Coast Barrel Cactus Translocation Plan for the Castlerock Project City of San Diego Project No. 10046

Prepared for

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

Prepared by

RECON Environmental, Inc.
1927 Fifth Avenue
San Diego, CA 92101-2358
P 619.308.9333 F 619.308.9334
RECON Number 3536-2
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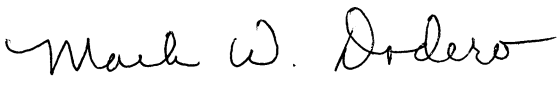
Cailin O'Meara, Biologist



Mark Dodero, Senior Biologist

TABLE OF CONTENTS

1.0 Introduction 1

2.0 Project Location and Description 1

3.0 Environmental Setting 9

4.0 Translocation Goals and Design 9

4.1 Conservation Status 10
4.2 Biology 10
4.3 Rationale for Expecting Translocation Success 12
4.4 Site Selection 13

5.0 Implementation 20

5.1 Site Preparation 20
5.2 Coast Barrel Cactus Salvage and Translocation 21
5.3 Timing of Salvage and Planting 21
5.4 Irrigation 21
5.5 Habitat Enhancement 22

6.0 Responsibilities 22

6.1 Property Owner 22
6.2 Principal Restoration Specialist 22
6.3 Qualifications of the Principal Restoration Specialist 23

7.0 Maintenance and Monitoring 24

7.1 Maintenance 24
7.2 Monitoring 26
7.3 Reporting 29
7.4 Remedial Measures 29
7.5 Contingency Measures 30

8.0 Notification of Completion 31

9.0 References Cited 32

TABLE OF CONTENTS (CONT.)

FIGURES

1:	Regional Location	2
2:	Project Location on USGS Map	3
3a:	Annexation Scenario Coast Barrel Cactus	5
3b:	No Annexation Scenario Coast Barrel Cactus	7
4a:	Annexation Scenario Potential Coast Barrel Cactus Translocation Areas	13
4b:	No Annexation Scenario Potential Coast Barrel Cactus Translocation Areas	15

PHOTOGRAPHS

1:	Coast Barrel Cactus (*Ferocactus viridescens*)	11
2:	Flowering Coast Barrel Cactus	11
3:	Translocated Coast Barrel Cactus Growing in Chula Vista after 15 Years	17
4:	Seedling Coast Barrel Cactus Growing at Base of Salvaged Plant	18

TABLE

1:	Three-Year Maintenance Schedule	24
2:	Anticipated Exotic Species	25
3:	Three-Year Monitoring Schedule	27

1.0 Introduction

This translocation plan describes methods for implementing the coast barrel cactus (*Ferocactus viridescens*) translocation plan as well as the three-year maintenance, monitoring, and reporting program for the proposed 203.64-acre Castlerock project (project) as required by the City of San Diego. The purpose of the maintenance program is to ensure the successful establishment of the translocated population. The purpose of the monitoring program is to make observations and collect data on survivorship and flowering of the translocated population so the progress of the mitigation effort can be assessed. The reporting program is designed to document the implementation of this translocation plan and report on results of annual monitoring efforts.

2.0 Project Location and Description

Pardee Homes is proposing a residential development at the Castlerock site in the city of San Diego, California (Figure 1). The 203.64-acre project site is located in the city of San Diego, in the East Elliott Community Planning Area, on the north side of Mast Boulevard between Medina Drive and West Hills Parkway. The project site is located in the Rancho El Cajon Spanish Land Grant within Township 15 South, Range 1 West, of the 7.5-minute U.S. Geological Survey (USGS) Poway quadrangle (Figure 2). Land uses adjacent to the project site include the Santee Lakes Regional Park, single-family residences, and Multi-Habitat Planning Area (MHPA).

This report evaluates two project development scenarios for this site. The first scenario assumes that the City of San Diego approves the project, but the project is subsequently annexed into Santee (Annexation Scenario). For the Annexation Scenario, Pardee Homes proposes to develop approximately 108.72 out of a total of 203.64 acres of the project site for residential use (Natural Resources Consultants 2012; Figure 3a). The Annexation Scenario would result in the construction of 283 detached single-family residences, 147 single-family detached units clustered on larger lots (referred to as “green court” units), approximately 4.0 acres (gross) of public parks, 0.64 acre (gross) and 0.49 acre (usable) of pocket parks, a pedestrian trail, and public streets and private driveways on an undeveloped 203.64-acre site, within the East Elliott Community Plan. The remainder of the property (94.92 acres) would remain undisturbed as open space, except for small areas needed for brush management. Access to the project would be provided from Mast Boulevard from the south.

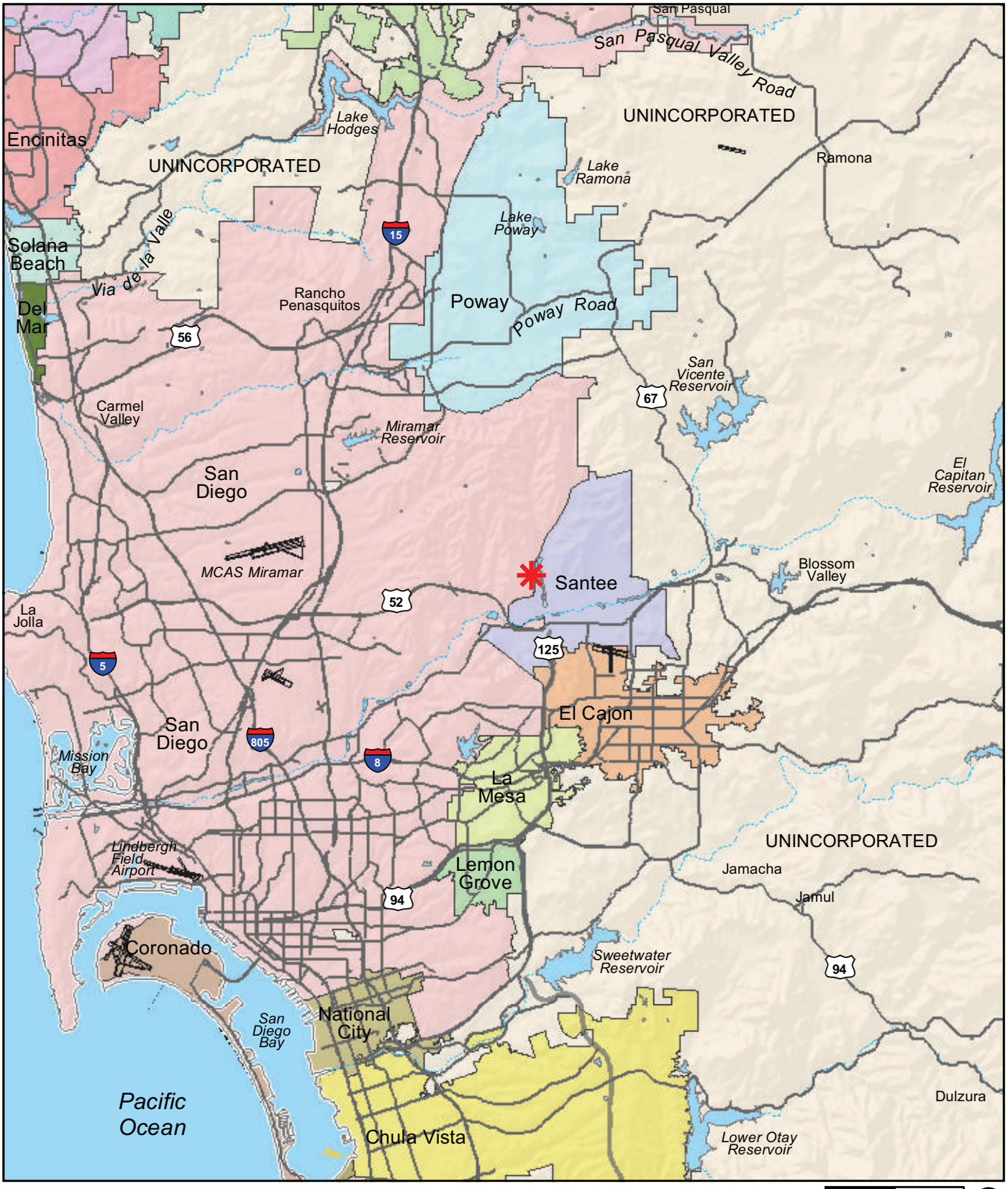


FIGURE 1

Regional Location

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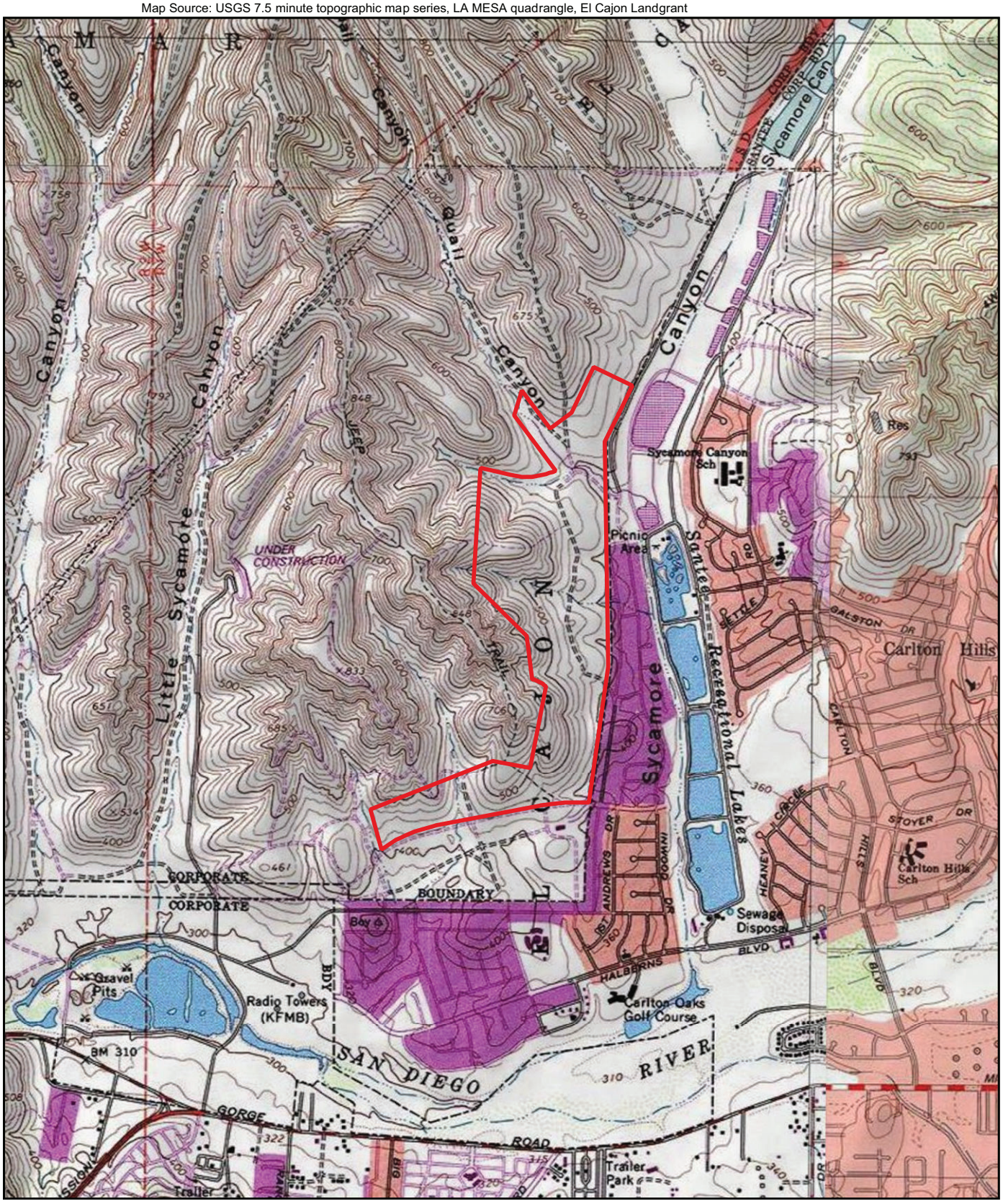
Map Source: USGS 7.5 minute topographic map series, LA MESA quadrangle, El Cajon Landgrant



Project Boundary

FIGURE 2

Project Location on USGS Map

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The second scenario (No Annexation Scenario) assumes the project would not be annexed into Santee and remains within the City of San Diego. For the No Annexation Scenario, Pardee Homes proposes to develop approximately 108.91 out of a total of 203.64 acres of the project site for residential use (Natural Resources Consultants 2012; Figure 3b). Due to the additional infrastructure requirements, the No Annexation Scenario has one less detached single-family residence. The No Annexation Scenario would involve minor changes in the land uses, with 282 detached single-family residences, 140 single-family detached small lot units (referred to as “green court” units), approximately 4.0 acres (gross) of public parks, 0.50 acre (gross) and 0.39 acre (usable) of pocket parks, a pedestrian trail, public streets and private driveways, and 94.73 acres of open space.

The newly proposed project is expected to directly impact approximately 40-41 coast barrel cacti inside the MHPA and 114 coast barrel cacti outside the MHPA. Approximately 40 individuals will be impacted under the Annexation Scenario, while approximately 41 individuals will be impacted under the No Annexation Scenario. Coast barrel cactus is covered by the Multiple Species Conservation Program (MSCP). Impacts to coast barrel cactus within the MHPA are considered significant and require mitigation measures, while impacts to this species outside of the MHPA are not considered significant and do not require mitigation measures.

Area-specific management directives include measures to protect this species from edge effects, unauthorized collection, and include appropriate fire management/control practices to protect against a too-frequent fire cycle. Management directives include:

- Having a biologist monitor the installation of limit fencing to delineate the extent of coast barrel cactus habitat. This effort will avoid any detrimental edge effects to individual cactus or associated habitat where construction activities are adjacent to habitat areas.

- Implementing any current fire management/control practices in place to reduce the risk of a fire ignition from any activities in the surrounding habitat and development.

- Salvaging coast barrel cactus individuals from impact areas and transplanting into mitigation areas located off-site within the MHPA as outlined below.

- Monitoring the transplanted coast barrel cactus mitigation area to ensure success of the translocation effort and to protect against unauthorized collection.

As mitigation for significant impacts to coast barrel cacti from the project, the approximately 40-41 coast barrel cacti inside the impacted MHPA will be salvaged prior to construction and translocated on-site within the mitigation area (non-impacted MHPA). The individuals may be temporarily stored by a local qualified native plant nursery if

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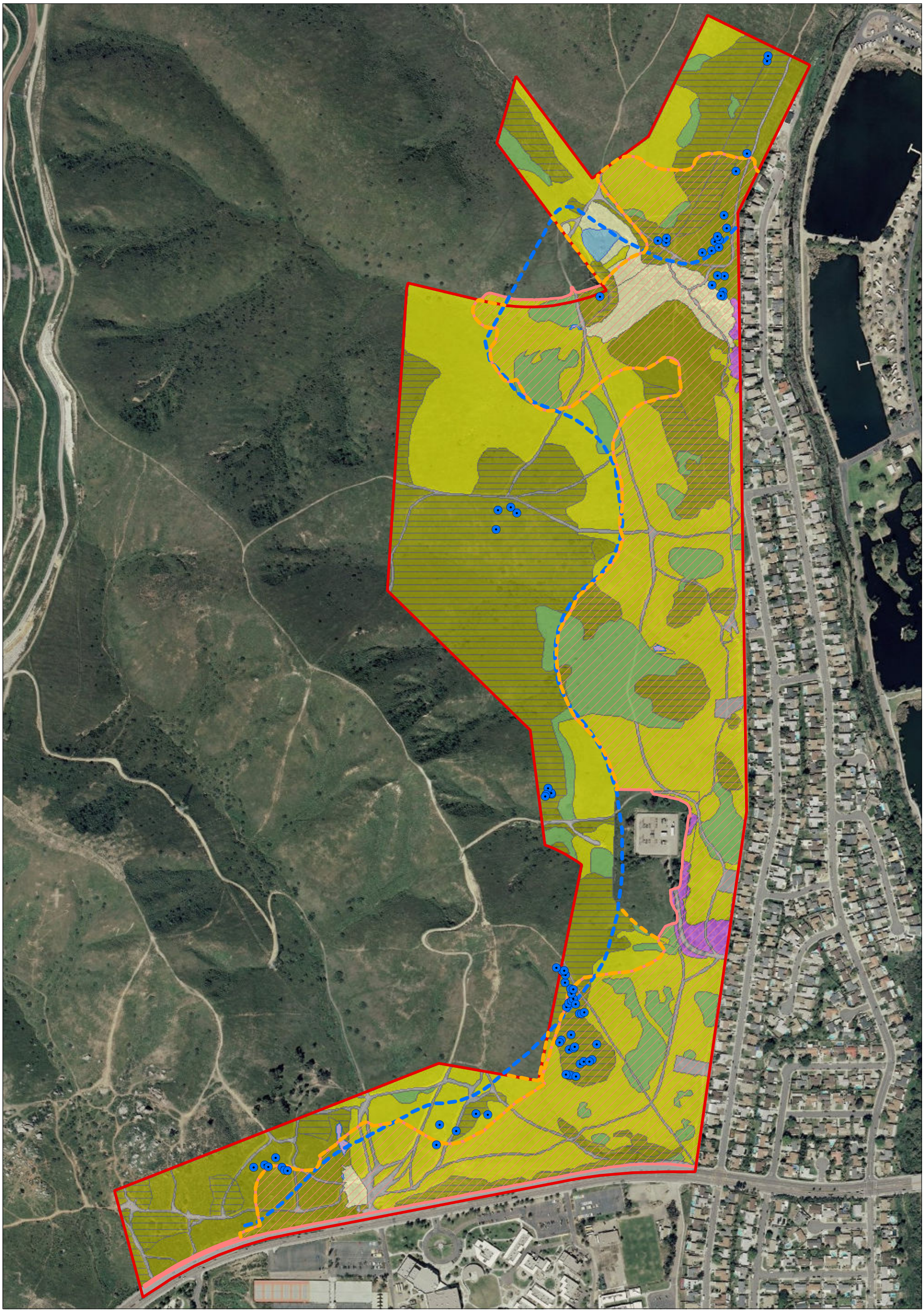

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FIGURE 3a

Annexation Scenario
Coast Barrel Cactus

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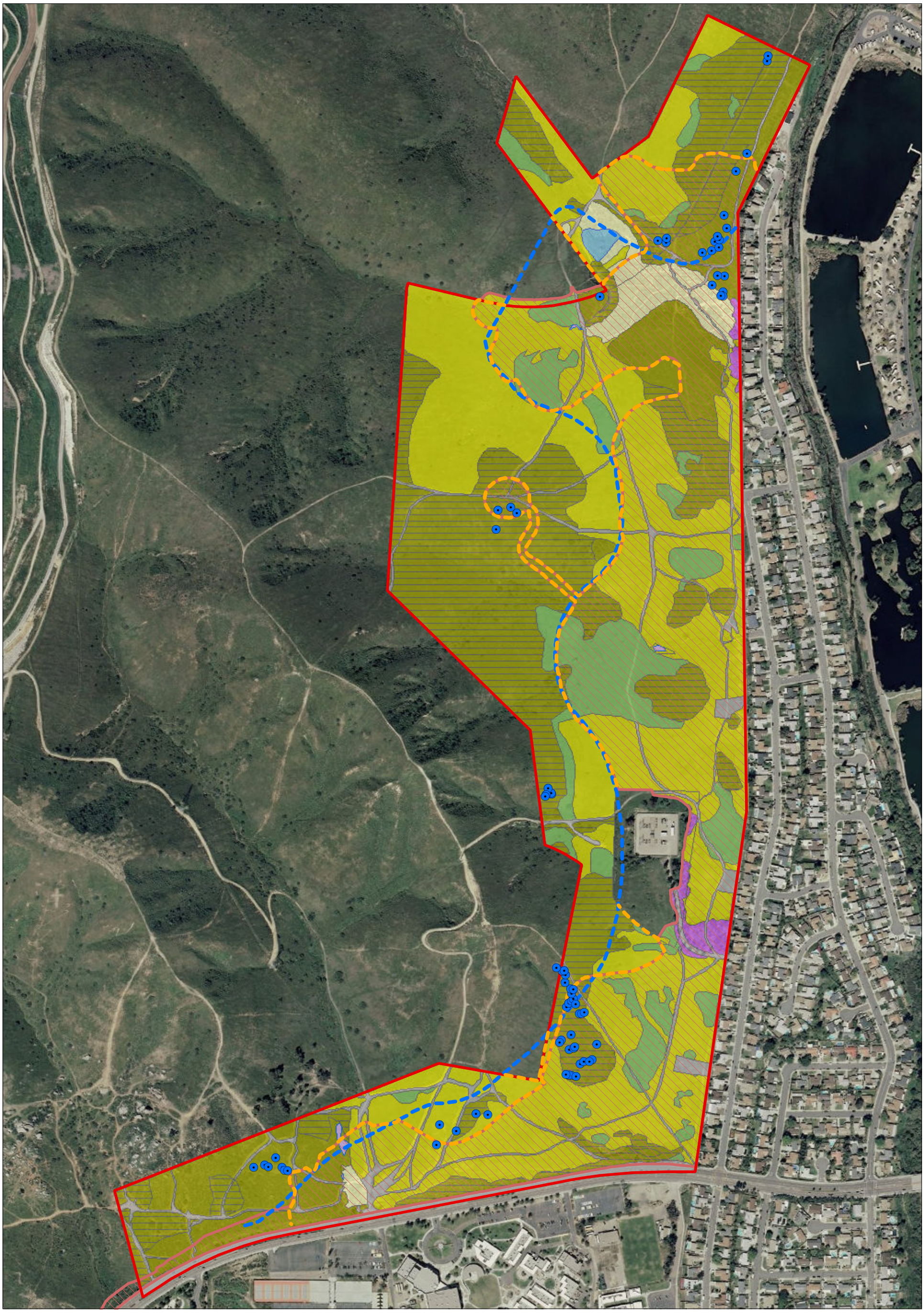

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FIGURE 3b

No Annexation Scenario
Coast Barrel Cactus

translocation conditions are not suitable at the time of salvage. While impacts to the 114 coast barrel cactus outside the MHPA are considered less than significant, they will also be salvaged prior to construction to compensate for mortality of the 40-41 salvaged individuals. Additionally, there is the potential to plant nursery-propagated coast barrel cacti to ensure successful mitigation of the 40-41 individuals impacted within the MHPA.

3.0 Environmental Setting

The project site occupies rugged terrain, rising from 376 feet above mean sea level at the eastern portion of the site to a maximum of 668 feet elevation at the northeastern portion of the site (Natural Resources Consultants 2012). The site exists on rolling terrain that consists of slopes and ridges that rise in elevation from east to west, and from south to north on the associated ridges. Soils on-site consist of Ciena rocky coarse sandy loam, Diablo-Olivehain complex, and Redding cobbly loam on 9 to 30 percent slopes; Redding gravelly loam on 2 to 9 percent slopes; dissected Redding cobbly loam on 15 to 30 percent slopes; Reiff fine sandy loam on 2 to 5 percent slopes; and Stony land.

The dominant vegetation community on-site is annual grassland and dominates the rolling hill landscape. Coastal sage scrub (CSS) occupies the southwest section of the site, as well as patches in the northeastern and southern sections. Disturbed CSS also occupies the majority of the site along the western site boundary. Additional habitats present on-site include baccharis-dominated CSS, native grassland, eucalyptus woodland coastal and valley freshwater marsh, emergent wetland, and disturbed areas (i.e., graded areas and dirt roads) (Natural Resources Consultants 2012).

4.0 Translocation Goals and Design

The purpose of this plan is to ensure that project impacts are fully mitigated through the translocation of coast barrel cacti into existing MHPA habitat located adjacent to the project area. The translocation program is designed to salvage the coast barrel cacti from the area of expansion impact.

Under the Annexation Scenario, approximately 155 coast barrel cacti will be salvaged, including 41 individuals within the MHPA and 114 individuals outside the MHPA. Under the No Annexation Scenario, approximately 154 coast barrel cacti will be salvaged, including 40 individuals within the MHPA and 114 individuals outside the MHPA. While impacts to the 114 individuals outside the MHPA are considered less than significant, the 114 coast barrel cacti impacted by development under either Scenario will be salvaged prior to construction activities to compensate for mortality of the 41 (Annexation Scenario) or 40 (No Annexation Scenario) salvaged individuals within

the MHPA. Salvaging the 114 individuals outside the MHPA will ensure successful mitigation of individuals impacted within the MHPA. Additionally, there is the possibility of planting nursery-propagated individuals to offset salvaged cactus mortalities and ensure successful mitigation. Coast barrel cactus conservation status, biology, rationale for expecting translocation success, and site selection are described in the following sections.

4.1 Conservation Status

Due to its limited distribution, the coast barrel cactus is a sensitive species throughout its range, from northwestern Baja California, Mexico through the southwest of California. Coast barrel cactus is considered a covered species by the City of San Diego (City of San Diego 1997). Species covered by the City of San Diego are subject to management actions described in the MSCP to ensure that they are adequately protected. Coast barrel cactus is also a California Native Plant Society (CNPS) List 2.1 species (species rare, threatened, or endangered in California, but more common elsewhere. These species are eligible for state listing; seriously threatened in California) (CNPS 2011). CNPS List 2 species meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing it is mandatory that they be fully considered during preparation of environmental documents relating to the California Environmental Quality Act (CEQA) (CNPS 2011).

In addition, coast barrel cactus is on the California Department of Fish and Game's Natural Diversity Data Base Special Vascular Plants, Bryophytes and Lichens List (California Department of Fish and Game 2011), which meets the criteria for state listing under Section 15380 of CEQA (State of California 2010).

4.2 Biology

Coast barrel cactus is a stemmed perennial succulent in the cactus family (Cactaceae) that generally grows wider than tall, usually up to an average of one foot (Photographs 1 and 2). The plants have 13 to 20 ribs stippled with groups of rigid spines. The three to four stout central spines of each group are brown or reddish, becoming gray or yellow, flattened, slightly curved, and from one to two inches long. The radial spines, 10 to 20 in number, are shorter, acicular, and unequal in length. The flowers are yellow-green to reddish, each petal with a faint reddish stripe (Hickman 1993). Plants generally flower from May to June. The native habitat for barrel cactus is on hillsides in openings in CSS and within native grasslands. In particular, they occur around rock outcrops, or surrounded by cobbles on warm dry slopes with a southerly exposure.

PHOTOGRAPH 1
Coast Barrel Cactus (*Ferocactus viridescens*)

PHOTOGRAPH 2
Flowering Coast Barrel Cactus

Native plant species associated with coast barrel cactus on the project area include broom baccharis (*Baccharis sarothroides*), purple needlegrass (*Nassella pulchra*), California sage bush (*Artemisia californica*), bush sunflower (*Encelia californica*), bush monkeyflower (*Mimulus aurantiacus*), and San Diego County viguiera (*Viguiera laciniata*). These species are typical associates of barrel cactus and CSS and grassland communities.

Within the grading footprint of the project area, a minimum of 40 coast barrel cacti were discovered and mapped inside the MHPA and 114 barrel cacti were mapped outside the MHPA (Natural Resources Consultants 2012) (see Figures 4a and 4b). The mapped barrel cacti occur primarily along the northern and southern areas of the project site in CSS and disturbed CSS habitats.

4.3 Rationale for Expecting Translocation Success

RECON has used the methodology described in this plan to successfully translocate coast barrel cactus throughout southern California, including sites at California Terraces on Otay Mesa, Pacific Highlands Ranch in Del Mar, and Rancho del Rey in Chula Vista (Photographs 3 and 4).

For successful barrel cactus translocation on the proposed Castle Rock project site, the project biologists recommend that translocated cacti be planted on-site in the MHPA open space west of the project site (see Figures 4a and 4b).

Translocation success will be increased by appropriate site preparation and through the proper placement of coast barrel cacti in the open space. Soil and topographic conditions in translocation are similar to existing habitat. Also, a minimum of 114 coast barrel cacti from outside the MHPA will be translocated in excess of the 40-41 barrel cacti impacted within the MHPA to compensate for mortality and further increase the probability of meeting success criteria. This effort, in addition to possibly planting of nursery-propagated coast barrel cactus, will ensure successful mitigation of the 40-41 individuals impacted within the MHPA. The translocated cacti will be maintained and monitored for three years following implementation to compensate for mortality.

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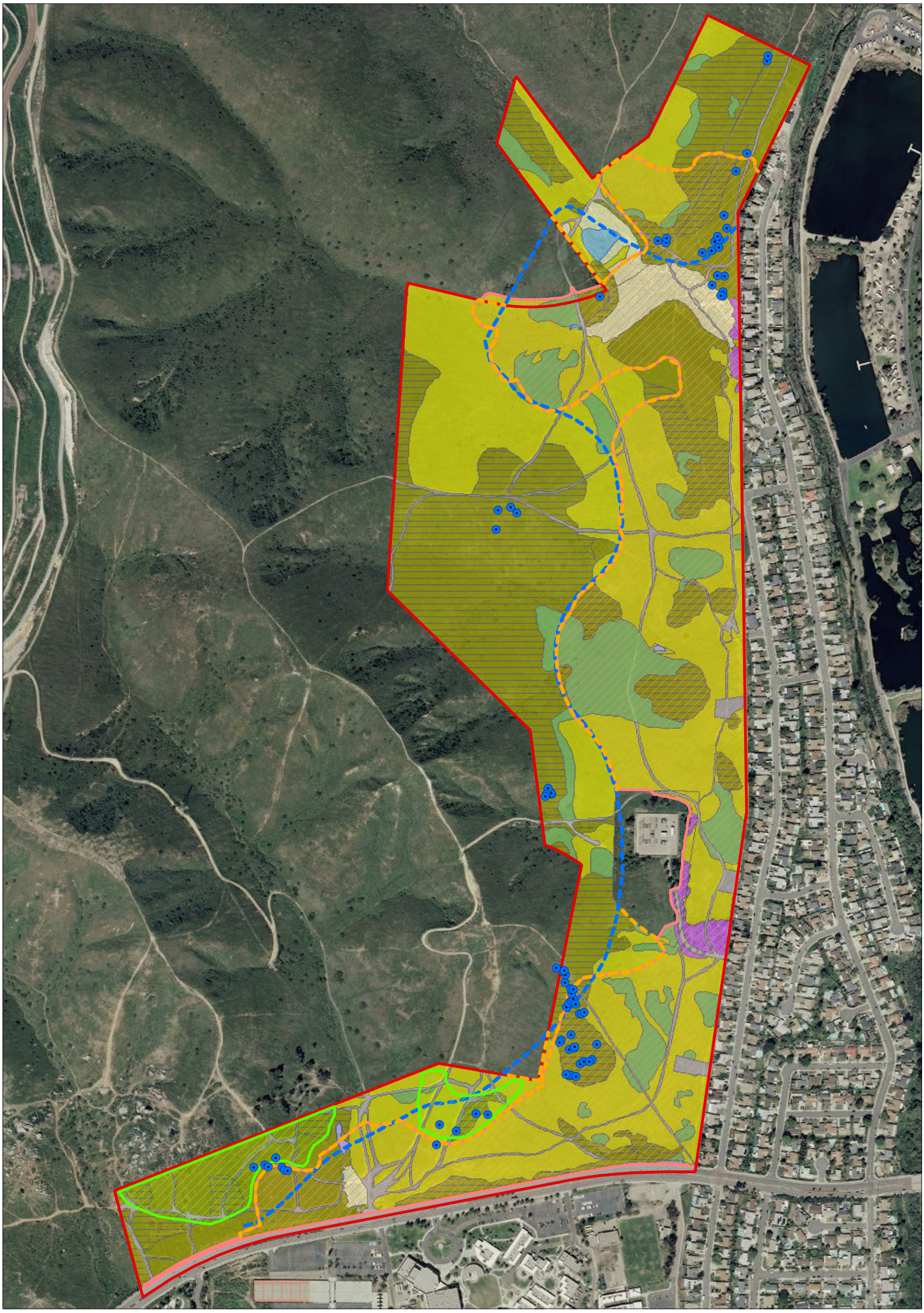

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FIGURE 4a

Annexation Scenario Potential
Coast Barrel Cactus Translocation Areas

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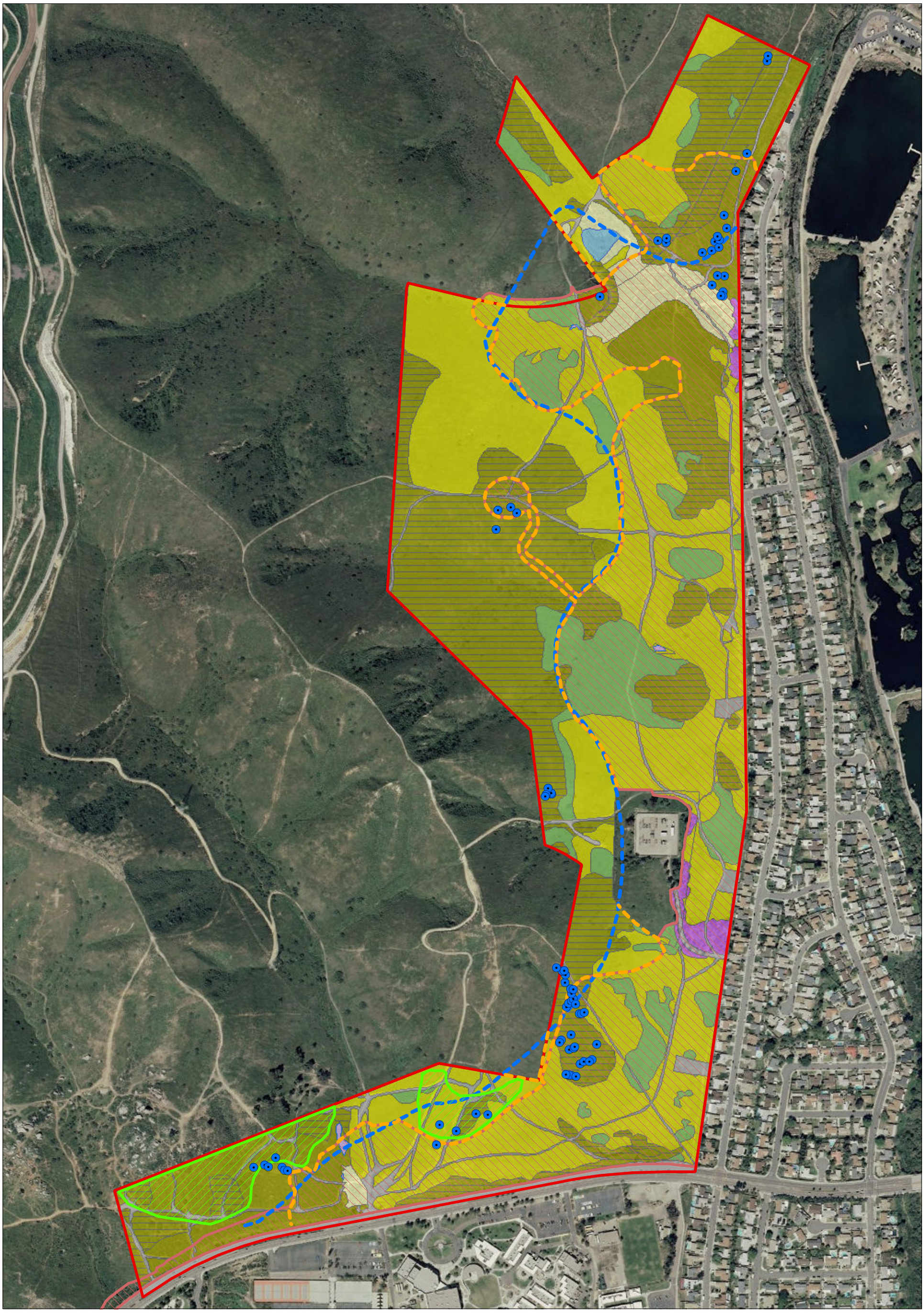

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FIGURE 4b

No Annexation Scenario Potential
Coast Barrel Cactus Translocation Areas

PHOTOGRAPH 3
Translocated Coast Barrel Cactus Growing in Chula Vista after 15 Years

PHOTOGRAPH 4
Seedling Coast Barrel Cactus Growing
at Base of Salvaged Plant

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4.4 Site Selection

The sites will be chosen based on (1) proximity to the donor site, (2) designation as permanent open space within the MHPA, as described in the City of San Diego MSCP Subarea Plan (1997), (3) adjacency to existing coast barrel cactus populations, and (4) location in areas that will not impact existing sensitive biological or native communities.

The translocation site must have specific environmental conditions similar to the donor site to ensure establishment and persistence of the introduced coast barrel cactus population. A total of approximately 9 acres of available habitat in mixed and disturbed CSS and non-native grassland have been chosen as the appropriate site into which coast barrel cacti will be translocated (Figures 4a and 4b). Of this available area, up to a total of 2 acres will be used and subject to the site preparation methods (discussed in the Maintenance and Monitoring section).

Four general factors are used to evaluate potential translocation sites: physical, biological, logistical, and historical (Fiedler and Laven 1996). These general factors are explained in the list below. Below each general heading, the specific physical, biological, logistical, and historical conditions for the coast barrel cactus at the proposed Castlerock project site are explained in bold print. This section provides justification for the translocation site selection as it relates to the four factors.

1. **Physical.** These factors include the soil and landscape characteristics of the site.

   Coast barrel cacti are typically found in openings on rocky soils. The translocation sites have the appropriate soils.

2. **Biological.** These factors include the presence of appropriate habitat and susceptibility to weed invasion.

   The site has suitable habitat with openings in the native grassland and CSS habitat that contains common plant associates of coast barrel cactus, and are located on slopes adjacent to natural coast barrel cactus populations. The translocation area includes non-native weed species that will be controlled as part of the maintenance activities.

3. **Logistical.** The accessibility of the site for maintenance and monitoring, and site protection from unauthorized use are logistic factors. The site should be easily accessible, but protected from off-road vehicle use or heavy bicycle or foot traffic.

   The site is easily accessible by bicycle and foot traffic, and has the potential to be accessed by off-road vehicles. Natural methods will be used to deter such activities and, if necessary, fencing and signs may be installed to prevent unauthorized off-road vehicle or heavy bicycle or foot traffic use in the mitigation site.

4. **Historical.** This factor considers using currently occupied versus potential habitat and incorporates knowledge of the species' evolutionary history.

   The coast barrel cactus will be translocated near existing populations of coast barrel cactus in suitable habitat within its historic range. The translocation site will be less than one mile from the donor site.

In summary, a total of 9 acres is suitable as potential translocation site and up to 2 acres of this will be designated for translocation of all barrel cactus. Under the Annexation Scenario, the project will require the translocation of 41 barrel cacti from inside the MHPA, and under the Non Annexation Scenario the project will require the translocation of 40 barrel cacti from inside the MHPA. In addition to either Scenario, 114 coast barrel cacti will be salvaged from outside the MHPA within the project site, potentially in addition to nursery-propagated individuals, and will planted in the translocation site.

5.0 Implementation

5.1 Site Preparation

The first step in translocation is to remove any non-native weeds and thatch while preserving the native species that may be present. Where necessary, weed whips will be used to cut weedy thatch material that has built up on the soil surface. The thatch will be raked into piles and composted on-site. After the first significant winter rains, newly germinated weeds in the translocation area will receive herbicide applications (glyphosate-based herbicides such as Prosecutor® or Roundup®) prior to planting. The site will be monitored frequently to allow the procedure to be repeated as needed. Weed seedlings will require herbicide treatments before they reach six inches in height or before flowering (especially important for small weed species such as storksbill [*Erodim* spp.]), whichever occurs first.

Weeding and de-thatching will occur as needed within the translocation site (see Figures 4a and 4b). This area will be sufficient to provide habitat for the approximately 40-41 barrel cacti subject to translocation from within the MHPA plus the additional 114 barrel cacti to be salvage outside the MHPA to compensate for mortality. After the first full winter, any weeds present in the translocation area will receive herbicide applications prior to planting. The site will be monitored frequently to allow the procedure to be repeated as needed.

5.2 Coast Barrel Cactus Salvage and Translocation

Surveys will be conducted throughout the project impact area to identify, mark, and flag the general locations of each barrel cactus individual and/or population. All cacti will be salvaged from the ground using hand tools to successfully remove the plant and the rootball. The barrel cacti will be bare-rooted, root trimmed, and the plants stored on-site or at RECON Native Plants, Inc. under shade cloth for one to three weeks, depending on weather conditions and season, to allow the roots to callus. This will prevent rot and encourage protective callus development on freshly exposed surfaces. Once the roots have callused, the barrel cactus will be transplanted.

Care will be taken with each individual to ensure that the cacti are planted only to the depth of the roots. It is important that soil is not allowed to accumulate on the stem of the cacti. Soil accumulation often induces the stems to rot. Following barrel cactus translocation, each translocated barrel cactus will be numbered by the monitoring biologist. Permanent markers will be placed near each cactus so they can be found easily each year. The translocated cactus will also be mapped using a Trimble® Global Positioning System (GPS) with sub-meter accuracy so they can be relocated if markers are lost. The total number of individuals will be counted when they are planted. These data will be used as a baseline so survivorship in subsequent years may be assessed.

5.3 Timing of Salvage and Planting

The timing for salvaging and translocating barrel cacti is not as critical as it may be for other plants and may occur at any time of year. Planting of translocation sites will be limited to approximately October 15 to February 1 in order to coincide with appropriate moist and cool weather conditions. Planting salvaged barrel cacti directly into open space eliminates the need for extended storage of cacti; however, if environmental conditions are not appropriate for planting at the time of salvage, the cacti will be stored at either on-site or at RECON Native Plants, Inc.

5.4 Irrigation

Coast barrel cactus is very drought tolerant and will need very little water after translocation. However, supplemental watering will be given during the first year if winter rainfall is significantly below average and the plants appear drought stressed. If the plants need to be given supplemental water, the soil will be allowed to dry prior to the next watering. If needed, supplemental watering will be done using a water truck until the plants have become established.

5.5 Habitat Enhancement

Enhancing the habitat by weeding at the translocation area is necessary to ensure survival and persistence of the introduced coast barrel cactus population. The 2-acre translocation site will be hand seeded as well as planted with limited container plants. After dethatching, removed material will be raked into piles and composted on-site. In addition, leaf blowers will be used to further concentrate the fine leaf and weed seed material to clean the soil surface. After winter rains commence, weed seed still present in the soil will germinate. Control of non-native seedlings during the growing season will include hand weeding within 48 inches of existing coast barrel cacti and spraying with herbicide and/or using weed whips outside of this area where non-native species dominate. When herbicide is used, there must be little to no wind present, as overspray may potentially harm native plants. Prosecutor® and Roundup® (glyphosate) herbicides are approved for use in natural areas by the U.S. Fish and Wildlife Service and California Department of Fish and Game, and must be applied by a licensed applicator.

6.0 Responsibilities

6.1 Property Owner

The party financially responsible for this translocation project is:

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

The Owner is responsible for management of the parcels owned by Pardee Homes. The Owner will be responsible for contracting with personnel qualified in implementation, maintenance, and monitoring of restoration/revegetation 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.

6.2 Principal Restoration Specialist

A Principal Restoration Specialist acceptable to the Owner shall be hired to implement this Plan. The Principal Restoration Specialist can either be an individual or an organization as long as the person(s) actively managing the program meets the qualifications outlined below to the satisfaction of the Owner. If the Principal Restoration Specialist is an organization, a project manager shall be designated. The Principal

Restoration Specialist will be responsible for the day-to-day implementation of this Plan and will carry out the requirements and objectives described herein.

The Principal Restoration Specialist(s) shall be responsible for the following:

- Preparation of this translocation plan
- Identifying plants to be salvaged from within the limits of grading
- Coordinating and monitoring translocation site preparation
- Supervising plant installation
- Supervising the maintenance of the translocation areas as defined herein
- Overseeing and performing the required monitoring and reporting in accordance with the procedures established in this plan

Contact Information:

RECON Environmental
1927 Fifth Avenue
San Diego, CA 92101
Mark Dodero, Senior Restoration Biologist

6.3 Qualifications of the Principal Restoration Specialist

The individual or project manager identified by the organization contracted to implement this Plan must meet the following criteria:

- B.S. or B.A. degree in ecology, botany, biology, landscape maintenance, range management, or a related field.
- At least two years of experience in native or horticultural landscaping including restoration of native habitats in southern California, preferably San Diego County.
- Demonstrated experience in similar projects or in projects including similar skills.

The Principal Restoration Specialist shall submit a letter of verification of experience to the City of San Diego's Mitigation Monitoring Coordination (MMC) office. MMC shall provide a letter to the applicant confirming the qualifications of all City-approved persons involved in the project. Prior to the start of work, any personnel changes associated with the implementation of this plan shall obtain approval from MMC.

7.0 Maintenance and Monitoring

The objectives of the maintenance and monitoring program are to ensure successful establishment of the translocated coast barrel cactus. To achieve these objectives, the project biologist will observe and direct implementation of translocation and site preparation efforts, as well as supervise maintenance and monitoring activities.

The three-year maintenance and monitoring period will begin following planting. The site will be monitored during the initial 120-plant establishment period (PEP), following planting, to ensure successful establishment of the translocated individuals. The PEP includes biweekly (once every other week) qualitative monitoring of the translocated individuals to identify and remediate any conditions that would inhibit successful establishment.

7.1 Maintenance

Maintenance tasks during the three-year maintenance and monitoring period may include weed control, trash removal, site protection, supplemental watering, and erosion control. Table 1 outlines the proposed maintenance schedule.

TABLE 1
THREE-YEAR MAINTENANCE SCHEDULE

Type/Task	Year 1	Year 2	Year 3
Weed control	Quarterly	Quarterly	Quarterly
Trash Removal	As needed	As needed	As needed
Site Protection	As needed	As needed	As needed
Supplemental watering	After planting	As needed	--
Erosion control	As needed	As needed	As needed

7.1.1 Weed Control

Weeds must be removed quarterly or more often if directed by the project biologist during the three-year maintenance and monitoring period to adequately control weed species and reduce the weed seed bank in the soil. Weed control will be performed by skilled restoration workers trained to distinguish weeds from native species.

Appropriate weed control measures will be implemented under the direction of the Principal Restoration Specialist. Weeds will be killed and/or removed before they set seeds. Only hand weeding will be allowed within 48 inches of coast barrel cacti. Outside of this area, weeds may be sprayed with Prosecutor® or Roundup® and/or removed using weed whips where non-native species dominate. When herbicide is used, it must

be applied by a licensed applicator and there must be little to no wind present, as overspray may potentially harm native plants.

A list of exotic species with potential to germinate is presented in Table 2. In the event that additional invasive species are encountered, the Principal Restoration Specialist shall refine control measures to address the problem.

TABLE 2
ANTICIPATED EXOTIC SPECIES

Scientific Name	Common Name
Avena spp.	Wild oat
Bromus diandrus	Ripgut grass
Bromus madritensis ssp. *Rubens*	Foxtail brome
Centaurea melitensis	Tocalote
Dittrichia graveolens	Stinkwort
Erodium spp.	Storksbill species
Hirschfeldia incana	Short-pod mustard

7.1.2 Trash Removal

Trash will be removed from the sites by hand as needed for the duration of the three-year maintenance period. Trash consists of all man-made materials, equipment, or construction debris left within the translocation areas that are not serving a function related to translocation/restoration.

7.1.3 Site Protection

The mitigation site will be assessed periodically throughout the three-year maintenance period for signs of human disturbance, including off-road vehicle activity and/or the formation of new mountain bike and hiking trails. If bicycle or foot trails are observed within the translocation area, natural methods will be used to discourage trail use. Natural methods include piling brush material at the entrance of the new trail and planting of shore cactus. If necessary, fencing and signs may be installed.

7.1.4 Supplemental Watering

Coast barrel cacti will be checked for drought stress during the summer dry season. Coast barrel cactus is very drought tolerant and will need very little water after translocation. However, if drought stress is observed, supplemental watering will be done using a water truck or by hand if winter rainfall is significantly below average and the plants appear drought stressed. Signs of drought stress include wrinkling and a reddish color on the stems of the plant. If the plants need to be given supplemental water, the soil will be allowed to dry prior to the next watering.

7.1.5 Erosion Control

Coast barrel cacti will be assessed for erosion periodically throughout the three-year maintenance and monitoring period. If erosion is evident, affected plantings will be reinforced by piling additional cobbles around each planting. This technique will prevent coast barrel cacti from decaying by eliminating direct contact with saturated soils. Cobble pilings also provide ideal germination sites for dispersed seed and divert rain around individual cacti to further minimize the chances of stem rot.

7.2 Monitoring

Monitoring of the translocation site requires frequent site visits and collection of qualitative and quantitative data to ensure the project is progressing toward the stated goals. The performance standards and monitoring methods are described below.

7.2.1 Performance Standards

The final performance standards of the coast barrel cactus translocation plan are:

- The establishment of a self-sustaining population of coast barrel cactus with a minimum 1:1 survivorship for either the 41 translocated individuals salvaged from within the MHPA under the Annexation Scenario or the 40 translocated individuals salvaged from within the MHPA under the No Annexation Scenario.

- Prior to the end of the three-year maintenance and monitoring period, the translocated individuals will have survived without supplemental watering for at least one year.

If in any year significant progress towards the performance standards is not observed, then the project biologist or the City of San Diego may recommend remedial actions. In addition, if final performance criteria are not met within the three years, remedial measures and additional years of monitoring and maintenance may be required by the City of San Diego. Appropriate remedial actions are discussed below.

California Invasive Plant Council List High, Moderate, and Alert species shall be controlled and no more than 10 percent of the mitigation site will be covered by exotic weeds by two years after the completion of this plan.

7.2.2 Monitoring Methods

A monitoring program will be conducted for three years following initial planting. Monitoring is necessary to determine the survival and performance of the transplant population and to adjust procedures as needed to ensure progress toward restoration

goals. Monitoring will be conducted by a biologist with experience in the preparation, implementation, and monitoring of rare plant translocation programs. The monitoring program will include both quantitative and qualitative assessments of the translocated population. Table 3 summarizes the monitoring schedule.

Qualitative monitoring will be conducted biweekly during the 120-day PEP. The project biologist will review the translocation area to assess general transplant health, levels of weed competition, erosion, and signs of herbivory.

Quantitative data will be collected by annually counting all surviving and flowering individuals. Qualitative data will be collected by visually comparing the stages of development within the translocated population to the natural populations nearby. Pollinators will be documented through photography and/or collections at the translocation site and a preserved coast barrel cactus population in open space (reference site) to make a general comparison of the pollinators of the two areas. Monitoring methods are described in detail below.

TABLE 3
THREE-YEAR MONITORING SCHEDULE

Type/Task	Year 1	Year 2	Year 3
Qualitative Monitoring	Bi-weekly/ Monthly*	Quarterly during the growing season	Quarterly during the growing season
Quantitative Monitoring			
Survivorship Counts	—	Winter	Winter
Flowering Counts	Spring	Spring	Spring

* Qualitative monitoring will occur bi-weekly during the 120-day PEP and monthly thereafter during the growing season.

7.2.2.1 Quantitative

a. Survivorship Counts

A census of the population will be conducted at the translocation site each year for two years. The timing for survivorship counts is not as critical as it may be for other plants, and may occur at any time of year. The first census will occur at least one year after the initial planting, and the second census will occur at least two years after the initial planting. The individuals will be counted and recorded each monitoring year. This assessment will be used to determine the total number of translocated individuals that have survived over the summer dry season. In addition, the areas immediately around

the translocated individuals will be searched carefully for volunteer coast barrel cactus. All volunteer plants will be counted and mapped.

b. Flowering Counts

The second quantitative assessment will be conducted later in the growing season (May-June), when the production of flowers and seed may be observed. Total counts of flowering individuals will be completed at that time. The project biologist will record all observations and include the results in the annual report.

7.2.2.2 Qualitative Monitoring

Two types of qualitative assessments—general growth assessments and limited pollinator observations—will be conducted during the translocation effort. Evaluation of plant health and identifying and correcting problems as they arise are necessary for ensuring successful establishment. Following planting, the site will be monitored biweekly during the initial 120-day PEP. After the PEP, qualitative monitoring will be conducted monthly during the growing season for the remainder of the first year and quarterly for the remainder of the three-year maintenance and monitoring period.

a. Growth Assessment

The performance of coast barrel cactus at the translocation site will be visually assessed to determine the overall plant condition and whether the timing of flower and seed production is similar to the adjacent natural populations. One reference population will be selected from the surrounding open space. Only a good-quality natural population that is not suffering from substantial weed invasion will be selected as a reference population. In addition, the reference site will also have a similar physical and biological setting as the translocation site. The reference site will be mapped using a Trimble® GPS with sub-meter accuracy, and this information will be included in the annual report.

b. Pollinator Observations

Pollinator observations will be performed to determine if potential coast barrel cactus pollinators are visiting the translocation site. This will help evaluate the progress of the coast barrel cactus translocation and habitat enhancement effort. If the habitat surrounding the translocation area is enhanced appropriately, it will likely be able to support a sufficiently diverse assemblage of pollinators that will ensure successful pollination and seed production of coast barrel cactus. The production of viable coast barrel cactus is crucial in ensuring the long-term persistence of the translocated population. Observations of pollinators will also help contribute to the overall understanding of the biology and reproduction of this species.

Pollinator observations will be conducted at least once each season during the flowering period (approximately May-June). Observations will be done in conjunction with other scheduled monitoring visits. The project biologist will stand near the coast barrel cactus plants and photograph and/or capture pollinators for approximately one hour. Both the translocation and at least one natural population within landfill open space will be observed. Pollinators that are photographed and/or captured will be identified to family, if possible. The type and number of pollinators observed visiting coast barrel cacti at the translocation site will be used for a general comparison with that of the natural population.

7.3 Reporting

An as-built report will be submitted to the City of San Diego documenting the translocation of the coast barrel cactus.

Two copies of the as-built report shall be submitted to the City of San Diego at the end of the 120-day PEP. This report shall include a discussion of weed control, horticulture treatments, erosion control, trash/debris removal, watering, site protection/signage, pest management, and vandalism as applicable to this translocation project. An assessment of the progress of the coast barrel cactus translocation effort shall be provided at the end of the 120-day PEP.

Three copies of the annual monitoring reports summarizing monitoring results of the coast barrel cactus translocation effort will be submitted to the City of San Diego and the wildlife agencies by the project biologist no later than December 1 each year. The monitoring section will include survey methods, data summary analysis, comparison of performance standards, discussion, reporting remedial actions, recommendations, and photodocumentation. The maintenance section will include weeding procedures and plant care activities. Each annual report from Year 2 on will compare findings of the current year with those in previous years.

7.4 Remedial Measures

The project biologist or the City of San Diego may recommend remedial measures based on the annual quantitative monitoring results or qualitative observations made in the field so that the plantings move toward the performance standards. If the coast barrel cactus requirement of 1:1 survivorship for either the 41 (under the Annexation Scenario) or 40 (under the No Annexation Scenario) individuals salvaged from the MHPA is not met by Year 3, additional planting of propagated coast barrel cacti will be required. Propagation, planting, monitoring, and maintenance will follow the methods discussed in

this plan. Other remedial measures may also include more intensive weeding efforts within the translocation area which may add additional monitoring years.

7.5 Contingency Measures

The contingency measures for the potential loss of coast barrel cacti individuals due to herbivory, drought, vandalism, and fire are as follows.

7.5.1 Herbivory/Disease

Supplemental coast barrel cactus planting may be required due to loss of individuals from herbivory or disease. If more than 30 percent of the translocated coast barrel cacti plants have evidence of herbivory, supplemental planting of coast barrel cacti will be required. A wire-mesh cage may be constructed around individuals planted by seed to prevent herbivory.

7.5.2 Vandalism

If the measures outlined in Section 7.1.3 fail to prevent vandalism due to trespassing, additional measures to prevent trespassing may be required. Additional measures may include, but are not limited to, repairing the fence or installing additional fencing or signs, as necessary.

7.5.3 Drought

During the first two seasons after translocation, plants will be watered after showing signs of drought stress to ensure survivorship, if necessary. By the third season after translocation, no supplemental water will be given to allow the plants to respond to the natural rainfall pattern, except in the event that new coast barrel cactus individuals are planted as replacements.

7.5.4 Fire

If plants are damaged by a fire, the plants will be replaced with no additional monitoring or maintenance time added to the original three-year requirement.

8.0 Notification of Completion

After the third year success criteria are met, the final monitoring report will be submitted to the City of San Diego for review. If the project has met the performance standards outlined herein, the project biologist will contact the City of San Diego and recommend final approval of the project. A request for a pre-final inspection shall be submitted with the final monitoring report. The City of San Diego will respond in writing after a 30-day review period or may request an on-site meeting to review the translocation area. After review, the coast barrel cactus requirement will be deemed complete when written approval by the City of San Diego has been received. Upon confirmation of project success, the City of San Diego shall release the property owner of any additional obligations. The applicant understands that failure of any significant portion of the revegetation area may result in a requirement to replace that portion of the site and/or to extend the monitoring and establishment/maintenance period until all success criteria are met.

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