APPENDIX B

Agriculture Viability Analysis

AGRICULTURAL VIABILITY ANALYSIS
for the
Agua Hedionda South Shore Specific Plan
for 85% Open Space and 15% Retail
Carlsbad, California

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TABLE OF CONTENTS

Section **Page No.**

TABLE OF CONTENTS (CONTINUED)

Page No.

TABLES

FIGURES

1 INTRODUCTION TO THE AGRICULTURAL VIABILITY ANALYSIS

The Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail (Agua Hedionda 85/15 Specific Plan; Specific Plan) is composed of approximately 203.4 acres of land between the south shore of Agua Hedionda Lagoon and Cannon Road in the City of Carlsbad, California. The Specific Plan will permanently protect and conserve approximately 176.7 acres for open space and continuing strawberry farming and coastal agricultural use (more than 85% of the Specific Plan area), and will reserve approximately 26.7 acres (less than 15% of the Specific Plan area) for a new pedestrian-oriented, visitor-serving outdoor retail, shopping, dining, and entertainment promenade (Outdoor Shopping, Dining and Entertainment Promenade), at no tax burden to the residents of Carlsbad. The Specific Plan requires that the open space lands be improved with low-impact public access by providing passive recreation amenities, including miles of new nature trails and walkways, picnic and rest areas, lagoon vistas, an outdoor classroom, parking, and an integrated resource and educational signage program. The Outdoor Shopping, Dining and Entertainment Promenade, together with supporting uses including a farm-to-table restaurant and farm stand, will provide for a total of approximately 585,000 square feet of Visitor-Serving Commercial uses in the Specific Plan area. The implementation of the Specific Plan is anticipated to occur between 2017 and 2019. This report has been prepared in a manner consistent with the Specific Plan.

The following is agricultural viability analysis for the proposed Specific Plan area (see **Figure 1**, Proposed Land Use Plan). This property consists of two parcels, Assessor's Parcel Number (APN) 211-010-24 and APN 211-010-31-00. The methodology employed in the analysis uses information related to a number of factors, including underlying soils information and production costs, as well as market demand and trends in the agricultural industry. Information has been retrieved through research, personal communication, the San Diego County Agricultural Commissioner's Office, the San Diego County Farm Bureau, and the University of California (UC) Cooperative Extension. When current data could not be retrieved, assumptions were made based on agricultural industry standards, best management practices, and cultivation of the same and/or similar crops in comparable counties. The factors discussed in this analysis are important and necessary to consider when determining the physical and economic viability of agricultural operations on specific parcels and their impact on the larger agricultural context of a particular area or region.

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2 AGRICULTURE IN SAN DIEGO COUNTY – OVERVIEW

San Diego County (the County) is the southernmost county in California and is essentially a desert. There is very little water in comparison to other counties in the state and the soil qualities, in general, are less suitable to large agricultural tracts and intense cultivation. Only 6% of soils within the County are considered Prime soils according to the U.S. Department of Agriculture, Natural Resources Conservation Service. These factors, coupled with variation in topography and resource constraints, create an environment that demands small farms, high value crops, innovation, and continual adjustment to trends and market demands.

Limiting factors and constraints, such as poor soils and high water prices, have not fettered the ability of the County's agriculture to flourish in the past. The agricultural industry accounts for $5.1 billion annually for the local economy (San Diego County Farm Bureau 2015). Agriculture is the fourth-largest segment of the County's economy, immediately preceded by tourism, which is the third-largest segment of the economy. In 2014, San Diego County was ranked as the 19th-largest agricultural economy among more than 3,000 counties nationwide (County of San Diego 2013). This is particularly due to the high value of the crops that are cultivated. Moreover, the production of high-value and specialty crops and the proximity of growers to large local markets, coupled with state-of-the-art transportation corridors to transport fresh products to even larger markets and distribution centers, provides many farmers with the means to remain competitive in an increasingly global economy.

2.1 Characteristics of Agriculture in San Diego County

The County has a vast array of topographies and microclimates. These give rise to over 30 different varieties of vegetation communities and more individual farms than any other county in the United States. Agricultural commodities in San Diego include over 200 different types of crops and products (County of San Diego 2013). The majority of farms in San Diego County (65%) are between 1 and 9 acres, with a median farm size of 4 acres. Approximately 90% of the County's farms are less than 49 acres in size (County of San Diego 2015a). This is a unique condition in terms of the agricultural industry and is attributable to the high cost of land, the inferior soil types, and the low availability of water. Frequent drought conditions and the high cost of water (priced at more than $600/acre-foot) require farmers to use smaller acreages and produce high dollar value per acre crops, including many specialty crops. San Diego County produces the highest dollar value per acre crop statewide (County of San Diego 2013).

Agricultural innovation and flexibility are at the heart of the industry. From the 1920s to the present, the agricultural industry in the County has adapted and changed. In 1927, which is the first year for which statistics are available, the most valuable products were lemons, canning tomatoes,

celery, alfalfa, table grapes, and navel oranges (County of San Diego 2015a). Today, the prevailing crops are quite different, as discussed below, and reflect the pressures experienced by growers and market demand. The types of crops grown throughout the County, such as greenhouse products or small-scale row crops, have been and continue to be compatible with the surrounding land uses, whether they are urban or rural. In fact, the agriculture within the County occurs in the interface areas between agricultural and urban populations and land uses (UC Cooperative Extension 2006). Direct marketing to local urban populations has become popular as it greatly increases the economic viability for local growers. For agriculture to remain viable and be resilient in the area, it is important that agricultural and urban uses be successfully integrated.

2.2 San Diego County's Agricultural Products

According to the *2013 Crop Statistics and Annual Report* (Crops Report) prepared by the County of San Diego Department of Agriculture, Weights and Measures, which is the most recent assessment of agriculture in the County, the top 10 crops in the County are as follows:

- Ornamental trees and shrubs
- Indoor flowering and foliage plants
- Bedding plants and color
- Avocados
- Tomatoes
- Lemons
- Eggs and chickens
- Berries
- Herbaceous perennials
- Cacti and succulents (County of San Diego 2013)

The Specific Plan area, which is the subject of this agricultural viability analysis, currently cultivates strawberries and various field crops targeted for sale at farmers markets and stands. Pursuant to the Crops Report, field crops account for less than 1% of all major crops in the County. As compared to 2012, the acreage cultivated in field crops has slightly risen and total value of field crops in the county has also increased from $6,021,294 in 2012 to $7,644,047 in 2013. Fruits and nuts, the crop category that contains strawberries, accounts for 22% of all production. Overall fruit and nut acreage has decreased from 38,535 acres in 2012 to 37,910 acres in 2013; however, the value of fruit and nut crops has increased from $338,808,324 in 2012 to $415,645,774 in 2013. County-wide, commercial agricultural production experienced a 1% increase in acreage between 2012 and 2013.

2.3 Agricultural Industry Opportunities

As the United States has been steadily transforming from traditionally agrarian communities into more urban or suburban spaces over the past 25 years, agricultural/urban interface issues have

gained much attention. The encroachment of urban uses into productive lands has impaired agricultural operations, particularly large-scale operations. Although urban encroachment is still a threat to agriculture, more sophisticated land use tools (e.g., zoning, agricultural buffers) and more sophisticated cultivation tools (e.g., strategic plantings, targeted and precise pesticide application, and rigorous regulations and licensing of pesticides) have vastly improved conditions such that agricultural and other land uses can coexist and even thrive together.

Although it is a significant portion of the economy in the County, agriculture, like all industries, must constantly innovate and pioneer new ways of remaining competitive and relevant. The ability of agriculture to innovate becomes particularly important in circumstances of urban agriculture or agricultural operations where there is an agriculture and urban interface, as in San Diego County. Over the last 10 to 15 years, there has been very real and meaningful focus on the importance of local and sustainable food sources. This awareness has been ushered in by the agricultural industry and, in part, supported by the agricultural tourism (agritourism) industry, community-supported agriculture, and the high consumer preference for organic and pesticide-free foods. In a County that has small farms interwoven into an urban environment, growers and operators are identifying and promoting opportunities for increasing the visibility of the agricultural industry and reducing any potential agricultural/urban conflicts.

2.3.1 Agricultural Tourism

As mentioned previously, tourism and agriculture are the third- and fourth-largest segments of the County's economy, respectively. The synthesis of these two markets has high benefits for both of these industries, especially when viewed in terms of increasing agricultural viability. Specifically, agritourism creates an economic incentive for continued and potentially more diversified agricultural operations and revenue streams (e.g., a greater variety of cultivated crops and/or opportunities for farm tours, u-pick operations). It also provides growers with opportunities for more direct consumer sales of unprocessed agricultural products, as well as direct consumer sales of prepared foods and processed agricultural products cultivated on site. In addition, agritourism is an optimal vehicle for educating the public, promoting agriculture, and fostering a greater understanding of agriculture as an industry, the importance of agriculture to the local economy, the concept of maintaining local food security and diversity, preservation of open space, and the benefits of agriculture on carbon sequestration. Finally, agritourism has the potential benefit of reducing friction and conflict between agricultural and other land uses.

Agritourism can also be very effective in supporting agricultural viability in areas where there is a well-developed tourist industry, such as in San Diego County. The County is already a major tourist destination. Agritourism activities and experiences can directly showcase the history, development, and perseverance of the agricultural industry and provide a destination in and of

itself. These factors further reinforce the overall destination appeal of the County and support locally produced products, while also raising the stature of County agriculture and its viability.

A study on agritourism in the County, titled "Agritourism Benefits in San Diego County" (Lobo et al. 1999), is based on a case study in Carlsbad. This case study provides a good example of the benefits of agritourism to the agricultural viability of the operator and the benefit to the local economy in terms of economics and open space.

2.3.2 Local and Community-Supported Agriculture

As the population of the state, nation, and world grow, the emphasis of the U.S. agricultural market is increasingly focused on the availability of locally and sustainably produced agricultural products. "Knowing one's local farmer" has practical, epicurean, economic, and nutritional benefits and California is at the forefront of this trend. In San Diego County, the climate, labor conditions, and consumer base all blend to create an optimal environment to support local agriculture and community-supported agriculture. Further local and community-supported agriculture is highly encouraged by the San Diego County Farm Bureau, Agricultural Commissioner's Office, and other agricultural industry organizations. There is the potential to further increase agricultural viability through expanded local food supply outlets and consumer opportunities, such as direct sales, farm-to-table dining experiences and venues, farmers' markets, and farm stands. It is also possible to integrate the local food supply with institutional entities like schools, hospitals, and large corporate employers. These activities strengthen the viability of agriculture in the area by increasing the consumer base for locally produced food.

2.3.3 Organic Agriculture

San Diego County has 347 registered organic growers and in 2011, organic growers produced over 150 different crops, ranging from staples of the fruit industry like avocados and oranges to specialty fruits like loquats, cherimoyas, and jujubes (County of San Diego 2015b). Although the majority of this San Diego County organic fruit is sold to wholesalers and then distributed statewide and nationwide, a portion of this produce is sold locally through farmers' markets and community-supported agriculture programs. The production of organic fruits and vegetables is one of the fastest-growing segments of the agricultural and food industry, which will only increase as there are more opportunities and outlets for its growth and direct market access. Moreover, an added benefit of organic agriculture is the ability to be compatible with a wide range of land uses.

3 BASELINE INFORMATION

3.1 Soils – Overview

The soils information presented in this analysis is derived from statewide soils maps that have been prepared by both state and federal government entities. The California Department of Conservation (DOC), Division of Land Resource Protection, and the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), both conduct regular and ongoing assessments of soil types and then prepare detailed soil maps. Once soils are mapped, they are grouped into the following categories that have specific definitions. The categories and definitions are as follows:

- **Prime Farmland.** In California, the DOC Farmland Mapping and Monitoring Program (FMMP) maps all statewide farmlands. The FMMP's soils study area is contiguous with modem soil surveys developed by the USDA. The FMMP requires that any land designated as Prime must meet the following criteria related to land use and soils.

  Under the category of land use, the following criterion is applied: the land has been used for irrigated agricultural production at some point during the 4 years prior to the Important Farmland Map date. Irrigated land use is determined by FMMP staff by analyzing current aerial photos, local comment letters, and related GIS data, supplemented with field verification.

  Under the category of soils, the following criterion is applied: the soil must meet the physical and chemical criteria for Prime Farmland or Farmland of Statewide Importance as determined by the NRCS. The NRCS compiles lists of which soils in each survey area meet the quality criteria. Factors considered in qualification of a soil by the NRCS include the following:

  1. Water moisture regimes, available water capacity, and developed irrigation water supply
  2. Soil temperature range
  3. Acid-alkali balance
  4. Water table
  5. Soil sodium content
  6. Flooding (uncontrollable runoff from natural precipitation)
  7. Erodibility
  8. Permeability rate
  9. Rock fragment content
  10. Soil rooting depth (DOC 2015a)

As such, farmland with the optimal combination of physical and chemical features to sustain long-term agriculture is described as Prime. The land has been determined to have the soil quality, growing season, and moisture supply needed to produce sustained high crop yields (DOC 2015b).

- **Farmland of Statewide Importance.** As with Prime Farmland, Farmland of Statewide Importance must also meet both the criteria described above with respect to land use and soils and is similar to the Prime Farmland category. The difference is that Farmland of Statewide Importance tolerates greater shortcomings of the soil, such as greater slopes or less ability to store moisture (DOC 2015b).
- **Unique Farmland.** This category of farmland is categorized as having lesser quality soils, but is still used for the production of leading agricultural crops. This farmland is typically irrigated, but can also include non-irrigated orchards or vineyards found in some climatic zones in the state. These lands must have been used for irrigated agricultural production at some time during the four years prior to the mapping date (DOC 2015b).
- **Farmland of Local Importance.** Lands that have been determined by local jurisdictional authorities such as county boards of supervisors or local advisory committees to have a specific importance to the local agricultural economy, are considered Farmland of Local Importance (DOC 2015b).

The FMMP has three other categories of land:

- **Grazing Land.** Land that is particularly suited to the grazing of livestock given existing vegetation. This particular designation was developed in concert with the California Cattlemen's Association, UC Cooperative Extension, and a host of other groups with an interest in grazing and livestock (DOC 2015b).
- **Urban and Built-Up Land.** This category refers to land that is occupied by structures with a building density of at least one unit to 1.5 acres or six structures to a 10-acre parcel. This category includes land uses such as residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water control structures, and other developed purposes (DOC 2015b).
- **Other Land.** All other lands that do not fall into the categories above are subsumed into this category. Examples of these lands include low-density rural developments, brush, timber wetland, riparian areas not suitable for livestock grazing, confined livestock poultry or aquaculture facilities, strip mines, borrow pits, and water bodies smaller than

40 acres. In addition, vacant and non-agricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land (DOC 2015b).

The California Coastal Act also has specific language and standards applicable to agricultural lands. California Coastal Act Section 30241 states that farmland within the coastal zone must meet any of the following requirements to be designated as Prime: farmland must (1) have a soil classification of Class I or II soils as defined by the NRCS; (2) have a Storie Index Rating of 80 through 100; (3) have the ability to support livestock, at least one animal unit per acre as defined by the USDA; or (4) have been planted with fruit or nut bearing trees, vines, bushes, or crops that have a nonbearing period of fewer than 5 years and that will normally return during the commercial bearing period on an annual basis from the production of unprocessed agricultural plant production not less than $200 per acre. Section 30242 of the California Coastal Act applies to other agricultural lands suitable for agricultural use, and limits conversions of such lands to non-agricultural uses unless continued agricultural use is not feasible, or the conversion would preserve prime agricultural land or concentrate development consistent with Section 30250. Any permitted conversion of agricultural land pursuant to Section 30242 must be compatible with continued agricultural use on surrounding lands.

Soils on Identified Parcels in the Specific Plan Area

According to the FMMP maps, the Specific Plan area is primarily underlain by Class III soils that have a Storie Index Rating of 54 and is partly underlain by Class IV soils that have a Storie Index Rating of 15. Specifically, the soil types are marine loamy coarse sand, 2%–9% slopes (Class III) and Carlsbad gravelly loamy sand, 15%–30% slopes (Class IV). Although these are not strictly Prime soils, the FMMP has classified part of the Specific Plan area as Prime Farmland, if irrigated (63.7 acres). The FMMP has also categorized the property as Farmland of Statewide Importance (2.0 acres), Farmland of Local Importance (31.3 acres), and Unique Farmland (42.2 acres). Under the California Coastal Act definitions, these soils do not qualify as Prime, nor is marine loamy coarse sand suitable for livestock grazing. As indicated in Table 1, the subject properties do not meet the California Coastal Act standards for prime agricultural land, although the land is suitable for agricultural use and therefore subject to the agricultural resource protection provisions of California Coastal Act Section 30242.

Table 1
California Coastal Act Agricultural Resource Designations

Land Acreage	Active Agriculture/ Irrigation	FMMP Farmland Type	Soil Classification[a]	Storie Index Rating[b]	Livestock Grazing[c]	Fruit or Nut-Bearing Crops[d]	Surrounded by or on Periphery of Urban Uses[e]
139.4	Yes; row crops	Prime Farmland, if irrigated; Farmland of Statewide Importance, Farmland of Local Importance and Unique Farmland	**Class III** *MIC: Marine loamy coarse sand, 2%–9% slopes*	54 (Grade 3)	No	Potential	South of Agua Hedionda Lagoon, bounded by I-5 to the west, Cannon Road to the south, and open space to the east
			Class VI *CbE: Carlsbad gravelly loamy sand, 15%–30% slopes*	15 (Grade 5)	No	No	
			Unclassified	N/A	N/A	N/A	

Source: California Coastal Act Section 30241.
Notes: I-5 = Interstate 5; N/A = not applicable.

[a] Class I or Class II Soils, as defined by the Natural Resource Conservation Service. Soils with less than Class II would not be considered prime.

[b] Land with a Storie Index Rating of 80 through 100; Storie Index Rating = [(Factor A/100) × (Factor B/100) × (Factor C/100) × Factor D/100) × 100], where Factor A = Soil Profile Group; Factor B = Surface Texture; Factor C = Slope; Factor D = Drainage, Alkalinity, Fertility, Acidity, Erosion and Microrelief. Land with a Storie Index Rating below 80 would not be considered prime (USDA 1973).

[c] Land with the ability to support livestock used for the production of food and fiber with an annual carrying capacity equivalent to at least one animal unit per acre as defined by the United States Department of Agriculture is considered prime agricultural land pursuant to Coastal Act Section 30241. "Animal unit month" is defined by the USDA as the amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days; roughly 12,000 pounds of forage per year is required to satisfy this element of the prime agricultural land definition. Minimum parcel size 100 acres for grazing to sustain 1 cow/calf unit.

[d] Land planted with fruit- or nut-bearing trees, vines, bushes, or crops which have a nonbearing period of less than five years and which will normally return during the commercial bearing period on an annual basis from the production of unprocessed agricultural plant production not less than $200 per acre.

[e] Even if land does not meet the prime agricultural land definition per California Coastal Act Section 30241, Section 30242 of the Coastal Act applies to all agricultural lands on the urban-rural boundary and imposes limits on both agricultural development and conversions of agricultural uses to nonagricultural uses, regardless if the agricultural lands are prime, or lands suitable for agriculture.

3.2 Geographical Information

The Specific Plan Area

The Specific Plan area is in the City of Carlsbad, which has a varied agricultural history. In the 1880s, most agricultural land was in orchards of citrus, avocados, and olives. Over the next decades, the agricultural production shifted to assorted row crops, strawberries, and production in greenhouses. The trend toward greenhouses continues today. As discussed previously, the ability of greenhouses to remain compatible with other non-agriculture uses is high given the low disturbance to other uses (e.g., from pesticides, dust, noise).

The Specific Plan area is leased out to different growers for cultivation. Previously, 110 acres were in cultivation, however, due to a variety of market factors, including the cost of cultivation and the increasingly staggering cost of water, which has risen steeply over the past 4 years due to the drought, only 40 acres are cultivated in a variety of field crops and strawberries. The parcels are bounded by Agua Hedionda Lagoon to the north, Interstate 5 (I-5) to the west, Cannon Road to the south, and open space to the east. The parcels have been in active cultivation, mainly strawberries and other assorted row crops, since the 1920s. Between 2009 and the present, portions of the parcels had been rendered fallow due to the high cost of water and inability to invest in capital improvements. In March of 2013, the grower/operator expressed an ability to potentially reinvest in the portion of the parcel that has lain fallow and restart strawberry cultivation (Grower/Operator, pers. comm. 2013a).

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4 PRODUCTION OPERATING COSTS

The production operating costs associated with growing strawberries and row crops vary throughout the state. In general, most studies cite costs from between $30,000 and $40,000 in production costs per acre, including harvest costs (Grower/Operator, pers. comm. 2013b). Production operating costs include the land preparation and soil bed up, plant establishment, fertilization, irrigation, pest management, and harvest. The second category of expenses includes labor and equipment.

The following information and assumptions included in the analysis are based on typical farm operation and production practices standard in well-managed fields. The overhead and calculations are derived from the Department of Agricultural and Resource Economics, UC Davis, UC Cooperative Extension, and specific information on the Specific Plan area.

4.1 Land Preparation and Bed Up

Land preparation and bed up is a rather consistent and fixed cost in the industry. In order to cultivate successfully, growers conduct a series of operations such as disking and ringrolling. Typically, disking and ringrolling are conducted over the field a series of five times, and then the subsoil is ripped in order to loosen the compacted soils to a depth beyond the cultivation layer to aerate soils, increase filtration rates, and decrease erosion. The fields are then smoothed over with a triplane, beds are shaped, pre-planting fertilizer is incorporated and drip tape is buried in the bed, and a plastic mulch layer is applied. Costs associated with this are for labor, which entails the grower renting a tractor or contracting a custom operator (UC Cooperative Extension 2015).

4.2 Plant Establishment

Once beds are made, the entire length of the field is fumigated, and a tracklayer tractor with a blade makes roads and divides the field into smaller blocks, generally 200–300 feet long. Holes are punched in the plastic mulch using a mechanical punch, and the plants are delivered to the beds for planting in the punched holes. Typically, there are 25,000 plants per acre. Costs associated with this include the plants and the labor.

4.3 Fertilization

Slow-release fertilizers are typically used in conventional farming, which is how plots in the Specific Plan area are farmed. Slow-release fertilizer is applied at 500 pounds per acre, and another fertilizer application is broadcast before planting. Before planting, the slow-release fertilizer is

drilled into the bed with a fertilizer drill with a bed shaper. Throughout the season, growers continue to apply various types of liquid fertilizers through the drip line or with foliar spray.

4.4 Irrigation

Growers often rent sprinkler pipe for the pre-planting and the establishment of sprinkler irrigations. Prior to planting, the field is irrigated for 12 hours. Typically, two to three laborers, in addition to the tractor driver, lay and pick up the pipe. After planting, sprinkler pipe is laid out and the field is sprinkled 2 hours per day for 15 days. There are two to four irrigators who manage the sprinkler and drip irrigation system. Rainfall has not been taken into account in irrigation.

Water

The State of California is in its fourth year of drought. According to the most recent U.S. Drought Monitor, released Thursday, February 26, 2015, the majority of San Diego County is experiencing a D3 condition, or "Extreme" drought, while the balance of the County is experiencing D2, or "Severe" drought, conditions. Approximately 80% of the water in San Diego County is imported from the Colorado River and through the State Water Project (SDCWA 2015). The remaining approximately 20% is derived from local groundwater and surface water sources, in addition to recycled water, and water from conservation measures. In large part, however, growers in the County are dependent on non-local sources and they pay some of the highest rates in the state for their water. Compared to the Central Valley and neighboring Imperial County, growers in the County pay 30 times more for their water (County of San Diego 2015a). Hence, the opportunity cost for growers is significantly higher than in other parts of California. The price of water is a significant factor driving the ability of agriculture to remain both sustainable and competitive and is decisive in determining the amount of acreage grown and the type of crop cultivated.

The Specific Plan area, located in the portion of the County experiencing D3 (Extreme drought) conditions, is served by the Carlsbad Municipal Water District, which is a subsidiary district of the City of Carlsbad. The district provides 100% of its water from the Colorado River through the Colorado River Aqueduct and from Northern California through the California Aqueduct, more commonly known as the State Water Project. The current agricultural rate for water is $4.15 per 100 cubic feet (City of Carlsbad 2015), and although there are mandatory water restrictions in place for residential water users, there are no mandatory cutbacks in place for agricultural water users. This analysis presumes that the water usage in the Specific Plan area is similar to the water usage typical for irrigated row crops/strawberries in the County.

4.5 Pest Management

The pesticide costs included in this analysis have been considered at the full retail price and the pesticide program typical for row crops/vegetables and strawberries. Fumigants are approximately $2,900 per acre. Weed management is generally controlled by hand weeding, and the analysis assumes a rate that totals 76 hours per acre over a period of 8 months. This analysis also assumes that insects and diseases are treated through insecticide and fungicide treatments.

4.6 Harvest

The crop cycles for the harvest are July and June for strawberries, and December and January for other row crops and vegetables (Grower/Operator, pers. comm. 2013c). The early harvests of crops go directly to fresh markets, and as other growing areas come into production, the growers tend to shift to the frozen markets. During harvest time, growers run 30- to 40-person crews with a general foreman for crew supervision, and one field checker on smaller acreages to two field checkers on the larger parcels, to check the field for proper picking. There is also one picking card puncher for smaller parcels and two picking card punchers for the larger parcels per crew to count out the boxes by each picker. For fresh market distribution, crops are picked by hand and then placed into 1-pound containers, which are in container trays that hold eight 1-pound containers. Picking rates per day range according to picker from three trays per hour early and late in the seasons, and five to eight trays during the peak season. Growers use 2-ton flatbed trucks that hold 116 pallets of 110 fresh market trays per pallet, or 1,760 fresh trays per load or 960 freezer trays per load. Once the fields are harvested, they need to be cleaned through mowing, removing mulch, and disking.

4.7 Yield

Row crops and strawberries are measured in the trays per acre for the fresh and frozen market. Tray weights are used to convert the yield to weight per acre. Standard consumer trays hold eight 1-pound containers, which typically range from 9.5 to 10.5 pounds per tray. This analysis uses 10 pounds per tray for fresh market products and 18 pounds per tray for the freezer market. Once trays are collected, they are delivered to coolers; trays usually weigh 10–20 pounds. Based on research by UC Davis (2015), the total per acre yield is 65,000 pounds delivered to the fresh market and 20,800 pounds delivered to the freezer.

4.8 Cooling

Average cooling costs are $0.50 per tray.

4.9 Selling Costs

Selling costs are market dependent, but based on 2011 figures, these have been estimated at $0.66 per tray.

4.10 Labor and Equipment

Currently, the labor costs associated with agriculture are some of the most variable and unstable costs industrywide, and current trends indicate they are also increasing rapidly.

4.10.1 Labor

Labor costs are variable, but range between $13 and $14 per hour for machine operators and $11 and $12 per hour for general labor.

4.10.2 Equipment Operating Costs

Equipment repair costs were based on the purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the American Society of Agricultural Engineers. Fuel and lubrication costs have been determined by the American Society of Agricultural Engineers and are based on the maximum power takeoff, horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline have been estimated at $3.44 and $3.85 per gallon, respectively.

5 ESTIMATED PRODUCTION COSTS PER ACRE

The following table summarizing production costs per acre (**Table 2**) has been prepared with information derived from the agricultural industry, information provided from the UC Cooperative Extension, and the preparer's estimates. Most information is based on 2011 data.

Table 2
Per Acre Production Costs

Operation – Cash and Labor Costs per Acre							
Operation	*Time (Hours)*	*Labor Cost*	*Fuel*	*Equipment – Lube and Repair*	*Material Cost*	*Custom/ Rent*	*Total Cost*
		U.S. Dollars					
Disk/roll	0.50	8	26	9	0	0	44
Subsoil	0.90	15	47	13	0	0	76
Plow	0.27	4	14	5	0	0	23
Level/smooth	0.50	8	20	5	0	0	33
Fertilize – custom	0	0	0	0	184	15	199
Land prep chisel	0.30	5	16	4	0	0	25
Irrigate – layout	4.00	308	31	10	107	0	456
Shape beds	0.90	15	47	18	0	0	80
Fertilize/pre-planting	0.25	4	4	1	290	0	300
Irrigate – install drip	0.14	2	2	1	327	0	332
Weed bed tops	0	123	14	4	0	0	140
Lay mulch	0.41	12	6	2	572	0	592
Cut roads	0.62	123	14	4	0	0	140
Lay laterals and connect drip	18.0	202	0	0	0	0	202
Cultivate furrows	0.69	11	12	3	0	0	26
Weed furrows	0	0	0	0	9	23	32
Irrigate through drip	29	325	0	0	393	0	718
Punch holes	0.69	11	5	1	0	0	18
Transplant	42	471	0	0	2,925	0	3,396
Hand weeding	76	853	0	0	0	0	853
Worms	0.58	10	6	2	42	0	60
Drip fertilizer	0	0	0	0	79	0	79
Drip fertilizer	0	0	0	0	210	0	210
Disease – Botrytis/mildew	1.17	19	12	4	157	0	192
Insect mite	2.40	27	0	0	120	0	147
Disease – Botrytis/mildew	1.17	19	12	4	265	0	300
Disease –mildew/mites	.58	10	6	2	152	0	169
Disease – mildew	.58	10	6	2	10	0	27
Disease – Botrytis/mildew	.58	10	6	2	157	0	175
Disease Botrytis/Lyngus/mites	.58	10	6	2	138	0	156

Table 2
Per Acre Production Costs

Operation – Cash and Labor Costs per Acre							
Operation	*Time (Hours)*	*Labor Cost*	*Fuel*	*Equipment – Lube and Repair*	*Material Cost*	*Custom/ Rent*	*Total Cost*
		U.S. Dollars					
Disease Botrytis/Lyngus/mites	.58	10	6	2	150	0	168
Harvest	704.22	12,059	33	15	7,514	0	19,621
Field cleanup	1.94	245	30	10	0	23	308
Cooling	0	0	0	0	0	2,210	2,210
Selling costs	0	0	0	0	0	2,917	2,917
Fruit/Vegetable Commission/ Association assessment fees	0	0	0	0	98	0	96
Interest on operating costs @ 5.75%	0	0	0	0	0	0	634
Total operating costs/acre	**889.57**	**14,808**	**368**	**121**	**13,924**	**6,411**	**36,264**

Note: Amounts estimated based on data from UC Cooperative Extension (2011).

6 ESTIMATED REVENUE RETURNS

Table 3 provides an estimate of the revenue returns for the parcels and operations analyzed based on information derived from the agricultural industry, information provided from the UC Cooperative Extension, and the preparer's estimates. The grower/operator currently on site reports that his returns can vary anywhere between negative $5,000 and positive $7,000 an acre; however, they are generally between $4,000 and $5,000 an acre (Ukegawa, pers. comm. 2015).

Table 3
Costs and Returns per Acre

Gross Returns	Quantity/Acre	Unit	Price or Cost/Unit (U.S. Dollars)	Value or Cost/Acre (U.S. Dollars)
Fresh (10-pound tray)	4,4200	Tray	8.25	36,465
Freezer (19-pound tray)	1,156	Tray	5.40	6,242
Total Gross Returns	*5,576*	*Tray*		*42,707*
Operating Costs				
Insecticide – aggregated				475
Fungicide – aggregated				596
Bio- Control – aggregated				120
Herbicide – aggregated				35
Fertilizer – aggregated				763
Custom fertilizer/drip				6,411
Material – aggregated				8,413
Water	28	Acre-inch	17.86	500
Plants	25,000	Thousand	117	29,000
Assessment				
Fresh (10-pound tray)	4,420	Tray	0.02	77
Freezer (14-pound tray)	1,156	Tray	0.02	20
Labor				
Equipment operator	26.63	Hours	13.84	369
Field labor	1,286.87	Hours	11.22	14,439
Machinery				
Fuel – gas	10.48	Gallon	3.85	40
Fuel – diesel	95.13	Gallon	3.44	327
Lube				55
Machinery repair				66
Interest on operating capital				634
Total operating costs/acre				**36,264**
Net returns above operating costs				**6,443**

Note: Amounts estimated based on data from UC Cooperative Extension (2011).

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7 OTHER OPERATIONAL CONSIDERATIONS

The value and therefore the viability of agricultural lands is more dependent on real estate value than its agricultural input value. Prices for land are some of the highest in the country (UC Cooperative Extension 2006). Hence, coupled with the high cost of water, agricultural viability is very reliant on high-value and specialty crops as well as direct consumer access, larger market access, and agricultural innovations such as agritourism. Personal communication with the grower/operator has indicated that market factors have resulted in a reduction in cultivation from 110 acres in the 1960s to 40 acres in 2015 (Ukegawa, pers. comm. 2015). The grower/operator started a u-pick operation 15 years ago (agritourism), which has prolonged the viability of the property, and he is looking for further opportunities to expand production once again and retain the agricultural viability of the parcel. Because much land has lain fallow for over 3 years, which is the minimum requirement in order for certified organic cultivation to begin, the grower/operator is investigating the best options and feasibility for organic crops.

The grower/operator, who has operated a u-pick operation for the past 15 years, is actively seeking other agritourism possibilities in order to retain agricultural viability. The high reliance on the direct marketing opportunities presented by agritourism and the options associated with diversification of revenue sources are attractive from an operational and cost offset standpoint. Importantly, these supplemental operations and opportunities allow the grower/operator to continue to produce and operate as well as provide enhance viability. Without these options, it is likely that the 40 acres currently in cultivation will also fall into a fallow state.

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8 CONCLUSIONS

The analysis above has taken into consideration the following information in the determination that the impacts of the Specific Plan would not impair the viability of the Specific Plan area to remain in active agricultural production:

- Soils and farmland classifications
- Past and current agricultural production and practices in the County
- Per acre production cost estimates
- Estimated revenue returns

In addition, this agricultural viability analysis considers the current market factors and operation information provided by the current grower/operator. In total, these all provide context and are relevant in determining that the proposed land uses have the potential to further ensure the longtime viability of active agriculture on the site.

Soils and Farmland Classifications

As discussed earlier in the analysis, the soils on the subject parcels are primarily Class III soils, and to lesser extent, Class IV soils, and are therefore not strictly considered Prime soils under the FMMP classifications and categories, unless they are irrigated. The subject property does not meet the California Coastal Act standards for prime agricultural land, although the land is suitable for agricultural use and therefore subject to the agricultural resource protection provisions of California Coastal Act Section 30242.

Small Farms in San Diego County

Agriculture in the County is conducted on small farms (with a median farm size of 4 acres; 90% of the County's farms are under 49 acres) and demands high value and specialty crops (County of San Diego 2015a). The high cost of land and the high cost of water, as well as the lack of superior soil quality and the prevalence of slopes unsuitable to large-scale cultivation, necessitate this growing situation. The agricultural economy in the County is highly dependent on greenhouse and small-scale row crops, which are compatible with surrounding non-agricultural uses.

Cost and Revenue Estimates

Per-acre production cost estimates for the crops on the subject parcels are $36,264. The per-acre estimated revenue return above the operating costs for the Specific Plan area crops is $6,443. These numbers are based on information derived from the agricultural industry, information

provided from the UC Cooperative Extension, and the preparer's estimates. The grower/operator currently on site reports that his returns can vary anywhere between negative $5,000 and positive $7,000 an acre but they are generally between $4,000 and $5,000 (positive) an acre (Ukegawa, pers. comm. 2015).

Proposed Specific Plan

A Specific Plan is proposed for the entire 203.4-acre Specific Plan area that would allow 26.7 acres of Visitor-Serving Commercial uses and preserve a total of 176.7 acres in agricultural and open space uses. Approximately 62 acres of row crops grown in the proposed Specific Plan area are currently used by the agricultural operator for various activities related to agricultural production. At any given time, only approximately 40 of those acres are actively cultivated, primarily with u-pick strawberries and various row crops targeted for farmers' markets and farm stands. The Specific Plan designates, in perpetuity, 61.5 of the 176.7 acres of open space lands as active farmland (45.6 Exclusive Agricultural Open Space (EAG-OS) and 15.9 Agricultural Support Open Space (AGS-OS). These active agriculture areas would l continue to consist of u-pick strawberries, row crops targeted for farmers' market and farm stands, and possibly orchards. The Visitor-Serving Commercial uses would be on the northwest portion of the site, thereby minimizing any potential urban/agriculture interface conflicts.

The Specific Plan also provides for farmers' markets, farm stands, agriculture education opportunities, u-pick operations, and a farm-to-table restaurant on the property. These amenities will allow for direct sales and purposing of the produce grown on site and will provide for a complete agritourism destination where visitors can pick their own produce and learn about local and sustainable agriculture. The proposed agritourism uses will reinforce the overall destination appeal of the County, support locally produced agricultural products, and raise the stature of San Diego agriculture.

As previously discussed, due to the high cost of water and operations, the grower/operator on site over the years has had to limit active cultivation to roughly 40 acres of the property. The proposed Specific Plan would preserve 61.5 acres as permanent agricultural production EAG-OS) and agricultural support . This proposed acreage is well over the County average. Strictly comparing Specific Plan area to the overall County average of parcel size and production viability, the answer to whether continued agricultural operations on the property are viable is positive. Based on the analysis provided in the per-acre production cost estimates and the per-acre estimated revenue returns, the answer regarding long-term viability is not quite as clear, but is dependent on the individual growers and the efficiency of their respective farm management plans, prevailing market trends, and development pressures for other land uses.

Agricultural Viability Analysis for the Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail

The proposed Specific Plan would increase the long-term agricultural viability of the Specific Plan area through creation of agritourism opportunities and direct sales and purposing of produce grown on site. The California Coastal Commission (CCC), in its 1982 approval of the Agua Hedionda Land Use Plan, also recognized the potential for long-term agricultural viability on this site through the mixed use approach to agricultural preservation. In 1982, the CCC approved conversion of 45 acres of farmland in the proposed Specific Plan area to "Travel Services" in return for preservation of 155 acres of agricultural lands and open space in the Specific Plan area. The current Specific Plan converts only 26.7 acres to Visitor-Serving Commercial uses consistent with the approved Travel Services designation and preserves the remaining 176.7 acres of the Specific Plan area in agricultural and open space uses.

In the 1982 approval of the Agua Hedionda Land Use Plan, the CCC found that the need for commercial-recreational uses was significant in the area and that development pressures on the agricultural lands in the proposed Specific Plan area were high. The CCC found that the viability of agriculture in this area was limited due to non-prime soils, the high cost of land, and urban/ agriculture conflicts. The CCC found that although continued agriculture was feasible in the area, agricultural production in the Specific Plan area would be better preserved through incentive programs such as the mixed-use concept, where non-agricultural development is allowed on a portion of the site to enhance the agricultural viability of the remaining area. The CCC findings state in part:

> Continued agriculture is feasible even with the above noted constraints; however, it was recognized that a mixed-use program would, on large single-ownership properties, allow for long term continued agricultural production while removing the land speculation which has contributed to the discouragement of continued long term agricultural use. In essence, the mixed use or supplemental use zoning approach allows a landowner to develop a portion of the agricultural lands in exchange for recording an enforceable restriction on the remaining portion of the land limiting use to agricultural activities. Thus, the property owner is afforded a supplemental source of income in addition to income derived from agricultural operations in the mixed-use program, thereby reducing pressures to convert the remaining portion of the agricultural lands. The mixed-use approach to preserving agricultural lands is supported by a recent study of agriculture in the Carlsbad area (prepared by Angus McDonald) titled *Enhancement of Coastal Agriculture*, dated March 1981.
>
> In conclusion, the Commission finds that the policies of the Agua Hedionda LUP which apply the mixed-use approach to the SDG&E south shore property east of I-5 are appropriate, consistent with previous Commission actions on the balance

of the Carlsbad LCP and the San Dieguito LUP, and in conformance with Section 30242 of the Coastal Act regarding conversion of non-prime agricultural lands (CCC 1982).

The proposed Specific Plan would not impair the viability of the Specific Plan area to remain in active agricultural production and would likely increase the economic viability of agriculture on site through agritourism and direct sales opportunities. In addition, the mixed-use approach of the Specific Plan would eliminate the pressures to convert the remaining agricultural lands in the proposed Specific Plan area and would preserve approximately 176.7 acres of agricultural and open space lands in perpetuity.

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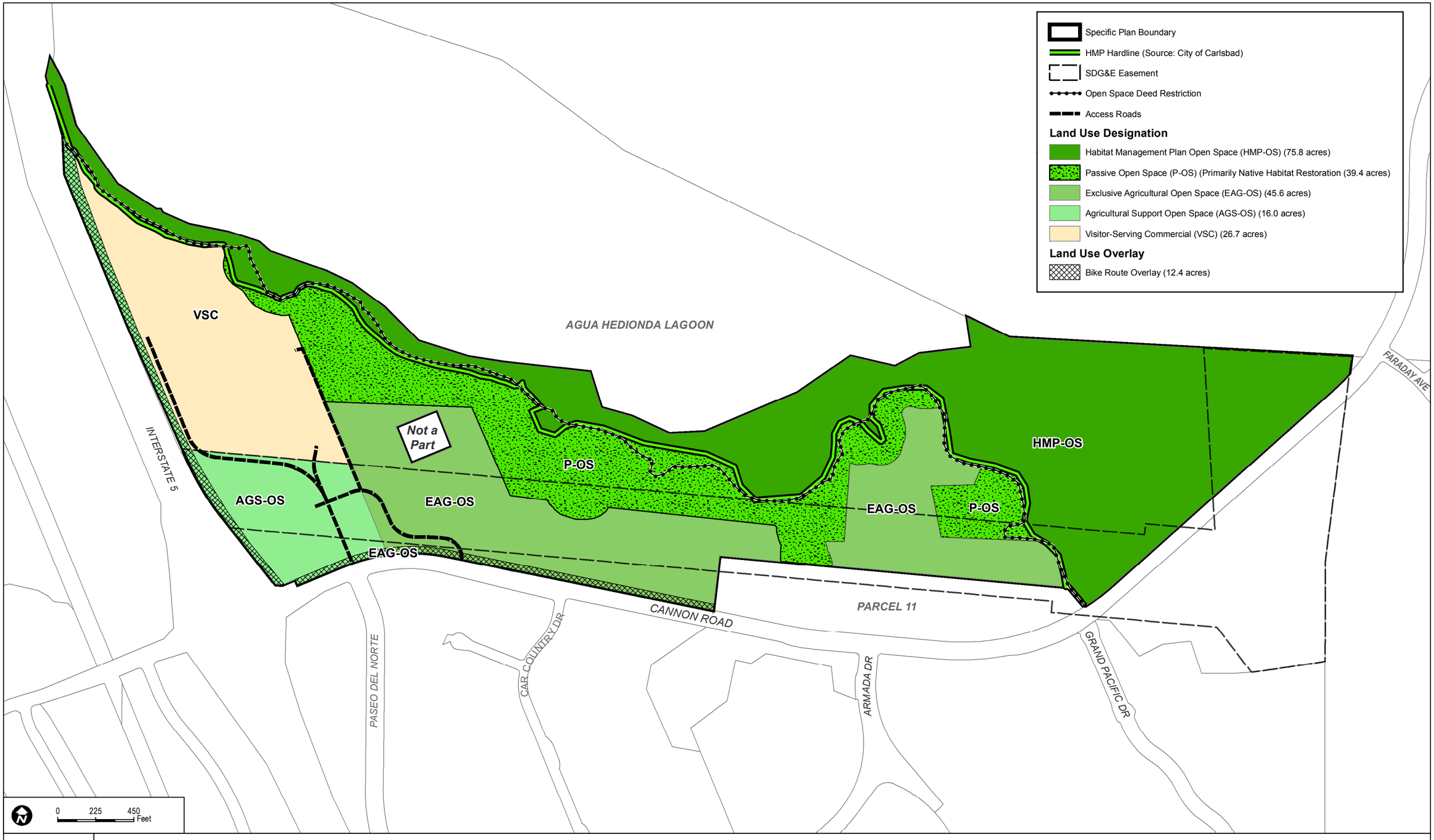

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SOURCE: Hunsaker 2015

FIGURE 1

Conceptual Land Use Plan

Agua Hedionda 85/15 Specific Plan Environmental Analysis

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