

APPENDIX C2

Avian Monitoring Survey Results

Memorandum

August 21, 2019

Project #4254-01

To: Tali Ashurov, David J. Powers & Associates
From: Stephen Peterson/Steve Rottenborn, H. T. Harvey & Associates
Subject: Topgolf Burlingame Monitoring Survey Results – August 2019

As requested, H. T. Harvey & Associates has conducted additional monitoring surveys of the proposed Topgolf Burlingame project site and the adjacent Sanchez Lagoon area, observing avian flight behavior and pathways in and around the proposed project site. The purpose of these surveys, which supplement our observations from May 7, 8, and 20, was to provide additional context for our evaluation of the potential for avian collisions with the netting of the proposed new facility.

H. T. Harvey & Associates senior wildlife ecologist Stephen L. Peterson, M.S., conducted monitoring surveys on August 5 and 19, 2019. During those surveys, Peterson walked the perimeter of the project site, observing bird flight locations and behavior on the Sanchez Lagoon side (south of the project site), the bayside (north of the project site), and on the west boundary of the project site, near a water treatment facility and dog park. Surveys were timed to coincide with early low tide conditions on August 5 (7:00 a.m. to 4:00 p.m.) and late rising tide conditions on August 19 (11:00 a.m. to 6:00 p.m.). He observed bird flight locations and behavior, watching the pathways birds took in flying in the vicinity (e.g., to determine whether they were flying through airspace that might be occupied or impeded by the proposed netting); observing the species and types (e.g., landbirds vs. waterbirds) of birds flying in the area; and observing any interactions of birds with the existing netting around the driving range or with the adjacent electrical transmission lines.

On August 5, Peterson observed relatively few birds using the Sanchez Lagoon mudflats or flying past or around the project site. The few birds he did observe in Sanchez Lagoon consisted of resident waterbird species, such as the snowy egret (*Egretta thula*), great egret (*Ardea alba*), Canada goose (*Branta canadensis*), and mallard (*Anas platyrhynchos*), all of which were either foraging on mudflats or in shallow pools of water in receding lagoon channels. A group of four black-necked stilts (*Himantopus mexicanus*) and a single spotted sandpiper (*Actitis macularius*) were observed foraging in channels of the lagoon. However, no other shorebird species were observed within Sanchez Lagoon or along the exposed mudflats (during low tide) of the eastern portion of the lagoon channel, which passes underneath Anza Boulevard. Typical urban-adapted resident bird species such as the American crow (*Corvus brachyrhynchos*), lesser goldfinch (*Spinus psaltria*), California towhee (*Melospiza crissalis*), and house finch (*Haemorrhous mexicanus*) were all observed along the hillside immediately south of the project site – and all appeared to be habituated to the existing netting, perching at times on top of the netting and poles,

chasing each other around the netting and surrounding vegetation, and at times flying parallel to the netting. With the exception of a few gull species observed flying in a north to south direction and vice-versa, at a height of approximately 120 feet (ft), no other birds were observed flying directly over the project site. Those birds that were observed in flight around the project site generally took an east to west flight pathway above the lagoon and then moved either to the south and over U.S. Highway 101, or turned and flew in a northwesterly direction around the west end of the project site and over the water treatment facility towards the Bay.

Of interest was a snowy egret that was observed flying at a height of approximately 75 feet (ft) from the lagoon towards the existing netting, in a southern to northwestern direction. When the egret was approximately 25 ft from the netting, it appeared to become aware of the netting; it performed a brief stall, mid-air, and then turned and flew parallel to the netting, until eventually turning around the netting and flying over the water treatment facility. This flight behavior indicated that the egret was on a straight south to north trajectory, across the project site, but the netting impeded its desired flight path. A great egret was also observed flying out of the southeast end of the lagoon at a height of approximately 100 ft, apparently headed on a direct northerly pathway, but before reaching the netting it turned west, just above the hillside adjacent to the south side of the project site, and flew parallel to the netting, eventually turning and flying northwest. These observations indicate that some birds' desired flight path would take them through the area occupied by existing netting. While these large, slow-flying egrets were able to detect the netting before flying into it, these observations support our expectation that some waterbirds will try to fly through the airspace that is occupied by the netting of the Topgolf facility, potentially leading to collisions by birds that do not detect the netting, or faster-flying birds (such as flocks of shorebirds) that may have a hard time avoiding the netting if they do not detect it well in advance.

As the tide started to rise throughout the day, mostly filling the lagoon channels by 2:30 p.m., Peterson observed additional snowy egrets flying east to west along the lagoon channel, eventually settling in to roost on vegetated high ground above the lagoon channels, directly south of the project site. On the bayside of the project site, Peterson observed, during low tide, thousands of waterbirds and shorebirds foraging in exposed mudflats of the Bay, located approximately 1.5 miles north of the shoreline, just north of the project site. However, no birds were observed flying from the Bay toward or over the project site.

On August 19, Peterson surveyed the surrounding project site again, timing his survey in order to observe avian flight behavior and pathways within Sanchez Lagoon and surrounding areas, as the tide rose and then receded later in the day. He once again observed the same bird species and low-level of flight activity in Sanchez Lagoon and within the immediately surrounding area of the project site as he did on August 5. In addition to surveying the same locations as described above, Peterson also surveyed (during the first hour [11:00 a.m. to 12:00 p.m.]) the entire eastern extent of the lagoon's channel, an approximately 0.75 mi. reach that runs from Anza Boulevard east to a canal that empties to the north into the Bay. The purpose of surveying the eastern extent of the channel was to identify the bird species that may be using this area during approaching high tide conditions, and how they may react to rising tide levels, as waters rose from east to west into Sanchez Lagoon. Peterson observed multiple snowy egrets, mallards, and two double-crested cormorants (*Phalacrocorax auritus*) in this area. However, no shorebirds were observed along the exposed mudflats of the eastern channel, nor in

Sanchez Lagoon. As the waters rose along the eastern channel, snowy egrets moved east to west along the channel, towards the remaining shallow pools of water, remaining exposed mudflats, and vegetated high ground of Sanchez Lagoon, directly south of the project site. By late afternoon (3:00 p.m.) all channels within Sanchez Lagoon were full and 30 plus snowy egrets were observed roosting in vegetated high ground areas, in the same area as observed on August 5. With the exception of a few individual gull species flying at high altitudes (approximately 150-300 ft), no other birds were observed flying over the project site. Bird flight activity around the project site appeared to be much lower, given the strong breezy conditions. During the survey period, no exposed mudflats were present in the Bay, and no foraging shorebirds or other waterbirds were seen in the Bay, with the exception of gull species.

During these August observations, we did not observe any birds colliding with the existing netting. However, our observations of two egrets altering their flight paths to fly around the netting, with one of them stalling in mid-air 25 feet before reaching the netting, indicates that the flight paths of some birds would take them into the netting if they did not detect it first. This supports the conclusions of our impact assessment – some birds will attempt to fly through the airspace occupied by the netting of the Topgolf facility, and if they do not detect the netting (e.g., in fog or low-light conditions), or they are flying so fast that they are unable to change direction before hitting the netting, collisions could occur.

Our August observations were performed at a time when large numbers of shorebirds and dabbling ducks were present in the greater South Bay area, which includes Burlingame, based on our own observations and numerous reports to local birding list-servs, yet we did not detect large numbers using Sanchez Lagoon. There may be many reasons for this, and perhaps use of Sanchez Lagoon by shorebirds and waterfowl is sporadic. However, as reported in our July 15, 2019 peer review memo, the eBird database lists counts of up to 300 short-billed dowitchers (*Limnodromus griseus*), 200 western sandpipers (*Calidris mauri*), and 156 semipalmated plovers (*Charadrius semipalmatus*) recorded in the lagoon on a single day in April 2009, and 497 greater scaup (*Aythya marila*) on November 18, 2007. Sufficient numbers of waterbirds are present in Sanchez Lagoon at least occasionally to warrant concern about the potential for waterbirds to collide with the proposed Topgolf netting, in our opinion, as outlined in our July 15 memo.