

Boulder Creek Commons

Boulder, Colorado



Concept Plan Application for Annexation, Initial Zoning and Site Review

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Boulder Creek Commons



SUMMARY

Boulder Creek Commons is envisioned as a pedestrian-friendly mixed income neighborhood that will provide a unique opportunity for Boulder to address one of its most challenging trends – the aging of its population. The new neighborhood will extend the existing pattern of the adjacent neighborhoods and establish its own unique identity with a network of pedestrian-oriented streets and a central park. Varying lot sizes and building types will be employed to address project goals of diversity, sustainability and compatibility with existing neighborhoods.

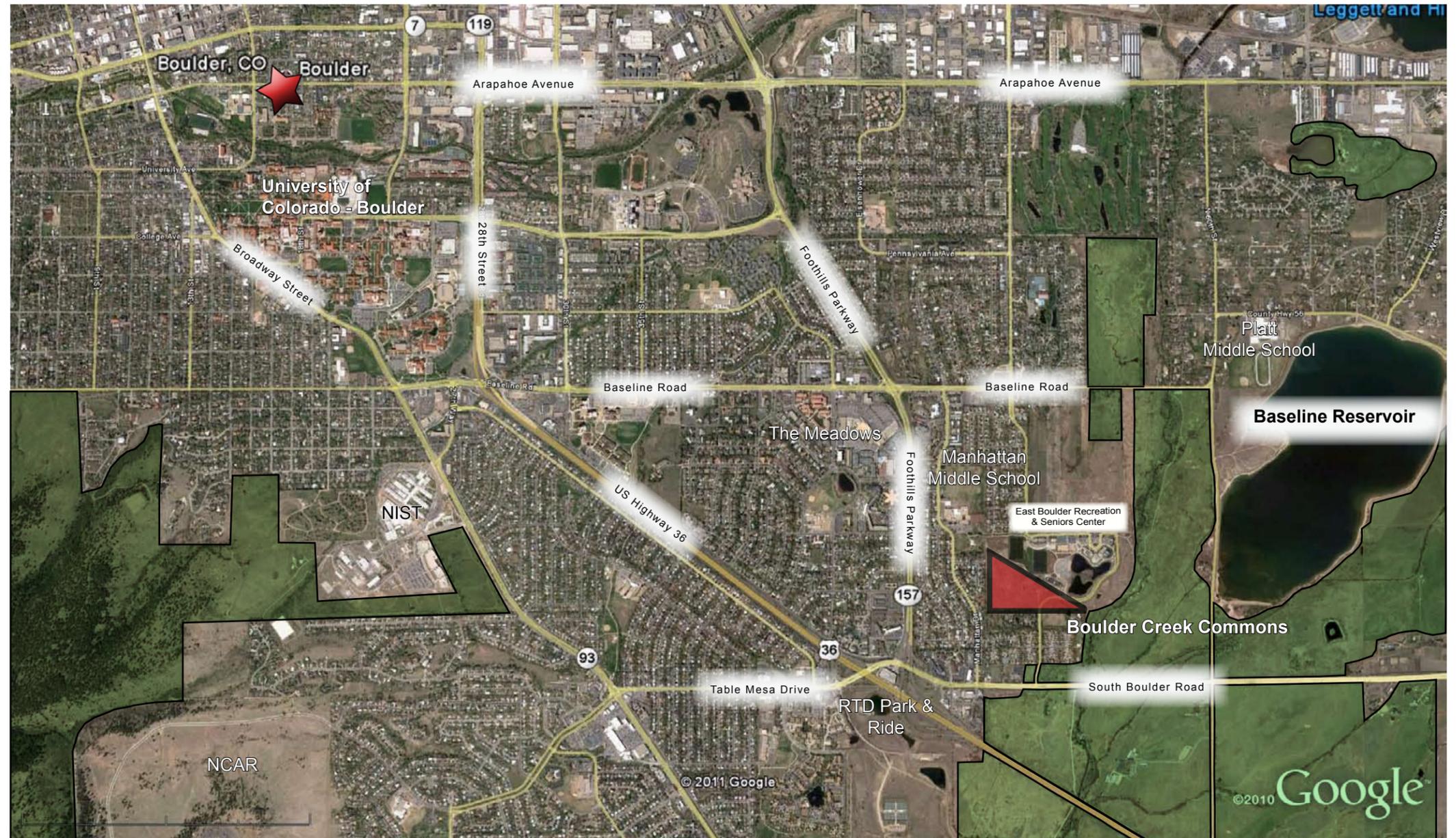
The core of the project will be to provide much needed deed-restricted affordable housing for low-income seniors in a distinctive, well managed congregate care community adjacent to the East Boulder Senior Center. Locating such a project at Boulder Creek Commons takes advantage of a unique opportunity to leverage existing city infrastructure by locating senior housing next to one of the best community centers of its kind in the region. Additional, affordable home-ownership opportunities for qualified middle-income buyers will also be provided within the neighborhood.

A network of trails, parks, and open space will link together the existing neighborhood, new single family and duplex homes, the congregate care community, the East Boulder Recreation/Senior Center and the regional South Boulder Creek Open Space corridor.

The site is bisected by 55th street, with the portion of the site west of 55th street well suited for development (West Parcel). That portion of the property east of 55th Street (East Parcel) is planned for environmental preservation and habitat enhancement.

One of the goals of the proposed development is to significantly enhance the ecological value of the property by providing prairie and riparian enhancements on the property on both the East and West Parcels. On the East Parcel, this will be achieved by significantly increasing the area of wetlands, removing noxious weeds, creating new wetlands in upland sites, enhancing existing wetlands with trees and shrubs to increase structural diversity of the habitat. These enhancements will greatly increase the quantity and quality of natural habitats on the East Parcel and will provide much greater aesthetic appeal for visitors to the East Boulder Community Park and Recreation Center and City of Boulder Open space along 55th Street.

On the main West Parcel, a bioswale will be created that will have several functions and benefits. It will be part of a substantial buffer to the adjacent neighborhood; it will be the primary storm water conveyance for offsite drainage and flood waters; it will include enhanced existing wetlands as well as new wetland creation; and become a wildlife corridor through the site.



CONTEXT AND SITE CHARACTERISTICS

The Setting

The site, known as the Hogan-Pancost property after the families that owned it for nearly 70 years, is a 22.17 acre property located along 55th Street adjacent the East Boulder Community Park. The land was farmed and used for grazing. Gradually the City of Boulder moved eastward, eventually surrounding the property with residential and related recreational development. Several adjacent parcels belonging to the extended families have been developed, and this is one of the last remaining parcels available for development.

The site is located along 55th Street, adjoining Keewaydin Meadows neighborhood to the west, Greenbelt Meadows to the south, and the East Boulder Senior Center and Recreation Center and Manhattan Middle School to the north. The recently completed East Boulder Community Park, including soccer fields, Dog Park and paved parking lot, abuts the north lot line of the property.

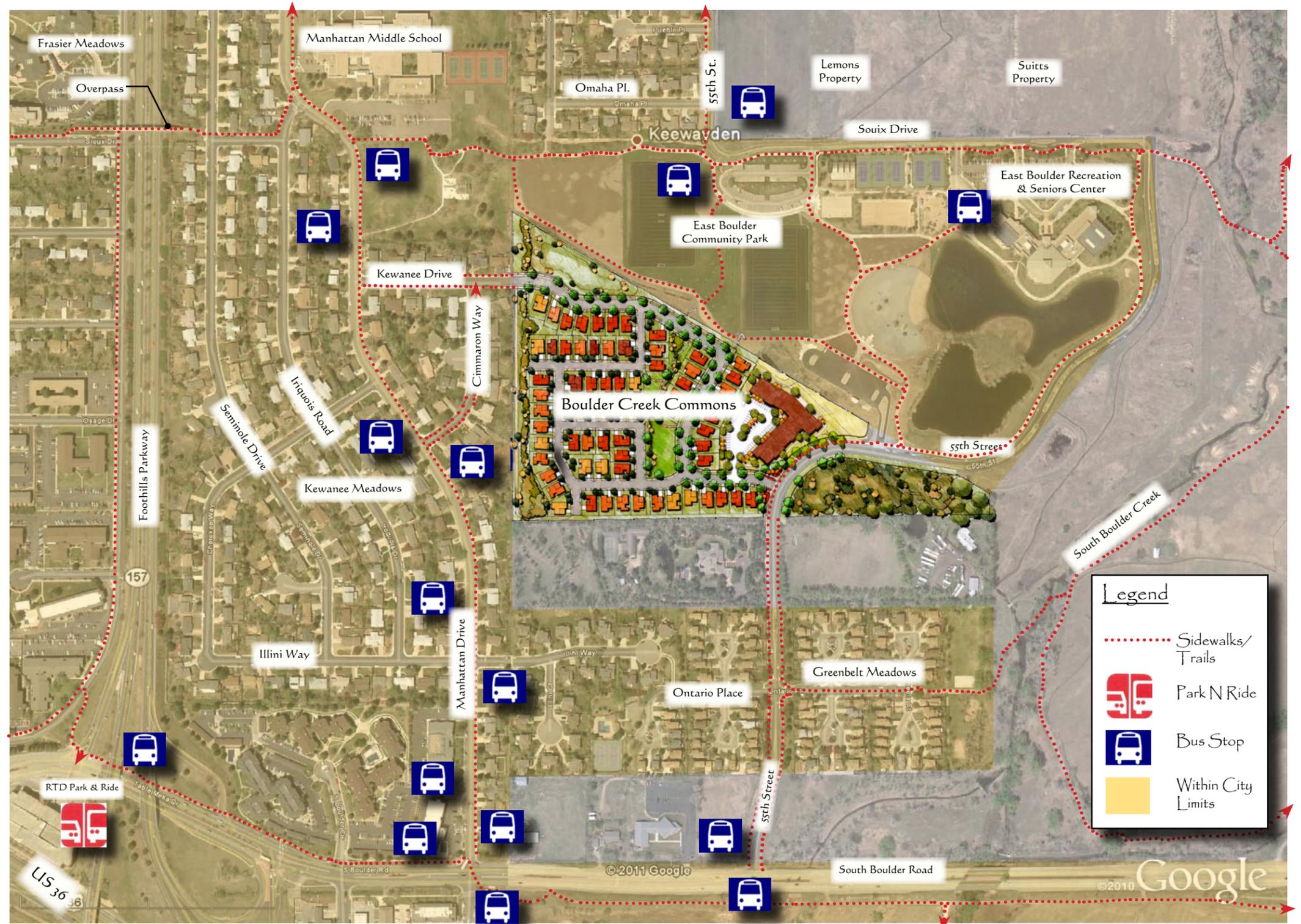
In addition to its immediate proximity to schools and recreational amenities, the site connects to the city of Boulder's extensive bicycle and pedestrian network and open space trails. Multi-use paths throughout the East Boulder Community Center site, just north of Boulder Creek Commons, provide good linkages. Further, there are multiple bus routes served by RTD within a short walk of the site including the 203, 206, Dash and 209 as well as on-demand Special Transit services for Seniors.

The property has excellent vehicular access from 55th Street, which arcs across the southeast corner of the site connecting to South Boulder Road, the Recreation Center, and ultimately Baseline Road. An additional access at the northwest corner was anticipated and provided for when the Keewaydin Meadows subdivision developed at Kewanee Drive. The primary entrance for Boulder Creek Commons will be accessed off of 55th Street and the secondary access will be Kewanee Drive. One residential subdivision, Greenbelt Meadows, is located to the south and is accessed from 55th Street as well.

The Keewaydin Meadows subdivision to the west was developed in the late 1960's and consists of low density single-family homes, including ranch style and split-level houses. The Greenbelt Meadows neighborhood to the south was built in the 1980's and consists of small lot single family homes placed in clusters. Two estate style homes exist on county lots just south of Boulder Creek Commons.

The site has little significant vegetation due to intensive agricultural uses and livestock grazing. The natural grade slopes gradually to the northwest. There are three irrigation ditches that cross the site, including Dry Creek Ditch #2, the Howard Super-Phostical Ditch, and the Bodam Lateral. There are sweeping views of open space to the north and northeast and magnificent views of the Flatirons and Arapahoe Peak to the west/northwest.

The 2.73 East Parcel is characterized by degraded wetlands, plains cottonwood forest, and introduced pasture grasses. In addition, the wetlands are degraded by dense populations of undesirable weeds.



BACKGROUND

The site has been designated as Area IIA in the Boulder Valley Comprehensive Plan (BVCP) since the adoption of the BVCP in 1977 and has remained this designation through all of the major updates to the BVCP. The BVCP classifies the west parcel as Low Density Residential (2-6 dwelling units per acre) and the east parcel as Environmental Preservation. A portion of the east parcel also includes a natural systems overlay. Due to other development in the area, including the East Boulder Recreation/Senior Center and Community Park, all Urban Services are available to the property and no extensions are required.

A petition for annexation was submitted in December of 2006. A previous application for Concept Plan Review was made in 2007. The City Staff and nearby neighbors identified potential technical issues and impacts associated with the development of this property that warranted further exploration. Because of the complexities involved with some of the technical aspects of the potential development of the property, the City and property owners agreed in the fall of 2007 that prior to another Concept Plan submittal, the environmental and engineering factors pertaining to the site would have to be assessed and the findings submitted to the City for review. To accommodate this unique process, the property owners engaged specialist consultants who spent several months evaluating the identified issues in a logical and factual manner based on accepted science and engineering methodologies. This resulted in an Environmental and Engineering Assessment and Feasibility Study that detailed the results of the evaluations. After submission, the City engaged its own consultants to critically review and analyze the Environmental and Engineering Assessment and Feasibility Studies. The results of the studies and independent analysis were presented at a Public Hearing to the Planning Board on January 6, 2011. The Planning Board determined in that meeting that the project should proceed with a Concept Plan Review application, accepting the Environmental and Engineering Assessment and Feasibility Study as the factual basis proving the technical feasibility of an appropriate level of development on the property. The Board identified four primary issues in that meeting that they believed needed to be addressed in more detail as part of a Concept Plan application. These included:

1. More information associated with the patterns of ground water in the area, its impact on the adjacent neighborhood, and impact mitigation strategies to the extent that can be accommodated by development on this site.
2. A drainage/flood management strategy through the site based on a proposed site plan
3. Analysis of the transportation impacts of development on this site and a Transportation Demand Management (TDM) plan for the site.
4. Wetland preservation and mitigation strategies, with a focus on wetland and habitat enhancement on the East Parcel.

In the months since this meeting, these topics have been investigated further and addressed in significant detail. The proposed Concept Plan has been developed taking these issues into consideration. The

methodologies and strategies of how the proposed Concept Plan addresses these topics are summarized elsewhere in this document and more detailed reports regarding each have been submitted to the City Staff for evaluation.

COMMUNITY VISION

Boulder Creek Commons will create its own sense of place and contribute to the fabric of Southeast Boulder through the application of a variety of sensitive site design principles and diversity of residents. A sense of arrival is created at 55th Street by orienting the access point to a framed view of the Flatirons and the Indian Peaks down the street and across the central park. The senior housing building is oriented toward 55th Street, announcing to all who pass by that this is a diverse neighborhood. This location has the benefit of being in close proximity and well connected to the East Boulder Community Park, Seniors Center and Recreation Center. The building itself screens its required parking from view by internalizing the parking lot.



A central park is the public heart of the neighborhood. Easily accessible on foot, it will be the home of family activities and seniors alike. The park also provides alternative pedestrian routes through the neighborhood. This will be the primary place where the diverse members of the neighborhood can interact with each other.

Kewanee Drive was designed and built by the developers of Keewaydin Meadows subdivision to allow for a connection from the Hogan-Pancost property to Manhattan Drive. This street will be extended into Boulder Creek Commons along the north boundary of the property, providing a dramatic view of the new East Boulder Community Park along this boundary. The placement of the road in this location is not only a logical extension of Kewanee Drive; it also allows all who travel along it to experience the expansive views across the park.

Cut-through traffic is discouraged by the circuitous street pattern within the neighborhood that requires stopping and making turns at a variety of locations.

There will be a total of 121 new residences in Boulder Creek Commons. Fifty (50) of these will be affordable to seniors in the 30% to 60% AMI range. An additional three (3) duplex buildings (six units) and two (2) single family homes will be deed restricted home ownership opportunities for middle-income residents. The remaining 63 market rate single family homes ranging in size from 2,250 square feet to 3,000 square feet will allow for a variety of household sizes and character. Potential households include small and large families, singles and couples, empty nesters, and independent seniors. The diversity of age and income encouraged by the variety of housing choices will create a socially vibrant and interesting community.

SPECIAL OPPORTUNITY OR BENEFIT TO THE CITY OF BOULDER for ANNEXATION

Policy 1.27(d) of the BVCP provides guidance to the City of Boulder staff and Council with regard to annexation of Area II land. A special opportunity or benefit to the city is a key consideration for annexation. Emphasis is given to the benefits of the creation of affordable housing. Additionally, environmental preservation and other amenities that are determined to be a special opportunity or benefit are also considered. This proposed project very clearly provides special opportunities and benefits in each of these categories.

Affordable Housing

The following excerpts are from the 2010 Summary of Key Trends for the City of Boulder, Boulder Valley Comprehensive Plan:

“Overall, Boulder is a community of individuals and families whose values include education, nature and innovation. In 2011, a town of 103,000 people, Boulder continues to grow in population, with an anticipated increase of about 15 percent between 2011 and 2035. Boulder’s median age is lower than the rest of the county, the state and the nation. However, Boulder County’s population is aging faster than the nation and the population aged 60 and over is expected to more than double between 2011 and 2020.”

“A community’s strength is often a reflection of its diversity. When multiple generations live near each other, elderly parents are able to receive care from their adult children, while young children can build relationships with their grandparents.”

According to the BVCP 2010 Summary of Key Trends, “While the percentage of Boulder’s population 65 and older has not changed significantly over the last 20 years (growing by 0.2 percent, from 7.8 percent to 8.0 percent), the future looks much different: In 2008, 12 percent of Boulder County’s residents were over the age of 60. In 2020, that age group is expected to reach 21 percent of residents.”

In a May 29, 2011 Boulder Daily Camera article on the recently released 2010 census data at the time is the following quote from City of Boulder Planner Chris Meschuk, “From a planning perspective, our population is going to age, and a big chunk of the population is

going to become reliant on our community infrastructure in a way that is very different from what it looks like today.”

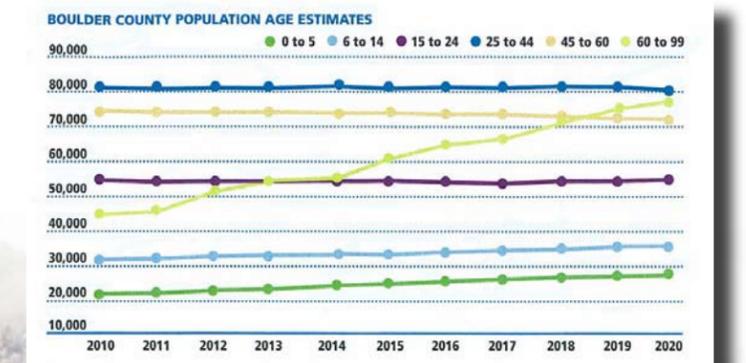
Clearly, the senior population of Boulder County is growing at a much higher rate than any other segment of the population. Yet, the affordable units available to lower income seniors are currently 3% of the total affordable housing stock in the City.

To meet this unquestioned and growing need, Boulder Creek Commons proposes 50, affordable independent senior units specifically designed to meet the social, physical, and emotional needs of seniors. The proposed location is ideal with close proximity to the East Boulder Senior Center and the East Boulder Recreation Center. This provides an excellent opportunity for coordination of facilities in the City and ease of transportation for residents to the Senior Center. The location in a traditional residential neighborhood, where seniors prefer to locate, helps strengthen the proposed single family neighborhood by providing diversity in housing types and density.

The senior units will be available exclusively to low-income residents with incomes below 60% of AMI and as low as 30% of AMI, depending on factors in place when the project is built. Deed restrictions will be put in place that will provide permanent affordability for the community of Boulder and its residents.

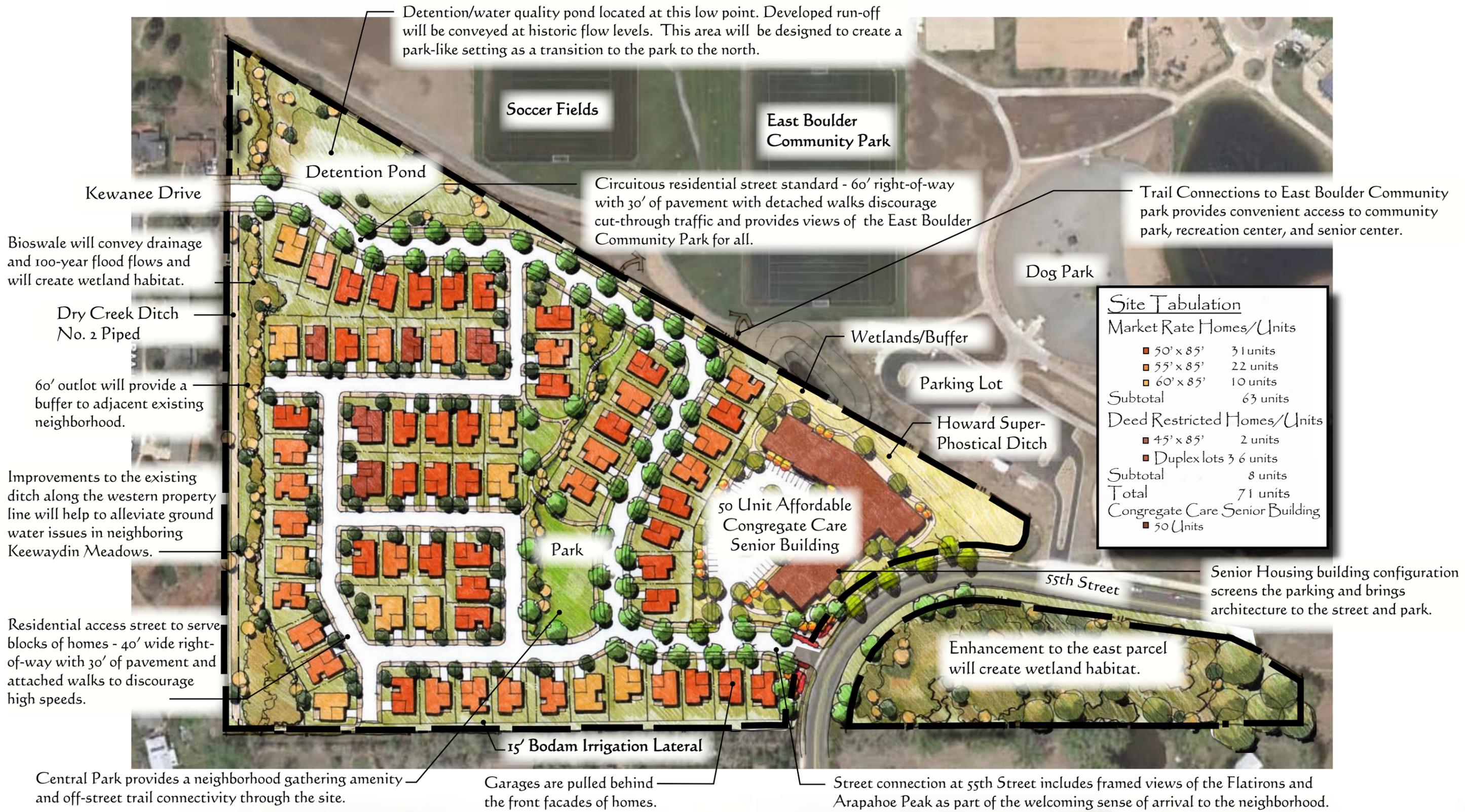
In addition, consistent with the City of Boulder’s Affordable Housing goals, the project will provide 8 units of ownership properties available to and restricted to middle-income buyers, consisting of three (3) duplex buildings (six total units) and two (2) single-family homes, distributed within the project.

This mix of housing was determined based on extensive discussion with the city Housing and Human Services staff. It should be noted that the applicant initially proposed sixty-eight (68) to seventy (70) deed restricted affordable seniors units and no middle income affordable units. The logic for this initial proposal was that seniors housing is a growing and under served need in Boulder, and this location near the East Boulder Seniors Center was an ideal spot to for a larger population of seniors. There are many other locations in Boulder where middle income housing can be located, so it seemed less essential that this demographic be served on this site. The applicant invites further dialogue on this topic as part of the Concept Plan Review.



Source: Boulder County TRENDS Report 2011. Article “Who Are We”, page 9.





Site Tabulation

Market Rate Homes/Units	
50' x 85'	31 units
55' x 85'	22 units
60' x 85'	10 units
Subtotal	63 units
Deed Restricted Homes/Units	
45' x 85'	2 units
Duplex lots	3 6 units
Subtotal	8 units
Total	71 units
Congregate Care Senior Building	
	50 Units

Environmental Preservation

The East Parcel at Boulder Creek Commons is currently a weed degraded area, once populated more extensively with wetland habitat. The wetlands were created due to flood irrigation techniques used in the agricultural past of the site. As part of the development of this project, the degraded wetlands on the East Parcel will be re-established, producing quality habitat adjacent city owned open space.

HOUSING TYPES

Three primary housing types are planned at Boulder Creek Commons. Congregate Care Senior Housing is a centerpiece of the neighborhood. Deed-restricted duplexes will provide affordable housing to middle-income residents. Single family lots of a variety of widths will provide a diversity of architectural character in the neighborhood. Two of these single family lots will be deed-restricted. The site plan opposite identifies the characteristics and locations of each of these housing and lot types.

Of particular importance is the Congregate Care Senior Housing. It is important to elaborate on this key part of the neighborhood.

The Congregate Care facility in Boulder Creek Commons includes 50 affordable, independent senior housing units, which will be provided in a single building community.

Hendricks Communities LLC, well-known and respected for its design and management experience in seven similar projects it has developed and manages will provide the best possible design and management for this project and the senior residents of Boulder.

The project will be developed to meet the specific need of senior residents, which will allow it to meet the specific requirements of the definition of “congregate care facility” as established by the City of Boulder.

The definition used to compare the project’s design and management to the city’s requirements is as follows: “Congregate care facility” means a facility for long-term residence exclusively by persons sixty years of age or older, and which shall include, without limitation, common dining and social and recreational features, special safety and convenience features designed for the needs of the elderly, such as emergency call systems, grab bars and handrails, special door hardware, cabinets, appliances, passageways, and doorways designed to accommodate wheelchairs, and the provision of social services for residents which must include at least two of the following: meal services, transportation, housekeeping, linen, and organized social activities.

The completed project will be available to independent senior residents on a long-term rental basis. As indicated, the project will be developed as a single building. It’s important that the property be developed in this way in order to enhance social interactions of the residents. The more residents that can be located in a single, well designed and managed project, the more opportunities there will be for social interaction.



Properly designed, located and furnished common areas at the property will be large, inviting and well furnished. Primary common areas will be centrally located in order to enhance the community feel of the property. Additional common areas will be located throughout the property to allow for intimate gatherings for smaller groups of residents. Both are very important to enhance the living environment for the residents.

Special safety and convenience features will be integrated throughout the complex for the needs of the elderly, such as emergency call systems, grab bars and handrails, special door hardware, cabinets, appliances, passageways and doorways designed to accommodate wheelchairs. Regarding accessibility, the project will be designed to enhance the quality of life of our residents and will specifically meet all accessibility requirements of the applicable local Building Codes.

The primary goal in operating this project will be to provide an attractive, safe, socially interactive community for the senior residents of Boulder. One of the primary objectives is to create a sense of community, involving all residents, through daily activities and services that utilize the property’s extensive common areas.

Resident services will be provided in one of two ways; either directly to the residents by on-site staff, or through owner-approved vendors that are invited onto the property to provide selected services. The daily goal is to eliminate the isolation that often afflicts seniors. The community will have a minimum of three organized activities each day. Often times there will be more, creating a sense of community, and enhancing the life and lifestyle of our residents.

The building will have a full time property manager and a resident coordinator to plan and implement social activities. Resident input will help to determine the specific activities.

The close proximity of the project to the East Boulder Senior Center will be invaluable in providing another level of services to the residents of the project. The Facility Management will work closely with the staff of the Recreation Center. This asset will be utilized to involve the residents in the activities at the facility and also to create additional interactions between the residents of Boulder Creek Commons and other seniors from the surrounding community.

SUSTAINABILITY CONCEPTS

The creation of a sustainable neighborhood includes thoughtful compact site design and well thought out public realm that will become more attractive as it matures. Attributes such as compatibility, diversity, and affordability contribute to the sustainability of the neighborhood.

Boulder Creek Commons is a good example of a development that follows the principles of a sustainable neighborhood (including those published by the United States Green Building Council in its LEED-ND Rating System). Selected examples of the principles that Boulder Creek Commons exhibit include:

The LEED-ND Rating System gives preference to projects that are located on infill properties to encourage smart growth of existing communities. The Boulder Creek Commons property and the two neighboring properties to the south are all considered LEED-ND infill sites. Over 86% of the combined boundaries about previously developed parcels including the Greenbelt Meadows Subdivision, Keewaydin Meadows Subdivision, East Boulder Community Park and East Boulder Community Center. The LEED-ND threshold for infill designation is 75%. A small segment of the property boundary abuts the Open Space to the east.

The site’s existing adjacent infrastructure and nearby amenities of the East Boulder Community Park, East Boulder Senior and Recreation Centers, the City’s open space and trail network make it an outstanding location for a new neighborhood. The development of Boulder Creek Commons is a logical, incremental expansion of the city that is well connected to existing adjacent developed areas. The site is well served by nearby transit service and trails. Strong pedestrian and bike connections to these amenities will be developed. Residents of the senior housing will be able to utilize Special Transit for many of their trips. Each of these conditions reduces dependence on automobiles.

Storm water management through the use of new bio-swales will filter storm water prior to discharge into the regional drainage system. The primary bio-swale on the west boundary of the property will also be an opportunity to create new and enhance existing wetland habitat.



The impact of the existing flood plain is mitigated through the conveyance channel on the west side of the site. All projected flood waters will be managed through this channel.

Boulder Creek Commons will have a high level of pedestrian and vehicular connectivity both internally and to the community at large. Internal streets, walks, and trails connect to surrounding areas effectively and in a pedestrian friendly manner.

The central park acts as both a central neighborhood gathering place as well as being an effective off-street pedestrian system connecting the neighborhood to the East Boulder Community Park.

Boulder Creek Commons will be a diverse, mixed-income neighborhood. The presence of seniors housing mixed with other forms of housing provides diversity not often achieved in other parts of the City. 48% of the community will be deed-restricted housing, including seniors that will be in the 30%-60% AMI range.

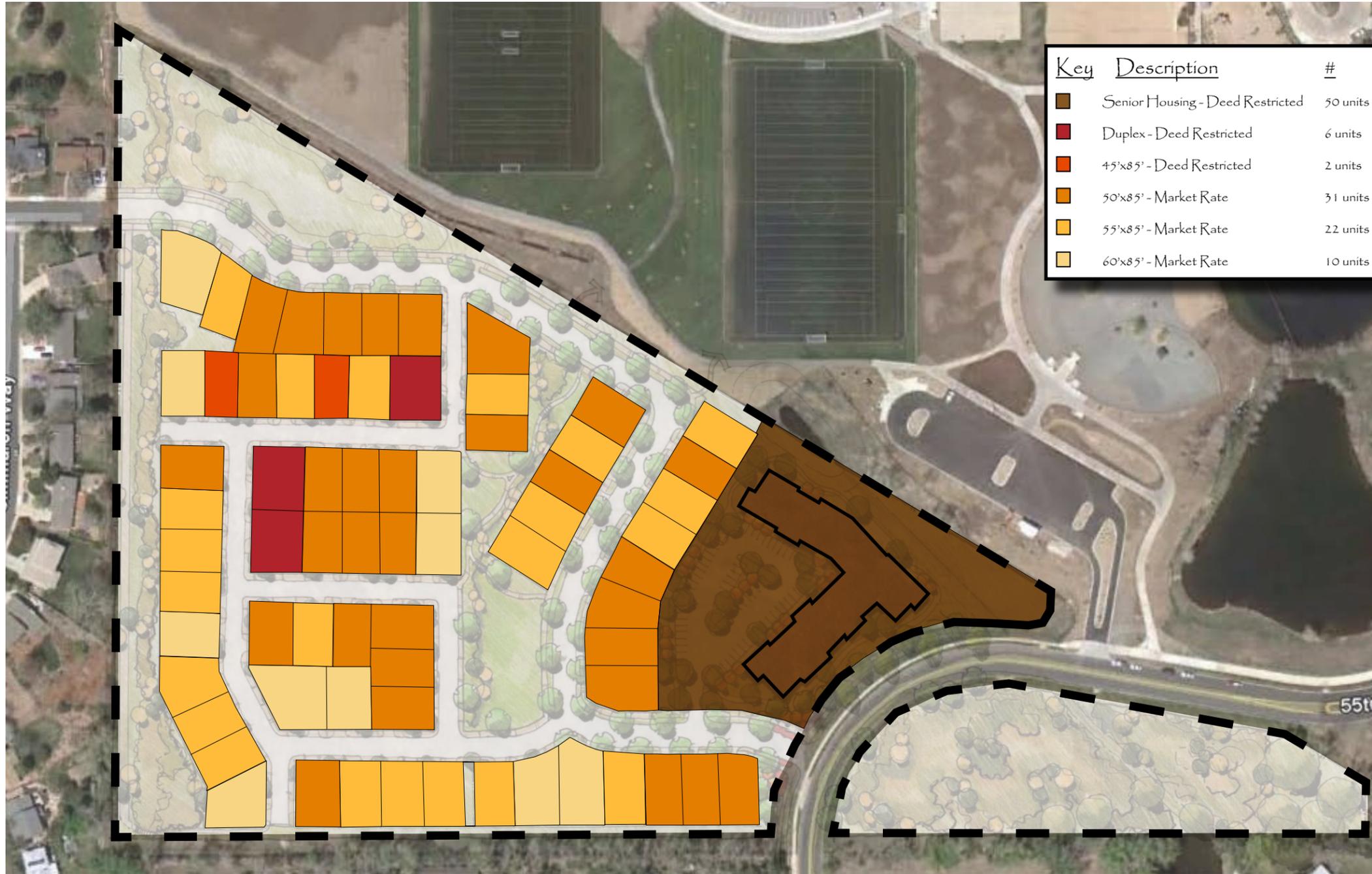
Resident physical and mental health will be improved due to the close proximity and connections to the East Boulder Community Park, the Boulder Seniors Center, the East Boulder Recreation Center, and the City’s open space network. Universal design techniques for the senior housing will allow seniors to be more independent for a longer period of time.

Close proximity to Manhattan Middle School and the existing transit system supports student health by encouraging walking, biking, and riding the bus to school.

The LEED-ND Rating System requires that a property be a “Smart Location” for development. The intent of the requirement is to:

- “Encourage development within and near existing communities and public transit infrastructure”
- “Reduce vehicle trip and vehicle miles traveled (VMT)”
- “Encourage daily physical activity associate with walking and bicycling”

PROJECT DATA



- Total site area = 22.17 acres
- Includes main parcel west of 55th Street (19.44 acres) and smaller parcel east of 55th Street (2.73 acres) to be enhanced as open space wetlands and habitat
 - The 55th Street right-of-way (1.43 acres) is not included

- Proposed number of units = 121
- 65 Single-Family Homes
 - 6 Duplex Units
 - 50 Senior Congregate Care Units

- Proposed gross density = 4 du/ac
- The overall density is compatible with the Boulder Valley Comprehensive Plan land-use designation of low-density residential with up to 6 units per acre, or a total of 133 units
 - Density is calculated based on 3 to 1 ratio for Congregate Care units as defined by B.R.C. 9-8-6, Occupancy Equivalencies for Group Residences, which states that for Congregate Care (g) "three attached dwelling units constitute one dwelling unit"
 - Total number of dwelling units = 88

- Proposed Zoning
- Flex District Zoning - as provided for in the Boulder Land Use Regulations will be proposed.

- Proposed Building Mix
- Single Family Detached Homes = 65 du (74%)
 - Duplex Units = 6 du (7%)
 - Senior Congregate Care = 50 units = 17du (19%)

Typical proposed Market-Rate Single-Family Lot Sizes
(Note that these sizes are "minimums". Some lots may be larger in each category if site conditions, such as corner lots or other irregular lot configurations.)

- 31 - 50' x 85' (4,250sf) lots
- 22 - 55' x 85' (4,675sf) lots
- 10 - 60' x 85' (5,100sf) lots

Typical Proposed Deed Restricted Single Family Homes

- 2 - 45' x 85' (3,825sf) lots

Proposed Percentage of Deed-Restricted Affordable Units = 48% (58 units of 121 proposed)

- 50 senior rental apartments permanently affordable to seniors not exceeding 60% and less of the Area Median Income (AMI)
- 30 One-Bedroom (650 SF not including patio/deck)
- 20 Two-Bedroom (850 SF not including patio/deck)
- 6 for Congregate Care 30 for Congregate Care 50 Senior one and two bedroom

The Boulder Creek Commons property qualifies as a LEED ND Smart Location for development by being an infill site already served by existing water and wastewater infrastructure and the rating systems described above.

Boulder has a very progressive sustainable building ordinance with its Green Points program. By complying with this program, homes in Boulder Creek Commons can also achieve EPA Energy Star ratings with regard to energy conservation.

Specific green building techniques that will be explored within the context of the Green Points program include:

- Design homes with optimum use of interior space in mind to keep overall building sizes-and operation demands on natural resources- smaller
- Utilize energy-efficient building envelope techniques
- Consider renewable energy sources such as incorporating photovoltaic panels
- Optimize material use and minimize waste by designing with standard sizes and recycling or re-using construction waste
- Use durable products and materials
- Choose building materials with low embodied energy
- Buy locally (within 500 miles) produced building materials to the maximum extent possible
- Use building products made from recycled materials
- Minimize the use of old growth timber or tropical hardwoods
- Utilize “engineered” lumber
- Install high efficiency heating, cooling lighting and appliances
- Purchase items that minimize packaging waste and recycle the packaging materials



IRRIGATION DITCHES AND LATERALS

In order to understand the issues and solutions associated with groundwater, wetlands, storm water management and flood control, it is important to put these topics in context with the presence of the irrigation ditches and laterals on the site. The ditches are key features in the historic and existing issues and in future solutions to these issues.



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Dry Creek Ditch No. 2

A segment of the Dry Creek Ditch No.2 (DC2) is located on the property and parallels the western boundary. It is an unlined ditch, and irrigation water seeps from the ditch recharging the groundwater table below. During the summer of 1995, residents adjacent to DC2 conducted dye tracer tests and found that the water in their sump pits contained the dye, indicating that the DC2 and the water in their sump pits were hydraulically connected. On the Hogan-Pancost property, seep is evident in areas adjacent the ditch by the presence of pockets of wetlands that have formed in low areas nearby.

Due to existing topography, DC2 is also the primary drainage way for the adjacent neighborhood. The existing neighborhood drains into DC2 without detaining storm flows to pre-development rates and without water quality treatment. Storm drainage can exceed the ditch's capacity because it is not sized to carry storm flows. Localized flooding occurs along the DC2 corridor and at the Hogan-Pancost west property line where Kewanee Drive drains directly into DC2.

The Boulder Creek Commons property owners propose to pipe DC2 the length of the west property line. Piping the ditch will reduce and possibly eliminate irrigation water leakage from the ditch that recharges the ground water. Piping the ditch will potentially eliminate the High Hazard Zone flooding along the west property. Additionally, the Dry Creek Ditch No.2 Company Board desires to separate their irrigation flows from the existing storm flows to prevent further water quality degradation of their irrigation water. The property owners are working cooperatively with the ditch company board to develop ditch piping plans that meet their operational needs. The proposed pipe is sized for the current capacity of the ditch. Storm flows from the adjacent neighborhood in excess of the pipe capacity will be diverted into a drainage bio-swale on the Hogan Pancost property.

Bodam Lateral

A Dry Creek No. 2 lateral parallels the south boundary of the West Parcel and is commonly referred to as the CD Bodam Lateral. The lateral enters the West Parcel at the southeast property corner and returns to the DC2 near the southwest property corner. The lateral straddles the property line between the Hogan-Pancost property and the Bodam property to the south. Both property owners own shares in DC2 and take their irrigation water from this lateral.

Historically the Hogan-Pancost property was flood irrigated through the growing season by blocking the Bodam Lateral and forcing water into small diversion ditches and north trending swales. Flood irrigation of the Hogan-Pancost property ceased in 2008.

The property owner to the south (Bodam) uses water from the Bodam Lateral to sprinkle irrigate his entire property throughout the growing season. He has an unlined ornamental pond located west of his residence and south of the lateral. Further west, a pumping system is used to pump water from the lateral for use on the property. Mr. Bodam has stated that that during the summer his irrigation can raise the ground water level on the entire 7-acre property to the

height of the water in the ornamental pond. The sprinkle irrigation system sprays water across the south property line of the Hogan-Pancost property north of the lateral and moistens the soil through out the growing season.

Around 2007, a temporary liner was installed in an attempt to mitigate the seepage from the lateral onto the Hogan-Pancost property. The liner is still in place, however, Mr. Bodam impounds water in the lateral for pumping and water levels in the lateral have breached the liner on a number of occasions.

The small diversion ditches and swales that were used to flood irrigate the Hogan-Pancost property collect the excess irrigation water; in the form of impounded water that breaches the liner seeps from the lateral and pond and inefficient application of water. The swales convey the irrigation water northwest across the Hogan-Pancost property toward DC2.

The Boulder Creek Commons property owners are working cooperatively with Mr. Bodam to preserve his historic use of the Bodam Lateral and to reduce the amount of irrigation water seeping from the lateral. Permanently lining or piping the lateral will reduce the ground water recharge directly attributable to the lateral. However, Mr. Bodum's inefficient and excessive use of ditch water to irrigate his property will likely continue.

The proposed Concept Plan provides an area parallel to the lateral to collect and manage the seep from Mr. Bodam's property using an underdrain system. An outlot provided between residential lots is proposed to allow the underdrain system to discharge into the central park.

Howard-Superphostical Ditch

The Howard-Superphostical Ditch flows from South Boulder Creek to a small pond on the south boundary of the East Parcel, then flows north westerly from the pond and bisects the East Parcel. The ditch passes under 55th Street and continues northwesterly across the northeast corner of the West Parcel onto the East Boulder Community Park. The ditch crosses the West parcel again near the northwest corner where the ditch flows into a culvert and crosses over DC2. This ditch flows year round. Wetland and habitat enhancements are proposed on the East Parcel, near where the Howard-Superphostical Ditch crosses the East Parcel.

GROUND WATER

During the January 6, 2011 Planning Board meeting regarding the Environmental and Engineering Assessment and Feasibility Study, questions arose about the nature of the ground water table in general and how the proposed development of Boulder Creek Commons would affect the ground water patterns in the area and adjacent homes.

After the Planning Board meeting, City Staff and representatives of the applicant met to determine a path forward on this topic. The outcome of this meeting concluded with a two prong approach. The City Staff felt an informational presentation about ground water

fundamentals would provide the Planning Board with the tools to better evaluate projects with ground water complexities. This informational presentation was made to Planning Board on May 5, 2011 by Gary Witt of Wright Water Engineers. The presentation was non-project specific and included ground water hydrology fundamentals, terminology, and general information that was oriented to help Planning Board members to be well informed when evaluating ground water studies.

The project team was to pursue three primary activities. These included continuing neighborhood outreach with neighbors who expressed a desire to cooperate with the project team. The team was also to prepare a concise summary of the 2010 “Ground Water Evaluation” Study and present findings in terms of ground water hydrology fundamentals and put the Boulder Creek Commons project into context with the ground water system. Finally, the team was to research the historical activities in the area and report changes in the local ground water levels.

The results of these activities are documented elsewhere in this application and in supplemental materials.

In summary, the applicant has been in regular communication with some adjacent property owners regarding their pumping cycles and pumping rates. A tour of the area was conducted with these neighbors and city staff to observe the current conditions on the property and the ditches in the area. Even though the owners of the Boulder Creek Commons property ceased flood irrigating of the West Parcel several years ago, the property owner to the south continues these practices. Continuing monitoring of ground water levels and one neighbor's sump pump flow rates has been taking place.

Further information regarding the overall ground water hydrology system in context with this property is also included elsewhere in this application, building on the presentation made to Planning Board in May. A key element of this information is the ground water system that underlies the Boulder Creek Commons site is very large. The recharge area for the ground water system extends across the 132 square mile South Boulder Creek watershed. The Boulder Creek Commons property covers only 0.03% of the total water shed area. Sources of ground water recharge include precipitation, snow melt, agricultural and lawn irrigation, and seepage from ponds, streams, and unlined irrigation ditches. The Boulder Creek Commons property owners can control the recharge that occurs on their property, but it must be recognized that this property represents a very small fraction of the watershed.

To that end, The Boulder Creek Commons property owners have initiated steps to minimize their contribution to ground water recharge. First, they have already voluntarily ceased flood irrigating their property and this will be a permanent condition with the development of the property. However, the flood irrigation practices of the neighbor directly to the south continues to contribute to a seasonal local rise in ground water levels.

Dry Creek Ditch No.2 will be piped to reduce or eliminate recharge that currently is caused by the leaking ditch. The property owners

are working cooperatively with the neighbor to the south to allow for his historic use of the Bodum lateral and to reduce or eliminate the recharge associated with this lateral by piping or lining the lateral.

The new meandering drainage bio-swale along the west property line will be lined to minimize the amount of recharge that this conveyance might cause.

With the exception of those areas where wetland mitigation and enhancement will take place, the landscape of the Boulder Creek Commons will feature low water use strategies to minimize the amount of water used to irrigate the new landscape.

DRAINAGE AND FLOOD MANAGEMENT

Since the 2010 Environmental and Engineering Assessment and Feasibility Study, the City of Boulder's South Boulder Creek Flood Mitigation Study has continued to progress. In reaction to and cooperation with the City's continued analysis, an effective strategy for conveying storm and possible flood waters became clear.

A bio-swale, designed as a multi-stage vegetated open channel along the west property line will best accommodate future flood mitigation options the city is exploring as part of their on-going flood mitigation study. This bio-swale will convey both off-site storm water flows and flood flows through the Boulder Creek Commons property in an environmentally sensitive manner.

The channel will meander and bulge to provide areas for wetland restoration, mitigation, and enhancements. The low flow portion of the channel is sized for more frequent storm events, and provides continuous water quality enhancement for off-site storm water flowing through the Boulder Creek Commons site. The upper stage of the channel is sized for the 100-year local storm event and anticipated 100-year flood flows diverted from South Boulder Creek.

Except for the rear yards of homes that will back onto this feature, this bio-swale will only convey off-site flows through the Boulder Creek Commons. On-site developed storm flows will be routed through the central park. Using low impact design strategies, a grass swale and buffers will provide water quality treatment. A single detention pond at the northwest corner of the site will provide detention storage for the the 10-year and 100-year design storms. Storm water will be released at or below historic rates.



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TRANSPORTATION

During the January 6, 2011 Planning Board meeting regarding the Environmental and Engineering Assessment and Feasibility Study, the Board asked that more specific information be provided regarding the nature of traffic impacts from development of Boulder Creek Commons and the probable Traffic Demand Management (TDM) Plan that may be implemented.

At the time the Transportation Impact Feasibility Study that was part of the Environmental and Engineering Assessment and Feasibility Study was completed in 2010, a specific site design for the site was not in place. For purposes of the study, 70 single family dwelling units and 71 seniors units were assumed. This study also included evaluation of two access scenarios; with and without a connection to Kewanee Drive. The 2010 traffic study concluded that the transportation network in the vicinity of the Boulder Creek Commons project could accommodate the addition of project generated traffic.

The current Concept Plan proposes 65 single-family homes, six duplex units, and 50 senior housing units. The plan proposes one access point onto 55th Street and one on Kewanee Drive. Based on trip generation rates cited by the Institute of Transportation Engineers, the industry standard for transportation planning, and assuming an alternative modes reduction of 15% based on City of Boulder recommendations, updated traffic generation estimates have been calculated for Boulder Creek Commons.

The Travel Demand Management Plan for Boulder Creek Commons recognizes that this site is well-positioned to make good use of existing transit and the bicycle/pedestrian network in the area. The City of Boulder has three draft residential development toolkit packages. Of the packages available, Package A is most advantageous for the single-family portion of the site, which requires the establishment of a single NECO pass participation program. For the senior housing portion of the site, a custom package is most likely to be appropriate.

Based on this analysis, all roads and intersections impacted by traffic generated by Boulder Creek Commons can accommodate the small increase in traffic. Boulder Creek Commons is expected to generate a total of about 707 vehicle-trips on an average week day, which is 69 fewer trips than were estimated in the 2010 study. Less than 30 vehicles will be added during each of the morning and evening peak-hours to the intersections most impacted by the project; Baseline Road/Manhattan Drive and Baseline Road/55th Street.

About 375 total daily vehicle-trips will be added to Kewanee Drive, with 26 vehicle-trips added during the morning peak-hour and 33 vehicle-trips added during the evening peak-hour. During the evening peak-hour, this is equivalent to adding one vehicle every two (2) minutes to Kewanee Drive.

The traffic analysis and transportation demand management plan are attached to this application as separate exhibits.

WETLANDS AND HABITAT

The Planning Board reviewed the status of the wetlands and wildlife habitat contained in the Environmental and Engineering Feasibility Study in its January 6, 2011 public hearing. The board indicated that it was satisfied with the level of study and requested that strategies be focused on improving wetland and wildlife habitat on the East Parcel.

The wetland delineations for the Boulder Creek Commons site were updated in late August, 2011. The existing wetlands are degraded, low value wildlife habitat and are considered low-functioning wetlands. All of the wetlands on the site have evolved due to alterations of the natural hydrology and are supported by man-induced hydrology; the irrigation ditches, seepage from the irrigation ditches, flood irrigation and inefficient use of irrigation water. The report contained in the Environmental and Engineering Feasibility Study determined that without natural hydrology, these wetland areas would revert to their former upland condition when flood irrigation ceased both on and off-site and when the ditches are permanently lined or piped. To date, the wetlands on site have reduced in area and changed in location between the 2008 mapping and the recent update. The wetland areas have responded primarily to the changes in flood irrigation practices, since the delineated wetlands are not naturally occurring wetlands and were created by man-induced hydrology. Additionally, water from leaking irrigation ditches and laterals support the wetlands. If this water source is decreased or eliminated, the wetlands retract or disappear completely.

The Boulder Creek Commons property owners propose to consolidate the wetlands along the Dry Creek Ditch No.2 corridor and on the East Parcel. By consolidating the wetlands the property owners can augment and control the necessary water supply by again creating a man-induced hydrology to support high-quality wetland habitats. The wetlands within the Dry Creek No.2 corridor will provide wildlife access through the property and will recreate the open channel character that will otherwise be lost when the irrigation ditch is piped. The East Parcel's proximity to the South Boulder Creek riparian habitat and environmental preservation status is an ideal location to provide further wildlife habitat enhancements.



The wetland mitigation strategy is to create high quality habitats on the property by enhancing some existing wetlands and to create new wetlands adjacent the existing wetlands to further enhance the existing wetlands. Where City regulated wetlands are disturbed for enhancement, the wetlands will be mitigated at a 1:1 ratio. Wetlands that are relocated on the property will be created at a 2:1 ratio.

With development of the Boulder Creek Commons, the wildlife habitat function of the property will be improved and the wetlands will be of higher quality and be supported by a controllable water source necessary to sustain the wetlands.

PARKS AND OPEN SPACE

Boulder Creek Commons is envisioned as a community with a park and open space focus. Over 40% of the site will be preserved as common open space. In addition, each residential lot will have its own open space as defined in the City of Boulder Land Use Regulations.

The physical and social heart of the community is a central park that will serve all residents of the community. It runs north to south through the core of the site, providing connectivity to the East Boulder Community Park and will include gathering spaces for all residents to interact.

Along the west boundary of the site, the existing Dry Creek Ditch No.2 will be piped the length of the site. Above the piped ditch, a path will be constructed to allow pedestrian access north to south. A meandering drainage bio-swale will be constructed to convey off site drainage and flood waters from the south end of the site through to the north end of the site. This bio-swale will create high quality wetland habitat along its length. The combined outlot will be a substantial buffer between the existing neighborhood to the west and new development on the Boulder Creek Commons site.

An open corridor along the south property line will provide room for the Bodam Lateral, and a buffer to the property to the south.

A loop trail around the Senior Congregate Care facility will provide daily exercise opportunities for the residents of the facility and connectivity to the East Boulder Community Park and the walk systems that connect to the East Boulder Senior and Recreation Center.

The water quality/detention pond at the northwest corner of the site will not only be a functional amenity, it will preserve an open landscaped zone along the north access to the site, with dramatic views to the East Boulder Community Park for all who travel along this street.

Wetland preservation and enhancement on the East Parcel will provide a significant wetland habitat where a degraded condition exists today. As a transition area to the South Boulder Creek riparian area, the East Parcel will create significant new habitat for a variety of flora and fauna.

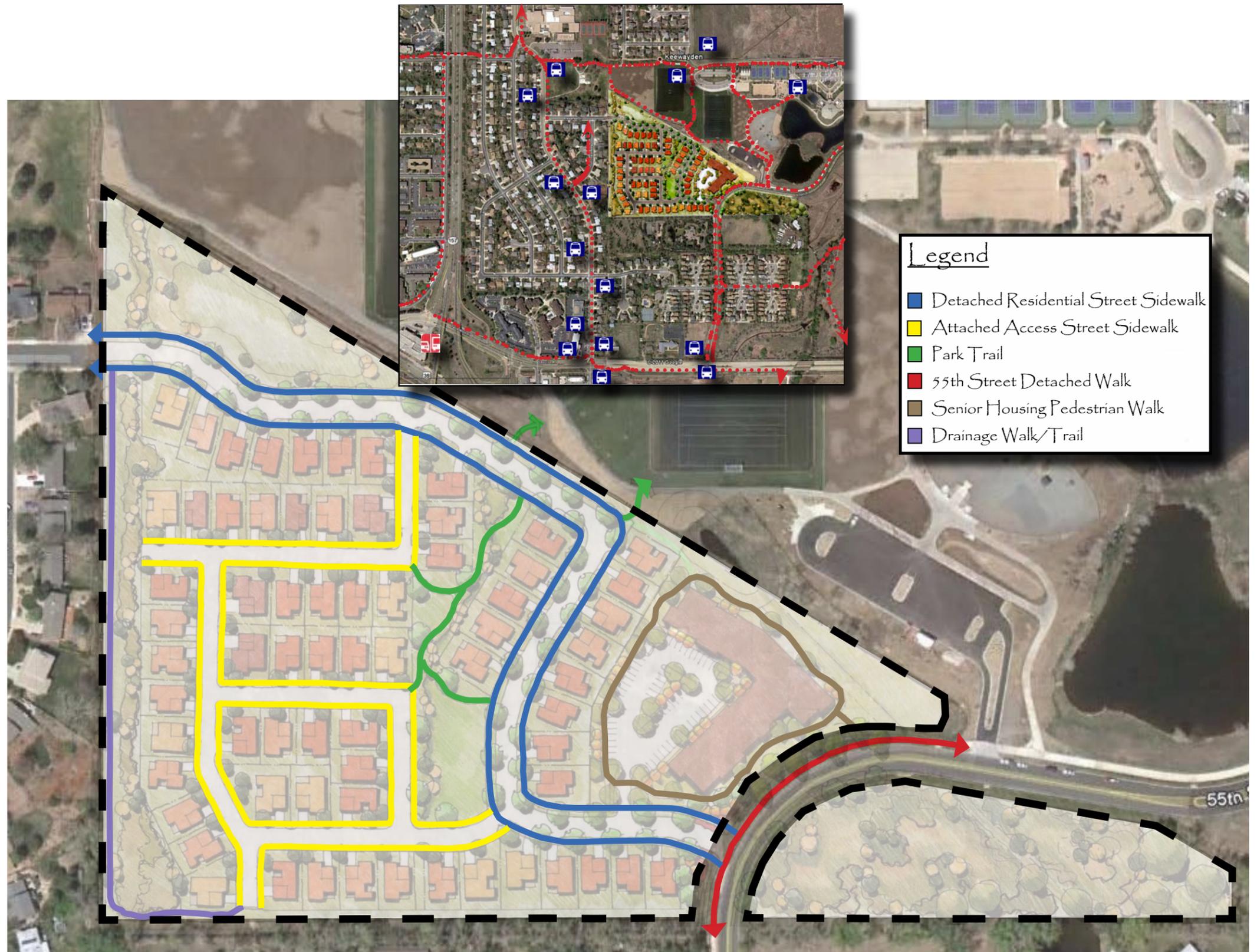


PEDESTRIAN/BICYCLE SYSTEMS AND TDM

The site design for the Boulder Creek Commons site includes a variety of pedestrian and bicycle systems that are well connected to the local and regional network. Sidewalks along the local streets provide immediate access for residents to the broader network. Trails through the central park, around the seniors congregate care facility and along the Dry Creek Ditch No. 2 corridor provide off street trail alternatives to residents. The design focuses on creating strong connections to the trails and sidewalks in the East Boulder Community Park and other regional trail systems.

Bicycles will be able to safely navigate the short blocks and circuitous main street through the site due to the slow speeds that the street network will create.

In addition, there are multiple bus routes served by RTD within a short walk of the site including the 203, 206, Dash and 209. Residents of the seniors congregate care facility will take advantage of the on-demand Special Transit services. The RTD Table Mesa Park and Ride which provides connections to the entire RTD network is a short bike or bus ride away.



NEIGHBORHOOD CHARACTER

Boulder Creek Commons will include a variety of single family and duplex residences as well as a senior congregate care facility. This will create a highly diverse community both in terms of demographics as well as architectural character.

The single family and duplex homes will all be designed to have porches and architecture associated with living spaces brought forward of the garages. This will allow for the garages to be accommodated without dominating the front elevation of the home. On corner lots, the driveway may be placed on either frontage to further minimize garage impact on the streetscape.

All streets allow for “front loading”, or garage access from the street in lieu of an alley, for a number of reasons. First, alleys are not found in this part of Boulder, and the use of alleys would be out of context with the surrounding neighborhoods. Second, there is evidence that the use of alleys add to the cost of residential neighborhoods. Third, anecdotal sales reports from neighborhoods in North Boulder that include both alley loaded and front loaded homes indicate that front loaded homes are more desirable in the marketplace.

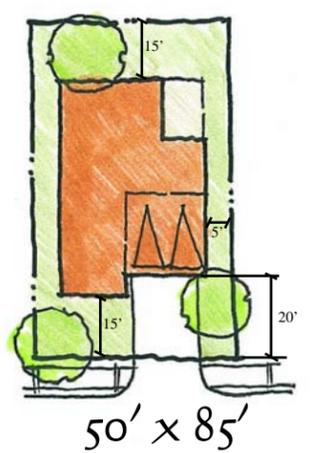
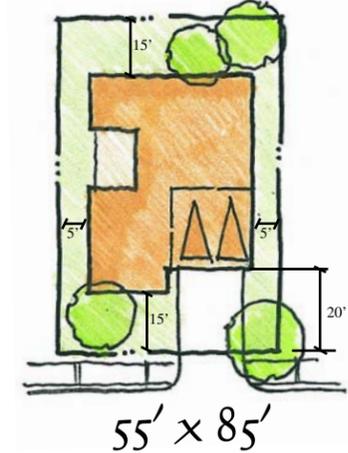
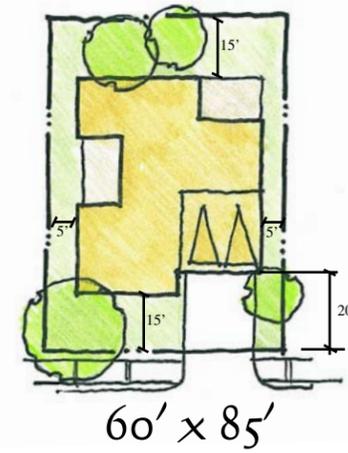
The architectural character of the homes and senior congregate care facility will include both contemporary and historically referenced architecture, using forms and materials commonly found in Boulder. The images included here are indications of the kind of architectural character that is to be expected in Boulder Creek Commons. More specific architecture for the site will be included in future processes.

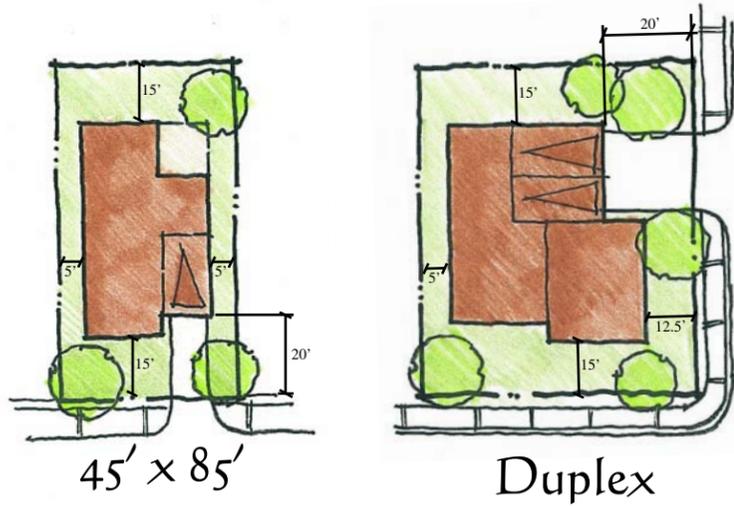
The senior congregate care facility is envisioned as a two-story building of similar architectural character to the single family and duplex buildings. Smaller scaled elements will help to reduce the scale of the larger building massing.

Appropriate streetscape landscape will further enhance the character of the neighborhood.



Lot Diagrams





Senior Congregate Care



DESIGN

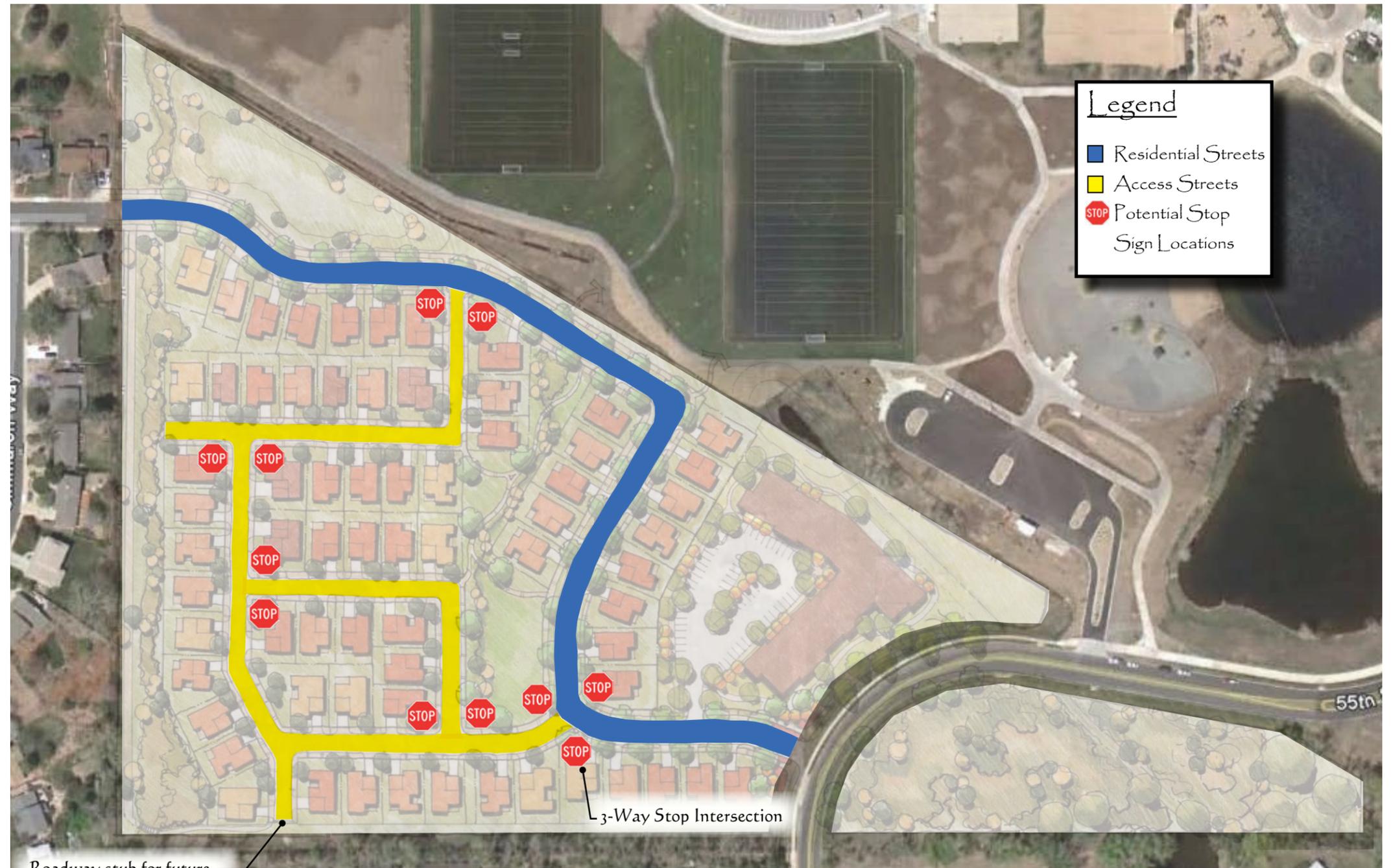
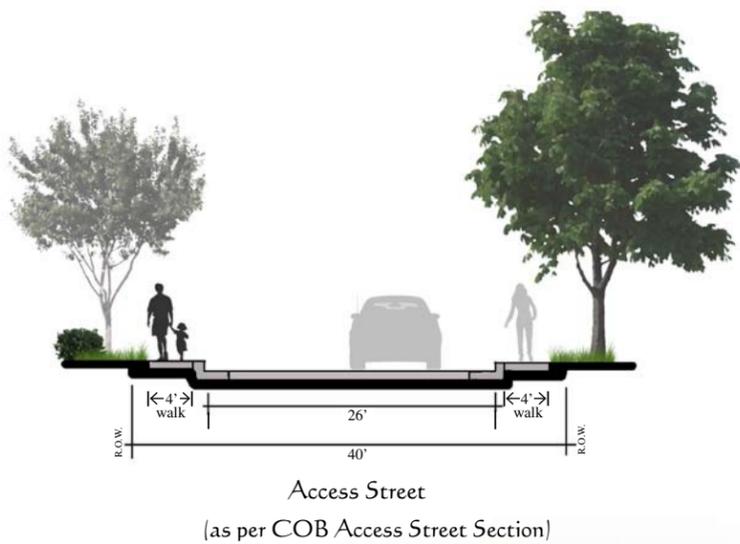
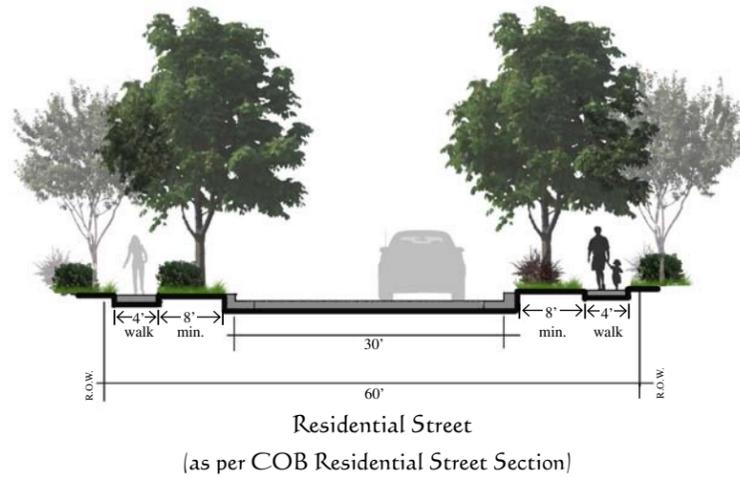
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Neighborhood Character

VEHICULAR SYSTEMS

The site design for Boulder Creek Commons incorporates a well connected street network that provides convenient access for residents, yet discourages “cut through” traffic. Two residential street types based on standard City of Boulder street sections are proposed. The primary street through the site that connects 55th Street to Kewanee Drive is a 60’ Right of Way Residential Street. This street follows a circuitous route through the site, which discourages high speeds. The fine-grained street pattern in the western part of the site utilizes the Access Street design. This street section is intended for slow moving streets that serve a relatively low number of lots.

All lots will have street-loaded driveways and garages providing good off-street parking capacity. This will reduce the pressure to use the streets for parking. These driveways will also provide the benefit of gaps in on-street parking to allow on-coming vehicles the opportunity to by-pass each other safely, but slowly.



Legend

- Residential Streets
- Access Streets
- STOP Sign Locations

Roadway stub for future access to Bodam Property

3-Way Stop Intersection



APPENDIX

Irrigation Ditches & Laterals, Groundwater, Drainage, Flood Control and Wetland Preservation, Mitigation and Enhancements

Irrigation Ditches & Laterals

In order to understand the issues and solutions associated with groundwater, wetlands, storm water management and flood control, it is important to put these topics in context with the presence of the irrigation ditches and laterals on the site. The ditches are key features in the historic and existing issues and in future solutions to these issues.



Dry Creek Ditch No. 2

A segment of Dry Creek Ditch No. 2 is located on the Boulder Creek Commons property and parallels the western boundary of the West Parcel. The ditch conveys water from a headgate on South Boulder Creek near Marshall to South Boulder Creek near Valmont Butte. From mid-May through August, the ditch segment on the Boulder Creek Commons property typically flows at 12-18 cfs and is estimated to have a maximum flow of 23-cfs. The ditch has a total decreed flow of 71-cfs.

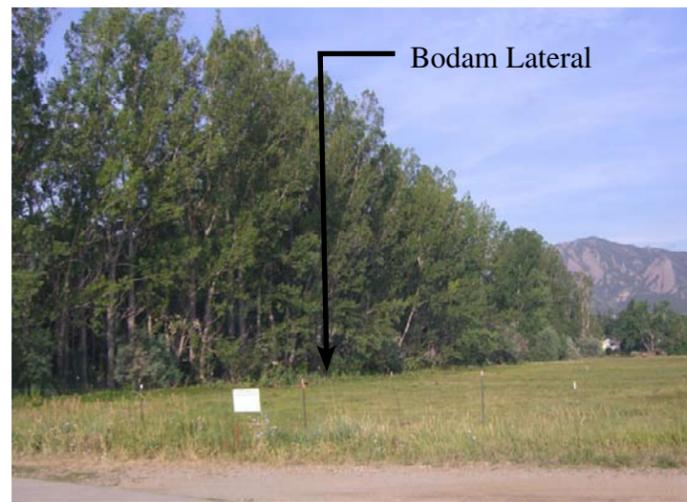
Dry Creek Ditch No. 2 is unlined and irrigation water seeps from the ditch recharging the groundwater table below. During the summer of 1995, residents adjacent to Dry Creek Ditch No. 2 conducted dye tracer tests and found that the Dry Creek Ditch No. 2 and the groundwater in their sump pits were hydraulically connected. On the Boulder Creek Commons property,

seep is evident in areas adjacent to Dry Creek Ditch No. 2. Pockets of wetlands have formed in the low areas adjacent to Dry Creek Ditch No. 2.

Due to topography, Dry Creek Ditch No. 2 forms the physical backbone of the neighborhood's existing drainage system. The existing neighborhood drains to Dry Creek Ditch No. 2 without detaining storm flows to pre-development rates and without water quality treatment. The irrigation ditch is not sized to carry storm water flows. Storm drainage can exceed the ditch's capacity causing localized flooding along the Dry Creek Ditch No. 2 corridor. Localized flooding occurs at the Boulder Creek Commons west property line where Kewanee Drive drains directly into Dry Creek Ditch No. 2.

The property owners propose to pipe Dry Creek Ditch No. 2 from the southwest property corner north to the existing dual culverts on the East Boulder Community Park. Piping the ditch will reduce and possibly eliminate irrigation water leakage from the ditch that recharges the ground water. Piping the ditch will potentially eliminate the High Hazard Zone flooding along the west property. In addition, the Dry Creek Ditch No. 2 Ditch Company Board desires to separate their irrigation flows from the existing storm flows to prevent further water quality degradation of their irrigation water.

The property owners are working cooperatively with the Ditch Company Board to develop ditch piping plans that meet their operational needs. The proposed Dry Creek Ditch No. 2 pipe is sized for the current operational capacity of the ditch. Storm flows in excess of the pipe capacity will be diverted into the Boulder Creek Commons property.



Bodam Lateral

A Dry Creek Ditch No. 2 lateral parallels the south boundary of the West Parcel and is commonly referred to as the Bodam Lateral. This lateral originates at a headgate located just north of the US Highway 36 and Dry Creek Ditch No. 2 crossing. The lateral enters the West Parcel at the southeast property corner and returns to Dry Creek Ditch No. 2 near the southwest property corner. The lateral straddles

the south property line. Both the Boulder Creek Commons and the adjacent property to the south own shares in Dry Creek Ditch No. 2 and take their irrigation water from this lateral.

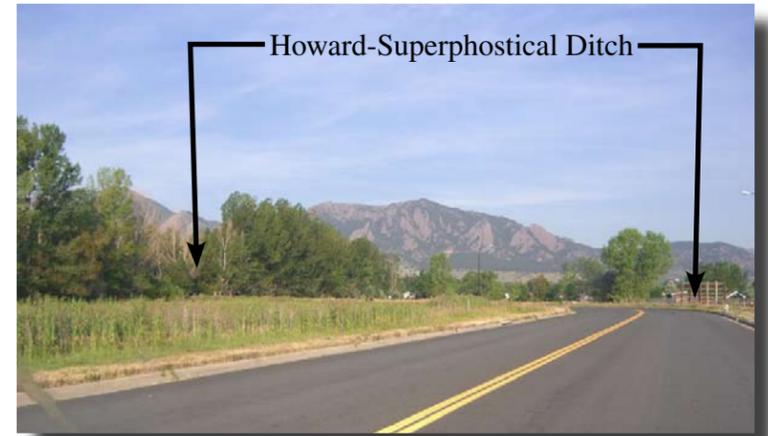
Historically, the Boulder Creek Commons property was flood irrigated through the growing season by blocking the Bodam Lateral and forcing water into small diversion ditches and north trending swales. Flood irrigation of the Boulder Creek Commons property ceased in 2008. The small diversion ditches and swales are still evident on the Boulder Creek Commons property.

The Bodam property is located immediately south of the Boulder Creek Commons property. The property owner uses water from the Bodam Lateral to sprinkle irrigate his entire property throughout the growing season. He has an unlined ornamental pond located west of his residence and south of the lateral. Further west, he has a pumping system to pump water from the lateral for use on his property. He has stated that during the summer his irrigation can raise the ground water level on his entire 7-acre property to the height of the water in the ornamental pond. The sprinkle irrigation system along the north boundary of the Bodam property sprays water on the southern edge of the West Parcel along the north bank of the lateral and moistens the soil on the Boulder Creek Commons property throughout the growing season.

Around 2007, a temporary liner was installed in the Bodam Lateral in an attempt to mitigate the seepage from the lateral onto the Boulder Creek Commons property. The liner is still in place. However, the property owner to the south impounds water in the lateral for pumping and water levels in the lateral have breached the liner on several occasions.

The small diversion ditches and swales that were used to flood irrigate the Boulder Creek Commons property collect the excess irrigation water: impounded water that breaches the liner, seeps from the lateral and pond, and inefficient application irrigation water. The swales convey the irrigation water northwest towards Dry Creek Ditch No. 2.

The property owners are working cooperatively with CD Bodam to preserve his historic use of the Bodam Lateral and to reduce the amount irrigation water seeping from the lateral. Permanently lining or piping the lateral will reduce the ground water recharge directly attributable to the lateral. However, the adjacent property owner's inefficient and excessive use of ditch water to irrigate the Bodam property will likely continue. The proposed Concept Plan provides an area parallel to the lateral to collect and manage the seep from Bodam's property using an underdrain system. An outlot is provided between the proposed residential lots to allow the underdrain to discharge into the central park.



Howard-Superphostical Ditch

The Howard-Superphostical Ditch flows from South Boulder Creek to a small pond on the south boundary of the East Parcel. The ditch flows northwesterly from the pond and bisects the East Parcel. The ditch passes under 55th Street and continues northwesterly across the northeast corner of the West Parcel onto the East Boulder Community Park. The ditch turns southwesterly and crosses the West Parcel again at the northwest corner where the ditch flows into a culvert and crosses over Dry Creek Ditch No. 2. The Howard-Superphostical flows year round conveying 10-15 cfs.

Wetland and habitat enhancements are proposed for areas adjacent to the Howard-Superphostical Ditch where it crosses the East Parcel. With development, the Howard-Superphostical Ditch will remain an open channel and no modifications are proposed for the ditch.

GROUNDWATER, DRAINAGE AND FLOOD CONTROL

These topics were summarized earlier in this document. The following narrative and exhibits provide more specific information about each of these areas.

GROUND WATER

The 2010 “Ground Water Evaluation”, Environmental and Engineering Assessment and Feasibility Study explored how the Boulder Creek Commons property relates to the existing ground water system and identified strategies for controlling ground water recharge within the project site. The focus of this study was to determine if the development of the Boulder Creek Commons property would adversely affect adjacent wells or neighboring homes. This study concluded:

“Based on this evaluation, it is Telesto’s professional opinion that the proposed housing development will not adversely affect the basement sump pumping currently being performed by the residents.”

This study was subject to reviews by City Staff and by CH2MHill, a third party consultant with expertise in ground water monitoring and mitigation retained by the City.

In a review letter to the City of Boulder, CH2MHill concluded:

“... the modeling and procedures used to evaluate the on-site natural resources, drainage, groundwater and soil issues does meet current and acceptable engineering standards of practice and no additional information is requested at this time.”

The pertinent findings of the 2010 “Ground Water Evaluation” Study were presented to the Planning Board in a brief presentation on 06 January 2011. The presentation focused on the correlation between ground water summer recharge conditions and the seasonal fluctuations in the ground water table. Similar to the Study, this part of the presentation focused on how the proposed development of the Boulder Creek Commons property would not adversely affect adjacent wells or neighboring homes.

During the public comment period and the Planning Board question and discussion period, questions arose about the nature of the ground water table in general and concerns were voiced about the coincidence of historical activities in the area and observed changes in local ground water levels.

On 21 January 2011, the project team met with City Staff to review the Planning Board meeting notes and to determine a path forward for the project. Because ground water has become a concern on projects throughout the City, Staff felt that an informational presentation about ground water fundamentals would provide Planning Board with the tools to better evaluate projects with ground water complexities. For the project team, our course of action included:

1. Continue our neighborhood outreach with neighbors who expressed a desire to cooperate with the project team.
2. Prepare a concise summary of the 2010 “Ground Water Evaluation” Study and present findings in terms of ground water hydrology fundamentals and put the Boulder Creek Commons into context with the ground water system.
3. Research the historical activities in the area and the reported changes in local ground water levels.

The City’s introductory presentation on ground water hydrology, “Ground Water 101”, was presented to Planning Board on 05 May 2011 by Gary D. Witt of Wright Water Engineers. This presentation was non-project specific and included ground water hydrology fundamentals, terminology and general items for Planning Board members to be aware of when evaluating ground water studies.

2011 Neighborhood Outreach

On 16 May 2011, City Staff, members of our project team, and three neighbors who live adjacent to the Boulder Creek Commons property met at Mr. Ron Craig’s home at 260 Cimarron Way. Mr. Craig allowed us to observe his sump pump configuration and operations. He provided a timeline of when his sump pump began operation this season and his observations of Dry Creek Ditch No. 2 flows. He consented to allowing further monitoring of his sump pump during the summer. During this meeting, we also observed the adjacent neighbor’s sump operations. As part of the meeting, the neighbors and City Staff, walked the southern property line of the Boulder Creek Commons property to observe the current conditions on the property, the Bodam lateral, and Dry Creek Ditch No. 2. Even though the Boulder Creek Commons property owners ceased flood irrigating the West Parcel several years ago, the neighbor immediately south of the property continues flood irrigation and other inefficient irrigation practices. At the time our site visit, portions of the Boulder Creek Commons property adjacent to the Bodam Lateral and Dry Creek Ditch were saturated and standing water was observed in several places.

Since the meeting with the neighbors, our project team has been measuring ground water levels on the Boulder Creek Commons property at six monitoring locations. We are in continued communication with Mr. Craig regarding his pumping cycles and pumping rates, and have measured Mr. Craig’s sump pump flow rates.

Ground Water 201: Ground Water Hydrology and the Hogan-Pancost Property

Included with this Concept Plan application is a letter titled “Ground Water Hydrology and the Hogan-Pancost Property” which builds on the ground water hydrology fundamentals presented in the Planning Board “Ground Water 101” presentation and puts the findings of the 2010 “Ground Water Evaluation” study and the Boulder Creek Commons into context with the overall ground water system. The letter is summarized below:

The ground water system that underlies the Boulder Creek Commons is vast. The recharge area for the ground water system

extends across 132 square mile South Boulder Creek watershed. The Boulder Creek Commons property covers only 0.03% of the total water shed area.

Recharge is simply the water that flows into the ground water system. Sources of ground water recharge are precipitation, snowmelt, agricultural irrigation, lawn irrigation and seepage from ponds, streams and unlined irrigation ditches. The Boulder Creek Commons property owners can control the recharge that occurs on their property, but the property represents a very small fraction of the water shed.

The ground water system is sensitive to watershed wide recharge fluctuations. Ground water levels are lowest in the winter when the only source of recharge is typically precipitation. In the spring, ground water levels can rise quickly and dramatically as recharge across the watershed increases due to seasonally high precipitation, snow melt in the higher elevations of the watershed, the start of residential and agricultural irrigation and the filling of ponds and irrigation ditches. On the Boulder Creek Commons property, the ground water levels increased 42 inches over 16 days this past spring. Ground water levels are typically at the highest during the late spring and early summer. Over the course of the summer months, recharge to the ground water begins to decrease as snow melt from the higher elevations lessens or ceases and precipitation decreases. By late summer, South Boulder Creek begins to drain the ground water table. As fall progress, ground water levels continue to decrease as agricultural and lawn irrigation ceases.

As documented in the 2010 “Ground Water Evaluation”, flood irrigation is an inefficient irrigation method and can contribute enough recharge to cause a local rise in the ground water table. During an irrigation season, land that is flood irrigated receives a net water application of 36-inches (13-inches of precipitation plus 23-inches of flood irrigation). Half of this water will percolate deeply and recharge the ground water. In contrast, when the same 13-inches of precipitation fall on native ground (without supplemental irrigation), less than 2-inches will become deep percolation that recharges the ground water table.

The property owners have already voluntarily ceased flood irrigating the property. However, flood irrigation by the neighbor located to the immediate south will continue to contribute to a seasonal local rise in ground water levels.

The Boulder Creek Commons property owners can only control the sources of ground water recharge that occur within their property. With the proposed development of the Boulder Creek Commons property flood irrigation will be permanently ceased. Dry Creek Ditch No. 2 will be piped to reduce or eliminate recharge currently caused by the leaking ditch. The property owners are working cooperatively with the neighbor to the south to allow for his historic use of the Bodam lateral and to reduce or eliminate the recharge associated with the lateral by piping or permanently lining the lateral. The Boulder Creek Commons property owners will mimic the current hydrological conditions as best they can by controlling recharge sources and rates.

Responses to Specific Questions Raised by Adjacent Neighbors

Included with this Concept Plan application is a letter titled “Hogan-Pancost Property: Neighborhood Event Timeline and Response to Specific Questions Raised by Adjacent Neighbors” which provides a clear timeline of neighborhood historical events and includes detailed responses to specific questions raised by adjacent neighbors regarding changes in ground water levels.

As discussed above, ground water levels in the vicinity of the site can rise quickly and dramatically as recharge across the 132-square mile watershed increases. The neighborhood events were compared to precipitation and South Boulder Creek stream flows. The Keewaydin Meadows homes adjacent to the Boulder Creek Commons property were built with basements and without sump pumps during sustained period of below average precipitation. From 1978 to 1990 there was a trend of increasing precipitation with 8 of 13 years having higher than average precipitation.

Also, from the time the homes were constructed in 1966 through the 1980’s, a significant amount of development occurred in Boulder south of Baseline Rd. By 1990, development in south Boulder covered approximately 3.7 square miles. With the change in land use, lawn irrigation increased and the amount of recharge to ground water also increased.

The combination of increased recharge from precipitation, and increased recharge from lawn watering caused ground water levels to rise. In 1990, the ground water level rise was enough to require basement sumps and pumping. Construction of the East Boulder Community Park soccer fields coincided with, but is not related to, the ground water rise observed in July of 1990.

Adjacent neighbor sump pumping rates may increase or decrease quickly and significantly in response to natural changes in recharge and the ground water level. On the Boulder Creek Commons property, the ground water levels increased 42 inches over 16 days this past spring in response to an increase in recharge throughout the watershed.

Please refer to the “Hogan-Pancost Property: Neighborhood Event Timeline and Response to Specific Questions Raised by Adjacent Neighbors” for detailed discussion regarding specific periods when neighbors have had changes to their sump pumping operations.

DRAINAGE AND FLOOD CONTROL

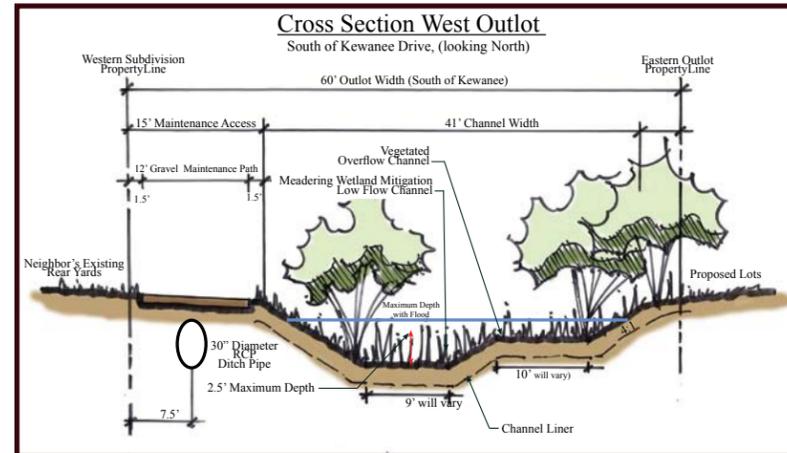
The 2010 “Conceptual Storm Water Management and Floodplain Mitigation Report”, Environmental and Engineering Assessment and Feasibility Study explored how the Boulder Creek Commons property relates to the existing drainage patterns of the surrounding neighborhood and identified possible storm water mitigation measures suitable for this property. This Concept Plan conforms to the findings and recommendations presented in the 2010 study.

In the 2010 Environmental and Engineering Assessment and Feasibility Study a bioswale was used to convey off-site storm



and flood waters through the Boulder Creek Commons site. The bioswale was routed along the south property line then turned eastward through the central portion of the West Parcel. At the north property line, the bioswale turned west again and then discharge at the northwest property corner. The bioswale also conveyed on-site developed runoff and contained two sequential detention ponds to attenuate developed flows to pre-development rates.

Since the 2010 Environmental and Engineering Assessment and Feasibility Study, City of Boulder "South Boulder Creek Flood Mitigation Study" has continued to progress. The City has identified potential channel improvements within the Dry Creek Ditch No. 2 corridor in two of four flood mitigation strategies. In each of these mitigation strategies, the Dry Creek Ditch No. 2 improvements include constructing an open channel with a 34' top width. The bioswale is realigned to be parallel with the west property line and immediately adjacent to the Dry Creek Ditch No. 2 pipe. This new alignment will better accommodate future flood mitigation options that the City of Boulder is exploring as part of their on-going flood mitigation study. The bioswale will convey both off-site storm water flows and flood flows through the Boulder Creek Commons property in an environmentally sensitive manner.

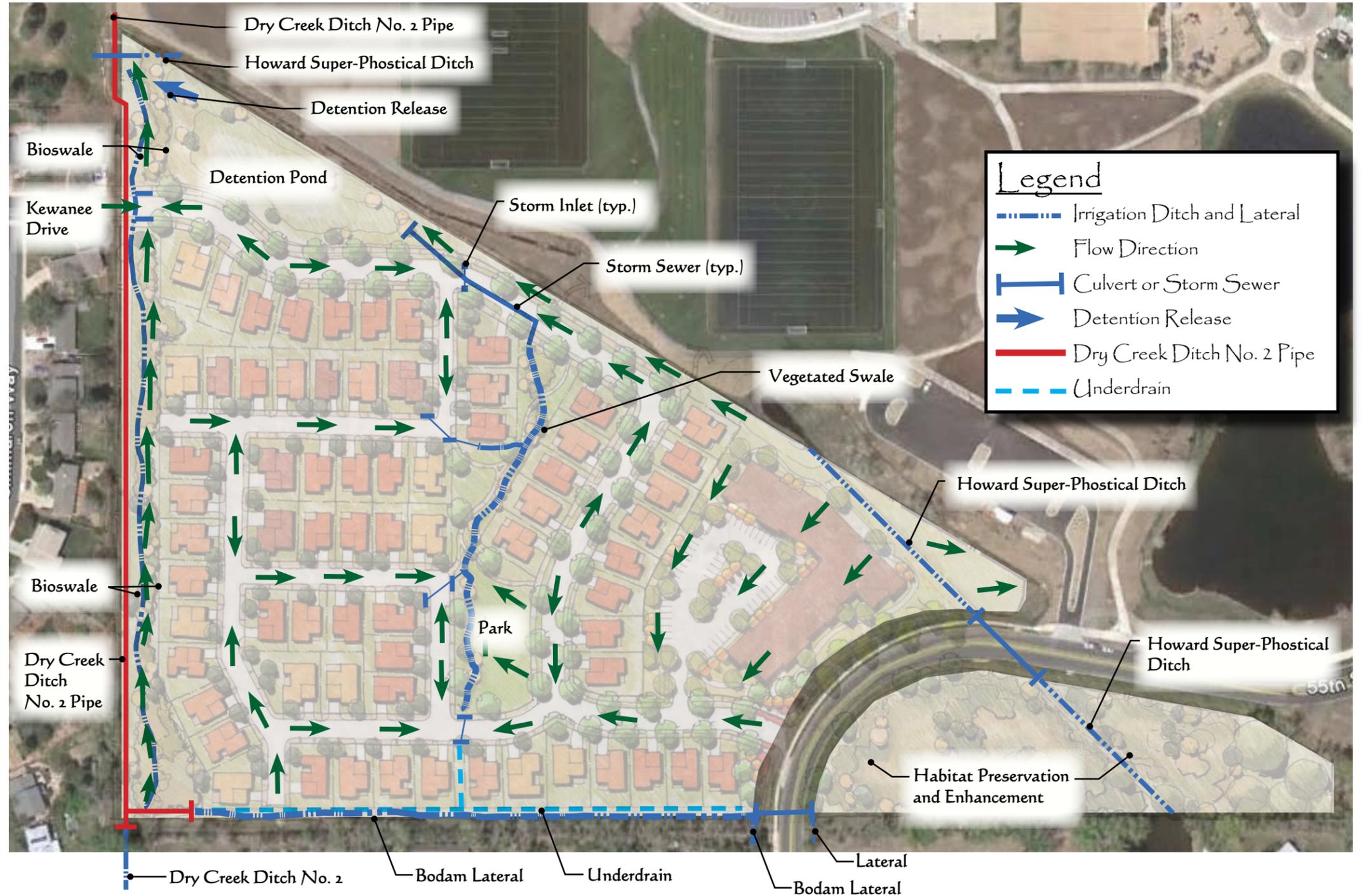


The bioswale, shown above, is a multi-stage vegetated open channel. The proposed bioswale has a channel top width of 41-ft and is designed with gentle side slopes and a meandering low flow channel. The low flow channel is sized for frequent storm events and provides continuous water quality enhancement for off-site storm water flowing onto the Boulder Creek Commons property from the Dry Creek Ditch No. 2 corridor and from Kewanee Drive. The bioswale's upper stage is sized to for the 100-year local storm event and for the project South Boulder Creek West Valley flood flows with freeboard. The bioswale will be lined to limit the ground water recharge from the channel and to support wetland restoration and creation.

The bioswale's low flow channel will meander and bulge to provide areas for wetland restoration, mitigation and enhancements. The low flow channel will be vegetated with wetland plant species. The terrace and side slopes of the bioswale will include short grass prairie with riparian trees and upland riparian shrubs.



October 17, 2011



Except for the rear yards of the homes proposed immediately adjacent to the bioswale, the realigned bioswale will only convey off-site flows through the Boulder Creek Commons site. On-site developed storm flows will be routed to the central park. Using low impact design strategies, a grass swale will wind through the park from the south to an outfall at the north end of the park. The grass swale and grass buffers will provide water quality treatment of the developed storm flows and will help attenuate the peak flows.

A single detention pond is located at northwest corner of site will provide detention storage for 10-year and 100-year design storms. On-site developed storm flows will be released from the Boulder Creek Commons site at or below pre-development rates.

The City of Boulder "South Boulder Creek Flood Mapping Study" identified the floodplain and assessed the flood hazard in east Boulder. The new flood maps have been adopted by the City. The City anticipates that the Federal Emergency Management Agency (FEMA) will adopt the mapping later this year.

Appendix



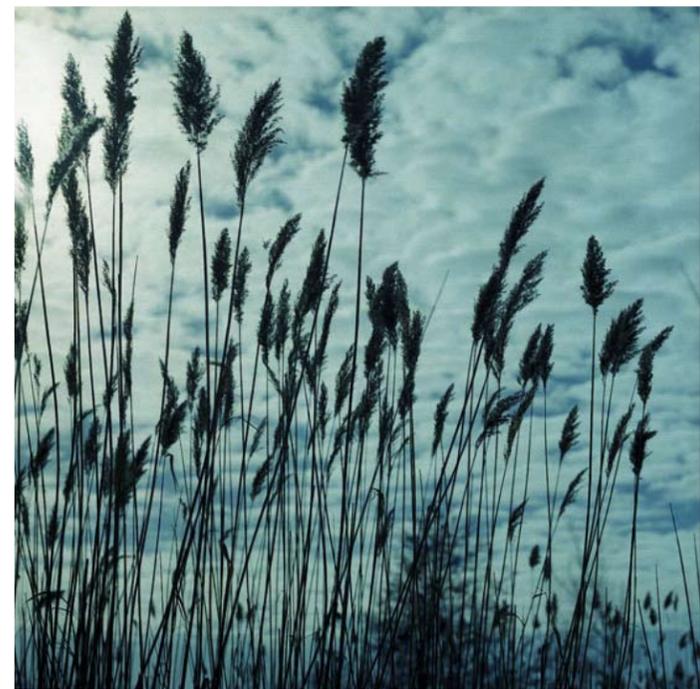
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The new South Boulder Creek 100-year floodplain delineation minimally impacts the development of the property. Within the Boulder Creek Commons property, areas of 100-year floodplain (Zone AE with elevations determined) are isolated to the Dry Creek Ditch No. 2 corridor on the West Parcel and a portion of the East Parcel. Areas of 500-year flooding (Zone X) are identified on both the East and West Parcels.

The City of Boulder "Land Use Review Results and Comments" dated 14 May 2007 stated that the subject property is not suited for providing regional flood storage mitigation for the South Boulder Creek floodplain due to the small flood volume impacting the property.

The proposed residential structures will be constructed in accordance with the requirements prescribed by the City of Boulder Floodplain Regulations. Additional measures that will be taken to reduce damage to proposed improvements during the event of a flood include, but not limited to:

- Flood proofing all proposed residential structures by raising the finished floor elevations of each of the homes a minimum of 2.0-ft above the base flood elevation.
- Limiting floodwater depths within the subdivision's roadways to allow for emergency access during the event of a flood.
- Restricting basement construction.



WETLAND PRESERVATION, MITIGATION & ENHANCEMENT

This topic was summarized earlier in this document. The following narrative and exhibit provides more detailed information about this issue.

The 2008 "Groundwater Hydrology Monitoring & Wetland Delineation Report", submitted with the 2010 Environmental and Engineering Assessment and Feasibility Study identified wetlands within the active irrigation ditches, in three isolated low areas on the West Parcel and across the majority of the East Parcel. In total, 2,422-acres of wetlands were delineated on the property in 2008. All of the wetlands have evolved due to alterations of the natural hydrology and are supported by man-induced hydrology: the irrigation ditches, seepage from the irrigation ditches, flood irrigation and inefficient use of irrigation water. The 2008 report determined that without a natural hydrology, these wetland areas would revert to their former upland condition when flood irrigation ceases both on and off-site and when the ditches are permanently lined or piped.

The wetland delineations for the Boulder Creek Commons property were updated in late August 2011. On 12 September 2011, representatives of the US Army Corps of Engineers and the City of Boulder visited the Boulder Creek Commons site to review the wetland delineations. Based on this site meeting, it is anticipated that the Corps will take jurisdiction of the wetlands within Dry Creek Ditch No. 2 and within the Howard-Superphostical Ditch as they did in 2008. Formal Corps approval of the wetland delineation and of the jurisdictional status of the wetlands is anticipated later this fall. The City will regulate the remaining wetlands delineated on the property.



A map of the current wetland locations and delineations are provided in a letter dated 04 October 2011 that accompanies this Concept Plan. The wetland function and value were assessed for each of the City regulated wetlands using the City's criteria. All of the City regulated wetlands found on the Boulder Creek Commons property are considered low-functioning. A Wetland Delineation Report will be provided separately to the City later this month.

In total, 2,163-acres of wetlands currently exist on the Boulder Creek Commons property. Upon annexation, 1,845-acres of wetlands will be regulated by the City. The remaining 0.318-acres of wetlands will be jurisdictional to the US Army Corp of Engineers.

The wetland areas have responded to shifts in the supporting man-induced hydrology. In 2008, 1,622 acres of wetlands were mapped on the East Parcel. On the East Parcel, flood irrigation ceased in 2009. These wetlands have shrunk in response to a reduction in man-induced hydrology and now cover just 0.468-acres of the East Parcel.

In 2008, 0.335-acres of Corp jurisdictional wetlands were delineated within Dry Creek Ditch No. 2 and the Howard-Superphostical Ditch on the West Parcel. The 2011 wetland delineation of these wetland areas are consistent to the 2008 mapping. The operation of these ditches has not changed appreciably since 2008 and the man-induced hydrology has remained fairly consistent.

On the West Parcel, flood irrigation ceased in 2008 and the Bodam Lateral was temporarily lined and actively managed during the duration of the 2008 growing season and subsequent wetland delineation study. In 2008, 0.465-acres of City regulatory wetlands were identified on the West Parcel. The wetlands were limited to low areas adjacent to Dry Creek Ditch No. 2 and to the small diversion ditches and swales that were historically used to flood irrigate the Boulder Creek Commons property.

The 2011 wetland delineation identifies 1,377-acres of City regulatory wetlands on the West Parcel. The wetland areas mapped in 2008 have expanded and new pockets of wetlands have formed in response to increased man-induced hydrology. As discussed in the "Irrigation Ditches and Laterals" section, even though flood irrigation ceased on the Boulder Creek Commons property, man-induced hydrology still exists on the West Parcel in the form of excess irrigation water from the Bodam property to the south (breaches of the temporary liner, seeps from the lateral and pond, and inefficient application irrigation water) and continued seepage from Dry Creek Ditch No. 2. Similar to the findings of 2008 study, the wetlands are limited to low areas adjacent to the swales that were historically used to flood irrigate the Boulder Creek Commons property and the low areas adjacent to both Dry Creek Ditch No. 2 and the Bodam Lateral.

As documented in the "Vegetation & Wildlife Existing Conditions" study submitted with the 2010 Environmental and Engineering Assessment and Feasibility Study, the Boulder Creek Commons property is degraded agricultural pastureland. In areas disturbed by the black-tailed prairie dogs, weeds and Colorado noxious weeds are the dominant vegetation. The existing wetlands are degraded, low value wildlife habitat and considered low-functioning wetlands.

The delineated wetlands are not naturally occurring wetlands and were created by man-induced hydrology. Water from leaking irrigation ditches and laterals support the wetlands. Should ditch operation change or cease, this water source could decrease or be eliminated causing the wetlands retract or disappear completely.



The Boulder Creek Commons property owners propose to consolidate the wetlands along the Dry Creek Ditch No. 2 corridor and on the East Parcel. By consolidating the wetlands, the property owners can augment and control the necessary water supply by again creating a man-induced hydrology to support high-quality wetland habitats. The wetlands within the Dry Creek Ditch No. 2 corridor will provide wildlife access through the property and will recreate the open channel character of Dry Creek Ditch No. 2 that would otherwise be lost when the irrigation ditch is piped. The East Parcel's proximity to the South Boulder Creek riparian habitat and environmental preservation status is an ideal location to provide further wildlife habitat enhancements.

The wetland mitigation strategy is to create high quality habitats on the property by enhancing existing wetlands. New wetlands will be created adjacent to the existing wetlands further enhance wildlife habitats along the Dry Creek Ditch No. 2 corridor and the East Parcel. Where City regulated wetlands are disturbed for enhancement, the wetlands will be mitigated in-place at a 1:1 ratio. Wetlands that are relocated on the property will be created at a 2:1 ratio.

With development of the Boulder Creek Commons project, the wildlife habitat function of the property will be improved and the wetlands will be of higher quality and be supported by a controllable water source necessary to sustain the wetlands.

