



MEMO

To: The Menlo Park City Council

Date: August 15, 2016

MANNED AIRCRAFT–DRONE TRAFFIC HAZARDS AT THE BEDWELL BAYFRONT PARK

The Bedwell Bayfront Park (“Park”) is located in the “cross-hairs” of intensive, congested, low-flying manned aircraft operations—some of the most complex airspace in the Nation.¹ Drone operations² at the Park create unprecedented, unmanageable, and unjustifiable flight safety hazards. This memo offers responsive recommendations to the Menlo Park City Council and underlying support thereof.

A. RECOMMENDATIONS

For the reasons discussed below, the Menlo Park City Council is respectfully urged to:

1. establish or otherwise confirm a policy underscoring that public safety³ is *the* primary consideration in addressing this matter;
2. direct staff to conduct a formal, peer-reviewed safety analysis of hazards, risks, and effective mitigations, and ensure that the Council will act on any resulting recommendations;
3. direct City administrative staff to investigate and recommend alternative, safer site(s) for drone operations, including but not limited to Menlo Park, abutting municipalities, and counties. The primary criteria for such site(s) should ensure safe separation from airports; and
4. in the interim, strictly prohibit drone operations at the Park.

DISCUSSION

Manned flight operations in the vicinity of the Park are incompatible with drone operations.⁴ The following

¹ For example, there were more than 119,000 operations at San Carlos Airport in 2015. “Operations” includes take-offs, landings, and transitions. FAA, ATADS Report for SQL, June 13, 2016. Air and street maps of the vicinity are presented in Appendix 1, below.

² Including unmanned, remote controlled “RC”, model, and remotely piloted aircraft.

³ A public safety responsibility underlies government action. See Staff Report, Menlo Park Public Works Department, May 27, 2015, available at <http://www.menlopark.org/DocumentCenter/View/7184> (recognizing “roles and responsibilities of the Parks and Recreation Commission [] to promote safety in all facilities and programs,” and recommending complete ban on drones at the Park).

⁴ There have been multiple, alleged compromises of separation between manned aircraft and drones above and abeam the Park, including between a drone “quadcopter” and a Pilatus PC-12 turboprop aircraft descending through 2,600 ft. See San Carlos Airport Association, Memo, Re: “Response to UAS Activity Proximate to the San Carlos Airport Terminal Area,” June 2015. See also footnote 3, above, referencing “multiple videos of drones flying much higher than recommended, including one drone flying 3,400.”

identifies and explains some of these operations. Such operations are presented in the following order, as associated with: San Carlos Airport, Palo Alto Airport, enroute flight, and the San Francisco International Airport.

B. SAN CARLOS AIRPORT (SQL) OPERATIONS

1. **Instrument Arrivals at SQL** – Aircraft may overfly or fly abeam the Park at low altitudes while descending on an instrument approach (procedures permitting flight in poor weather) during:
 - a. a “circle-to-land” operation to runway 12. The circle-to-land scenario is presented in Section F, below, and
 - b. a “straight-in” approach to runway 30.⁵
2. **Surf Air Chanted Visual** – Surf Air is currently flying a provisional route directly above or abeam the Park at low (descending) altitudes on the new charted visual (good weather) approach that transitions from the Dumbarton Bridge or the Cement Plant.⁶ Additionally, all pilots are increasingly encouraged to avoid the noise-sensitive areas denoted in Figure 1, below, by flying closer to the Bay. Such operations may (disproportionately) place aircraft above or abeam the Park at low altitudes.



Figure 1 – Surf Air Chanted Visual (Arrival Route)

3. **Visual Arrivals at SQL** – Aircraft frequently overfly the Park at low altitudes during arrivals on good-weather days, for:
 - a. an extended right base leg for runway 30 from the East Bay⁷,
 - b. a descending “270” arrival from the west, and
 - c. an extended downwind leg for runway 30 (particularly when traffic is busy).⁸

⁵ Note that the approach is “angled” (at 297 degrees), bringing aircraft closer to the Park than if aligned with the runway (at 300 degrees). Recognize that pilots have (and require) discretion/authority to maneuver.

⁶ FAA approval pending. Surf Air will likely fly this procedure for approximately 85% of operations. The approximate location of the Park has been denoted in green within this and other selected figures presented herein.

⁷ This is the standard arrival instruction from the SQL control tower.

⁸ Note that the lowest permissible altitudes for visual arrivals (using visual flight rules - VFR) are unrestricted, other than a general requirement to maintain a “safe altitude”.

4. **Departures at SQL** – Aircraft departing San Carlos Airport frequently overfly the Park (at low altitudes) pursuant to the:
 - a. Rwy 12 Obstacle Departure Procedure (ODP),⁹
 - b. Rwy 30 visual-to-instrument departure procedure,¹⁰ and
 - c. Published Noise Abatement Procedure (see Figure 3, below).



Figure 2 - SQL Rwy 30 VFR-to-IFR Departure Guidance



Figure 3 - San Carlos Apt. Noise Abatement Procedure

C. PALO ALTO AIRPORT (PAO) OPERATIONS

5. **Visual Arrivals at PAO** –
 - a. Aircraft may descend at low altitudes above the Park when winds are from the South or Southwest, or otherwise favoring use of runway 13.

⁹ Available at <http://airnav.com/depart?http://155.178.201.160/d-tpp/1608/SW2TO.PDF>.

¹⁰ Available at <http://www.sancarlosairport.org/guidance/Departure-Guidance-Updated-7-15-12.pdf>. Aircraft altitude may still be under 1,100 feet when abeam the Park during transition to higher altitudes.

6. **Departures at PAO –**
 - a. Aircraft may overfly the Park at low altitudes during “straight-out” or “left cross-wind” departures.
 - b. Training flights frequently depart PAO and fly at low altitudes to land at SQL.

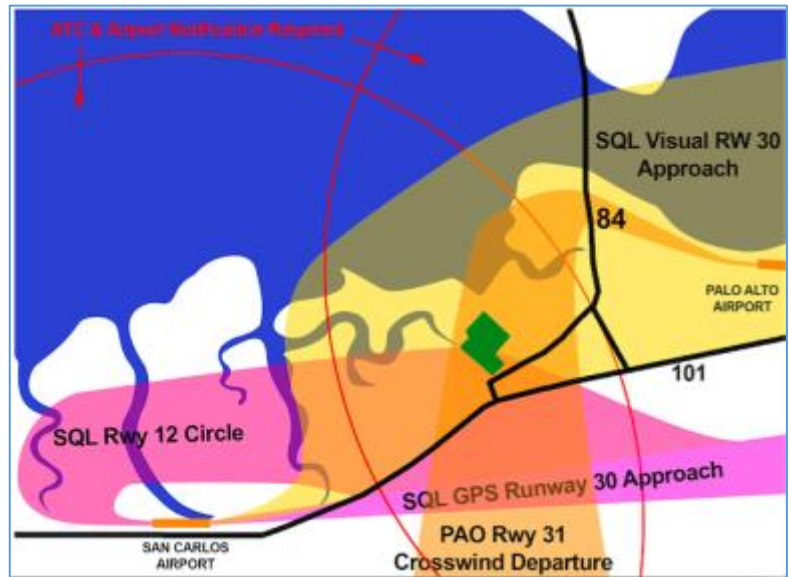


Figure 4 – SQL & PAO Route Conflicts with the Park (green, center)

D. ENROUTE OPERATIONS

7. **Visual Flight Rule (VFR) Charted Flyway –** Aircraft frequently fly above the Park on the charted corridor (see Figure 5, below – blue line) at low altitudes when transitioning the Bay. The FAA chart merely constrains aircraft altitudes to “BELOW 2500” ft.¹¹

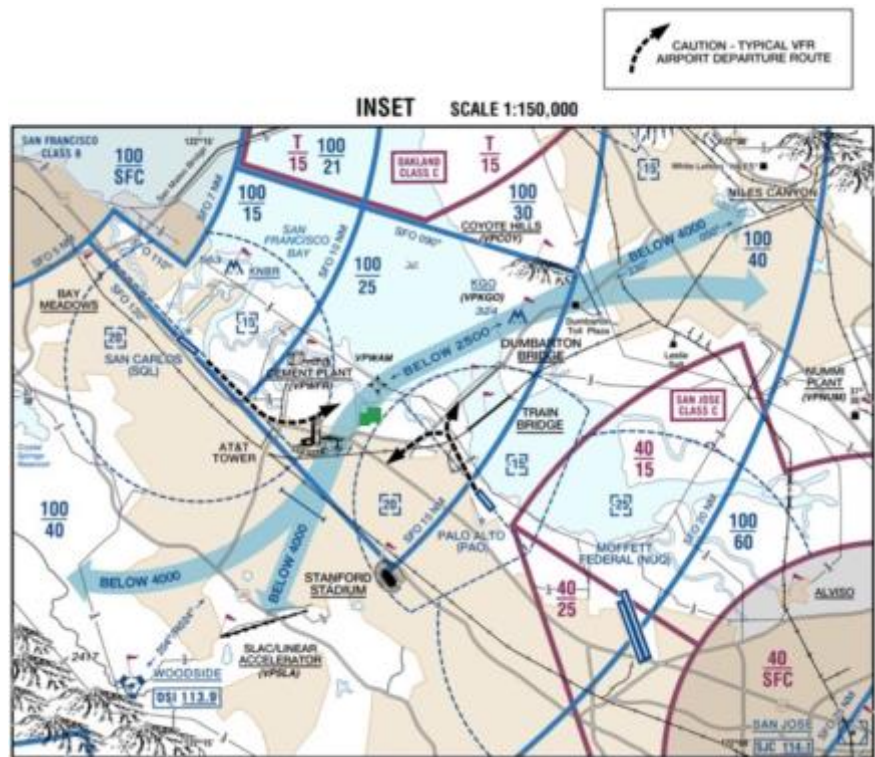


Figure 5 - Charted Flyway

8. **Bayshore Transitions –** Aircraft frequently fly abeam the Park at low altitudes on flight routes parallel to US Route 101. Such routes are used intensively by law enforcement, medevac helicopters, media traffic reporting, and other general aviation (nonairline, non-governmental, typically small) aircraft. When cloud bases are “marginal VFR” (e.g., at 1,000

¹¹ This is the only such transition in the Bay area south of Angel Island. Traffic is effectively “funneled” through Menlo Park. Aircraft communication with control towers is not required.

above ground level), aircraft must maintain an altitude of no greater than 500 ft. below the clouds to comply with FAA regulations. In this case, such aircraft would then be operating at no more than 500 ft. above the ground.

E. SAN FRANCISCO INT'L AIRPORT (SFO) ARRIVALS

9. **Minimum Vectoring Altitude (MVA)** – The MVA abeam the Park is merely 1,800 ft. MSL.¹² Controllers may require aircraft to operate above the Park at comparatively low altitudes during SFO operations.
10. **Visual Arrival SFO** – Aircraft, including airliners frequently operate above and abeam the Park while descending on the TIPP TOW¹³ or other Rwy 28L/R approaches to SFO at a minimum charted altitude of 2,500 ft. MSL. See Figure 6.

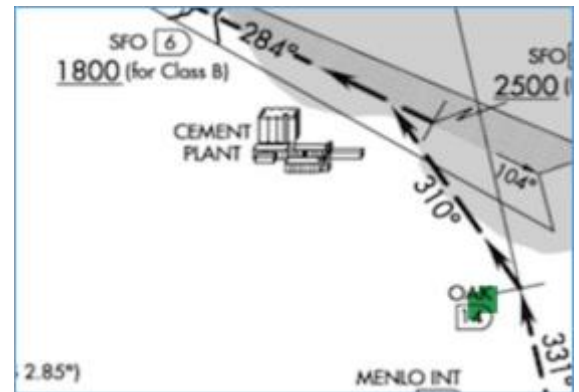


Figure 6 - TIPP TOE Visual - SFO

F. EXAMPLE SCENARIO – ALTITUDE AND SEPARATION DANGERS

To highlight the acute flight hazards in the vicinity of the Park, consider the following scenario of an aircraft on an instrument approach to San Carlos Airport's runway 12.

[Continued on next page]

¹² A MVA is an IFR altitude lower than the minimum enroute altitude (MEA) that provides terrain and obstacle clearance.

¹³ Available at http://airnav.com/depart?http://155.178.201.160/d-tpp/1608/00375TIPPTOE_VI28LR.PDF.

- i. Instrument approaches to SQL originate from the South East, near San Jose.¹⁴ Upon reaching the vicinity of the Stanford Stadium (at the CUZUP intersection – see Figure 7, below), aircraft may descend immediately to 600 ft. MSL.¹⁵
- ii. Aircraft landing on runway 12 must “circle-to-land” to the north side of the Airport, (as low as 600 ft. MSL). Such operations typically overfly the Park.
- iii. Drones at the Park are permitted to be flown as high as 400 Ft. AGL. In the best of circumstances, this may provide a mere 200 ft. of vertical separation between manned aircraft and drones.
- iv. However, aircraft altimeters are not perfect; small drones do not have sensitive/accurate altimeters;¹⁶ and, of course, both aircraft pilots and drone operators are mere mortals. Consequently:
 - a. aircraft altitude often may vary ~100 ft.; and
 - b. drone operators cannot visually ascertain altitude accurately from the ground; and most small drones do not provide accurate altitude control. Despite a 400 ft. above ground level restriction, altitude may unintentionally / unknowingly vary by 100 ft. or more.
- v. Manned aircraft cannot generally see, detect, or avoid small drones. And, most drone operators have little or no training and are not certificated pilots.
- vi. Thus, ***separation between manned aircraft and drones cannot be assured.***

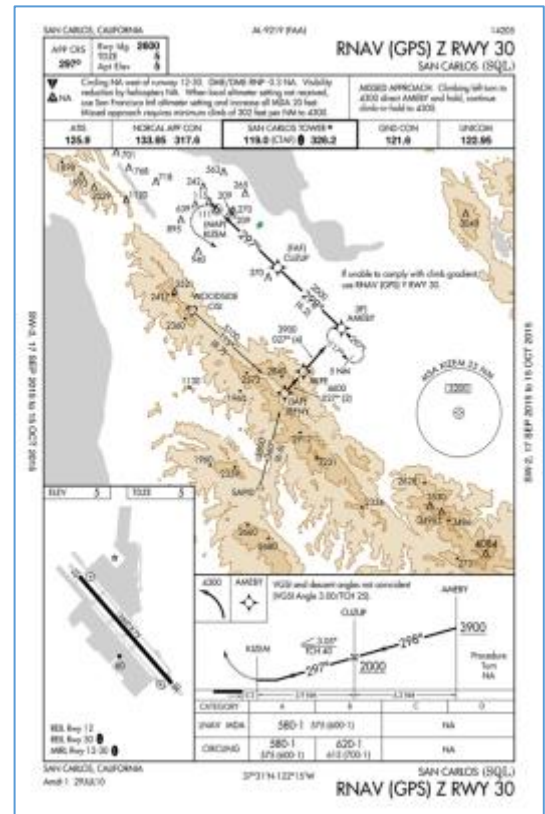


Figure 7 - Instrument Approach at San Carlos

G. SUMMARY

Each of the above situations may cause or contribute to a loss of separation between manned aircraft and drones above the Park, the cumulative effect of which is *hazardous and untenable*. And, the above situations do not even consider major drone malfunctions that create a “fly away” – such as uncontrollable, immediate, high-speed altitude gain.¹⁷ **There is no recognized solution**

¹⁴ Available at <http://airnav.com/depart?http://155.178.201.160/d-tpp/1608/09219RZ30.PDF>.

¹⁵ The minimum descent and circling altitudes have been increased from 580 ft. (as indicated on Figure 7) to 600 ft. by NOTAM.

¹⁶ Instead, many small drones rely on uncertified GPS to (inaccurately) derive altitude.

¹⁷ Small consumer drones have been sighted throughout the Country at greater than 6,000 ft. MSL.

short of the strict prohibition of drone operations at the Park.¹⁸ This is an inconvenient truth. Notwithstanding, the City has an underlying responsibility to protect people on the ground and in the air within the purview of its jurisdiction. Flight safety cannot be compromised.

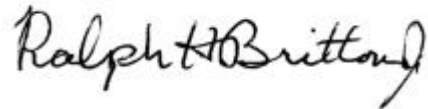
The San Carlos and Palo Alto Airport Associations are pleased to offer the City of Menlo Park further assistance and information regarding this matter upon request.

Thank you for your consideration.

Respectfully submitted,



Michael S. Baum
VP, San Carlos Airport Association
michael@secureav.com
Tel. 650-917-9430
www.sancarlosairport.org



Ralph Britton
Pres., Palo Alto Airport Association
ralphbritton@comcast.net
Tel. 650-328-0760
www.paolaltoairport.aero

¹⁸ Additionally, non-aviation issues material to Park's accommodation of drones are not addressed in this memo, including: the stress and collision threat of drones to avian predators and other birds, increasing Park utilization, and the public's right to peaceful and quiet enjoyment at the Park.

Appendix 1 – San Francisco VFR Terminal Area Chart Excerpt: Bedwell Bayfront Park Vicinity



Appendix 2 – Bedwell Bayfront Park Street Map: Palo Alto and San Carlos Airports Vicinity

