Technical Memorandum

To: Steve Coyne, Back Bay Barrels LLC – 3857 Birch Street #521
Newport Beach, CA 92660

From: Nick Johnson, Johnson Aviation, Inc.
Date: December 6, 2024

Subject: Aircraft Hazard and Land Use Risk Assessment & Wildlife Hazard Management Analysis – Snug Harbor Project

A. Introduction

This technical memorandum is prepared for the Snug Harbor Project located at 3100 Irvine Avenue in the City of Newport Beach (Project). John Wayne Airport (SNA or Airport) property is located approximately 2,700 feet to the north of the Project site. This technical memorandum compiles the publicly available and relevant information related to the Aircraft Hazard and Land Use Risk Assessment and Wildlife Hazard Management Analysis for the Project. Information presented in the Airport Environs Land Use Plan (AELUP) for SNA is also reviewed, specifically as it relates to aviation safety and aircraft overflight. Additionally, a solar photovoltaic (PV) glare analysis was completed and is provided in a separate Technical Memorandum.

B. Project Description

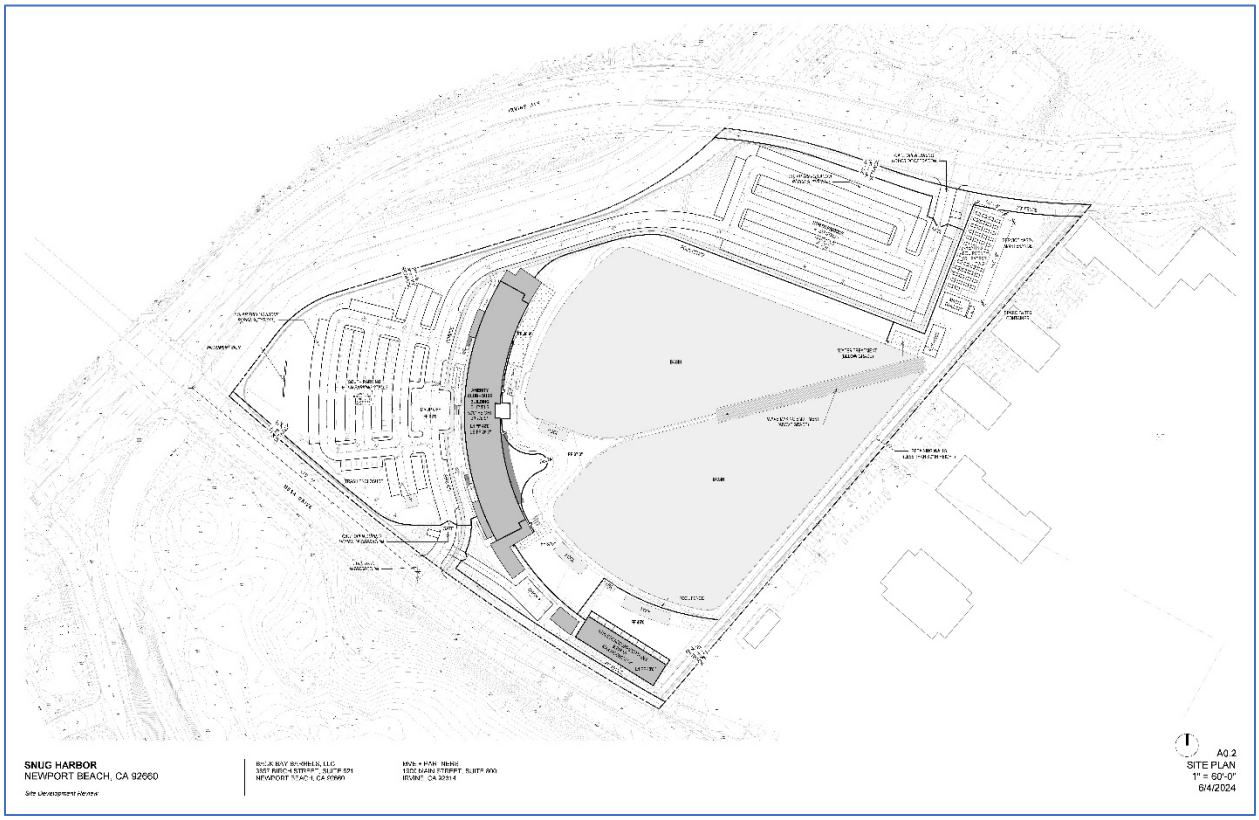
The Project site is located at 3100 Irvine Avenue and the northern boundary of the City of Newport Beach, near the California 73 Toll Road (SR73) and the California 55 Freeway (SR 55); between Irvine Avenue and Mesa Drive. John Wayne Airport property is located approximately 2,700 feet to the north (Figure 1).

Figure 1 - Project Site

Commercial office buildings adjoin the Project site to the east, and the Newport Beach Santa Ana Heights Fire Station and Training Center is located adjacent to the southeast corner of the Project site. The immediate surrounding area is largely built-out with low-rise offices, commercial development, apartment complexes, and single-family residences. The Upper Newport Bay Nature Preserve is located approximately one-quarter mile to the south of the Project site. The Upper Newport Bay State Marine Conservation Area, San Diego Creek and Irvine Ranch Water District (IRWD) San Joaquin Marsh & Wildlife Sanctuary are located south, southeast and east of the Project site, respectively.

The proposed Project site is approximately 15.38 acres and would replace an existing driving range and three holes of golf (golf course holes 1, 2, and 9), which are a part of the larger Newport Beach Golf Course. The Project elements would include a new surf lagoon, associated outdoor recreation, and ancillary uses. The focal use of the Snug Harbor Project is a proposed seven-acre surf lagoon. The lagoon would be divided into four distinct areas including two outside surf breaks for left and right experienced surfers as well as two inside breaks (smaller waves) for left and right beginning surfers. Snug Harbor would include a variety of amenities ancillary to the surf lagoon such as health and fitness facilities, a surf-related retail store, locker rooms, storage lockers, and food service. The Site Plan is shown in Figure 2. The Project site is within the AELUP notification area for John Wayne Airport as shown in Figure 3.

Figure 2 – Project Site Plan



The proposed main building would be three levels with a basement. The amenities that are open to the public would be primarily located on the first floor and a portion of the second floor with the third floor reserved for staff and member use only. The basement level would contain maintenance and storage related uses. A second building located at the southeast corner of the Project site would house 20

bungalow-style athlete accommodations. The general space plan for these two buildings is shown on Table 1.

The proposed Project would have a maximum main building height of 48 feet and the proposed athlete accommodations building would have a maximum height of 38 feet. A use permit would be required to address the proposed heights.

A collection of solar panels located in the major parking areas (as carports) and on the building and patio shade structures would provide power for the wave machine as well as water heating for the lagoon.

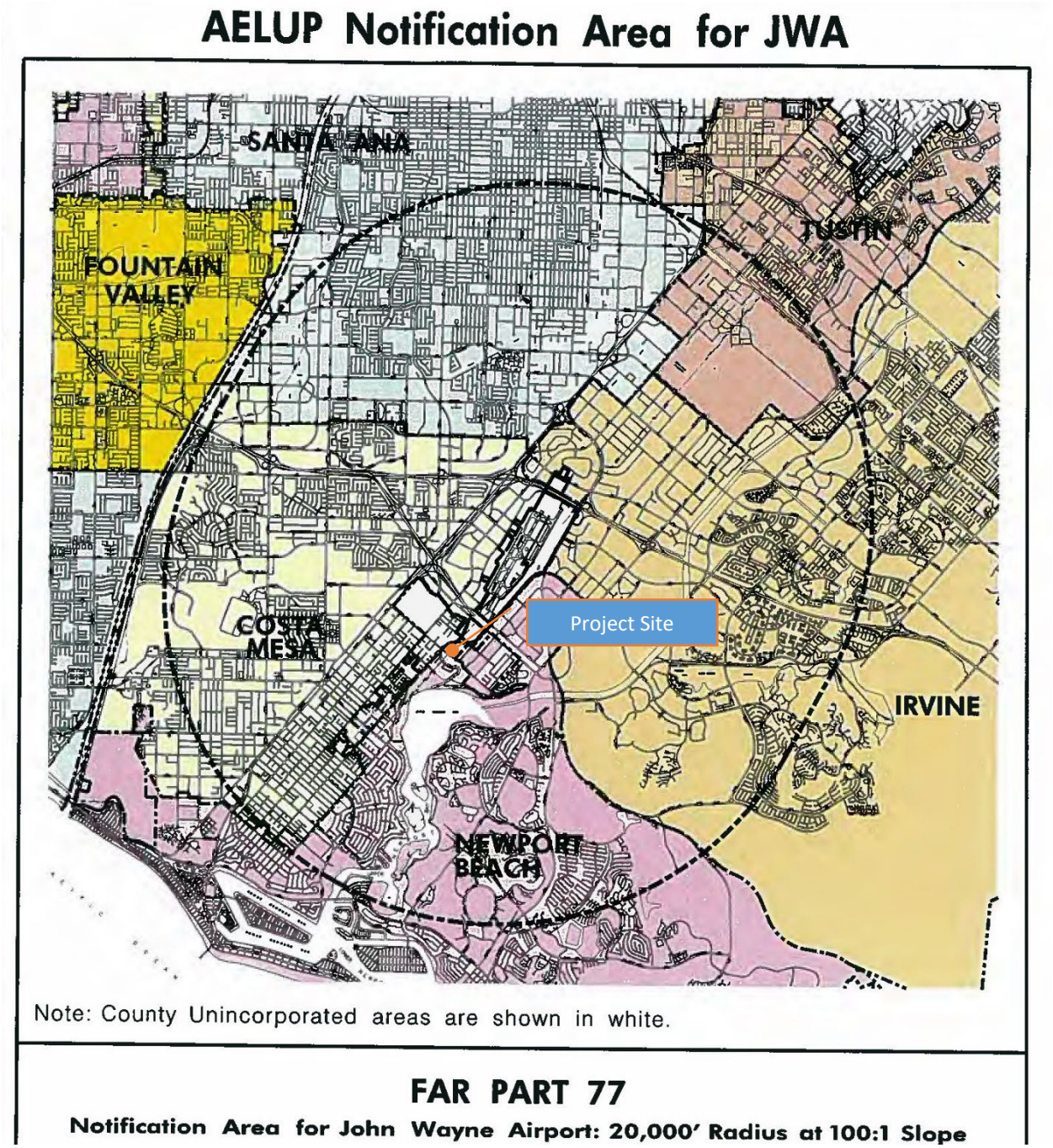
Table 1 – Building Area Summary

Main Building		
Basement	4,085 sf	Staff Area, mechanical
Level 1	17,830 sf	Surf academy, change room and locker room, food and beverage service, surf shop
Level 2	15,324 sf	Fitness, members locker room and lounge, spa
Level 3	11,982 sf	Operations, recording studio, VIP suites
Total	49,221 sf	
Athlete Accommodations		
Level 1	4,716 sf	10 units
Level 2	4,716 sf	10 units
Total	9,432 sf	
Total Building Area	58,653 sf	20 units

The City's General Plan designation for the Project site is Parks and Recreation (PR), which applies to land used or proposed for active public or private recreational use. Permitted uses include parks (both active and passive), golf courses, marina support facilities, aquatic facilities, tennis clubs and courts, private recreation, and similar facilities. The proposed outdoor recreation use is consistent with the Parks and Recreation General Plan land use designation, which allows for public and private recreational uses.

The Project site is also located within the Santa Ana Heights Specific Plan, which provides the zoning regulations for the property. The zoning designation for the Project site is Open Space/Recreation (OS/R). Permitted uses, subject to a use permit, include golf courses and outdoor commercial recreation. The Specific Plan provides for a building height maximum of 18 feet unless a use permit is approved.

Figure 3 - Project Site and AELUP Notification Area



C. John Wayne Airport Accidents

The 2011 California Airport Land Use Planning Handbook (Handbook) is the guiding land use document under State law[1]. To better define accident risk near airports in the Handbook, and recommend airport safety zones and compatibility criteria, aircraft accident research was completed in 2002 and 2010. The results of this research can be found in Appendix E of the Handbook. The 2002 research analyzed accident data between the years 1983 and 1992. The 2010 research is an update to the information provided in the 2002 Handbook and focuses on accidents that occurred between the years 2000 and 2009, exclusively in California (research in 2002 focused on accident data nationwide).

This research is important from a land use planning perspective, because the risk associated with where accidents may occur in the future based on where they have occurred in the past, comes down to frequency and consequences. It's also the first step in creating and justifying airport safety compatibility zones. These two studies form the basis for the recommended safety compatibility zones in the 2011 Handbook.

Some of the major findings from the research in the 2002 Handbook and 2011 Handbook are as follows[2]:

- Over two-thirds of both general aviation (68%) and commercial (67%) aircraft accidents take place on an airport.
- Another 3% of general aviation and 7% of commercial aviation are enroute accidents— defined as ones occurring more than 5 miles from an airport.
- 29% of general aviation and 26% of commercial aviation accidents can be classified as airport-vicinity accidents—within 5 miles of an airport.
- Three-fourths (77%) of all general aviation landing accidents occur during touchdown or roll-out (usually hard or long landings, ground loops, etc.). The remaining 23% of general aviation landing accidents take place in the landing pattern, on final approach, or during a go-around attempt.
- Accidents on or near the runway range from 64% for air carrier operations, to 51% for commuter operations, to 58% for air taxi operations.
- Accident sites tend to be fairly close to the extended runway centerline and closer to the runway end than at points farther away.
- The greatest proportion of general aviation takeoff/departure accidents (some 65%) take place during the initial climb phase.
- For single-engine airplanes, a high percentage of accidents can be expected to occur within 7,000 to 9,000 feet of the start of takeoff roll.
- For multi-engine airplanes, including jets, a high percentage of accidents can be expected to occur within 5,000 to 10,000 feet of the start of takeoff roll.
- Approximately 86% of all general aviation accidents and 61% of commercial aircraft accidents take place during dawn, daylight, or dusk with about 14% of general aviation accidents and 39% of commercial aviation accidents occurring in hours of darkness.

[1] California Public Utilities Code, Section 21674.7(a).
[2] This data is summarized from the 2011 California Airport Land Use Planning Handbook, Appendix E.

A review of aircraft accidents at John Wayne Airport as found in the National Transportation Safety Board (NTSB) database[3] indicates that there have been 66 accidents investigated by the NTSB at SNA between 1982 and 2024 (through October 9th, 2024). Of the investigated accidents, 14 were fatal and 57 (90%) occurred during the takeoff, climb, approach, landing or traffic pattern phase of flight. Of the fatal accidents, one person on the ground sustained minor injuries. Nine accidents (9%) were caused by wake turbulence. Wake turbulence is a type of turbulence created by the wings of a heavy aircraft, like a commercial jet, and can linger for a significant amount of time after the passage of the aircraft, sometimes more than a minute. This type of turbulence can seriously upset or invert a smaller aircraft that encounters it, either in the air or on the ground.

Over the 42-year review period, five fatal accidents involving aircraft using SNA were generally located south of the Airport and within 3.5 miles. During this same period, over 15 million aircraft operations took place at SNA (0.033 fatal accidents per 100,000 aircraft operations). The five fatal accident sites south of the Airport are shown in Figure 4 and described in more detail below.

Most recently, on January 30, 2018, a private helicopter pilot departed with three passengers on a cross-country flight. The helicopter reached a maximum altitude of 500 feet mean sea level (MSL) before it entered a rapid descent and impacted homes in Newport Beach (Egret Court near Shearwater Place in the Bayview Terrace community) and the ground less than one mile from the Airport on a southeasterly heading. There were three fatalities, one person seriously injured and one person on the ground sustained minor injuries.

On November 21, 2010, during a cross-country flight at night, the pilot contacted air traffic control (ATC) that the Beech 19 aircraft had run out of fuel. The pilot was unable to reach the Airport and landed in an ecological reserve at “Back Bay”, south of the Airport, in about three feet of water. The accident resulted in three fatalities.

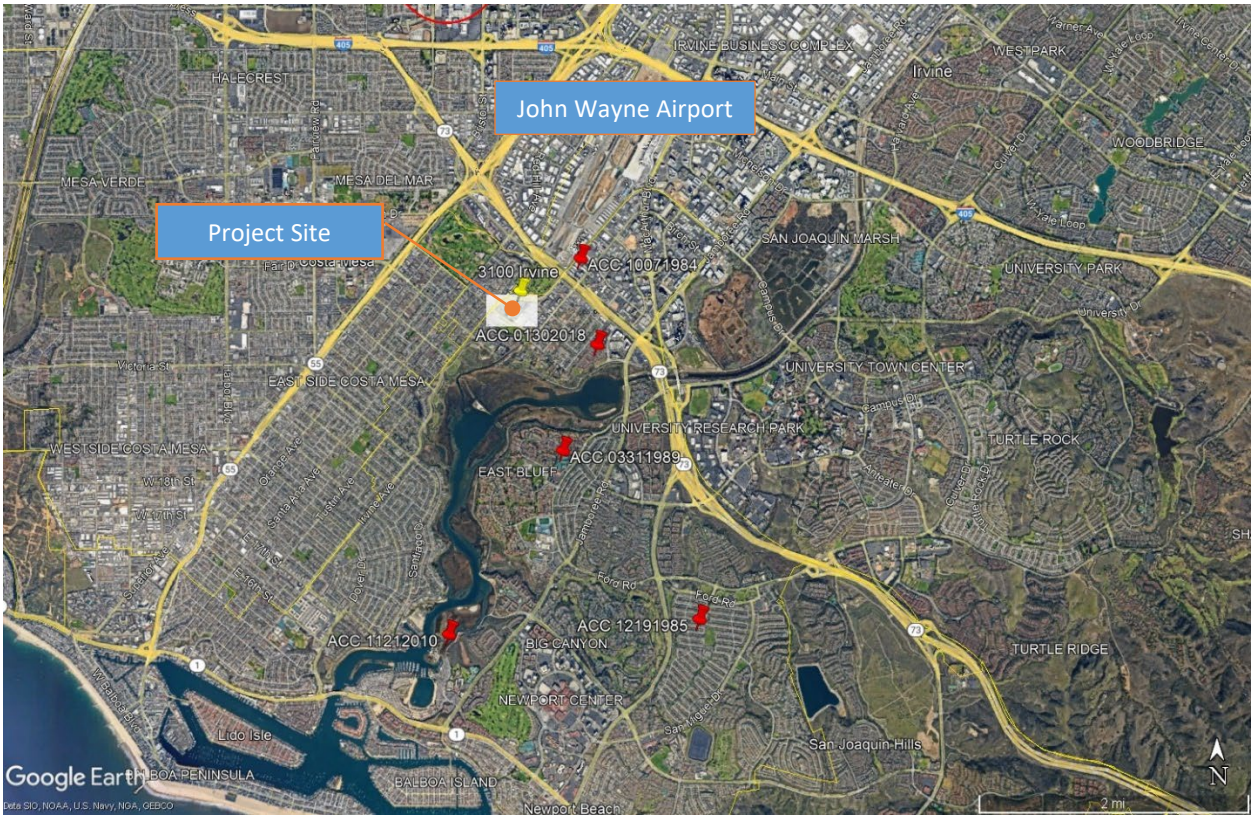
On March 31, 1989, a Piper aircraft took off from the Airport with a trail of black smoke, as per several witnesses. The aircraft staggered off the ground and never got above 100 feet above ground level (AGL). The pilot contacted ATC that the aircraft was coming back to the runway, but shortly thereafter entered a steep left turn, stalled and crashed into tennis courts (Newport Beach Tennis Club) approximately two nautical miles (nm) from the Airport. The accident resulted in five fatalities.

On December 19, 1985, a Piper aircraft on a cross country flight from San Diego to Torrance declared an emergency because the engine had quit and requested vectors to the Airport. The pilot received clearance to land on either runway but three minutes later told ATC that he did not think he was going to reach the Airport. The aircraft subsequently collided with trees, a house, and a fence in a residential area approximately three nm from the Airport. The accident resulted in one fatality.

On October 7, 1984, shortly after takeoff, the propeller separated from a Beech aircraft. The aircraft continued to climb straight ahead and then was observed in a steep left turn and crashed into the roof of a building approximately one quarter mile southeast of the Airport. There was one fatality.

[3] https://www.ntsb.gov/Pages/home.aspx

Figure 4 – Accidents South of Airport and Within Approximately 3.5 Miles.



The historical accident data at SNA is in line with the major findings from the research in the 2002 Handbook and 2011 Handbook. A summary of the accidents reported in the NTSB database is provided in Appendix A of this Report. The full NTSB reports for the five accidents south of the Airport and within 3.5 miles can be reviewed in Appendix B.

The California Airport Land Use Planning Handbook requires the assessment of historical accident data at an airport as a first step in defining airport safety zones within an airport land use compatibility plan. Each safety zone carries a certain level of risk and this risk is addressed by land use and density/intensity policies.

The Orange County Airport Environs Land Use Plan for John Wayne Airport (AELUP) was last amended April 17, 2008, by the Airport Land Use Commission (ALUC). The AELUP intends to safeguard the general welfare of the inhabitants within the vicinity of the airport, "to protect the public from the adverse effects of aircraft noise, to ensure that people and facilities are not concentrated in areas susceptible to aircraft accidents, and to ensure that no structures or activities adversely affect navigable airspace".

Safety and compatibility zones "depict which land uses are acceptable and which are unacceptable in various portions of airport environs. The purpose of these zones is to support the continued use and operation of an airport by establishing compatibility and safety standards to promote air navigational safety and to reduce potential safety hazards for persons living, working or recreating near JWA". The John Wayne Airport Safety Compatibility Zones were developed using the California Airport Land Use Planning Handbook (Handbook) January 2002 Edition. As noted previously, the Handbook was updated in 2011 but there has not been a subsequent update to the AELUP.

The Project site is located within the AELUP Safety Zones 2, 4, and 6 as shown in Figure 5. The AELUP uses further descriptions from the 2002 Handbook to define safety risk and basic land use compatibility in these zones. For the purpose of this analysis, descriptions from the most current 2011 Handbook are used. As shown in Figure 6, Zone 2, the Inner Approach/Departure Zone, poses a higher risk to persons in the area for aircraft accidents. Aircraft are typically overflying this zone at lower altitudes and emergency landings from straight out departures can be more prevalent in this zone than in other zones. Figure 7 shows a summary of accident risk and land use compatibility for Zone 4, the Outer Approach/Departure Zone. This zone has moderate aircraft accident risk; aircraft emergencies can occur over this area approximately two to six percent of the time. Zone 6, the Traffic Pattern Zone, is shown in Figure 8. This zone has the lowest risk for aircraft accidents and no land use is prohibited.

Figure 5 - Project Site and AELUP Safety Compatibility Zones

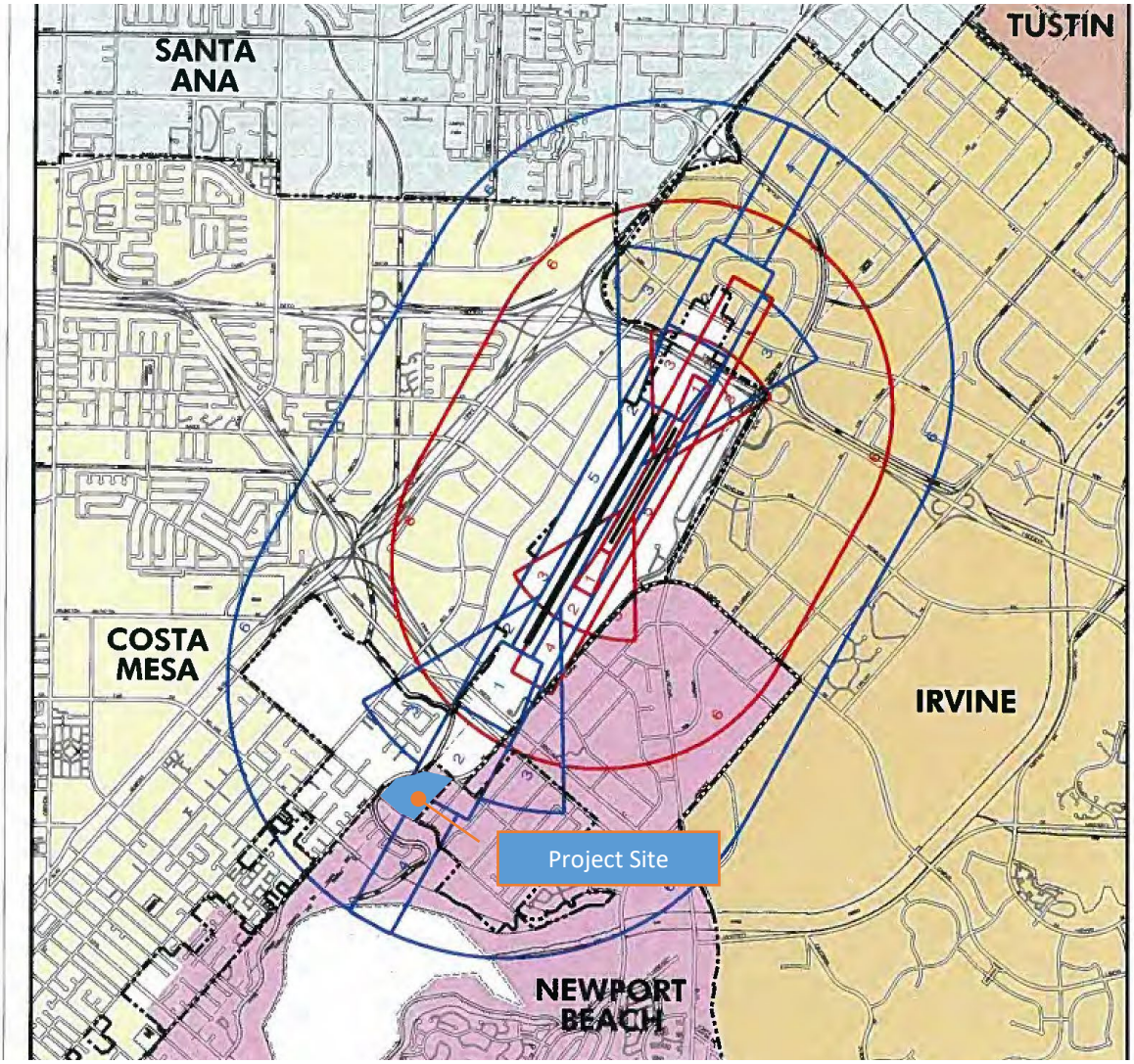


Figure 6 – Zone 2 Risk and Compatibility

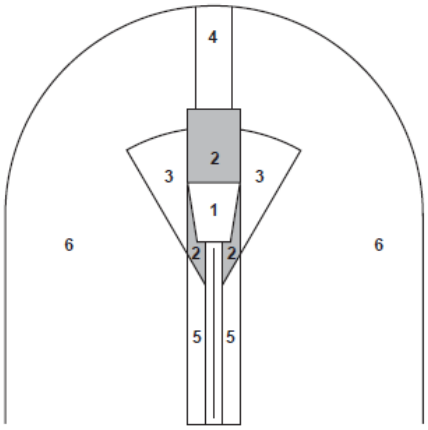
Nature of Risk

- Normal Maneuvers
  - Aircraft overflying at low altitudes on final approach and straight-out departures
- Altitude
  - Between 200 and 400 feet above runway
- Common Accident Types
  - Arrival: Similar to Zone 1, aircraft under-shooting approaches, forced short landings
  - Departure: Similar to Zone 1, emergency landing on straight-out departure
- Risk Level
  - High
  - Percentage of near-runway accidents in this zone: 8% - 22%

FINAL APPROACH

Basic Compatibility Policies

- Normally Allow
  - Agriculture; non-group recreational uses
  - Low-hazard materials storage, warehouses
  - Low-intensity light industrial uses; auto, aircraft, marine repair services
- Limit
  - Single-story office buildings
  - Nonresidential uses to activities that attract few people
- Avoid
  - All residential uses except as infill in developed areas
  - Multi-story uses; uses with high density or intensity
  - Shopping centers, most eating establishments
- Prohibit
  - Theaters, meeting halls and other assembly uses
  - Office buildings greater than 3 stories
  - Labor-intensive industrial uses
  - Children's schools, large daycare centers, hospitals, nursing homes
  - Stadiums, group recreational uses
  - Hazardous uses (e.g. aboveground bulk fuel storage)



Refer to Chapter 3 for dimensions.

Figure 7 – Zone 4 Risk and Compatibility

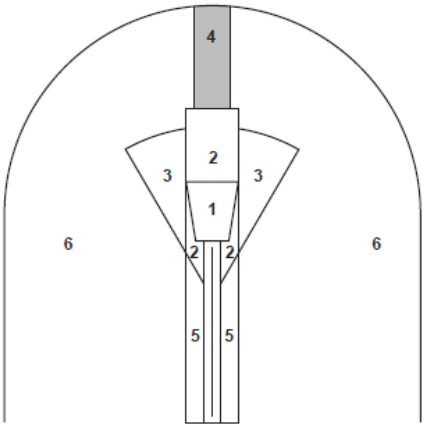
Nature of Risk

- Normal Maneuvers
  - Approaching aircraft usually at less than traffic pattern altitude. Particularly applicable for busy general aviation runways (because of elongated traffic pattern), runways with straight-in instrument approach procedures, and other runways where straight-in or straight-out flight paths are common
- Altitude
  - Less than 1,000 feet above runway
- Common Accident Types
  - Arrival: Pilot undershoots runway during an instrument approach, aircraft loses engine on approach, forced landing
  - Departure: Mechanical failure on takeoff
- Risk Level
  - Moderate
  - Percentage of near-runway accidents in this zone: 2% - 6%

LONG FINAL

Basic Compatibility Policies

- Normally Allow
  - Uses allowed in Zone 3
  - Restaurants, retail, industrial
- Limit
  - Residential uses to low density
- Avoid
  - High-intensity retail or office buildings
- Prohibit
  - Children's schools, large daycare centers, hospitals, nursing homes
  - Stadiums, group recreational uses
- Other Factors
  - Most low to moderate intensity uses are acceptable. Restrict assemblages of people
  - Consider potential airspace protection hazards of certain energy/industrial projects



Refer to Chapter 3 for dimensions.

Figure 8 – Zone 6 Risk and Compatibility

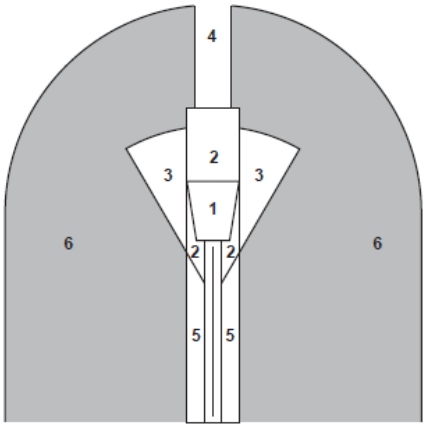
Nature of Risk

- Normal Maneuvers
  - Aircraft within a regular traffic pattern and pattern entry routes
- Altitude
  - Ranging from 1,000 to 1,500 feet above runway
- Common Accident Types
  - Arrival: Pattern accidents in proximity of airport
  - Departure: Emergency landings
- Risk Level
  - Low
  - Percentage of near-runway accidents in this zone: 18% - 29% (percentage is high because of large area encompassed)

IN TRAFFIC PATTERN

Basic Compatibility Policies

- Normally Allow
  - Residential uses (however, noise and overflight impacts should be considered where ambient noise levels are low)
- Limit
  - Children's schools, large day care centers, hospitals, and nursing homes
  - Processing and storage of bulk quantities of highly hazardous materials
- Avoid
  - Outdoor stadiums and similar uses with very high intensities
- Prohibit
  - None



Refer to Chapter 3 for dimensions.

Level of Risk at Project Site

The first step to understanding level of risk more specifically, and at the Project site, is to review aircraft operations and runway use at SNA. The most recent FAA Terminal Area Forecast (TAF), issued January 2024, notes that there were 328,889 total operations at SNA in 2022, and 367 based aircraft. Air carrier operations accounted for 93,918 of those operations, 444 of those operations were military, and the rest were attributed to general aviation. The John Wayne Airport General Aviation Improvement Program (GAIP) Environmental Impact Report (EIR) further broke down its operations data by fleet mix for its "existing conditions", which were based on the year 2016:

> *In 2016, there were 284,246 aircraft operations at JWA. Of these operations, 91,522 were large and regional jets, 9,798 were turbo prop aircraft, 31,712 were business jets, and 3,862 were helicopter. The remaining 147,352 were propeller driven aircraft. In summary, there are 91,522 commercial operations and 192,724 general aviation operations at JWA.*

The EIR states the following with regards to operations and runway use at SNA based on existing conditions (2016):

> *The flight paths at JWA are well established to take advantage of the runway configuration and prevailing wind conditions. Runway 20R/02L is approximately 5,700 feet long and is the only runway suitable for larger commercial aircraft. With winds predominantly coming from the ocean, aircraft typically depart to the southwest and arrive from the northeast about 95 percent of the time with slight variations from year to year. The reverse (depart to northeast and arrive from southwest) occurs primarily when Santa Ana wind conditions occur, but there are times where winds aloft, or other weather conditions may cause operations to go into reverse.*
>
> *Departures to the southwest proceed one (1) nautical mile and turn left approximately 20 degrees to generally follow Newport Bay. Arrivals use a straight in approach from the northeast to Runway 20R, generally lining up with the runway centerline over Anaheim Hills. Additionally, aircraft arriving from the northwest arrive from the ocean over Huntington Beach on a downwind path that is parallel to JWA after which a right base leg turn to Runway 20R begins. This turn begins anywhere over a wide area starting near South Coast Plaza extending to the Riverside Freeway.*

The EIR further noted that for existing conditions (2016), large jets, regional jets, and business jets, predominantly used Runway 20R for arrivals and departures. Runway 20L was predominantly used by general aviation prop-powered aircraft.

Because the predominant direction of aircraft departing SNA is to the southwest and aircraft arriving into SNA is from the northeast (about 95 percent of the time), the Project area would mostly be exposed to overflight by aircraft departing SNA to the southwest, therefore accident risk over the Project area is also predominantly from aircraft departing SNA. As per accident trends, there is generally a lower rate of accidents that occur during takeoff (departure) versus during landing (on approach). At SNA, 10 of the 66 accidents reported by the NTSB between 1982 and 2024 occurred during the takeoff phase of flight. All of those ten accidents, except for one, were attributed to general aviation operations.

The Handbook provides a plot of the approximate location of general aviation departure-related accidents for airports nationwide for the period 1983-1992 (shown as circles). That same plot in the Handbook also includes an analysis of 154 accidents in California between 2000 and 2009 (shown as X's). That plot is shown in Figure 9, is lined up with Runway 20L, and shows the Project site and actual accident locations south of the Airport (within 7,500 feet from the departure end of the runway), for perspective. The plot is lined up with Runway 20L because that runway is used by general aviation aircraft approximately 50 percent of the time according to the EIR.

Figure 9 – Handbook Accident Research and Project Site

Using the accident data in the Handbook and from the NTSB database for SNA, it is possible to develop a rough order of magnitude estimate of accident risk at the Project site. There were no actual SNA-recorded accidents in the Project area, nor would any accidents have occurred in the Project area based on the 2011 Handbook accident research. Since there was a potential of one accident occurring in the Project area based on the 2002 Handbook research, for the purpose of this rough order of magnitude estimate, only the Handbook's accident research between 1983 and 1992 is included (873 accidents).

Approximately 1, or 0.115%, of the 873 total accidents represented in the 1983 to 1992 Handbook database would have occurred within the Project site.

Over the most recent ten-year period, 2014-2024, SNA had 11 accidents listed in the NTSB database, however, only two occurred during the takeoff or departure phase of flight (the Project is located in the departure path of Runways 20R and 20L). During this same time period there were over 3 million aircraft operations at SNA. This is approximately a risk rate of 0.067 accidents per 100,000 aircraft operations.

Combining these two figures (0.3 accidents per year) provides an estimate of the chances of an accident per year on the Project site as 0.035% per year. Considering that aircraft typically depart to the southwest about 95 percent of the time, brings the chances of an accident per year on the Project site to 0.033% per year.

In terms of the annual risk to an individual on the Project site, if there is a 0.033% chance of an on-site accident per year, and as per the Handbook, approximately, 0.11% of general aviation aircraft accidents result in fatalities to people on the ground, this yields a 0.000036% chance of a fatality per year, or an approximate risk of 0.036 in 100,000 operations. Therefore, impacts from potential aircraft accidents would be less than significant.

D. Wildlife Hazard Management Analysis

The 2011 California Airport Land Use Planning Handbook recognizes that "A variety of land uses, facilities, and structures on and near airports can create wildlife hazard attractants that pose a threat to aircraft operations. Examples of these include sanitary landfills, water management facilities, ponds built for recreational use, wetlands, agricultural areas, natural areas, and landscaping." These areas may provide food and drinking sources, wildlife corridors, roost sites, migratory flyway stop over sites or numerous other functions that may benefit wildlife, while creating a hazard to aircraft operations. Parks and golf courses, with their large grassy areas and water features, may also act as attractants to wildlife. Special attention should be given to avoiding open sources of garbage and certain types of vegetation on these land uses near airport operations areas. Airport owners and project proponents are encouraged to assess potential wildlife hazard attractants on and near airports and to work to avoid or mitigate the establishment of non-compatible land uses.

FAA Advisory Circular 150/5200-33C, Wildlife Hazard Attractants on and near Airports, recommends the use of minimum separation criteria for land uses that attract wildlife to the vicinity of airports; into, or across the airport's approach or departure paths or aircraft operations areas. Generally, the FAA recommends a distance of 5 miles between the airport's aircraft operations area and a wildlife attractant. Specifically, for airports serving turbine-powered aircraft, the FAA recommends a separation distance of 10,000 feet between an airport's operations area and a wildlife attractant. Figure 10 depicts the FAA's recommended separation standards.

Whether these separation criteria are feasible, or not, airport operators, local land use planners and developers should give them consideration to determine whether a development plan has the potential to impact aircraft operations by attracting wildlife, whether design changes should be made, and whether any mitigation measures need to be enacted.

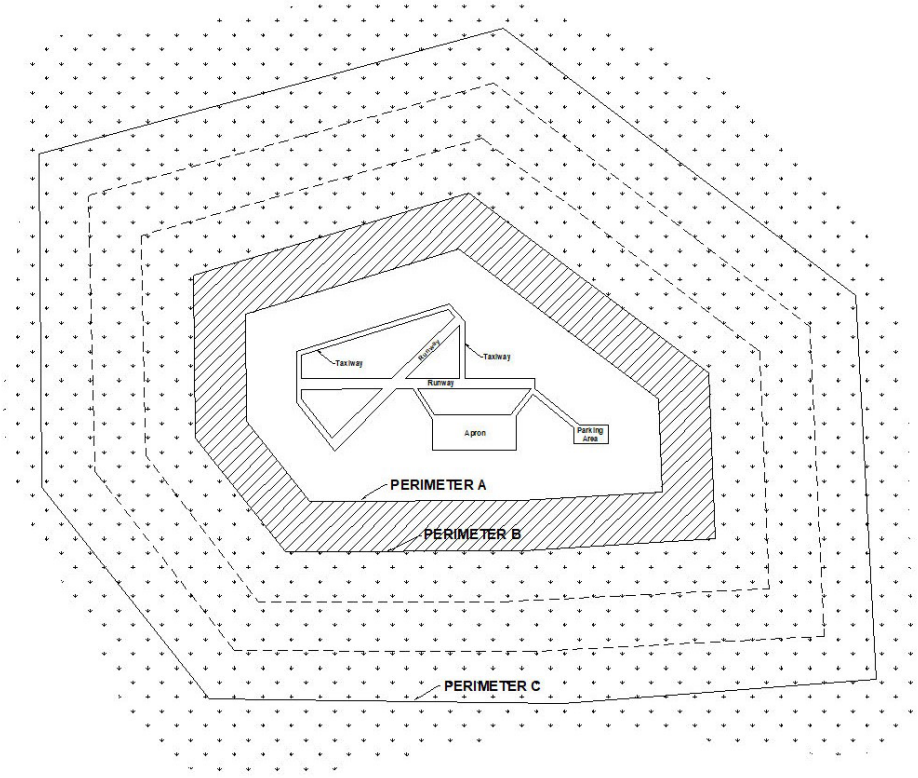
For projects that are located within 5 miles of the airport's aircraft operations area, the FAA may review development plans, however, the FAA is not a permitting agency for land use modifications, therefore their review is advisory in nature. FAA review can be initiated by using FAA Form 7460-1, Notice of Proposed Construction or Alteration. Project proponents can contact the appropriate FAA Regional Airports Division Office for assistance with the notification process prior to submitting Form 7460-1.

The Newport Beach Golf Course, which is just south of SNA, is considered a wildlife attractant and the Snug Harbor surf lagoon would be situated on the northerly portion of the golf course. The surf lagoon would be located approximately 2,700 feet south of SNA and would be considered as having the potential to attract wildlife hazards. Water in general, is considered a wildlife attractant, however, this Project is a type of pool with no food sources or resting or nesting sites like those found in an ocean or the Upper Newport Bay ecological preserve. While the Project has the potential to be a wildlife attractant like the golf course, design, operational, and monitoring initiatives would mitigate most risk associated with attracting wildlife, therefore impacts would be less than significant.

In reviewing the 66 accidents at SNA found in the National Transportation Safety Board (NTSB) database between 1982 and 2024, none were caused by a wildlife strike. In reviewing the FAA's wildlife strike database[4], there were 669 wildlife strike incidents reported for SNA between 1990 and 2024 (through June 2024). There was a total of 305,523 wildlife strike incidents across airports in the United States during the same time frame.

[4] https://wildlife.faa.gov/search

Figure 10 – FAA Recommended Wildlife Attractant Separation Distances



PERIMETER A: For airports serving piston-powered aircraft, it is recommended hazardous wildlife attractants be 5,000 feet from the nearest aircraft operations area.

PERIMETER B: For airports serving turbine-powered aircraft, it is recommended hazardous wildlife attractants be 10,000 feet from the nearest aircraft operations area.

PERIMETER C: Recommended for all airports, 5-mile range to protect approach, departure and circling airspace.

Source: FAA Advisory Circular 150/5200-33B

Project Design and Operation

The Project proposes a new surf lagoon, associated outdoor recreation, and ancillary uses on approximately 15.38 acres. The Project would be part of the larger Newport Beach Golf Course. The Project is located approximately 2,700 feet south of SNA property, which is near the airport operations area.

The Project site currently has approximately 75 trees growing along the perimeter of the property and the Santa Ana-Delhi Channel is located along the westerly Project site boundary. The northerly portion of the golf course, that would partially be converted to the Project use, also currently has a water feature.

The focal use of Snug Harbor is a 7-acre surf lagoon. The lagoon would be divided into two outside surf breaks for left and right experienced surfers as well as two inside breaks (smaller waves) for left and right beginning surfers. The maximum number of participants in the lagoon is assumed to be 72 people with an average hourly usage of 35-45 people. The wave mechanics can be changed at any time to alter the wave experience of the lagoon. The hours of operation would be similar to the John Wayne Airport Commercial Curfew and General Aviation Noise Ordinance that restrict aircraft arrivals and departures. The presence

of surfers and other users would further discourage bird use of the surf lagoon. Further, the lack of food sources in the surf lagoon would not create an attractant to sea birds and other large water fowl, particularly when compared to the rich sources of food and other attractants within the Upper Newport Bay Nature Preserve and Ecological Reserve, San Diego Creek and the San Joaquin Marsh & Wildlife Sanctuary.

The outdoor areas of Snug Harbor would include seating and lounging areas around the surf lagoon, wave viewing platforms for spectators, private cabanas with bathrooms and showers, and three warming pools and a spa. Snug Harbor includes a variety of amenities ancillary to the surf lagoon such as health and fitness facilities, a surf-related retail store, locker rooms, storage lockers, and food service. The Project site would also house 20 bungalow-style athlete accommodations. Proposed beach theme native planting would surround the wave pool, and in adjacent outdoor areas would complement the parking lot and exterior landscape areas.

The facility would employ approximately 50 full-time and part-time employees with a range of responsibilities from executive management to water safety to custodial and cleanliness duties. The surf-themed retail shop, restaurant and bar would staff additional employees based on volume and standards consistent with a high-end recreation facility. This level of human activity on the Project site would further discourage birds and wildlife on the property.

Area Wildlife and Attractants

As described in the John Wayne Airport General Aviation Improvement Program (GAIP) Environmental Impact Report (EIR), the Santa Ana River Basin, which feeds into the Santa Ana Delhi Channel and Newport Bay supports a variety of habitats and wildlife. Aquatic habitats, estuarine habitats, invertebrates, prey species used by waterfowl and other wildlife, marine habitats, vegetation (e.g., kelp), fish and shellfish and wildlife (e.g., marine mammals, waterfowl and shorebirds) are all present in these natural areas.

The Airport's Wildlife Hazard Management Plan (WHMP) identifies the following off-Airport Wildlife attractants:

> *San Joaquin Marsh & Wildlife Sanctuary - Located one mile southeast of SNA on Irvine Ave, the San Joaquin Marsh encompasses 300 acres of land including San Diego Creek and coastal wetlands. The area serves as a key component for the Irvine Ranch Water District's natural water treatment system. Facilities for the Audubon Society of Orange County are also located within this sanctuary. The University of California, Irvine is directly adjacent to the marsh sanctuary.*
>
> *Upper Newport Bay - Upper Newport Bay Nature Preserve and Ecological Reserve is located approximately one mile south of SNA and is directly underneath the departure path. The Back Bay consists of approx. one thousand acres of natural estuary coastal wetland consisting of salt marsh, mudflat, and marine habitats. Large mudflats with suitable loafing areas above high tide are desirable for migrating shorebirds and waterfowl. Sheltered waters provide foraging, spawning and nursery habitat for marine fishes. The land is managed by California Department of Fish & Wildlife. The Back Bay serves as a popular destination for outdoor recreational activities including running, biking, kayaking and bird watching.*
>
> *Newport Beach Golf Course - Located directly south of the runways, the Newport Beach Golf Course is an 18 hole public golf course that offers night play. While much of the land is privately owned, a portion of the course, between Irvine Ave and Bristol St., located directly south of the airport is leased from the Airport. Aside from the constantly maintained grass lengths, this property contains man-made bodies of water along with a storm water drainage canal running throughout.*

The SNA WHMP identifies the migratory and resident species present on, or in the vicinity of the Airport, as shown in Figure 11.

Figure 11 – SNA WHMP Migratory and Resident Problem Species

Species Category	Federal Permit Required	Federal Permit Obtained
European Starlings, House Sparrows and Rock Pigeons	No	N/A
Red-tailed Hawks, Ferruginous Hawks, Red-shouldered Hawks, Cooper's Hawks, Peregrine Falcons*, Prairie falcons, American Kestrels, Ospreys, Barn Owls, Great Horned Owls, Burrowing Owls, Turkey Vultures, Barn Swallows, Cliff Swallows, House Finches, Western Kingbirds, Horned Larks, Northern Mockingbirds, Brewer's Blackbirds, Common Ravens, Western Meadowlarks, Mourning Doves, Northern Pintail, Whimbrels, Double-crested Cormorants, Mallards, Canada Geese, Great Egrets, Great Blue Herons, Killdeers, and California Gulls.	Yes	Yes
Red-winged & Brewer's Blackbirds, Brown- headed Cowbirds and all Crows and Grackles	No	N/A
All species of mammals, including coyotes	No	N/A
Threatened and Endangered species	Yes	No

Monitoring, Mitigation, and Communication

The Newport Beach Golf Course is identified as a wildlife attractant in the SNA WHMP and the surf lagoon Project would be situated on the northerly portion of the golf course, therefore it would have the potential to attract wildlife. Water is also generally considered a wildlife attractant, however, this Project is a type of pool with no food sources or resting or nesting sites like the ocean or the Upper Newport Bay ecological preserve. Regardless, operators of the Snug Harbor surf lagoon should have protocols in place to monitor and manage any wildlife that presents itself on the property.

As noted in FAA AC 150/5200-33C, the following management protocols should be considered for land uses in the vicinity of airports that have the potential of attracting wildlife that could impact aircraft operations:

1. Vegetation Management - Remove all unnecessary trees, shrubs, weeds, and plants. Avoid vegetation that is known to attract wildlife; that may provide food, water, cover, or a nesting site for wildlife. Vegetation that produces seeds, fruits, nuts, or berries, or that provides dense roosting or nesting cover should not be used.
2. Landscaping - Avoid landscaping that could become an attractant to wildlife. Avoid fruit bearing palm trees that can attract birds or remove fruit from these trees regularly. Avoid turf and ornamental landscaping. Disturbed areas or areas in need of re- vegetating should not be planted with seed mixtures containing millet or any other large seed producing grass. The FAA recommends consulting with a Qualified Airport Wildlife Biologist before finalizing the design of landscaping and wildlife management techniques.

3. Buildings – Avoid structural design features that are attractive to wildlife. Buildings should not provide potential nesting, perching or roosting sites for birds and should not allow access for such mammals as coyotes, rabbits and rodents. Flat rooftops can be attractive for nesting, and light posts can provide loafing/hunting perches. Wire spikes or other cost-effective bird exclusion devices can be used on vertical uprights where feasible.
4. Ongoing Observations – Staff should be trained to conduct physical inspections of all property on a regular basis. Staff should understand control and communication techniques for detracting and removing wildlife or working with wildlife specialists on these techniques.

The FAA's Wildlife Hazard Management at Airports Manual[5] provides additional guidance for recognizing hazardous wildlife attractants, developing wildlife hazard management programs, wildlife hazard management training, and wildlife control strategies and techniques. While this manual is aimed at airport personnel, it is a good resource for any business operator that is proposing a use that has the potential for attracting wildlife in the vicinity of an airport. The FAA also recommends consulting with a Qualified Airport Wildlife Biologist before finalizing the design of landscaping and wildlife management techniques. Additionally, the County of Orange and the City of Newport Beach should be consulted for their own local recommendations related to vegetation, landscaping, and wildlife management.

[5] https://www.faa.gov/airports/airport_safety/wildlife/management

Appendix A – NTSB Accident Summary – John Wayne Airport (SNA)

EventType	EventDate	City	N	HighestInjuryLevel	FatalInjuryCount	SeriousInjuryCount	MinorInjuryCount	ProbableCause	Phase of Flight	Accident Location	Make	Model	AirCraftCat	AirportID	NumberOfI	Scheduled	PurposeOfI	FAR	AirCraftDar	WeatherCo	Operator
ACC	2024-02-11T11:35:00	Santa Ana	N377YG	Serious	0	1	1	Wake turbulence	Approach	North of 20L; descent into terrain; on airport property	EVEKTOR-A	HARMONY	AIR	SNA	1		INST	91	Substantial	VMC	Sunrise Aviation Company
ACC	2023-08-20T23:15:00	Santa Ana	N516AS	None	0	0	0	Left main landing gear collapse after landing on 20R	Landing - on runway	On 20R	BOEING	737-890	AIR	KSNA	2	SCHD		121	Substantial	IMC	Alaska Airlines
ACC	2023-04-01T13:43:00	Santa Ana	N1399U		0	0	0	The flight instructor's failure to maintain clearance from a medium category commercial airliner which resulted in an encounter with wake turbulence and subsequent loss of control resulting in impact with terrain.	Approach	Approach to 20L, impact with terrain	CESSNA	172M	AIR	KSNA	1		INST	91	Substantial	VMC	OC 172 GROUP LLC
ACC	2022-07-01T18:21:00	Santa Ana	N480WN	Serious	0	1	0	A flight attendant received a serious injury for undetermined reasons during a firm landing.	Landing - on runway	Landing on 20R	BOEING	737-700	AIR	sna	2	SCHD		121	None	VMC	SOUTHWEST AIRLINES CO
ACC	2018-12-22T17:22:00	Santa Ana	N15321	None	0	0	0	A total loss of engine power due to a loose carburetor bowl.	Landing - on taxiway	Emergency landing on taxiway	Piper	PA28	AIR	KSNA	1		INST	91	Substantial	VMC	TRC Holdings
ACC	2018-09-03T15:37:00	Santa Ana	N401SH	None	0	0	0	The flight instructor's delayed application of power during a power recovery following an autorotation, which resulted in an unrecoverable low rotor rpm during the landing flare and subsequent loss of control.	Landing - on runway	Uncontrolled landing on 20L	Guimbal	CABRI	HELI	SNA	1		INST	91	Substantial	VMC	One Above Aviation
ACC	2018-08-05T12:29:00	Santa Ana	N727RP	Fatal	5	0	0	The pilot's failure to maintain adequate airspeed while maneuvering in the traffic pattern which resulted in an aerodynamic stall and subsequent spin at a low altitude, which the pilot was unable to recover from.	Traffic pattern	Airplane impacted a shopping center parking lot (South Coast Plaza) about 1.6 miles from the airport	Cessna	414	AIR	SNA	2		BUS	91	Destroyed	VMC	
ACC	2018-01-30T14:50:00	Newport Be	N7530R	Fatal	3	1	1	The pilot's failure to perform weight and balance calculations before departing on the flight, which resulted in his operation of the helicopter outside of its published weight and balance limitations and a subsequent loss of control shortly after takeoff.	Takeoff	Rapid descent, impact into homes (Newport Beach) 1 mile from airport (southeasterly heading); one person on ground sustained minor injuries	ROBINSON	R44	HELI	SNA	1		PERS	91	Destroyed	VMC	
ACC	2017-12-26T14:30:00	Santa Ana	N698MC	None	0	0	0	The pilot's failure to follow ground control instructions and to see and avoid ground obstacles while taxiing.	Landing - off runway	Aircraft ran off end of runway, made wrong turns and struck an unmanned guard shack	CESSNA	182	AIR	SNA	1		PERS	91	Substantial	VMC	HAC PROPERTIES LLC
ACC	2017-07-26T19:45:00	Santa Ana	N7535G	None	0	0	0	The pilot's failure to maintain helicopter control while maneuvering during takeoff.	Takeoff	Shortly after takeoff, helicopter rolled right and struck the ground	ROBINSON	R44 II	HELI	SNA	1		POSI	91	Substantial	VMC	Orbic Air LLC
ACC	2017-06-30T09:35:00	Santa Ana	N87297	Serious	0	2	0	The pilot's inability to maintain adequate airspeed after a loss of power to the right engine while maneuvering in the pattern to return to the airport. Contributing to the accident were the loss of power to the right engine for reasons that could not be determined and the pilot's improper decision to turn toward the inoperative engine during the return flight to the airport.	Traffic pattern	During emergency landing for 20R, aircraft turned right to final approach then left before impacting freeways center median	CESSNA	310R	AIR	SNA	2		PERS	91	Substantial	VMC	
ACC	2012-06-09T12:22:00	Santa Ana	N5211Y	None	0	0	0	The pilot's failure to compensate for the gusting wind and failure to maintain airplane control during the approach to land.	Landing - off runway	Pilot attempted to land then go around because of gust and collided with taxiway sign	CESSNA AI	162	AIR	SNA	1		PERS	91	Substantial	VMC	Orange County Flight Center
ACC	2012-01-07T17:28:00	Santa Ana	N580TC	None	0	0	0	The pilot's failure to review or execute any applicable checklist procedures or troubleshoot or take corrective action before landing despite indications that the landing gear was not extended. Contributing to the accident were the pilot's misunderstanding of the air traffic controller's communication that the landing gear was not extended, his desire to land quickly, and an undetermined electrical system anomaly.	Landing - on runway	Pilot landed aircraft on runway (20L) with landing gear retracted	BEECH	58P	AIR	SNA	2		PERS	91	Substantial	VMC	
ACC	2011-01-21T14:57:00	Santa Ana	N47589	None	0	0	0	The failure of the left main landing gear due to the lack of lubrication.	Landing - on runway	Pilot landed (20L) and left main landing gear collapsed	PIPER	PA-28-201	AIR	SNA	1		PERS	91	Substantial	VMC	Employ/Ease Inc.
ACC	2010-11-21T18:44:00	Newport Be	N6064N	Fatal	3	0	0	The pilot's inadequate fuel planning, which resulted in a total loss of engine power due to fuel exhaustion.	En route	Pilot was unable to reach airport and landed in ecological reserve in three feet of water	BEECH	19A	AIR	SNA	1		PERS	91	Substantial	VMC	
ACC	2007-12-31T13:15:00	Santa Ana	N2800D	None	0	0	0	The failure of the student to maintain directional control during landing and the flight instructor's inadequate supervision of the flight.	Landing - on runway	During landing roll (20L) airplane yawed to the right and entered ground loop which collapsed left main landing gear	Piper	PA-12	AIR	SNA	1		INST	91	Substantial	VMC	

EventType	EventDate	City	N	HighestInjuryLevel	FatalInjuryCount	SeriousInjuryCount	MinorInjuryCount	ProbableCause	Phase of Flight	Accident Location	Make	Model	AirCraftCat	AirportID	NumberOfI	Scheduled	PurposeOfI	FAR	AirCraftDar	WeatherCo	Operator
ACC	2007-10-29T13:58:00	Santa Ana	N800CC	None	0	0	0	The failure of the pilot-in-command to follow procedures stipulated in the airplane flight manual regarding brake cooling time periods. Factors contributing to the accident were the intentional aborted takeoffs which resulted in the hot brakes, and the subsequent landing gear tire bursting.	Takeoff - on runway	Pilot aborted takeoff eventually traveling into the overrun area at the end of Runway 20R	Raytheon C	Hawker 80	AIR	SNA	2		EXEC	91	Substantial	VMC	Charter Communications Holding Co
ACC	2003-09-29T17:00:00	Santa Ana	N9564B	None	0	0	0	the failure of the right main landing gear pivot assembly.	Landing - on runway	Right landing gear failed, pilot landed Runway 20R	Cessna	172RG	AIR	KSNA	1		PERS	91	Substantial	VMC	
ACC	2003-05-20T12:10:00	Santa Ana	N692AA	None	0	0	0	the vehicle driver's failure to deploy the parking brake or use wheel chocks to secure the vehicle prior to leaving it unattended.	On Taxiway	Crash fire rescue truck rolled into aircraft on taxiway waiting on tower instructions	Boeing	757-223	AIR	SNA	2	SCHD		121	Substantial	VMC	
ACC	2002-12-16T15:30:00	Anaheim H	N6268P	Fatal	2	0	0	the pilot's encounter with forecast severe turbulence during an inadvertent penetration of an intense weather cell, which resulted in the pilot exceeding the design structural limits of the airplane. A factor in the accident was the pilot's inadequate preflight planning and preparation, and his failure to obtain a complete weather briefing.	En route	On approach to 20R, collision with terrain and homes in Anaheim Hills	Piper	PA-24-250	AIR	SNA	1		PERS	91	Destroyed	IMC	
ACC	2002-11-07T14:40:00	Santa Ana	N3373C	Serious	0	2	0	The pilot's encounter with wake turbulence resulting in a loss of control. A related factor was insufficient separation by air traffic control.	Approach	On approach to 20L airplane impacted ground short of runway	Beech	35	AIR	SNA	1		PERS	91	Substantial	VMC	
ACC	2002-02-02T19:23:00	Santa Ana	N4458S	None	0	0	0	the pilot's failure to remain above the landing Boeing 757's glide path resulting in an encounter with wing tip vortices (wake turbulence), a loss of directional control after touchdown, and collision with taxiway signs.	Approach	Airplane landed hard on runway (20R) and hit two taxkway signs	Beech	58P	AIR	SNA	2		PERS	91	Substantial	VMC	
ACC	2000-06-21T18:28:00	SANTA ANA	N7598D	None	0	0	0	The loss of engine power during the initial takeoff climb, at too low an altitude to afford remedial action, because of an ingested valve, and the airplane's subsequent collision with the ground adjacent to the runway.	Takeoff	Pilot was forced to do an emergency landing in between runways	Cessna	172N	AIR	SNA	1		INST	91	Substantial	VMC	SUNRISE AVIATION
ACC	1999-12-23T13:14:00	SANTA ANA	N87WA, N4	None	0	0	0	The pilot's failure to maintain an adequate obstruction clearance while taxiing.	On Taxiway	Aircraft collided on taxiway	Pitts, Piper	S-2B, PA-2	AIR,AIR	SNA	1,1		PERS,PERS	91,091	Minor,Subs	VMC	DORIAN CHRISTIAN VINIEGRA,
ACC	1999-05-21T20:08:00	SANTA ANA	N51641	None	0	0	0	The pilot's failure to maintain directional control and his excessive use of the rudder to regain runway alignment.	Landing - on runway	Pilot ground looped aircraft after landing 20L	Maule	M-5-210C	AIR	SNA	1		PERS	91	Substantial	VMC	
ACC	1998-06-23T17:07:00	SANTA ANA	N67421	Fatal	1	0	0	The failure of the pilot-in-command to identify a proper touchdown point on the runway and maintain an appropriate glidepath so as to remain clear of vortex turbulence (wake turbulence) from the preceding large aircraft. A factor in the accident was the pilot's failure to initiate a go-around in the known presence of vortex turbulence.	Approach	Impact short of Runway 20L	Cessna	152	AIR	SNA	1		INST	91	Destroyed	VMC	
ACC	1997-08-11T11:39:00	SANTA ANA	N9328A	Serious	0	1	0	Water contamination in the fuel system due to the failure of the mechanic who performed the last annual inspection to adequately comply with the AD which required inspection of the fuel tank filler area for proper sealing, and the pilot's inadequate preflight inspection.	Approach	On approach to 20R, emergency landing in an auto parking lot and impact with ground obstructions one mile north of SNA	Cessna	195	AIR	SNA	1		PERS	91	Substantial	VMC	

EventType	EventDate	City	N	HighestInjuryLevel	FatalInjuryCount	SeriousInjuryCount	MinorInjuryCount	ProbableCause	Phase of Flight	Accident Location	Make	Model	AirCraftCat	AirportID	NumberOfI	Scheduled	PurposeOfI	FAR	AirCraftDar	WeatherCo	Operator
ACC	1996-11-30T14:07:00	IRVINE	N2TE	Fatal	3	0	0	The pilot's failure to maintain an adequate airspeed margin while maneuvering in a steep banked turn to the landing runway, which resulted in an inadvertent stall/spin. Factors in the accident were: the pilot's inadequate preflight inspection of the aircraft in that he departed with the boarding ladder attached to the aircraft's exterior; the pilot's inadequate in-flight planning in that he flew a traffic pattern so close to the runway that it required excessive bank angles to align the aircraft with the landing runway; and the aircraft's probable encounter with the periphery of a weakened B-757 wake turbulence, which increased the wing's angle of attack beyond the stall point at a critical point during a steep banked turn.	Traffic pattern	During emergency landing, aircraft crashed into an industrial building in Irvine about one mile from 20R landing threshold	Morane-Sa	MS760 II	AIR	SNA	2		PERS	91	Destroyed	VMC	
ACC	1996-08-04T16:16:00	SANTA ANA	N8124S	None	0	0	0	the pilot's decision to turn off the runway while at an excessive speed that did not allow him to maintain directional control of the aircraft.	Landing - on taxiway	Pilot veered off taxiway	Piper	PA-28-236	AIR	SNA	1		PUBU	91	Substantia	VMC	
ACC	1996-04-30T18:00:00	SANTA ANA	N9070N	Serious	0	1	1	the pilot misjudged the helicopter's distance and altitude and failed to attain the proper descent rate.	Landing	Aircraft crashed about 20 feet short of Runway 20L	Robinson	R22	HELI	SNA	1		PERS	91	Destroyed	VMC	
ACC	1996-01-19T18:20:00	SEAL BEAC	N2476Y	Minor	0	0	2	a total loss of engine power from an improperly installed magneto that separated from the engine housing due to fatigue from vibration.	En route	Unable to reach ground pilot ditched in ocean, 200 yards offshore at Seal Beach	Piper	PA-28-236	AIR	SNA	1		PERS	91	Substantia	VMC	ORANGE CO. FLIGHT CENTER
ACC	1995-11-10T10:00:00	SANTA ANA	N55152	None	0	0	0	The pilot's failure to maintain directional control which resulted in an inadvertent ground loop. The pilot's diverted attention while raising the flaps and pushing in the carburetor heat control was a factor in this accident.	Takeoff	Aircraft ground looped during takeoff from Runway 20L	CESSNA	172	AIR	SNA	1		PERS	91	Substantia	VMC	ORANGE COUNTY FLIGHT CENTER
ACC	1995-09-30T21:19:00	SANTA ANA	N68225	None	0	0	0	the second pilot's failure to maintain directional control and the first pilot's improper supervision of the flight.	Landing - on runway	During landing roll (20R) pilot lost control and collided with an airport facility	CESSNA	152	AIR	SNA	1		PERS	91	Substantia	VMC	
ACC	1995-08-27T14:20:00	SANTA ANA	N66758	None	0	0	0	the student's inadequate compensation for the existing crosswind condition, and his failure to raise the landing flaps and turn off the carburetor heat during the attempted go-around.	Landing	Pilot tried to go around but struck a runway sign off Runway 20L	CESSNA	150M	AIR	SNA	1		INST	91	Substantia	VMC	
ACC	1994-05-08T16:40:00	SANTA ANA	N8246B	None	0	0	0	the pilot's failure to maintain directional control of the aircraft. A factor in the accident was the pilot's limited experience in conventional gear aircraft.	Landing - on runway	Pilot landed on 20L then lost directional control and aircraft ground looped	CESSNA	172	AIR	SNA	1		PERS	91	Substantia	VMC	WISE, JEFFREY A.
ACC	1993-12-15T18:33:00	SANTA ANA	N309CK	Fatal	5	0	0	THE PILOT-IN-COMMAND'S FAILURE TO MAINTAIN ADEQUATE SEPARATION BEHIND THE BOEING 757 AND/OR REMAIN ABOVE ITS FLIGHT PATH DURING THE APPROACH, WHICH RESULTED IN AN ENCOUNTER WITH WAKE VORTICES (wake turbulence) FROM THE 757. FACTORS RELATED TO THE ACCIDENT WERE: AN INADEQUACY IN THE ATC PROCEDURE RELATED TO VISUAL APPROACHES AND VFR OPERATIONS BEHIND HEAVIER AIRPLANES, AND THE RESULTANT LACK OF INFORMATION TO THE WESTWIND PILOTS FOR THEM TO DETERMINE THE RELATIVE FLIGHT PATH OF THEIR AIRPLANE WITH RESPECT TO THE BOEING 757'S FLIGHT PATH.	Approach	Aircraft on final approach to 20R crashed in vacant lot about 3.5 nm north of SNA	Israel Aircr	1124A	AIR	SNA	2	NSCH	UNK	135	Destroyed	VMC	MARTIN AVIATION
ACC	1993-11-18T12:07:00	SANTA ANA	N9620B, N	None	0	0	0	were the other airplane's CFI's inadequate supervision of the flight, and his delay in taking remedial action.	On runway	Aircraft holding at runway approach end was struck by another aircraft	CESSNA, C	172RG, 17	AIR,AIR	SNA	1,1		INST,INST	91,091	Substantia	VMC	,AMERICAN FLYERS

EventType	EventDate	City	N	HighestInjuryLevel	FatalInjuryCount	SeriousInjuryCount	MinorInjuryCount	ProbableCause	Phase of Flight	Accident Location	Make	Model	AirCraftCat	AirportID	NumberOfI	Scheduled	PurposeOfI	FAR	AirCraftDar	WeatherCo	Operator
ACC	1993-02-24T14:43:00	SANTA ANA	N43Y	None	0	0	0	THE PILOT'S INADEQUATE COMPENSATION FOR THE EXISTING WIND CONDITIONS AND HIS FAILURE TO MAINTAIN AN ADEQUATE APPROACH REFERENCE AIRSPEED. FACTORS IN THE ACCIDENT WERE THE PILOT'S LOW EXPERIENCE IN THE AIRCRAFT.	Landing - on runway	After landing aircraft veered off runway impacted signs and came to rest between runways	BEECH	A36	AIR	SNA	1		PERS	91	Substantia	VMC	JAMES C. BUNNELL
ACC	1992-11-20T18:20:00	SANTA ANA	N4766H	None	0	0	0	THE PILOT'S IMPROPER LANDING FLARE, HIS IMPROPER BOUNCED LANDING RECOVERY TECHNIQUE, AND HIS INADVERTENT ENTRY INTO A STALL MUSH CONDITION.	Landing - on runway	Aircraft landed then pitched up and left then right wings hit runway and landing gear collapsed	MOONEY	M20J	AIR	SNA	1		PERS	91	Substantia	VMC	THE FLYING CLUB
ACC	1991-03-11T18:18:00	SANTA ANA	N757XE	None	0	0	0	THE PILOT'S IMPROPER INFLIGHT PLANNING WHICH RESULTED IN THE FLIGHT'S ENCOUNTER WITH WAKE TURBULENCE FROM A LANDING HEAVY TRANSPORT.	Approach	On approach to 20L aircraft rolled and struck runway	CESSNA	152	AIR	SNA	1		INST	91	Destroyed	VMC	SUNRISE AVIATION CO.
ACC	1990-11-24T13:30:00	SANTA ANA	N2290C	None	0	0	0	THE PILOT'S MISJUDGING THE DISTANCE BETWEEN THE AIRPLANE AND HANGAR.	On Taxiway	During taxi aircraft's wing struck hangar	CESSNA	T303A	AIR	SNA	2		PERS	91	Substantia	VMC	OSCAR DE LA CRUZ
ACC	1990-11-11T15:20:00	DANA POIN	N30438	Minor	0	0	3	THE PILOT'S IMPROPER FUEL CONSUMPTION CALCULATIONS.	En route	Aircraft struck palm tree and crashed; 35 minutes after departing SNA for Fullerton	CESSNA	177A	AIR	SNA	1		PERS	91	Substantia	VMC	GILES, WILMA
ACC	1990-08-25T12:06:00	SANTA ANA	N47477	None	0	0	0	THE IMPROPER TECHNIQUE USED BY THE STUDENT PILOT TO RECOVER FROM A BOUNCED LANDING ATTEMPT.	Landing - on runway	Aircraft landed then bounced, then struck runway with nose wheel	CESSNA	152	AIR	SNA	1		INST	91	Substantia	VMC	SUNRISE AVIATION
ACC	1990-06-20T06:00:00	SANTA ANA	N4034B	None	0	0	0	THE PILOT'S USE OF AN IMPROPER STARTING TECHNIQUE.	On airport	Pilot began to hand prop to start engine, engine went into high power setting, jumped chicks and collided with parked aircraft, light pole, and fence	BELLANCA	BL26	AIR	SNA	1		PERS	91	Substantia	VMC	
ACC	1990-03-16T17:57:00	SANTA ANA	N306AW	None	0	0	0	THE PILOT'S IMPROPER ROTATION DURING TAKEOFF.	Takeoff	Tail strike during rotation, flight continued to Las Vegas	BOEING	737-300	AIR	SNA	2	SCHD	UNK	121	Substantia	VMC	AMERICA WEST AIRLINES
ACC	1990-01-06T18:02:00	SANTA ANA	N74520	Minor	0	0	1	THE FAILURE OF BOLTS RETAINING THE IDLER SHAFT ALLOWING THE CAM SHIFT TIMING TO CHANGE AND BY ITS FAILURE TO DRIVE THE LEFT MAGNETO.	Approach	Engine failure on short final to Runway 20, forced landing	MOONEY	M20B	AIR	SNA	1		PERS	91	Substantia	VMC	ROBLEY D. MC CANTS
ACC	1989-12-21T23:34:00	SANTA ANA	N611AM	None	0	0	0	THE COPILOT'S OVERROTATION OF THE AIRCRAFT DURING THE FLARE WHICH ALLOWED THE TAIL TO COLLIDE WITH THE RUNWAY. THE FAILURE OF THE CAPTAIN TO TAKE APPROPRIATE CORRECTIVE ACTION WAS A FACTOR IN THE ACCIDENT.	Landing	Tail impact with runway during landing	BOEING	757-223	AIR	SNA	2	SCHD	UNK	121	Substantia	VMC	AMERICAN AIRLINES
ACC	1989-09-06T13:48:00	SANTA ANA	N1739C	None	0	0	0	THE PILOT'S IMPROPER IN-FLIGHT PLANNING AFTER BEING ADVISED OF POSSIBLE WAKE TURBULENCE.	Landing	Aircraft wings impacted runway (20L) before nosing over	CESSNA	180	AIR	SNA	1		PERS	91	Substantia	VMC	RUSSELL, SCOTT
ACC	1989-04-14T18:33:00	SANTA ANA	N1168U	Minor	0	0	1	FAILURE OF THE LANDING GEAR RESULTING FROM EXCESSIVE LOADING DURING GROUND OPERATIONS, AND FATIGUE CRACKING.	Taxi	During taxi left maing landing gear separated	SIKORSKY	S-58ET	HELI	SNA	2	NSCH	UNK	135	Substantia	VMC	
ACC	1989-03-31T09:35:00	NEWPORT	CGWPS	Fatal	5	0	0	FAILURE OF THE PILOT TO ATTAIN ADEQUATE AIRSPEED BEFORE MANEUVERING (TURNING) BACK TOWARD THE AIRPORT, WHICH RESULTED IN A LOSS OF AIRCRAFT CONTROL. A FACTOR RELATED TO THE ACCIDENT WAS: IMPROPER MAINTENANCE/INSTALLATION OF A FUEL INJECTOR REFERENCE AIR LINE, WHICH ALLOWED CONTAMINATION OF THE INJECTORS AND LOSS OF POWER IN THE RIGHT ENGINE.	Takeoff	Aircraft departed 20R, shortly thereafter entered a steep left turn, crashed into tennis courts, airport was 2nm and 358 degrees from accident site	PIPER	PA-60-601I	AIR	SNA	2		PERS	91	Destroyed	VMC	ANTHONY DEIS
ACC	1989-01-18T00:45:00	SANTA ANA	N6913D	None	0	0	0	POOR PREFLIGHT PLANNING AND PREPARATION BY SELECTING THE WRONG RUNWAY DESPITE NOTAM AND ATIS INFORMATION INDICATING THE RUNWAY WAS CLOSED.	Takeoff	20R was closed. Pilot collided with generator on closed runway	PIPER	PA-32R-30	AIR	SNA	1		PERS	91	Substantia	VMC	
ACC	1987-11-24T14:20:00	SAN CLEM	N5418P	None	0	0	0	Loss of engine power	En route	Emergency landing on upward sloping terrain. Departure point was Santa Monica, destination was Carlsbad, airport was 22nm and 100 degrees from crash site	CESSNA	152	AIR	SNA	1		INST	91	Substantia	VMC	GUNNEL AVIATION

EventType	EventDate	City	N	HighestInjuryLevel	FatalInjuryCount	SeriousInjuryCount	MinorInjuryCount	ProbableCause	Phase of Flight	Accident Location	Make	Model	AirCraftCat	AirportID	NumberOfI	Scheduled	PurposeOfI	FAR	AirCraftDar	WeatherCo	Operator
ACC	1986-03-03T00:12:00	NEWPORT	N81918	Fatal	3	0	0	Inadquate supervision by CFI, poor judgment, student had alcohol and drug impairment, altitude was misjudged	En route	Aircarft flew over Newport Beach pier then entered right climpbing turn, descended, contacted the ocean and sank	PIPER	PA-28-181	AIR	SNA	1		INST	91	Destroyed	VMC	AERO FLIGHT CENTER
ACC	1986-02-26T21:24:00	IRVINE	N58SB	Fatal	1	0	0	Loss of control, adverse weather	Approach	On approach to 20R, pilot was issued low altitude warning, aircraft crashed in parking lot 1/2 mile northeast of the airport	BEECH	V35-B	AIR	SNA	1		BUS	91	Destroyed	IMC	
ACC	1985-12-19T08:53:00	NEWPORT	N9044P	Fatal	1	0	0	Fuel starvation and improper fuel tank selection	En route	Pilot was en route from San Diego to Torrance, declared emergency, could not make either runway at SNA, collided with trees, a house, and fence in residential area airport was 3 nm and 335 degrees from accident site	PIPER	PA-24-260	AIR	SNA	1		PERS	91	Destroyed	VMC	
ACC	1985-11-23T16:50:00	TUSTIN	N5353Y	Minor	0	0	1	Fuel starvation, engine failure, snap fasteners on fuel tank bladders weathered and shrunk, inadequate maintenance	En route	Forced landing in field, departed from Madera with destination being SNA	PIPER	PA-23-250	AIR	SNA	2		PERS	91	Substantia	VMC	
ACC	1985-02-26T03:07:00	NEWPORT	N714WJ	Fatal	3	0	0	Alcohol and drug impairment, weight and balance exceeded, spatial disorientation, altitude misjudged	En route	Aircraft flew over Newport Beach pier, entered turn, descended into ocean and sank	CESSNA	152	AIR	SNA	1		PERS	91	Destroyed	IMC	THE FLYING CLUB
ACC	1984-10-07T17:59:00	NEWPORT	N9572Y	Fatal	1	0	0	Propeller separated from aircraft left engine, improper maintenance	Takeoff	Crash into roof of a building one quarter mile southeast of airport	BEECH	95-A55	AIR	SNA	2		UNK	91	Destroyed	VMC	
ACC	1984-09-19T14:20:00	SANTA ANA	N88MJ	None	0	0	0	Pilot did not follow procedures for tunring off the antiskid switch	Landing - on taxiway	Collision with two aircraft	CESSNA	550	AIR	SNA	2		INST	91	Substantia	VMC	ATLAS HOTELS
ACC	1984-07-09T16:57:00	SANTA ANA	N222LT	None	0	0	0	Directional control not maintained by pilot	Landing - on runway	Aircraft landed veered right and groud looped	HELIO	H-295	AIR	SNA	1		PERS	91	Substantia	VMC	JACK LINKLETTER
ACC	1984-02-19T11:25:00	SANTA ANA	N280AA	None	0	0	0	Landing gear failure	Landing - on runway	During landing roll, landing gear collapsed	BEECH	M35	AIR	SNA	1		PERS	91	Substantia	VMC	JEFFERY FARMER
ACC	1984-01-26T11:34:00	SANTA ANA	N7571F	Minor	0	0	1	Unfavorable high wind, pool pilot judgment	Landing - on runway	After landing gust of wind overturned aircraft	Bellanca	7KCAB	AIR	SNA	1		AOBV	91	Substantia	VMC	
ACC	1983-10-15T15:30:00	SANTA ANA	N49670	None	0	0	0	During moving operation for helicopter, the left shoe slipped off platform	Landing	Helicopter rocked back and damaged the tail rotor area	BELL	206B	HELI	SNA	1		PERS	91	Substantia	VMC	
ACC	1983-09-18T19:20:00	SANTA ANA	N8052M	Fatal	1	0	0	Inadequate supervisio by pilot, safety advisory not followed by passenger	Landing	Passenger walked into rotating propeller	CESSNA	T210M	AIR	SNA	1		PERS	91	Minor	VMC	PARSONS AIR
ACC	1982-10-03T10:45:00	SANTA ANA	N66909	Minor	0	0	1	Fuel pressure discrepancy, engine power loss	Takeoff	After takeoff from Runway 20, aircraft landed gear up off end of runway	BEECH	A36TC	AIR	SNA	1		PERS	91	Substantia	VMC	CROWN DEVELOPMENT COMPANY
ACC	1982-07-16T14:41:00	SANTA ANA	N59242	Minor	0	0	2	Engine power loss, inadequate fuel system	Traffic pattern	Emergency landing on taxiway perpendicular to approach ends of Runway 20L and 20R, collision with sign and aircraft	CESSNA	210L	AIR	SNA	1		PERS	91	Substantia	VMC	RICHARD JOHN KROLL
INC	1991-09-20T22:15:00	SANTA ANA	N633AW	Minor	0	0	1	THE FAILURE OF THE FLIGHT ATTENDANT ASSIGNED TO THE AFT GALLEY JUMPSEAT TO SECURE A BEVERAGE CART IN ACCORDANCE WITH COMPANY POLICY.			Airbus Indu	A-320-231	AIR	SNA	2	SCHD	UNK	121	None	VMC	AMERICA WEST
INC	1984-11-04T22:45:00	SANTA ANA	N5840T	None	0	0	0	Durign climb crew experienced control difficulties and returned to airport successfully			Westland H	WG30	HELI	SNA	2		POSI	91	None	IMC	EVERGREEN HELICOPTERS OF AK
INC	1984-02-17T09:46:00	SANTA ANA	N203AA	None	0	0	0	Shortly after takeoff, loss of engine power on one engine			MCDONNE	DC-9-82	AIR	SNA	2	SCHD	UNK	121	None	VMC	
INC	1983-09-27T12:55:00	SANTA ANA	N302RC	None	0	0	0	Just after takeoff (Runway 20) left engine failed, several homes under flight fath sustained fire and debris damage, aircraft returned to airport successfully			McDonnell	DC-9-82	AIR	SNA	2	SCHD	UNK	121	None	VMC	
INC	1983-05-05T18:30:00	HUNTINGT	N4913G	None	0	0	0	Left aileron sustained damage, pilot indicated near miss, could not be substantiated with radar			CESSNA	C-172-N	AIR	SNA	1		PERS	91	Minor	VMC	AERO-FLITE CENTER
INC	1982-11-19T19:00:00	SANTA ANA	N6428V	Minor	0	0	1	While crusing cabin filled with smoke, pilot successfully landed at airport			CESSNA	172RG	AIR	SNA	1		PERS	91	None	VMC	CARL C. STOUGH

Appendix B – NTSB Accident Reports: Five Fatal General Aviation Accidents South of John Wayne Airport