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cover: Anderson Ditch (foreground) at Broadway and College traffic circle, looking north, c. 1950



Boulder Valley Ditches:
Anderson Ditch
A History and Guide

This booklet is one of three:

Anderson Ditch
Farmers Ditch
Silver Lake Ditch

The first half of this booklet appears in identical form in the others; the second half in this one alone.

Michael Holleran



Farmers Ditch north of the city, 1999

Irrigation in Boulder

“In the many ... irrigating channels which traverse the city in so many quarters Boulder has what seems like a veritable treasure of municipal decorations, ... all retaining their essential elements unspoiled and ready to shed beauty all about them if only given a proper setting.”

-- Frederick Law Olmsted, Jr., 1910

Within the city of Boulder, Colorado, in addition to two year-round creeks and a handful of intermittent ones, there are twenty-three other waterways that flow half the year. These are irrigation ditches, bringing water through the city on its way to fields, pastures, orchards and gardens. The 30 miles of ditches make up most of the system of watercourses in Boulder.

The ditches are old. Raising food in this semi-arid region required irrigation, so Boulder’s first ditch was dug in the city’s first year, and most were finished by the 1870s. Cottonwoods and willows have grown over more than a century and the ditches now seem more natural than artificial. The rest of the city has grown around them, sometimes forming itself around the ditches, sometimes ignoring and swallowing them.

In 1859, two of Boulder’s first residents, Marinus Smith & William Pell, sold a load of hay to miners in Black Hawk for \$400, an amount of money that could then buy a house. Boulder pioneers didn’t always know where to find gold, but they knew how to make hay. Smith and Pell dug Boulder’s first irrigation ditch - now known as Smith-Goss Ditch - in 1859. It still runs under the Arapahoe Avenue sidewalk and appears briefly in front of the old Lincoln School, now Naropa University. Less than a year later, water began flowing through the more ambitious Anderson Ditch, another project of Marinus Smith, together with Jonah Anderson and others on the south side of the creek.

Pioneers could find irrigation precedents in the Hispanic systems of southern Colorado, pueblo systems before that in New Mexico, and Mormon irrigation in Utah. The most direct ancestors of Boulder ditches were probably mining districts in California; hydraulic mining techniques were brought back east to Colorado goldfields and then down to the plains. Several of Boulder’s pioneer ditch-builders - Frederick Kohler, Marinus Smith, and Henry and Luther Wellman - had prospected in California before coming to Colorado. From mining camps also came the basic concept behind Colorado water rights: like a vein of ore, whoever used it first gained a right to it. “First in time, first in right” - history is at the very foundation of Colorado water law.

Ditches did not just serve farmland; they were also Boulder’s first domestic water system. *Laterals* - little side ditches - carried water to every house in many neighborhoods: from Anderson Ditch to Highland Lawn, from Farmers Ditch to downtown, and later from Silver Lake Ditch to Mapleton Avenue and North Boulder. In 1872, the Boulder Aqueduct Company was organized to distribute Farmers Ditch water through wooden pipes; it is not clear whether the company ever delivered any water. The aqueduct company was superseded a few years later by a municipal system, but the street laterals continued alongside it for decades.

The street laterals were formalized in 1883 with cobblestone channels, two feet wide and eight inches deep. Little stone bridges crossed the little stone ditches. Twenty-five years later, a real estate promoter touted Boulder for its “streams of clear, cold water coursing through the



Downtown Boulder street lateral, c. 1896

streets in stone gutters.” One Boulder resident remembered from her turn-of-the-century childhood that “there was always a little ditch water running up and down the streets, you know. It was a lot of fun to make dams and put boats on them and so forth. I don’t know now where all that water came from, but it ran down every street that I can remember - had a little ditch running down the side of it and it was so much fun to play in.”

Households needed water all the time, so in early years the ditches ran year-round, except a brief spring shut-off for cleaning and an occasional winter cold spell when the channels froze solid. At those times, Mapleton Hill children used Farmers Ditch for ice skating. During cold months, the laterals froze first, and then some Boulderites had to carry household water from the main ditches.

Ditch technology

The **headgate** controls the amount of water entering the ditch, protects it from floods, and removes as much as possible of the creek’s sediment and debris. The first headgates were built of wood; all of Boulder’s

ditches now have concrete and steel headgates, some of them built early in the twentieth century.



White Rock Ditch headgate and diversion dam, on whose design Frederick Law Olmsted, Jr. consulted. Photo 1921

Diversion dams are little dams (not big dams for storage; those came later) that in times of low flow direct the stream toward the headgate. While these are now engineered structures designed to survive most floods, early diversion dams were often made of brush and stone and rebuilt every year or so.

Ditching - digging the channel - was usually done by a team of oxen using either “ditchers” or ordinary plows. Grade could be regulated with levels attached to the plows. Ditch builders aimed for a drop of one inch per 20 feet; they measured distance by the turns of wagon wheel. Little ditches might be dug by farmers; big ones (such as Boulder’s White Rock Ditch) were sometimes built by railroad contractors, because the large labor force required and some of the engineering was similar.

Flood irrigation of pastures was first controlled by shoveling earth to open one channel and close another. Later wooden boxes controlled the flow to each lateral. Starting in the 1920s, these boxes were in turn superseded with concrete boxes and steel gates. On the laterals, irrigators used movable canvas “tappoons” to block the lateral where water was wanted on the field (until recent years this system could be seen watering the CU campus).

Measurement was a part of the system that grew in importance. Ditch flow was first measured in “miner’s inches”; a term that attested to the Gold Rush origins of Colorado irrigation practice. Ralph Parshall, a professor at Colorado State, in 1937 invented the *Parshall flume*, a standardized sheet-metal channel in which flow can be measured accurately. Near the head of each ditch, and sometimes at other important division points, instruments provide a continuous record of flow, inside a small *recording house* (often a round sheetmetal silo about as tall as a person).



The Parshall flume and recording house for Silver Lake Ditch, 1999

Storage: Ditches often delivered water to small-scale farm ponds. Sometimes they filled larger reservoirs on the plains for later redistribution. Eventually some relied on high-watershed storage such as Silver Lake, to release water into the creek above the ditch.

Ditches as amenities

“When Boulder is visited by an eastern stranger who has an eye for beauty,” wrote one such easterner, “and some acquaintance with the use to which water is put in the gardens and cities of older countries he cannot fail to be strikingly impressed with the neglect of what seems to him an extraordinary opportunity for civic beauty.” That “east ern stranger” was Frederick Law Olmsted, Jr., Professor of Landscape Architecture at Harvard University and one of the founders of the profession of city planning. In 1910, at the invitation of a group of Boulder citizens, Olmsted prepared a pamphlet of suggestions for the city’s “improvement.” In addition to proposing the greenway ultimately realized decades later as the Boulder Creek Path, he suggested a promenade along Whiterock (then called Beasley) Ditch through the center of town, and a parkway following it beyond Folsom, then the eastern edge of Boulder. He also proposed a park and trail along Farmer’s Ditch below Red Rocks Park:

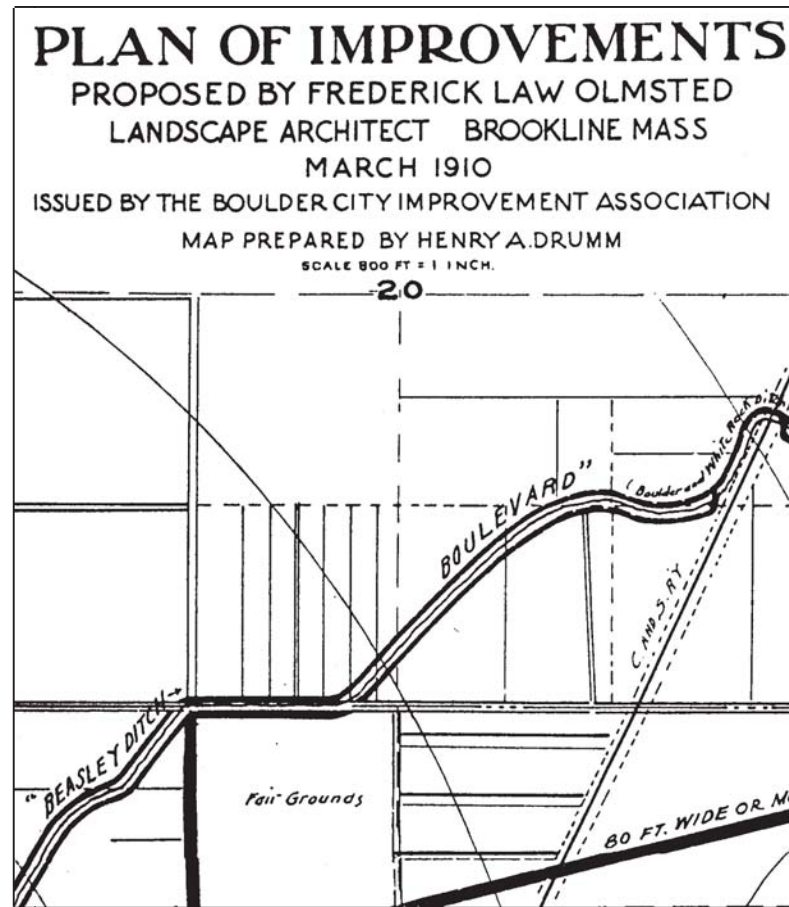
Given sunshine and breeze and the wonderful plunging view across the valley to rugged mountains bathed in sunlight; given shade from the direct glare of the sun and sky, easily to be obtained by planting; the one thing wanted to complete the situation is water, and the quiet flowing canal on its way to irrigate the fields beyond the city gives the very note that is needed. To be sure its banks are here shabby and neglected, the vegetation is weedy and an appearance of squalor is more or less in evidence, so that a superficial observer might turn away without feeling the least interest in the ditch. But all the essential elements of the most beautiful scenes of Italy are here, waiting only a little patient, skillful care to unite them into a little picture of paradise.

Olmsted devoted several pages to ditches throughout Boulder. They clearly charmed him.

If the inherent beauty of the water of the irrigating channels were supplemented by such treatment of their immediate borders as would remove the unpleasant associations that now in many places attach to them, such treatments as would bring out and enhance the natural associations of refreshment and abundance that are inseparable from them and would re-enforce their intrinsic charm, these channels alone would serve to make Boulder a place of high civic beauty.

Olmsted collaborated on the design of one ditch headgate in Boulder -

Whiterock Ditch, whose Olmsted-designed headgate still operates in Central Park (photo page 4). His advice on the design is a remarkable early statement of the philosophy that would later become 20th-century architectural Modernism: “The entire construction should be kept very simple and straightforward, with no applied ornaments or unnecessary complications of form. Any distinctive quality in appearance should be sought by making the work thoroughly substantial and durable and by avoiding awkward and ugly lines rather than by making a special effort at beauty or ornamentation for its own sake.”



Safety and the battle against ditches

In the last hundred and forty years at least fourteen people have drowned in Boulder ditches, mostly very small children (in recent decades for which figures are available, about three times as many have died in Boulder Creek). These tragedies have become less frequent in the past fifty years, even with the growth of population and of the mileage of ditches within the expanding city limits. Boulder’s ditches have become safer. Some of that is because ditch companies have installed improvements such as safety grates. Urban growth has also probably helped solve the problem: as streets became busier, parents were less likely to let small children play outside unsupervised. Ditches remain potentially dangerous, and small children should be supervised near them.

Accidents produced several efforts to eliminate Boulder’s ditches by putting them underground. The first of these movements originated after two drownings in 1929. Alarmed Boulder citizens called for piping or covering all the ditches, but the cost of this solution would have been enormous. Fencing the ditches was rejected as a safety hazard in itself; children who managed to get into the ditch could not be easily discovered or rescued. Ditch companies did begin installing safety grates, and cooperated with the city in keeping them clear of debris.

Community concern was prompted again in the early 1950s when one drowning was followed by three close calls. A citizen initiative in 1951 would have required ditch companies to cover or fence all ditches within the city at their own expense within 60 days.

This initiative was opposed by some people who valued the open water, such as Mrs. Harry Ohling, who wrote to the *Daily Camera* that “it will break my heart if the ditch company is forced to cover the stream that flows through my property. I have beautified the banks” near Walnut Street. “The ditch and the garden I have developed around it is enjoyed by all of my tenants.” There was also a great deal of opposition from those who felt the proposal was unreasonable or unworkable. The referendum failed 1606 to 907 at the polls. The same day the ditch companies pledged “to work toward a fair and safe solution” to ditch safety problems.

The new approach, during these postwar years of rapid development, was to get developers to foot the bill by undergrounding the ditch through their subdivisions. A siphon built in 1953 carried the Farmers Ditch under North Boulder Park; the Hudson Construction Company was able to build 16 houses on lots where the ditch once ran. The siphon itself claimed a life when an excavation collapsed during construction. More Boulder ditches were undergrounded at Table Mesa in the late 1950s, and Wonderland Hills in North Boulder in the 1970s.

The city no longer encourages covering ditches. The Boulder Valley Comprehensive plan calls for keeping the historic ditch system as part of the valley's agricultural heritage and as neighborhood amenities, and managing them safely.



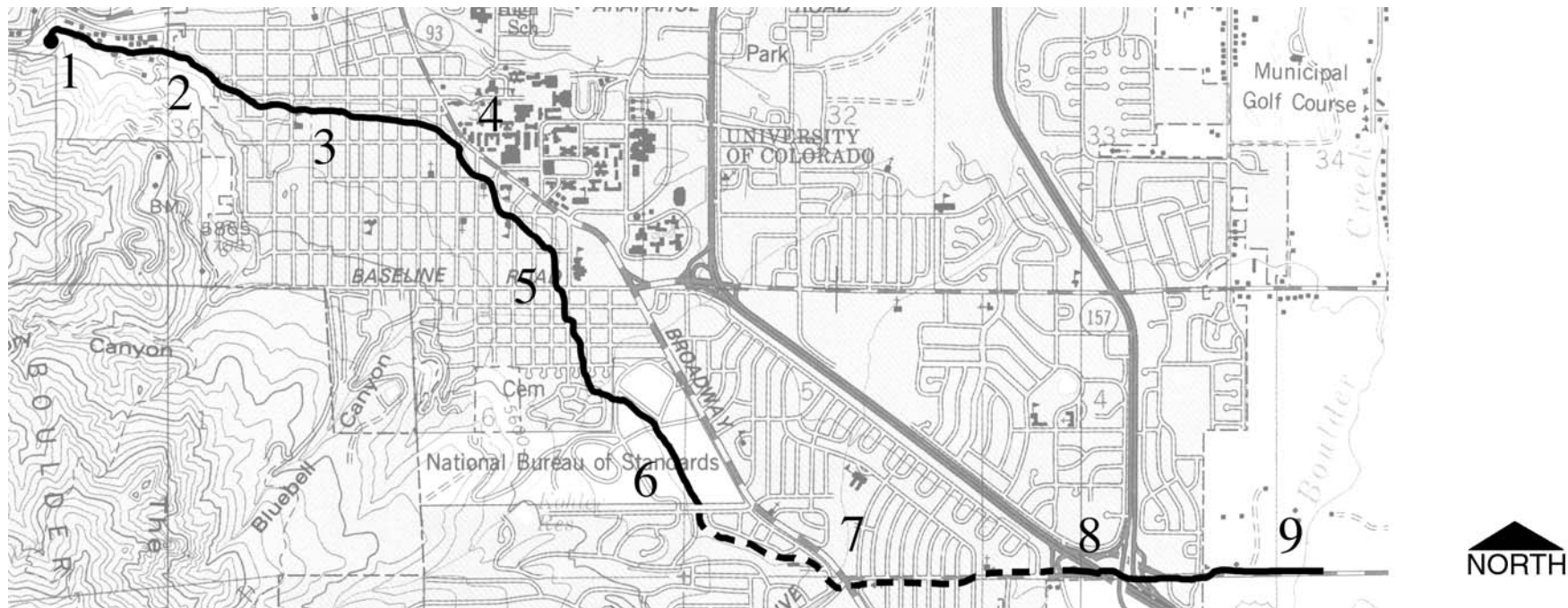
Anderson Extension Ditch (top) on its way into pipe (middle) under Martin Acres neighborhood (bottom), 1958



Orchards and gardens from Flagstaff Mountain in 1894. From foreground: Anderson Ditch, University Avenue, 6th Street, Marine Street.

Anderson Ditch takes its water from the south side of Boulder Creek as the creek leaves Boulder Canyon, at the first possible point of diversion that didn't require building elaborate flumes or extensive cutting through rock cliffs (the first reach of the ditch, visible from the Boulder Creek path, was cut through the canyon wall). That diversion point allowed it to

Where you can see Anderson Ditch



1. Headgate and dam at Boulder Creek, and rock cut along wall of canyon. Both visible from Boulder Creek path.

2. Anderson Ditch runs along the edge of open space. Remnant lateral gates here once supplied orchards and gardens along West Arapahoe.

3. Pioneer Cemetery (Jonas Anderson's grave overlooks his ditch). Before and after the cemetery, the ditch runs along

Pleasant and Pennsylvania. The front porch of 658 Pleasant steps across the ditch. In the Mattie Dean open space plot north of Pleasant is a remnant street lateral; you can see its old headgate at Ninth Street in the cemetery.

4. Campus laterals: four laterals cross Broadway to water the CU campus. One fills Varsity Pond, which supplies water to sprinklers. Historic lateral channels in Norlin Quadrangle now carry return water to the creek.

5. The ditch is visible along 19th Street north of Baseline, and 20th Street from Columbine to Bluebell.

6. The new NOAA building is set behind Anderson Ditch and its trees. Lateral headgates and faint traces of laterals recall this land's past as irrigated pasture. The end of the ditch in 1860.

7. Bear Creek: the ditch was extended to here in 1875. At the bike underpass, a control structure releases water into the creek for

downstream irrigation. This is the end of Anderson Ditch. The same structure can pass water across the creek to the Anderson Extension Ditch, which begins here.

8. In the U.S. 36 interchange, Anderson Extension Ditch daylights for the first time.

9. Along South Boulder Road, Anderson Extension Ditch is visible to South Boulder Creek. It supplies Baseline Reservoir.

irrigate the greatest possible amount of land close to town - all of it now in town. It was a strategic place to be in 1860, before “first in time, first in right” had been established as the basis of Colorado water law; it would be difficult for another ditch to divert water before it reached the Anderson headgate. And now its rights are senior to almost all other ditches on Boulder Creek.

Just a few feet beyond the point where the ditch takes its water, the creek drops out of the canyon and into the broad Boulder Valley. The creek falls about ninety feet in the next mile, but Anderson Ditch followed a nearly level course (a five foot drop to the mile) which took it out along the side of the valley toward Bear Creek, so that the broad flat lands between these streams could be watered from above. It passed through what is now University Hill and the neighborhoods west of Broadway, but in 1860 was the wide open slope where the plains met the Flatirons. An extension of Anderson Ditch later brought water a little farther, to Baseline Reservoir, where it could supply farm ditches farther out on the plains.

Anderson Ditch was built in 1860 by Jonas Anderson and Marinus



Hidden old headgates still show where laterals once started along the streets of West Arapahoe and Highlands Lawn.

Smith, who had homesteaded 160 acres immediately south of the “Boulder City” townsite. The original filing called for irrigating only 80 acres, which must have been the close-in lands along Boulder Creek, where Marinus Smith soon produced subdivision plats, in what are now the West Arapahoe and Highlands Lawn neighborhoods.

From the very beginning, the ditch supplied not only farms but households in these neighborhoods, through little laterals along the streets. By the turn of the century, about half the water in the ditch supplied domestic users (many of whom had not gone to the trouble of buying rights to the water).

The ditch company was incorporated in 1871 for twenty years. When it was reincorporated in 1891 its name became “New Anderson Ditch Company”; both names have been used since then.

In 1875, the ditch was extended by a half mile to spill water into Bear Canyon Creek, which allows not only disposal of excess but permits using Bear Canyon Creek as a carrier to irrigate additional lands. Among those lands are the present CU Research Park, which is still irrigated by Anderson Ditch water sent down Skunk Creek.



A remnant lateral headgate on the grounds of the new NOAA building, which irrigated what is now Martin Acres. Photo 1997.

Near the head of Anderson Ditch, Jay Sternberg in 1873 built “Boulder

City Flouring Mill,” also known as Sternberg Mill. The ditch delivered water to the mill, which took its power from the drop back into Boulder Creek. It stood opposite the Yount Mill, which was powered in the same manner from Farmers Ditch on the north side of the creek.

The District 6 Water Commissioner’s Report in 1890 gave a statistical picture of Anderson Ditch:

length in miles	3
number of days run	175
acres can irrigate	425
acres irrigated, alfalfa	75
acres irrigated, seeded grasses other than alfalfa	50
acres irrigated, natural grasses	110
acres irrigated, other crops	175



Anderson Extension Ditch along South Boulder Road, 1998

Baseline Reservoir & Anderson Extension

The Baseline Land & Reservoir Company in 1904 built a new reservoir, and a new ditch to bring water to it. “Anderson Extension” starts at Bear Creek, where Anderson Ditch ends. It is a separately



Table Mesa Drive under construction, 1958, looking west: in the foreground, part of Anderson Extension Ditch on its way into pipe.

manged company that runs water through Anderson Ditch under an agreement signed in 1911. The city of Lafayette bought a majority interest in the Baseline Land & Reservoir Co. in 1996 as part of its municipal supply system, and the Baseline and Anderson companies spent the next three years in court clarifying the terms of the 1911 agreement.

Table Mesa Drive pipe

Much of the New Anderson Extension was put into a pipe underneath Table Mesa Drive in 1958 as part of the construction of the Martin Acres neighborhood. The ditch remains visible along South Boulder Road.



Anderson Extension Ditch daylights in the Table Mesa interchange.

Campus laterals

One of the most valuable early donations to the University of Colorado was 10 shares of Anderson Ditch water by Marinus G. Smith (he also donated some of the land on which to use it). This land and water helped Boulder convince the territorial legislature to locate the university here.



Anderson Ditch water allowed planting trees and watering the lawns on campus. An early popular name for Anderson was “University Ditch.”

Generations of CU students, up until the 1980s, remember ditch irrigation of the campus: groundspeople flooded quadrangles by blocking laterals with sandbags or with “tappoons,” canvas flaps hung between two rods. Flood irrigation has been replaced by a computerized sprinkler system that applies water according to the weather and the exact needs of specific planting zones, but the water still comes from Anderson Ditch. It now flows through pipes under Broadway and into Varsity Pond, from which it is pumped to the sprinklers. Many of the old laterals remain as historic landscape features of the Norlin Quadrangle National Register Historic District. They carry small amounts of water that eventually flows back to replenish Boulder Creek.

Water transfers

The city of Boulder first bought eight shares of Anderson Ditch in 1886, and has continued acquiring shares, of which it now owns the majority. In 1925, the city began transferring shares from Anderson Ditch to the municipal pipelines below Silver Lake. Those transfers continued as the city grew:

1925	14.75 shares
1942	11.25 shares
1963	24.55 shares
1989	7.23 shares
1993	2.48 shares



Lateral crossing Broadway to the campus, c. 1900. View from Hale Science (house at right is now parking lot at Pennsylvania Avenue).

Beginning in 1974, the city also began transferring small amounts of Anderson Ditch water back to Boulder Creek to maintain minimum flows there. In 1993, the city and the Colorado Water Conservancy Board jointly transferred 9.7 shares. Anderson Ditch shares are particularly attractive for the instream flow program, just as they are for municipal use, because they are senior to almost all others on the stream.

Anderson Ditch continues to deliver irrigation water to the University and to the National Institute of Standards and Technology, both of which use their Anderson water in automated sprinkler systems, and to the city of Boulder, which also keeps a few of its shares for use under the ditch. It also delivers water to a small number of individual irrigators in Boulder who are the successors, after almost a century and a half, of Jonas Anderson and Marinus Smith.

A guide for people who live along the ditch

Don't block ditch company access to the ditch. Ditch companies have a need and a right to access all along the ditch to maintain it, even in places such as backyards where construction over the years may have made access difficult.

Do consult the ditch company before placing any structure in, across, or next to the ditch. The company must review structures to be sure they won't block maintenance access; bridges and even crossings for electrical or irrigation lines must be reviewed to be sure they will not trap debris. Retaining walls must be reviewed to ensure that they will not present maintenance problems or disrupt flow. The ditch company has the right to remove unapproved structures, even if they have been in place several years. The company may charge a fee to offset future maintenance.

Do not dump anything in the ditch. It carries clean water for parks, for irrigating crops for human consumption, and even for drinking. No drainage should be directed into a ditch, except for clean ground runoff that has historically flowed into it. Rubbish and debris in the channel - even leaves or grass clippings - can clog the ditch and cause dangerous overflows.

Do not take water from the ditch. It belongs to shareholders in the ditch company, who have rights to specific amounts of water at specific times, and who pay for the ditch's upkeep. Water is extremely valuable in Colorado, and taking water to which you're not entitled is theft.

Do watch children and pets around the ditch. Flows may change dramatically in just a few hours; tonight's slow and safe-looking ditch may be full, fast, and hazardous tomorrow morning.

Do call with any problems or questions. For general questions call Joanna Tisdale (City of Boulder Water Resources Specialist) 303-441-3115. In an emergency dial **911**.

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