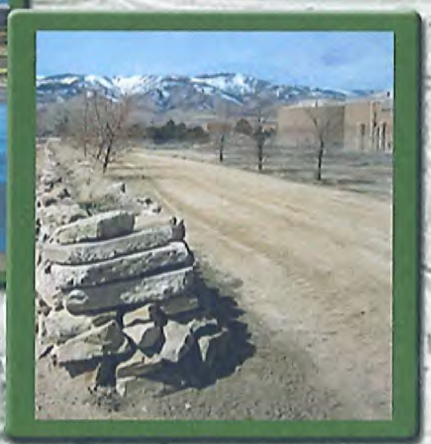
MASTER PLAN FOR THE CARSON CITY CORPORATE YARD AND WASTEWATER TREATMENT PLANT



Prepared 2007 By
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INDEX

1 EXECUTIVE SUMMARY

The Carson City Corporate Yard & Wastewater Treatment Plant Master Plan has been prepared to establish workable guidelines for ongoing and future development within and adjacent to these facilities.

The area encompasses approximately 130 acres in the primary project vicinity, defined by E. Fifth Street, Airport Road, Butti way and Fairview Drive. Additional acreage involving the adjoining Moffat Open space, the proposed Linear Park extension (west of E. Fifth Street and the future Airport Road intersection), and projected improvements along E. Fifth Street (between Fairview Dr. and Hells Bells Rd.) have been included because of their relationship to a major goal of this project: provide connectivity between the Carson City area west of Butti Way and the Mexican Ditch Trail system and open space areas east of Fairview Drive.

The Design Standards identify specific areas to be developed, the plant materials to be utilized, types of site amenities, and graphic images to support these guidelines.

The goal is to link the various components of design together -- such as circulation, access and entry points, land uses, recreation and open space, habitat opportunities, landscape water distribution, etc. -- into a cohesive program. While construction costs and other issues may become limiting factors, the document asserts that development be thoughtful, and display aesthetic as well as functional design.

To this end, a rugged design theme has emerged incorporating art, metal, and architectural site elements with a whimsical quality. While relating back to the functional activities occupying the site, it contributes to an emerging identity for this part of the City. Ideas presented here should be viewed as a starting point, inspiring more thorough study and design evolution.

Acknowledged for their input and approval for this work are the following individuals.

Carson City Public Works Director
Andrew Burnham

Carson City Chief Storm Water Engineer
Robb Fellows

Carson City Parks & Recreation Director
Roger Moellendorf

Carson City Parks & Recreation,
Director of Operations
Scott Fahrenbruch

Carson City Parks & Recreation,
Park Planner
Vern Krahn

2 PROJECT OVERVIEW

This Master Plan has been initiated by Carson City Public Works, to coordinate various planned developments and activities in and around the City's Corporation Yard and Wastewater Treatment Facility. The plan's purpose is to identify those factors and unify them into a comprehensive document that can guide City staff and design professionals towards a common vision.

The goals comprising this vision are several:

- to create a complex that has a unique identity that compliments its important function as the public facilities center of Carson City.
- to create a more attractive street façade that acknowledges yet softens the primary utilitarian functions.
- to improve both vehicular and pedestrian access.
- to enhance and comply with Carson City's Unified Pathways Master Plan.
- to provide new recreation opportunities.
- to improve directional signage and facility identification.

Adjacent areas that have been identified in conjunction with this project are those that will serve to realize the goals of the Unified Pathways Master Plan. These include the Moffat Property to the east, the wetlands parcel located at the northwest corner of E. Fifth Street and future Airport Road, and the potential round-about to the east at Carson River Road and E. Fifth Street. The primary inclusion of these elements is to strengthen important circulation linkages that connect the project area not only to the larger neighborhood, but to other key open space opportunities such as the Mexican Ditch Trail. This will occur mainly via continued development of the Linear Park through the project site.

3 SITE EVALUATION

A. Project Area and Adjacent Uses (see figure 1)

The primary project area lies within the boundaries created by East Fifth Street to the south, Fairview Drive to the east, and Butti Way along the north and west sides. Three intersections lead into the site, where the City's Public Works facilities are focused. E. Fifth Street and Butti Way form the major entry point (currently designated for engineering upgrades by NDOT). Airport Road forms a secondary entry point at the northwest corner, as does the Butti Way and Fairview Drive intersection at the northeast.

Three principal uses currently occupy the site: Public Works, Parks and Recreation, and Corporate Yard facilities are situated on the northern half of the site, while the Carson City Wastewater Treatment Plant is on the southern half. They are bisected by the Kings Canyon Creek drainage which is a primary floodway. Two lease properties exist on the northeast corner; one is currently not used, the second has radio towers situated on the parcel. To the north and west of Public Works lie areas of undeveloped city-owned land. In addition, the Department of Animal Services occupies the corner at Fairview Drive and Butti Way.

Partial landscaping improvements have been made along the southern and eastern boundaries. These were initiated by the development of bike and pedestrian paths providing connection to the Mexican Ditch Trail; a response to increasing flow of traffic along E. Fifth Street and Fairview Drive; and the desire to visually upgrade the perimeter of the Wastewater Treatment Plant.

Important components of the project area include its location along designated bike and pedestrian routes that have been part of a city-wide effort to promote non-motorized recreational access. A second asset is the volume of open space provided by the relatively undeveloped floodway area along Kings Canyon Creek.

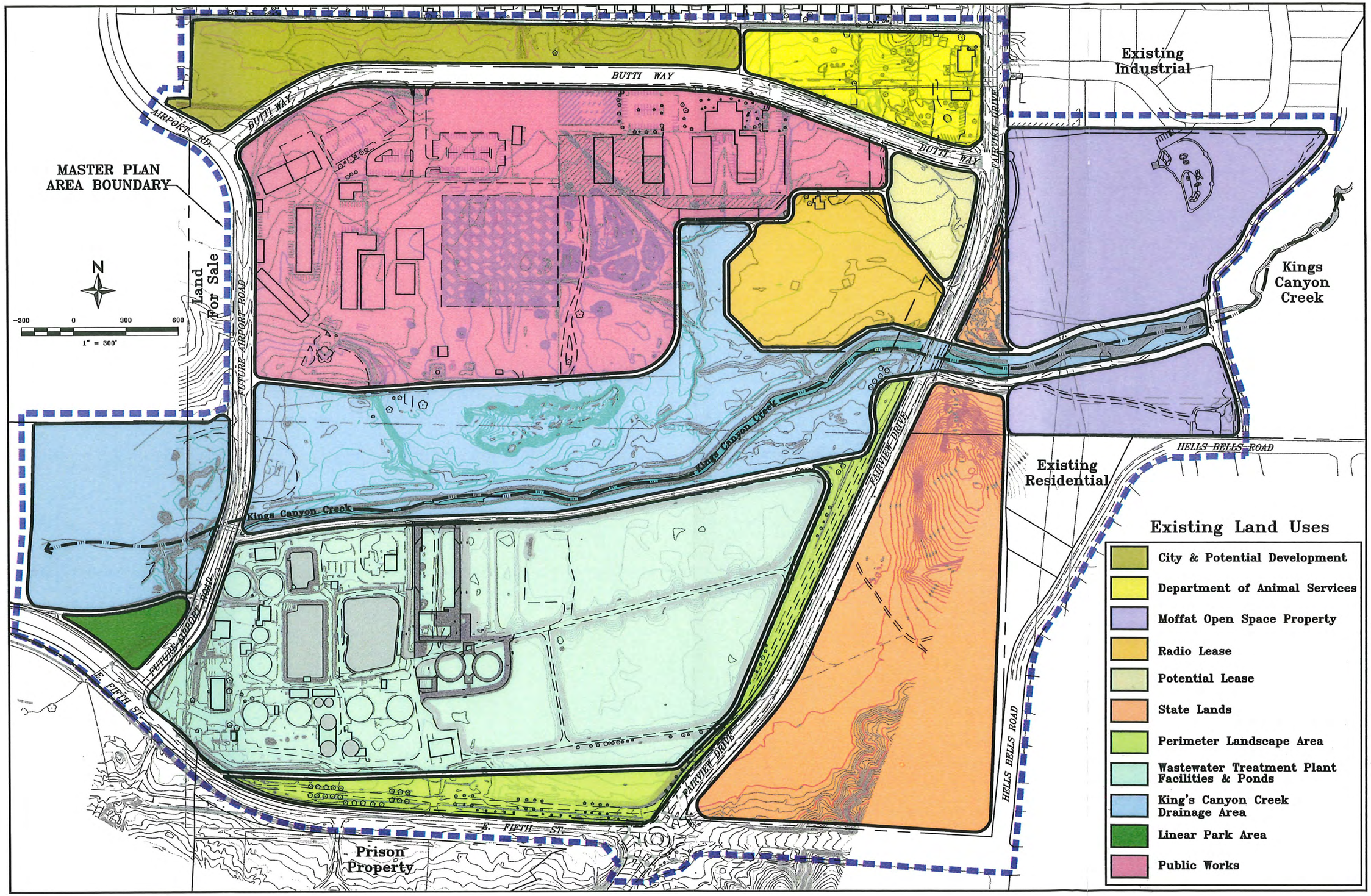
Recent improvements by NDOT to Kings Canyon Creek west of Butti Way do not seem to have discouraged bird life. This entire drainage area holds possibilities for increased wildlife habitat and recreation to serve on-site public employees and city residents at large. Improving connectivity to the Moffat open-space property will allow for a natural extension of both the recreational path system and outdoor experience.

▪ general design issues

During the evaluation phase of the master plan process, various design issues were identified as important considerations. These include, but are not limited to, the following:

a. The utilitarian component of the site is a dominant visual characteristic.

b. Open space and recreational opportunities have not been fully developed in the Master Plan area.



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PROJECT AREA AND ADJACENT USES
MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE FEB. 1, 2007
SCALE 1" = 300'
DRAWN MAL
CHECKED SW

DRAWING TITLE
Uses Plan

Figure 1

c. Areas flooded in times of significant storm events must be planned for.

d. Site soils and weather conditions create difficult growing conditions.

e. Ditches and drainage conditions require improvement.

f. Visual buffering of buildings and fences is lacking.

g. Parking needs to be developed and visually screened.

h. Directional signage is poor and not coordinated.

i. Bike and pedestrian routes need to be constructed to prevent deterioration.

j. Connections need to be established between the City's existing facilites.

k. Maintenance of current landscaping does not appear consistent.

l. Animal and bird habitat should be encouraged.

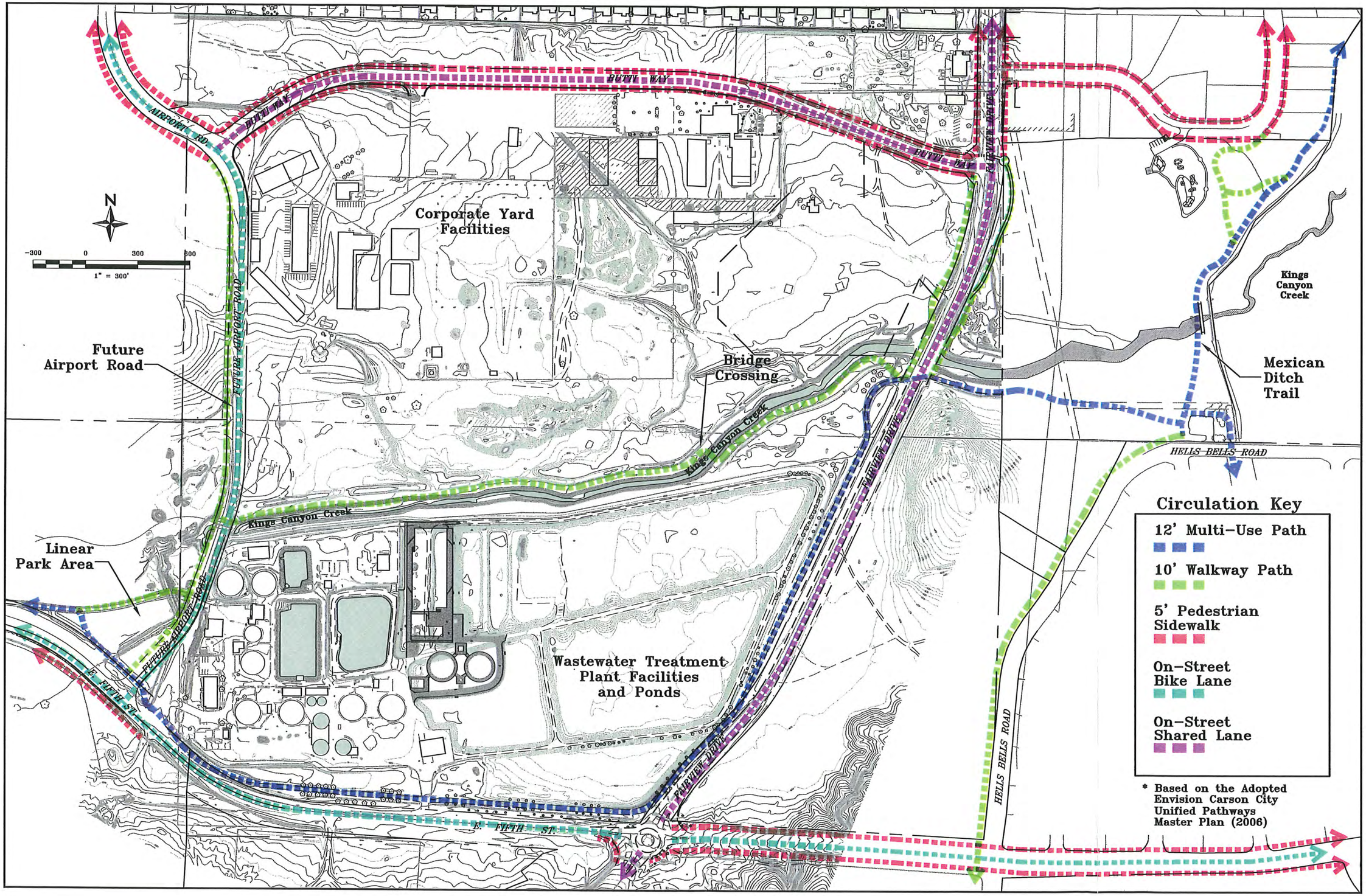
m. Natural vegetation should be restored in vacant, damaged areas.

B. Circulation (see figure 2)

Carson City's Adopted Unified Pathways Master Plan has designated four pedestrian/bicycle/roadway combinations to be installed as future funds become available. A goal of this circulation network is to provide safe alternatives from vehicular transportation and to minimize conflict with cars. Another is to link the varied open space and park opportunities throughout the city. Various routes are planned to be integrated into the master planned site. These have been defined in the Circulation Diagram.

Of these routes, the proposed off street/paved/multi-use pathway that traverses the southern end of the Kings Canyon Creek drainage is a promising opportunity. While it appears that a bridge crossing may be required (concluded from our site survey), the recreation value is clear – the pathway affords a measure of privacy; views of the creek and potential wildlife; provides the most direct route through the site; and permits retreat from the commotion of steady traffic on Fairview Drive and E. Fifth Street. For this reason we propose the development of a naturalized park area at the west end and on on the Moffat property to anchor this major feature.

An additional planned component of any site planning is RTC's proposal to realign Airport Road and Butti Way, with Airport Road continuing south to intersect with E. Fifth Street.



Circulation Key

- 12' Multi-Use Path
- 10' Walkway Path
- 5' Pedestrian Sidewalk
- On-Street Bike Lane
- On-Street Shared Lane

* Based on the Adopted Envision Carson City Unified Pathways Master Plan (2006)

CIRCULATION DIAGRAM
MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

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DATE: FEB. 1, 2007
SCALE: 1" = 300'
DRAWN: MAL
CHECKED: SW

DRAWING TITLE: Circulation

Figure 2

▪ **road sections** (see figure 3)
Based on the input from the Envision Master Plans and Carson City's Engineering Division, two types of roads will be developed on Butti Way as part of future development. These two road sections are illustrated in figure 3. Comprised of vehicle lanes, parking, bike lanes, walkways and planters, they are contained within the 60 foot right-of-way that has been designated for these purposes.

C. Development Zones (see figure 4)

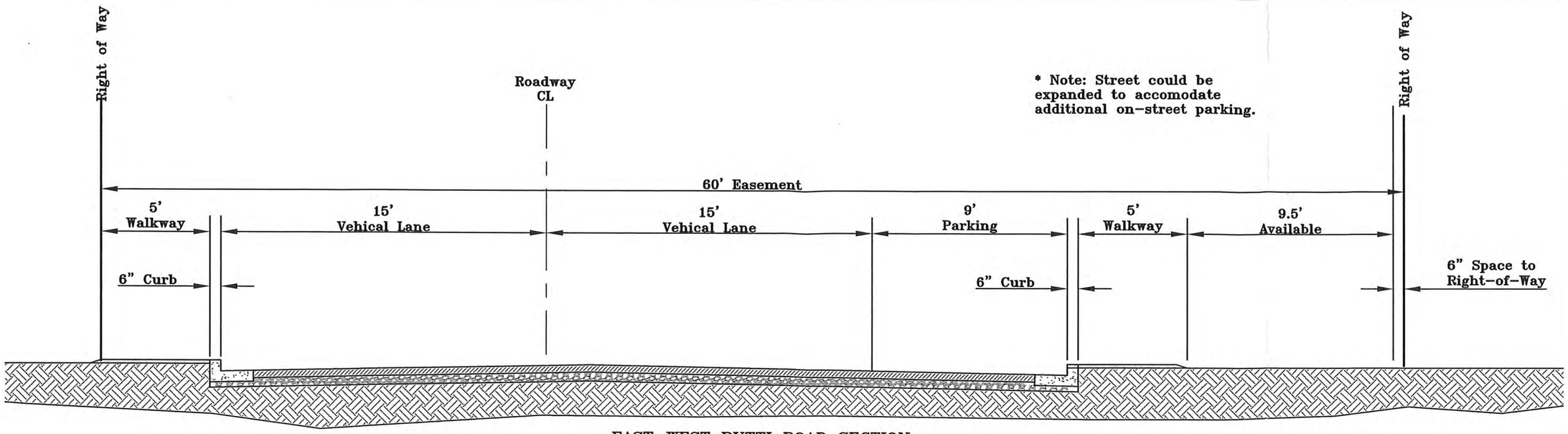
Generally, the existing uses of the Master Plan area are a blend of office, utilitarian /institutional, partial landscaped areas, basins and drainages, undefined open space, and undeveloped parcels. The two primary functional activities, the Corporation Yard and Wastewater Treatment Plant, are dominant and not without importance. Thematic design that embraces, rather than hides, the utilitarian nature of this site could be effective in establishing unique visual character. To this end, the use of metal - industrial design or art is recommended for elements of the overall design – be it signage, lighting, fencing, etc. Few well placed strong sculptural or architectural elements could provide a powerful visual identity for this part of the city.


Example of Conceptual Wall Art

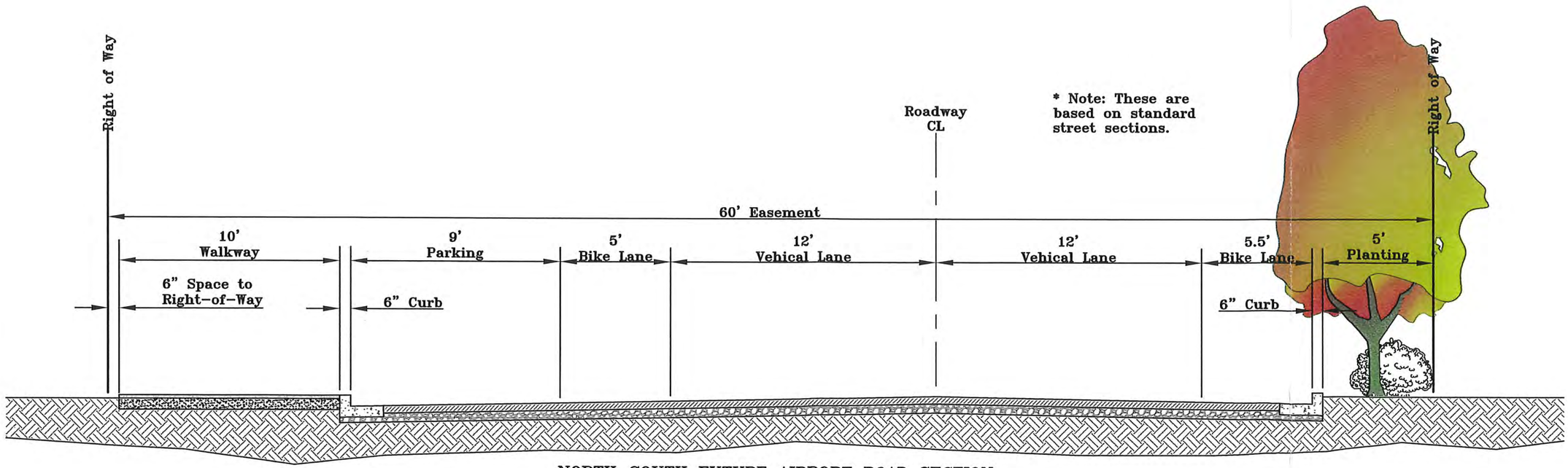

New Entry Signage Could Be Wall Art
On This Building

D. Landscape Planting Zones (see figure 5)

Many variables will influence the selection of species, massing and locations of future plantings needed to achieve goals of the master plan, such as buffering, improved visual quality, and shade. Factors will include site soils, proposed irrigation techniques, purpose of the proposed plantings, and above all maintenance. In the end, the ability and funding to maintain landscaping can limit success as much, or more than, any other factor. The zoning map that has been prepared attempts to coordinate planting, and future maintenance, on the site by delineating areas where planting will be more significant – more plants, greater diversity of species, possibly more intensive maintenance and higher water requirements – from other areas of less visual importance or need.



EAST-WEST BUTTI ROAD SECTION
(Facing West)
Scale: 1" = 5'



NORTH-SOUTH FUTURE AIRPORT ROAD SECTION
(Facing North)
Scale: 1" = 5'

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TYPICAL ROAD SECTIONS
MASTER PLAN FOR THE CARSON CITY
CORPORATE YARD &
WASTEWATER TREATMENT PLANT

DATE
FEB. 1, 2007
SCALE
1" = 300'
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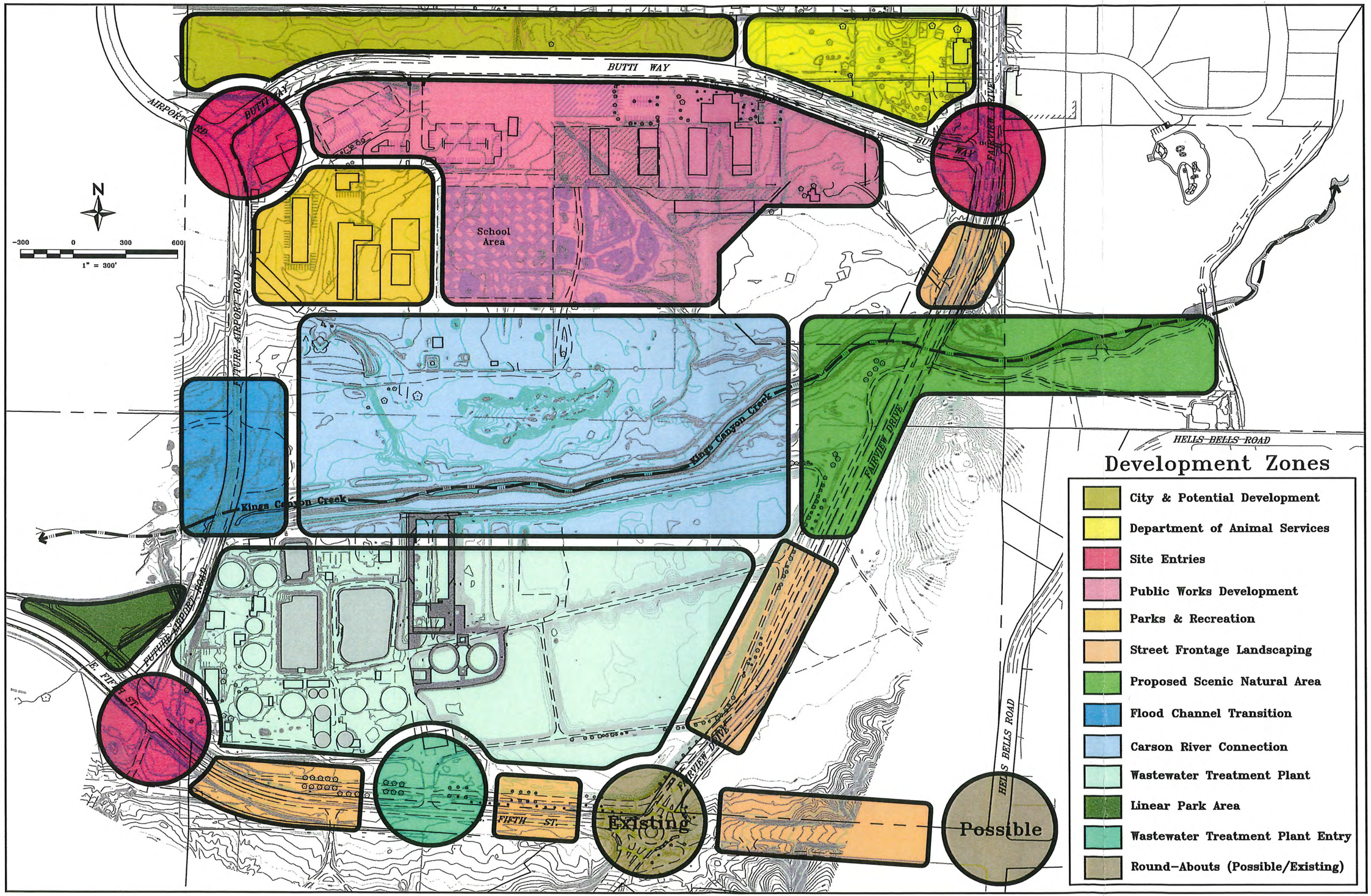
Road Sections

Figure 3



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DEVELOPMENT ZONE MAP

MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE FEB. 1, 2007
SCALE 1" = 300'
DRAWN MAL
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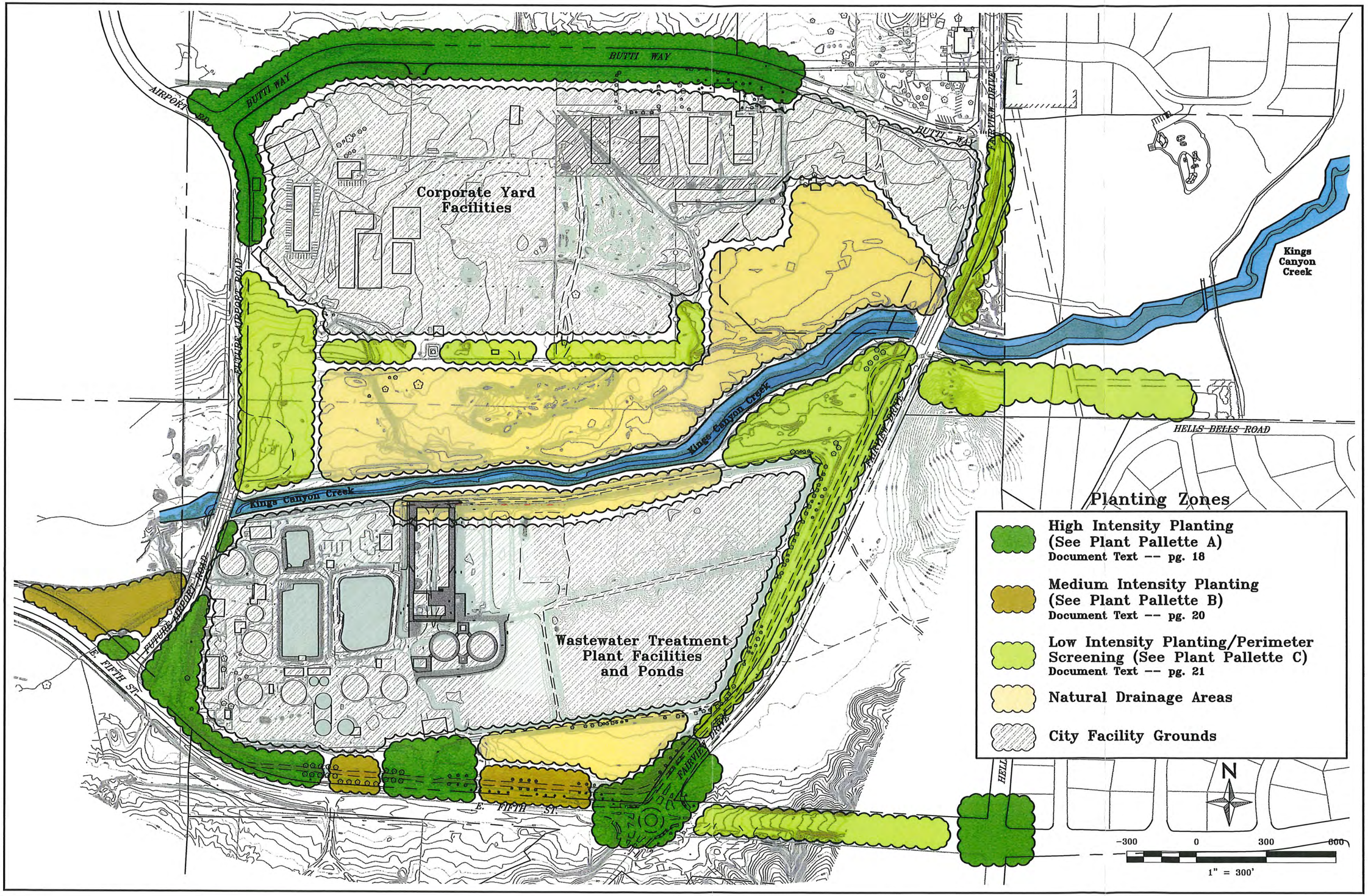
Devel. Zones

Figure 4



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PROPOSED LANDSCAPE ZONES
MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE
FEB. 1, 2007
SCALE
1" = 300'
DRAWN
MAL
CHECKED
SW

DRAWING TITLE
Planting Zones

Figure 5

4 DEVELOPMENT ZONES AND DESIGN STANDARDS

A. Office Development Zone (see figure 6)

The designation of Office Development Zone refers to the area in the vicinity of Public Works, adjacent to Butti Way, between the developing street intersections at Airport Road and Fairview Drive. Consisting of city-owned property on the south side, and city-owned property on the north side (which may become residential housing), this land currently is a random mixture of city offices, exposed parking areas, and miscellaneous city maintenance functions. There exists side-by-side, partially developed landscape areas abutting undefined land uses, traversed by open ditches. It is recommended that development of this area exemplify the expectations for orderly, attractive design that is likely to follow to the north and west of Butti Way. This area has also been included in the 'high intensity' landscape development zone, which advocates more intensive planting and public amenities.

Public Works Buildings

Ex. Paving and Ditch Conditions

To accomplish this, the following program elements are encouraged. The first would be to develop a friendly 'view from the road'. This could be encouraged by developing a plan for buildings which embody 'street' appeal and are attractively landscaped. Circulation would include not only the sidewalks that are planned as part of the street improvements (see Street Sections, figure 3), but a landscaped walkway to encourage employees to walk between the various City offices and the Corporation Yard. The planned screening wall adjacent to the street should include some façade treatment or detail to break up the linearity and provide visual interest along the walkway.

Berming & landscaping to screen parking area

5' Pedestrian walkway

Revised Main Access

Wall to screen utilitarian functions. See conceptual wall elevation detail in text (pg. 9)

Proposed parallel parking & landscaping

5' Wide pedestrian walkway to connect Corporate Yard to Public Works

BUTTI WAY

Fleet Parking

Visitor Parking

Employee Parking

Parks

Sheriff Impound

Grindings Employee Parking

Employee Parking

Public Works

Bldg. "D"

Bldg. "C"

New Electronic Gate

Paved Access Rd.

Future Parks

Parks Facilities Maint.

Parks Parking

School Bus Parking (3 Acres Paved)

N

-100 0 100 200

1" = 100'

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OFFICE DEVELOPMENT ZONE
MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE FEB. 1, 2007
SCALE 1" = 100'
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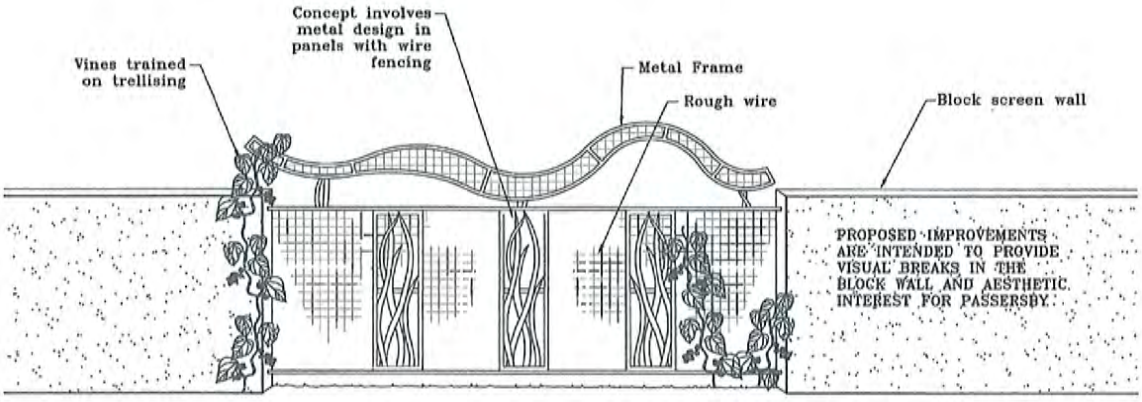
DRAWING TITLE
Office Devel

Figure 6



Metal Trellis Concept (not to scale)

B. Entries and Intersections

The two types of entries designated in the Development Zones diagram (figure 4) refer to the entries leading from peripheral roads into the heart of the master plan site. Most significant is the southwest portal, where Butti Way intersects E. Fifth Street which has been designated as a dominant east-west corridor through Carson City. High vehicular numbers, combined with the large size of the intersection and adjacency to future open space improvements sets it apart from the other two.

Secondary entries, at the intersections of Butti Way and Airport Road and Butti Way and Fairview Drive, can also become focal points; inviting people into the site, providing directions to facilities, and presenting an aesthetic and organized entry experience.

Existing View South of the WWTP
at the corner of E. Fifth Street and Butti Way

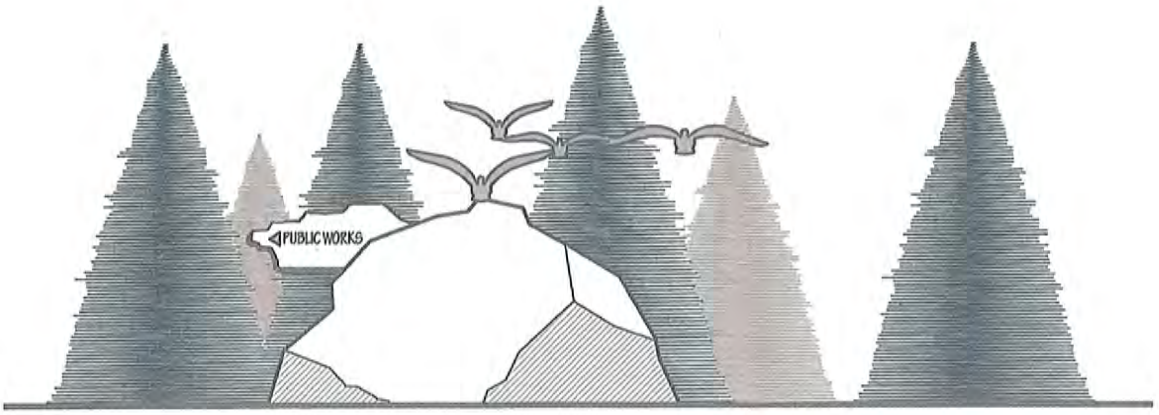
Existing View West of the Corp Yard
at the intersection of Airport Road with Butti Way

Minor entries within the site – leading into the Public Works Area, Corporation Yard, and Wastewater Treatment Plant – also deserve special consideration.

▪ primary entry area

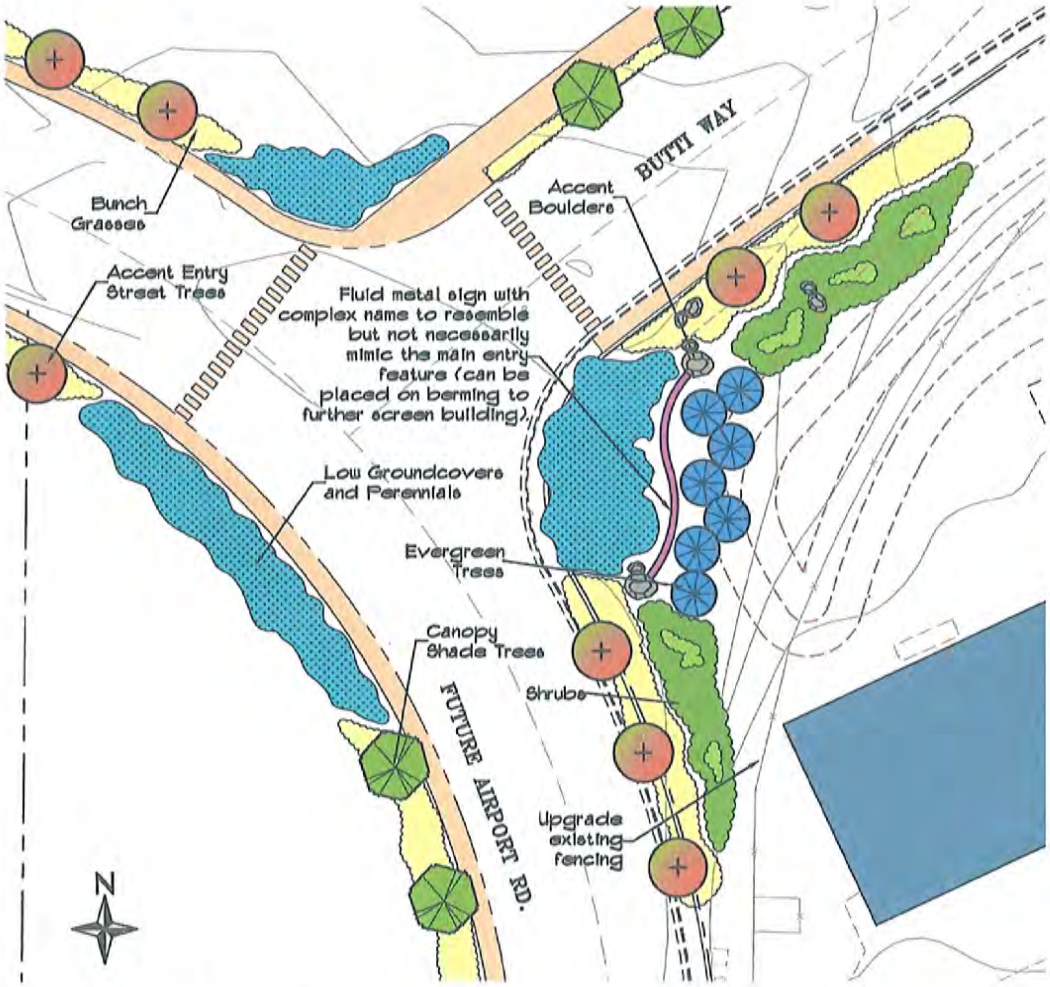
The main entry should present a comprehensive impression of the overall master plan area. This can be accomplished by setting off the landscape in a unique or eye-catching way. The idea presented here is to create a fluid, rather than static presentation. This would involve a non-linear sign, with logo identification or place name such as *Carson City Municipal Complex* and a kinetic metallic sculpture which is moved by wind.

Directional signage, in this case, would not be central, but peripheral to the main sign. One idea is to create a sign motif or standard, such as the illustration below.



Accent vegetation might include a 'field of bunchgrass' (high intensity planting) and low groundcovers and perennials in front of the signage and along street corners where visibility is essential. The concept for planting at entries would consists of few species, heavily massed.

- **secondary entry area**



C. Open Space Concepts

An open space area has been anticipated in the triangle of land northwest of Butti Way and E. Fifth Street traded by NDOT to Carson City for open space and park use. This study also proposes that an additional area, west of Fairview Drive and Rattlesnake Hill, be designated for public open space development. The merits of each area are described in detail below. They will be linked by a multi-use paved walkway and provide stopping points for pedestrians utilizing the extensive city pathway system under construction.

▪ **scenic and natural area – west** (see figure 7)
This parcel is currently criss-crossed by ditches, and portions are continuously wet. Filling and grading will be required to convert it to a useful public recreation area. The proximity to recently restored wetlands along Kings Canyon Creek drainage, is the site's most promising feature. This master plan proposes that it be enhanced for both wildlife and users by providing dense vegetation along the shoreline for shelter, and providing discreet observation areas, well buffered from the noise and traffic of adjacent streets. A significant portion of this site would be planned for open turf-type areas allowing for more physical, unstructured play. Family and small group use is encouraged by the inclusion of small shade shelters and limited picnic amenities. A small parking area to facilitate access has been proposed north of the floodway (see figure 13).


View of the West Area, Facing South


View of Rattlesnake Hill, Facing East

▪ **scenic and natural area – east** (see figure 8)
This area directly facing the dominant geographic feature, Rattlesnake Hill, holds recreational potential.

Creek restoration efforts shall be continued east, across Fairview Drive, leading into the Moffat Open Space area.

King's Canyon Creek
Drainage

Wetland/Bird Habitat

Maintenance Road
Pedestrian Pathway

Approximate shoreline

Wildlife Overlook
Seating Area

Shrub/Thicket for habitat and privacy

DIRT PILES

Low-Maintenance Turf Grass

Open Space

Picnic Shelter

Tree groves

Shrub thickets to screen traffic from entering the site

See entry concept Figure 10

E. FIFTH ST.

FUTURE AIRPORT ROAD

U/C

GATE

4620

POLE

-50 0 50 100

1" = 50'

N

Picnic Shelter Concept

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OPEN SPACE CONCEPT - WEST SIDE
MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE
FEB. 1, 2007
SCALE
1" = 50'
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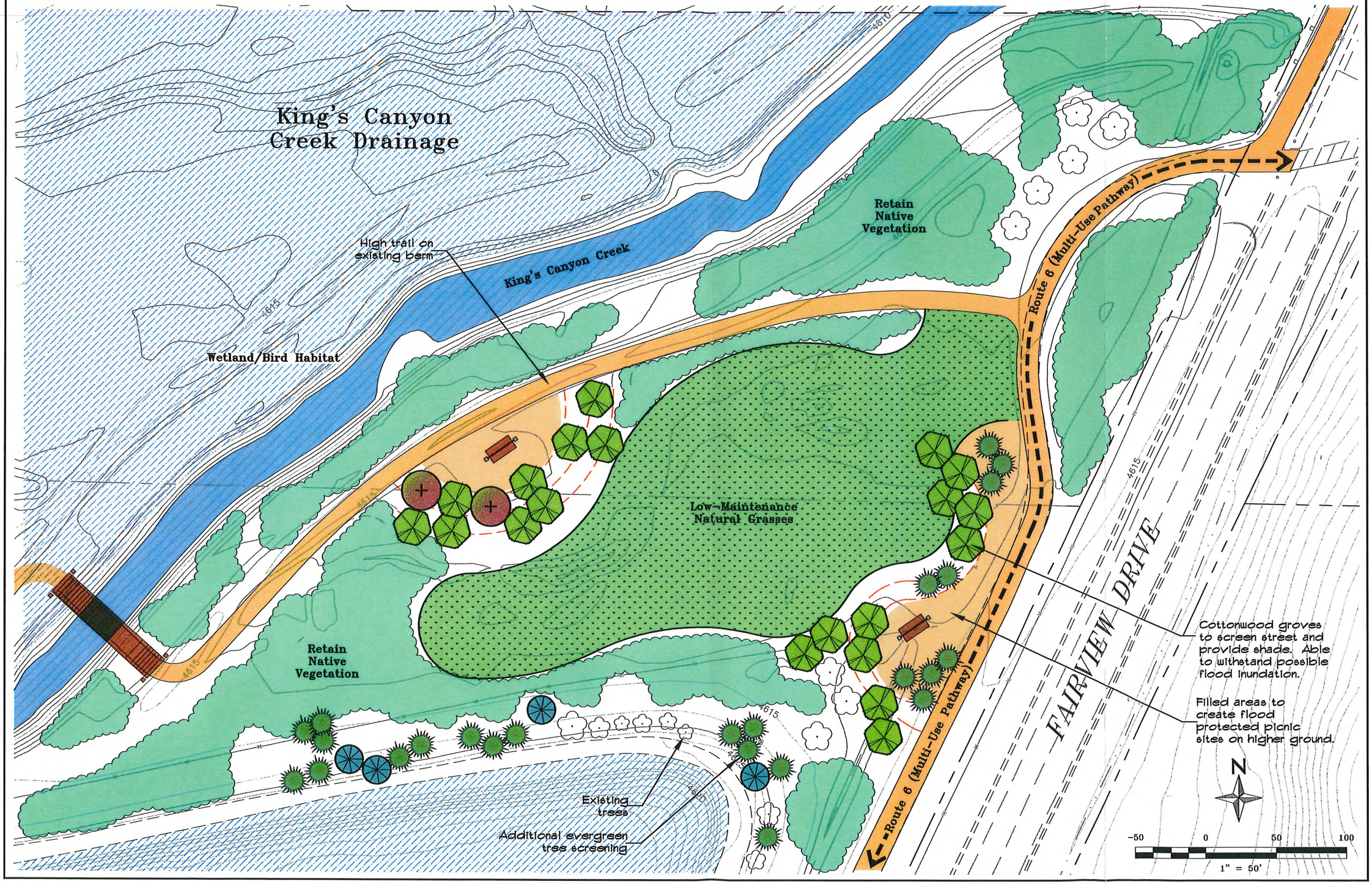
DRAWING TITLE
Open Space West

Figure 7



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OPEN SPACE CONCEPT – EAST SIDE

MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE: FEB. 1, 2007
SCALE: 1" = 50'
DRAWN: MAL
CHECKED: SW

DRAWING TITLE: Open Space East

Figure 8

D. Wastewater Treatment Plant

- **entry** (see figure 9)

Closure of alternate entries into the treatment plant grounds will direct all traffic to the designated entry off E. Fifth Street. The master plan has proposed that this entry be enhanced by the following program elements. Relocate the access road west of its current position to remove focus off the large wall of the building facing the street. Buffer roads, utility fencing, and the massive building wall with berming and new landscaping. A major component of this redesign is to incorporate artistic or architectural elements, industrial metal or iron into distinctive signage and gate designs.

- **perimeter** (see figure 10)

The focus of perimeter improvements should be at the intersection of Butti Way and E. Fifth Street, where vehicles traveling west to east first encounter the treatment plant facility. Existing landscaping, walls, and fencing are outdated and bring unwanted attention to this side of the property, especially since all entrances but one utility entrance are to be eliminated. The master plan proposes that berming (to withstand flooding) be terraced with designed walls (punctuated by mammoth boulders) and additional plant material screening. Eliminate the existing wall, signage, and relocate security fencing to the east side of the berm.

E. Round-abouts

- **existing round-about – E. Fifth Street and Fairview Drive** (see figure 11)

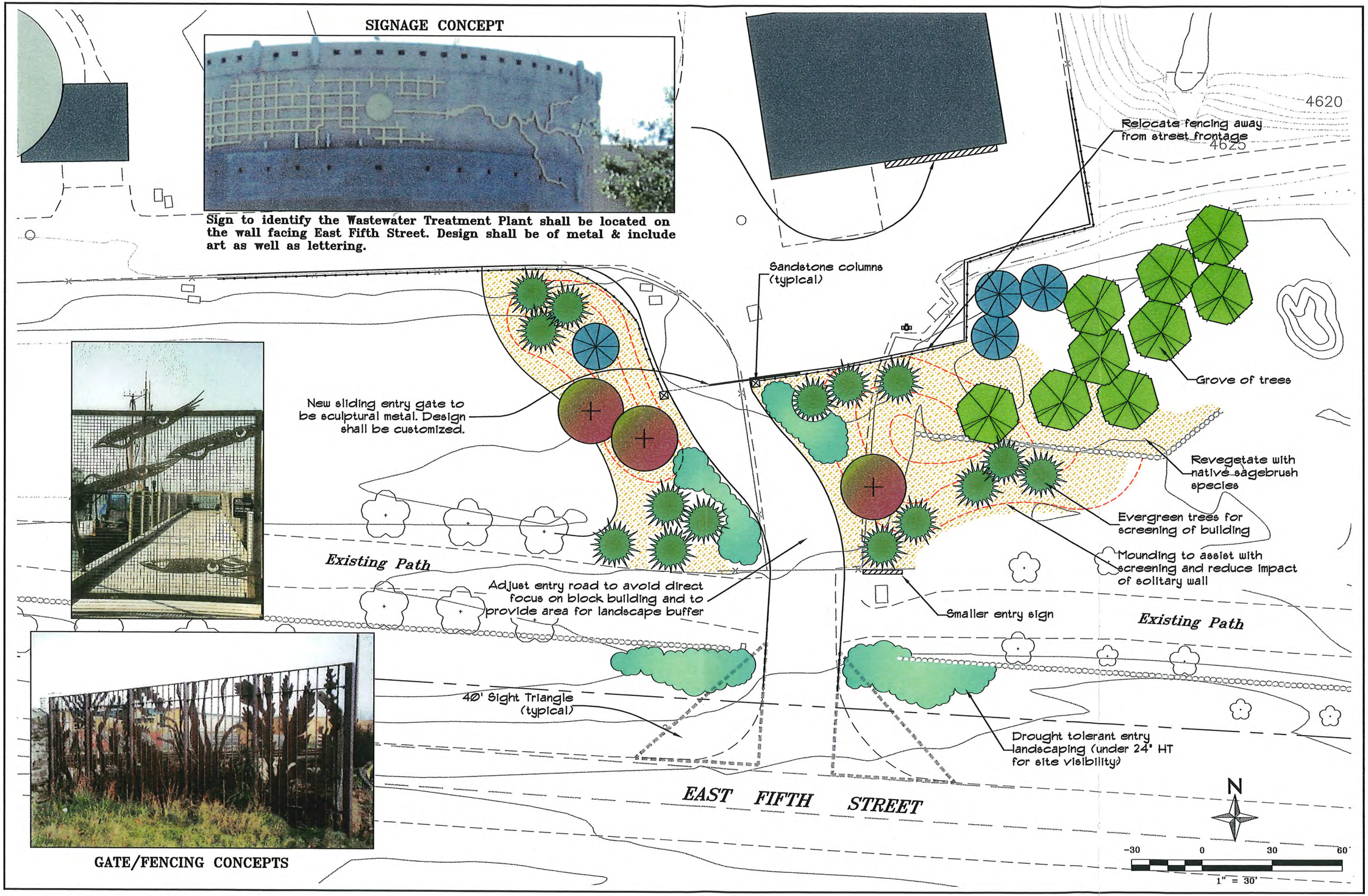
Enhancement of the existing round-a-bout consists primarily of providing additional landscaping along the northwest corner, adjacent to the storm water basin. Saline conditions present in the basin area prevent planting directly in the existing soil, and adjacent slopes are currently subject to erosion. It is recommended that available fill soil be heavily utilized to extend the planting and buffering opportunities at this well-traveled interchange. Fill soil will permit the planting of species that do not have high salt and alkaline tolerance and visually add depth to the small amount of landscaping currently permitted by the slope area adjacent to the path. Use of rock retaining walls, and some terracing, could further promote aesthetics and slope stability.

View of Proposed Landscape Corner Northwest of Round-about

SIGNAGE CONCEPT

Sign to identify the Wastewater Treatment Plant shall be located on the wall facing East Fifth Street. Design shall be of metal & include art as well as lettering.

GATE/FENCING CONCEPTS



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ENTRY CONCEPT FOR WW TREATMENT PLANT

MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE FEB. 1, 2007
SCALE 1" = 30'
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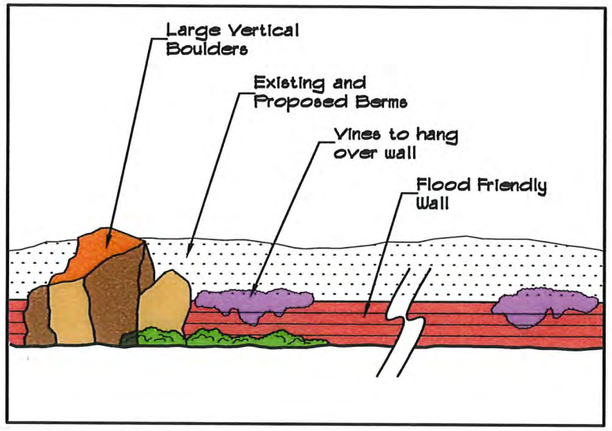
CHECKED SW

DRAWING TITLE
WWTP Entry

Figure 9



Proposed Wall Elevation

Scale: 1" = 10'-0"

N

−50 0 50 100

1" = 50'

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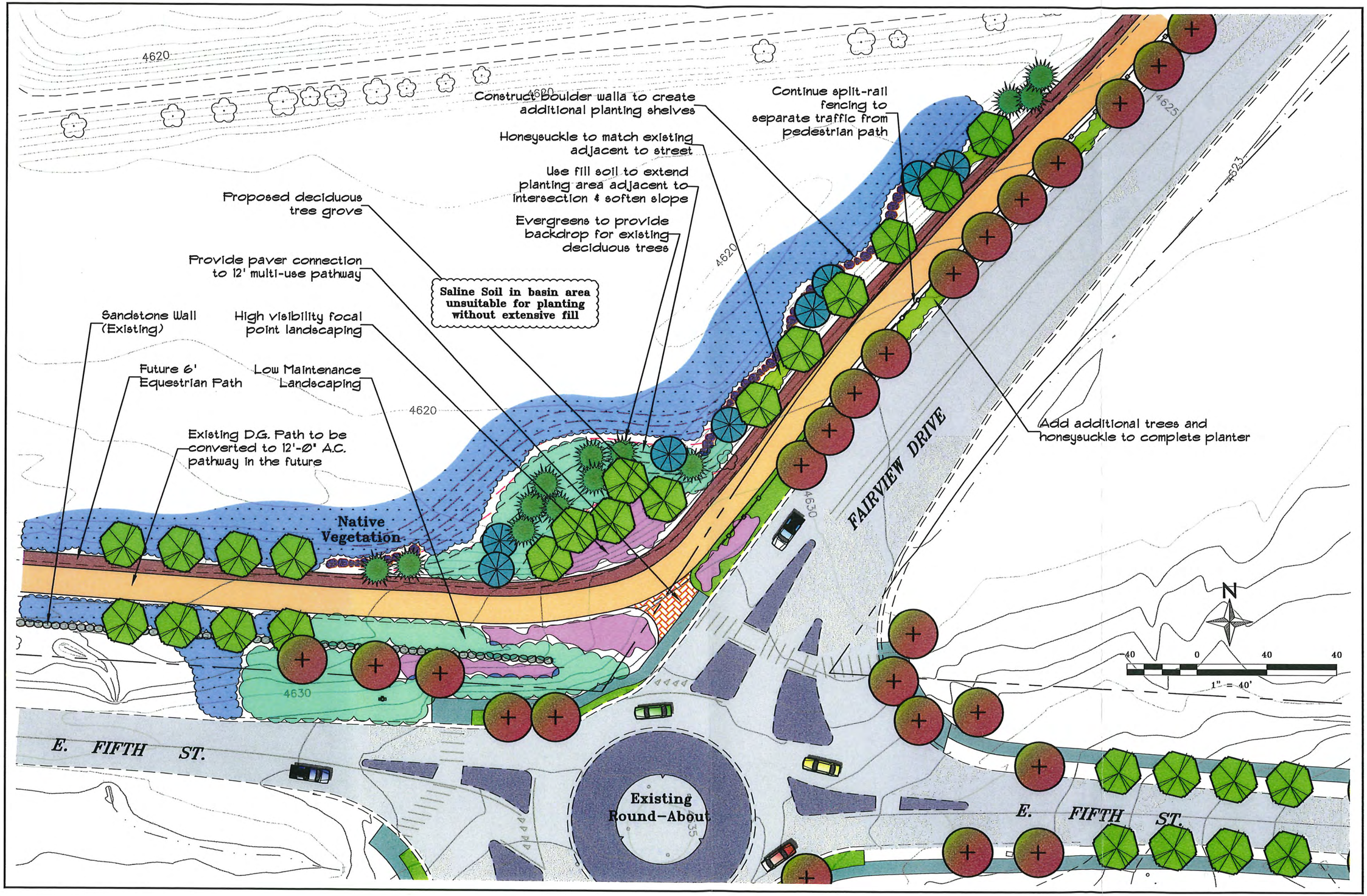
WASTE WATER TREATMENT PLANT PERIMETER
MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE FEB. 1, 2007
SCALE Varies
DRAWN MAL
CHECKED SW

DRAWING TITLE
Waste Water Plant

Figure 10



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EXISTING ROUND-ABOUT IMPROVEMENTS

MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE FEB. 1, 2007
SCALE 1" = 40'
DRAWN MAL
CHECKED SW

DRAWING TITLE
Existing R-about

Figure 11

- **proposed round-about – E. Fifth Street and Hells Bells Road,** (see figure 12)
Carson River Road

Vehicular statistics indicate that the construction of an additional round-a-bout may be desirable in the future at the junction of Hells Bells Road. If such construction occurs, plans should follow that provide additional landscaping to connect both round-abouts. This would assist in providing stronger visual linkage for users not familiar with the roads and local neighborhood area.

F. Flood Channel Transition Zone (see figure 13)

Running north-south, between the site access points at E. Fifth Street and Airport Road, is a stretch of roadway crossing the Kings Canyon floodway. On the west side, wetland and creek restoration is underway. On the east side, compacted, flat ground obscures the creek and centers attention on the water loading equipment area. Views of the Corporate Yard sheds are also prevalent on the northeast side. Master plan proposals include adding Cottonwood trees (vertical elements) to break up the horizontal expanse, berming and evergreen trees to subdue the sheds, and concrete fencing to create a "bridge" effect across the creek channel.

View of Corp Yard Sheds, Facing Northeast

View of Water Loading Area, Facing East

G. Carson River Connection (see figure 14)

Responding to Carson City's Unified Pathways Master Plan, a 10 foot wide multi-use pathway has been planned to parallel Kings Canyon Creek through the floodway zone. Designed to begin at Fairview Drive, it starts out elevated along the modified berm, overlooking the creek, and eventually crosses on a Cor-ten steel bridge, similar to one already used along other Carson City creeks, is proposed the traverse the drainage. Creek restoration is the only other landscaping treatment recommended, except for the strategic placement of benches occasionally along the path. This path will enable access to the most undisturbed and remote part of the site.

Kings Canyon Creek

Wastewater Treatment Ponds

FAIRVIEW DRIVE

Rattlesnake Hill & Open Space Area

HELLS BELLS ROAD

Moffat open-space access parking

Residential Housing

Future Sidewalks

Future street tree planting

Possible Round-About at the intersection of E. Fifth Street & Hells Bells Road

N

-170 0 170 340

1" = 170'

LANDSCAPE ARCHITECT
SANDRA J. MENDEL
890 MARLIN WAY
GARDNERVILLE, NV 89460
(775) 265-4024
NV #301 and CA #2606

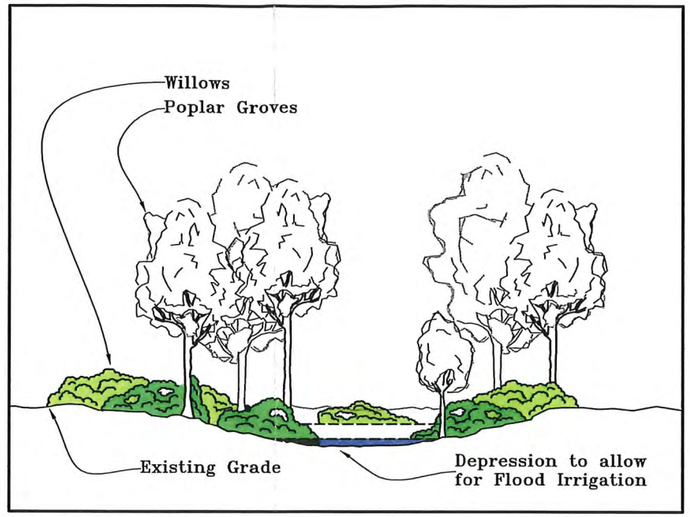
PROPOSED ROUND-ABOUT IMPROVEMENTS
MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE
FEB. 1, 2007
SCALE
1" = 170'
DRAWN
MAL
CHECKED
SM

DRAWING TITLE
Proposed R-about

Figure 12

Concrete Railing Example



Flood Basin

Scale: 1" = 20'-0"

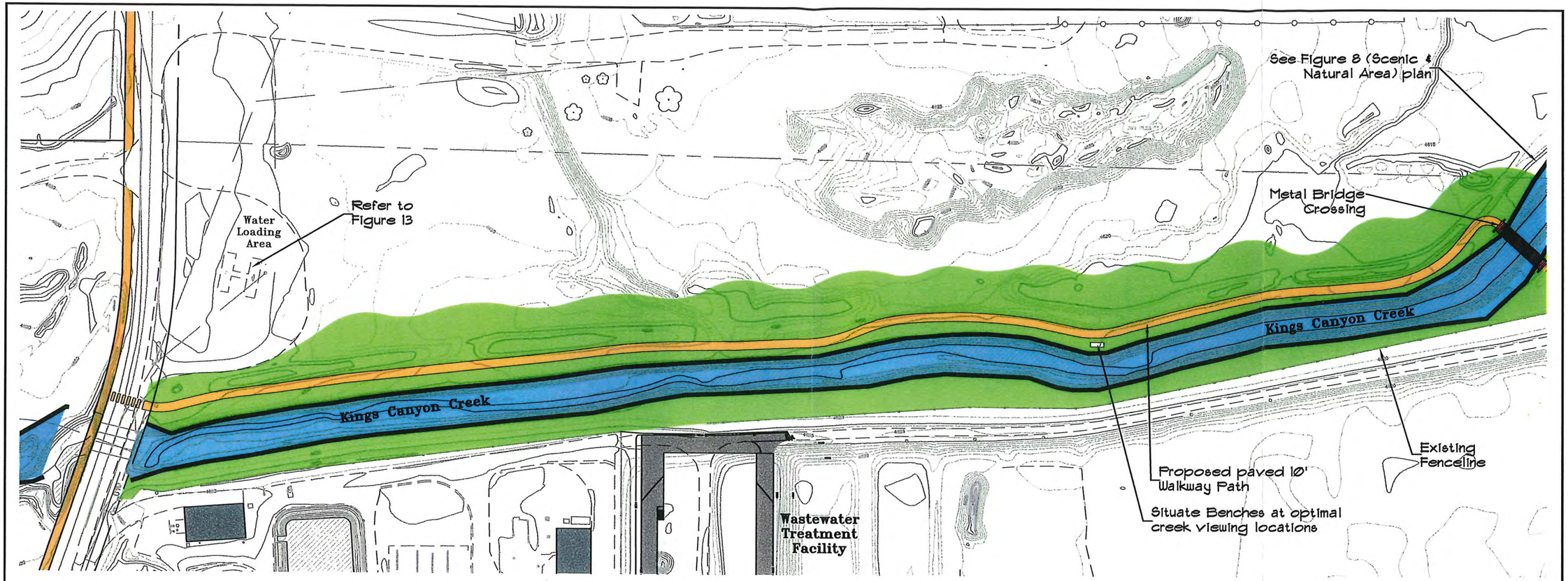
LANDSCAPE ARCHITECT
SANDRA J. MENDEL
890 MARION WAY
GARDNERVILLE, NV 89460
(775) 265-4624
NV #501 and CA #2506

FLOOD CHANNEL TRANSITION ZONE
MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE: FEB. 1, 2007
SCALE: Varies
DRAWN: MAL
CHECKED: SW

DRAWING TITLE: Flood Channel Trans.

Figure 13



View of Kings Canyon Creek

Existing Metal Bridge off Saliman Street

N

−120 0 120 240

1" = 120'

LANDSCAPE ARCHITECT
SANDRA L. WENDEL
890 MARION WAY
GARDNERVILLE, NV 89460
(775) 265-4624
NV #501 and CA #2506

KINGS CANYON FLOODWAY CONNECTION
MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE: FEB. 1, 2007
SCALE: 1" = 120'
DRAWN: MAL
CHECKED: SW

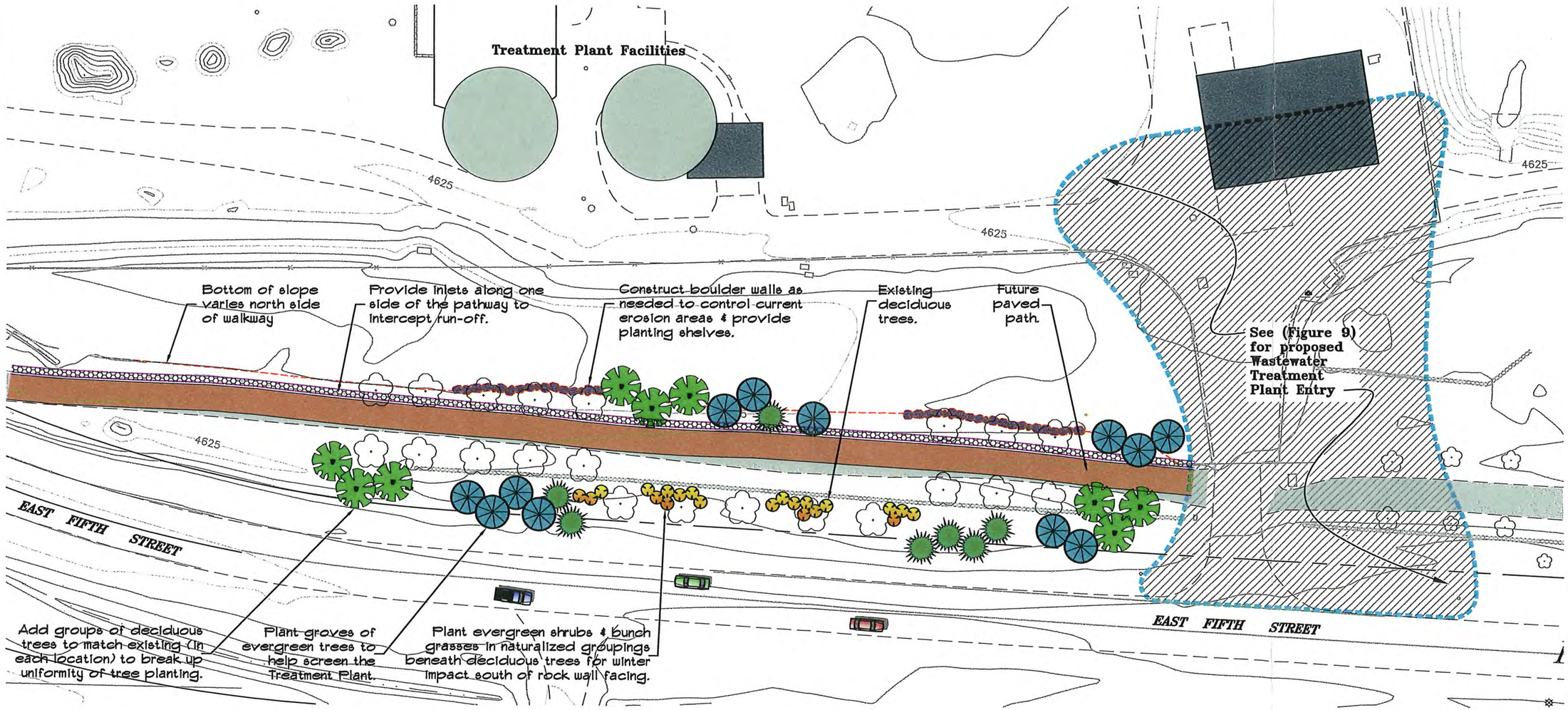
DRAWING TITLE: King's Canyon Creek

Figure 14

H. East Fifth Street Frontage (see figure 15)

Along the multi-use pathway between the treatment plant and historic rock wall, landscaping has been initiated. Deciduous trees are grouped on both sides of the pathway and some vines are establishing which will eventually soften the southern face of the wall. To further a main goal of the master plan, which is to buffer the Wastewater Treatment Plant, additional tree groupings are proposed, particularly evergreen species. Traditional conifers may need to be minimized with greater focus on alkaline tolerant Rocky Mountain Junipers or similar adapted species.

North of the existing multi-use path, serious erosion has occurred on portions of the sandy slope. It is proposed that the most eroded areas be stabilized by dry stack boulder walls. Imported topsoil, used to fill these segments, would permit the successful establishment of more varied plant material. Inlets, to capture runoff from southern slopes and the pathway is desirable to prevent further degradation.



LANDSCAPE ARCHITECT
SANDRA J. WENDEL
860 MARION WAY
GARDNERVILLE, NV 89460
(775) 265-4664
NV #501 and CA #2506

EAST 5TH ST. FRONTAGE
MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE
FEB. 1, 2007
SCALE
1" = 50'
DRAWN
MAL
CHECKED
SW

DRAWING TITLE
East 5th Street

Figure 15

5 LANDSCAPE PLANTING ZONES

A. Planting Considerations

Several key site constraints must be acknowledged that influence the selection of plant species.

- Soils: the soils in this area are typically compacted, sandy, salty, chemically imbalanced, or water logged. All of these things add up to difficult growing conditions.

- Exposure: currently, the site is very open and exposed to winds and intense sunlight. This may change in some areas as planting becomes mature.

- Animals: rabbits, in particular, may pose a threat to new plant material. Plants must be hardy, tough, aggressively rooting or thorny.

- Weeds: the competition from weeds or even sagebrush, will be enormous.

- Maintenance: City staff will not have the resources to provide a high level of maintenance in all areas. The majority of plants must be able to thrive on minimal care.

B. Soils Analysis (see figure 16)

Many soils characteristics influence growth and survival of plant material, including physical properties such as texture and water holding capacity, and chemical properties. Due to the importance of soil chemistry, soil samples were collected at seven locations within the master plan area where future planting is likely to occur. Five locations had been previously sampled (year 2001) at the southern end of the site. Figure 16 documents previous and recent sample locations (year 2006), with the results contained in the Appendix. The sample I.D. corresponds to the location identification numbers.

Soil pH values and salts are primary factors that limit plant choices. A pH of 6.5 is the standard neutral range for the average, generic type of plant. Higher or lower pH values often indicate the need to be more selective about plant materials. In Nevada, a pH of above 7.0 is not uncommon (Alkaline soil type), and anything above 7.5-7.6 can become a severely limiting factor in plant survival. (3) of the five sites sampled in the year 2001 had high alkalinity, combined with high salt. This is characteristic for areas with poor drainage where salts cannot be leached, such as the drainage basins where this sampling occurred. In the recent soil survey, (2) test sites on the north side along Butti Way showed high pH values. It is hoped that these areas, which lie in the primary development zone, can be modified in order to install more diverse planting as indicated in Figure 5. This could be achieved by berming and/or providing high quality fill soil, especially in the top 24-30 inches.

Soil Test Sites

2001 ⊕	
Test Site #01	pH 6.4
Test Site #02	pH 7.7
Test Site #03	pH 8.8
Test Site #04	pH 8.5
Test Site #05	pH 7.4

2006 ✳	
Test Site #1	pH 6.3
Test Site #2	pH 7.7
Test Site #3	pH 7.8
Test Site #4	pH 7.0
Test Site #5	pH 7.2
Test Site #6	pH 7.6
Test Site #7	pH 8.1

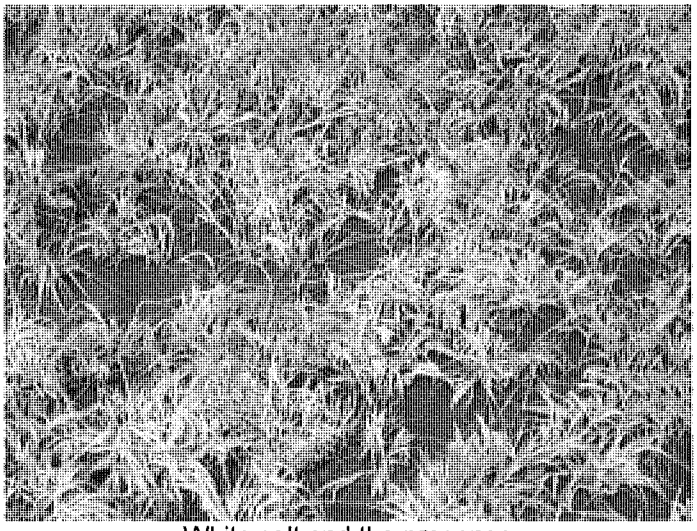
LANDSCAPE ARCHITECT
SANDRA J. MENDEL
890 MARION WAY
GARDNERVILLE, NV 89460
(775) 265-4624
NV #501 and CA #2606

SOIL SAMPLE LOCATION MAP
MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE FEB. 1, 2007
SCALE 1" = 300'
DRAWN MAL
CHECKED SW

DRAWING TITLE
Soils Samples

Figure 16



White salt and the presence
of Salt grass is indicative of soil problems

ECe, which is a salinity measurement, usually becomes a problem for commercial or landscape purposes at a numerical level of 2.0 or higher. High salt concentrations were not evidenced in recent soil sample areas.

Generic laboratory recommendations for samples 1-7 have been provided by a soils testing lab technician and are summarized in the Appendix. Preliminary findings are somewhat typical of arid western soils, and suggest it is prudent to selects trees and shrubs that are tolerant of a ph> 7.0 and somewhat adapted to salty soils. This will also insure that the plants are tough and less of a long term maintenance concern.

Obviously, many of these areas will undergo either excavation or have imported fill applied to the site during development. It is advisable to complete additional soils testing (a relatively inexpensive procedure) after grading operations are complete and prior to the installation of plant material.

Good drainage is crucial to the success of any laboratory soils amending procedures. In the absence of good drainage, it is not always recommended that elements like sulfur be applied; they may only compound the problem of chemical saturation. The best alternative in this case would be to forgo amendments and select only plants that can tolerate these severe soil conditions. If chemical amendment programs are applied to a site, it is advisable to follow-up with subsequent soils testing, on an annual basis, to monitor the change(s) in soil character.

The use of reclaimed water for irrigation provides further reason to select the hardiest of plant material, in that it will administer a slight, additional quantity of salts.















PLANT PALETTE A

C. Planting Recommendations

The following lists of recommended plant materials are intended to bring visual unity and order to the master plan area, beyond the important aspects of their ability to adapt and survive in the conditions present. Future designs are not totally restricted to these plants, however additional species must be approved and shall strive to maintain the overall character and intent of the palettes outlined in this document. Obviously, poor experience over time with any of the suggested plant materials should be acknowledged and the lists amended.

- **high intensity planting – Palette A**

This zone of planting lies in proximity to the most urban development on the site, those areas adjacent to Public Works. This development is anticipated to include both offices and potential residential construction. High 'intensity' refers not only to the density of planting (mass/quantity), but to the quality in terms of higher variety and level of interest, as well as anticipated maintenance levels. Planting will be more formal, typically adjacent to buildings, streets and parking, contained within relatively linear boundary areas. Other areas deserving this attention are the focal signage/entry areas connecting perimeter roads to the interior of the site. As previously advocated, soil improvements in these areas would be most beneficial.

(Note that several species or varieties may be available for a particular type of plant. Many plant selections have been identified as very tough by the Nevada Cooperative Extension).

Deciduous Trees:

Acer ginnala 'Flame'	*Flame Amur Maple*
Gleditsia triacanthos 'Skyline'	*Skyline Honeylocust*
Fraxinus americana 'Autumn Purple'	*Autumn Purple Ash*
Malus spp.	*Flowering Crabapple*
Quercus rubra	*Red Oak*
Platanus acerifolia 'Bloodgood'	*London Plane Tree*
Prunus virginiana 'Canada Red'	*Canada Red Chokecherry*
Pyrus calleryana 'Chanticleer'	*Chanticleer Pear*

Evergreen Trees:

Calocedrus decurrens	*Incense Cedar*
Juniperus scopulorum	*Rocky Mt. Juniper*
Pinus aristata	*Bristlecone Pine*
Pinus nigra	*Austrian Pine*
Pinus sylvestris	*Scotch Pine*

Deciduous Shrubs:

Acer ginnala	*Multi-trunk Amur*
Amelancier utahhensis	*Utah Serviceberry*
Artemisia 'Powis Castle'	*Powis Castle Sage*
Buddleia davidii	*Butterfly Bush*

Caryopteris clandonensis	*Blue Mist Spirea*
Chaenonmeles japonica	*Flowering Quince*
Cotoneaster apiculata	*Peking Cotoneaster*
Forestiera neomexicana	*New Mexican Privet*
Philadephus	*Mock Orange*
Physocarpus	*Ninebark*
Potentilla fruticosa	*Cinquefoil*
Rhus	*Sumac*
Spiraea	*Spiraea*

Evergreen Shrubs:

Cercocarpus	*Curl-leaf and Alderleaf Mt. Mahogany*
Eleagnus commutata	*Silverberry*
Euonymus	*Euonymus*
Juniperus	*Juniper*
Kniphofia uvaria	*Red Hot Poker*
Yucca glauca	*Narrow-Leaf Yucca*

Groundcovers/Vines:

Eriogonum umbellatum	*Sulfur Buckwheat*
Euphorbia myrsinites	*Spurge*
Lonicera halliana	*Honeysuckle*
Parthenocissus quinquefolia	*Virginia Creeper*
Prunus besseyi 'Pawnee Buttes'	*Spreading Western Sand Cherry*
Rosa	*Shrub Roses and Carpet Roses*
Stachys	*Lamb's Ears*

Bunchgrasses:

Calamagrostis	*Feather Reed Grass*
Leymus arenaria	*Blue Lyme Grass*
Miscanthus	*Maiden Grass*
Panicum virgatum	*Red Switch Grass*

Perennials:

Achillea	*Yarrow*
Gaillardia	*Blankeflower*
Hemerocallis	*Daylily*
Oenothera	*Evening Primrose*
Papavier orientale	*Oriental Poppy*
Perovskia atriplicifolia	*Russian Sage*
Tanacetum vulgare	*Tansy*
Teucrium chamaedrys	*Germander*














PLANT PALETTE B

- **medium intensity planting – Palette B**

These designated areas lie along E. Fifth Street, where public viewing while driving is an important consideration. They include the Linear Park, the entry to the Wastewater Treatment Plant, and the two round-abouts. These focal areas do not require the highest level of planting, but could benefit from a degree of organization and design composition.

Deciduous Trees:

Gleditsia triacanthos 'Skyline'	*Skyline Honeylocust*
Fraxinus americana 'Autumn Purple'	*Autumn Purple Ash*
Quercus rubra	*Red Oak*
Pyrus calleryana 'Chanticleer'	*Chanticleer Pear*

Evergreen Trees:

Juniperus scopulorum	*Rocky Mt. Juniper*
Pinus nigra	*Austrian Pine*
Pinus edulis	*Pinyon Pine*

Deciduous Shrubs:

Caragana	*Siberian Pea Shrub*
Cowania mexicana	*Cliffrose*
Eleagnus umbellate 'Cardinal'	*Cardinal Autumn Olive*
Fallugia paradoxa	*Apache Plume*
Prunus virginiana	*Western Chokecherry*
Rosa woodsii	*Woods Rose*
Rhus	*Sumac*
Salix purpurea 'nana'	*Dwarf Arctic Willow*

Evergreen Shrubs:

Cercocarpus	*Curl-leaf Mt. Mahogany*
Eleagnus commutata	*Silverberry*
Juniperus	*Juniper*
Kniphofia uvaria	*Red Hot Poker*

Groundcovers:

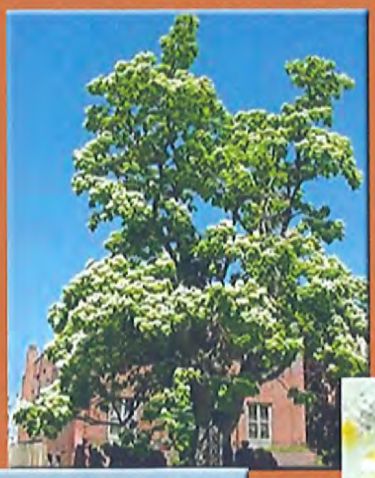
Lonicera halliana	*Honeysuckle*
Prunus besseyi 'Pawnee Buttes'	*Spreading Western Sand Cherry*

Bunchgrasses:

Leymus arenaria	*Blue Lyme Grass*
Miscanthus	*Maiden Grass*
Panicum virgatum	*Red Switch Grass*

Perennials:

Perovskia atriplicifolia	*Russian Sage*
Tanacetum vulgare	*Tansy*













PLANT PALETTE C

- **low intensity planting – Palette C**

Low intensity planting will involve those areas between focal points and in naturalized areas where detailed planting is not necessary or desirable from a maintenance standpoint. The emphasis of planting design should be on trees, specifically in groups, with minimal, low maintenance shrubbery. Any use of Cottonwoods shall insure for provision of high moisture levels, especially during dry years.

Deciduous Trees:

Catalpa speciosa	*Western Catalpa*
Eleagnus angustifolia	*Russian Olive*
Gleditsia triacanthos 'Skyline'	*Skyline Honeylocust*
Fraxinus americana 'Autumn Purple'	*Autumn Purple Ash*
Populus deltoides 'Siouxland'	*Siouxland Poplar*
Robinia pseudoacacia	*Black Locust*
Ulmus 'Frontier' and 'Pioneer'	*Frontier and Pioneer Elm*

Evergreen Trees:

Juniperus scopulorum	*Rocky Mt. Juniper*
Pinus nigra	*Austrian Pine*
Pinus edulis	*Pinyon Pine*

Deciduous Shrubs:

Caragana	*Siberian Pea Shrub*
Fallugia paradoxa	*Apache Plume*
Rhus	*Sumac*
Salix	*Native Willow*

Evergreen Shrubs:

Artemisia tridentate	*Big Sage*
Cercocarpus	*Curl-leaf Mt. Mahogany*
Juniperus	*Juniper*

Groundcovers:

Lonicera halliana	*Honeysuckle*
Prunus besseyi 'Pawnee Buttes'	*Spreading Western Sand Cherry*

6 IRRIGATION PROGRAM (see figure 17)

The planned utilization of reclaimed water for landscaping throughout the master plan area may present some challenges.

The use of reclaimed water for proposed turf areas (in the open space locations) will require special design considerations. First, non-potable water is not permitted to enter the public storm drainage system. Secondly, sprinkler systems will need to be designed to prevent over spray onto foliage of adjacent plants, prevent drift into creek drainages and must be timed to avoid conflict with public use.

The use of valve types, and other irrigation components better suited to reclaimed water, will need to be considered for both sprinkler and drip, or bubbler systems. Clogging of drip emitters can be problematic due to suspended solids in treated water. However, the high number of bubblers that would be required for any significant volume of planting, along with their immovable aspect, suggests that providing quality filtration and centralized filter stations may be preferable in the high and medium intensity planting areas. Bubblers should continue to be used for trees if cost effective – separation of tree and shrub irrigation is always desirable. However, the rigid structure of bubblers is less suited to massed shrubbery and limits the flexibility needed to maintain and replant shrub beds.

The overall program envisioned for irrigation involves the continuation of existing 4 inch mainlines installed in the first phase of planting. The new 4 inch lines will be extended either to the northeast and northwest ends of Butti Way and preferably would continue along the north side to result in a looped line around the perimeter of the site. This should result in improved pressure, providing adequate service to distant areas, and allowing for future expansion, should that become necessary. Advance planning for future valve wire needs, controller locations, power supply, Rainmaster flow, monitoring constraints and filtration needs, etc. are important design considerations. The mainline must be designed to be compatible with the City's Rainmaster Central Control System.

Irrigation for the Flood Channel Transition Zone, along the west side, may involve a totally different form of supply, such as a series of large pipes located to facilitate basin flooding.

All irrigation construction plans and detailing, shall conform to the current standards of the Carson City and the Parks & Recreation Department and utilize state of the art technology.

Irrigation Key

Existing 4" Mainline

Proposed 4" Mainline

* All Irrigation Design Shall be Coordinated With The Requirements of Carson City's Parks & Recreation Dept.

BUTTI WAY

AIRPORT RD.

FUTURE AIRPORT ROAD

FAIRVIEW DRIVE

HELLS BELLS RD.

HELLS BELLS ROAD

E. FIFTH ST.

Proposed 4" Mainline to loop entire site

Crossings over culverts will be above Creek elevation

Existing end of 4" Mainline Connect with proposed

Existing 4" Mainline

Existing point of connection to reclaimed water line

Existing end of 4" Mainline

N

-50 0 50 100

1" = 300'

LANDSCAPE ARCHITECT
SANDRA J. WENDEL
860 HARION WAY
GARDNERVILLE, NV 89460
(775) 265-4506
NV #301 and CA #2506

E. FIFTH STEET FRONTAGE
MASTER PLAN FOR THE CARSON CITY CORPORATE YARD & WASTEWATER TREATMENT PLANT

DATE FEB. 1, 2007

SCALE 1" = 300'

DRAWN MAL

CHECKED SW

DRAWING TITLE
Irrigation

Figure 17

7 SITE AMENITIES

Furniture selections may vary for different areas of the site. The Public Works development zone will be more suitable for refined, or stylized designs than the open space and park areas. All furniture items shall be reasonably complimentary in terms of design, style, color and/or materials. They shall be consciously placed in response to user needs or requirements. An exhaustive search has not been conducted as part of the scope of this work; therefore the following images are only representative of what will be encouraged for use on the site. All fixtures shall meet staff approval at the time of final design.

- **benches**

Placement of benches should take into consideration shade in the summer, sun access in the winter, wind protection, visual stimulation, and traffic impediments. The Carson City Parks and Recreation Department has preferred bench types that are utilized in all park and open space project work. However, it is recommended that more products with stronger visual quality be considered for gathering areas adjacent to Public Works office development.

Stone Slabs may be considered for use as benches

- **tables**

Tables will likely be utilitarian in nature; but not all eating needs to take place at a table top. Large rock surfaces, such as those illustrated above could be modified for outdoor picnicking.

- **street lighting**

Street lamps unique to this site may be desirable, particularly along Butti Way. Some images of lighting are provided below however all selections must comply with the City's 'Dark Sky' Ordinance.

- **path or accent lighting**

Accent lighting may only be required to provide sufficient illumination along walkways to and from City buildings if nighttime activity is anticipated.

- **feature lighting**

Feature lighting refers to the accent illumination of signage, art, or other areas of special interest.

- **trash receptacles**

Carson City Parks and Recreation Department standards shall be followed for all trash cans since pick up should remain similar to existing routines.

- **bike racks**

- **sculpture/art**

- **signage**

8 APPENDIX

- **soil samples lab analyses (2000)**

Lebanon TURF PRODUCTS
Division of Lebanon Seaboard Corporation

P.O. Box ...
Lebanon ...

Distributor: UHS-UAP/Lebanon #41
875 Marietta Way
Sparks NV 89431

Lebanon Salesman: Jim Jeffers/Lebanon # 41

Client: CARSON CITY PARK/WASTE TRE
3303 BUTTIWAY BL
CARSON CITY NV 89701

Date Reported: 20-Mar-2001

Laboratory Turnaround: < 3 DAYS

Laboratory Sample No.: [illegible]

Information Sheet: 14367

Samples Will Be Stored Until: 19-Apr-01

GRAPHIC SUMMARY OF AVERAGE TEST RESULTS

	Phosphorus	Potassium	Magnesium	Calcium	Sulfur	Zinc	Manganese	Copper	Iron
High	XXXXXX XXXXXX								
Optimum	XXXXXX XXXXXX	XXXXXX XXXXXX XXXXXX	XXXXXX XXXXXX	XXXXXX XXXXXX					
Low			XXXXXX XXXXXX						

	Soil pH	Buffer pH	Soluble Salts	Sodium
Severe Problem	XXXXXX		XXXXXX XXXXXX	XXXXXX
Increasing Problem	XXXXXX		XXXXXX XXXXXX	XXXXXX
Developing Problem	XXXXXX		XXXXXX XXXXXX	XXXXXX
Satisfactory	XXXXXX	XXXXXX	XXXXXX XXXXXX	XXXXXX

OPTIMUM NUTRIENT RANGE

	Phosphorus	Potassium	Magnesium	Calcium	Sulfur	Zinc	Manganese	Copper	Iron
Optimum Range	ppm 1 to	ppm 201 to	ppm 340 to	ppm 2280 to	ppm 7 to	ppm 1.1 to	ppm 9.0 to	ppm 0.8 to	ppm 5.0 to
Level	25	250	480	3800	20	5.0	25	3.0	50

OPTIMUM RANGE

	Soil pH	Buffer pH	Soluble Salts	Sodium
Optimum Range	5.5 to	6.7 to	mmhos/cm 1 to	% 1 to
Level	6.5	7.5	39	4.5

FERTILIZER RECOMMENDATIONS

lbs/1000 sf

Sample ID	Soil Amendments: Lime	Soil Amendments: Gypsum	Soil Amendments: Sulfur
00001			
00002		32.1	
00003		7. 1023.	12
00004		642.3	
00005		16.4	
ADAMS			

Lebanon
TURF PRODUCTS
Division of Lebanon Seaboard Corporation
Distributor

Client: CARSON CITY PARK/WASTE TRE
Lebanon Salesman: Jim Jeffers/Lebanon # 41
UHS-UAP/Lebanon 841

Laboratory #: 252292 - 2

ANALYTICAL DATA

Sample ID #	00001	00002	00003	00004	00005	LADAMS					
SOIL CHARACTERISTICS											
Soil pH	6.4	7.7	8.8	8.5	7.4	7.6					7.7
Buffer pH	7.2										7.2
Soluble Salts mmhos/cm	1.25	0.24	8.80	4.07	0.34	1.07					0.44
Sodium ppm	706	951	7020	4280	266	112					2223
SOIL NUTRIENTS											
P ppm	13	33	9	5	22	206					51
K ppm	85	145	200	151	303	709					266
Mg ppm	47	191	71	91	134	243					130
Ca ppm	2850	5489	5262	2172	2206	3992					3662
S ppm											
Zn ppm											
Mn ppm											
Cu ppm											
Fe ppm											
CEC and PERCENT BASE SATURATION											
CEC	19.1	33.5	37.9	30.6	14.1	24.3					30.9
%K	1.1	1.1	0.9	1.3	5.5	7.5					2.2
%Mg	2.0	4.7	1.0	2.5	7.9	8.3					3.5
%Ca	74.5	81.8	43.4	35.5	78.3	82.2					59.8
%Na	16.0	12.3	52.7	60.8	8.2	12.0					31.2
%H	6.3	0.0	0.0	0.0	0.0	0.0					3.4

Sample 1 – Fairly normal; zinc a little low, common in the arid west

▪ soil samples lab analyses (2006)

BEST APEX

PROFESSIONAL PRODUCTS

16777 HOWLAND ROAD, P.O. BOX 196, LATHROP, CA 95330 • (209) 858-2511 • FAX (209) 858-2519

REPORT NUMBER: 06-124-027

GROWER: CARSON CITY PARKS

SEND TO: UAP-RENO
5355 CAPITOL COURT
RENO, NV 89502

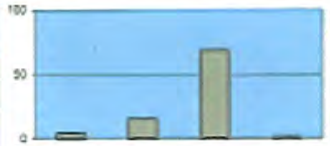
SUBMITTED BY: DAVE

Graphical Soil Analysis Report

DATE OF REPORT: 05/08/06 LAB NO: 55890 SAMPLE ID: 1 PAGE: 1

Analyte	Organic Matter percent	Nitrogen NO_3-N ppm	Phosphorus Weak Bray ppm	Phosphorus $NaHCO_3$-P ppm	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	Sodium Na ppm	Sulfur SO_4-S ppm	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Chloride Cl ppm
Results	2.0	16	40	31	220	253	1847	29	46	0.6	4	21	1.4	1.2	
		LOW		AVERAGE		HIGH									

Percent Cation Saturation (computed)



Potassium K %	Magnesium Mg %	Calcium Ca %	Sodium Na %
4.2	15.5	68.8	0.9
ACIDIC		BASIC	

ECe	CEC	Ex. Lime	pH
0.6	13.4	L	6.3
dS/m	meq/100g		

INCREASING SALINITY →

← INCREASING NEED FOR LIME

Buffer pH: 6.8

Soil Fertility Guidelines

CROP: RATE: NOTES:

Dolomite (70 score)	Lime (70 score)	Gypsum	Elemental Sulfur	Nitrogen N	Phosphate P_2O_5	Potash K_2O	Magnesium Mg	Sulfur SO_4-S	Zinc Zn	Manganese Mn	Iron Fe	Copper Cu	Boron B	

COMMENTS

Mike Buttress, CPAg
A & L WESTERN LABORATORIES, INC.

Sample 2 – pH is high; recommend addition of elemental sulfur & gypsum at 100 lbs/1000 s.f.. Insure for good drainage.

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REPORT NUMBER: 06-124-027

GROWER: CARSON CITY PARKS

SEND TO: UAP-RENO
5355 CAPITOL COURT
RENO, NV 89502

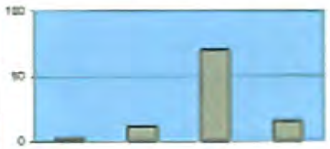
SUBMITTED BY: DAVE

Graphical Soil Analysis Report

DATE OF REPORT: 05/08/06 LAB NO: 55891 SAMPLE ID: 2 PAGE: 2

Analyte	Organic Matter percent	Nitrogen NO_3-N ppm	Phosphorus Weak Bray ppm	Phosphorus $NaHCO_3$-P ppm	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	Sodium Na ppm	Sulfur SO_4-S ppm	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Chloride Cl ppm
Results	0.8	7	20	18	85	129	1298	335	99	0.4	2	7	0.5	1.0	
			LOW	AVERAGE	HIGH										

Percent Cation Saturation (computed)



Potassium K %	Magnesium Mg %	Calcium Ca %	Sodium Na %
2.4	11.5	70.3	15.8

ACIDIC BASIC

1.6 EC@ dS/m — INCREASING SALINITY →

9.2 CEC meq/100g

L Ex. Lime

7.7 pH

← INCREASING NEED FOR LIME

Buffer pH:

Weak Bray P unreliable at M or H excess lime or pH > 7.5

Soil Fertility Guidelines

CROP: RATE: NOTES:

Dolomite (70 score)	Lime (70 score)	Gypsum	Elemental Sulfur	Nitrogen N	Phosphate P_2O_5	Potash K_2O	Magnesium Mg	Sulfur SO_4-S	Zinc Zn	Manganese Mn	Iron Fe	Copper Cu	Boron B	

COMMENTS

Mike Buttress, CPAg
A & L WESTERN LABORATORIES, INC.

Sample 3 – Needs a trace element pack, including zinc, manganese, iron and copper (no boron). A small amount of sulfur (standard practice of 5 lbs./ 1000 s.f.) may be applied every 6-8 weeks during the irrigation season.

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RENO, NV 89502

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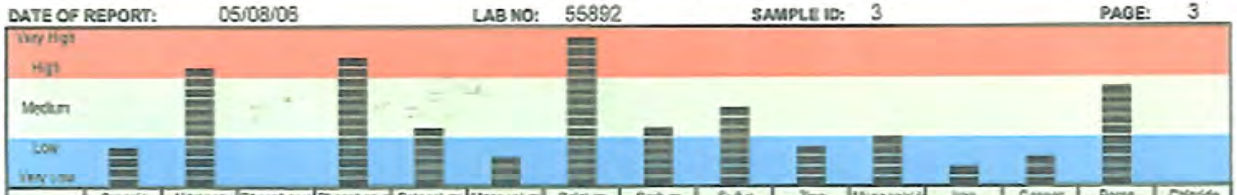
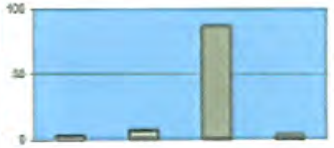
Graphical Soil Analysis Report

DATE OF REPORT: 05/08/06 LAB NO: 55892 SAMPLE ID: 3 PAGE: 3



Analyte	Organic Matter percent	Nitrogen NO_3-N ppm	Phosphorus Weak Bray ppm	Phosphorus $NaHCO_3$-P ppm	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	Sodium Na ppm	Sulfur SO_4-S ppm	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Chloride Cl ppm
Results	1.7	40	41	40	126	86	1923	89	20	0.9	3	4	0.5	1.4	
		LOW	AVERAGE		HIGH										

Percent Cation Saturation (computed)



Potassium K %	Magnesium Mg %	Calcium Ca %	Sodium Na %
2.9	7.1	86.5	3.5
		BASIC	

ACIDIC

ECe dS/m	CEC meq/100g	Ex. Lime	pH
1.4	11.1	H	7.8

INCREASING SALINITY →

← INCREASING NEED FOR LIME

Buffer pH:

Weak Bray P unreliable at M or H excess line or pH > 7.5

Soil Fertility Guidelines

CROP: RATE: NOTES:

Dolomite (70 score)	Lime (70 score)	Gypsum	Elemental Sulfur	Nitrogen N	Phosphate P_2O_5	Potash K_2O	Magnesium Mg	Sulfur SO_4-S	Zinc Zn	Manganese Mn	Iron Fe	Copper Cu	Boron B	

COMMENTS

Mike Buttress, CPAg
A & L WESTERN LABORATORIES, INC.

Sample 4 – pH level is good; salt level good. Need nitrogen and sulfur; trace elements are borderline.

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REPORT NUMBER: 06-124-027

GROWER: CARSON CITY PARKS

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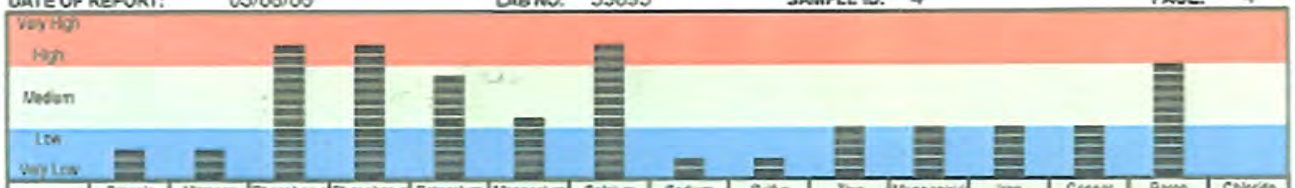
SUBMITTED BY: DAVE

Graphical Soil Analysis Report

DATE OF REPORT: 05/08/06 LAB NO: 55893 SAMPLE ID: 4 PAGE: 4



Analyte	Organic Matter	Nitrogen NO_3-N	Phosphorus Weak Bray	Phosphorus $NaHCO_3$-P	Potassium K	Magnesium Mg	Calcium Ca	Sodium Na	Sulfur SO_4-S	Zinc Zn	Manganese Mn	Iron Fe	Copper Cu	Boron B	Chloride Cl
	percent	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Results	1.2	8	40	30	118	67	733	17	5	1.0	3	10	0.8	1.5	
		LOW	AVERAGE	HIGH											

Percent Cation Saturation (computed)

Potassium K %	Magnesium Mg %	Calcium Ca %	Sodium Na %
6.6	12.1	79.8	1.6

ACIDIC BASIC

0.4	4.6	L	7.0
ECe dS/m	CEC meq/100g	Ex. Lime	pH

INCREASING SALINITY →

← INCREASING NEED FOR LIME

Buffer pH:

Soil Fertility Guidelines

CROP: RATE: NOTES:

Dolomite (70 score)	Lime (70 score)	Gypsum	Elemental Sulfur	Nitrogen N	Phosphate P_2O_5	Potash K_2O	Magnesium Mg	Sulfur SO_4-S	Zinc Zn	Manganese Mn	Iron Fe	Copper Cu	Boron B	

COMMENTS

Mike Buttress, CPAg
A & L WESTERN LABORATORIES, INC.

Sample 5 – pH is ok, salt levels ok. Recommend trace element package. Desirable to have calcium above 60% and magnesium 12-15%.

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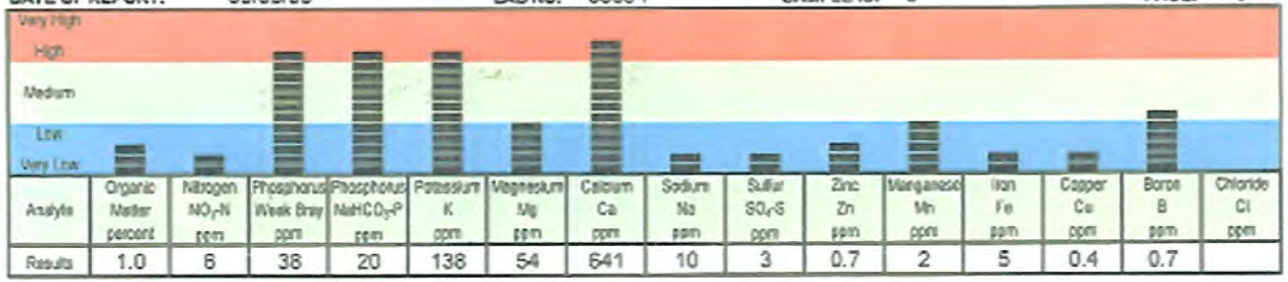
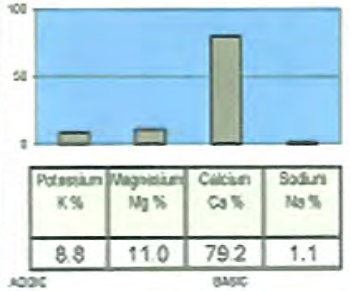
Graphical Soil Analysis Report

DATE OF REPORT: 05/08/06 LAB NO: 55894 SAMPLE ID: 5 PAGE: 5



Analyte	Organic Matter percent	Nitrogen NO_3-N ppm	Phosphorus Week Bray ppm	Phosphorus $NaHCO_3$-P ppm	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	Sodium Na ppm	Sulfur SO_4-S ppm	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Chloride Cl ppm
Results	1.0	6	38	20	138	54	641	10	3	0.7	2	5	0.4	0.7	
		LOW	AVERAGE	HIGH											



Potassium K %	Magnesium Mg %	Calcium Ca %	Sodium Na %
8.8	11.0	79.2	1.1
		ACIDIC	BASIC

0.3 ECe 65m — INCREASING SALINITY →

4.0 CEC meq/100g

L Ex. Lime

7.2 pH — ← INCREASING NEED FOR LIME

Buffer pH:

Soil Fertility Guidelines

CROP: RATE: NOTES:

Dolomite (70 score)	Lime (70 score)	Gypsum	Elemental Sulfur	Nitrogen N	Phosphate P_2O_5	Potash K_2O	Magnesium Mg	Sulfur SO_4-S	Zinc Zn	Manganese Mn	Iron Fe	Copper Cu	Boron B	

COMMENTS

Mike Buttress, CPAg
A & L WESTERN LABORATORIES, INC.

Sample 6– Magnesium is low. Add magnesium sulfate; will help pH too. Reapplication is usually needed. Re-test soil annually.

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REPORT NUMBER: 06-124-027

GROWER: CARSON CITY PARKS

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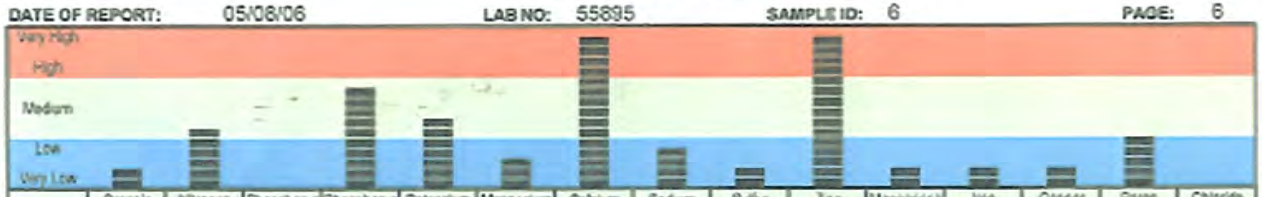
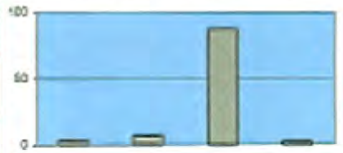
Graphical Soil Analysis Report

DATE OF REPORT: 05/08/06 LAB NO: 55895 SAMPLE ID: 6 PAGE: 6



Analyte	Organic Matter percent	Nitrogen NO_3-N ppm	Phosphorus Weak Bray ppm	Phosphorus $NaHCO_3$-P ppm	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	Sodium Na ppm	Sulfur SO_4-S ppm	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Chloride Cl ppm
Results	0.9	16	22	14	58	39	788	26	3	11.9	1	3	0.4	0.6	
		LOW		MARGINAL	HIGH										

Percent Cation Saturation (computed)



Potassium K %	Magnesium Mg %	Calcium Ca %	Sodium Na %
3.3	7.2	87.0	2.5
		BASIC	

ACIDIC

0.5 ECe dS/m — INCREASING SALINITY →

4.5 CEC meq/100g

H Ex. Lime

7.6 pH ← INCREASING NEED FOR LIME

Buffer pH:

Weak Bray P unreliable at M or H excess lime or pH > 7.5

Soil Fertility Guidelines

CROP: RATE: NOTES:

Dolomite (70 score)	Lime (70 score)	Gypsum	Elemental Sulfur	Nitrogen N	Phosphate P_2O_5	Potash K_2O	Magnesium Mg	Sulfur SO_4-S	Zinc Zn	Manganese Mn	Iron Fe	Copper Cu	Boron B	

COMMENTS

Mike Buttress, CPAg
A & L WESTERN LABORATORIES, INC.

Sample 7 – Nitrogen is low; pH is high. Apply elemental sulfur at a rate of 5 lbs./ 1000 s.f. every 6-8 weeks. Apply a trace elements pack.

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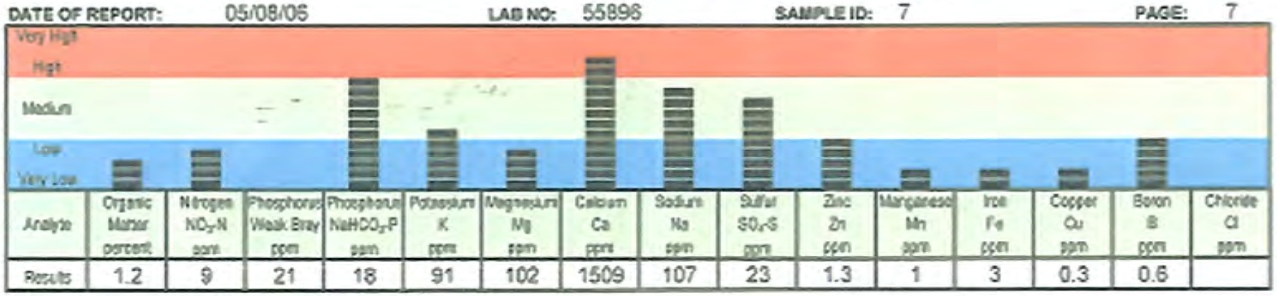
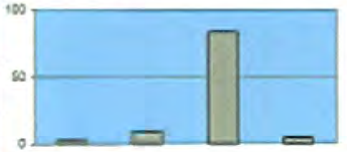
Graphical Soil Analysis Report

DATE OF REPORT: 05/08/06 LAB NO: 55896 SAMPLE ID: 7 PAGE: 7



Analyte	Organic Matter percent	Nitrogen NO_3-N ppm	Phosphorus Weak Bray ppm	Phosphorus $NaHCO_3$-P ppm	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	Sodium Na ppm	Sulfur SO_4-S ppm	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Chloride Cl ppm
Results	1.2	9	21	18	91	102	1509	107	23	1.3	1	3	0.3	0.6	
		LOW	AVERAGE		HIGH										

Percent Cation Saturation (computed)



Potassium K %	Magnesium Mg %	Calcium Ca %	Sodium Na %
2.6	9.2	83.1	5.1
ACIDIC		BASIC	

0.9 ECe dS/m — INCREASING SALINITY →

9.1 CEC meq/100g

H Ex. Lime

8.1 pH ← INCREASING NEED FOR LIME

Buffer pH:

Weak Bray P unreliable at M or H excess lime or pH > 7.5

Soil Fertility Guidelines

CROP: RATE: NOTES:

Dolomite (70 score)	Lime (70 score)	Gypsum	Elemental Sulfur	Nitrogen N	Phosphate P_2O_5	Potash K_2O	Magnesium Mg	Sulfur SO_4-S	Zinc Zn	Manganese Mn	Iron Fe	Copper Cu	Boron B	

COMMENTS

Mike Buttress, CPAg
A & L WESTERN LABORATORIES, INC.

- **reclaimed water quality test (2000)**

Carson City Wastewater Reclamation Plant
Water Quality Profile
September 26, 2000

Parameters	Values	Limits
pH Value, S.U.	7.46	6.5 - 8.5
Electrical Conductivity, umhos/cm	924	
Total Dissolved Solids (TDS), mg/L	580	500-1000
Alkalinity (Carb), mg CaC03/L	0	
Alkalinity (Bicarb), mg CaC03/L	225	
Calcium (Ca), mg/L	44.7	
Magnesium (Mg), mg/L	6.69	125-150
Potassium (K), mg/L	13.3	
Sodium (Na), mg/L	104	
Sodium Absorption Ratio (SAR)	3.83	
Chloride (Cl-), mg/L	80	250-500
Fluoride (F-), mg/L	0.92	2
Sulfate (S04-), mg/L	111	250
Arsenic (As), mg/L	0.007	0.05
Cadmium (Cd), mg/L	<0.1	0.01
Chromium (Cr), mg/L	<0.1	0.05
Copper (Cu), mg/L	<0.1	1
Iron (Fe), mg/L	0.12	0.3-0.6
Lead (Pb), mg/L	<0.1	0.05
Manganese (Mn), mg/L	<0.1	0.05-0.10
Nickel (Ni), mg/L	<0.1	
Selenium (Se), mg/L	<0.002	0.01
Zinc (Zn), mg/L	<0.1	5
Aluminum (Al), mg/L	<0.05	
Boron (B), mg/L	0.39	