Broomfield County Commons Management and Master Plan

THE BROOMFIELD COUNTY COMMONS MANAGEMENT AND MASTER PLAN

December 14, 2004

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OBJECTIVES OF THE PLAN

Broomfield County Commons Open Space is a 237-acre parcel north of Midway Boulevard, between Sheridan and Lowell Boulevards and south of W. 136th Ave. and the Red Leaf Development. The open space is part of a larger parcel (Broomfield County Commons, 346 acres) that includes the Paul Derda Recreation Center, Broomfield County Commons Cemetery and Broomfield County Commons Park (Figure 1). The property was purchased between 2000-2002 using funds from Broomfield's open space and parks sales tax.

Significant natural features at Broomfield County Commons Open Space include LeGault Reservoir, which once functioned as a regional stormwater detention basin but has since been decommissioned. The reservoir presently encompasses a large cattail marsh with a very small area of open water. Tom Frost Reservoir, located in the southeast corner of the open space, fulfills regional storm detention functions and is stocked for public fishing, with a small dock and benches for seating. Connecting LeGault and Tom Frost Reservoirs is a narrow, incised former irrigation channel with small patches of cottonwoods, willows, Russian-olives and non-native pasture grasses to the channel margins.

Approximately 80 acres of the site are leased for cultivation, with biannual crop rotation. The site also contains a large prairie dog colony, estimated to include 360 animals on 40 acres.

The site has become a haven for urban wildlife, including coyote, red fox, raptors, songbirds, and small mammals, as residential neighborhoods have developed around it. Because the area is somewhat lacking in landscape diversity, however, its ability to support a more extensive range of species has been limited.

To enhance the resource value for wildlife and to provide for compatible public use, the City and County of Broomfield has commissioned a management and master plan. The Plan includes:

- An assessment of the property's wildlife habitat, vegetation, water resources and views.
- The types of public uses that may be compatible with the site.
- Potential locations for trails, trailheads, viewing areas, parking and other facilities.
- A phasing plan for improvements and estimated costs.

The plan is guided by the following five goals:

1. Expand the amount of wildlife habitat for a diverse range of species.
2. Increase landscape and wildlife diversity, to promote a self-sustaining ecosystem.
3. Provide for compatible public uses.
4. Provide opportunities for education.
5. Demonstrate a sustainable and wise use of water resources.

The management and master plan is the result of sustained effort over a one-year period by the Open Space and Trails Advisory Committee (OSTAC), the Parks and Recreation Advisory Committee (PRAC), public input received from interested residents, City Council comments from study sessions, and design and engineering work by City staff and consultants. Two public meetings have been held during the planning process, including an initial meeting in March 2004 to review site features and opportunities, and a meeting in November 2004 to review concept proposals.

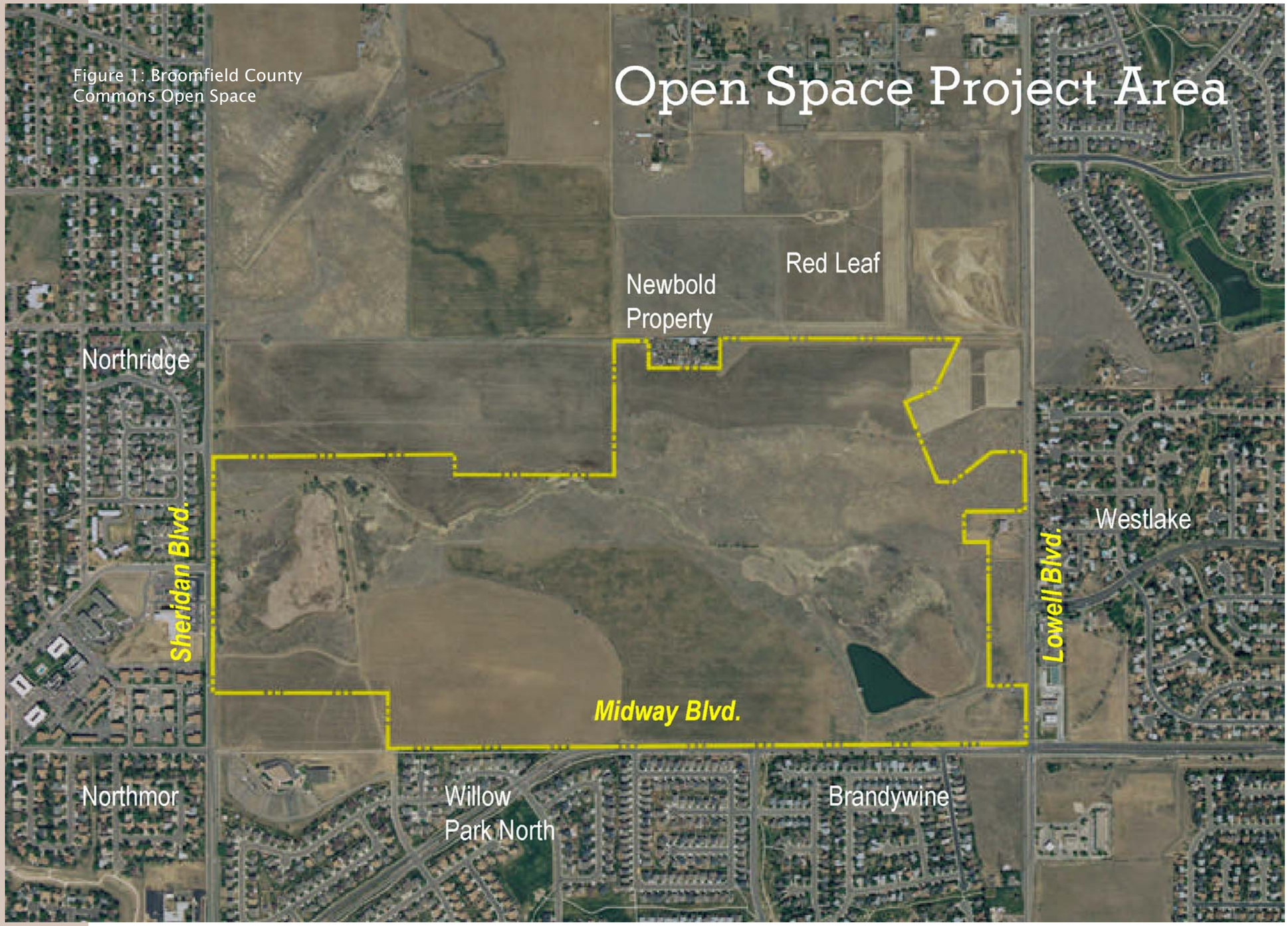


Figure 1: Broomfield County Commons Open Space

SITE CHARACTER ZONES AND OPPORTUNITIES

The Broomfield County Commons Open Space encompasses a number of distinct "character zones" that are defined by their natural features and ecological character, by the types and level of public use they presently receive, and by their proximity to developed areas, including athletic and recreation facilities as well as established neighborhoods (Figure 2). Existing conditions within each character zone, and opportunities for enhancement, are summarized below.

Area 1: Agricultural Field

This approximately 80-acre area at the center of the site remains in agricultural cultivation, with the land leased continuously from year to year by a local farmer. Crops are rotated on a biannual basis, so that a portion of the fields are left fallow each year. The high point of the open space is located on a small knoll within the fields, and affords striking panoramic views of the channel below. Because the area remains in cultivation, it has limited value for wildlife, though small mammals and birds may forage in the area.

One opportunity would be for the City/County to continue leasing the land for agriculture as long as a willing lessee could be found. Approximately half of the residents attending community open houses voiced a preference for leaving the land in agriculture as long as feasible, to perpetuate some of the community's early farming heritage.

Another opportunity may exist to convert the area to native dryland grasses over the long term. Enhancing the variety of grasses and small shrubs would allow for more foraging opportunities for small mammals and voles, thus increasing the prey base for raptors and other species. Transitioning the site from agriculture might also allow for a low-impact, soft surface trail spur from the Willow Park North trail to the site's high point, with a small observation platform and/or bench to provide opportunities for viewing the landscape.

Area 2: Le Gault Reservoir

The approximately eight-acre reservoir was constructed prior to the 1940s and served as an irrigation reservoir and regional stormwater detention facility until approximately 1996, when an improvement plan was designated Tom Frost Reservoir as the primary regional detention basin. The reservoir now has a cattail marsh and a wetland mitigation project constructed in support of the Sheridan Boulevard road widening project that has introduced other riparian species, including sedges and bulrushes, understory shrubs (golden currant, chokecherry), cottonwoods and willows. Due to the dominance of the cattail marsh, the area is not very diverse ecologically and supports a limited range of birds and mammals.

Area 1: Agricultural Fields
Area 2: LeGault Reservoir
Area 3: Two Southfacing Uplands
Area 4: Channel Corridor
Area 5: Prairie Dog Colony
Area 6: Tom Frost Reservoir
Area 7: Gateway

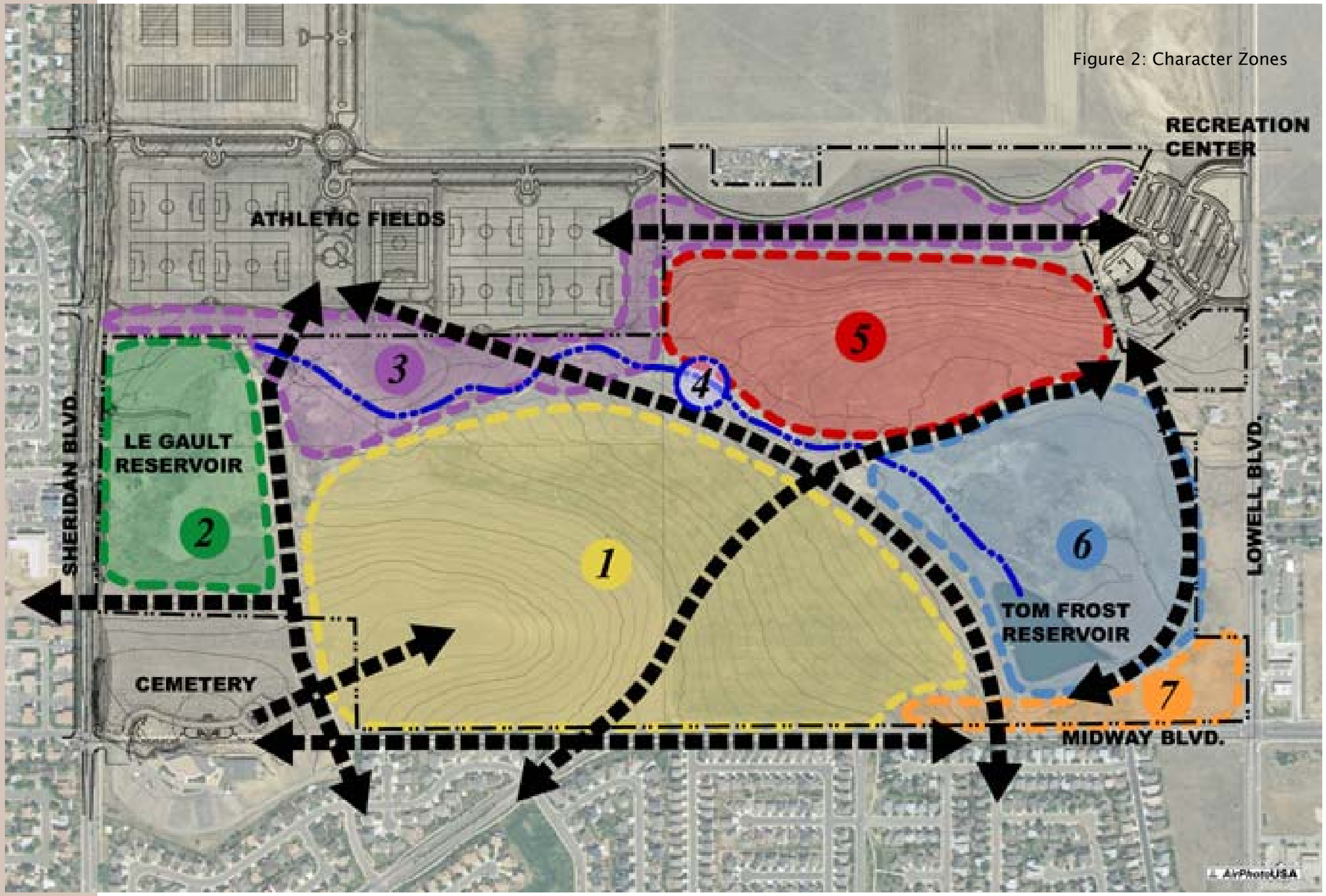


Figure 2: Character Zones

Although no longer designated as a regional storm detention facility, the reservoir does receive runoff from two large storm sewer outfalls that drain the watershed tributary to Sheridan Boulevard, and occasionally open water may be present. Historic drainage patterns in the area have been altered by development to the west of Sheridan Boulevard. Many of these neighborhoods lack storm sewers and water has been conveyed along roadway surfaces during particularly severe storm events.

To correct this situation, a revised Drainage Report was prepared for Sheridan Boulevard between 9th and 136th Avenues (see Muller Engineering, 2002), recommending that storm flows from this area be directed to Le Gault Reservoir. These improvements have been implemented with the reconstruction of Sheridan Boulevard. The reservoir is deemed as having the capacity to contain the 100-year storm event, though some modifications may eventually be necessary to the dam embankment and to the existing spillway.

At the east side of the reservoir, the existing dam embankment remains in place and is a popular destination for hikers and wildlife watchers. Social trails are observed leading from the athletic field complex to the north, and from the Willow Park North neighborhood to the south. There are also established pathways along the north and south sides of the reservoir, and it is speculated that these paths, which extend along the dam embankment, are former maintenance roads that are now used by hikers. Patches of cottonwoods and occasional Russian olives are present along the dam, but vary in health and habitat value. They do provide a sense of enclosure, and create a quiet, “preserve-like” setting that is conducive to appreciation of natural surroundings.

Opportunities exist to enhance habitat quality through creation of an open water area and through diversifying landscape ecology. Open water would attract a diverse range of water birds, including geese, ducks, rails, great blue herons, and black-crowned night-herons; as well as wetland songbirds including yellow-headed blackbird, red-winged blackbird, common yellowthroat, and song sparrows. At the margins of the open water area, a more diverse riparian landscape could be created, using the planting palette developed for the wetland mitigation area. More diversity would provide more hospitable habitat as well as breeding sites for a wider range of species.

With the development of the athletic fields to the north, more human presence and pressure may be felt at the reservoir. The availability and convenience of parking at the athletic fields may begin to draw more users from other areas of the City. However, the somewhat-secluded nature of the area may also invite unintentional use that may be incompatible with habitat restoration and enhancement – for example, people allowing their dogs to run off-leash, using the dam embankment as a mountain bike/bmx course, or using the area as a weekend "party" venue.

To minimize these inappropriate uses, trail access from the athletic fields should be deliberately designed to provide a very clear route to designated public use areas, and to minimize opportunities for social trails to more sensitive, or more secluded, zones.

The existing dam embankment provides an opportunity to create a viewing platform or overlook to the restored reservoir, and this may also provide an environmental education site for Broomfield's volunteer nature program. The overlook may also be designed to provide a clear terminus for the trail along the embankment, preventing visitors from straying into stands of cottonwoods that provide raptor nesting sites.

Since many visitors come to LeGault Reservoir from the neighborhoods west of Sheridan Boulevard, safe crossings and access points should be designated. To minimize impacts on wildlife, barriers to vehicular access should be developed south of the reservoir, where the old dam maintenance road has been illegally used as a point of vehicular entry and where cars have parked, though no parking is allowed.

Area 3: Two Southfacing Uplands

This area comprises two uplands: one immediately south of the athletic fields that forms a "transition area" between the fields and the open space; and one immediately

south of the sidewalk that connects the athletic fields to Paul Derda Recreation Center. The former, includes a mix of fairly high-quality grasslands and weedier, more disturbed areas. Review of aerial photography and historical interviews suggest the area was used to cultivate livestock since at least the 1930s or 1940s, explaining the weedy areas. The other upland area is presently the site of a fairly large prairie dog town.

Within the property boundary of the athletic fields, there are two storm detention/water quality infiltration basins. These areas could be more effectively integrated into the landscape than they are at present and areas that either do not drain properly or that show erosion, could be corrected before problems worsen. Since, there is concern about prairie dog encroachment westward toward the athletic fields, the second upland area could be designed with the goal of more effectively containing the animals.

As mentioned above, the 'transition area' south of the athletic fields should be designed to present a very clear and deliberate entry into the open space, and to manage public access to minimize social trailing and other uses, such as off-leash dog exercise areas, that are incompatible with enhancing habitat quality. Earthforms, landscape and trail alignment should work together to direct people to designated public use areas, while providing views into areas which are being enhanced as habitat. This area may also be an appropriate and desirable place for public art, including art that functions to sustain habitat, such as hedgerows or raptor nesting poles.

Area 4: Channel Corridor

An intermittent drainage channel traverses the site from Le Gault to Tom Frost Reservoirs. The channel ranges in depth from one to three feet and is generally less than three feet wide. In some segments the channel is not well-defined and can be difficult to locate. The channel is contained within the 100-year floodplain.

Vegetation consists of selected patches of willows, plains cottonwoods and Russian olives; a cattail marsh has become established in a low-lying area where the channel merges with flows that outfall from LeGault Reservoir. Riparian-margin vegetation along the channel consists of smooth brome, reed canarygrass, Canada thistle, showy milkweed, great mullein and curly dock. The channel provides habitat for small mammals, including mice, cottontails, and shrews. Coyote and red fox occasionally hunt for small mammals and a coyote den has been reported in one of the Russian olive stands.

Opportunities exist to enhance the channel corridor if additional water may be directed to the open space site. In particular, a more

diverse riparian corridor, including shrub understory and trees (cottonwood, hackberry) to provide nesting and foraging locations, may be planted to support more intensive wildlife use and possibly a greater species diversity. The channel corridor may also support a recreational trail providing that adequate buffers (150 to 200 feet) are maintained between the trail and the low flow channel and providing that use is largely limited to quiet and passive activities that do not startle wildlife or disrupt nesting sites.

Area 5: Prairie Dog Colony

The prairie dog colony is located south of the walkway that connects Paul Derda Recreation Center with the athletic fields and presently comprises about 40 acres of prairie dog town. A high point is located near the Recreation Center, and would provide an ideal location for an overlook or viewing platform.

This may also provide an opportunity for a pavilion or other small structure to support programming for the Broomfield Nature Program. The proximity of meeting rooms and parking at the Recreation Center could also support Nature Program activities.

Concerns have been raised about prairie dogs "migrating" from their colony, which is estimated to include 360 animals. Since prairie dog movement may be inhibited by visual and physical barriers (vegetation, deep drainage swales, prairie dog fencing), water, and steeper slopes greater than 10 percent, opportunities may exist to reshape the edges of the colony to enlarge their useable habitat while improving containment. Raptor poles may also be provided to encourage predation.

Area 6: Tom Frost Reservoir:

Tom Frost Reservoir, located in the southeast corner of the site, includes an area of open water with public fishing access; a cattail marsh and wetland fringe to the north; a parking area with capacity for 10-12 cars; and a short segment of trail from the parking area to a fishing dock on the reservoir's western edge. Unlike LeGault Reservoir, Tom Frost has no shade trees and few shrubs.

Opportunities exist to enhance the landscape and public amenities in this zone. Adding selected shade trees and perhaps another fishing dock may provide a more pleasant visitor environment and shade, and over the long term may provide some habitat enhancement as trees mature. Completing a loop trail around the reservoir could allow for hiking and birdwatching, providing that the trail does not segment the cattail marsh and inhibit the movement of water birds. Since it is anticipated that this area will continue to receive more public use than other areas of the open space, provisions should be made for potential future expansion of the parking area and for locating a restroom enclosure. It is also anticipated that the Tom Frost area would serve as the principal trailhead access point.

Neighborhood connections are especially important in this area. Safe crossings will need to be provided across Midway Boulevard to the Brandywine neighborhood and nearby elementary school, as well as across Lowell Boulevard to the Westlake neighborhood and trails system.

Area 7: Gateway

The zone immediately south of Tom Frost Reservoir, at the intersection of Midway and Lowell Boulevards, is a significant gateway to the open space and is highly visible. As recently as a year ago, this corner was marked by three very large, dead cottonwood trees that formed a very powerful visual landmark and that framed views of the mountains to the west. These trees have now fallen down due to high winds and were placed adjacent to Tom Frost Reservoir to provide wildlife habitat. An equally large and healthy, stand of cottonwoods is visible along Midway Blvd., lining a drainage swale that parallels the roadway. This corner area is also inhabited by a small prairie dog colony, which has denuded vegetation; some animals have been killed by passing vehicular traffic.

This area has great potential to function once again as a visual landmark and entry or "front door" to the open space. Opportunities exist to restore stands of cottonwoods in selected locations, and it may be possible to relocate the prairie dog colony to the south-facing upland or to another area within Broomfield, enabling restoration of vegetative cover.

OPTIONS FOR AUGMENTING WATER RESOURCES

A total of 63 shares of irrigation water in the Farmers Reservoir and Irrigation Company's ("FRICO") Community Ditch are currently available for use on the open space. Depending on river calls made by more senior water rights than FRICO's Community Ditch rights, the water yield from these shares could range from one acre-foot per share in a drought year where users with more senior rights were able to take priority over Broomfield's more junior rights, to four acre-feet per share in an average to good year where water was plentiful and most users could be satisfied fully. (One acre-foot is the volume of water that would cover one acre, or 43,560 square feet, to a depth of one foot.) Calculations for drought and "good-to-average" scenarios suggest the following potential yields:

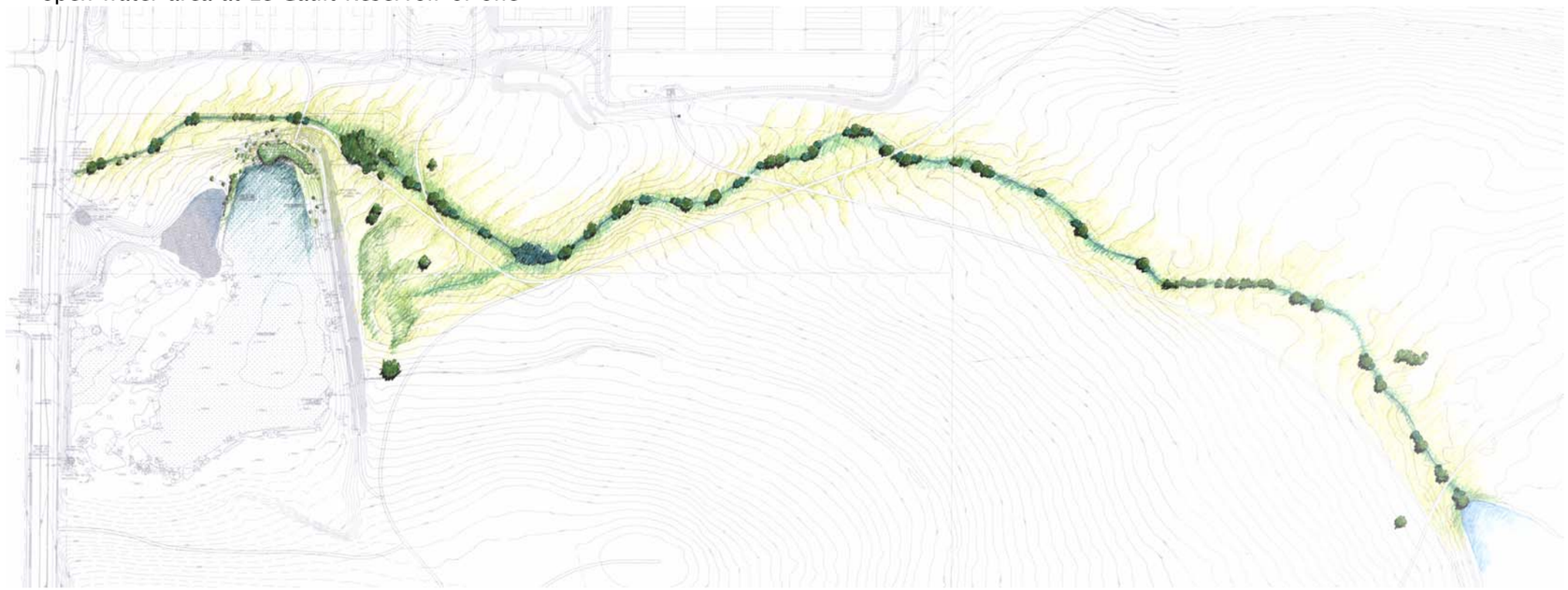
Drought year: 1 acre foot/share x 63 shares = 63 acre feet
Good to average year: 4 acre feet/share x 63 shares = 252 acre feet

A variety of assumptions were made by the planning team, working in conjunction with Broomfield's Public Works and water resources staff, to translate this information into "design criteria" that could be applied to estimate the level of enhancements that could be implemented at Broomfield County Commons Open Space. These assumptions were conservative, knowing that there could be variability in both the total number of shares made available to the site (as opposed to leased for other purposes) as well as the yield per share in any given year. The team wanted to avoid planning for landscape improvements that could not be sustained by the water resources that would be made available. Assumptions included the following:

1. A minimum of 63 acre feet would be available in most years, and particularly in the first two to three years when plantings were becoming established. If this quantity could not be made available in the establishment period due to severe drought, supplemental watering via a tap (if near an area where an existing tap has been placed) or water truck would be necessary.
2. Conservative allowances were made for water losses through evaporation (where open water areas may be planned), evapotranspiration by plants, and infiltration. To reduce infiltration the analysis assumed that the channel and LeGault Reservoir would be lined with a geosynthetic material, though subsequent geotechnical testing suggested that existing soils were of sufficient clay content to function as a liner (except in selected areas).
3. In most years, a minimum of 63 acre feet would be delivered to the site during a 150-day period (May through September) of each year.
4. From an ecological perspective it is most desirable to eliminate wide fluctuations in water levels at the reservoirs that might be attributable to year-to-year variations in the yield per share. Thus, in the case of LeGault, where an open water area was suggested, it was desirable to keep the fluctuation within two or three feet.
5. The Sheridan Boulevard drainage study prepared by Muller Engineering (2002) indicates that the 100-year storm event could be contained within LeGault Reservoir's existing footprint, even if a small open water area was created and the existing water surface elevation increased by up to two feet. Rather than raising the water surface elevation, the planning team conservatively opted to excavate to create an open water area, leaving the existing water surface elevation as is.
6. The water delivery system for getting ditch water to the open space should be able to independently supply Le Gault Reservoir and the channel. Supply during "very good" years would be accommodated within the channel and its existing floodplain, and directed to the wetland area north of Tom Frost Reservoir.

7. Existing storm detention capacity must be maintained on the site without washing out riparian vegetation. Existing facilities can accommodate up to 230 acre feet per year. Even with the establishment of an open water area, LeGault Reservoir is still able to accommodate the 100-year storm event from the Sheridan Boulevard watershed.

Scenario modeling using these assumptions suggested that the "optimal" design for LeGault Reservoir and the channel, assuming that shares of irrigation water could be made available, would be to receive a minimum quantity of 63 acre feet and an optimal quantity of 252 acre feet, for each May-September period. This would support an open water area at Le Gault Reservoir of one to one and one half acres, approximately three to five feet deep; and a narrow channel that would support riparian vegetation but would only rarely carry open water.



CONCEPT AND MANAGEMENT PLAN

Figure 3 shows the concept plan for Broomfield County Commons Open Space, with key recommendations summarized below. Recommendations have been developed through extensive work with City staff, Broomfield's Open Space and Trails Advisory Committee, and through work with the Parks and Recreation Advisory Committee on trail alignment and surfacing. Two public open houses were held to review preliminary and final proposed concepts (March 4 and November 4, 2004), and two City Council study sessions have been held (May 18 and September 21, 2004).

LeGault Reservoir:

- Create an area of open water and restore a more diverse riparian edge, including cottonwoods and a shrub understory, to improve habitat for aquatic life, waterfowl, and wetland songbirds. The area of open water is proposed to be increased from a few hundred square feet to approximately one acre. A portion of the current cattail marsh could be converted to an open water area with an extensive marsh around 50 to 75 percent of the shoreline. This would preserve most of the current habitat benefits while also providing the habitat needed to sustain aquatic species, including leopard frog, western painted turtle, northern water snake, and non-game fishes (orange-spotted sunfish, fathead minnow, golden shiner); as well as feeding habitat for water birds (e.g., geese, ducks, great blue herons). The water-marsh interface will provide nesting habitat for water birds (ducks, rails, and black-crowned night herons) and wetland songbirds (yellow-headed blackbird, red-winged blackbird, common yellowthroat, song sparrow); breeding sites for northern chorus frogs and Woodhouse's toads; and both breeding sites and hiding cover for fish.
- A substantially richer and more diverse riparian edge would be developed that would include a wet meadow, and new cottonwoods with an extensive shrub understory. Shortgrass prairie would be restored in the surrounding upland areas. The open water would function as a visual amenity and would provide habitat for aquatic species.
- Provide for public viewing areas in two locations (Sheridan Boulevard and the dam embankment) while maintaining a generous buffer between public use areas and wildlife habitat.
- Provide ADA-accessible trails from the athletic fields and parking area; from Sheridan Boulevard; and from Wolff Street.
- Manage LeGault Reservoir as a natural preserve, allowing very low impact public use at overlooks and trails, while emphasizing habitat preservation. The reservoir would be designated as a preserve, with limited human access. Bicycles would not be permitted on trails in the vicinity of the reservoir.
- East of the Reservoir, an existing stand of cottonwoods will be enhanced with new plantings to create a woodland buffer between the reservoir and the channel. In addition to cottonwoods, other species planted may include hackberry, white mulberry, serviceberry, and bur oak.

Transition Area:

- Create a 'transition area' between the active athletic fields and the reservoir that will manage public access to Le Gault Reservoir and enhance habitat value. A native shrub 'living fence' to provide habitat for songbirds and small mammals, will mark the transition to the open space preserve. Species to be planted may include rabbitbrush, bur oak, yellow twig dogwood, wild plum, snowberry, and desert holly.

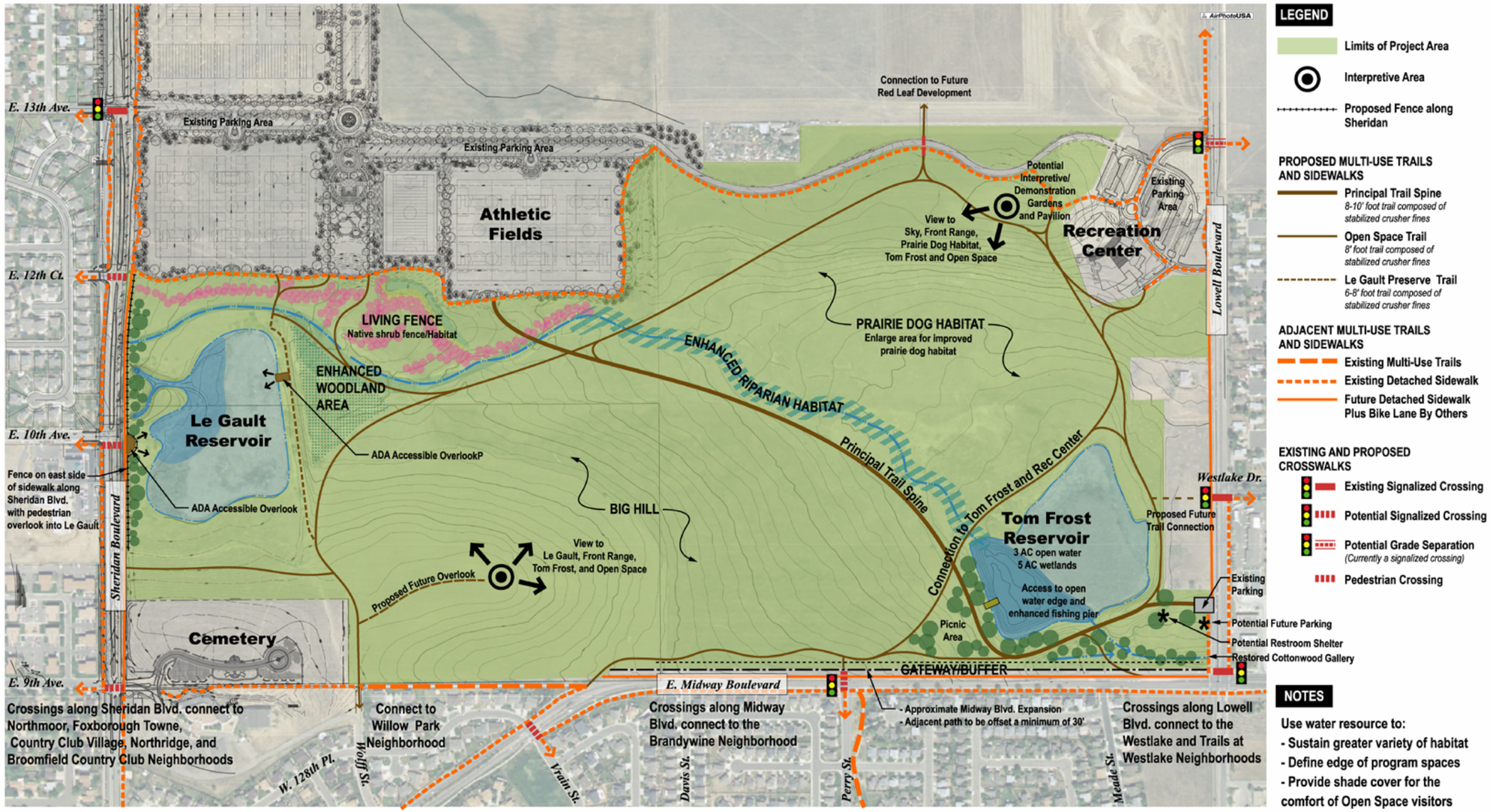
The Channel:

- Enhance the existing irrigation channel connecting LeGault and Tom Frost Reservoirs by planting cottonwoods, hackberry, and tall shrubs to increase habitat quality. Cottonwoods, willows, and tall riparian shrubs and riparian-margin trees would be planted to increase habitat quality, structural complexity, and species richness, with an emphasis on arboreal songbird nesting and feeding sites and raptor perching sites. A wider channel and lusher margin and understory would provide cover for breeding and feeding by myriad small mammals (which in turn provide prey base for predators), arboreal and ground-nesting songbirds, and reptiles such as the western terrestrial garter snake and smooth green snake.
- The channel could support the following general types of aquatic, wetland, and riparian communities:

Riparian Cottonwood/Willow Woodland – Requiring persistent soil moisture but not actual inundation (although able to tolerate periodic inundation), a linear band of mature trees along all or part of the drainage would be visually attractive and provide nesting and feeding sites for a variety of songbirds—including neotropical migrant species as well as resident species. Several species of raptors could also use the trees as they mature. The types and numbers of birds that could be supported would depend on total habitat area, patch size (one large patch is preferable to multiple small patches that equal the same combined area), patch width-to-length ratio, type of understory (shrubby versus grassy), type of adjacent habitat (diverse grassland versus degraded pasture or cropland), and intensity of human use (e.g., proximity to a trail and the type of use on the trail). To maximize habitat diversity, all of the regionally native riparian tree species could be planted (plains cottonwood, narrowleaf cottonwood, lanceleaf cottonwood, western hackberry, and peachleaf willow), as well as a variety of associated tall streambank shrubs (thinleaf alder, western river birch, and various tall willow species). Only male (cottonless) cottonwoods would be planted.

Riparian-margin Shrubland – This type requires seasonal moisture and can tolerate infrequent inundation but is also able to tolerate seasonal drought during the non-growing season and, once established, occasional drought during the growing season. While not attracting raptor nesting and supporting fewer neotropical migrant songbirds than trees, the diversity and density of birds would still be much greater than at present. The goal would be to plant these species in natural groupings that would soon establish thickets, providing cover for predators and smaller mammals. Thickets of tall shrubs would also provide a good visual screening for seclusion of wildlife using the adjacent stream and would be a relatively effective dispersal barrier to prairie dogs. Species to be planted would include common riparian-margin species that provide varying heights, thicket-forming growth habit, attractive flowers in spring, fruits that attract wildlife, and attractive fall foliage. These would include native hawthorn, chokecherry, wild plum, leadplant, silver buffaloberry, golden currant, gooseberry, ninebark, snowberry, and Boulder raspberry.

Figure 3: Concept Plan



CONCEPTUAL MASTER PLAN

WENK ASSOCIATES, INC
SELLARDS & GRIGG, INC
WALSH ENVIRONMENTAL, INC.

Broomfield County Commons Open Space Management and Master Plan
November 30, 2004

Moist Bottomland Grassland – The transition zone from the marsh, woodland, or shrubland communities and nearby uplands could be converted from the currently dominant non-native pasture grasses (smooth brome, intermediate wheatgrass) to a diverse mosaic of mesophytic (moist-site) grasses, sedges, and rushes. This habitat type is visually more interesting and ecologically much more productive than the near-monocultures of planted pasture grasses. The diverse graminoids—and wildflowers that could eventually be planted into the community once weeds have been controlled—would support an abundant preybase (small mammals, snakes, and large insects) for raptors, grassland songbirds, and carnivores. Being adjacent to a wooded riparian community is ideal: many species would nest, hide, or move within the cover of the riparian corridor but use the adjacent grassland to forage or hunt. Species to be seeded would represent a moisture gradient, from persistently wet throughout the growing season to moist during the early growing season but drier later in the season.

This gradient could include the following:

- Persistently Wet – Nebraska sedge, American sloughgrass, fowl manna-grass
- Seasonally Wet – Nebraska sedge, Baltic rush, prairie cordgrass, bluejoint reedgrass
- Persistently Moist – big bluestem, switchgrass, yellow Indiangrass
- Seasonally Moist – western wheatgrass, streambank wheatgrass, fowl bluegrass, Canada bluegrass,

Tom Frost Reservoir and Gateway:

- Enhance landscape and habitat at the western edge of the reservoir to improve visual quality, provide shade for fishers, and provide perching sites for birds.
- The existing pond-marsh interface would be enhanced, by expanding the shoreline wetland fringe to the north to provide additional cover for aquatic and amphibious species. In the degraded area immediately north of the pond, species adapted to an alternating wet/dry moisture regimen and tolerant of alkaline conditions would be planted to improve cover and food sources for wildlife. The latter would include native alkali-tolerant species adapted to this type of situation, such as Baltic rush, alkali bulrush, inland saltgrass, Nuttall alkaligrass, alkali sacaton, western wheatgrass, and streambank wheatgrass.
- Provide a group picnic area and restroom shelter. Expand parking area as warranted over time to accommodate approximately 25 additional cars.
- Restore the cottonwood gallery at the corner of Midway and Lowell Boulevards, to create a visual ‘gateway’ to the open space and reestablish raptor habitat.

Trails Network:

- Create 3.73 miles of new ADA-accessible trails that provide hiking and birdwatching opportunities, and that connect surrounding neighborhoods to the open space, athletic fields, and Paul Derda Recreation Center. The entire Broomfield County Commons open lands will have a total of 7.5 miles of trails (3.75 existing trails plus the proposed 3.73 miles of trails).
- All trails will be a stabilized crusher fines material that will support walkers, joggers, bicyclists, strollers and wheelchair users. No equestrian use is planned.
- No bicycles, scooters or rollerblades will be permitted on the preserve trail along the dam embankment at LeGault Reservoir, to minimize impacts to wildlife.
- A trail is also proposed just west of the light at Westlake Drive. This land is currently private property. Any future development plan for this property should incorporate this trail access.

Interpretive and Public Use Signage:

- Interpretive signage will be installed in selected areas to provide information about wildlife and habitat restoration, current and former agricultural activities, the irrigation ditch, and other site features. Directional and regulatory signage will also be installed to indicate trail connections/destinations as well as uses permitted.

Opportunities for Public Art:

- Provide suitable opportunities for public art, that are compatible with the underlying natural features of the site and that will not detract from them. Areas that may be suitable include the proposed site for the nature pavilion at the Paul Derda Recreation Center, the gateway at Tom Frost Reservoir, and the transition area.

Agricultural Fields:

- Maintain fields in agriculture in the short term. Over time, restore fields as native grassland to support raptors, coyote, fox and other species. Converting the cropland to native grassland would require weed control and site preparation, including clean cultivation. Although the site is sufficiently uniform to support a monoculture of winter wheat, it actually has sufficient micro-scale differences in soil, slope, and aspect to support a grassland mosaic. Prior to restoration, the area would be inspected to assess soil and topography, and three to four seed mixes would be developed.

- While the mixes would be somewhat different, they would also have considerable overlap, and the diversity within each mix would ensure that some species do better in some micro-sites than others. Thus, the eventual result would be a complex grassland community—as occurs in natural situations—rather than the type of monocultures or near-monocultures normally associated with degraded or "improved" rangeland. Likely species from which the mixes would be blended include the following:

  - *Taller, More Mesic Species* – Areas at the toe of slopes or in shallow depressions where moisture accumulates would include a component of tall grasses such as big bluestem and switchgrass in addition to intermediate-height and intermediate-moisture species such as little bluestem, side-oats grama, big bluegrass, and green needlegrass. These species range from approximately 18 inches to 4 feet in height.
  - *Mixed-Height, Mid-Moisture Species* – These species of intermediate conditions include slender wheatgrass, western wheatgrass, and thickspike wheatgrass in addition to little bluestem, side-oats grama, big bluegrass, sheep fescue and green needlegrass. Heights range from approximately 18 inches to 2 feet.
  - *Shorter, More Xeric Species* – These species of the driest sites include the prevalent shortgrass prairie species of the region (blue grama and buffalo grass) as well as Canby bluegrass, prairie junegrass, and some of the species listed above (e.g., western wheatgrass, side-oats grama). Heights range from approximately 6 inches to 18 inches. Two other species—sand dropseed and Indian ricegrass—may also be planted in these driest sites, depending on soil conditions.

In addition to these native grasses, some shrubs and forbs (broadleaf herbs, including species described as "wildflowers") may also be seeded. Normally, these are not planted until after the grassland has become sufficiently well established to no longer need chemical treatment of weeds—since most weed poisons also kill young shrubs and forbs. However, since the area is now a cropland, these species may be included in the seed mix. Examples include fringed sagebrush, prairie sage, winterfat, slimflower scurfpea, American vetch, Lambert locoweed, golden-banner, silvery lupine, purple prairie clover, purple coneflower, prairie coneflower, plains coreopsis, prairie aster, spreading fleabane, blanketflower, black-eyed susan, dotted gayfeather, wild blue flax, Rocky Mountain penstemon, and sidebells penstemon.

The Prairie Dog Town:

Maintain and enhance existing prairie dog town by regrading the north edge of the colony to enlarge useable habitat and provide for more effective control of migration into recreation areas. Visual/vegetative barriers, prairie dog fencing, deep drainage swales, and slopes over 10 percent have all been used to limit dispersal, though it should be cautioned that multiple strategies will need to be employed and no combination of strategies will be guaranteed to provide 100 percent containment. A zone of dense and very tall grasses may also discourage prairie dog dispersal. Two species—native Great Basin wildrye and non-native tall wheatgrass—appear to be tall enough, dense enough, and fast-growing enough for this purpose. The wildrye is especially intriguing because of the tall sheaf of dead foliage throughout the winter (similar to the winter foliage of the decorative "Pampas grass" or "plume grass"). Great Basin wildrye also has the benefit of tolerating, and indeed preferring, moist and occasionally inundated areas along drainage floors. Therefore, it may be appropriate to establish a band of wildrye, perhaps 50 feet wide, along the outer edge of any riparian or wetland habitat to be created adjacent to the large prairie dog colony.

- Create a small open air (though covered) nature pavilion housing a maximum of 25 persons, viewing platform and demonstration gardens adjacent to Paul Derda Recreation center to provide for "indoor/outdoor" nature programming.
- Raptor perches would be provided in this area until the cottonwoods and hackberries along the channel were of sufficient size to provide adequate perches.

COST AND CONSTRUCTION PHASING

The master plan improvements have been organized in four phases, based on the following factors:

- A desire to minimize repeated impacts to the site, including disruption to wildlife habitat.
- A desire to provide for public access.
- A need to identify efficient and logical packages of construction improvements; and
- Responsiveness to public comments.

Phases I through III are expected to be constructed within two to four years. Phase IV improvements are proposed to be implemented within five to 10 years.

Preliminary plans for construction phasing are shown in Figure 4 and are summarized below.

- Phase I – 2005 Construction: Channel restoration, transition area between athletic fields and open space, principal trail spine from Tom Frost to athletic fields, trails from athletic fields to Le Gault Reservoir, overlooks (estimated construction cost $450,000)
- Phase IIa – 2005 Construction: Complete as many of the remaining trails as possible except the proposed future trail to the top of the 'big hill' at the agricultural fields. (This trail will not be completed until grassland restoration takes place.) (estimated construction cost $400,000)
- Phase IIb: Landscape and habitat restoration at Le Gault and Tom Frost Reservoirs, restoration of cottonwood gallery at Tom Frost entry, construction of picnic area and restroom enclosure. (estimated construction cost $514,000, project is in the proposed 5 Year CIP Plan and will be evaluated on an annual basis)
- Phase III: Enhancements to prairie dog habitat, construction of nature pavilion, viewing area and demonstration gardens (estimated construction cost $150,000, project is in the proposed 5 Year CIP Plan and will be evaluated on an annual basis)
- Phase IV: Restoration of native grassland at agricultural area, construction of the trail from the trail east of the cemetery to the overlook/viewing area (estimated construction cost $865,000, project is in the proposed 5 Year CIP Plan and will be evaluated on an annual basis)

Broomfield has also made a long-term commitment to monitoring and "adaptive management" of Broomfield County Commons and its other open space sites. This includes a commitment to maintenance, including weed control; and refining or revising human-use scenarios to limit impacts on wildlife (e.g., implementing seasonal trail closures, limitations on disruptive types of trail uses, and the like.) A Maintenance Plan will be prepared for the site once construction documents have been completed.

Figure 4: Construction Phasing Plan