



Native Grassland
Restoration Plan for the
Castlerock Project
City of San Diego
Project No. 10046

Prepared for

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~~February 10, 2012~~ August 23, 2012

A handwritten signature in blue ink, appearing to read "Gerry Scheid".

Gerry Scheid, Senior Biologist

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1.0 Introduction

This restoration plan describes the implementation guidelines, maintenance tasks, and monitoring methodologies through which native grassland habitat can be restored on-site for the proposed Castlerock development as part of the Multiple Habitat Planning Area (MHPA) boundary line adjustment. Upon completion, this program will satisfy conditions imposed by the City of San Diego, U.S. Fish and Wildlife Service, and California Department of Fish and Game on Castlerock with respect to the restoration of native grassland areas within the MHPA.

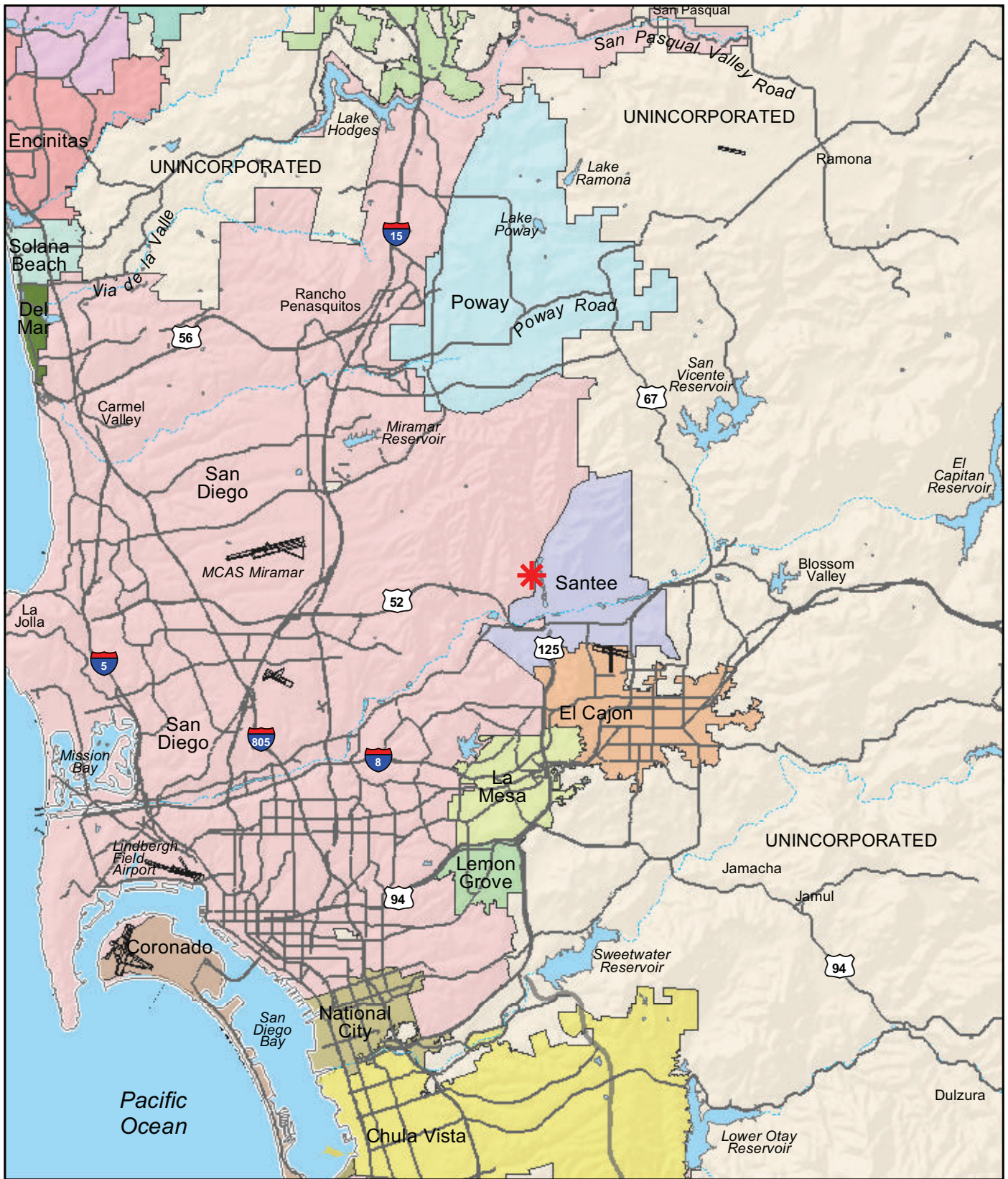
The Castlerock project site is located in the eastern portion of the city of San Diego within the city of San Diego and within the East Elliott Community Planning Area (Figures 1 and 2). Because the project site is located adjacent to the city of Santee's western boundary and Santee could provide services to the proposed project detachment from the City of San Diego, an annexation of the project site to the City of Santee ("reorganization") is being proposed as one of the project scenarios (the Annexation Scenario). The project could also be developed in the city of San Diego without its annexation to the City of Santee, with either San Diego providing all municipal services or most municipal services with an out-of-service agreement for water and sewer service from Padre Dam Municipal Water District (PDMWD) (No Annexation Scenario).

The Annexation Scenario would result in the construction of 283 detached single-family residences, 147 single-family detached units clustered on larger lots, approximately 4.0 acres (gross) of public parks, 0.64 acre (0.49 acre usable) of pocket parks, a pedestrian trail, and public streets and private driveways on the project site. The remainder of the property (94.92 acres) would be undisturbed as MHPA open space.

The No Annexation Scenario would involve slight changes in the land uses with 282 detached single-family residences, 140 single-family detached small lot units, approximately 4.0 acres (3.0 acres usable) of public parks, 0.50 acre (0.39 acre usable) of pocket parks, a pedestrian trail, public streets and private driveways, and 94.73 acres of MHPA open space.

1.1 Subregional Planning Context

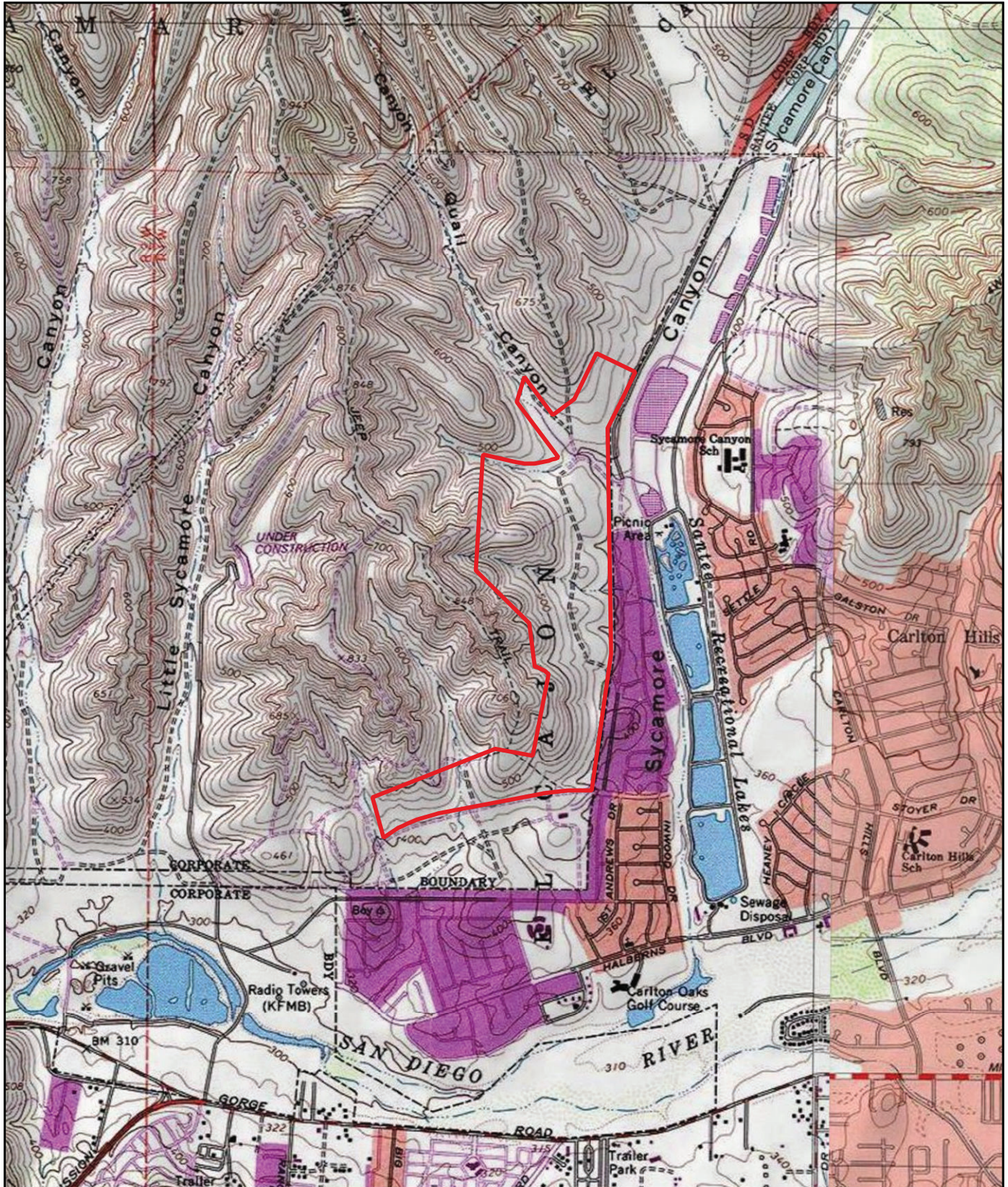
The Castlerock project site falls partially within the MHPA. Project approval would adjust the boundary of the MHPA along the western edge of the project. The MHPA boundary adjustment analysis concluded that an equal amount of land would be deleted from and added to the MHPA by the proposed land exchange; however, the habitat equivalency for coastal sage scrub will be in deficit. The restoration of surplus non-native grassland



 Project Location

FIGURE 1

Regional Location



 Project Boundary

FIGURE 2

Project Location on USGS Map



to native grassland within areas added to the MHPA will compensate for the coastal sage scrub deficit by creating Tier I habitat (native grassland) to replace Tier II habitat (coastal sage scrub).

1.2 Responsibilities

1.2.1 Property Owner

The party financially responsible for this restoration project is:

Pardee Homes
6025 Edgewood Bend Court
San Diego, CA 92130
Contact: Jimmy Ayala

The owner will be responsible for contracting with personnel qualified in implementation, maintenance, and monitoring of restoration sites and practices described in this plan. Upon contracting with a qualified person or organization to implement this plan, the owner will designate a person or group as the Principal Restoration Specialist.

1.2.2 Habitat Restoration Specialist

The Habitat Restoration Specialist must have a minimum of five years of experience in upland restoration. The Habitat Restoration Specialist must understand upland plant communities and have expertise in plant and wildlife identification and ecology. The Habitat Restoration Specialist should be retained during habitat restoration to perform the following tasks and be responsible for implementing the restoration plan in accordance with its specifications:

- Coordinate and monitor restoration site preparation and salvaged plant translocation.
- Oversee the installation and maintenance of the habitat restoration areas as defined herein.

1.2.3 Plant Supplier

The Plant Supplier must have at least two years of experience in propagating native plants for upland restoration projects. The Plant Supplier's tasks would be:

- Produce properly aged plants (roots filling pots, but not root-bound) in specified pot sizes ready for outplanting.

- Produce plants from seed collected on or adjacent to the site and inoculated with mycorrhizae.
- Deliver healthy plants to the restoration site.

1.2.4 Seed Supplier

The Seed Supplier must have at least two years of experience collecting native grassland seeds for upland restoration projects and would:

- Collect only species specified or approved by the Habitat Restoration Specialist.
- Collect seeds on-site or within 10 miles of Castlerock development site, if approved by the Habitat Restoration Specialist.
- Collect seed only on legally accessible lands.
- Supply weed-free (pure) seed.

1.2.5 Monitoring Biologist

The Monitoring Biologist may be the Habitat Restoration Specialist or a biologist with a minimum of two years of experience in upland habitat restoration monitoring. The Monitoring Biologist must understand upland plant communities and have expertise in upland plant and wildlife identification and ecology. The monitoring biologist would:

- Oversee and perform the required monitoring and reporting in accordance with the procedures established in this plan.

2.0 Existing Conditions and MHPA Boundary Line Adjustment Native Grassland Requirements

The project site consists primarily of rolling terrain of slopes and ridges, generally rising in elevation from east to west and also from south to north on the associated ridges. Elevations within the proposed development area range from approximately 376 feet above mean sea level (MSL) at the southeastern corner of the site to approximately 678 feet above MSL on the nearby adjacent slopes immediately to the northwest.

The project site lies within the southeast corner of the former Camp Elliott, a former Marine Corps training facility that was active in the 1940s and 1950s. Historical records show that portions of Camp Elliott were used for a firing range and a tank course.

A network of unimproved dirt trails and roads resulting from off-road vehicle activity exists on-site. Several seasonal drainages flow generally south and southeastward, into Sycamore Creek located along the eastern boundary, and eventually into the San Diego River, to the south. Two earthen dams are located at the northern and eastern portions of the property at canyon openings. Water is retained behind the northernmost dam.

Several biological communities exist on-site including vernal pools, wetlands, emergent wetland, coastal and valley freshwater marsh, native grasslands, disturbed coastal sage scrub, coastal sage scrub, non-native grasslands, and eucalyptus woodlands (Figure 3). The majority of the project site is vegetated with annual grassland consisting of a mixture of native and non-native grassland components. In places, this is intermixed with low and sparse coastal sage scrub. Diegan coastal sage scrub occurs within the southern, western, and northern portions of the site. Other on-site sensitive biological resources include vernal pools located within the Diegan coastal sage scrub and non-native grassland. The Cedar Fire, which took place during late October and early November 2003, burned the vast majority of the project site.

Implementation of the proposed project would require an adjustment to the adopted MHPA boundary as shown on Figure 4. This adjustment would remove areas related to project design refinements and landslide remediation, creation of a vernal pool preserve and connection to the MHPA, and allow the siting of a public park. All areas that are removed from or added to the MHPA are immediately adjacent to areas designated for development.

The basic requirement for any adjustment to the MHPA boundary is that the adjustment would result in a preserve that is functionally equivalent to the adopted MHPA. This is evaluated through the MHPA equivalency analysis. As detailed in the MHPA analysis below, the proposed MHPA boundary line adjustment would potentially result in a reduction of coastal sage scrub and non-native grassland within the MHPA. Coordination between the City of San Diego, U.S. Fish and Wildlife Service (USFWS), and California Department of Fish and Game (CDFG) regarding the equivalency analysis resulted in the acceptance of restoration of non-native grasslands to Tier I native grasslands within the MHPA to compensate for the loss of Tier II coastal sage scrub habitat.

A total of approximately 4.8 acres of non-native grassland (Tier IIIB) is available for restoration to native grassland (Tier I) within the lands to be added to the MHPA by the proposed boundary line adjustment. To ensure no loss of functionally equivalent habitat, the No Annexation project would restore 2.79 acres of the Tier IIIB habitat to Tier I habitat. Therefore, the total native grassland (Tier I) would total 3.42 acres after restoration and would compensate for the deficit of coastal sage scrub habitat (Tier II), resulting in equal or better habitat within the MHPA under the Annexation Scenario. The proposed increase in native grassland in the MHPA would increase foraging area for raptors, grasshopper sparrows (*Ammodramus savannarum*), and other grassland-dependent species and further compensate for the functional loss of the 0.22 acre of

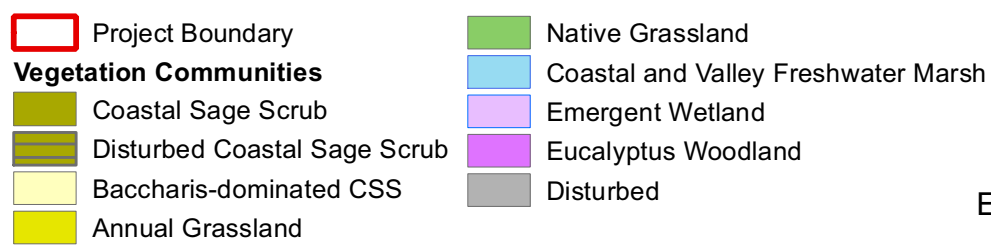
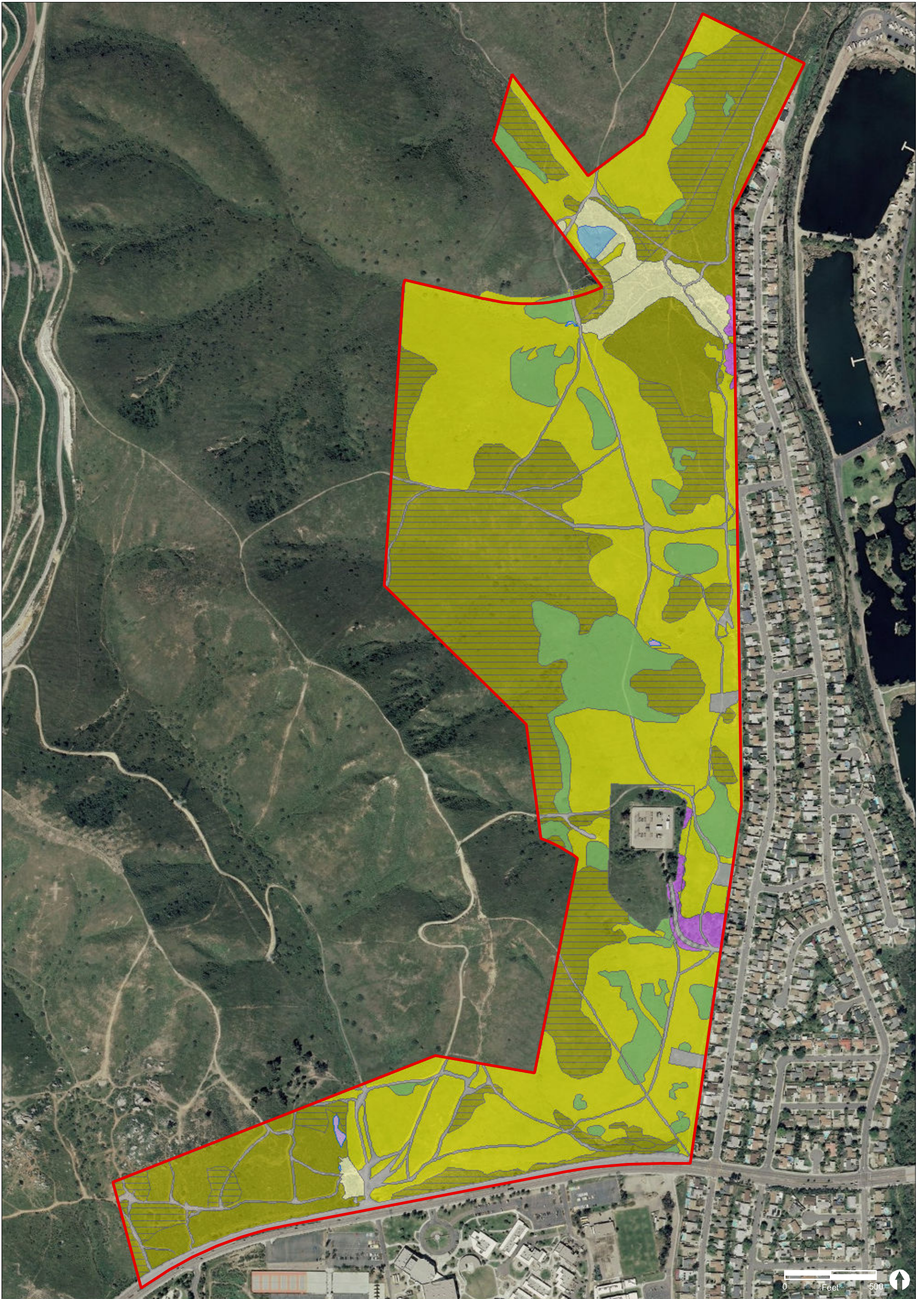
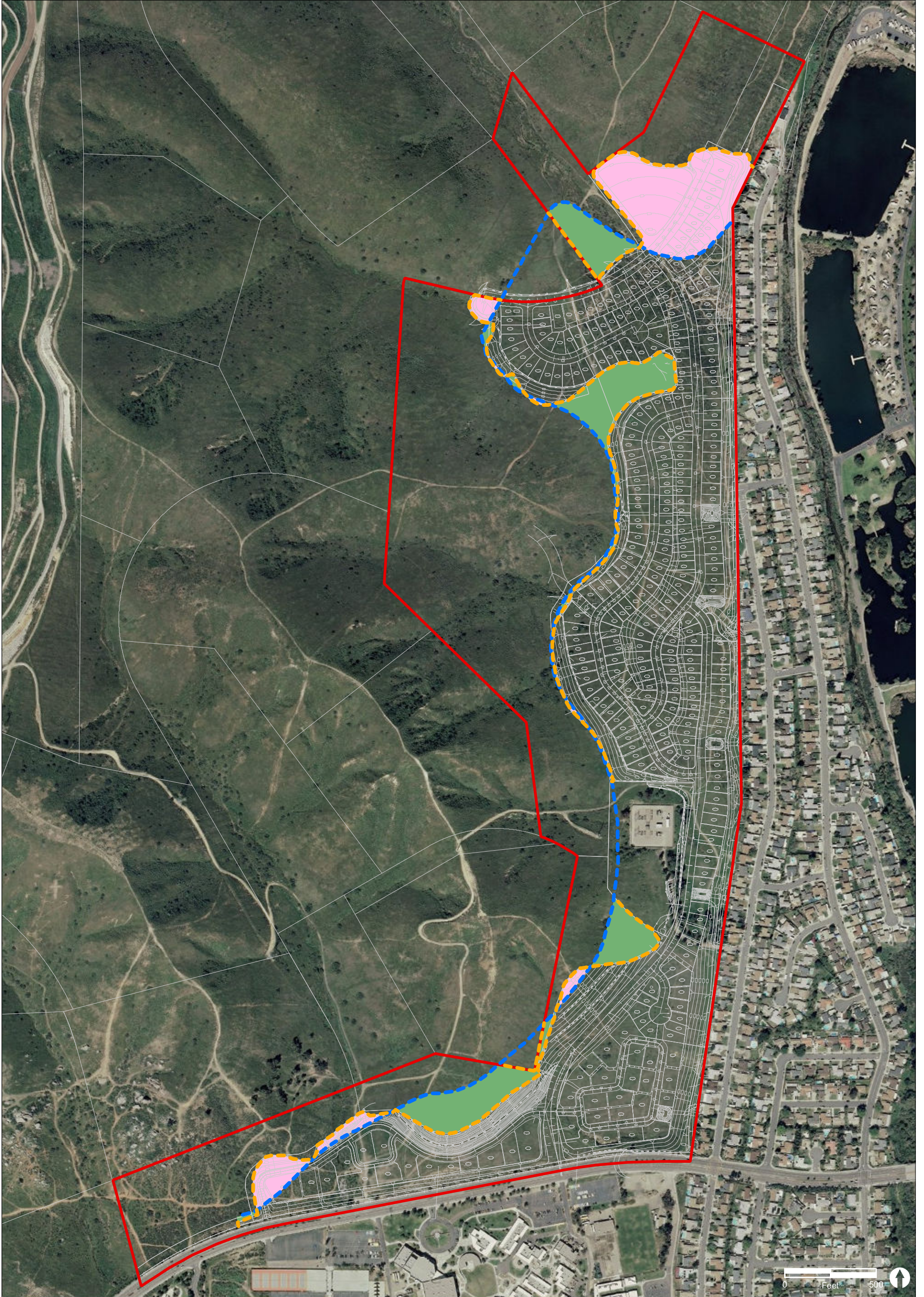


FIGURE 3

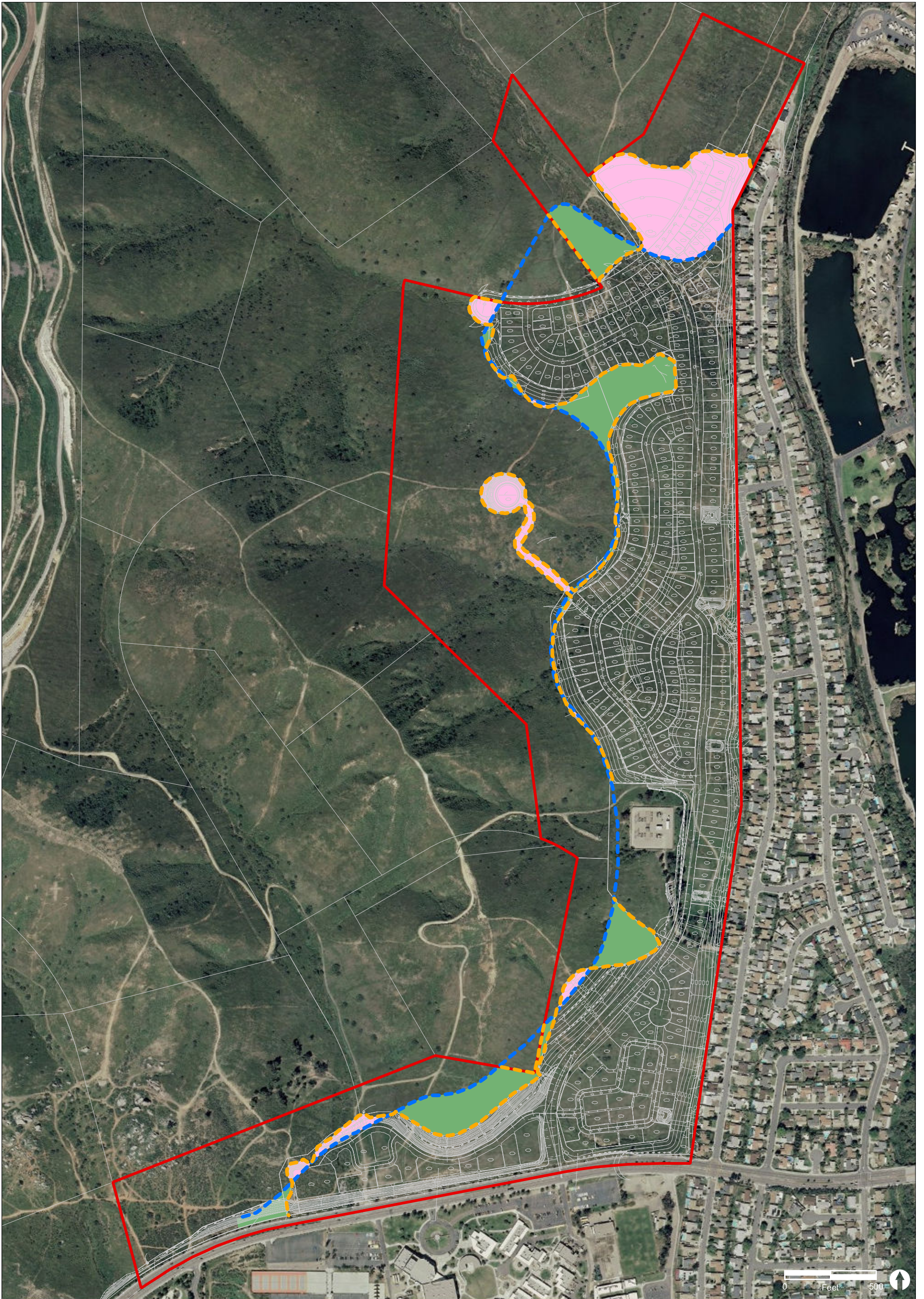
Existing Vegetation Communities and Land Cover Types



- Project Boundary
- Project Plan Lines
- Proposed MHPA
- Existing MHPA
- Proposed MHPA Addition
- Proposed MHPA Subtraction

FIGURE 4a

Location of MHPA Boundary Line Adjustment
Annexation Alternative



- Project Boundary
- Plan Lines
- Proposed MHPA
- Existing MHPA
- Proposed MHPA Addition
- Proposed MHPA Subtraction

FIGURE 4b

Location of MHPA Boundary Line Adjustment
No Annexation Alternative

non-native grassland from the MHPA that would occur under the Annexation Scenario after mitigation.

Under the Annexation Scenario, the project would restore 2.83 acres of non-native grassland (Tier IIIB) to native grassland (Tier I) to ensure no loss of functionally equivalent habitat. With restoration, the total native grassland (Tier I) would total 3.45 acres after restoration and would compensate for the deficit of coastal sage scrub (Tier II), resulting in equal or better habitat within the MHPA under the No Annexation Scenario. The proposed increase in native grassland in the MHPA would increase foraging area for raptors, grasshopper sparrows (*Ammodramus savannarum*), and other grassland-dependent species and further compensate for the functional loss of the 0.21 acre of non-native grassland from the MHPA that would occur under the No Annexation Scenario after mitigation.

3.0 Restoration Goals

The purpose of this habitat restoration plan is to provide the guidelines for the successful restoration of native grassland. The specific criteria for vegetation cover and diversity described in this plan will be determined by sampling reference sites located in and around the MHPA near the project site. The MHPA boundary line adjustment analysis determined that 2.79 acres of non-native grassland needs to be restored to native grassland under the Annexation Scenario and 2.83 acres of Non-native grassland needs to be restored under the No Annexation Scenario.

This restoration program is designed to create a diverse composition of native plant species which resembles the reference sites in terms of cover and diversity. Selection of appropriate reference sites will be determined by the Habitat Restoration Specialist. The reference sites will be sampled prior to mitigation implementation to compile baseline data that will be used to develop success criteria for this native grassland mitigation program.

Details regarding site preparation, weed control, seed collection, plant salvage, plant production, irrigation, and implementation scheduling are described below.

4.0 Description of the Proposed Restoration Sites

The native grassland restoration areas are located within existing and proposed open space areas on the Castlerock project site within the adjacent MHPA lands (Figure 5).

4.1 Location and Existing Conditions of Restoration Sites

Approximately 2.79 acres of non-native grassland will be restored to native grassland on Castlerock under the Annexation Scenario and 2.83 acres under the No Annexation Scenario. The location of these restoration areas are along the western edge of the development footprint within lands proposed for addition to the MHPA (see Figure 5). The non-native grasslands at these locations are dominated by introduced Mediterranean grasses of several species consisting primarily of wild oats (*Avena* sp.) and bromes (*Bromus* spp.). Also present are herbaceous plants such as fascicled tarplant (*Hemizonia fasciculata*), black mustard (*Brassica nigra*), prickly lettuce (*Lactuca serriola*), and tocalote (*Centaurea melitensis*). Non-native grasslands occur throughout southern California.

4.2 Ownership Status

The restoration areas at Castlerock are on lands under the ownership of Pardee. The MHPA lands would be dedicated to the City of San Diego upon successful completion of the habitat mitigation.

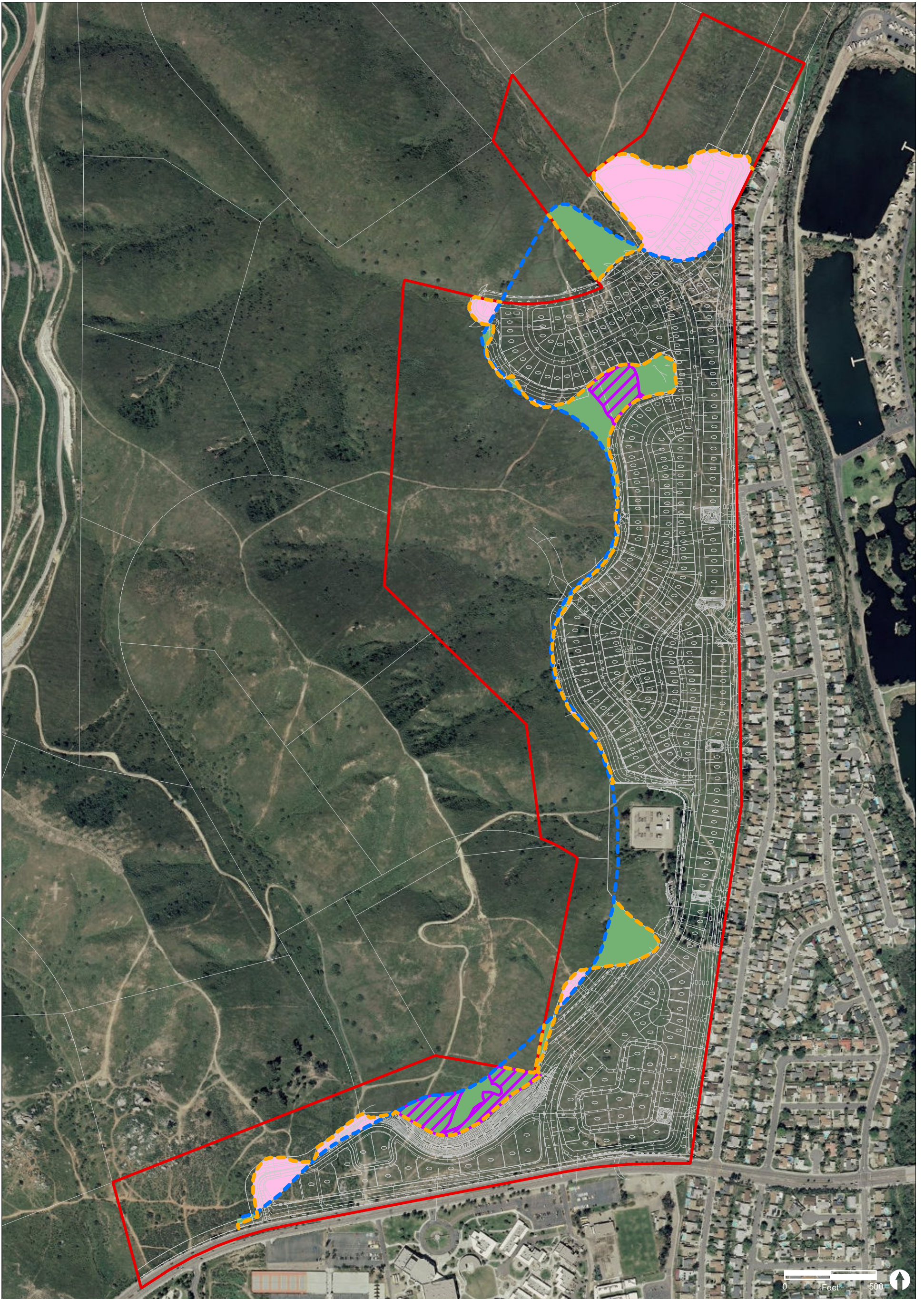
5.0 Implementation Plan

5.1 Native Grassland Restoration

The proposed restoration areas were likely once dominated by native perennial bunchgrasses and annual herbs based on the presence of clay soils. Native grasses and other grassland species will be planted throughout this area and exotic weeds will be removed.

The restoration of native grassland will be accomplished primarily through the use of container plants, with some supplemental seeding. Table 1 lists species that will be installed as containers. Species other than those listed in Table 1 may be included if soil conditions are determined to be appropriate by the Monitoring Biologist and if seeds or other propagules are available from nearby open space. Table 2 lists species that will be introduced through hand seeding after weeds are under control.

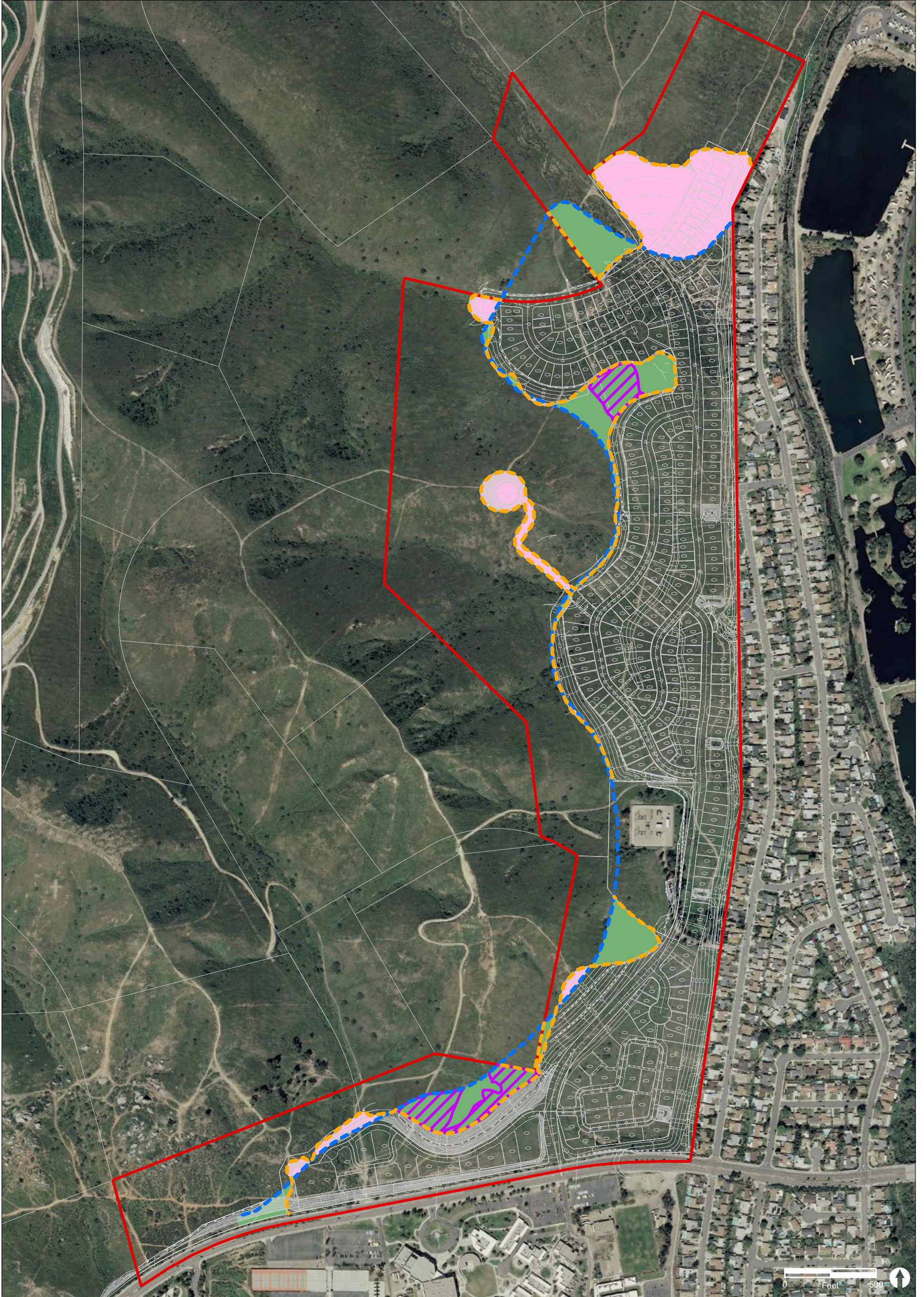
Native species will be planted in an arrangement that will approximate the natural distribution and cover of plants similar to the reference sites of native grassland. The restored grassland will be a purple needlegrass (*Nassella pulchra*)- and foothill needlegrass (*N. lepida*)-dominated community with native shrubs, and annual and



- Project Boundary
- Project Plan Lines
- Proposed MHPA
- Existing MHPA
- Proposed MHPA Addition
- Proposed MHPA Subtraction
- Native Grassland Restoration Area

FIGURE 5a

Location of Native Grassland Restoration Areas
Annexation Alternative



- Project Boundary
- Plan Lines
- Proposed MHPA
- Existing MHPA
- Proposed MHPA Addition
- Proposed MHPA Subtraction
- Native Grassland Restoration Area

FIGURE 5b

Location of Native Grassland Restoration Areas
No Annexation Alternative

perennial herbs such as bulbs. The restored grassland will be representative of native grassland in the area.

5.2 Rationale for Expecting Implementation Success

Evaluation of the rationale for expecting success of the native grassland restoration effort is dependent on the following factors: site selection, site preparation, and maintenance and monitoring. The grassland restoration sites at Castlerock were selected because they likely supported patches of native perennial grasslands in the past. The native clay soils needed for successful establishment of grasslands are more or less intact at these sites. The soils at the grassland restoration sites are composed of Diablo–Olivenhain complex. This complex is a mixture of clay and cobbly loam soils.

**TABLE 1
 CONTAINER PLANT DENSITIES FOR NATIVE GRASSLAND RESTORATION**

Species	Size	Density (plants/acre)
<i>Aristida purpurea</i> Purple three-awn	Rose pots	50
<i>Bothriochloa barbinodis</i> Cane bluestem	Rose pots	50
<i>Nassella pulchra</i> Purple needlegrass	Rose pots	1,500
<i>Nassella lepida</i> Foothill needlegrass	Rose pots	500
<i>Melica imperfecta</i> Coast Range melic	Rose pots	100
<i>Adolphia californica</i> California adolphia	1-gallon	25
<i>Rhamnus crocea</i> Foothill needlegrass	Rose pots	25
<i>Ferocactus viridescens</i> Coast barrel cactus	Salvaged	TBD
<i>Cylindropuntia prolifera</i> Coastal cholla	Branch-joints	TBD
<i>Dudleya variegata</i> Variegated dudleya	Salvaged	TBD
<i>Sisyrinchium bellum</i> Blue-eyed-grass	4-inch	100
TOTAL		1850+

NOTE: These recommendations are guidelines that may be changed due to a variety of circumstances, including changes to reflect the reference area monitoring data. Availability of salvaged coast barrel cactus and variegated dudleya is dependent on how many are recovered in the field.

TABLE 2
NATIVE GRASSLAND SUPPLEMENTAL SEED MIX

Common Name/Scientific Name
<i>Lasthenia californica</i> Goldfields
<i>Hemizonia fasciculata</i> Fascicled tarplant
<i>Grindelia camporum</i> Gumplant
<i>Muhlenbergia microsperma</i> Littleseed muhly
<i>Chaenactis gabriuscula</i> Pincushion flower

These types of soils are suitable to support native perennial grassland species. The restoration areas are also immediately adjacent to existing Diegan coastal sage scrub and native and non-native grasslands, which will facilitate wildlife use.

Based on soils, topography, and the presence of native grassland patches, it has been determined that with the proper implementation of the site preparation, maintenance, and monitoring guidelines given in this restoration plan the native grassland restoration sites will support the target vegetation community. Therefore, the overall ecological character of the sites is supportive of the restoration of native grassland.

5.3 Site Preparation

The native grassland restoration sites are dominated by invasive exotic species. The first step of the restoration program is to remove these non-native plants. The sites will first be dethatched using weed whips, which involves cutting the vegetative thatch material. Maintenance personnel will be individuals that are trained to recognize native and non-native species. The cut material will be raked into piles, collected, removed from site and then deposited at a landfill. After the rainy season has begun, herbicide will be used to spray newly germinated non-native species. The site will be monitored frequently and herbicide applications will be scheduled as needed to control non-native plants. Newly germinated non-native plant seedlings will require herbicide treatments before they reach six inches in height or before flowering (especially important for smaller species), whichever occurs first.

5.4 Plant Propagation

5.4.1 Seed Collection

Native seed collection will commence as soon as possible and will continue for the first three years of the maintenance and monitoring period. Native seed for the mitigation program will be collected in and around the Castlerock project site, as directed by the Monitoring Biologist. Seed collection areas will be limited to a five-mile radius around the project site. Seeds will be used to propagate plants in containers and for hand broadcasting onto restoration sites. Seeds will be collected from the target species listed in Tables 1 and 2.

5.4.2 Salvaged Plants

If the timing of project impacts coincides with the cool winter season, the following species may be salvaged: purple needlegrass, foothill needlegrass, and bulb species, such as wavy-leaved soap plant (*Chlorogalum pomeridianum*). Salvaged species will be immediately planted in the prepared mitigation site.

Other plant species being salvaged as part of the project include variegated dudleya (*Dudleya variegata*), San Diego goldenstar (~~*Mulla*~~ *Bloomeria clevelandii*), and coast barrel cactus (*Ferocactus viridescens*). Salvaged variegated dudleya and coastal barrel cactus will be included in the native grassland restoration areas. San Diego goldenstar will be transplanted in other parts of the open space.

5.4.3 Container Stock

Grassland species, propagated from locally collected seed (see Tables 1 and 2), will be planted at the restoration sites after they have been dethatched and non-native plant reestablishment controlled. Container plants will be installed during the winter season, after rains have begun. Plants will be grown at a reputable native plant nursery. A minimum of six months will be needed to grow the plants to an adequate size for installation.

Native soil will be used in the containers, if available. The native soil provides arbuscular mycorrhizae (fungi) and other micro-organisms that enhance native plant growth. Commercial soil mixes with high nutrient levels tend to produce healthy looking plants, but may inhibit root growth, which can be detrimental to the plant once in the field.

5.4.4 Seed Application

Since the restoration sites are dominated by non-native plants, we do not recommend that seed be applied to the restoration sites during the two first years. Intensive weeding efforts will be needed to eradicate non-native grasses and herbs. Weeding is more efficient when native seedlings are not present in the first two seasons. After weeds are under control (in Year 3) and the salvaged and container plants have been installed, hand seeding of locally collected annuals and herbaceous perennials will be done to increase diversity. Species to be hand seeded after weeds are controlled are included in Table 2.

5.5 Planting Schedule

Site preparation of the mitigation areas should be completed by late October of the implementation year so that the restoration sites will be ready for planting during the winter season. Planting will be scheduled to take advantage of the winter and spring rains. Planting when moisture conditions are good ensures a higher survivorship of container stock. The plants will be watered thoroughly upon installation. Containers will be planted to mimic a natural distribution, with variations in planting patterns. Final locations will be determined in the field by the monitoring biologist to account for microhabitats and other field conditions.

5.6 Irrigation

As mentioned previously, planting shall be timed to coincide with the rainy season to take advantage of natural precipitation. Supplemental watering will be done using a water truck, based on the recommendations of the Monitoring Biologist. After planting, additional water will be applied to moisten the root ball and to settle the soil around the plant. The frequency and duration of irrigation visits will be modified as needed by the Monitoring Biologist in order to provide beneficial growing conditions for newly planted containers.

5.7 Site Protection

Protection of the restoration sites from disturbance is essential for project success. Signage will be located around the perimeter of the restoration areas that informs the public of restoration activities. Signs that describe the area, in both English and Spanish, as a habitat restoration site, will state that trespassers will be liable for any damage caused and list the project contact. Signs will be attached to posts at approximately 100-foot intervals in areas that are accessible to the public.

6.0 As-Built Plan and Completion Letter

An as-built plan will be submitted within 60 days following the completion of the initial restoration work. The as-built plan will outline how the restoration sites have been established in accordance with the approved design and construction methods. The as-built report will cover the time period from when grading of the restoration site begins to the end of the main planting activities.

7.0 Maintenance Activities

This section discusses the methods used to maintain the restoration area following completion of implementation. Maintenance procedures are intended to be adaptive to ensure that the restored habitat meets the performance standards.

7.1 Maintenance Activities

7.1.1 Non-native Plant Control

Following the completion of the implementation period it is important to control non-native species (weeds) on-site. Weeds can outcompete native species for water and nutrients at the surface, preventing plants from germinating (limiting natural regeneration) or successfully maturing. Non-native species produce an enormous amount of viable seed and can be effective vegetative propagators, making them very difficult to control once established. The weed management program described below will be implemented over a five-year period.

After weeds have been initially controlled, a reduced level of effort will be required for weed management. The weeding program will focus on spot control of weed populations, as well as identification and eradication of new populations. Timing of non-native plant control efforts is critical to success. If non-native plants are not killed prior to seed set, removal effort and cost will remain high over time. Maintenance workers must be trained to distinguish between native and non-native plants for restoration to be successful.

Regular visits to monitor the site for germinating weeds will be done and this will be followed by repeat spraying, as necessary, to maintain non-native plant density to a low level. If non-native plants are controlled each season prior to flowering and setting seed, the level of effort required should decrease over the five-year period.

Weed control will continue throughout the monitoring period. Exotic species will be removed by hand or herbicide applications (glyphosate) by maintenance workers familiar with and trained to distinguish weeds from native species. During the first year, weeding will be performed as needed to keep weeds from producing seeds and to control weed competition during the establishment period of native plants. A list of exotic species anticipated to grow on-site is presented in Table 3. In the event that additional invasive plant species are encountered, the Habitat Restoration Specialist will refine measures to control them.

Adaptive management strategies must quickly address control of newly emerging non-native species. Frequent site visits are necessary during the growing season to assess non-native plant removal efforts and to determine whether changes in strategy or intensity are needed.

**TABLE 3
 ANTICIPATED EXOTIC SPECIES**

Scientific Name	Common Name
<i>Anagallis arvensis</i>	Scarlet pimpernell
<i>Atriplex semibaccata</i>	Australian saltbush
<i>Avena</i> spp.	Wild oats
<i>Brassica</i> spp.	Mustard
<i>Bromus</i> spp.	Chess species
<i>Centaurea melitensis</i>	Tocalote
<i>Cynara cardunculus</i>	Cardoon
<i>Erodium</i> spp.	Filaree, storksbill
<i>Foeniculum vulgare</i>	Fennel
<i>Lactuca serriola</i>	Prickly lettuce
<i>Lolium perenne</i>	Perennial ryegrass
<i>Mesembryanthemum crystallinum</i>	Crystalline iceplant
<i>Nicotiana glauca</i>	Tree tobacco
<i>Raphanus sativa</i>	Wild radish
<i>Salsola tragus</i>	Russian thistle
<i>Sonchus asper</i>	Prickly sow thistle

7.1.2 Reseeding and Replanting

Planting and seed collection should continue each year to provide additional plants to increase the diversity and cover of the restoration sites throughout the five-year monitoring period.

7.1.3 Supplemental Irrigation

Irrigation will be applied, as needed, using a water truck (as determined by the Habitat Restoration Specialist) for a minimum of one year and not to exceed two years. At the

direction of the Habitat Restoration Specialist, the irrigation will be discontinued when the plants have become established.

7.2 Schedule

The maintenance schedule is presented as follows (Table 4):

**TABLE 4
 MAINTENANCE SCHEDULE**

Type/Task	Year 1	Year 2	Year 3	Year 4	Year 5
Site protection	Monthly	Quarterly	Quarterly	Quarterly	Quarterly
Weed control	As-needed	As-needed	Quarterly	Twice a year	Twice a year
Trash removal	Monthly	Quarterly	Quarterly	Quarterly	Quarterly
Replanting/seeding	Fall/winter	Fall/winter	Fall/winter	--	--
Irrigation	As-needed	As-needed	As-needed	--	--

8.0 Monitoring Methods

8.1 Performance Standards for the Target Dates and Success Criteria

The restoration sites will be monitored both qualitatively and quantitatively for five years following implementation. The performance criteria include percent cover, species diversity, and density relative to reference sites. The mitigation will be considered complete and the habitat restoration successful if the restoration site is similar in both species composition and cover to nearby relatively undisturbed stands of native grasslands. The restoration sites must achieve 90 percent cover relative to the reference sites in five years.

8.2 Target Functions and Values

The restoration sites will develop over time to be self-sustaining habitat that is equivalent in form, function, and value to the natural, undisturbed native grassland. Moreover, the restoration site must sustain itself for a minimum of one year (meeting the fifth-year performance standards of 90 percent of reference site coverage) in the absence of significant maintenance measures.

The performance standards described below for achieving percent cover and species diversity will be based on a relative percentage of reference site values. For example, if

the reference community had 60 percent total native cover, after five years of monitoring the mitigation site must reach 90 percent of that or 54 percent total native cover. Each restored habitat type will be considered to meet the diversity and composition criteria if 90 percent of its plant species are shared with the reference site and if the overall species diversity is approximately equivalent to the reference site. Within each habitat, the relative cover of exotic plant species will not exceed an absolute value of 10 percent cover of annual weeds and 0 percent cover of perennial weed species. Yearly target values for cover and diversity of native grassland are presented in Table 5.

**TABLE 5
NATIVE GRASSLAND TARGET VALUES
AS A RELATIVE PERCENTAGE OF REFERENCE AREA VALUES**

Year	Coverage of	
	Grasses and Herbs	Diversity
1	20	
2	40	50
3	60	60
4	80	70
5	90	75

8.3 Monitoring Methods

Specific monitoring activities will track changes over time and measure conditions against the success standards. The monitoring program will include both qualitative and quantitative monitoring.

8.3.1 Qualitative Monitoring

Evaluation of plant health and identifying and correcting problem areas is necessary for ensuring successful vegetation establishment. It is part of an adaptive management program to be implemented as part of this restoration project. Qualitative monitoring will be conducted by the Monitoring Biologist weekly for the first two months following the plan implementation and monthly for the remainder of the first year. The project biologist will review the restoration areas to examine transplant vigor, native annual and grass germination, and exotic plant encroachment. The biologist will recommend remedial actions, if necessary.

A list of wildlife species observed in the restoration sites will be compiled during each qualitative monitoring visit. The list of wildlife observed will be included with each annual report.

8.3.2 Quantitative Monitoring

Quantitative monitoring will be performed to measure development of vegetation in the restoration areas. Beginning in Year 2, permanent vegetation sampling stations will be established within each restoration site to measure year-to-year changes in native grassland cover, diversity, and structure. Monitoring methods will follow California Native Plant Society (CNPS) Plant Communities Project (Sawyer and Keeler-Wolf 1995) protocol. Transect data will be collected in Years 2 through 5 but not during Year 1 in order to prevent damage to small newly germinated seedlings. These data will be compared to reference data collected prior to project implementation and on an annual basis (see below). Results will objectively determine if the restoration areas approach the cover and species diversity characteristics of the reference area habitat.

The CNPS sampling method is based on a 50-meter point transect centered on a 50x5-meter plot. Using this method, vegetation is sampled by the point method at 0.5-meter intervals along the 50-meter transect to determine cover. The surveyor will note the species encountered and classify their height (i.e., herb, shrub, or tree) at each interval. In addition, each shrub-sized individual and all perennial bunchgrasses of each species growing in the 50x5-meter plot will be counted to determine habitat diversity, cover, and structure. All annuals present in the 50x5-meter plot will also be noted and contribute to the diversity of the transect data.

Sampling will be conducted in the spring on the mitigation sites in order to record the maximum species diversity present. A minimum of three plots will be established in each restoration site, depending on the size of the sites, to determine cover, and species composition. Each sample endpoint will be staked with a permanent marker and used for a photodocumentation point to record the progress of mitigation over the monitoring period.

8.4 Reference Sites for Monitoring

The following monitoring methods will be used to collect data that will determine whether the native grassland restoration areas meet the success criteria presented in this document. In the spring, the Monitoring Biologist will sample vegetation transects through existing plant communities to determine plant species composition, diversity, and cover.

A minimum of three transects will be established and sampled in native grassland habitats neighboring the selected on- and off-site restoration sites. This will be used to provide baseline data for use in defining vegetation success criteria.

8.5 Monitoring Schedule

The monitoring period will begin with implementation of the restoration work and will last for five years or until the restored vegetation has met the success criteria. A monitoring schedule is presented in Table 6. The monitoring program will be conducted by the Monitoring Biologist as outlined below.

**TABLE 6
 MONITORING SCHEDULE (APPROXIMATE)**

Type/Task	Year 1	Year 2	Year 3	Year 4	Year 5
Qualitative					
Vegetation Monitoring	Monthly	Quarterly	Quarterly	Quarterly	Quarterly
Wildlife Monitoring	Monthly	Quarterly	Quarterly	Quarterly	Quarterly
Quantitative					
Spring vegetation sampling	--	Annually	Annually	Annually	Annually

8.6 As-built Reporting

Within 60 days of the completion of the initial planting an “as-built” plan will be submitted to the City of San Diego and resource agencies demonstrating that the restoration sites have been established in accordance with the approved design and construction methods. After the 120-day plant establishment period is complete, the restoration specialist shall also prepare a letter to the Executive Director and the City of San Diego Mitigation Monitoring Coordinator, indicating that the installation is finished and that the five-year monitoring period has begun.

8.7 Annual Monitoring Reports

Annual reports summarizing monitoring results of the habitat restoration will be submitted to the City of San Diego, CDFG, and USFWS. The quantitative monitoring section will include survey methods, data summary analyses, comparison to performance standards, discussions, reporting remedial actions, recommendations, and photodocumentation. Each annual report will compare findings of the current year with those in previous years.

9.0 Completion of the Mitigation Program

9.1 Notification of Completion

At the end of the fifth year or when the restoration sites have met the performance standards (whichever happens first), a final report will be submitted to the City of San Diego, CDFG, and USFWS evaluating the success of the mitigation. The report will make a determination of whether the requirements of the mitigation plan have been achieved.

9.2 Agency Confirmation

Upon satisfactory achievement of the performance standards, the project biologist will inform the City of San Diego, USFWS, and CDFG. A site review will be scheduled for all parties to review the restored areas within two months of the notification. These agencies will provide written confirmation of acceptance within one month following the site visit that the site has met the performance standards.

10.0 Contingency Measures

If annual or final success criteria are not met, the party responsible for mitigation obligations will analyze the cause(s) and, if determined necessary the City of San Diego, USFWS, and CDFG, propose remedial action for approval. The responsible party will be liable for reasonable funding of the contingency procedures necessary for completion of the mitigation success.

11.0 Reference Cited

Sawyer, J. O. and T. Keeler-Wolf

1995 *A Manual of California Vegetation*. California Native Plant Society, Sacramento.