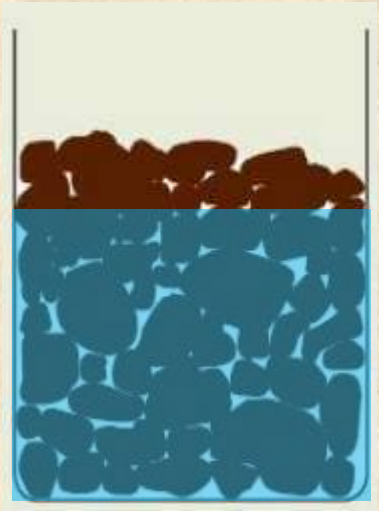
- Rise in water table
  - Compression of soils, reduction in soil water storage
  - Foundation footers reduces soil water storage
  - New localized groundwater flow directions
  - Increased recharge from landscape irrigation
- Increased risk of home flooding due to higher water table
  - Cost of increased sump pump use (existing & new pumps)
  - Increased load on existing stormwater system
  - Cost to install new or upgraded home drainage systems

EFFECT OF SOIL COMPACTION ON GROUNDWATER LEVELS

Uncompacted soil



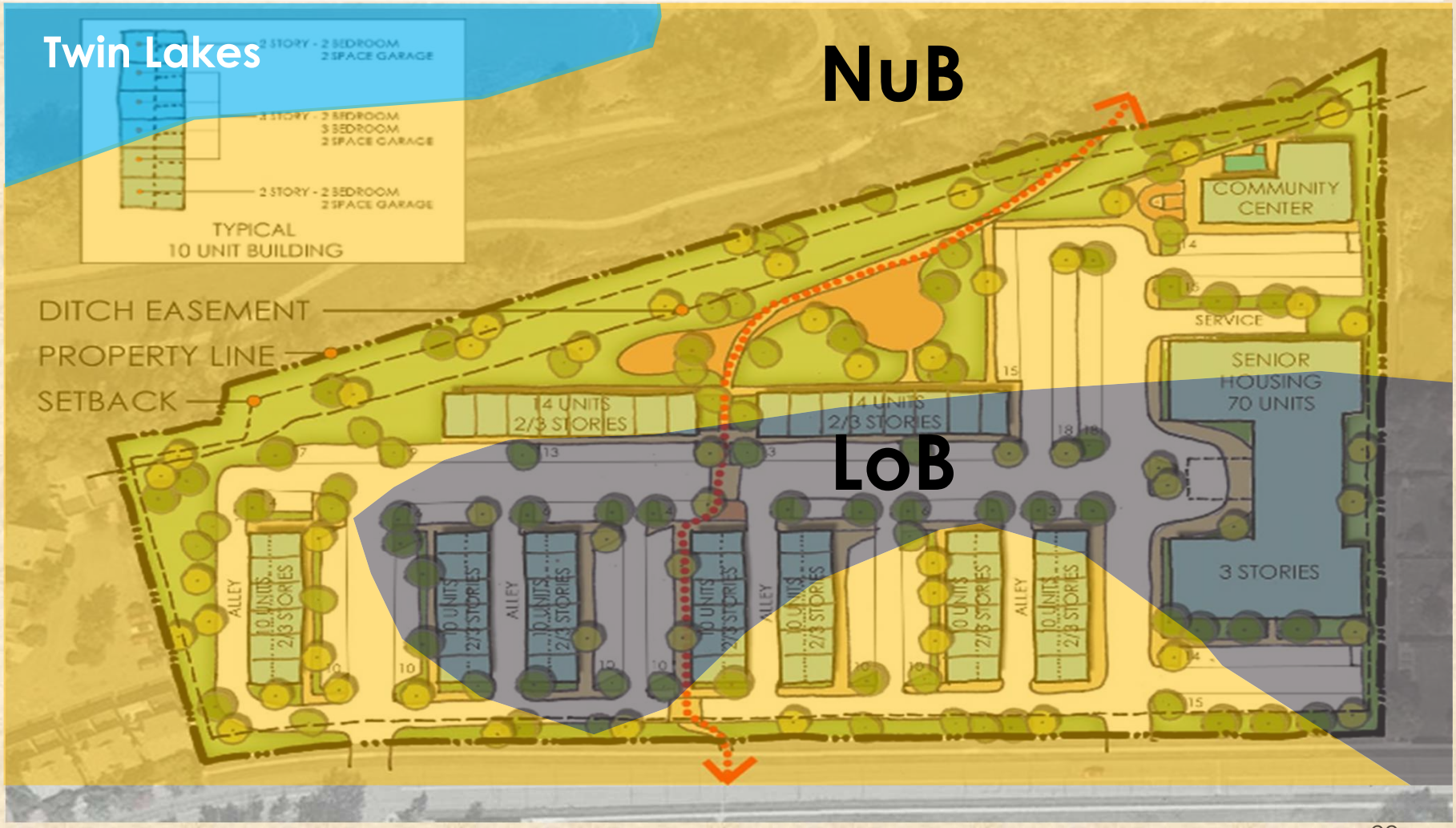
Compacted soil



- Structures such as buildings and roads compact the soil
- Compacted soil has a reduced porosity
- When saturated, the compacted soil water levels rise since there is less pore space to store the water

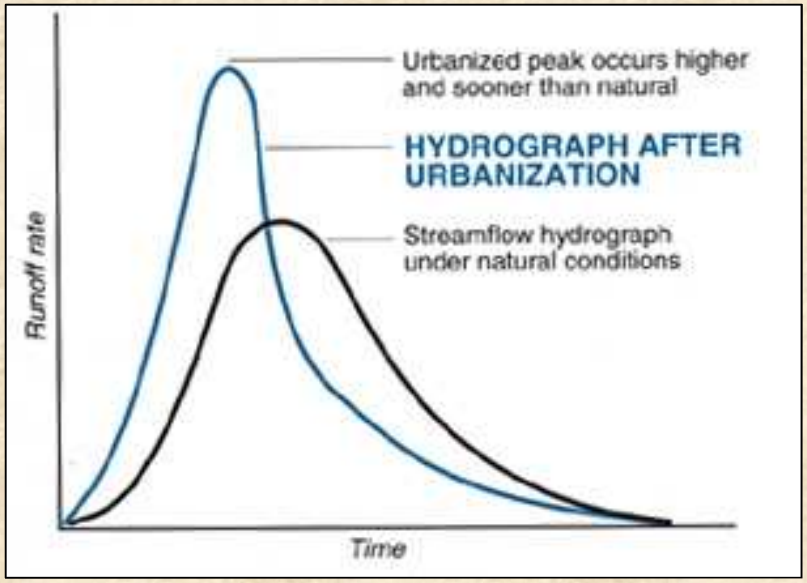
EXAMPLE HIGH-DENSITY LAYOUT (BCHA, 2013)

MANY STRUCTURES LOCATED OVER MOST EASILY COMPACTED SOILS



TLAG CONCERNS – INCREASED RISK OF SURFACE FLOODING

- High-density construction will lead to a high percentage of paved and impervious surfaces
- The impervious surfaces will cause stormwater to runoff more quickly and at higher peak rates due to reduced infiltration and natural surface storage

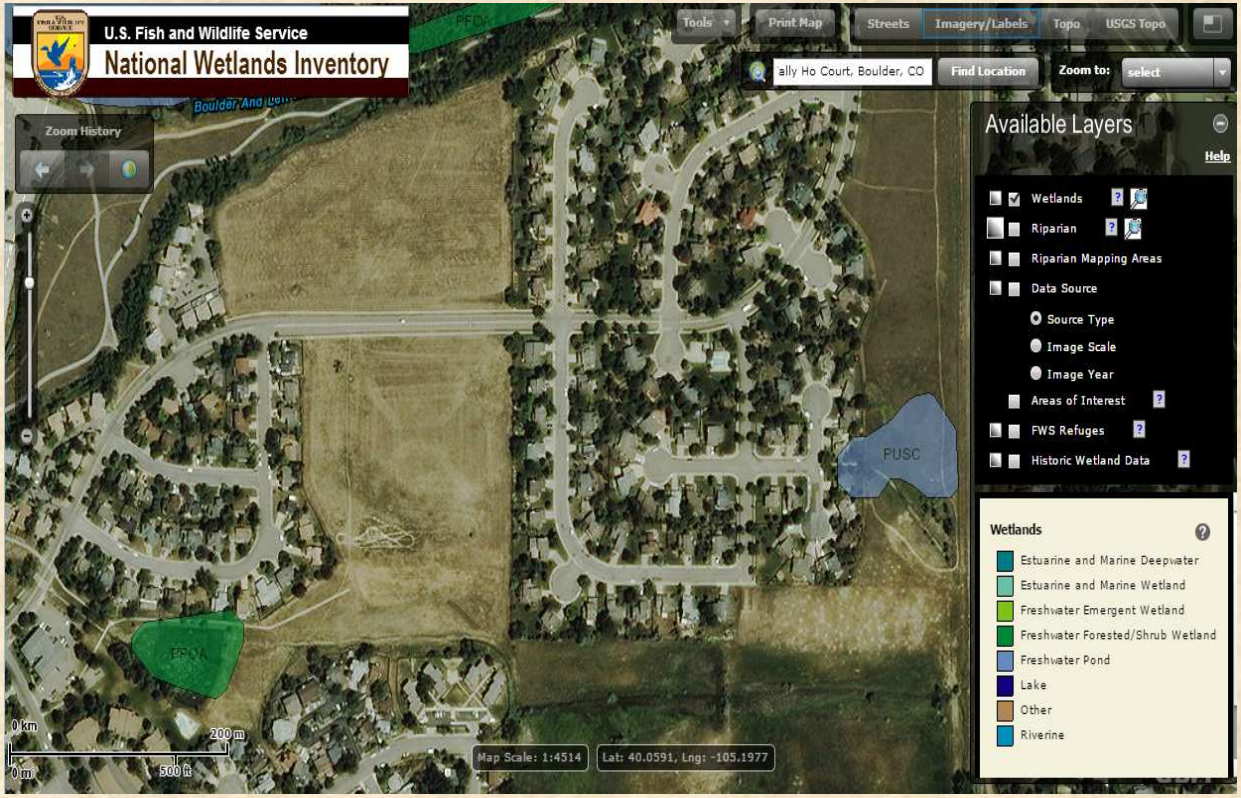


- The result is higher risk of flooding in downstream areas (RFH neighborhood) unless an appropriate stormwater system is built

TLAG CONCERNS –WETLANDS IMPACTS

Impacts due to:

- Altered GW levels
- Changes in runoff (timing & amount)
- Changes in water quality (car oil, trash)



4. NEXT STEPS

HYDROLOGY

- Any additional technical questions?

LIABILITY FOR DAMAGES

- 90 years of legal precedent
- City and County could be liable in perpetuity
- Who pays?!? We all do! The taxpayer
- City has set precedent to pay for damages related to infrastructure failures.
- A change to MXR changes entire neighborhood hydrology

REQUEST FOR PROPOSALS

- We've presented our EXPERT voices
- How do we move forward to:
  - "***Jointly formulate recommendations*** for areas of expertise and selection of experts to inform the desired land use patterns for the area. The areas for study should include the suitability for urban development, desired land use patterns, and environmental constraints"
  - "***Jointly recommend the appropriate range*** of potential housing units with consideration given to intensity and community benefit, regardless of who holds title to the property"

RFP COMPARISONS – WELL TESTS

Firm	On-site slug tests	Standard Penetration Testing
TLAG Proposal	Y	Y
GroundEngineering	Y	Y
CTL / Thompson	N	N
Ninyo&Moore	N	N
SCA	Y	N
Cesare	N	Y
RMG	N	N
Martinez	N	N
New Fields	N	Y
Tabbara	N	N

RFP COMPARISONS – SOIL TESTS

Firm	Number of Samples	Moisture / Density	Swell / Consolidation	water soluble sulfates	Grain Size	Compressive Strength	Atterberg limits	Other
TLAG Proposal	12-20	Y	Y	Y	Y	Y	Y	
GroundEngineering	6	Y	Y	Y	Y	Y	Y	Proctor, R-value, pH, K
CTL / Thompson	11	Y	Y	N	N	Y	N	
Ninyo&Moore	10	Y	Y	Y	Y	N	Y	
SCA	10	N	Y	N	N	N	N	
Cesare	10-12	Y	Y	Y	N	N	N	
RMG	10	Y	Y	Y	N	N	N	
Martinez	6	N	Y	N	N	N	N	?
New Fields	10	Y	Y	N	Y	N	Y	
Tabbara	5	Y	Y	N	N	N	N	CBR, liquefaction potential

RFP COMPARISONS – COSTS

Firm	Cost
TLAG Proposal	?
GroundEngineering	67,725
CTL / Thompson	14,600
Ninyo&Moore	19,850
SCA	69,000
Cesare	39,210
RMG	30,210
Martinez	15,150
New Fields	58,159
Tabbara	71,080

NEXT STEPS

- Discussion on presented material
- Let's address the elephant in the room!

Density

NEXT STEPS


TWIN LAKES
0
80'
160'
320'
NORTH
BRIDGE
BRIDGE
WILDLIFE CORRIDOR
COMMUNITY GARDENS
POND
WALKING/ CROSS COUNTRY SKI TRAIL
WILDLIFE CORRIDOR
Tally Ho Ct
TWIN LAKES ROAD
6655 TWIN LAKES ROAD

SUMMARY

- Keep to our TLAG mission
- Density and Hydrology largest concerns
- Infrastructure and jurisdiction issues
- Impacts on Wildlife and Ecology important to many, not just in Gunbarrel
- Land use changes are long term and follow the properties
  - Up-Zoning and spot zoning are hard to remove
  - Just like the town Center – when developer changed, so did the design!

discussion of how development of the property may affect groundwater elevations, flow directions and flow rates to adjacent properties.

- Engineering studies should include strategies for maintaining adequate ground water reserves to preserve the wetlands, located to the south of the BVSD property, while at the same time protecting existing homes from increased risk groundwater seepage into basements.

- Transducers, located in select monitoring wells would allow for real time monitoring of water table response to punctuated storm events.

- Awarding of the final contract should be reconsidered and TLAG should be allowed its voice in the selection process as outlined in the facilitated discussion agreement**.**

Overall, we believe the possible shortcomings in the Martinez proposal was likely due to the biased preamble of the RFP, which presupposed development would occur and specifically stated these studies were to be completed for the construction of affordable housing. There was no mention of the possibility of maintaining the wetlands and open space, nor was there any mention of the very real concerns of the citizens related to water flow, runoff, possible neighborhood flooding and sizing of existing storm water systems. This is illustrated by the Martinez' RFP Response, which states:

"Based on the information provided in the RFP and our site observations, we believe Boulder County Housing Authority (BCHA) is looking for a preliminary geotechnical site investigation which would provide general subsurface conditions and preliminary recommendations for site construction. The site investigation would also include an evaluation of the groundwater conditions beneath the site as it is anticipated that shallow groundwater levels exist and may affect the development plans for the site."

The above sentence is the guiding basis for the quotation which is not consistent with a hydrological study. That said, not only was the Martinez proposal the cheapest bid received, it was also the weakest of all proposals received seeming to present predetermined conclusions prior to actual evaluation.

Thanks,

Dave Rechberger– TLAG Chair

Paul Boni – TLAG Hydrology Committee, Geologist

Mark George – TLAG member, Civil Engineer

Brian Lay – TLAG board member, Engineer

Recommendations Regarding the Proposal Submitted by Felsburg, Holt & Ullevig

May 3, 2016

To: Three Party Facilitation Members (TLSG)

In response to the facilitated negotiation on April 24th, 2016, TLAG had an action to make comments and recommendations based on the Request for Proposal for Wildlife Habitat Study #6425-16, we present the following recommendations:

As both land use requests 35 and 36 were both moved forward, all studies should be conducted with an equal objectivity regarding land use suitability for housing construction and sustaining wetlands / open space. The following should be included in the scope of work:

- Studies should examine all five of Parks and Open Space's acquisition criteria for open space: Land threatened by development that is near or adjacent to existing open space; Prime agricultural land; Wildlife habitat; Riparian and scenic corridors; and Land that could provide trail connections.

- In keeping with the biological definition of habitat, studies should investigate not only the animals that nest or den on the fields but also the animals that occur on the fields and use them for foraging, buffer habitat, movement, and other functions.

- Wildlife biologists need to develop a comprehensive species list over an entire year and at different times of day, so as to include migratory species through the four seasons and diurnal, nocturnal, and crepuscular animals. May need to set traps to inventory species such as mice and bats.

- Along with federal and state Endangered and Threatened species, studies should investigate Boulder County Wildlife Species of Special Concern using the fields.

- Plant species, including hydrophilic plants, should be inventoried and the land's importance to pollinators and other insect life assessed,

- Studies should provide raptor nesting guidelines (breakdown by species). For example, need to stay certain distance away from the nest for any construction.

- Allow the grass to grow and therefore provide more habitat for various wildlife in the area. Can also bring in native prairie grass to what is already there. Don't scalp the land with mowers.

- Studies should assess the value and function of the wildlife corridor, connecting the Twin Lakes with the Johnson/Coen Trust and then to Walden Ponds. This would look at immediate value (allowing movement and genetic mixing of populations) and the value in case of an environmental disturbance at one area. This is the last remaining direct corridor.

- A wetland assessment should be performed, as both fields have wetland/riparian designated areas.

- To get an accurate idea of the open space value, biologists should address habitat value of the fields if the annual mowing were to cease. This is a manmade stressor that prevents the growth of shrubs, trees, and tall grasses and artificially detracts from habitat value.

- For land-use changes, the requestor must show the MXR change will have no cross-jurisdictional impacts. A wildlife study, therefore, should assess how MXR development would impact the adjacent Twin Lakes Open Space. Impacts such as light pollution and noise pollution from construction and MXR development must also be assessed.

- Awarding of the final contract should be reconsidered and TLAG should be allowed its voice in the selection process as outlined in the facilitated discussion agreement.

Overall, we believe the possible shortcomings in the FHU proposal was likely due to the biased preamble of the RFP, which presupposed development would occur and specifically stated these studies were to be completed for the construction of affordable housing. There was no mention of the possibility of maintaining the wetlands and open space. This is illustrated by the FHU RFP Response, which has already concluded:

“Based on our initial site visit, the project area has limited wildlife habitat potential within the three parcels of interest.”

And, “This Great Horned Owl family will likely keep using this nest, even with new development, as they are already accustomed to human development and human disturbance.”

The scope of work proposed is limited and the conclusions seem to have already been reached, which is not how any scientifically credible study would be conducted. Any results from this study should not be admissible to the BVCP process, and a new RFP should be jointly issued.

Thanks, Dave Rechberger– TLAG Chair

Boulder County

Housing Authority

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www.bouldercountyhhs.org

May 19, 2016
Twin Lakes Stakeholder Group

Re: Response to Twin Lakes Action Group input on BCHA/BVSD wildlife and geotechnical studies

Dear Mr. Rechberger:

Thank you for your review and comments on the two proposals selected by BCHA for a preliminary geotechnical/hydrological investigation and wildlife habitat investigation. We have taken your input under advisement and will be incorporating several of your recommendations into the studies. We understand that both hydrology and wildlife impacts are of concern to TLAG and the surrounding neighborhood.

As previously discussed, BCHA has procured and will fund these studies as the developer of the properties. To be clear, these studies will be very useful in determining the overall habitat, hydrology and geotechnical conditions underlying the BCHA and BVSD properties. However, the reason we are completing these studies is to inform BCHA's development of the properties, not to make recommendations regarding the competing land use designation requests that were submitted as part of the BVCP 2015 Major Update. Planning studies to inform the BVCP process will be conducted by City/County planning staff at their discretion, as it is not BCHA's role to evaluate parcels for use as open space or other non-housing uses.

After review and discussion with our consultants, we will be including the following recommendations as part of the scope of work for the respective studies:

Preliminary geotechnical and hydrological investigation:

- The purpose of the report is to address the preliminary geotechnical and groundwater conditions on the properties that would ultimately impact the future development of the site. The six to eight borings across the two sites will provide ample opportunity for preliminary monitoring; later in the development process, many more borings will be needed once the design is further defined and additional monitoring is necessary on potential building sites.
- The borings are not a one-shot sample. Each boring will be permitted as a monitoring hole to evaluate depth of groundwater across the site and general direction of flow. As off-site conditions change (for example, if the Twin Lakes are raised or lowered), we will be able to correlate those changes with groundwater fluctuations in the monitoring holes. Likewise, we will make the best use of the equipment to drill the bores and the soil sampling for geotechnical conditions, in addition to the hydrological data. We will get as much data out of each hole as practicable.
- BCHA is purchasing pressure transducers for the monitoring holes so that water levels may be monitored at least daily for a full year. This will also help evaluate impacts from off-site water fluctuations, such as the Ditch Company's operations.
- Field Permeability Values of Subsurface Materials – The transducer devices may be used to inform the relative permeability of the soils as they respond to potential changes in groundwater

conditions on-site and off-site. It would be fiscally irresponsible to conduct slug tests to define permeability when we do not anticipate the use of deep foundations, massive parking garages with dewatering systems, raised embankment heights across the site due to significant changes in the Twin Lakes, or any major disturbances on the sites that would necessitate the use of field permeability tests for the soils.

- The final report will include a detailed summation of all data gathered and will be shared with the public.
- The final report will include a discussion of potential foundation types and their effect on the groundwater and area hydrology. Not only will we ensure that we study and select foundation systems that fit the hydrology of the site itself, but we are also committed to selecting foundation systems that do not negatively impact groundwater or hydrology of neighboring households off-site.
- Many of the other items of concerns (runoff, storm water management, etc.) will be addressed in detail during future stages of development. BCHA will proceed with selection of a full design team that will include civil engineering design, drainage engineering and utility design, stormwater management planning, structural engineering, and architecture. These are costly scopes of work, and we will not engage the engineers until we have sufficient underlying data from the initial work of the geotechnical and hydrology investigation and the wildlife investigation. The initial studies underway will inform the engineering and design scopes, as will the community engagement process (as we have seen in our previous developments).

Foundation systems - At this early stage, we anticipate we would use foundation systems that would be appropriate for typical one-, two- or three-story dwelling units. Examples of these foundations might include:

  - Spread footings for a duplex elevated over a crawl space;
  - A reinforced slab with no crawl space typical of apartment buildings;
  - A drilled shaft and grade beam system typical of many residential buildings constructed on Denver's and Boulder's expansive soils regions. While more costly, this options sometimes results in a time saver over a spread footing.

In no case would we consider a foundation system of deep concrete walls, deep underground parking, sub-surface dewatering systems, or other massive concrete foundations systems sunk in the ground. In addition to the hydrological concerns, these would be costly to construct and therefore inappropriate for affordable housing on this site.

Wildlife Habitat Investigation

- A wetland delineation will be conducted, and the study will outline the extent of the wetlands using a survey engineering team to map the area.
- A discussion of the parcels' value as a wildlife corridor will be included.
- Additional site visits will be included and coordinated with the geotechnical engineer conducting borings on-site to minimize disturbance.
- The study will include investigation of both federal and state threatened and endangered species as well as Boulder County species of special concern.
- A specialist will carefully inspect the owl habitat off-site as well as the wildlife habitat on-site, and will evaluate potential corridors and other wildlife habitat questions and opportunities.

It is important to note that several of the TLAG-requested additional scope items are not being included at this point due to the preliminary natures of these studies. The reason we are not including the additional items in the scope of work is that it is unwarranted at this time and adds no value to the preliminary design. We want to be clear that we are not ignoring the TLAG recommendations, and some of the recommendations are valid much later in the design process. For example, additional borings and/or monitoring holes and slug tests were requested to be included as part of the geotechnical and hydrological evaluation. As development proceeds, additional geotechnical evaluations will be required once the locations of building footprints are known and will be incorporated into a final geotechnical investigation and recommendation for foundation designs. Should initial tests indicate that additional information is needed, we will consider revisiting these options and refining the scope of one or more of the studies underway.

Thank you again for your review and comment on the proposals received for this work.

Sincerely,

Frank Alexander, Executive Director
Boulder County Housing Authority

BVCP Map-Based Change Requests 2016 Schedule

		May	June	July	Aug	Sept	Oct
Four Body Requests #25 - 3261 3rd Street #29 - 2801 Jay Public #35, #36 - 6655 and 6500 Twin Lakes, 0 Kalua Road **Two Body Requests** #1 – Naropa** #3 - 385 Broadway #12 - 0, 693, 695 Broadway (Table Mesa Shopping Center) #13 - 3485 Stanford Court **(pending decision by requester to advance)	**Boards and Commissions**				✓ (County) Planning Commission Action ✓ Board of County Commissioners Action ✓ (City) Planning Board Action ✓ City Council Action *These meetings may also include consideration of BVCP policy changes*		
	Community Engagement	• May 11 BVCP Community Event • Twin Lakes Facilitated Community Process	• Twin Lakes Facilitated Community Process (dates TBD) Focused Community Engagement on other <u>Four Body Requests</u> • Open House (and subsequent targeted engagement) for request #29 • Meeting for Request #25 _____ Focused Community Engagement on <u>Two Body Requests:</u> • South Boulder - Open House/Meetings (#3, #12, #13) • Open House/Meetings for Request #1, if needed		BVCP Community Events		

May 18, 2016 – Subject to Change

Hi Heather,

I hope this inquiry is not too late concerning the Twin Lakes.

Did I understand Susan Richstone when she said that when they discuss the "community", that it is the broader general
Boulder valley community and not the smaller subcommunities and neighborhoods that are actually mainly impacted
by BVCP policies that they are concerned with?

I would like to know how she justifies this line of reasoning since in the BVCP, it clearly states how neighborhood character
is important and all the BVCP events are asking for people to come and let their voices heard....? If they have no say, or control
in what happens right next to them, why do the planners even bother to hold these sessions?

How is this different to the Colorado Courts telling Longmont and Lafayette that their fracking bans
are meaningless because fracking will benefit the state as a whole, regardless of what individual communities want?

Thanks for including this in the next session.

Miho Shida
TLAG member

Members of the BVCP Process Subcommittee:

My name is Dinah McKay and I have lived in Gunbarrel for 23 years. I'm here because I am very concerned about the recent construction of nearly 600 units of dense 3-story apartment buildings in downtown Gunbarrel.

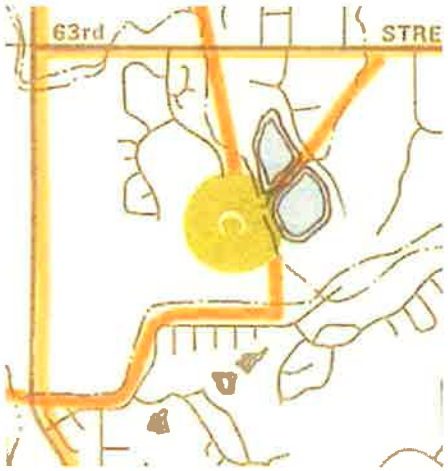
In 2006, the city created a 48-page Gunbarrel Town-Center Community Plan that involved city and county staff, landowners, neighborhood representatives, urban designers and consultants, and took over a year. There were detailed architectural drawings of the proposed downtown "main street" retail area with a plaza that would "provide a pleasant, pedestrian-oriented, gathering area for the sub community" and even an urban park and other public amenities were approved by the city.

That planning must have cost many thousands of taxpayer dollars, but with this dense construction taking up the whole Gunbarrel Town-Center plan area, all that expense and effort along with all the Community's hopes expressed in this 2006 plan, were apparently disregarded. What a waste and shame that a few developers were allowed to make a killing off of building those expensively-priced, dense 3-story apartment buildings, without a single affordable unit on-site, that destroyed the downtown Gunbarrel site plan area forever!

Now, 20-acres located immediately south of the Twin Lakes Open Space, that under the 1977 BV Comp Plan were to become part of a 40-acre Community park and in the 1990's were designated part of the Gunbarrel Improvement District to be purchased for open space, are being threatened with another high density development that could add up to 360 units to this low-density neighborhood of 422 units--an 85 percent increase--basically doubling the density of the neighborhood! The Boulder County Housing Authority land use change request to MXR clashes with the existing character of this rural residential neighborhood and with a responsible, well-thought out Gunbarrel sub-community plan, which does not exist now!

Both Boulder County and the City, who share jurisdictions in Gunbarrel, should slow down on the current rushed plans to build-out Gunbarrel and need to put together a new Gunbarrel sub-community plan. Like the many years taken to plan out the Planning Reserve and other sub-communities, Gunbarrel residents should be given the necessary time and the opportunity to plan for the future of their sub-community. The Twin Lakes parcels represent one of the last opportunities left to express the Gunbarrel Community's needs that were disregarded in the 2006 plan. The Gunbarrel community needs to know that their City and County Officials are representing their best interests and the best interests of their Community--NOT developer's interests. The Twin Lakes parcels would provide a central public open space and gathering area for a variety of public uses to build Community. Under the BV Comp Plan update, please make that happen and initiate a new Gunbarrel sub-community plan. Thank you.

Dinah McKay
4695 Portside Way
Boulder, CO 80301
303-581-0261
dinah.mckay@colorado.edu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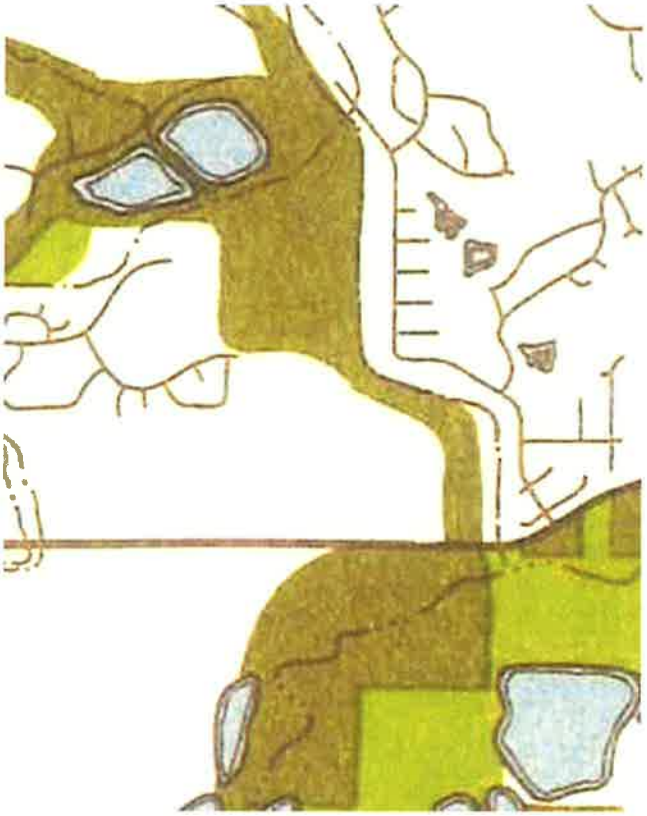


Boulder County

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**

TO: **Twin Lakes Stakeholder Group**
FROM: **Pete Fogg and Nicole Wobus, Boulder County Land Use**
RE: **Summary of research outcomes**
Date: **May 18, 2016**

Staff assembled and reviewed available data from a variety of sources outlined here. This document summarizes key content and findings from each source. Overall, based on a review of available data staff finds that the hydrologic and soil characteristics of the subject parcels appear to present design issues, but do not preclude development on the site. The granularity of currently available data is poor, and more detailed data would be necessary to inform decision making during the development review stage.

- **Public comments**: Written comments included those from Mike Smith and Susan Lambert, and those submitted April 4 regarding recent flooding on the BCHA parcel and adjacent yards. Staff also reviewed oral comments provided by Gordon McCurry, Mark George and others from the February 2 City Council / Planning Board joint session. Key concerns expressed in public comments include:
  - High groundwater
  - Construction on parcels could increase flooding on surrounding property
  - Shallow bedrock
  - High water table due to constant recharge from up-gradient ditches and ponds
  - Federally listed as hydric soils - characteristic of wetland soil
  - Soils recognized as of agricultural significance
  - High water table could leave limited volume to absorb and store rainwater development would further displace water from the area
  - Potential for dam breach

- **Gordon McCurry's preliminary reports** regarding the hydrology and soils associated with the BCHA and BVSD parcels:
  - The studies rely on existing data (no site-specific primary data collection), and cite potential issues related to high groundwater and expansive soils.
  - The report for each property concludes: "Before any dwellings are built on the [BCHA/BVSD] property the developer must take into account the shallow groundwater conditions that likely exist in the region so that existing homes are not adversely affected. Any homes that are built should be designed to overcome the limitations posed by flooding potential, shallow depth to water, and shrink-swell conditions of the soil. Installing wells on the property and instrumenting them to characterize the depth to groundwater in the shallow aquifer, over the course of at least one year, and performing geotechnical testing on soils are both necessary to better characterize the hydraulic properties and gain a better understanding of potential impacts to adjacent residences." The report on the BVSD property also includes comments about additional design features to consider including in any structures built on the property.

- **County Land Use and Transportation Department plat files for subdivisions surrounding the subject parcels**:
    - Hydrology and soil studies specific to the BCHA and BVSD properties were not found in County land use files, as those parcels were not part of the platted subdivisions.
    - A hydrology study conducted for the **Red Fox Hills** subdivision by Chen and Associates in September, 1978 contained the most detailed data. The study's conclusion (p.1): "Subsurface and geologic studies made on the site indicate that the area is suitable for residential development. Precautions relating to soil and geologic conditions should be followed for design and construction of the development as presented in the report." A memo from County Geologist Tom Gray to County planner Steph Hanson (11/8/78) concurs with Chen and Associate's findings that permits should be issued in Red Fox Hills on a lot-by-lot basis and be preceded by a soil report outlining soil conditions and proper footing design. The memo also references water table depths from five test holes drilled in late September 1978, following a relatively dry summer. Water table elevations ranged from 2.5 to 10 feet with an average of 5.7 feet. Due to the time of year the data were collected, those levels are thought to be well below the maximum that would exist in spring and summer. The memo states that basements should only be built if designed with drainage systems based on water table elevations collected from May 1 - June 15.
    - An amendment to the subdivision agreement for Red Fox Hills includes language indicating that Red Fox Hills would own and maintain its own under-drain system to manage groundwater. This is different from the main storm drain system that is owned and maintained by the County.
    - A “Sub-Surface Soil Investigation and Pavement Design Recommendations” study conducted by Lord and Associates in November, 1978 related to a proposed cul-de-sac extension of Kalua Road included data on soils in the **Twin Lakes Second Filing** area. High groundwater was not detected during the initial study. Memos from the fall of 1980 document water table data collected to follow up on the original 1978 report. A memo from Lord and Associates on September 24, 1980 notes a water level reading of 28 inches from the surface collected earlier that month.
    - The final plat file for **Portal Estates** includes a referral response from Coleen Murray (County Engineer for Public Works Department) referencing a single water table elevation measurement from the original soil study: 6 feet below the surface. A memo from Tom Gray to Gary Goodell reference a Design Water Table range from 3.67 to about 6.5 feet.
    - The County had a policy in place at the time of the subdivision development to address construction requirements in areas with high groundwater issues. The policy is referenced in a referral package issued by the County to the City in November 1978. A later version of the policy is referenced in a memo from Tom Gray, County Geologist, to all interested parties in March, 1979. The memo notes that the policy is intended to address groundwater issues present in the plains area of the County. Similar requirements are in place today as part of the Boulder County

Building Code. The County Building Code is based on the 2015 International Building Code.

- **City and County Staff**:
  - Richard (Dick) Smith and Varda Blum of the Boulder County Transportation Department both have expertise in hydrology and are available to assist by contributing to discussion regarding what expertise may be appropriate to inform BVCP decision making.
  - Mike Thomas of the County Transportation Department provided clarification on TLAG members' comments indicating that a special layer was used for moisture control purposes when the County repaved Twin Lakes Road. Mike explained that the layer the County put down was not for moisture maintenance purposes. A fabric is used to hold materials together for the longer term integrity of the road. The same material is used for all road repairs of that nature. What happened there was part of the life cycle of every road. There may be a secondary benefit of keeping water out but that was not the reason the layer was used.
  - Dick Smith and Varda Blum met with Edward Stafford from the City of Boulder to discuss the available information, and to consider what role they could play in the facilitated discussion that will focus on hydrology on May 19, 2016.

- **Natural Resource Conservation Service (NRCS) Soil Survey Data:**[1]
  - NRCS, a division of USDA, publishes soil survey data, and provides a "Soil Data Explorer" tool to understand the implications of soil characteristics for specific areas of interest. It is difficult to draw conclusions from the data as the mapping is intended to be viewed at a scale of 1:20,000, which would provide minimal granularity. The soil data noted here is based on mapping that is zoomed in to a much more granular scale than is intended for use (approximately 1:1,530). In addition, the characteristics noted for each soil type are general characteristics for the soil type, not specific to the area of interest.
  - Soils present on subject parcels (entirety of BCHA and BVSD parcels selected as Area of Interest for report):
    Longmont Clay (LoB):
    - Covers 21.2% of the total area of interest, with the most coverage on the BCHA parcel.

[1] The NRCS website provides a description of their soil resource. It notes that soil surveys are one of the main tools available to help land users determine the potentials and limitations of soils. Soil surveys are available through the USDA, Natural Resources Conservation Service (NRCS). The surveys are made by NRCS in cooperation with other Federal, State, and local agencies. A soil survey generally contains soils data for one county, parish, or other geographic area, such as a major land resource area. During a soil survey, soil scientists walk over the landscapes, bore holes with soil augers, and examine cross sections of soil profiles. They determine the texture, color, structure, and reaction of the soil and the relationship and thickness of the different soil horizons. Some soils are sampled and tested at soil survey laboratories for certain soil property determinations, such as cation-exchange capacity and bulk density. The survey does not replace careful onsite investigation or analysis by a soil scientist (http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)

- This soil's drainage class is "poorly drained."
- This soil belongs to the "Group D" Hydrologic Soil Group, which is characterized as follows: Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Nunn Clay (NuB):

- Covers of 78.8% the total area of interest.
- This soil's drainage class is "well drained."
- This soil belongs to the "Group C" Hydrologic Soil Group, which is characterized as follows: Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

- NRCS provides ratings for "Suitabilities and Limitations for Use" based on soil survey data. The "Building Site Development" component of that feature provides ratings to characterize the potential limitations that may exist for constructing residential dwellings, and the extent to which special planning or design elements may be necessary given the soil characteristics.[2] Based on the soils present on the subject parcels, the suitability for building structures ***without*** basements is rated "very limited" for the entire area of interest. Suitability for building structures ***with*** basements is rated "very limited" for the LoB area and "somewhat limited" for the NuB area. Ratings for the LoB are due to this soil type's potential for flooding, shrink-swell, and depth to saturation zone; for NuB the ratings are due to this soil type's shrink-swell potential. These ratings suggest there may be a structural benefit to having basements, if development occurs, given the properties of the soils present on the parcels. Site specific data on the soils present on the properties, as well as further analysis and interpretation by a hydrologist would provide more accurate data to guide decisions.
- Based on the soils present on the subject parcels NRCS categorizes the area as Farmland of Statewide Importance. The Boulder County Comprehensive Plan (BCCP) does not recognize these parcels as being of statewide or local importance, though

[2] The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design or installation. Fair performance and maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedure. Poor performance and high maintenance can be expected. See NRCS website for full descriptions of the ratings: Source: http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

areas to the south of the Twin Lakes development are categorized as of statewide and local importance in the BCCP. The parcels may have been excluded from BCCP designation due to the fact that they are an enclave in a developed area and in Area II.

- **Other**:
    - The subject parcels are in Urban Drainage and Flood Control District (UDFCD) and any construction would need to meet current UDFCD standards.

Attachments:

A. **Red Fox Hills-Related Files**: Chen and Associates Subsoil and Geologic Investigation (September 26, 1978), related memo from Steph Hanson to Tom Gray (November 8, 1978); Amendment to subdivision agreement referencing an underdrain system to lower the water table (May 27, 1986)
B. **Portal Estates-Related Files**: Memo from Tom Gray to all interested parties (March 1, 1979), Memo from Tom Gray to Gary Goodell (July 6, 1979), Referral packet sent to City of Boulder (November 27, 1978)
C. **Twin Lakes-Related Files**: Lord and Associates Subsurface Soil Investigation and Pavement Design Recommendations for the Proposed Cul-de-Sac Extension of Kalua Rd. (November 17, 1978), related correspondence from Coleen Murray, Boulder County Public Works (March 27, 1980), William Heffington of Lord and Associates (September 24, 1980), Coleen Murray, Boulder County Public Works (October 21, 1980)

ATTACHMENT A.

Red Fox Hills-Related Files

chen and associates, inc.
CONSULTING ENGINEERS
SOIL & FOUNDATION ENGINEERING
96 S. ZUNI • DENVER, COLORADO 80223 • 303/744-7106
1924 EAST FIRST STREET • CASPER, WYOMING 82601 • 307/234-2126

PRELIMINARY SUBSOIL AND GEOLOGIC INVESTIGATION RED FOX HILLS DEVELOPMENT BOULDER, COLORADO

Prepared for:

HILLHOUSE, WELLS & GIPP, LTD.
4310 RIVERSIDE
BOULDER, COLORADO 80301

Job No. 17,164

September 26, 1978

TABLE OF CONTENTS

CONCLUSIONS

Subsurface and geologic studies made on the site indicate that the area is suitable for residential development. Precautions relating to soil and geologic conditions should be followed for design and construction of the development as presented in the report.

SCOPE OF STUDY

This report presents the results of a preliminary subsoil and geologic investigation for the proposed Red Fox Hills development to be located directly west of the Cunbarrel Green Subdivision and southeast of Twin Lakes in Boulder, Colorado, in portions of the SE 1/4, Sec. 11 and NE 1/4, Sec. 14, T. 1 N., R. 70 W. The report presents the general subsoil and geologic conditions at the site, most suitable foundations, and precautions to be followed relating to soil and geologic conditions.

PROPOSED CONSTRUCTION

We understand the proposed development will consist of residential housing. It is expected that the residences will be one and two stories and will possibly have basements, if feasible. Loadings for the structures are expected to be light, typical of residential type construction.

SITE CONDITIONS

The site is located approximately 3 miles southwest of Niwot, Colorado, is presently vacant and being used for hay production and

pasture. Topographically, the site consists of gently rolling relief with a general slope down to the south and east. The maximum difference in elevation across the site is on the order of 25 feet from the high northwest corner down to near the southeast corner. The site is intersected by the Boulder and Left Hand and Boulder and Whiterock Ditches. Both irrigation canals were flowing at the time of our investigation. Several other small lateral ditches were observed across the property and are essentially dry. Boulder Feeder Ditch bounds the property on the east. A small man-made pond about 2 feet deep was observed in the southeast corner of the property and appears to be fed by irrigation water. The berm retaining the water is on the order of 3 feet high.

Construction in the area consists of the residential developments of Gunbarrel Greens to the east and Twin Lakes Subdivision to the southwest.

Vegetation on the site consists of native grasses with a mixture of alfalfa. The southwest portion is not irrigated and vegetation is less abundant. A large prairie dog colony is also located in the southwest portion of the site.

GEOLOGIC SETTING AND CONDITIONS

The geology of the site consists of Recent clay and sand alluvial deposits overlying claystone bedrock of the upper transition member of the Cretaceous age Pierre Shale. There are no bedrock outcrops visible on the site. We observed no geologic conditions at the site which would present a major hazard.

Examination of USGS Map I-855-D, Gravel Sources, Boulder-Fort Collins-Greeley Area, indicates the area of proposed development is in an area of Upland gravel deposits suitable for road material. At this site, bedrock is shallow and the alluvial soils are fine-grained. It is our opinion that there are no commercial mineral deposits on the site which would be of significant economic value as defined in the Colorado Open Mining Land Reclamation Act.

Review of the USGS Flood Prone Areas, Map I-855-E, indicates the site is not subject to inundation by a 100-year flood. Some faulting has been mapped to the east of the site but is not considered to be a hazard for the site.

SUBSOIL CONDITIONS

A preliminary study of the subsoil conditions at this site consisted of drilling five exploratory test holes at the locations shown on Fig. 1. Generally, beneath a mantle of topsoil, 3 to 11.5 feet of sandy clays to sands overlie claystone bedrock.

The upper sandy clays vary from moist to wet and have low to moderate strength characteristics. A swell-consolidation test performed on the upper clays indicates that the clays will consolidate upon loading and wetting, see Fig. 5. Clayey sands to sand lenses and layers were found in Test Holes 3, 4 and 5 at depths varying from 3 to 6 feet beneath the surface. These sands are in a loose to medium dense condition and are wet.

The bedrock is a moderately plastic to plastic claystone and varies from medium hard to hard. Swell-consolidation tests performed

on the claystone indicate that it possesses a nil to slight swell potential upon wetting as shown on Figs. 3 through 5.

Free water was found in three of the five borings at depths of 4 to 5 feet beneath the ground surface upon completion of drilling. Test Holes 2 and 4, which were drilled at the extreme southern boundary of the property, had no free water upon completion of drilling. When checked 3 days after drilling, free water was encountered in all the holes from 2.5 to 10 feet beneath the ground surface.

FOUNDATIONS

Considering the subsoil conditions and the proposed construction, we believe that both spread footings and straight-shaft pier foundation systems are suitable on the site depending upon the conditions encountered at specific locations. Footings placed on the upper low swelling clays and nonswelling sands may be designed for soil pressures ranging from 1,000 to 3,000 psf. Where low swelling clays are encountered, a minimum dead load pressure will be required on the footings to help resist uplift pressures generated by these swelling soils. Straight-shaft piers drilled through the overburden soils into the lower bedrock appears to be the most suitable foundation type where swelling soils are encountered or where bedrock is relatively shallow. Straight-shaft piers will have end pressures ranging from 15,000 to 50,000 psf. Skin friction values for the portion of the pier in bedrock are generally taken as 10% of the end bearing pressure. Due to the presence of free water at some locations, pier holes will need to be cased in these areas. The exact type of foundation system to be used at individual

sites should be determined by drilling an exploratory test boring at the individual location or inspecting the foundation excavation.

BASEMENT CONSTRUCTION

Deep basement construction is not recommended in areas of a shallow water table. These conditions occur practically throughout the site. We recommend keeping the lower floor as high as possible. The lower floor levels should also be protected by an underdrain system.

FLOOR SLABS

The natural overburden soils and bedrock at this site are capable of supporting slab-on-grade type construction. However, because of the swelling nature of some of the soils and bedrock, slabs will be subjected to uplift pressures in these areas. In this case, we recommend that a structural floor slab system be considered with a crawl space beneath it. Also, in areas where the water table is high, it would be desirable to also use structural floor systems without basements. Where slab-on-grade is contemplated for basements, the slabs should be separated from all bearing members with expansion joints. In addition, it will be necessary to provide gravel beneath floor slabs to help distribute loadings and to break capillary water rise. The underslab gravel should be connected into the peripheral subsurface drainage systems.

SITE GRADING

The site is relatively flat, and no evidence of site instability exists. However, we do recommend that cuts and fills be kept to an absolute minimum, especially in areas of a high ground water table. In addition, deep cuts could expose the claystone bedrock, thereby subjecting the claystones to desiccation. The swell potential of the bedrock would be increased by drying.

MISCELLANEOUS

This report was prepared for use in preliminary planning for the project. It is recommended that a final subsurface investigation be conducted on each residential site to more accurately delineate the subsoil characteristics and to formulate specific foundation design criteria for each residence.

CHEN AND ASSOCIATES, INC.

By Roger L. Barker
Roger L. Barker

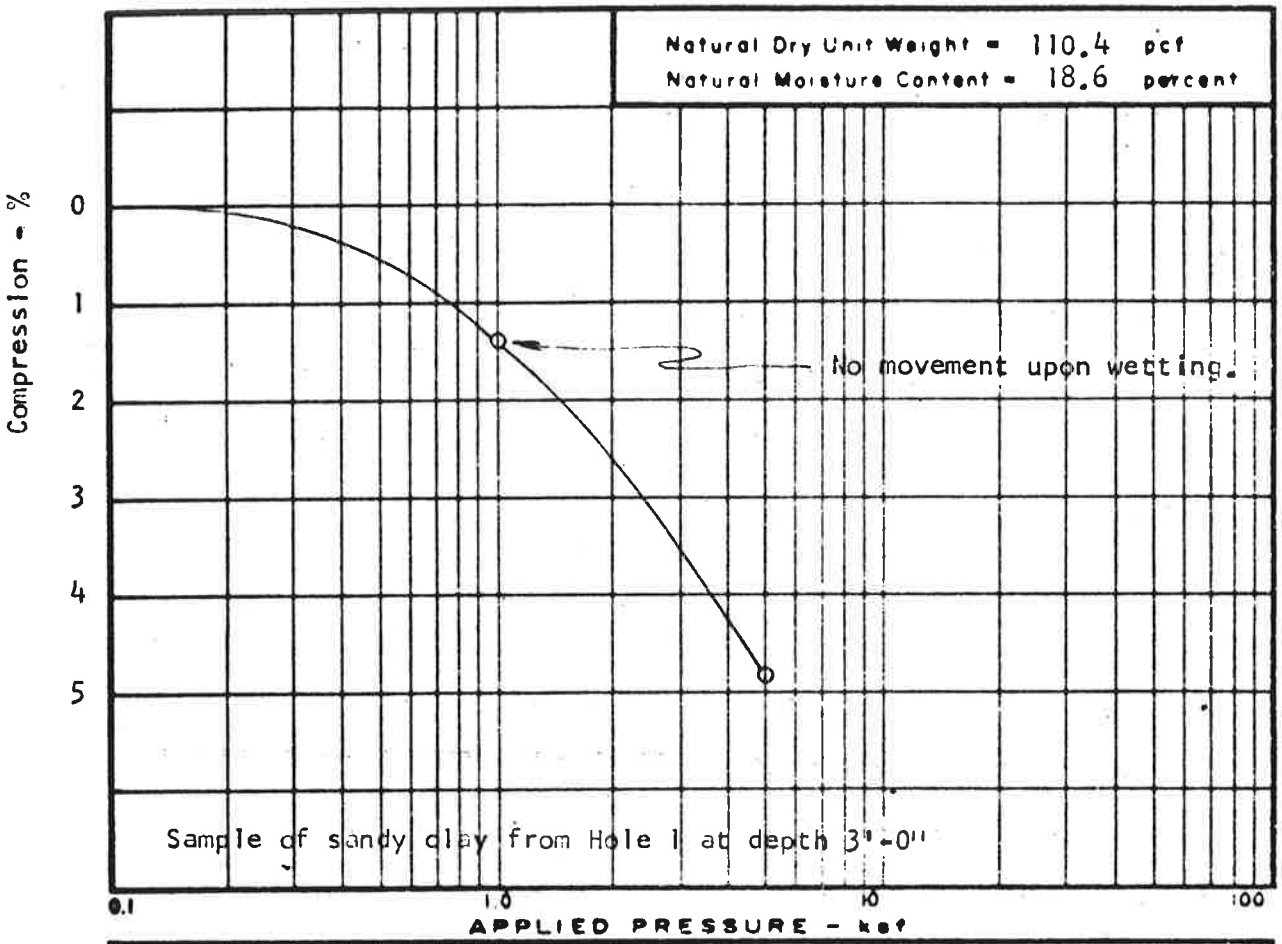
By
Curtis O. Sealy, P.E.

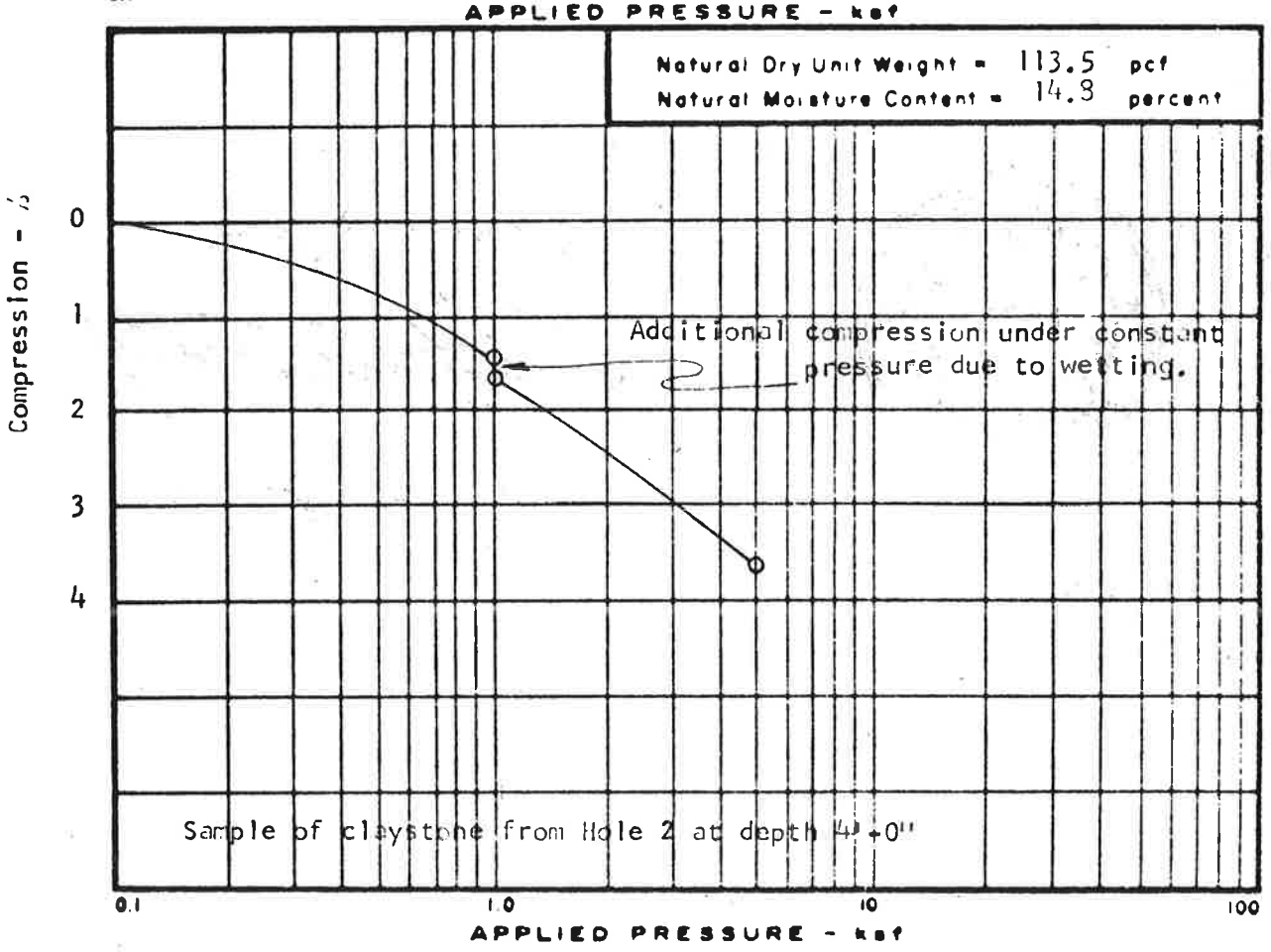
Reviewed By
Richard C. Ellsworth, P.E.

CURTIS O. SEALY REGISTERED 10336 PROFESSIONAL ENGINEER STATE OF COLORADO

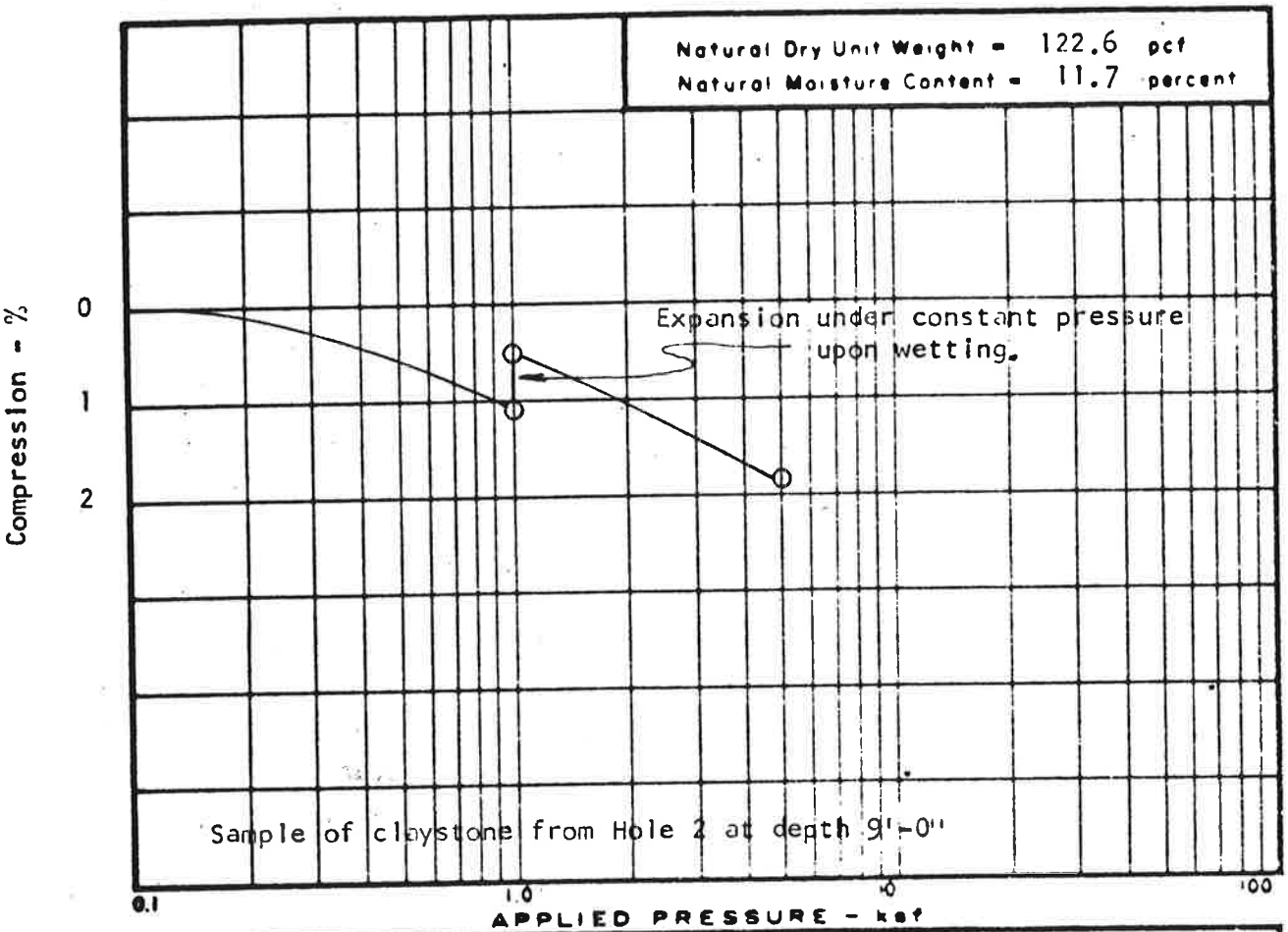
COS/RLB/bn

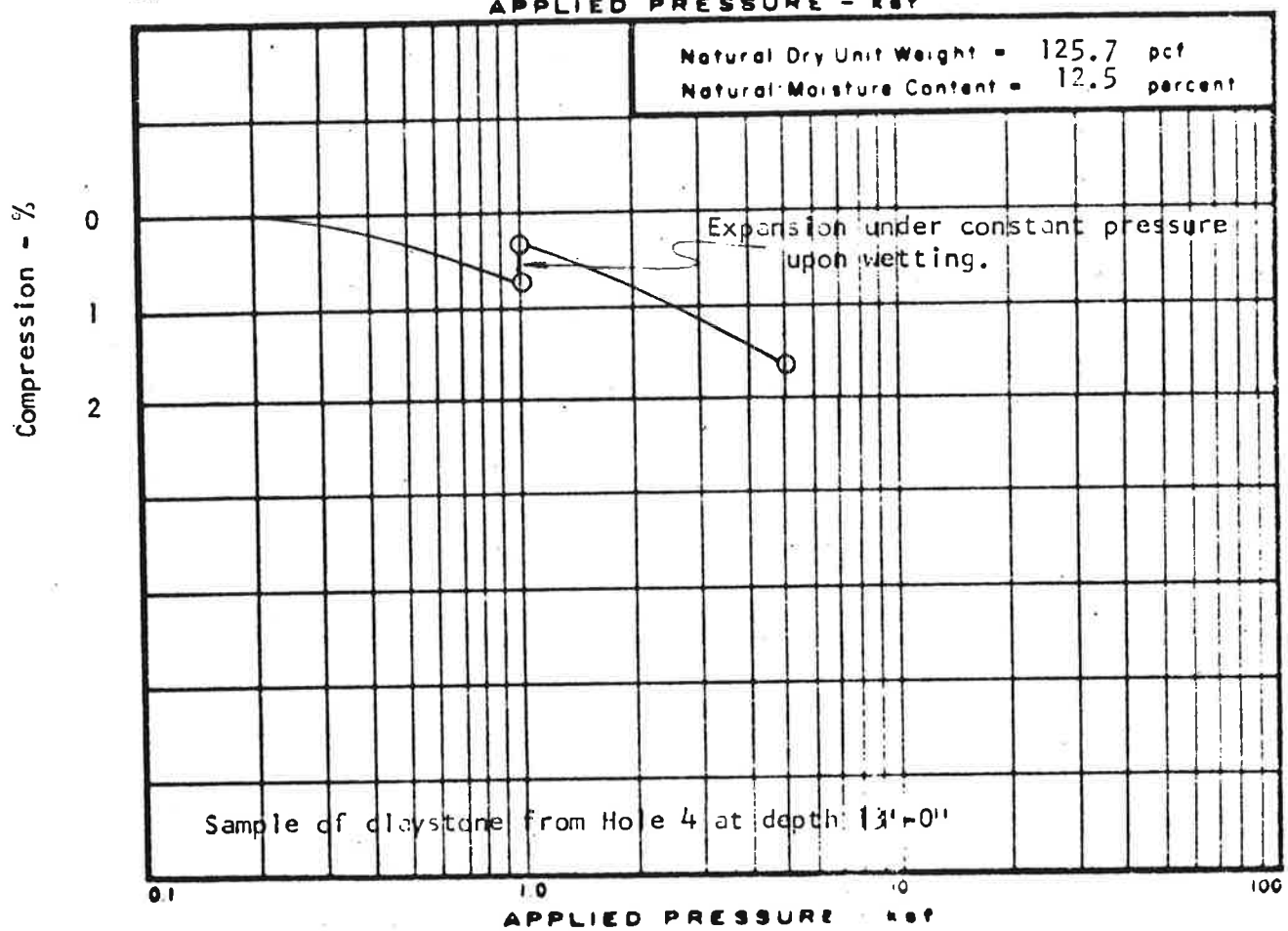
CHEN AND ASSOCIATES





#17,164 **Swell-Consolidation Test Results** Fig. 3

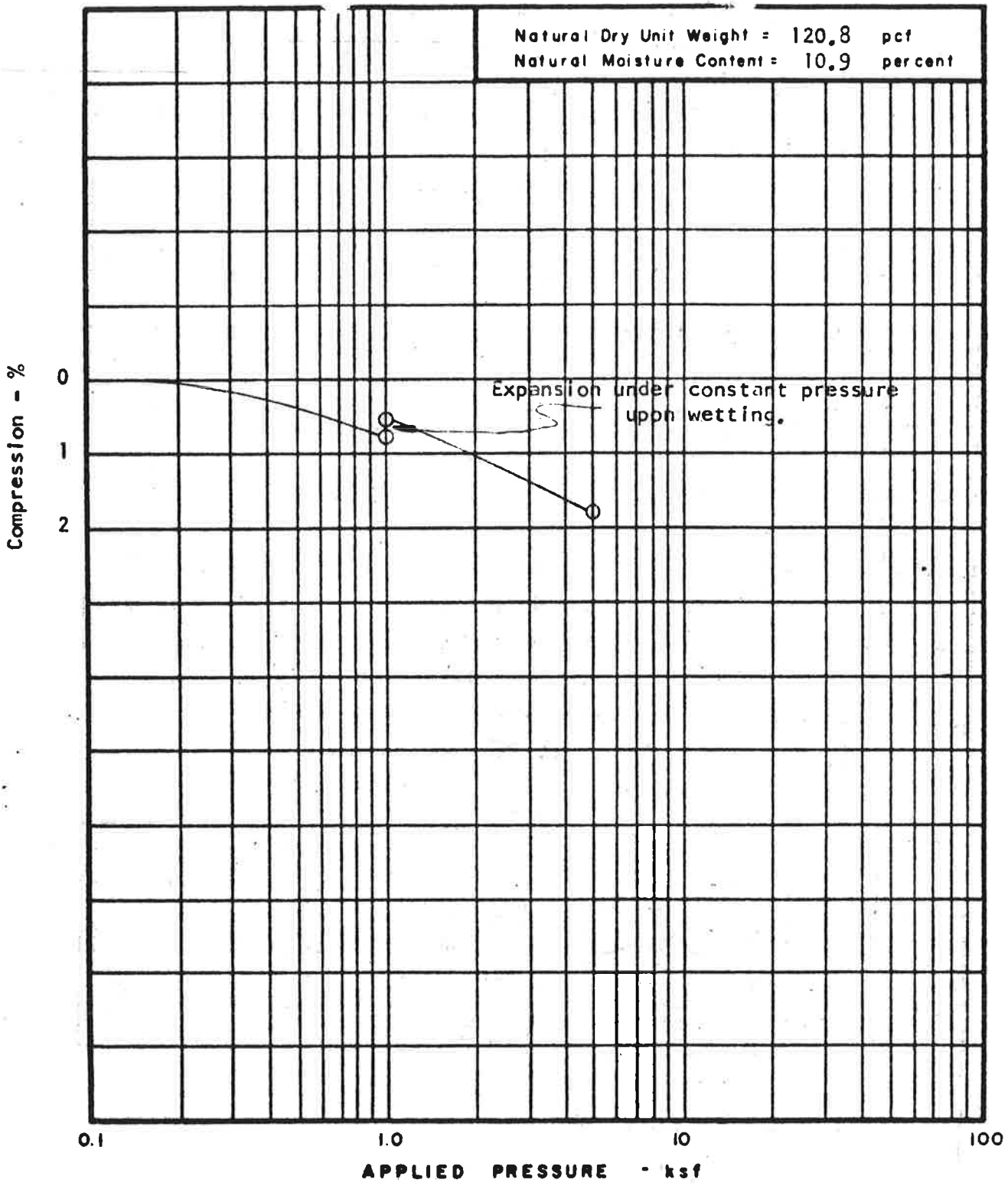




#17,164

Swell-Consolidation Test Results

Fig. 4



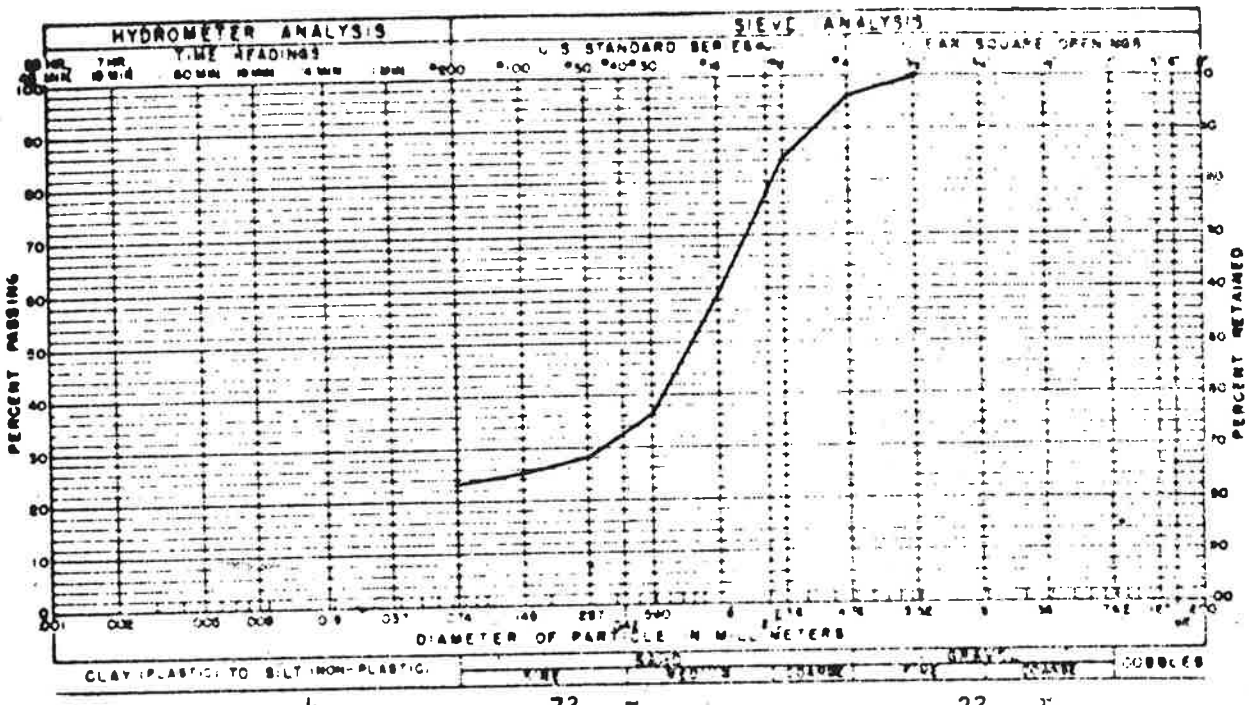
Sample of claystone from Hole 5 at depth 15'-0"

#17,164

Swell - Consolidation Test Results

Fig. 5

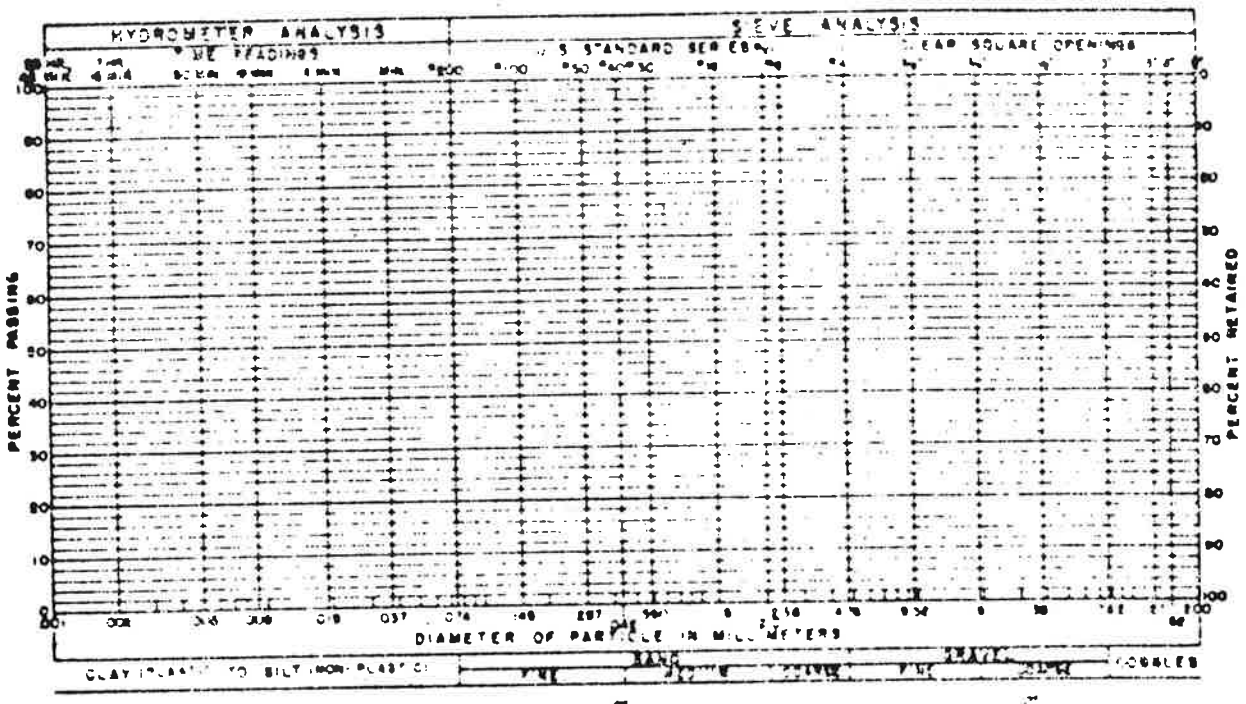
CA 1A



GRAVEL 4 % SAND 73 % SILT AND CLAY 23 %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF Silty sand FROM Hole 3 at depth 7'-0"



GRAVEL % SAND % SILT AND CLAY %

LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF FROM

#17,164 GRADATION TEST RESULTS Fig. 6

CA-2

CHEN AND ASSOCIATES

TABLE I

SUMMARY OF LABORATORY TEST RESULTS

HOLE	DEPTH (FEET)	NATURAL MOISTURE (%)	NATURAL DRY DENSITY	ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH (PSF)	TRIAXIAL SHEAR TESTS			SOIL TYPE
				LIQUID LIMIT (%)	PLASTICITY INDEX (%)		DEVIATOR STRESS (PSF)	CONFINING PRESSURE (PSF)		
1	3.0	18.6	110.4							Sandy clay
2	4.0	14.8	113.5							Claystone
	9.0	11.7	122.6							Claystone
3	7.0	14.3	119.0							Sand
4	13.0	12.5	125.7							Claystone
5	15.0	10.9	120.8							Claystone

planning department
p.o. box 471 13th and spruce st. boulder, colo. 80306 441-3930

boulder county

memorandum

edward a. tepe
planning director

DATE: November 8, 1978

TO: Steph Hanson, Operational Planner

FROM: Tom Gray, County Geologist Tom

SUBJECT: Subdivision - Sketch Plan/PUD - (Docket #SD-78-14/SU-78-11) - Red Fox Hills

This office has reviewed the subject referral in detail as especially related to soil and geologic conditions presented by Chen and Associates. The two main areas of concern in this respect are the potential for a high water table and the existence of expansive soil at normal foundation depths.

I concur with the opinion of Chen and Associates that the issuance of a building permit on a lot-by-lot basis be preceded by a soil report outlining soil conditions and proper footing design.

The five test holes were drilled in late September 1978 subsequent to the time of heavy irrigation and after an unusually dry summer in terms of rainfall. In other words, the water table elevations as reported would be well below maximum elevations which might be expected in the spring or early summer. Even so, the water table elevations ranged from 2.5 to 10.0 feet below the surface and the average was 5.7 feet. The proposed subdivision is surrounded by wetlands in the forms of irrigated fields, artificial lakes, and a major unlined irrigation ditch.

Accordingly, it is strongly recommended as a condition of approval for this subdivision and it is clearly understood that no basements shall be allowed unless:

1. The design of all basement drainage systems, if any, shall be based on water table elevations obtained between May 1 and June 15 of any year; and

2. The design of basement drain systems shall be approved on a lot-by-lot basis by the Building Official.

TG/mgp

C: Applicant
Engineering

FORM NO. M100 8/78

5-1

RECEIVED

MAY 27 1986

AMENDMENT TO AGREEMENT
RELATING TO THE SUBDIVISION AND DEVELOPMENT OF LAND USE DEPT.
RED FOX HILLS

THIS AMENDMENT is made this 27th day of May, 1986, by and between THE BOARD OF COUNTY COMMISSIONERS OF BOULDER COUNTY, COLORADO (hereinafter referred to as the "County"), and RED FOX HILLS CO., a Colorado general partnership (hereinafter referred to as the "Subdivider").

15

WHEREAS, the parties wish to amend the Subdivision Agreement between the parties dated June 9, 1980, concerning Red Fox Hills as specifically provided herein;

NOW, THEREFORE, the parties agree as follows:

1. Idylwild Trail has been eliminated as a vehicular road and has instead been constructed as a pedestrian and bike pathway and emergency vehicular access in accordance with plans and specifications approved by the County.

2. An underdrain system to lower the water table has been or will be constructed on the perimeter of and within the interior of the subdivision in accordance with plans and specifications approved by the County, and will be maintained by the Red Fox Hills Homeowner's Association.

3. For the purposes of this Agreement, the Subdivision has been divided into three phases:

Phase	Description
I	Block 1 - Lots 1 to 15 Block 2 - Lots 1 to 23 Block 3 - Lots 1 to 21 Block 4 - Lots 10 to 13
II	Block 4 - Lots 1 to 9 Block 5 - Lots 18 to 30
III	Block 5 - Lots 1 to 17, Lots 31 to 45

ATTACHMENT B.

Portal Estates-Related Files

Rec 11/27/78

planning division

p.o. box 471 · 13th and spruce street · boulder, colorado 80306 · 441-3930

boulder county

edward a. tepe
land use department director

City of Boulder
Planning Dept.
ATTN: Ed Gawf, Acting Director

DEC 5 19/8

DEPARTMENT

To Whom It May Concern:

The following request has been submitted to this office:

Docket:	#SD-78-13 - Portal Estates
Applicant:	Starboard Partnership
Proposed Use:	Subdivision/Final Plat - Replat of Block 5, Twin Lakes 2nd Filing
Acres/#Lots:	1.46 Acres/22 Lots
General Location:	North of Twin Lakes Road, approximately 100 feet west of Starboard Drive

We would appreciate any comments you may have regarding this matter. You may check the appropriate response below or send a letter and return it to the above address by _____ so that we may give full consideration to your recommendation;

1. ____ We have reviewed the proposal and have no conflicts.
2. ✓ A formal recommendation is under consideration to be submitted by 12/12/78.
3. ____ Additional time is necessary for Board action on _____.
4. ____ Please contact our office immediately.
5. ____ Please refer to the enclosed letter.

Signed Dick Ryan

If you have questions regarding this application please contact our office.

Sincerely,

Stephen R. Hanson, Operational Planner

Suzanne R. Box

Suzanne R. Box - Operational Secretary

P.S. If you no longer own your property adjacent to this proposal, please notify the Boulder County Planning Department so that we may send out another packet of information to the present property owner.

cc: Applicant
Engineering

boulder county

Public Works Dept.

MEMORANDUM

To Gary Goodell, Planner Date November 27, 1978

From Coleen Murray, P.E., Project Engineer CM

Subject: Portal Estates SD-78-13

This application falls into the category which Public Works has discussed previously with Planning. It is a replat of a block which is already platted but the lot configurations, streets, utility layouts, etc. are new. These items are normally reviewed during the Preliminary Plan process. To complicate the review, the block was platted over six years ago and the state of the art in engineering of subdivision plans has improved since then.

Engineering items which were not realized at that time to be a public concern are now critically evaluated. For these reasons, the scheduling of this docket for December is not reasonable. The application can be scheduled for a preliminary critique on December 13th and can perhaps be scheduled for the January Planning Commission.

Public Works Department looked briefly at the proposal for Portal Estates on November 20, 1978 and has these concerns:

REVISED 6-15-79

20 units 9 common spaces 10 Spaces

1. The parking is not satisfactory. In standard subdivision design(non-PUD) the standard street section provides for parking at the curb for every dwelling. In a PUD where street sections are reduced and no parking is accommodated on the street, a public parking area is necessary. Adding an additional space on a lot is not sufficient since visitors to other lots cannot use it. In the plan proposed these extra spaces will be theoretically public but visitors will not feel free to park on what appears to be a private space. Signs which indicate public parking would be ugly and probably removed by the adjacent residents. The only solution for replacement of curbside parking is a group lot that is clearly for public use. The spaces labeled 2-5 are satisfactory but spaces 6-11 are not. The total of 11 spaces shown is the minimum if these are two-bedroom units. If they are three-bedroom units, then 22 spaces are required.

OK

2. No supporting material was presented, but it is suspected that these are to be carports covenanted against being enclosed as was done in Portal Village. The documents must be provided.

maintenance by separate HOA

3. Maintenance of Portal Drive by Twin Lakes Homeowners Association must be verified.

4. A draft letter of credit and a cost estimate prepared by a registered professional engineer for public improvements including water, sewer, streets, and parking are required.

5. Street name, stop and dead-end or private road signs should be shown on the Site & Utility Plan, sheet 1 of 1.

cc: Applicant

6. The County policy for groundwater data is:

check new standards

A. Representative test borings tested twice at least 4 weeks apart between April 15 and June 15 for high groundwater level.

B. The nearest representative well log data or similar data to show the past 20-year variation in the high groundwater level.

C. Location map showing and describing wells, ditches, reservoirs or other water supply facilities that may be affected by lowering the groundwater table.

At the time of the original soils report six years ago, only one determination of groundwater elevation was made in this area. It shows the water table to be 6 ft. below grade. The time of year that the test was done is not given.

The design criteria for groundwater control are: Multi-lot subsurface drainage systems are to be designed to achieve the following.

A. To lower and maintain the maximum 20-year groundwater level below a specified elevation depending on the purpose (to allow basements, prevent frost heave in public roads, etc.) without affecting water supply systems.

B. To provide a simple and readily maintained groundwater discharge system. Extensive use of perforated pipe or gravel underdrain systems will not meet this criteria unless adequate cleanout provisions are made. Using existing storm sewer systems is preferred. Use of sewerage systems is not allowed.

C. To design systems in accordance with generally recognized and accepted engineering practice. Source data to be cited and provided on request.

Single lot subsurface drainage systems (for basements) are to be designed to achieve the following:

D. To lower and maintain the maximum 20-year groundwater level to 3 ft. below finished basement floor elevations.

E. To provide a positive gravity drain system where the unlowered maximum 20-year high groundwater level is higher than the finished basement floor elevation. Sump pumps are not allowed where the unlowered maximum 20-year high groundwater level is above the finished floor elevation.

F. To disallow basements where the unlowered maximum 20-year high groundwater is more than 3 ft. above the proposed finished floor elevation.

G. To disallow basements where soils are expansive as defined in the 1976 UBC section 2904(b) and Boulder County Resolution No. 78-7 and where the unlowered maximum 20-year high groundwater is above the finished basement floor elevation. Where basements are allowed, foundation and superstructure shall be designed to accommodate the expansive soil stresses in accordance with applicable provisions of the UBC.

H. To provide a minimum of 4" of compacted permeable gravel placed beneath the floor slab where the unlowered maximum 20-year high groundwater is higher than 3 ft. below the finished floor elevation.

I. See the attached drawing for a visual depiction of the above requirements.

Further engineering is required with regard to these items:

7. The peripheral road fee for the 63rd Street Fund will be determined by the Public Works Department.

8. ~~Closure tapes to check the plat are needed.~~ submitted

9. City Utility approval of water and sewer plans is needed. (pending?)

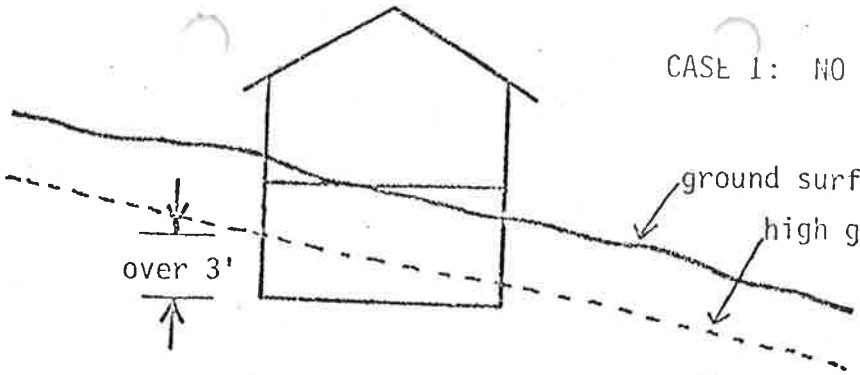
10. Copies of amendments to the subdivision agreement and the covenants, if any, are neeed for review.

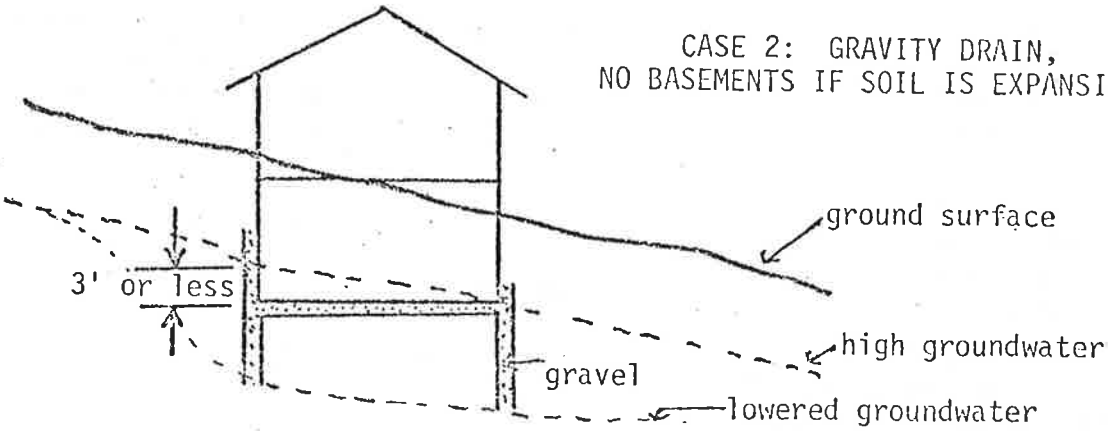
11. Mail boxes and any identification signs should be shown on the site plan.

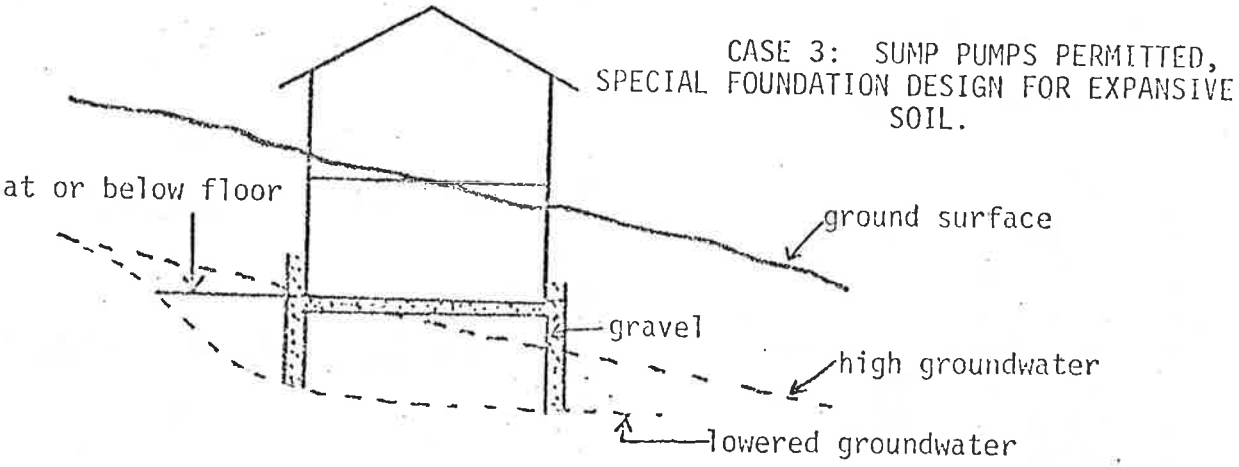
Engineering review is continuing but the applicant should have the above information as soon as possible since there is significant engineering yet to be done.

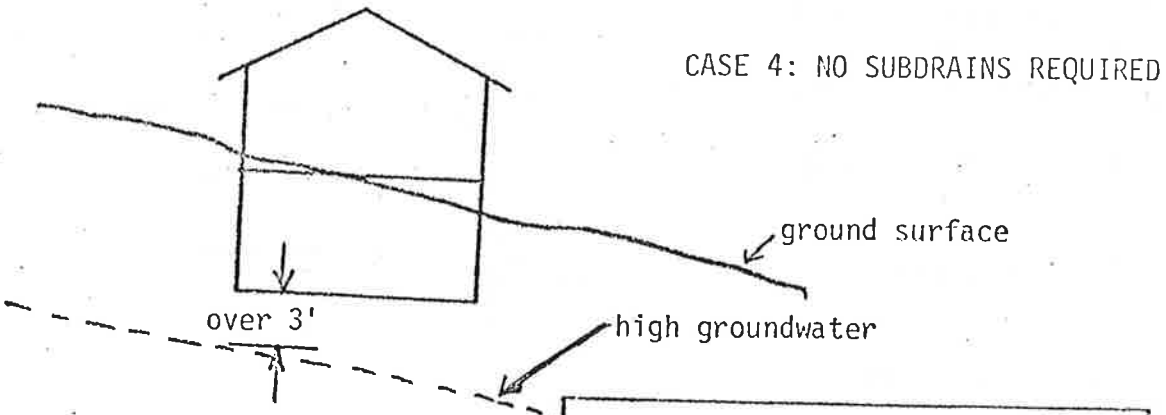
att.
/sw

cc: Applicant









BOULDER COUNTY
BUILDING DEPARTMENT

BASEMENT GROUNDWATER CONTROL

No Scale 10/78

CC: Applicant

REFERRAL RECORD

DOCKET #/NAME #SD-78-13 – PORTAL ESTATES FINAL PLAT/REPLAT

DATE SUBMITTED 11/2/78 REFERRAL REPLY DEADLINE 12/6/78

SEND		SENT	REC'D
	Boulder County Referrals		
⊘	ATTORNEY	○	○
⊘	BUILDING DEPT.	○	○
●	ENGINEERING DEPT.	●	●
○	EXTENSION AGENT	○	○
○	FIREFIGHTERS' ASSOC.	○	○
○	GEOLOGIST	○	○
○	HEALTH DEPT.	○	○
⊘	HOUSING AUTHORITY	○	○
●	PARKS & OPEN SPACE DEPT.	●	○
○	SHERIFF'S DEPT.	○	○
○	SOCIAL SERVICES	○	○
○	SOIL CONSERVATION SERVICE	○	○
○	SOLID WASTE/SPECIAL STUDIES	○	○
○	WILDLIFE CONSERVATION OFFICER	○	○
	Colorado State Referrals		
○	COSHA	○	○
○	DRCOG	○	○
○	ENGINEER	○	○
○	FOREST SERVICE	○	○
○	GEOLOGIST	○	○
○	HIGHWAY DEPT. (GREELEY)	○	○
○	LAND RECLAMATION BOARD	○	○
○	LAND USE COMMISSION	○	○
○	PLANNING OFFICE	○	○
○	PUBLIC HEALTH DEPT.	○	○
○	SOCIAL SERVICES	○	○
○	WATER QUALITY CONTROL COMM.	○	○
	U.S. Gov't. Referrals		
○	EPA	○	○
○	FOREST SERVICE	○	○
○	HUD	○	○
○	OSHA	○	○
○	POSTAL SERVICE	○	○
	CITIES, TOWNS, COUNTIES		
●	CITY OF BOULDER (3 COPIES)	●	○
○		○	○
○		○	○

SEND		SENT	REC'D
	Utility/Water Referrals		
⊘	PUBLIC SERVICE COMPANY	○	○
⊘	MOUNTAIN BELL TELEPHONE	○	○
○	DISTRICT 6 WUA (ENGR)	○	○
○	LEFTHAND/ST. VRAIN WCD (ENGR)	○	○
○	NORTHERN COLORADO WCD (ENGR)	○	○
○		○	○
○		○	○
	SCHOOL DISTRICT		
⊘	FOUNDERS VALLEY	○	○
	FIRE DISTRICT (LOCAL)		
⊘	FOUNDERS VALLEY	○	○
	HOMEOWNERS' ASSOCIATION		
⊘	TWIN LAKES	○	○
○	ADJACENT PROPERTY OWNERS	○	○
	MISCELLANEOUS OTHER		
○		○	○
○		○	○
○		○	○
○		○	○

sent interoffice mail - no certified receipts

planning department
p.o. box 471 13th and spruce st. boulder, colo. 80306 441-3930

boulder county

memorandum

edward a. tepe
planning director

DATE: March 1, 1979

TO: All Interested Parties

FROM: Tom Gray, County Geologist Tom

SUBJECT: Groundwater, Basements, and Crawl Spaces

As a result of emerging and projected problems concerning groundwater and basement drainage, especially in irrigated districts in the plains areas of the County, representatives of the Department of Public Works, the Building Division, and the Planning Division met in my office recently to firm up consistent County policy on accepted practice related to subdrainage. The following was agreed to.

1. The "design water table" is defined as (a) the elevation of the water table at a site as may be measured in the time period between May 1 and July 15 in any year or (b) the predicted May 1 - July 15 elevation of the water table at a site where such prediction is based on a comprehensive geo-hydrological study directed by a professional geologist and where the accuracy of such prediction is demonstrated to the reasonable satisfaction of the County. In cases where the water table may be artificially lowered, the design water table must be determined subsequent to the completion of the subdrain system. Provisions must be made for maintenance of the subdrain system, funds for maintenance, and individual or group responsibility for on-going maintenance.

2. Building permits for structures with basements shall not be issued unless the finished basement floor elevation is 6 inches or more above the design water table; and,

3. Building permits for structures with basements shall be issued where the finished basement floor elevation ranges from 6 inches to 2 feet above the design water table provided that the basement is equipped with a peripheral subdrain which flows to a sump or sumps, daylight, or other approved point. In each case the ultimate discharge point(s) for peripheral subdrains shall be approved during building permit application review and/or shall have been approved during subdivision-P.U.D.-special use review by the Department of Public Works. Acceptable ultimate discharge points may be (a) at-grade on lots larger than 1 acre provided that water will not flow onto adjacent property (b) buried storm drainage systems provided that freezing will not be a problem and (c) major natural waterways. Unacceptable discharge points are (a) roadside ditches (b) street gutters (c) at-grade on Lots 1 acre or smaller and (d) adjacent property; and,

...over please

planning department
p.o. box 471 13th and spruce st. boulder, colo. 80306 441-3930

boulder county

memorandum

edward a. tepe
planning director

DATE: July 6, 1979

TO: Gary Goodell, Planner

FROM: Tom Gray, County Geologist TOM

SUBJECT: Conceptual Replat Review, Portal Estates, Block 5, Twin Lakes, Second Filing

I have reviewed the subject replat as especially related to soil and geologic conditions, described in R.V. Lord & Associates report dated May 13, 1979. Approval of this proposal is recommended subject to the following understandings:

1. Building permit applications must be accompanied by plans and specifications showing compliance with all recommendations of said report; and,

2. The depths of the "Design Water Table" range from roughly 3.67 to about 6.5 feet in this subdivision. Basements will therefore be permitted when compliance with all provisions of the attached memorandum dated March 1, 1979 is clearly demonstrated. If developers or builders in this subdivision propose to construct basements with peripheral drains and sump pumps, it is strongly recommended that the ultimate water discharge points be approved by the County Engineer now!

TG:djp

ATTACHMENT C.

Twin Lakes-Related Files

SUBSURFACE SOIL INVESTIGATION

& PAVEMENT DESIGN RECOMMENDATIONS

For The Proposed

Cul-de-sac Extension of Kalua Rd.

TWIN LAKES SUBDIVISION

Boulder County, Colorado

Prepared For:

Grabow and Associates
250 Arapahoe Avenue
Suite 303
Boulder, Colorado 80302

November 17, 1978

Twin Lakes 2nd

R. V. LORD & ASSOCIATES INC.
P.O. Box 335/3250 Walnut St./Boulder, Colo. 80306
(303)443-0413

November 17, 1978

Grabow and Associates
250 Arapahoe Avenue
Suite 303
Boulder, Colorado 80302

Gentlemen:

The enclosed report contains the results of subsurface soil investigation services for the proposed cul-de-sac extension of Kalua Road to be located in Twin Lakes a subdivision of a part of Boulder County, Colorado.

If you have any questions concerning the data or recommendations presented, please call.

Very truly yours,

R. V. LORD AND ASSOCIATES, INC.

Donald Van Buskirk

Donald Van Buskirk
Engineering Geologist

DVB/sdk

Enclosure

W.O. 3220

GENERAL

The following report presents the results of a subsurface soil investigation for the proposed cul-de-sac extension of Kalua Road to be located in Twin Lakes a subdivision of a part of Boulder County, Colorado. This investigation was directed toward obtaining the technical information and soil property data necessary for the design of a foundation for the structure. The conclusions and recommendations presented are based upon analysis of field and laboratory data and experience with similar soils in the general area.

FIELD INVESTIGATION

The field investigation consisted of two test pits made at locations selected by R. V. Lord and Associates, Inc. project personnel in the field. Test pits were carried to depths considered sufficient to identify critical soils that would underlie the pavement system at the site and determine continuity.

For use in the laboratory, wall samples were recovered and preserved. Copies of the test pit logs are included with this report.

SUBSURFACE SOILS

The subsurface soils at the cul-de-sac consisted of 3 1/2- to 5-feet of gravelly sand overlying weathered claystone bedrock. The gravelly sand material was brown to dark-brown in color, moist, well-graded and determined to be at least partially fill material in origin. Sand grains were medium- to coarse-grained and subangular in texture. Besides the overall appearance and topographic variations of the granular material, we feel that the vegetative variations in the area indicate that some of the material is fill. Cobbles were determined to have a 3-inch maximum diameter. The weathered claystone bedrock was gray with some mottling and relatively soft as determined by visual inspection and pocket penetrometer test results.

No groundwater was encountered at the time of this investigation; however, it is anticipated that seasonally, seepage water may move through the strata.

LABORATORY TESTING

The laboratory testing program was directed toward obtaining the necessary information to recommend pavement design criteria based upon Boulder County specifications. A summary of our test results is as follows:

	% PASSING EACH SIEVE BY WEIGHT										
SAMPLE	1½"	1"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
Sandy Gravel & Clay Mixture	100	96	85	80	74	67	57	45	33	27	22.9
Weathered Claystone & Sand Mixture		100	94	93	88	82	74	68	62	58	49.6

LIQUID LIMIT	PLASTICITY INDEX	GROUP INDEX
26.8	15.1	0.3
30.6	17.6	5.4

PAVEMENT RECOMMENDATIONS

The pavement thickness requirements involves the consideration of the number of factors. These include volume, weight and distribution of the anticipated traffic loads, quality of the base and subbase materials utilized supporting the capacity of naturally occurring subgrade soils, the resistence of the asphaltic surface, as well as climatic and other environmental conditions.

The anticipated traffic volumes and 18k equivalent daily load application (18k EDLA) were estimated for the cul-de-sac extension on Kalua Road. This data is generally based upon traffic counts conducted prior to construction and utilization of equations to determine anticipated future conditions. For design

purposes, an 18k EDLA value of approximately 5 and a regional factor of 1.7 were used to estimate design parameters. We also anticipate this section of Kalua Road to have a serviceability index of 2.0. The soil support values for the area were determined by comparing the group index to the standard nomograph conversion charts supplied by the Colorado Department of Highways and utilized by Boulder County. For design purposes, an R value of 20 was used for the gravelly sand material (if used as subgrade) and an R value of approximately 5 was used for the claystone bedrock (if used as subgrade).

Based upon the data supplied above, the following pavement thickness recommendations are considered to be sufficient for the cul-de-sac addition on Kalua Road:

STREET DESIGNATION	TOTAL PAVEMENT THICKNESS IN INCHES
Local - Sandy Gravel Subgrade	8 "
	(2 " A.C., 6 " Base, 0 " Subbase)
Local - Weathered Claystone Subgrade	10 "
	(2 " A.C., 8 " Base, 0 " Subbase)*

Since the origin of at least part of the soils underlying the new cul-de-sac are in question, we would recommend that a minimum of 1 1/2- to 2-feet of this material be scarified and recompacted to a minimum of 95-percent of maximum density, as determined by AASHTO Method T-99. We have supplied a proctor curve for this material that has a maximum dry density of 130.2 pcf and an optimum moisture content of 7.4-percent. The mixing of this material in the field with claystone may change these values but for the time being they should be representative of site conditions. From the above recommendations, it can be seen that the reworking of on-site gravelly materials reduces the amount of import material necessary for adequate design.

*NOTE: 4-inches of base can be replaced with 8-inches of subbase.

During the course of this investigation, every effort has been made to determine subsurface soil conditions representative of the cul-de-sac. It is, of course, necessary to interpolate between soil borings, and the possibility of anomalies does exist. In the event that major soil variations are encountered at the time of construction, we should be notified immediately so that proper reevaluation may be undertaken.

Respectfully submitted,

R. V. LORD AND ASSOCIATES, INC.

Donald Van Buskirk

Donald Van Buskirk
Engineering Geologist

R. V. Lord and Associates, Inc.

Job No. 3320 Date: 10/20/78

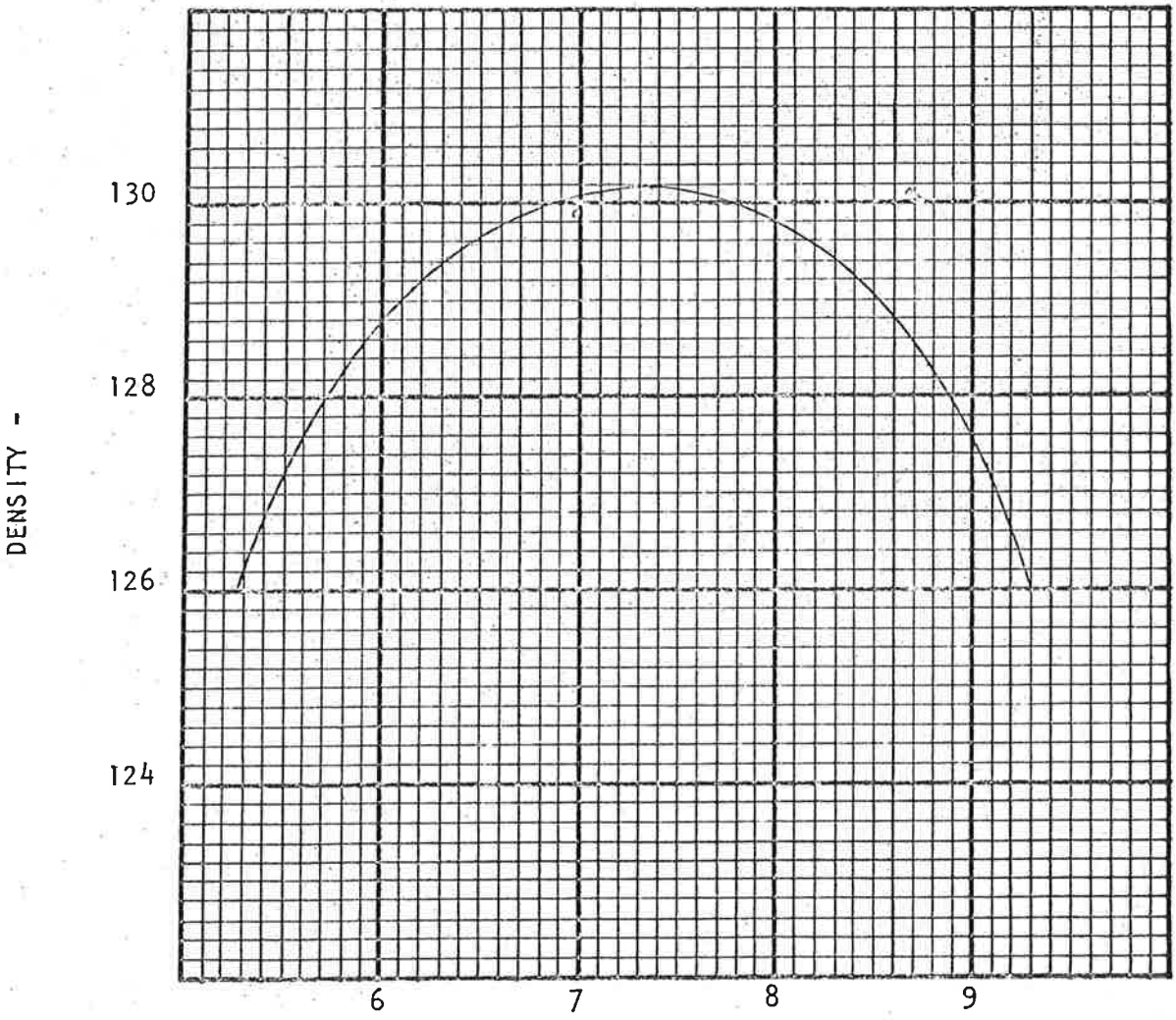
MOISTURE - DENSITY RELATIONSHIP

PROJECT: Kalua Road Extension

LOCATION SAMPLED: Subgrade R-90

MATERIAL: Sandy Gravel (Brown) SPECIFIC GRAVITY:

MAX. DRY DENSITY: 130.2 OPTIMUM MOISTURE: 7.4



WEIGHT OF HAMMER: 5.5 lbs. NO. OF LIFTS: 3

DISTANCE OF FALL: 12 inches DIA. OF MOLD: 4 inches

NO. OF BLOWS/-LIFT: 25 TESTED BY: TN

R. T. LORD & ASSOCIATES INC.
LORD
3[illegible] Walnut St P.O. Box 335 Boulder, Colo. 80302
(303) 443-0413

Project Twin Lakes — Date 10/18/78

Location of Boring End - 20' Extension of Kalua Road — W.O. # 3320

East hole at proposed road end — Boring # 1

Ground Surface Elevation: - ft. — Boring Method: Backhoe

Datum Elevation: - ft. — Diameter of Test Hole: - in.

Total Depth of Test Hole: 8' ft. — Benchmark Location -

GROUND WATER OBSERVATION: Water encountered during drilling -

Depth - hours after drilling -

SOIL PROFILE

DEPTH FEET	DESCRIPTION	SAMPLE NO.	SAMPLE DEPTH	BLOW COUNT
0 - 3½	SW Gravelly Sand - Dark-brown, moist, well-graded; sand - medium- to coarse-grained, angular, gravel - coarse-grained (2"-3" max.), rounded	1	0 - 3	Bag
3½ - 8	Weathered Claystone-Gray, mottled, relatively soft, moist	2	4 - 7	Bag

Drilled By: _____

LORD
3250 Walnut St P O Box 335 Boulder, Colo 80302
(303) 443-0813

Project Twin Lakes — Date 10/18/78

Location of Boring End - 20' Extension of Kalua Road — W.O. # 3320

Test hole at western end of extension — Boring # 2

Ground Surface Elevation: - ft. — Boring Method: Backhoe

Datum Elevation: - ft. — Diameter of Test Hole: - in.

Total Depth of Test Hole: 8' ft. — Benchmark Location -

GROUND WATER OBSERVATION: Water encountered during drilling -

Depth - hours after drilling -

SOIL PROFILE

DEPTH FEET	DESCRIPTION	SAMPLE NO.	SAMPLE DEPTH	BLOW COUNT
0 - 5	SW Gravelly Sand - Dark-brown, moist, well-graded; sand - medium- to coarse-grained, angular, gravel - coarse-grained (2"-3" max.), rounded	3	0 - 3	Bag
5 - 8	Weathered Claystone - Gray, mottled, relatively soft, moist	4	4 - 7	Bag

Drilled By:

boulder county

PUBLIC WORKS

MEMORANDUM

Authority

To Frances Jonas, County Housing / Date March 27, 1980

From Coleen Murray, P.E., Project Engineer CM

Subject: Twin Lakes 2nd Filing - Kalua Road - Soil Report by R. V. Lord and Associates dated November 17, 1978

The Public Works Department has reviewed the above-referenced soils report and is concerned that the test holes were made in October and indicated the water table was more than eight feet below grade. Experience in the area indicates that the seasonal water table is very high in this area, and the area is frequently boggy during the irrigation season. If the consultant reports the determination of the water table elevation during a time of seasonal high water table (May 15 through July 15) and the elevation is still at least eight feet below grade, the Public Works Department agrees to the proposed road structural section and the proposed recompaction of the top one and one-half to two feet of existing material.

co

LORD
R. V. LORD & ASSOCIATES INC.
P.O. Box 335 Boulder, Colo. 80306
(303)443-0413

September 24, 1980

Mr. Jim Liles, Director
Boulder County Housing Authority
P.O. Box 471
Boulder, Colorado 80306

Re: Kalmia Extension - Water Table

Dear Mr. Liles:

Please forgive the delay in getting this letter out; since our telephone conversation, it has been extremely busy.

As we discussed on the telephone, after the initial effort of attempting to read the water elevation and finding the monitoring pipe full of rocks, we went out again and, using a very small tape, were able to secure a water level reading of 28-inches from the surface.

A water level of this nature, this time of year, September 10, 1980, would indicate a very high seasonal level and any attempt to construct a roadway on this property would be quite expensive and, knowing the area under discussion, would be somewhat foolish.

Again, I apologize for the delay in getting the written confirmation to you. If you should have any questions, please do not hesitate to call me.

Very truly yours,

R. V. LORD AND ASSOCIATES, INC.

William A. Heffington
Director of Engineering

WAH:aol

W.O. 3320

public works department

p.o. box 471 2045 - 13th st. boulder, colorado 80306 441-3900

engineering division

boulder county

alex ariniello, p.e.
county engineer

October 21, 1980

Mr. Jim Liles, Director
Boulder County Housing Authority
P.O. Box 471
Boulder, Colorado 80306

TWIN LAKES SECOND FILING
BUILDING PERMITS # 23430 - 23440

The Public Works Department has reviewed the water table elevation information provided by R.V. Lord and Associates dated September 24, 1980. Although this does not correspond to the time of seasonal high water table (May 15 through July 15) it does show that the November 17, 1978 report indicating a water table more than eight feet below grade was not reflective of the actual situation and that the recommended design in that report will need to be modified due to the much higher water table measured September 10, 1980 at 28 inches below grade.

Rather than attempting to determine the costs and road design for the 160-foot Kalua Road extension at this time, the Public Works Department proposes that no money be escrowed by the Housing Authority for Block 9. When the property to the east of Twin Lakes proposes to develop, the government agency with jurisdiction at that time (the property may be annexed to the City of Boulder) can determine the required payments from the adjacent property owners based on cost estimates and policies in effect at the time.

It was originally planned to escrow funds from the adjacent property owners for their share of the road construction; and the developer of Lot 1 Block 11 has escrowed funds. Funds for only curb, gutter, sidewalk and paving were escrowed, however, and no escrow provisions were made for base and sub-base. Review of the above reports by R.V. Lord indicates that this base and sub-base work will be very expensive.

Since the time of the original platting of this Kalua extension in 1972, the County has adopted new zoning regulations and the comprehensive plan, both of which have resulted in delaying the development of the land to the east to which Kalua would connect. Although the current Twin Lakes Subdivision has developed with an undesirable dead-end road length, there was no plan to remedy this with the Kalua extension until the area to the east was developed. Because of this change in development timing, the Public Works Department has abandoned the original escrowing plan.

If you have any questions, please contact me.

Coleen Murray

COLEEN MURRAY, P.E.
PROJECT ENGINEER

dlf

Twin Lakes Open Space

Draft
Resource Evaluation & Management Plan

Prepared by:
Boulder County
Parks & Open Space

October 2004

SUMMARY

Great blue herons, red-winged blackbirds, Northern Harriers, Red-tailed hawks, coyotes, fox, and other birds and mammals use the Twin Lakes area to satisfy some of their habitat needs. The reservoirs and irrigation ditch corridors have become man-made refuges with increasing importance as development expands. They also are peaceful settings for walking, wildlife viewing, and dog exercising that are in the back yards of many neighbors.

The Boulder County Parks and Open Space Department's (BCPOS) mission encompasses the goals of conserving natural resources and providing public uses that reflect sound resource management and community values. For Twin Lakes, management recommendations revolve around protecting the best areas of wildlife habitat by focusing access points and imposing minor restrictions on dog activities. The plan recommends that dog access at the East Lake be limited to dogs on leash, and that dogs be allowed to continue to have off leash access to the West Lake.

1.0 INTRODUCTION

Twin Lakes, a 42-acre open space property containing two reservoirs, was purchased in January 2002. The reservoirs are used by the Boulder & Left Hand Irrigation Company (B&LHIC) to store and transport agriculture water. The lakes, surrounding wetlands, and irrigation ditches are habitat and travel corridors for wildlife. Neighbors walk, jog, view wildlife, and enjoy the lakes' scenic values.

Twin Lakes Open Space is located within the developed area known as Gunbarrel. A majority of the residences are in the unincorporated county while the commercial and industrial uses have been annexed into the City of Boulder. The Boulder & Left Hand Irrigation Company has been operating the reservoirs since 1910. In 1957 IBM purchased nearly 500 acres of agricultural property north of the Gunbarrel area. Residential and commercial development began in response to the development of the IBM plant in 1965. The Gunbarrel neighborhood grew and people started to use the reservoirs for recreation, trespassing onto private property and raising liability concerns for B&LHIC. In 2002 Boulder County and B&LHIC reached an agreement in which the county would purchase fee interest in the land and the recreation rights on the reservoirs while B&LHIC would retain the right to use the reservoirs to store water.

Legitimizing public use of Twin Lakes requires balancing wildlife requirements, historic recreational use, and Boulder County's mission and goals. Twin Lakes Open Space is a unique property requiring special consideration for management because of its ecological characteristics, patterns of previous use and proximity to urban development.

Dogs and their behavior on open space present wildlife sustainability concerns as well as conflicts with other users. Twin Lake's informal system of dog use at the time the county purchased the property evolved from years of neighborhood use and did not include any formal leash regulations. The development of this management plan is a result of Boulder County's purchase of the property, resource protection goals and policies for open space, public feedback and specific dog management recommendations that reflect Twin Lake's unique context and history.

1.1 Twin Lakes Open Space Survey

Along with assembling site information for the management plan, a neighborhood survey was completed in spring 2002 to collect opinions of property owners, surrounding business employees, and open space users regarding future management options. The survey results indicated the most heavily used access points, the reasons users appreciated Twin Lakes (such as its natural setting, proximity, and wildlife) and the importance of Twin Lakes to retain its neighborhood identity. The survey revealed that the property is consistently used throughout the day and over the week and a high percentage of users have dogs. Additionally, the survey results implied support for leash controls. A separate countywide phone-survey of 512 registered voters was conducted in July 2002 by an independent organization. Ninety-two percent of respondents of that survey indicated that protecting habitat for wildlife is very or fairly important. Sixty-eight percent agreed with the County policy requiring dogs to be on leash. See *Appendix 1* for a summary of survey results.

1.2 Interim Management Guidelines

In April 2002 staff developed interim management guidelines to manage the property until a final management plan was adopted. The recommendations included addressing health and safety issues such as removal of exposed re-bar in the concrete rubble and rope swings at the shoreline; general maintenance of the trails around the lakes; review of social trail access points for consolidation; initiation of a voluntary dog excrement pick-up program with newspaper plastic-bag recycling stations; enforcement of BCPOS rules and regulations; and prohibition of dogs from entering the lakes due to safety concerns. The Parks and Open Space Advisory Committee reviewed and recommended adoption of the interim guideline recommendations on April 22, 2002, after considerable public input.

The Board of County Commissioners adopted the interim management guidelines with the exception of the provisions on enforcement of the leash regulation. The Board directed staff to form a neighborhood advisory group to review and recommend dog management policies for Twin Lakes.

1.3 Twin Lakes Advisory Group

Dog management can be a significant concern among open space users and due to the unregulated, historic use of Twin Lakes it emerged as a prominent issue for recreational users and neighbors of Twin Lakes. This led the Board of County Commissioners to direct BCPOS staff to develop a Twin Lakes neighborhood advisory task force to formulate a dog management recommendation that would at a minimum "provide for wildlife protection and some accommodation for users that prefer not to encounter dogs off-leash." The Twin Lakes Advisory Group (TLAG) was formed from a pool of applicants living in the vicinity of Twin Lakes representing differing viewpoints about dog management at Twin Lakes. The group was facilitated by BCPOS staff and included two members of the Parks and Open Space Advisory Committee.

The Twin Lakes Advisory Group met six times between April and December 2003. Over the course of the six meetings, TLAG followed a process that resulted in a consensus dog management recommendation. The process consisted of the following steps.

- A vision exercise: What would you like to see at Twin Lakes in five years? What would the community like to see?
- Development of evaluation criteria to use for evaluating dog management proposals
- Submission of dog management proposals by individual members followed by evaluation by the group.
- A decision tree exercise to develop priorities and identify trade-offs in order to further evaluate and narrow down proposals
- Consensus recommendation

In addition to the process listed above, with BCPOS staff assistance, TLAG researched and reviewed documentation related to the dog management issue locally, statewide and nationally. They explored the possibilities of creating a dog park on a different open space property in the area, but it was ultimately agreed that an enclosed dog park could not offer the same opportunities for people to walk and exercise near water with their dogs, features that Twin Lakes has available. Throughout the discussions, wildlife values and impacts of human and dog use were weighed for this site.

2.0 RELEVANT GOALS AND POLICIES

The Boulder County Comprehensive Plan outlines goals and policies that are relevant to the Twin Lakes Open Space. These goals and policies, identified in *Appendix 2,* provide direction for land classification and natural resource planning and management; relevant topics include open space and environmental resources.

3.0 MANAGEMENT GOALS

The location of Twin Lakes within an urbanized area lends itself to providing neighborhood passive recreational opportunities, such as dog exercise, walking, jogging, and wildlife viewing. However, these activities must be compatible with the B&LHIC's water storage and delivery rights and protecting plant and animal communities dependant on Twin Lakes.

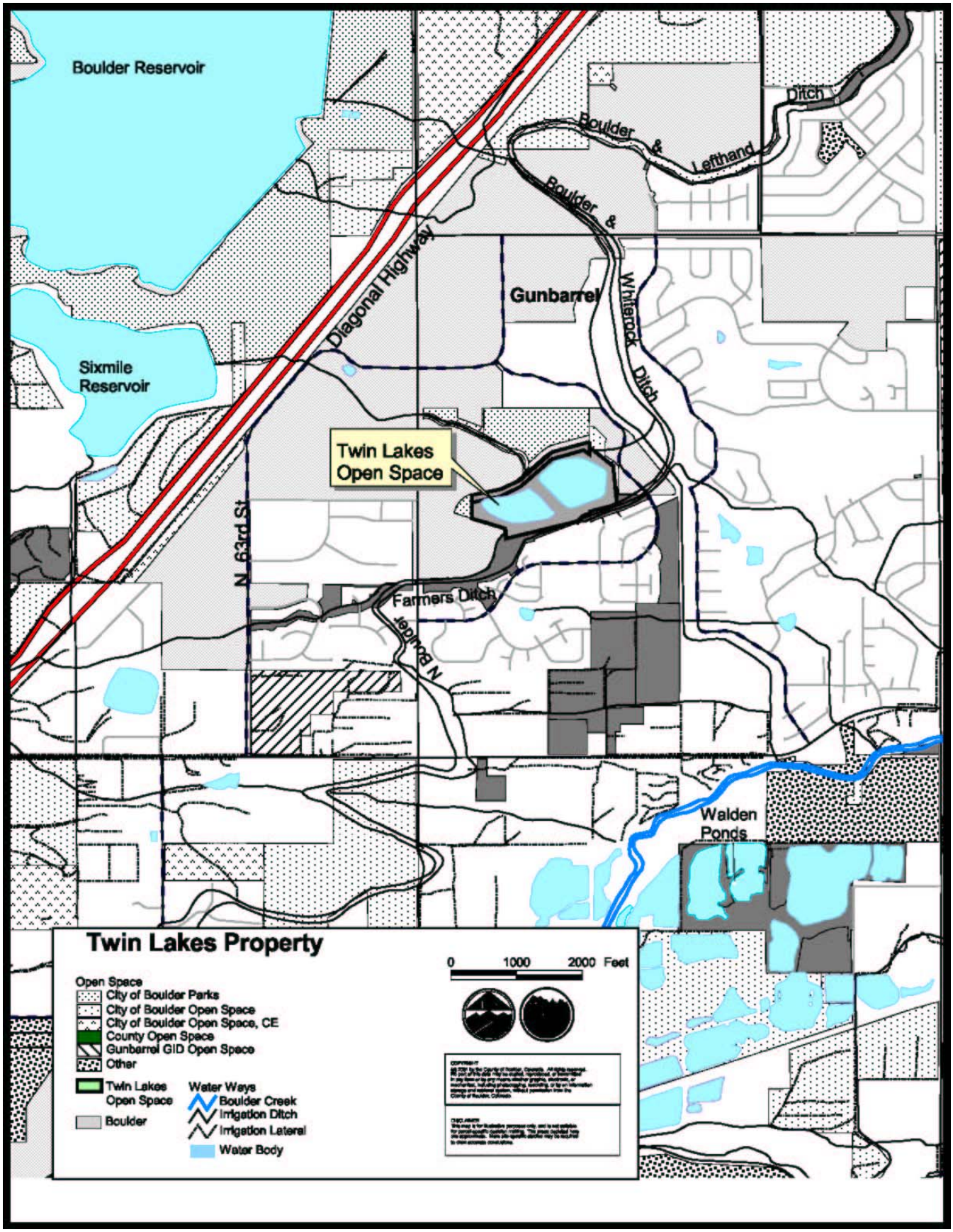
The primary management goals for Twin Lakes Open Space include:

1. Manage the historic recreational use of Twin Lakes.
2. Minimize and mitigate the recreational impacts on the B&LHIC's storage and water delivery rights.
3. Protect and enhance existing plant and wildlife communities.

4.0 GENERAL DESCRIPTION OF THE PROPERTY

Twin Lakes Open Space is approximately 42 acres, adjacent to the Gunbarrel area of the City of Boulder. The property consists of two reservoirs—a.k.a. Davis No. 1 (East Lake) and No. 2 (West Lake)—covering 27 acres, surrounded by trails, marshes, wetlands, upland and deciduous forest. Twin Lakes Open Space is virtually surrounded by commercial and residential development. Two irrigation ditches that also serve as wildlife corridors abut the south side of the lakes and one runs between the lakes. The Twin Lakes Open Space property shares boundaries with City of Boulder Parks and Recreation, City of Boulder Open Space and Mountain Parks, County Open Space, and private landowners.

Figure 1: Location Map



4.1 Acquisition History

Boulder County purchased the underlying fee interest plus the recreation rights to the reservoirs from the B&LHIC in January 2002 as the result of an effort to legitimize public recreational use of the property. The purchase price was $130,000, which included recreation rights but not water rights. Separately, the County was already a substantial shareholder of water in the ditch company. The purchase is subject to the reserved rights of the B&LHIC to continue to operate the water storage vessel and water delivery system outlined in the *Water Storage and Delivery Easement.* Additionally, a *Restrictive Covenant Running With the Land* states that the B&LHIC and Boulder County will use portions of the property jointly for recreational/open space and the operation and use of irrigation facilities as a part of the acquisition. The agreement allows for a minimum pool of water to remain in the reservoirs in the event a fishery is established in the future, and so long as the BCPOS does not claim the water as a carryover storage right.

4.1.1 History of Ditch Company Operations

The Boulder and Left Hand Irrigation Company has always used the Twin Lakes as an equalizer for direct flow deliveries within the ditch system. Water brought in through the inlet is released back to the ditch further downstream as needs dictate. Providing irrigation water to the agriculture shareholders is the primary function of the company. The water originates from Boulder Creek with the headgate located at the Broadway Street bridge in Boulder. Delivery of Colorado Big Thompson water is also available to shareholders of the B&LHIC.

Prior to residential development around the lakes, there was a period of time when the recreational rights were leased to a hunting and fishing club. The property was out in the country at the time so access was easily controlled with perimeter fencing and signage. However that began to change after the first condos were built in 1969 north of the lakes and construction began on the homes south of the lakes in the late 1970s. The private club gave up the lease when they could no longer control the general public from accessing the property and the ditch company was subsequently unable to find any other potential lessees interested in enforcing the trespass concerns in exchange for the exclusive recreational rights to the lakes.

Lee Forsyth was the irrigation ditch rider from 1976 until his death in 2000. After the newer residential units were constructed east of the lakes in the 1980s, Mr. Forsyth gave up trying to keep the increasing numbers of people out of the property (personal communication). His attempts with signage, fences and/or barriers were futile as they disappeared within a matter of days. Forced accommodation then became the operational mode of the company for the use on the property.

In 1994, with liability concerns as a major issue, the Board of Directors for the B&LHIC approached Boulder County about the possibility of leasing the Twin Lakes property to legitimize and help control all the public recreational use. State Law changes allowed for limited governmental liability to apply to private

irrigation facilities if those facilities were leased to public agencies for outdoor recreational purposes.

4.1.2 Boulder County Response

The BCPOS Department decided the request was worth consideration because of the considerable public use of the property, the adjacent open space already under management by the Department, the responsibilities of the BCPOS Department to provide non-urban recreational opportunities for residents of the unincorporated county, and the continued liability exposure of the ditch company, of which Boulder County was a significant shareholder.

After several attempts at structuring an equitable recreational lease for the property, the parties could not reach an agreement and the process was discontinued in 1998. Three years later, discussions began again for the county to purchase the underlying fee interest plus recreation rights to the reservoirs. The purchase was completed January 2002.

4.2 Physical Characteristics

4.2.1 Location and Access

Twin Lakes Open Space is located in southeast Boulder County, adjacent and to the south of the Gunbarrel area of the City of Boulder, in Section 11, Township 1N, Range 70W.

Twin Lakes can be accessed from Nautilus Dr. on the north, from the Twin Lakes Regional Trail to the south, and social trails connecting from Twin Lakes Road. There are approximately 10 unmarked spaces around the perimeter of the Nautilus Drive cul-de-sac that are used for public parking for Twin Lakes and the adjacent Eaton Park property.

Eleven existing access points were presented in the *Twin Lakes Neighborhood Survey*. The survey revealed that most users accessed Twin Lakes Open Space from Twin Lakes Road and the Twin Lakes Trail, south of the lakes. Neighbors also access Twin Lakes from the northeast across Eaton Park and along the outlet channel from the east lake. The Red Fox Hills subdivision has two private open space access points to the Twin Lakes trail.

4.2.2 Adjacent Land-Use and Ownership

Prior to 1969, when the first multi-family residential complexes were built north of the lakes, the surrounding land was farmed. Now, there is residential development adjacent to the east and south sides of the lakes, Twin Lakes Technological Park offices to the west, the private Country Day School to the northwest, and Eaton Park (a City of Boulder Park) to the north. Both the Archdiocese of Denver and the Boulder Valley School District own vacant property south of the lakes and there are a number of vacant lots in the Twin Lakes Technological Park to the northwest.

The Twin Lakes Technological Park, Eaton Park and Twin Lakes and Brandon Creek Condominiums are in the city limits of Boulder while Red Fox Hills and the Twin Lakes subdivisions south and southwest of the lakes are in the unincorporated county.

In the mid 1990s Boulder County constructed a segment of the regional trail adjacent to the south side of the lakes. The Twin Lakes Regional Trail currently extends from Spine Road through the Willows Open Space on the west to Twin Lakes Road on the east. The *Boulder County Comprehensive Plan* calls for this trail to eventually connect Boulder with the City of Longmont.

In addition to Eaton Park on the north, there are a number of other publicly owned properties in the vicinity of the lakes. The regional trail is within the Twin Lakes and Red Fox Hills Open Space dedications; A second Red Fox Hills Open Space parcel is to the southeast; and the Twin Lakes Technological Park dedication is west and northwest.

4.2.3 Current Leases, Easements, and Rights of Way

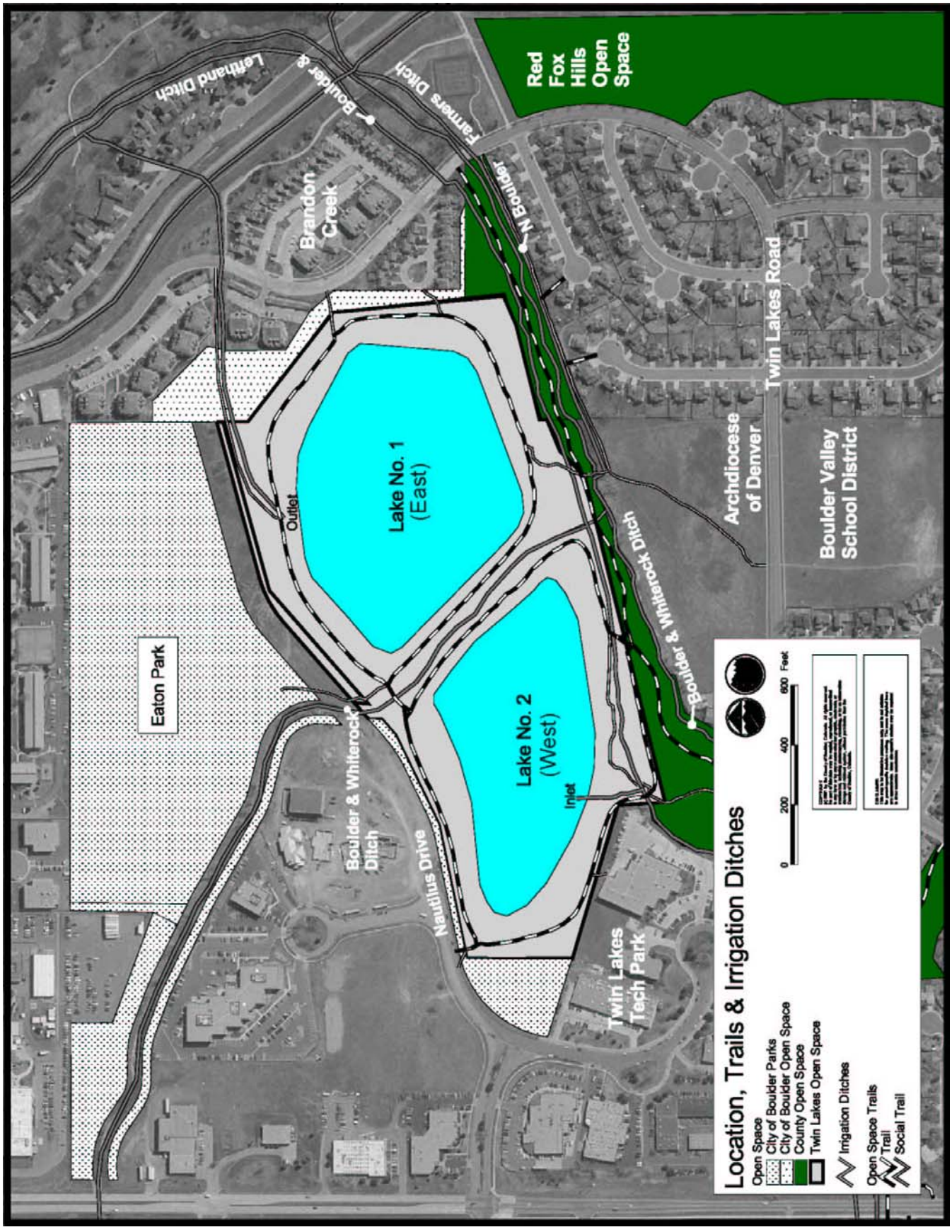
- Water Storage and Delivery Easement held by the Boulder and Left Hand Irrigation Company (the Seller of the Twin Lakes property)
- Restrictive Covenant Running with the Land
- Right-of-way for ditch purposes to the Boulder and Left Hand Irrigation Company
- Right-of-way for gravel road, pedestrian trail, concrete ditch structure, bridge, storm sewer manhole, and box culvert to N. Boulder Farmer's Ditch
- A 50-foot ditch easement for the Boulder and White Rock Ditch Company
- A 60-foot ingress and egress easement for the Boulder and Left Hand Ditch Company accessing the east lake from Nautilus Drive at the northwest edge of the lake.
- A 60-foot ingress and egress easement for the Boulder and Left Hand Ditch Company accessing the west lake from Nautilus Drive at the northeast edge of the lake.

4.2.4 Climate

Warm summers and cool winters characterize the climate along Colorado's Front Range and high plains. The average high temperature in July is 88.5° and the average low temperature in January is 11.5° (Weatherbase, 2002). Variations in temperature are the result of the absence of a large body of water that would act to regulate temperature extremes (Mutel and Emerick, 1984).

Rising from the plains, only eight to ten miles west of Twin Lakes, are the foothills of the Rocky Mountains. Peaks over 14,000 feet compose the shield of the Continental Divide causing rain clouds to drop their moisture, creating a rain shadow over the high plains. The average yearly precipitation is only 13.8" with most of the precipitation falling in May. The average snowfall is 35.5". Intensifying the effects of low precipitation are the drying winds channeled down

Figure 2: Location, Trails, & Irrigation Ditches



from the Continental Divide. These conditions produce a semi-arid climate on the high plains on which mainly grasses and herbs survive.

4.2.5 Topography

Gently rolling hills and seemingly flat land sloping imperceptibly to the east make up the topography of Colorado's high plains. Residing at an elevation of 5,180 feet due in part to the dam, the Twin Lakes reservoirs are slightly higher than Gunbarrel's commercial center. Wetland depressions and marshes surround portions of the lakes. Pasture grasses are preserved in open space areas south of the reservoirs.

4.2.6 Geology

Seventy to eighty million years ago a shallow Cretaceous sea covering all of Colorado was depositing layers of thick gray mud. Sea creatures were swimming around in these warm waters and leaving evidence of their existence through fossilized teeth, skeletons, or shells in muddy sediments. Underlying the Twin Lake reservoirs is thousands of feet of Pierre Shale bedrock made up of the muddy sediments left behind by retreating seas.

4.2.7 Soils

Nunn soils, formed on terraces and valley side slopes in loamy alluvium, a mixture of clay, sand, and silt deposited by streams, make up the soil composition of the Twin Lakes reservoirs. The well draining soils cover slopes of 0-9%. The slopes the Twin Lakes Open Space are 0-3% and 5-9%. The soils reach to a depth of 60 inches or more and vary from grayish brown clay loam to pale brown clay and clay loam. Short and mid grasses grow on Nunn soils (USDA Soil Survey, 1975).

4.2.8 Hydrology

Three ditches flow south of the Twin Lakes reservoirs, the North Boulder Farmer's Ditch, the Boulder and Left Hand Ditch, and the Boulder and White Rock Ditch. To the north of the east lake is Eaton Park (a City of Boulder Park). A wetland occupies approximately 14.2 acres of that park, which in part is energized from lake seepage. Northeast of the east lake is a marsh area, created by seepage from the lake, and wetlands continue around the east and south of the east lake.

The southwest corner of the west lake is the inlet from the Boulder & Left Hand Ditch. There is also a wetland on the west side of the west lake that is fed by street runoff from the adjacent industrial development. It is released from the detention area into the lakes.

4.2.8.1 Ditch Company Water Rights

The first direct flow water rights for the B&LHIC were appropriated off Boulder Creek June 1, 1862. An additional 82.8 cfs was appropriated December 1, 1873 and adjudicated June 2, 1882.

The first storage rights for the Twin Lakes carry an appropriation date of April 18, 1910. The present enlargement and increase in the height of the dam were a result of an additional appropriation October 30, 1947. The combined capacity of the two reservoirs is 218 acre-feet of storage. Over the past twenty years the average annual delivery to Twin Lakes has been 145 acre-feet.

The Twin Lakes are separated by the Boulder and White Rock Ditch easement. The inlet for the lakes is located in the southwest corner of the west reservoir and the gated outlet is on the north side of east reservoir. A siphon tube under the B&WR Ditch connects the two lakes. The east lake is 16 surface acres with a capacity of 137 acre-feet and maximum depth of 12 feet. The impoundment has a state dam rating of class 2, for which there could be significant property damage if there is dam failure. The west lake is approximately 11 surface acres with a capacity of 81 acre-feet. In most years this lake is drawn down during the irrigation season, exposing extensive mudflats by fall.

The Boulder and Left Hand Irrigation Company is a Colorado Mutual Ditch Company with 130 shares of stock issued; Boulder County owns 54.6 shares. The service area of the Ditch Company includes approximately 2,000 acres of farmland. The average annual delivery of water to stockholders (direct and storage rights) is 19 acre-feet per share.

5.0 RESOURCE EVALUATIONS

5.1 Historic Ecology

Enormous expanses of short grass prairie divided by cottonwoods and willows lining permanent watercourses covered the high plains prior to Euro-American settlement. Pronghorn antelope, foxes, coyotes, numerous small mammals, reptiles, and an estimated sixty million bison foraged in the shadow of the Rocky Mountains and across the plains (Costello, 1969). The sea of grass provided food and shelter for wildlife and there were few physiographic obstacles for the animals to contend with.

Agriculture and grazing altered the plains dramatically and growing cities covered open land. In the Gunbarrel/Boulder Reservoir area the once extensive wetlands have been transformed for industrial, agriculture, and residential uses. Remnants of native riparian and wetland ecosystems remain and artificial waterways create new habitat.

Wetlands and riparian areas provide food, denning and nesting sites, and respite from the hot sun or gusting winds. A diversity of flora and fauna are found in this ecosystem from water-dependent plants to migratory birds that use them for resting places.

5.2 Vegetative Resources

5.2.1 Vegetative Communities

Wetland fringe, forested riparian, and upland grass communities comprise the vegetation surrounding Twin Lakes. These communities are heavily disturbed and the predominant vegetative covering is weedy species and pasture grasses.

Covering the dry upland is primarily introduced pasture grasses such as cheatgrass (*Bromus tectorum*) and smooth brome (*Bromus inermis*). Native buffalo grass (*Buchloe dactyloides*) and blue grama (*Bouteloua gracilis*) are present. Native wetland species include Emory's sedge (*Carex emoryi*), marsh milkweed (*Asclepias incarnata*) and three square (*Schoenplectus pungens*), forbs include curlycup gumweed (*Grindelia squarroso*), Indian hemp (*Apocynum cannabinum*), wild licorice (*Glycyrrhiza lepidota*), and broadleaf cattails (*Typha latifolia*). Cattails are abundant in the marshy areas around the lakes.

The intermediate and over-story include Plains cottonwoods (*Populus deltoides*), peach-leaf willow (*Salix amygdaloides*), wild plum (*Prunus americana*) and chokecherry (*Padus virginiana*).

5.2.2 Exotic Species and Noxious Weeds

Weed species are the predominant covering at Twin Lakes. Common teasel (*Dipsacus fullonum*), prickly lettuce (*Lactuca serriola*), kochia (*Kochia scoparia*), common ragweed (*Ambrosia psilostachya*) are present. Canada thistle (*Cirsium arvense*), knapweed (*centaurea* diffusa) and Russian olive (*Elaeagnus angustifolia*) are noxious weeds found in limited quantities.

5.3 Wildlife Resources

By the late 19th and early 20th centuries, much of the native prairie ecosystem in what is now Gunbarrel had been converted to agricultural habitats. The dryland and irrigated crops and pastures replaced the native grasses and ditches and small lakes were added for distribution of irrigation water and stock watering. The new blocks of habitat were more fragmented and better suited to use by habitat generalists vs. specialists, "edge" vs. "interior" species, and species tolerant of human influence. Additionally, from the 1950's thru the 1980's gravel mining and reclamation along Boulder Creek, 1 mile south, has provided hundred's of acres of pond, riparian and wetland habitat that did not exist previously.

Twin Lakes is also an artificial system but it provides habitat for a variety of avian species and mammals relatively tolerant of close human proximity and adaptable to an urban context. Waterfowl, migratory songbirds, and small mammals are most common. Cattails and marshes provide resting places and shelter, and irrigation ditches serve as travel corridors for movement to nearby open space and rural landscapes.

With reference to the Boulder County Comprehensive Plan, there are no critical wildlife habitat, critical stream corridor designation, high quality aquatic habitat, rare plants or designated ECA's identified for Twin Lakes. The occasional Bald Eagle

noted at the property is the only Federally listed T&E species and it has been proposed for delisting by the US Fish & Wildlife Service becase it has recovered sufficiently to no longer be in danger of extinction.

Parks & Open Space staff analyzed the existing habitat on the Twin Lakes property and developed a wildlife values ranking (see figure 4). Those areas with the highest overall ratings warrant some measure of protection from human and canine encroachment.

5.3.1 Mammals

Small mammals that adapt well to urban areas are the most common mammals in Twin Lakes Open Space. Species include meadow voles (*Mictrotus pennsylvanicus*), raccoon (*Procyon iotor*), striped skunk (*Mephitus mephitus*), and red fox (*Vulpes vulpes*). Introduced fox squirrels (*Sciurus niger)* are common. Coyotes (*Canis latrans*) will also use this riparian habitat occasionally although they are more common in open areas. In recent years, trapping for the Preble's Meadow Jumping Mouse has been undertaken as part of the development of Eaton Park and no individuals were found. Mammalian species, some more common than others, are listed in *Appendix 3*.

Figure 3: Vegetation

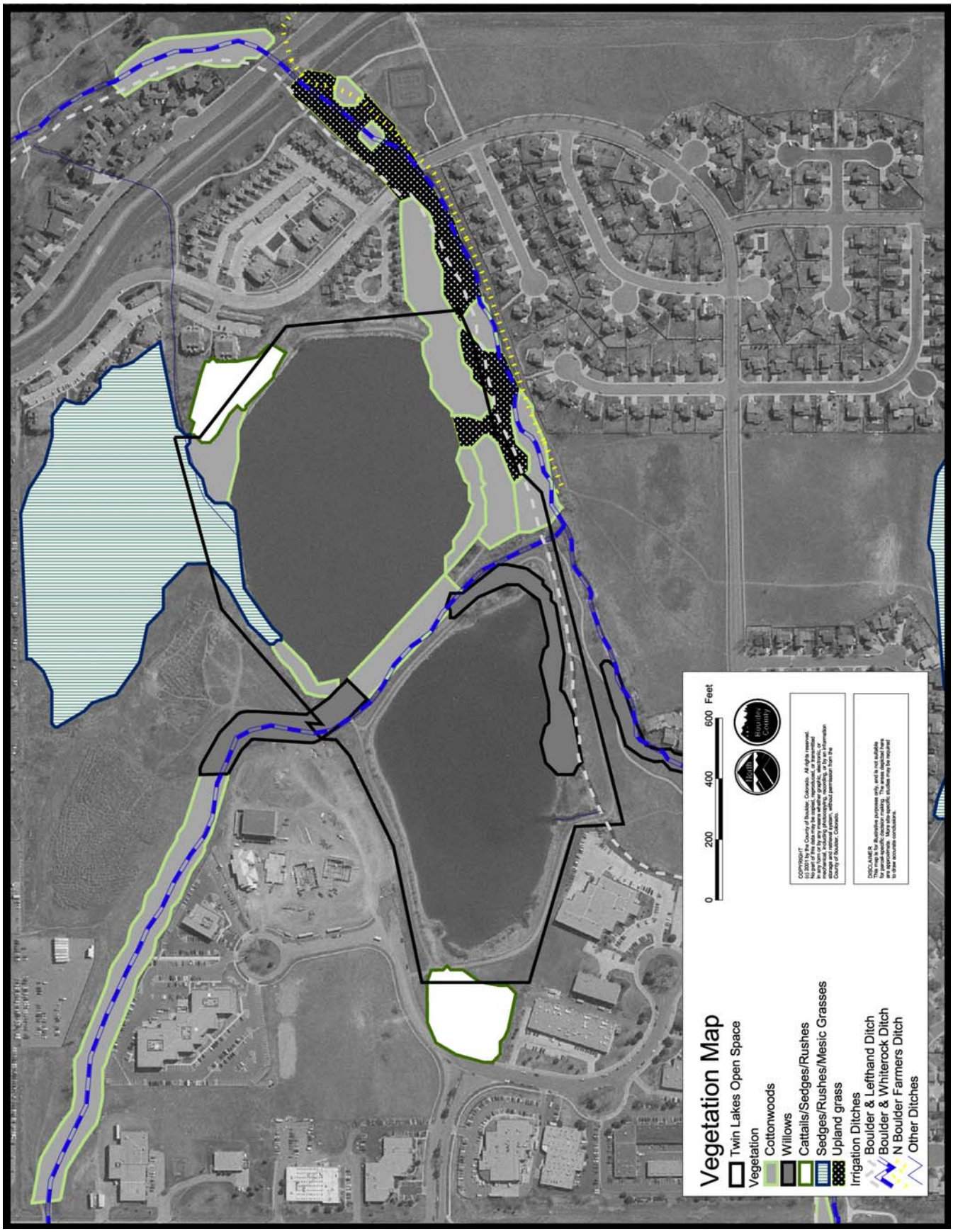
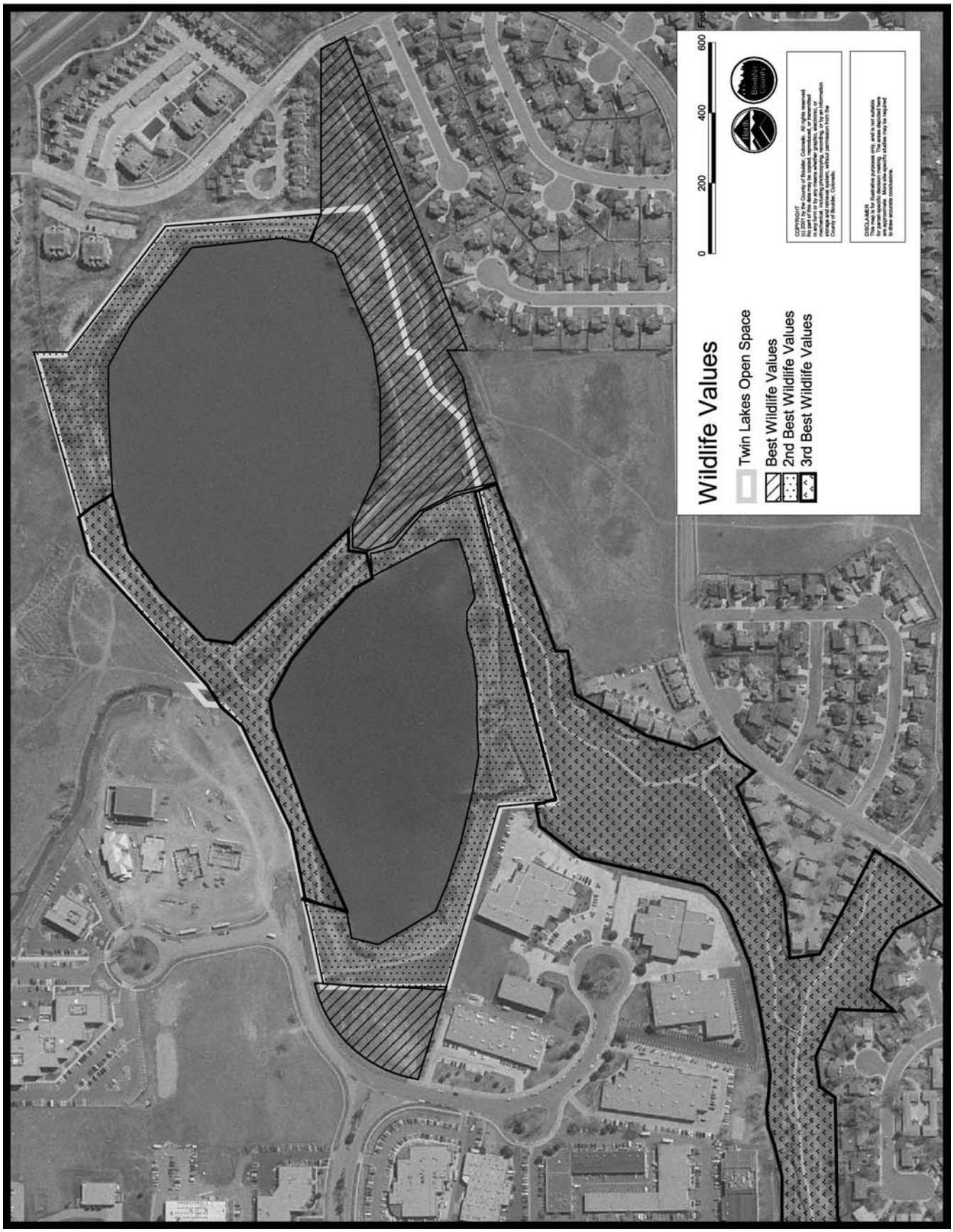


Figure 4: Wildlife Values



5.3.2 Birds

The avian habitats for Twin Lakes include open water, marshes and cattails, irrigation ditches, and forested areas that provide resting areas and sheltered nest sites. Waterfowl, shorebirds and wading birds are found at Twin Lakes and neotropical migrants stop over to rest during long flights. Both lakes provide open water for waterfowl however the east lake has a deeper bowl and retains water throughout normal years. Common species include red-winged blackbirds (*Agelaius phoenicus*), mallards (*Ana platyrhynchos*), Canada geese (*Branta canadensis*), common snipe (*Gallinago gallinago*), killdeer (*Charadrius vociferous*), and the belted-kingfisher (*Ceryle alcyon*). For a list of potential avian species see *Appendix 4*.

While all native birds are protected by the Migratory Bird Treaty Act, the Colorado Division of Wildlife and Boulder County maintain a list of Species of Special Concern that include those who are present infrequently or in small numbers; are undergoing a significant regional, national or global decline; or are limited to specific, small or vulnerable habitats. Those bird species of concern that may frequent Twin Lakes are noted with an * in *Appendix 4*.

5.3.3 Ecological Values of East Lake

- Vegetation and trees on south side provide wildlife refuge
- Better potential fishery due to deeper bowl relative to west lake
- Large continuous wetlands starting in Eaton Park on the north and surrounding the east lake to the east and south are valuable habitat

5.3.4 Ecological Values of West Lake

- Wetlands along west shoreline provides value to ground nesting birds
- Lower aquatic habitat value due to fluctuations in water level compared to east lake
- More natural shoreline sustaining wetland fringe, and wetland plant communities
- Better winter habitat for waterfowl due to the shallow depth of the lake
- Trail turns inland along south side of the west lake allowing for a less disturbed shoreline area

5.4 Recreation Resources

According to the user survey, walking is the most common recreational activity at Twin Lakes Open Space. Wildlife viewing, jogging/running, bike riding, dog exercising in and out of the water, bird watching, and nature study are other activities that users pursue at the property. Additionally, the 1.9-mile Twin Lakes Regional Trail, south of the reservoirs, provides further recreation opportunities. The maintenance road around the lakes provides 1.2 miles of trail for recreational users. The lakes are adjacent to picnic tables and an informal BMX dirt bike area at Eaton Park to the north. The City of Boulder is planning a number of educational signs interpreting wetlands along the trail at the southwest side of Eaton Park.

6.0 MANAGEMENT DIRECTION

The general management direction for this property includes balancing protection of the natural environment with the interests of dog owners, general recreationists and the irrigation company. Factors including surrounding development, historic uses and contractual agreements became important elements in the management objectives for this property:

1. Protect the scenic quality and undeveloped nature of the property.
2. Provide passive outdoor recreation opportunities that do not adversely impact biological resources or the water delivery or storage rights of the B&LHIC.
3. Manage vegetative communities by maintaining and encouraging desirable native species, restoring degraded areas and controlling undesirable exotic species.
4. Manage wildlife habitat by maintaining natural food, cover, nesting and roosting areas.
5. Consolidate management of public property to the extent possible.
6. Manage the property to retain the existing neighborhood character.
7. Provide a good neighbor policy to the B&LHIC and adjacent landowners.

6.1 Reservoir Management

The B&LHIC will continue to be responsible for maintaining the structural integrity of the dam and the maintenance of the irrigation ditches. The *Restrictive Covenant Running with the Land* includes a provision that allows for a minimum pool of water to remain in the east lake to perpetuate a potential fishery.

6.2 Vegetative Management

Encouraging native species through weed control is the recommended vegetative management strategy. As management partners, the irrigation companies should be consulted up front to determine any impacts on water delivery or storage such actions might have. Similarly, the City of Boulder Parks and Recreation Department should review any control action contemplated on land adjacent to Eaton Park.

In the *Restrictive Covenant Running with the Land* the County agrees not to plant trees or other vegetation that would interfere with the B&LHIC's water delivery. The Boulder & Left Hand Irrigation Company also reserves the right to remove vegetation as necessary for unimpeded flow of irrigation water and preventative maintenance of irrigation facilities.

6.2.1 Noxious Weeds

Noxious weed infestations are not severe on the Twin Lakes Open Space, however efforts should be made to keep potential problems at a minimum. Controlling infestations must be accomplished in coordination with the ditch company to ensure the structural integrity of the dam. Recommendations for managing weed infestations are:

- Spot spraying Canada thistle and teasel with an herbicide
- Mowing trailside areas to keep the annual broadleaf weeds to a minimum
- Working with the ditch company to halt the growth of Russian Olive by cutting trees and encouraging the growth of native trees such as cottonwoods and willows away from dam.
- Coordinating efforts with City of Boulder Parks & Recreation to control the spread of weed species across adjoining properties.

6.3 Wildlife Management

Managing wildlife values on the Twin Lakes Open Space should center on protecting important areas from human and canine encroachment. Each lake has different wildlife significance. The east lake is bordered by a continuous wetland at the base of the dam along its north and east sides providing significant habitat. The west lake has a more natural shoreline. It is also less accessible to human and canine disturbance along its south side because of willow thickets and the larger distance between the trail and lake shoreline.

Discouraging or preventing people and dogs from using important wildlife areas (indicated on Figure 4) are the most effective management tools to protect wildlife values on this property. Fencing will be used to define appropriate recreation areas and access points minimizing canine and human encroachment into wildlife habitat. This could result in some improvement in species diversity for the property.

The Boulder & Lefthand Irrigation Company has the responsibility, as outlined in the *Restrictive Covenant Running with the Land,* to remove burrowing rodents from the dam as may be necessary for preventative maintenance and to allow the unimpeded flow of irrigation water through the facilities.

The gallery deciduous forest along the south side of the property will be managed to discourage human or canine encroachment through the use of fencing (may be temporary) and signage as needed

6.4 Recreation Management

Managing recreation in Twin Lakes Open Space requires a change in historic visitor use. Prior to the purchase of the property by the county recreational use had evolved into a laissez faire, non-regulated or enforced system. Recreation management of the property will include oversight of health and safety issues, site planning to focus human access, and dog management. Management recommendations will reflect the importance of retaining the feel of a neighborhood-gathering place.

6.4.1 Twin Lakes Advisory Group Dog Management Recommendation

The Twin Lakes Advisory Group was formed at the direction of the Board of County Commissioners. The group used a process of vision exercises to develop evaluation criteria, submit individual dog management proposals, evaluate the proposals as a group, and identified and prioritized solutions. Balancing the habitat requirements of wildlife and the impacts of humans and dogs were central

considerations. The Twin Lakes Advisory Group developed three guiding principles that aided in their consensus recommendation.

1) The Twin Lakes area should retain the feeling of a neighborhood-gathering place.
2) The Twin Lakes should be a place where a broad diversity of people could enjoy the outdoor setting in relative harmony.
3) The physical infrastructure in the Twin Lakes area should support a casual atmosphere, and build on the historic traditions of the area.

6.4.1.1 Recommendation

Twin Lakes Advisory Group's recommendation is that upon completion of the management plan, the County permits one lake to have an off-leash regulation while enforcement of the County's on-leash regulation occurs at the other lake. This recommendation also extends to dogs being allowed in the water on the corresponding side, i.e. dogs are allowed in the water on leash on the East Lake and dogs are allowed in the water off-leash in the West Lake.

Twin Lakes will not be the only Boulder County Open Space property where specific dog management measures have been structured. Dogs are not permitted at Heil Valley Ranch, Hall Ranch and Caribou Ranch while Reynolds Rogers near Nederland and the Blue Jay Mine property near Jamestown permit dogs to be off-leash. Below is a summary of TLAG's recommendation. See *Appendix 5* for the complete recommendation.

6.4.1.1.1 Definition of "Off-Leash"

For the purposes of off-leash regulations, TLAG recommends that Boulder County define dogs off-leash as dogs that are not physically connected to the human they are accompanied by.

6.4.1.1.2 Designation of "Off-Leash" Lake

Twin Lakes Advisory Group discussed many of the variables that should be considered in deciding which lake should have the off-leash designation. They summarized variables and decided to defer to Boulder County POS staff within the context of the broader management plan and TLAG's guiding principles.

Each lake has important ecological and recreational values. Protecting the best wildlife habitat from human and canine encroachment is a priority. In addition, open space management must strive to serve the public interest of all Boulder County citizens who provided the opportunity to purchase and preserve open space. Designating one lake as off-leash must take into account these factors.

To reach a decision designating which lake will be off-leash BCPOS staff analyzed wildlife habitat, vegetative communities, access, visitor use, management of adjacent properties, and TLAG's guiding principles. A

consensus was reached designating the east lake as on-leash, and the west lake as off-leash. The following factors influenced this decision.

- The best overall wildlife values are along the south side of the east lake. Leash requirements and focused access could also increase the wildlife habitat potential along the east and northeast wetland/marsh area.
- The east lake has the most continuous wetland below the dam and extending from Eaton Park, along the east side of the lake to the gallery forest stands along the south side.
- Eaton Park to the north, the City of Boulder Mountain Parks and Open Space property to the east, Twin Lakes Regional Trail to the south, and City of Boulder leash laws in the City jurisdiction all require dogs to be on-leash. Visitors with dogs should already have their dogs on-leash when accessing the east lake from these sides. Designating the east lake as on-leash would be a continuation of the rules and regulations of the surrounding property.
- A significant number of residences and access points are located near the east lake. All visitors, including those wishing not to encounter dogs off-leash, could use this area.
- Although scenic values are comparable the east lake provides a slightly more expansive view of the mountains from its east shoreline.
- The west lake is mostly devoid of an armored shoreline and is more conducive to dog access to water.
- Water levels fluctuate considerably in the west lake, lowering aquatic habitat values.
- Both lakes will likely freeze over in the winter. However, the west lake is shallower and will likely have less ice surface for safety concerns.
- Willow stands protect the south side and southeast corner of the west lake. The trail moves away from the lake on this side thereby allowing for some habitat effectiveness.

See *Appendix 6* for a Preliminary Site Plan.

6.4.1.1.3 Evaluation Period

Boulder County Parks and Open Space and TLAG recommends that the off-leash designation be monitored and evaluated after the management plan adoption and implementation. The purpose of the resource-based evaluation is to determine if the off-leash designation is

working adequately or if adjustments to the policy or its implementation are needed. Monitoring and evaluation would begin after the infrastructure improvements are in place (e.g., fencing and signage).

The evaluation period would be two-phase: a check-in after one year, and a more formal evaluation after five years. After the first year, the check in would review evidence of compliance, number and nature of tickets issued, number and nature of complaints, habitat degradation and any other available anecdotal evidence. The success of voluntary excrement removal, adequacy of parking and potential adjustments with neighboring property agencies would also be reviewed. Adjustments or refinements in the infrastructure or the policy implementation would be recommended based on this information.

The five-year evaluation would be more thorough, and might include more formal evaluation of habitat conditions and compliance with leash regulations on the east side as compared with other BCPOS properties. This longer time frame would allow the BCPOS interpretive staff to include Twin Lakes in their five-year visitor study. This study, which is based on personal interviews at most BCPOS parks, focuses on visitors' experiences. The next study cycle is slated for 2005. Finally, this time period would allow the development of a neighborhood "Friends of Twin Lakes" to develop and work from the grassroots level.

6.4.2 Visitor Amenities

Visitor amenities should be limited at the Twin Lakes reservoirs to reflect TLAG's guiding principle of physical infrastructure supporting a casual atmosphere and building on the historic traditions of the area. Currently, a trash receptacle and plastic bag recycling station are located at the access from Nautilus Drive. A kiosk placed near the Nautilus Drive access, central to users of either lake, would provide a location to post information about the lakes, rules and regulations, a map, information about the area's unique management, and brochures. Benches placed along the trail may be desirable amenities in the future.

Stocking the reservoirs with fish and installing fishing pier amenities are often supported by grants offered by the Colorado Division of Wildlife. Despite the fluctuation of the water levels in the reservoirs, these urban fishing opportunities should be pursued in the future.

Due to the relatively small size of the reservoirs, fluctuating water levels, desires of the neighborhood and no formal, supported fishing program, there should be no boats or bellyboats permitted at this time on either lake.

6.4.3 Visitor Access, Fencing, Trails and Parking

Focusing visitor access can aid in protecting wildlife values around Twin Lakes by establishing consistent areas and patterns of use away from valuable wildlife areas and thereby potentially increasing habitat effectiveness. Site planning includes locating access points and fencing to protect significant natural

resources as well as addressing safety concerns by making improvements to bridge crossings.

One of the guiding principles of TLAG is the desire that Twin Lakes retains its feel as a neighborhood-gathering place. Any infrastructure addition will reflect this principle.

Access: Historically, visitors have accessed Twin Lakes by numerous social trails. The desire is to close and revegetate about ½ of those access points, focusing instead where there is the least environmental impact, where there are logical openings in fences and across bridges, and where many recreationists currently enter the property. Many of the current social trails have caused erosion on the dam face, cut through environmentally sensitive areas or are unnecessary duplicates.

Designated access points would be signed with BCPOS rules and regulations. The existing access points at both the B&LHIC maintenance roads from Nautilus Drive as well as from Twin Lakes Trail will continue to be used. Drop gates should be installed to provide visitor and vehicle access. Improving trail access from Nautilus Drive by building trail beds, grading using methods that will not impact the structural integrity of the dam, and using crusher fines would improve access and minimize compacted areas that are muddy after rains or snow melt.

Currently the primary access from the Twin Lakes Regional Trail feeds into Twin Lakes at two points on the south side of the west lake. These would continue. Constructing a trail and bridge from the Twin Lakes Regional Trail to the east lake at the regional trail bridge over the Boulder & White Rock Ditch would provide users wishing not to encounter dogs off-leash a new access to the on-leash lake.

Trail access from the east side of the property is desired and should be formalized, subject to a number of constraints. First, the trail would cross City of Boulder Open Space and Mountain Parks property so coordination will be necessary; full management by the county would be preferred. Second, the trail crosses a wetland area that may require a permit to install a boardwalk. Third, accessing the trails requires recreationists to walk up the dam face. Some form of engineered trail or stairs that do not compromise the structural integrity of the dam would need to be built.

Fencing: Fencing can be used to protect important natural areas and habitat and to define visitor use areas. At Twin Lakes fencing would be used to:

- Define appropriate access locations
- Protect important natural resource features around the west side of the off-leash (west) lake from human and canine encroachment
- Delineate boundaries between the off-leash and on-leash areas and between city and county property

- Direct visitor use patterns away from important natural areas

Temporary fencing and signage should be used to discourage use of social trails until they are re-vegetated and new visitor use patterns are established.

Trails: The existing east and west loop trail system adequately serves the current and projected needs of visitors to the Twin Lakes Open Space. As a result, only minor modifications to this system are desired in order to provide an alternate route into the east lake at the southwest corner and to upgrade trail surfaces.

All bridges in the system need improvements including railings. A new bridge crossing in the southwest corner of the east lake will be needed when the new connector segment of trail is constructed.

Continued vehicle access by the B&LHIC ditch rider on the same trail system is anticipated.

Parking: If use of Twin Lakes remains relatively status quo then vehicle parking is adequate. A moderate growth in visitation can likely be accommodated with existing on-street parking. However, if documented parking problems occur or if Twin Lakes becomes a destination park and there isn't enough parking, review of additional parking options will be necessary.

See *Appendix 6* for the Preliminary Site Plan and *Appendix 7* for Site Photos.

6.4.4 Education and Outreach

Effective forms of outreach and non-personal interpretation such as signs can be used to educate users on natural resources, in particular riparian and wildlife values, dog management policies and BCPOS rules and regulations. Outreach will be conducted through personal contact by Park and Open Space staff primarily during the beginning of the trial period and at the implementation of the dog management plan.

A kiosk will be centrally located between the two lakes informing and educating visitors about the regulations in place as well as information on the property. The City of Boulder will be installing a series of interpretive signs on wetland ecology along their trail in the southwest side of Eaton Park. There may be opportunities to expand these types of trailside interpretive panels at Twin Lakes in the future.

6.5 Emergency Services

Emergency response is provided by a number of agencies, organizations, and fire protection districts with the primary jurisdiction by the Boulder County Sheriff's Department.

6.5.1 Law Enforcement

Boulder County Sheriff's Deputies, a number of whom are assigned full-time to patrol open space properties, and County Open Space Rangers will provide patrol and law enforcement services.

Rules and Regulations for Twin Lakes Open Space are the same as for other POS properties, the only exception being for the off-leash allowance of the west lake area. In order to allow dogs off-leash, the county can use existing regulations, which would permit off-leash use at Twin Lakes by posting the appropriate side of property as a designated off-leash area. See *Appendix 8* for *Boulder County Parks and Open Space Rules and Regulations, Appendix 5* for *"Elements of an "Off-Leash" regulation" in TLAG's Dog Management Recommendation.*

6.5.2 Fire Protection

Twin Lakes Open Space is within the Boulder Rural Fire Protection District.

APPENDICES

Appendix 1: Twin Lakes & Open Space Management Survey Results

BOULDER COUNTY PARKS AND OPEN SPACE
TWIN LAKES NEIGHBOR SURVEY 2002

		OVERALL	SURVEY VERSION	DO YOU HAVE DOGS	
			Mail Survey	YES	NO
WHAT IS THE TOTAL NUMBER OF PEOPLE IN YOUR HOUSEHOLD	One	30%	30%	23%	35%
	Two	37%	37%	38%	36%
	Three	13%	13%	15%	12%
	Four	15%	15%	19%	12%
	Five	4%	4%	4%	4%
	Six	0%	0%	1%	0%
TOTAL		100%	100%	100%	100%
Average		2.3	2.3	2.5	2.1
Median		2.0	2.0	2.0	2.0
n =		678	678	294	380
HOW MANY CHILDREN ARE IN YOUR HOUSEHOLD	None	51%	51%	48%	53%
	One	20%	20%	19%	21%
	Two	23%	23%	27%	20%
	Three	6%	6%	6%	5%
	Four	1%	1%	1%	0%
TOTAL		100%	100%	100%	100%
Average		.9	.9	.9	.8
Median		.0	.0	1.0	.0
n =		468	468	225	243

10 Apr 02
Source: RRC Associates

BOULDER COUNTY PARKS AND OPEN SPACE
TWIN LAKES NEIGHBOR SURVEY 2002

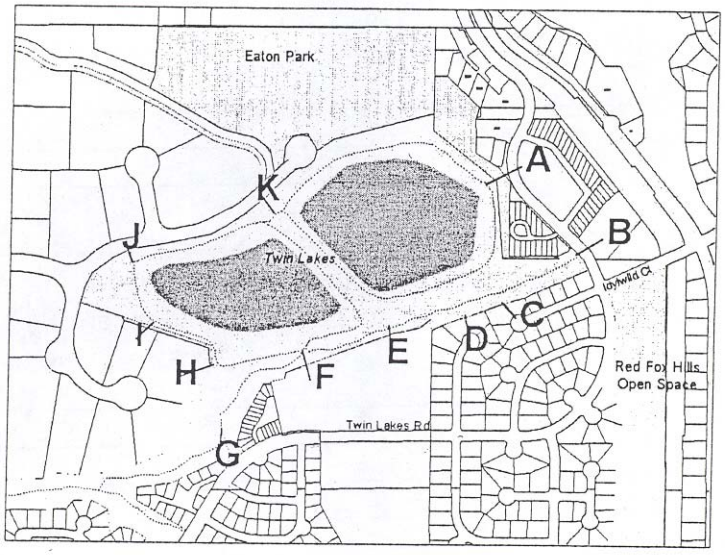
		OVERALL	SURVEY VERSION	DO YOU HAVE DOGS	
			Mail Survey	YES	NO
IF YOU HAVE CHILDREN, WHAT ARE THEIR AGES	0	5%	5%	5%	5%
	1	8%	8%	10%	5%
	2	7%	7%	11%	3%
	3	7%	7%	6%	9%
	4	7%	7%	7%	6%
	5	7%	7%	5%	10%
	6	8%	8%	7%	9%
	7	7%	7%	7%	8%
	8	9%	9%	7%	11%
	9	6%	6%	4%	7%
	10	11%	11%	11%	12%
	11	12%	12%	9%	16%
	12	12%	12%	14%	10%
	13	14%	14%	14%	14%
	14	9%	9%	10%	8%
	15	12%	12%	14%	11%
	16	8%	8%	9%	7%
	17	10%	10%	12%	8%
	18	5%	5%	7%	4%
	19	4%	4%	4%	5%
	20	3%	3%	5%	1%
	21	1%	1%		2%
	22	0%	0%		1%
TOTAL		175%	175%	179%	170%
	n =	227	227	116	111

10 Apr 02
Source: RRC Associates

BOULDER COUNTY PARKS AND OPEN SPACE
TWIN LAKES NEIGHBOR SURVEY 2002

		OVERALL	SURVEY VERSION		DO YOU HAVE DOGS	
			Mail Survey	On-Site Survey	YES	NO
DO YOU HAVE PET DOGS	Yes	46%	44%	64%	100%	
	No	54%	56%	36%		100%
TOTAL		100%	100%	100%	100%	100%
	n =	761	676	85	349	412
IF YOU HAVE PET DOGS, HOW MANY DO YOU HAVE	One	72%	72%	74%	72%	
	Two	24%	25%	17%	24%	
	Three	3%	2%	6%	3%	
	Four	0%	0%		0%	
	Five	0%		2%	0%	
	Six	0%		2%	0%	
TOTAL		100%	100%	100%	100%	
Average		1.3	1.3	1.5	1.3	
Median		1.0	1.0	1.0	1.0	
n =		345	292	53	345	0
DO YOU FEEL DOG WASTE IS A PROBLEM	Yes	30%		30%	15%	57%
	No	70%		70%	85%	43%
TOTAL		100%		100%	100%	100%
	n =	84		84	52	30

10 Apr 02
Source: RRC Associates



BOULDER COUNTY PARKS AND OPEN SPACE
TWIN LAKES NEIGHBOR SURVEY 2002

			SURVEY VERSION			DO YOU HAVE DOGS	
		OVERALL	Mail Survey	Employee Survey	On-Site Survey	YES	NO
DO YOU USE THE TWIN LAKES AREA	No	7%	6%	17%	1%	4%	7%
	Yes	93%	94%	83%	99%	96%	93%
TOTAL		100%	100%	100%	100%	100%	100%
	n =	870	679	106	85	349	411
HOW DO YOU ACCESS TWIN LAKES	G	48%	52%	35%	33%	45%	55%
	B	23%	26%	16%	11%	23%	25%
	A	16%	17%	7%	13%	20%	14%
	F	13%	14%	9%	7%	17%	9%
	J	11%	8%	32%	11%	8%	8%
	K	10%	8%	22%	15%	9%	9%
	E	9%	10%	6%	9%	11%	8%
	D	8%	9%	3%	8%	11%	7%
	H	6%	4%	26%	4%	3%	4%
	C	4%	4%	4%	5%	4%	5%
	I	3%	2%	7%	4%	2%	3%
	L	0%	0%	1%		0%	0%
TOTAL		152%	155%	168%	120%	154%	147%
	n =	669	525	69	75	289	310

10 Apr 02
Source: RRC Associates

BOULDER COUNTY PARKS AND OPEN SPACE
TWIN LAKES NEIGHBOR SURVEY 2002

		OVERALL	SURVEY VERSION			DO YOU HAVE DOGS	
			Mail Survey	Employee Survey	On-Site Survey	YES	NO
WHAT ACTIVITIES DO YOU PURSUE AT TWIN LAKES	Walk	90%	90%	94%	89%	89%	91%
	View wildlife	54%	56%	43%	46%	52%	57%
	Jog/run	52%	52%	41%	68%	58%	50%
	Ride my bike	49%	55%	15%	41%	51%	55%
	Exercise my dog(s)	41%	42%	17%	56%	91%	2%
	Bird watch	31%	33%	23%	25%	30%	34%
	Exercise my dog(s) in water	22%	22%	11%	35%	48%	2%
	Study nature	21%	23%	9%	19%	22%	23%
	Other	5%	6%	3%	5%	5%	6%
	Fishing	5%	5%	3%	7%	4%	6%
	Ice skate	3%	3%	6%	2%	3%	3%
	Boating, including belly boats	3%	2%	2%	9%	3%	3%
TOTAL		377%	389%	268%	404%	456%	332%
	n =	806	633	88	85	334	380
WHEN DO YOU USE TWIN LAKES	Weekends	67%	74%	20%	59%	72%	74%
	After work	50%	54%	19%	49%	59%	49%
	Weekdays during the day	39%	39%	31%	49%	43%	37%
	Early weekday mornings	38%	38%	11%	63%	50%	32%
	After dinner/evenings	36%	41%	5%	32%	41%	39%
	Noon time/lunch break	25%	16%	81%	35%	23%	14%
TOTAL		254%	262%	167%	288%	288%	245%
	n =	801	632	88	81	329	379

10 Apr 02
Source: RRC Associates

BOULDER COUNTY PARKS AND OPEN SPACE
TWIN LAKES NEIGHBOR SURVEY 2002

		OVERALL	SURVEY VERSION			DO YOU HAVE DOGS	
			Mail Survey	Employee Survey	On-Site Survey	YES	NO
HOW MANY TIMES PER MONTH DO YOU VISIT TWIN LAKES ON AVERAGE	1 time	5%	7%	1%		3%	9%
	2 times	8%	9%	5%		6%	10%
	3 times	4%	5%	1%		3%	5%
	4 times	10%	11%	8%	7%	8%	13%
	5 times	1%	1%			1%	1%
	6 times	1%	1%	3%		1%	1%
	8 times	14%	15%	13%	12%	12%	17%
	10 times	0%	0%			0%	1%
	11 - 15 times	18%	17%	28%	18%	15%	18%
	16 - 20 times	22%	20%	39%	25%	22%	19%
	More than 20 times	16%	15%	2%	37%	29%	7%
TOTAL		100%	100%	100%	100%	100%	100%
Average		13.7	13.0	12.6	20.4	17.7	10.5
Median		12.0	12.0	12.0	20.0	16.0	8.0

BOULDER COUNTY PARKS AND OPEN SPACE
TWIN LAKES NEIGHBOR SURVEY 2002

		OVERALL	SURVEY VERSION			DO YOU HAVE DOGS	
			Mail Survey	Employee Survey	On-Site Survey	YES	NO
WOULD YOU SUPPORT THE LEASH REGULATION	Yes	62%	62%	76%	46%	38%	81%
	No	38%	38%	24%	54%	62%	19%
TOTAL		100%	100%	100%	100%	100%	100%
	n =	815	645	88	82	339	382
WOULD YOU SUPPORT OCCASIONAL WILDLIFE CLOSURES	Yes	83%	84%	83%	78%	77%	88%
	No	17%	16%	17%	22%	23%	12%
TOTAL		100%	100%	100%	100%	100%	100%
	n =	833	655	96	82	337	395

10 Apr 02

BOULDER COUNTY PARKS AND OPEN SPACE
TWIN LAKES NEIGHBOR SURVEY 2002

		OVERALL	SURVEY VERSION			DO YOU HAVE DOGS	
			Mail Survey	Employee Survey	On-Site Survey	YES	NO
DO YOU NOTICE ANY PROBLEMS AT TWIN LAKES	None	34%	33%	40%	39%	38%	30%
	Litter	19%	20%	8%	23%	22%	19%
	Dog waste	18%	18%	17%	14%	11%	24%
	Dogs off leash	16%	17%	8%	20%	11%	23%
	Lake concerns/ water level	12%	12%	17%	11%	10%	12%
	Trail conditions	11%	12%	12%	3%	8%	14%
	Other	9%	11%	3%	4%	12%	8%
	Human use concerns	6%	6%	4%	13%	10%	4%
	Environmental concerns	6%	6%	6%	4%	6%	5%
TOTAL		132%	134%	114%	131%	128%	139%
	n =	678	530	77	71	282	317
WHAT ARE THE BEST THINGS ABOUT TWIN LAKES	Natural setting	33%	34%	28%	35%	31%	36%
	Proximity	33%	34%	32%	26%	28%	37%
	Quiet, peaceful, uncrowded	29%	29%	28%	26%	27%	31%
	Wildlife	25%	27%	16%	14%	18%	33%
	Trails	22%	22%	25%	16%	19%	24%
	Dogs can be off leash	16%	15%	9%	25%	32%	2%
	View	14%	15%	9%	10%	11%	18%
	Recreational opportunities	13%	13%	12%	16%	15%	12%
	Undeveloped open space	11%	13%	4%	6%	13%	11%
	Other	11%	9%	14%	19%	12%	8%
TOTAL		206%	211%	177%	194%	206%	212%
	n =	729	571	81	77	313	330

10 Apr 02
Source: RRC Associates

BOULDER COUNTY PARKS AND OPEN SPACE
TWIN LAKES NEIGHBOR SURVEY 2002

		OVERALL	SURVEY VERSION			DO YOU HAVE DOGS	
			Mail Survey	Employee Survey	On-Site Survey	YES	NO
WHAT CAN BE IMPROVED AT TWIN LAKES	Other	22%	24%	11%	12%	23%	23%
	Improve trails	18%	18%	23%	11%	14%	21%
	Remove litter	17%	16%	13%	26%	19%	16%
	Improve access	14%	15%	15%	7%	12%	16%
	Enforce dog waste control/add dog waste containers	14%	14%	13%	12%	16%	12%
	Nothing	11%	11%	9%	14%	16%	7%
	Leash regulations	11%	12%	6%	9%	4%	20%
	Add benches/picnic areas	9%	9%	8%	12%	3%	15%
	Add/maintain water levels	9%	9%	15%	4%	8%	10%
	Install trash containers	8%	9%		11%	13%	5%
	Improve natural setting	8%	9%	13%	4%	6%	10%
	Voice/sight control regulations	3%	3%		5%	5%	2%
	Stock lake with fish	2%	2%	2%	7%	2%	3%
TOTAL		148%	152%	126%	133%	141%	159%
	n =	566	456	53	57	249	261

10 Apr 02
Source: RRC Associates

Excerpt of results related to open space management, from telephone survey conducted by The Public Information Corporation in July 2002.

How the Survey Was Conducted

The Public Information Corporation of Littleton, Colorado, conducted a random opinion survey of active voters in Boulder County, Colorado, in July 2002. Interviewing took place in two periods extending from July 1 through July 15. No interviews were conducted during the Independence Day holiday period extending from July 4 through 7.

A total of 512 interviews were conducted. Confidence factor in this survey is 4.2 percent or better, plus or minus, in 95 out of 100 cases.

Calling lists were extracted from a file of all active voters provided by the office of the Boulder County Clerk and Recorder. Demographic balancing was utilized throughout the interviewing phase so that the 512 respondents collectively resembled the makeup of all persons in the active voter file by residency, party affiliation, gender and age. Demographic quotas were determined from totals shown in the county file with one exception -- age. Dates of birth are provided, but for our data processing it is necessary to sort them into six age brackets which are assigned numerical codes.

We drew an "every nth" sampling from the registration file to determined the frequency within each of those age brackets. It would have been simpler to use the profiles from the 2000 census, but that is not valid because the demographic characteristics of active voters are appreciably different from those of the population as a whole.

We use the actual questions from the questionnaire, minus some introductory statements and instructions to interviewers, as a framework for this report. Some of the tables presenting countywide results also show how respondents in each of four geographical zones feel about particular questions. The zones consist of (1) the City of Boulder; (2) the City of Longmont; (3) the Cities of Lafayette, Louisville, Superior and Erie; and (4) towns and unincorporated areas.

Instances in which residents of any of those zones feel appreciably different than do Boulder County active voters a whole may be seen in those tables. When those differences are greater than 5 percent plus or minus compared with the countywide result on a given question we term them "demographic anomaies" and highlight them in the analysis. In addition, we report on many anomalies that turn up in the other demographic groupings including political party affiliation, gender and age brackets.

All told there are 16 demographic groupings.

Questions 8-11 -- Importance of Open Space Activities

Open space is a broad subject that includes a variety of activities and values . . .
Please tell me whether you feel the following activities of Boulder County Open Space are very important, fairly important, not very important or not important at all.

Question 8. What about protecting habitat for wildlife?

Very important . . .	68%	Not important at all	2
Fairly important. . .	24	No response	1
Not very important	5		

Question 9. What about preserving farms and ranches?

Very important . . .	55%
Fairly important . . .	30
Not very important	10
Not important at all	4
No response	1

Question 10. What about nature study?

Very important . . .	36%
Fairly important . . .	40
Not very important	17
Not important at all	5
No response	1

Question 11. What about preserving historic mining and farm structures?

Very important . . .	28%
Fairly important . .	39
Not very important	24
Not important at all	8
No response	1

One of the purposes of this series of questions, in which the order in which the questions were asked was rotated to avoid possible order bias, was to provide a direct comparison of the relative importance of the four activities/values to respondents. The following consolidated table was prepared for that purpose:

	Q8. Wildlife Habitat	Q9. Farms & Ranches	Q10. Nature Study	Q11. Historic Structures
Very important	68%	55%	36%	28%
Fairly important	24	30	40	39
Not very important	5	10	17	24
Not important at all	2	4	5	8
No response	1	1	1	1

Discussion

None of the activities and values could be described as unpopular, but with two of them, protecting habitat for wildlife and preserving farms and ranches, more than half of the 512 respondents described them as "very important." Nature study was well-regarded, but support for preserving historic mining and farm structures was relatively lukewarm.

The responses to questions 8 through 11 were further processed to provide another kind of comparison. We assigned numerical values to each of the response categories as follows: Very important, 3 points; fairly important, 2 points; not very important, 1 point; and not important at all or no response, 0 points. We applied those values to the frequencies of all question responses, added them and divided by 512. A perfect score would have been 3.00. The results were:

Question 8 --	Protecting habitat for wildlife	2.72
Question 9 --	Preserving farms and ranches	2.46
Question 10 --	Nature study	2.09
Question 11 --	Preserving historic mining . . . . . and farm structures	1.87

Demographic Anomalies

Due to the format of the questions, which did not use two distinctly positive and two distinctly negative response categories as was case previously in the questionnaire, we present only instances with the four questions where anomalously high results occurred with "very important." The 512-response percents are shown in parentheses.

Question 8 -- Protecting habitat for wildlife
Women, 78 percent (69); Democrats, 79 percent; persons who are 18 to 24 years of age, 75 percent; persons who are 25 to 34 years of age, 85 percent.

Question 9 -- Preserving farms and ranches
Women, 62 percent (56); and persons who are 35 to 45 years of age, 62 percent.

Question 10 -- Nature study
Democrats, 44 percent (38); residents of towns and unincorporated areas, 47 percent; women, 45 percent; and persons 18 to 34 years of age, 48 percent.

Question 11 -- Preserving historic mining and farm structures
Persons who are 18 to 24 years of age, 49 percent (26).

Questions 12 -14 -- Dogs in Space (Open)

Questions 12 and 14 were asked of all respondents. Question 13 was asked only of persons who said they do own a dog.

Question 12 -- Do you own a dog?	Yes	47%
	No	53
	No response . . .	1

Discussion

There were a number of demographic anomalies when it comes to Boulder County dog ownership, although not where party affiliation is concerned. Dog ownership appears to be apolitical, because no anomalously high or low numbers turned up there, although Unaffiliated persons were a bit more likely to be dog owners than were members of either major party.

City of Boulder residents are much less likely to say that they own a dog than are persons who live in other areas, and it is unusual that all four geographical zones are anomalously high or low compared with the countywide average of 47 percent. The results were: City of Boulder, 30 percent; City of Longmont, 54 percent; Southeast cities, 55 percent; and towns and unincorporated areas, 48 percent.

The age brackets also produced some sharp divergences, with only one grouping -- those who are between 25 to 34 years of age -- in the average range. In fact they were right on the average. The largest concentration of dog owners was persons between 35 and 54 years of age -- 55 percent. The youngest and oldest groupings are least likely to own dogs. It was 40 percent for 18-to-24-year-olds; 38 percent for those 55 to 64; and 34 percent for persons 65 and older.

Question 13 -- How often do you take your dog onto open space?	Frequently	31%
	Occasionally . . .	22
	Rarely	24
	Never	22
	No response	0

Discussion

City of Boulder active voters may be least likely of the geographical zone residents to own dogs, but the ones who do are most likely to take them onto open space, with a particularly large 49 percent indicating that they do so frequently. Next were persons who live in the southeast county cities, at 43 percent. Only 17 percent of Longmont residents say they take their dogs onto open space frequently, and 32 percent say they rarely do, compared to 24 percent countywide. Again, there isn't a partisan pattern among active voters who take their dog onto open space frequently.

Persons in the two youngest age groupings are the most likely to take dogs onto open space, and it's by a considerable margin. Forty-two percent of persons who are 18 to 24 say they do frequently. Among 25 to 35-year-olds it's 59 percent, and in fact, nearly one-third of all persons who say they take dogs onto open space are in that age bracket.

Only 12 percent of the 65 and older dog owners say they frequently take their pets onto open space, and 40 percent say they never do.

Question 14 -- Currently it is County policy that dogs are required to be on a leash at all times they are on County open space. How do you feel about (that policy)?	Agree strongly . . .	54%
	Agree mildly	14
	Disagree mildly . .	14
	Disagree strongly	14
	Other	3
	No response.	2

Discussion

It's obvious from this table that more than half of the 512 respondents agree strongly with the county's leash policy on open space and the other three response categories couldn't possibly be more clustered. "Other" responses, which were volunteered and not solicited, consisted almost entirely of observations that exceptions should be made when dogs are well-trained and under firm voice control.

The people least affected by the leash policy are most vehement in their support of that policy. Sixty-nine percent of persons 65 and older agree strongly with the policy.

And, people most affected by the leash policy are least in favor of it. Only 38 percent of those who are 25 to 34 years of age agree strongly. But all told more of them are in agreement than are in disagreement with the leash policy in open space, with 54 percent agreeing either strongly or mildly versus 34 percent who disagree either mildly or strongly.

Persons in the three main partisan groupings aren't quite as much in lock-step as was the case with questions 12 and 13. Republicans and Democrats are close to the 512-respondent "agree strongly" result, but Unaffiliateds drop back to 47 percent. However, when degree of agreement or disagreement isn't considered Republicans, Democrats and Unaffiliateds are within three percent of one another, which is statistically insignificant.

Appendix 2: Boulder County Comprehensive Plan: Goals and Policies

Goals

Those goals in the Boulder County Comprehensive Plan (as amended, 1999) of particular relevance to the Twin Lakes Open Space include:

- **Environmental Management**

B.5 Wetlands, which are important to maintaining the overall balance of ecological systems, should be conserved.

B.9 Riparian ecosystems, which are important plant communities, wildlife habitat and movement corridors, shall be protected.

- **Parks and Opens Space**

C.1 Provision should be made for open space to protect and enhance the quality of life and enjoyment of the environment.

C.5 The private sector, non-county agencies, and other governmental jurisdictions should be encouraged to participate in open space preservation and trails development in Boulder County.

- **Residential Goals**

D.2 Quality residential areas, which function as integral neighborhood units with schools, parks and other similar facilities as centers, should be encouraged.

- **Public Involvement**

H.1 The county shall encourage public participation in the making of decisions by public and quasi-public bodies which significantly affect citizens.

Policies

Those policies in the Boulder County Comprehensive Plan (as amended, 1999) of particular relevance to the Twin Lakes Open Space include:

- **Resource Management**

OS 2.03 The county shall provide management plans and the means for the implementation of said plans for all open space areas that have been acquired by or dedicated to the county.

OS 2.03.01 The foremost management objectives of the individual open space lands shall follow directly from the purposes for which the land was acquired.

OS 2.03.02 Management of county open space lands shall consider the regional context of ecosystems and adjacent land uses.

OS 2.04 The county, through its Parks and Open Space Department, shall provide appropriate educational services for the public which increase public awareness of the county's irreplaceable and renewable resources and the management techniques appropriate for their protection, preservation, and conservation.

OS 2.05 The county, through its Weed Management Program, shall discourage the introduction of exotic or undesirable plants and shall work to eradicate existing infestations through the use of Integrated Weed Management throughout the county on private and public lands.

- **Recreational Use**

OS 4.03.01 Recreational use shall be passive, including but not limited to hiking, photography or nature studies, and, if specifically designated, bicycling, horseback riding, or fishing. Only limited development and maintenance of facilities will be provided.

- **Trails**

OS 6.01 Trails and trailheads shall be planned, designed, and constructed to avoid or minimize the degradation of natural and cultural resources, especially riparian areas and associated wildlife habitats.

OS 6.04 Trails shall provide for pedestrian, equestrian, bicycle, and/or other non-motorized uses, where each is warranted. Incompatible uses shall be appropriately separated.

- **Public Decision Making**

OS 8.03 In developing management plans for open space area, Parks and Open Space staff shall solicit public participation of interested individuals, community organizations, adjacent landowners and the Parks and Open Space Advisory Committee. Plans shall be reviewed by the Parks and Open Space Advisory Committee, including public comment, and recommended for adoption after public hearing by the Board of County Commissioners.

Appendix 3: Potential Mammalian Species

ORDER MARSUPICARNIVORA
- Didelphis virginiana (Virginia Oppossum)

ORDER INSECTIVORA
- Sorex cinereus (Masked Shrew)
- Cryptotis parva (Least Shrew)

ORDER CHIROPTERA
- Myotis lucifugus (Little Brown Bat)
- Myotis volans (Long-legged Myotis)
- Myotis leibii (Small-footed Myotis)
- Lasionycteris noctivagans (Silver-haired Bat)
- Eptesicus fuscus (Big Brown Bat)
- Lasiurus cinereus (Hoary Bat)

ORDER LAGOMORPHA
- Sylviagus floridanus (Eastern Cottontail)

ORDER RODENTIA
- Sciurus niger (Fox Squirrel)
- Castor Canadensis (Beaver)
- Microtus pennsylvanicus ((Meadow vole)
- Microtus ochrogaster (Prairie Vole)
- Ondatra zibethicus (Muskrat)
- Zapus hudsonius (Meadow Jumping Mouse)

ORDER CARNIVORA
- Canis latrans (Coyote)
- Vulpes vulpes (Red Fox)
- Ursus Americanus (Black Bear)
- Procyon Iotor (Raccoon)
- Mustela frenata (Long-tailed Weasel)
- Mephitis mephitis (Striped Skunk)
- Lutra Canadensis (River Otter)
- Felis concolor (Mountain Lion)
- Felis rufus (Bobcat)

ORDER ARTIODACTYLA
- Odocoileus hemionus (Mule Deer)
- Odocoileus virginianus (White-tailed Deer)

Appendix 4: Potential Avian Species

Birds that may be found in Eastern Boulder County

BIRDS OF PREY

Kites, Hawks, Eagles & Vultures

*Osprey – uncommon summer
Bald Eagle –common winter
Turkey Vulture –summer
Sharp-shinned Hawk –a few year-round
Red-tailed Hawk –common year-round
Swainson's Hawk –occasionally year-round, fairly common in migration
Rough-legged Hawk –common winter resident
*Northern Harrier –common year round
Merlin –casual summer and winter
American Kestrel –fairly common summer and winter

Owls

Screech Owl – may find year round
Great Horned Owl – may be resident year round
*Long-eared Owl – historically common; uncommon last 20 years
*Short-eared Owl – uncommon year round

BIRDS OF THE PONDS AND MARSHY AREAS

Year-round residents

Pied-billed Grebe – most common in migration, occasional rest of the year
Canada Goose – very abundant in migration, increasing in summer
Mallard – abundant in winter, casual in summer
Gadwall – common in migration
American Coot –very common in migration, fairly common in summer, casual in winter
Killdeer – common summer resident, casual in winter
Snipe – fairly common in summer and winter
Belted Kingfisher – common summer and winter
Red-shafted Flicker – common summer and winter
Downy Woodpecker – common year round
Black-billed Magpie – conspicuous year round
Starling – common
Red-winged Blackbird – common year round, abundant in summer
Song Sparrow – fairly common summer, few in winter

Summer residents – may indicate nesting

Great Blue Heron – common March to October
*Great Egret – rare summer
Black-crowned Night Heron – probably find from April to September
*American Bittern – decreasing
Blue-winged Teal – fairly common April and early October in migration
Cinnamon Teal – possible in summer
Virginia Rail – probably find in summer
Sora – probably find in summer

American Avocet – probably common in summer
Wilson's Phalarope – in migration
Mourning Dove – common in summer
Tree Swallow – nests
Yellowthroat – arrive first of May, probably nests
Yellow-headed Blackbird – occasionally common in thick marshy areas in summer
Bullock's Oriole – common in summer, numerous nests noted
Lark Sparrow – young may gather around ponds late in the summer

Winter residents
Horned Grebe – most common in migration, but occasionally occur in winter
Red-breasted Merganser – infrequent in winter
Herring Gull – common in winter on ponds
Ring-billed Gull – common in winter on ponds
Harris' Sparrow – few in winter

Migrants
Franklin's Gull
Pintail – common in migration, few in summer, arrive March leave early October
Green-winged Teal – common in migration, few year round
American Wigeon – common migrant, late May and again in October
Northern Shoveler – common migrant May, June, and again September and October
Redhead – casual in migration, few in summer and winter
Canvasback – casual in migration
Ruddy Duck – casual in migration
Common Merganser – common in migration and winter
Baird's Sandpiper – probably common in migration
Townsend's Warbler – few in spring and fall migration
White-crowned Sparrow – few in migration

BIRDS OF RIPARIAN STANDS

Year-round residents
Killdeer – common in summer and less so in winter
Common Snipe – fairly common summer and winter
Belted Kingfisher – common year round
Dark-eyed Junco – common in winter especially in weed patches
Tree Sparrow – fairly common in winter
Harris Sparrow – few in winter

Migrants
Baird's Sandpiper – common in migration
Least Flycatcher – regular spring and fall migrant
Cordilleran Flycatcher – probably occurs during migration
Swainson's Thrush – common migrant first half of May
Western Bluebird – occurs in small numbers in migration
Plumbeous Vireo – common in migration, May and again in October
Orange-crowned Warbler – fairly common in migration, late April early May
Virginia Warbler – fairly common in migration, arrive early May
Yellow-rumped Warbler – spring and fall migration, few stragglers in winter
Townsend's Warbler – may see a few in spring and fall migration
MacGillvary's Warbler – common in migration, nests in thickets along streams

BIRDS OF THE FLOOD PLAIN GRASSY AREAS

Year-round residents

Canada Goose- abundant in migration and winter, increasing in summer
Killdeer- common in summer and less so in winter
Red-shafted Flicker – very common year round
Downy Woodpecker – uncommon year round
Horned Lark – fairly common, though irregularly so, year round
Blue Jay – uncommon year round, apparently expanding its range westward, so expect to see them increasing in the Boulder area
Common Crow – year round resident
Black-billed Magpie – conspicuous year round
American Robin – common year round, more so in summer
Starling – common year round
House Sparrow – common year round around farmyards and barns
Western Meadowlark – common year round
Red-winged Blackbird – common year round
House Finch – common year round
American Goldfinch – few year round, especially in weed patches
Lesser Goldfinch – fairly common in summer, occasionally in winter

Summer residents – may indicate nesting birds

Mourning Dove – probably nests in the summer
Eastern Kingbird – probably nests
Say's Phoebe – probably nests
Cliff Swallow - probable
Barn Swallow – fairly common, especially around barns
House Wren – may find a few here in the summer, they prefer the streamside cottonwood groves, arrive in May
Bullock's Oriole – common in summer, found many nests
Brewer's Blackbird – probably fairly common in summer, nests
*Lark Bunting – rare in summer
Savannah Sparrow – few in the summer
Grasshopper Sparrow – infrequent in small numbers
Vesper Sparrow – probably common breeder
Lark Sparrow – probably find a few in the summer
Chipping Sparrow – probably find a few in thickets in the summer, fairly common migrant
Clay-colored Sparrow – infrequent in small numbers
Brewer's Sparrow – infrequent in small numbers
Dickcissel – irregularly common in summer

Winter residents

Common Raven – occurs regularly in small numbers in winter
Cedar Waxwing – irregular in large flocks in winter
Bohemian Waxwing – irregular in large flocks in winter
Northern Shrike – winter resident
Dark-eyed Junco – fairly common winter resident, especially in weed patches
Tree Sparrow – common in winter

Migrants

Mountain Bluebird – spring and fall
Western Bluebird – occurs in small numbers in migration March and April
Red-shafted Flicker – common year round
Blue Jay – uncommon year round, expanding its range westward apparently, so expect it to in crease its numbers in the future

Black-billed Magpie – conspicuous year round
Black-capped Chickadee – common year round
White-breasted Nuthatch – common year round
Mockingbird – uncommon year round, expanding its range westward apparently, so expect it to increase its numbers in the future
American Robin – common year round, more so in the summer
Starling – common
House Sparrow – common around farmhouses and barns, along creeks year round
Red-winged Blackbird – common year round
House Finch – common year round resident
Lesser Goldfinch – fairly common in summer, occasionally in winter
Song Sparrow – fairly common in summer, few in winter

Summer residents – indicates nesting birds

Mourning Dove – probably breeder along creek bottoms
Eastern Kingbird – arrives in early May, possibly nests in the area
Western Kingbird – arrives in early May, possibly nests in the area
Say's Phoebe – probably nests, arrives late March, early May
Traill's Flycatcher – probably breeds along stream banks
Western Wood Pewee – probably nests, nesting begins mid-June, probably arrives mid-May
Tree Swallow – probably nests, arrives mid-April
House Wren – common in summer, probably nests, arrives early May
Catbird – uncommon
*Brown Thrasher – a few may nest in dense thickets
Red-eyed Vireo – common in migration, probably nests
Warbling Vireo – arrived mid-May, likely breeder
Yellow Warbler – very likely nester
Yellowthroat – arrive first week of May, possibly nests
Bullock's Oriole – common in summer, definite nester
Brown-headed Cowbird – probable in summer, known to parasitize some of the birds on this list
Black-headed Grosbeak – arrive early May, possibly nests

Winter residents

Common Raven – occurs in small numbers in winter
Mountain Chickadee – will come down during harsh weather in winter
Brown Creeper – common in small numbers in winter
Dipper – common in small numbers in winter,
Townsend's Solitaire – fairly common in winter
Cedar Waxwing – occurs irregularly in winter
Bohemian Waxwing – occurs irregularly in winter
Cassin's Finch – occurs regularly in winter

#NOTE: The faunal inventory is a compilation of data from the Colorado Division of Wildlife, Boulder County Audubon, Thorne Ecological Institute and Boulder County. The above species are documented for eastern Boulder County but all may not necessarily be found on this property.

Appendix 5: TLAG Dog Management Recommendation

To: **Parks and Open Space Advisory Committee**

From: **Twin Lakes Advisory Group (TLAG): Erick Brunner, Darryl Dargitz, Barbara Hawke, Ruth Merriman, Christine Quinlan, Susan Winter, Frank Zygmunt**

RE: **TLAG Recommendation**

Date: **January 12, 2003**

Background

Who is TLAG? We are Boulder County residents selected from a pool of applicants who live in the vicinity of Twin Lakes and appointed to the Twin Lakes Advisory Group (TLAG) by the Boulder County Board of Commissioners. Our primary task was to formulate a recommendation for dog management at Twin Lakes.

We, as TLAG members, represent differing viewpoints about best management for the Twin Lakes. Some of us are long-time residents, some more recent; some are dog owners and some are not. A common thread of our involvement is that we care about Twin Lakes and its future.

TLAG met six times between April and December 2003. Over the course of these six meetings, TLAG followed a process lead by BCPOS staff that resulted in our dog management recommendation. The process consisted of the following steps:

- Vision exercise: what would you like to see at Twin Lakes in 5 years? What would the community like to see at Twin Lakes in 5 years?
- Develop evaluation criteria to use for evaluating dog management proposals (See Attachment A).
- Submit individual dog management proposals and evaluate them as a group.
- Decision Tree Exercise to develop priorities and identify trade-offs in order to further evaluate and narrow down proposals.
- Consensus Recommendation (See below).

In addition to the process listed above, with Boulder County Parks and Open Space (BCPOS) staff assistance, TLAG researched and reviewed documentation related to the dog management issue locally, statewide and nationally.

Although we have different opinions about how to balance the interests of humans, dogs, and wildlife, we share certain hopes and guiding principals for the future of Twin Lakes:

- The Twin Lakes area should retain the feeling of a neighborhood gathering place
- The Twin Lakes should be a place where a broad diversity of people could enjoy the outdoor setting in relative harmony
- The physical infrastructure in the Twin Lakes area should support a casual atmosphere, and build on the historic traditions of the area

Recommendation

TLAG's consensus recommendation is that the County allow one lake to have an off leash regulation and to implement the County's leash regulation at the other lake upon completion of the Twin Lakes Management Plan. Details and timeline are discussed below.

Discussion

1) **Define "Off Leash"**. For purposes of off leash regulations, TLAG recommends that Boulder County define dogs off leash as dogs that are not physically connected to the person they are accompanied by.
    - TLAG recommends that the County limit the number of off leash dogs to two per person. This would not restrict the number of dogs a person could have on leash.
    - The off leash designation would extend to the lakes: e.g. it would allow dogs to be off leash in the water at the lake which has the off leash designation, and it would allow dogs to be on leash in the water at the lake which has the on leash designation.
        - TLAG discussed whether the accompanying person should be required to have a leash with them for each off leash dog, and prefers that this requirement be part of the new regulations, provided it is deemed to be legal. TLAG will defer to the BCPOS law enforcement and legal staff for their recommendation.

2) **Elements of an "Off Leash" regulation.** TLAG looked at characteristics of off leash areas locally and around the country. Some areas require special licensing, and some areas require annual fees. Many are operated as dog parks for training opportunities.

An excerpt of BCPOS Regulations pertaining to dogs is included below. In order to allow dogs off leash, the county can use existing regulation 5(a), which would allow the off leash use at Twin Lakes and any other property deemed appropriate for such designation by posting the property as a designated off leash area. Paragraph 5(b) can also be modified to include language regarding the necessity of carrying a leash, if that is deemed appropriate.

Regulation 19 outlines unacceptable behavior for humans and domestic animals. This regulation applies to all dogs whether or not they are leashed. BCPOS staff feels this regulation gives them the necessary power to address problems that may occur with unleashed dogs.

TLAG feels that voluntary dog excrement pick up works well and is not currently a problem at Twin Lakes, aided by the pick up bags and trash can that were installed in 2003. TLAG recommends that voluntary dog excrement pick-up be evaluated along with the off leash designation after the new regulations have been in place (see discussion under paragraph 4). If necessary, the county can adopt a resolution regarding excrement pick up as provided for in paragraph 5(b).

Boulder County Parks and Open Space Regulations, Resolution No. 2001-50

5. (a) Any dog or other domestic animal within a Boulder County Park and Open Space area shall be restrained by a leash, cord, rope or

chain and under physical control of a person, except as otherwise provided for in this paragraph or posted with approval from the Board of County Commissioners.

(b) The Director may adopt dog restrictions on specific trails, parks or open space areas that would require any person who brings a dog into a Boulder County Park and Open Space area to pick up, carry out and dispose of that dog's excrement.

19. It shall be unlawful for any person or their domestic animals to engage in disorderly conduct or any activity within a County park or open space area which interferes with the health, safety and welfare of the users or the neighbors in the area, or which creates a nuisance (including amplified sound). …

3) **<u>Which lake should be designated as Off Leash</u>**? TLAG discussed many of the variables that should be considered in deciding which lake should have the off leash designation, summarized below. TLAG recommends that the off leash designation decision be made in the context of the management plan, so that all the relevant factors will be considered. TLAG will defer to the BCPOS staff for the recommendation, but would like the staff to consider TLAG's guiding principles (enumerated in the Background section of this memo), the evaluation criteria developed by TLAG (See Attachment A), the considerations listed below, in addition to technical information.

<u>West Lake</u>:

- West shoreline provides value to ground nesting birds due to wetlands
- More likely to dry out due to shallower "bowl"
- Lower aquatic habitat value (compared to East Lake) due to fluctuations in water level
- Better natural access barriers
- Better vegetative value on interior of trail around the lake
- Fewer entry points minimizes signage needs
- Closer to tech park (most employees are not dog walkers)

<u>East Lake</u>:

- Vegetation and trees on south side provide wildlife refuge
- Adjacent to Eaton Park wetland on north side
- On leash regulation would be consistent with adjacent Eaton Park management
- Better fishing opportunities compared to East Lake, due to deeper bowl
- Rip rap-stabilized shorelines means less shoreline impacts resulting from dogs
- Boat ramp provides dog access to water.
- Larger continuous wetlands of Eaton Park and wetlands surrounding East Lake are more valuable than the habitat around West Lake.

Variables that could be argued for either on leash or off leash designation include proximity of lake to residential neighborhoods and scenic values.

4) **Evaluation Period.** TLAG recommends that the off leash designation be monitored and evaluated after the management plan adoption and implementation. The purpose of the evaluation is to determine if the off leash designation is working adequately or if adjustments to the policy or its implementation are needed. Monitoring and evaluation would begin after the infrastructure improvements are in place (fencing, signage).

   TLAG agreed with BCPOS staff that there should be a two-phase evaluation period: a check-in after one year, and a more formal evaluation after five years. After the first year, the check in would review evidence of compliance, number and nature of tickets issued, number and nature of complaints and any other available anecdotal evidence. The success of voluntary excrement removal, adequacy of parking and potential adjustments with neighboring property agencies would also be reviewed. Adjustments or refinements in the infrastructure or the policy implementation would be recommended based on this information.

   The five- year evaluation would be more thorough, and might include more formal evaluation of compliance as compared with other POS properties. This longer time frame would allow the BCPOS interpretive staff to include Twin Lakes in their 5-year visitor study. This study, based on personal interviews at most BCPOS parks, focuses on visitors' experiences. The next iteration is slated for 2005. Finally, this time period would allow the development of a neighborhood "Friends of Twin Lakes" to develop and work from the grassroots level.

5) Interim Management Actions. The Twin Lakes Management Plan is slated for completion in fall of 2004. During the interim period, dogs will continue to be allowed off leash at both lakes. TLAG recommends that POS install temporary signage that will inform the public about how dogs are being managed in the interim period, about the upcoming management plan changes, and also to remind people about dog etiquette. TLAG also recommends that the BCPOS staff provide outreach to involve the surrounding community during the interim management period and leading up to the off leash designation. There was an expectation among TLAG members that some guidance or assistance from BCPOS staff would be needed to form and sustain this group.

Twin Lakes Time Line (Dates are Approximate)

- December 11: final TLAG meeting to review/refine and adopt recommendation
- January 2004: Update to POSAC on TLAG recommendation
- Winter/Spring/Summer 2004: install interim signage; engage in outreach activities
- Fall 2004: Twin Lakes Management Plan to POSAC and BOCC for adoption. BCPOS Staff is currently working on developing all the components of the management plan, aside from the dog management piece
- 2005: Implement infrastructure as recommended in Twin Lakes management plan
- Jan 2006: Begin enforcing leash law upon completion of fencing and signage
- Jan 2007: Schedule a "check-in" with POSAC to review how the regulation is working one year after enforcement begins, with courtesy notification to TLAG members
- 2012: 5-Year evaluation

Attachment A
TLAG Evaluation Criteria Dog Management Proposals

Operational Characteristics:

- Is the proposal easy to understand, remember and enforce?

Neighborhood Characteristics:

- Does the proposal primarily encourage neighborhood use (as opposed to destination visits)?
- Does the proposal create a safe environment?
- Does the proposal retain the current character of the neighborhood?

Environmental Characteristics:

- Does the proposal reduce impacts to wildlife?
- Does the proposal reduce impacts to existing vegetation?
- Does the proposal have the potential to improve wildlife habitat and vegetation?
- Does the proposal reduce potential health hazards?

User Experience Characteristics:

- Does the proposal provide a positive recreational experience for a variety of users?

County Commissioner's Request:

- Does the proposal satisfy BOCC's direction to "provide some accommodation for users that prefer not to encounter dogs off leash and for wildlife protection"?

Appendix 6: Site Plan

Appendix 7: Site Photos

East Lake, view of boat ramp to east

Boulder & Whiterock Ditch between lakes, view to southeast

East Lake trail, view to northeast, Eaton Park north of trail

Social trail accessing East Lake along outlet ditch, recommending closing trail

East Lake. view to west

City of Boulder Open Space & Mountain Parks property, east of East Lake primarly wetlands, cattails

Proposed east access, crosses City of Boulder Open Space & Mountain Parks wetland property

Social trail accessing east lake from Brandon Creek Drive, recommending closing

South side of East Lake trail, view to west, best wildlife values area south of trail

Social trail accessing East Lake from Twin Lakes Trail across wetland, recommending closing trail

Social trail accessing East Lake from Twin Lakes Trail across diversion structure, recommending installing a new bridge and formalizing access.

West Lake, north shoreline, view to west

West Lake, northwest 'corner,'

Northwest access to West Lake, recommending installing a drop gate for ditch rider and public access

West Lake, south shoreline

West Lake, south shoreline

West Lake, south shoreline

West Lake, inlet channel

Social trail accessing West Lake from Twin Lakes Trail, recommending formalizing trail and permitting dogs off-leash between Twin Lakes Trail and Boulder & Lefthand Ditch

Access to West Lake from Twin Lakes Trail, recommending trail improvements

West Lake, view to southwest

Appendix 8: General Boulder County POS Rules and Regulations

- Properties that are open for public use are open from sunrise to sunset. Overnight camping is prohibited.
- Collecting, removing, destroying, or defacing any natural or man-made objects within parks and open space is not permitted.
- Discharging or carrying firearms, crossbows, fireworks, or projectile weapons of any kind is not permitted (except law enforcement officials and as allowed by the Board of County Commissioners to carry out a wildlife management program).
- Ground fires are not permitted. Fires may only be built in established grills and fireplaces in picnic areas. Fires may prohibited entirely by order of the Board of County Commissioners, the Boulder County Sheriff, or the Director of Parks and Open Space by posting special notices or notification through the press.
- Feeding, disturbing, trapping, hunting, or killing wildlife is not permitted (except as allowed by the Board of County Commissioners to carry out a wildlife management program).
- Motorized vehicles are not permitted (County, emergency, and agricultural lessees on official business are excepted; exceptions may also be granted to persons with disabilities, by written permission from the Parks and Open Space Department, for the use of single-rider, motorized vehicles adapted for recreational use by people with disabilities).
- It is unlawful to place rock bolts, install gates, establish or construct trails or other facility for public or private use without the written permission from the Parks and Open Space Department.
- The Parks and Open Space Department may temporarily close areas to public use for repairs or due to wildlife, vegetation, and/or public safety concerns. It shall be unlawful for the public to enter such areas.
- It is unlawful to consume, possess, or serve alcoholic beverages, as defined by state statute.
- Activities that unduly interfere with the health, safety, and welfare of the users or the neighbors in the area, or that create a nuisance or hazard to the use and safety or persons using or neighboring such areas are prohibited. Disorderly conduct (including amplified sound) shall be prohibited.
- Swimming, wading, boating, ice skating or ice fishing are permitted only where posted.
- Obey all fishing regulations at the specific open space property. A valid Colorado fishing license is required for all persons 16 years of age or older whenever fishing in ponds, lakes, creeks and rivers.

Appendix 9: Twin Lakes Open Space Management Team

Boulder County

Sara Melena, Resource Planning Intern
Ron Stewart, Director, Parks and Open Space Department
Therese Glowacki, Resource Management Manager
Rich Koopmann, Manager, Resource Planning Division
Jeff Moline, Natural Resource Planner
Patrick Malone, Natural Resource Planner
Peter Conovitz, Water Resource Specialist
Kristi Van Den Bosch, GIS/GPS Technician
Tim D'Amato, Weed Management Coordinator
David Bell, Lead Ranger
Mark Brennan, Wildlife Specialist
Dave Hoerath, Wildlife Specialist
Claire DeLeo, Plant Ecologist
Jennifer Kesler, Plant Ecologist
Kathy Kron, Landscape Architect
Tina Nielsen, Open Space Assistant

Twin Lakes Advisory Group (TLAG)

Boulder County Parks and Open Space Staff
David Bell
Rich Koopmann
Kathy Kron
Sara Melena
Tina Nielsen

POSAC Liaisons
Barbara Hawke
Christine Quinlan

Neighborhood Representatives
Erick Brunner
Darryl Dargitz
Ruth Merriman
Susan Winter
Frank Zygmunt