Edwin M. Lee, Mayor
Philip A. Ginsburg, General Manager

Date: **June 2, 2017**

To: **Angela Calvillo, Clerk of the Board of Supervisors**

From: **Philip A. Ginsburg, General Manager**

Re: **Golden Gate Park – Beach Chalet Athletic Field Lighting Evaluation**

This memorandum is a summary report on a public meeting requested by Supervisor Eric Mar during the Golden Gate Park Beach Chalet Athletic Field FEIR appeal hearing dated July 10, 2012. This public meeting was hosted to receive feedback from project stakeholders and neighbors on the athletic field lights post construction.

General Background:

The Recreation and Park Department and the City Fields Foundation, a non-profit organization, entered into a partnership agreement back in 2006 to renovate athletic fields across the City in an effort to address the shortage of available athletic field play. Over the last 10 years, this partnership has successfully delivered field renovation projects in nine separate part facilities across the City, renovating over 21 athletic fields utilizing synthetic turf and field lights. The final project of this partnership included the renovation of the Beach Chalet athletic fields in Golden Gate Park.

This project, which was initiated back in 2009, was developed through a very robust public engagement process which including the development of a comprehensive environmental impact report (FEIR) required under the California Environmental Quality Act (CEQA). In 2012, in a joint hearing, the Planning Commission and the Recreation and Park Commission adopted the CEQA Approval Findings and approved the project. Following that approval process, the ruling was appealed to the Board of Supervisors in June of 2012. In July of 2012, the Board of Supervisors held a public hearing to consider the appeal of the FEIR. Through Motion No. M12-79 (file 120692), the Board of Supervisors re-affirmed the decision of the Planning Commission and certify the FEIR.

During the hearing process, Supervisor Eric Mar requested that the Recreation and Park Department host a public meeting with various stakeholder groups and park neighbors to review the new field lights and discuss possible options to adjust the evening light hours. Supervisor

Mar requested that the Department report back to the Board following this process, if appropriate.

Project/Site Information:

The Beach Chalet Project included the renovation of four existing soccer fields at the west end of Golden Gate Park. The facility has been used as formal athletic fields since the early 1930's. The project included the following improvements: synthetic turf surfacing, athletic field and pathway lighting, improved site drainage, new fencing and pedestrian pathways, renovation and expansion of the existing parking lot, renovation of the existing restroom building, installation of a new maintenance building, installation of a new children's play structure, spectator bleachers, new park furniture (benches, tables, drinking fountains and signage) and new irrigation and planting.

The primary focus of the project and the overall field renovation program was to increase the available amount of play time at this facility. Prior to construction, the fields received a total of 3,213 play hours in 2013. In 2016, the fields were used more than 15,049 hours, approximately 5 times more play time.

Public safety is also of critical concern for the Department. Having this facility illuminated and used for active and healthy recreation has created a park space that is more welcoming and safe for the public use.

The current lighting schedule for this facility is as follows:

Monday through Saturday:	dusk to 10:00 PM
Sunday:	dusk to 8:00 PM (unless formally permitted)

Public Meeting Process:

On November 3, 2016, approximately one year following the opening of the renovated athletic field, the Department hosted a public meeting at the Golden Gate Park Senior Center to hear feedback from various stakeholder groups and neighbors regarding the new field lights. Staff's outreach included contacting all public members and organizations that participated in the EIR process as well as posting the meeting at the project site and noticing the event on the Department's web page. The meeting was well attended with more than 30 individuals signing the attendance form. Supervisor Eric Mar was also in attendance.

Staff made a brief presentation about the project history, outlined the purpose of the meeting and provided some general field use data from both pre-and post-construction time periods. The balance of the meeting was an open forum for public comment and discussion. (Attached please find Exhibit A, Public Presentation)

In additional to the public meeting, staff kept a list of all formal public comments (emails/letters/311 calls) received during the first year of field operation, a list of comments

received once this meeting was announced and cataloged all comments documented at the public meeting. (Attached please find Exhibit B, Public Meeting Minutes/ Comments)

Public Comments Received (pre-and post-meeting):

- From the date of project completion to the notice date for the public meeting, staff received a total of (7) separate comments/correspondence expressing lighting concerns. These comments are summarized in Exhibit A; pages 9 and 10.
- Following the meeting notice, staff received (27) separate emails in support of the field lights and (0) opposed.
- Following the meeting date, staff received (13) separate emails in support of the field lights and (7) opposed.

Bird Monitoring Activities:

Several comments received throughout this discussion process were directed as how field lighting might impact birds. These concerns were also discussed during the EIR process and were addressed and answered in the FEIR document. During the project approval process with the California Coastal Commission (CCC), one of their members requested that the Department conduct a pre-and post-construction bird monitoring program to review possible impacts to birds. Following the CCC approval, the Department secured the services of a qualified biologist specializing in ornithology to develop an Avian Monitoring Plan and execute the recommended and approved monitoring activities. The monitoring activities were developed through discussions between the consulting biologist, the Department and staff members of the CCC who approved the final monitoring approach.

The monitoring plan called for a three-phased approach in monitoring birds in and around the athletic field site. This included establishing a pre-construction baseline survey of avian presence at the project site. This was followed by ten-night time point count surveys followed by morning sweep surveys during the spring and fall seasons following the completion of the project. The summary of the report concluded that there was no evidence of project effects on birds in the area and that no further avian surveys were warranted for this project. A copy of the Avian Monitoring Plan and the Summary Report are posted on the Department's website. A copy of the Final Report is also included as Exhibit C.

http://sfrecpark.org/project/beach-chalet-athletic-fields-renovation/

Technology and Equipment Discussion:

During the public hearing, there were several suggestions to look at other equipment or technology solutions to assist in refining the light quality and quantity. These includes:

- Installing new or larger light visors/shields
- Changing the lamps to a warmer light color
- Changing the lamps to LED

- Installing a push button system which would allow the public to control lights when needed

During the design and EIR process for this project, staff conducted extensive research into the most appropriate lighting systems available for this project as well as refined the design, height and placement of poles and fixtures. This process included a compromise between adequately illuminating the fields while providing appropriate mitigating design solutions to address concerns raised during the FEIR process.

Staff contacted the lighting manufacture to discuss the options raised above. The follow summarizes those findings.

Installing new or larger light visors/shields: The visors that are currently installed were selected during the FEIR design refinement process. They are the best, most restrictive visors available for this type of light fixture.

Change lamps to a warmer color: The lamps that are installed are an HID metal halide fixture. The color of the lamps can't be changed to a warmer color. Although the lights are not a "muted" tone similar to a standard incandescent light bulb, they are warmer than what has been traditionally installed in new LED street lamps.

Change the lamps to LED: This option was recommended by several members of the public but there were other members that thought this solution was not appropriate. During the design phase of this project, LED sports light fixtures were new to the market and were just being tested for this application. The technology at that time required that the number of fixtures would be approximately double in quantity to traditional HID technology and the height of the fixtures would need to be raised in height to perform equally. Given that this technology was not proven yet coupled with other EIR required mitigation measures, this option was not pursued further. The idea of switching out the newer LED fixtures that are now available is not an option either. The new fixtures are substantially heavier than the HID fixtures and the current pole design is not structurally adequate to carry this additional load.

Install Push Button Light Control Option: The control option is one that is viable with the existing lighting system. It would require minor modifications to the existing equipment and new hardware would be required. This type of system has been used at other athletic facilities but mostly at athletic courts. There is a technical issue associated with the proposal and the type of lights that are currently installed. The time required to turn the lights on once the system is activated is approximately 15 minutes (warm up time). The other issue is that once the lights turn off, they require a cold down period before they can be activated again. This cool down period ranges in time but would be approximately 10 minutes. Given these time delay issues (approximately 25 minutes) with lighting operations, this particular proposal does not appear appropriate for this application.

Department Recommendations:

Scheduling:

Currently the athletic field lights are scheduled as follows:

Monday through Saturday:	dusk to 10:00 PM
Sunday:	dusk to 8:00 PM (unless formally permitted)

Based on 12 months of field use data, the Department will initiate a revised field lighting schedule as follows:

Monday through Friday:	dusk to 10:00 PM
Saturday:	dusk to 8:00 PM (unless formally permitted)
Sunday:	dusk to 8:00 PM (unless formally permitted)

If the Department receives request to extend the play time on Saturdays beyond the 8:00 PM hour, we will extend this time period to 9:00 PM.

There has been a request to turn the light off in winter months when it's raining. The assumption for this request is that the fields are not being used during inclement weather. The benefit of synthetic turf over natural turf fields are that these facilities can and are generally used during inclement/ rainy periods. The proposed approach to address this request is to reduce the number of fields that are illuminated after 8:00 PM from 4 to 2 during raining weather if the fields are not formally permitted. Raining weather is determined if it is raining during this time period. Leaving two fields illuminated during non-permitted times allows public access and use of this facility which is the core goal of the program and project.

Attachments:

Exhibit A: Public Meeting Presentation (11/3/16)
Exhibit B: Public Meeting Minutes (Public Comments)
Exhibit C: Avian Monitoring Plan Final Report (4/24/17)

Exhibit A

Golden Gate Park
Beach Chalet
Field Light Discussion

November 3, 2016

Meeting Agenda

- Introductions
- Intent of Meeting
- Background on Field Light Design
- Current Field Use Information
- Public Comments Received
- Questions and Comments

Intent of Meeting

- During the project approval process at the BOS, Supervisor Mar requested that the Department host a meeting with different stakeholder groups and neighbors to discuss possible plans to adjust the light hours at the site and report back to the BOS with feedback recieved.

BOS Hearing July 10, 2012

Field Light Design Background

Initial field light design had lights on 80' tall poles. Poles were located around the field perimeter and the light quantity was at 50 foot candles (FC)

With feedback during the planning and design process, the design was modified to reduce the pole height to 60', bring the poles to the interior of field area and reduce the light quality from 50 FC to 30 FC.

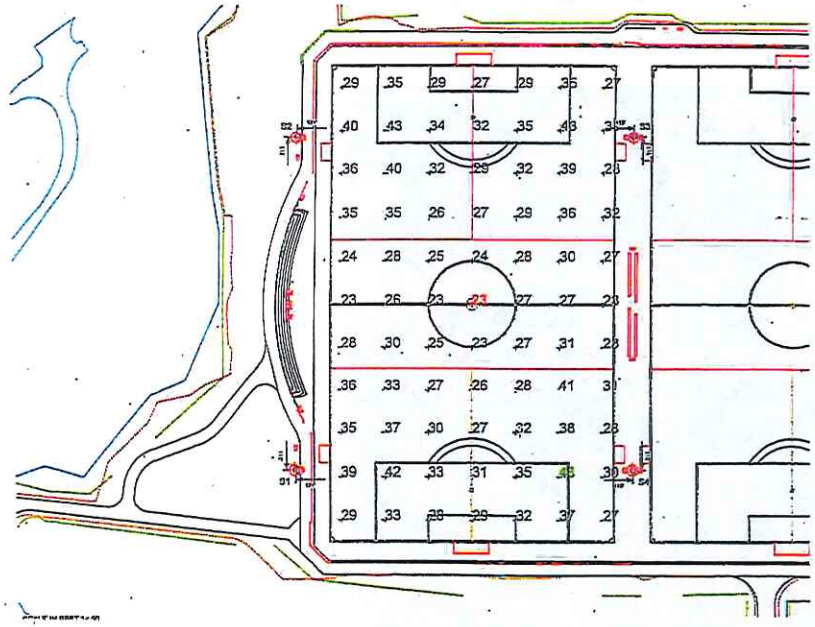
Selected a lighting supplier that specializes in field lighting, one that has demonstrated quality light distribution control, fixtures that are energy efficient and light fixtures that are shielded and provides light spill control. Also, the lighting system was selected because it provides an automated control system for operational flexibility.

Field Light Calculations

Sample Numbers from Field #1

Pre Readings
Average: 31
Max: 43
Min: 23

Post Readings
Average: 31.3
Max: 44
Min: 23



Pre-Construction Goals

Project Name: Beach Chalet Soccer
Project Number: 139305
Field Identification: Soccer 1
Technician: Bill Holland

41	42	39	40	34	30	27	39	42	44	38
37	44	44	40	33	28	26	38	40	44	39
28	34	32	31	30	24	25	26	30	33	29
24	29	26	26	23	23	23	23	27	31	24
25	29	26	23	24	25	24	24	30	32	24
30	37	33	30	26	25	31	30	37	41	31
27	35	35	32	23	23	26	36	34	41	29

Average:	31.3
Maximum:	44.0
Minimum:	23.0

Max/Min:	1.9
# Target Points:	77

Stan
CV:

Post-Construction Readings

Field Use Data

	2013	2014	2016
Jan - March	626	667	3151
April -June	1366	1010	4051
July-Sept	674	163	4937
Sept - Dec	547	0	2910
Total Hours	3213	1840	15049

Current Light Operation Hours

- Monday thru Thursday (Dusk to 10:10 PM – play ends at 10 PM)
- Friday & Saturday (Dust to 10:00 PM)
- Sundays (Dusk to 8:00 PM)

Bird Monitoring

During the project approval process with the California Coastal Commission (CCC), the Department agreed to conduct an avian monitoring plan. In concert with the CCC and the Department's environmental biologists, we developed a monitoring program which includes the following:

- Pre construction survey (spring migration period April & May)
- Post construction survey (spring period)
- Post construction survey (fall period) - *currently in process*

The post construction surveys include nighttime survey and morning sweeps once a week for 5 week in the spring and 5 weeks in the fall.

Project Site Photos

Photo from EIR

Photo from neighbor that lives on Sutro Heights

Public Comments Received

- The Department has received (7) separate comment notifications expressing lighting concerns since the field opening through this meeting publication date.

- Since the meeting notice, staff has received (27) separate emails in support of the lights

Summary of Comments:

- Lights were on at 10PM on a rainy evening. Lights disturb neighbors
- And waste electricity if field isn't being used (x2)
- Are there timers for the lights? Concerned about energy use. (x2)
- Is the field use and lights being monitored?
- Lights are very bright.
- Looks like lights are pointed off the field.
- Lights on all night and every night.
- Adjust the position of the lights. They look like they are out of position and pointing up the hill (Sutro Heights).

Public Comments Received

Summary of Comments (continued):

- Since the lights are controlled off-site, turn them off when there's no open play or permitted use.
- Turn lights off when stargazers are most likely to be out. Certain times a year there are unusual and interesting astronomical events.
- Turn lights off earlier than 10 PM at least several nights per week.
- Dim lights as much as possible.
- Make sure lights are properly directed onto the fields.
- Turn some of the lights off if all fields are not in use.
- Use low energy bulbs to minimize glare, save money and conserve energy.
- Shield the lights as much as possible.
- Meet with Audubon Society to understand impact of lights on birds and better understand when they should not be on.

- Support the lights, more positive activity, more field time, safer space, great play time with family and friends, great amenities other than fields, etc.

Public Comment Period

Next Steps

- All public comments will be noted at this meeting.
- Staff will review all comments and prepare a meeting summary memorandum with recommendations.
- Final recommendations will be distributed to Supervisor Mar's Office, meeting attendees and posted on the Department's website.

THANK YOU!

Exhibit B

Golden Gate Park Beach Chalet Field Lights Discussion

Public Meeting Minutes
Golden Gate Park Senior Center
November 3, 2016

Meeting Agenda:
Introduction
Intent of Meeting
Background on Field Light Design
Current Field Use Information
Public Comments Received
Questions and Comments

Public Comments:

- Use Data: Kids vs. Adults – hours used for each
- Notify public on when fiber cable technology is available which will help provide ability to turn lights off when field is not in use. (security cameras)
- Why are light on until 10PM every night? Do youth use the field at night?
- Dedicate RPD staff to monitor non-permitted use of the field and gauge those patterns
- Lights conflict with the GGP Master Plan. Opposed to lights on the west end of the park.
- Lights impact habitat value
- Provide a balance between play and night sky
- Families use the facility multiple times a week
- Families feel safe and this facility provides great recreational use
- Concerned about red tail hawks, red shoulder hawks and other birds
- People and animals need dark skies
- Project was sold as a project for kids not adults
- Look at field uses patterns across the city and reduce the hours at this site if possible.
- Soccer family is opposed to this project
- Not for profit adult leagues that play at Beach Chalet generate money for underserved youth programs
- Transportation is an issue- site is good for local park users
- Golden Gate Park is a city park and these fields are a good and positive use
- Do the lights need to be on 24/7 365? Can we have reduced hours?
- Field and lights is a compromise between neighbors, field users, night skies, etc.
- Can the fixtures be dimmed? (Musco)
- Can revenues from field permits help support star gazing program?

- This project is not required and alternative ideas were not accepted
- This is not an issue of kids verse nature
- Refer to professor Longhorn letter on light impacts, impacts to animals. Also, the EIR is not accurate
- The current light schedule is not a compromise. This is concentrated light and not ambient light.
- Provide a technical solution for turning lights on/off for non-permitted play. (push button option)
- Lights impact views. Neighbors will move because of lights.
- Golden Gate Park is over programmed with large events that impact neighbors.
- Are the specific days/times for dark skies? Do more calculations on night use and see if there is a compromise.
- Supervisor Mar looked at fields from different vantage points. 10 pm is too because there is not enough use to support lights on at 10 pm. Likes the idea of revenue to support night skies opportunities. Overall, he thinks field use outweighs impacts.
- Bird migration patterns should be considered on light hours and compromised solution
- Look at other facilities (Moscone/ Kezar) as a compromise example.
- LED lights are not a solution
- Plants are impacted for the field lights (plants are dying)
- Like the project and love the walking paths
- GGNRA (past employee)- You can see the impacts of the lights when looking at stars from Ocean Beach. Overall the lighting system is well done.
- Recommend doing additional night light monitoring to see what other impacts might exist. Additional light shields might be a solution to the field light concerns.
- Change light color to a warmer tone fixture
- Lights impact older people or folks with light sensitive issues.
- The impact from the lights is not so much collision but that birds can be drawn of their migration routes. The study did not investigate that impact.
- Red Tailed Hawks and other birds previously nested in this area. What impact has the lighting had?
- What impact has the project has on birds that fed and rested on the field?
- The report indicates racoons were observed at the trash cans. Are they wildlife proof?
- Is the lowest illumination level being used at the field?
- Are the lights controlled automatically or on a photo cell?

There were also two handouts that the public provided.

1. Miscellaneous questions on birds and light technology was submitted by Ms. Weeden. Questions were added above
2. West Golden Gate park Raptor Nests map

ESA

550 Kearny Street
Suite 800
San Francisco, CA 94108
415.896.5900 phone
415.896.0332 fax

www.esassoc.com

April 24, 2017

Exhibit C

Dan Mauer
Capital Improvement Division
San Francisco Recreation and Park Department
30 Van Ness Avenue, 3rd Floor
San Francisco, CA | 94102

Subject: Beach Chalet Athletic Fields Renovation Avian Monitoring Plan Final Report

Dear Mr. Mauer:

This summary report conveys the spring 2016 and fall 2016 avian survey reports that were performed by Environmental Science Associates in support of the City and County of San Francisco Beach Chalet Athletic Fields Renovation Project. The Beach Chalet Athletic Fields facility is an approximately 9.4-acre public sports field facility located at 1500 John F. Kennedy Drive, along the western edge of Golden Gate Park in the City and County of San Francisco. The Beach Chalet Athletic Fields Renovation Project (project) completed by the San Francisco Recreation and Parks Department (SFRPD) in 2016 replaced the grass turf fields with synthetic turf, installed field lighting, renovated the existing restroom building, installed player benches and seating, and improved the overall conditions of the facility through various other modifications intended to increase the amount of play time available on the athletic fields. During their review of the project in 2014, the California Coastal Commission (CCC) requested the preparation and implementation of an Avian Monitoring Plan (AMP) to identify any potential adverse impacts to birds resulting from the use of night lighting by the project. The AMP included pre-project and post-project monitoring of avian behavior and mortality, which was performed by ESA biologists in spring and fall 2016. Following 20 biological surveys that were intended to detect avian mortality, no evidence of project effects on birds was detected based on the thresholds of significance presented in the AMP. On this basis, ESA recommends that no further avian surveys are warranted for this project.

The impact thresholds identified in the AMP, survey methodology, and general survey findings are discussed below.

Thresholds of Significance for Determining Impacts during Avian Monitoring

An initial source of concern for the project was the operation of new lighting standards in close proximity to the Pacific Ocean. Hence, the avian monitoring methodology in the AMP was designed with the intent of discovering any behavior changes in avian behavior that were caused by the project. The following criteria were used to assess potential impacts on migratory and resident bird species.

1. *A bird strike with a light structure is observed.* This event will be interpreted as a blind collision with the light structure or a collision caused by being blinded, disoriented, or confused from the artificial lighting. The collision may or may not result in injury or mortality.

2. *A bird carcass is observed on or beneath a lighting structure*, providing evidence of a bird strike with the light structure that resulted in mortality. Bird carcasses will be inspected by the Monitoring Biologist for evidence that the cause of death was potentially directly related to the field lights and not an unrelated cause.

3. *Light swarming and entrapment behavior by a bird or group of birds is observed within the lighting sphere* during nights when the field lights are on, whereby birds are observed circling within the light sphere for a minimum total duration of two minutes during a monitoring effort. This behavior will be interpreted as a disruption of steller or other visual cues used during nocturnal migration as a result of positive phototaxis.

4. *Any other behavior observed and interpreted by the Monitoring Biologist as uncharacteristic and demonstrated to be correlated with the athletic field lights.*

Avian Monitoring Methodology

ESA biologist Rachel Danielson performed the spring and fall migration avian surveys in 2016. The surveys included nighttime surveys to identify any swarming or entrapment behavior by birds and morning surveys to detect evidence of overnight avian mortality. Nighttime surveys were performed generally after dark, when the fields and new lights were in use. The morning visits started before dawn and were generally performed between 5:30 am and 9:00 am. Such an early start ensured that any bird carcass would be detected before being removed by scavengers or City staff.

Surveys in spring and fall 2016 included five nighttime surveys and five morning sweeps, for a total of 20 avian surveys during the course of the year. Surveys were performed from each of six monitoring stations that were established during preconstruction surveys in 2014. The monitoring stations were visited for 20-minute intervals during the 2016 surveys. Avian activity on, over, and in the vicinity of the athletic fields was noted. The monitoring biologist also looked for evidence of behavior indicating distress or other response to the new lighting.

Survey Findings

During night surveys, all fields were in-use upon ESA's arrival and human noise and activity were high throughout the survey period. Following the 10 focused night surveys, no birds were observed exhibiting distress or confusion in response to the lights, or reacting to their presence in general. The biologist consistently detected individual feathers on the field during the 10 morning surveys. These individual feathers were consistent with avian preening activity and were not the result of impacts with the field lights. No signs of blood or other avian body parts were observed in association with the feathers and there was no evidence to suggest avian mortality.

Several bats were observed flying around the light standards, as they were hunting moths and other flying invertebrates attracted to the lights while in use. Bats did not appear to be entrapped by the light but avoided a prolonged presence within the light beam.

To summarize our findings, following 20 post-construction surveys that were designed and timed to identify avian stressors from the Beach Chalet Athletic Fields Renovation Project, no evidence of avian stress or mortality was detected. The use of lights at the fields does not appear to be an avian navigation hazard, as no evidence of behavior modification or mortality was detected during surveys. Based on the survey findings and discussions with City staff, we find that the lights are minimally impacting to avian species and recommend that further surveys are not warranted.

You may contact me or Rachel Danielson at 415-254-2023 if you have any questions about the surveys or interpretation of the survey findings.

Sincerely,

Brian Pittman, CWB
Wildlife Program Manager

Attachments:

1) Memorandum from Rachel Danielson dated July 13, 2016 entitled, "Beach Chalet Athletic Fields Renovation Post-Construction Monitoring, Spring Migration 2016."
2) Memorandum from Rachel Danielson and Brian Pittman dated February 17, 2017, entitled, "Beach Chalet Athletic Fields Renovation Post-Construction Monitoring, Fall Migration 2016."

ESA Biological Resources

550 Kearny Street
Suite 800
San Francisco, CA 94108
415.896.5900 phone
415.896.0332 fax

www.esassoc.com

memorandum

date July 13, 2016

from Rachel Danielson

subject Beach Chalet Athletic Fields Renovation Post-Construction Monitoring, Spring Migration 2016

Summary

ESA biologist, Rachel Danielson, performed spring migration nighttime and morning sweep surveys at the Beach Chalet Athletic Fields in San Francisco, CA per the Avian Monitoring Plan. No evidence of impact collision with light towers or other adverse effects on birds associated with the use of new lighting at the athletic fields (e.g. entrapment resulting in death by exhaustion) was observed during the spring 2016 monitoring events. The following describes in detail conditions, avian and other wildlife activity observed during these five nighttime surveys and five morning sweeps.

April 26, 2016 – Nighttime Survey 1 (Spring Migration)

The nighttime survey was conducted between 8:00pm and 10:00pm while the new lights were in-use. Each of the six monitoring stations, established during the preconstruction surveys in 2014, was visited for 20-minute intervals during the survey period. Avian activity on, over, and in the vicinity of the athletic fields was noted. Any behavior indicating distress or in response to the new lighting was also noted.

Athletic field and security lighting was turned on between 7:28pm – 10:10pm.

Weather Conditions

- Survey start: 56°F, mostly cloudy with high fog, winds 18-25 mph.
- Survey end: 51°F, mostly cloudy, winds 25-35 mph.
- Sunset: 7:56pm
- Last light: 8:24pm

Observations

All fields in-use upon arrival. Artificial turf has no foraging attraction for birds and human noise and activity is high during the survey period. Few ravens and gulls observed flying over the field or over the Monterey cypress trees and ngaio shrubs surrounding the fields and indiscernible passerines heard from dense landscaping along field margins. After last light, avian activity over or on the margins of the fields was difficult to see beyond the glare of the field lights. Surveyor often backed away from the monitoring station to achieve a better perspective of the fields above and below the lighting. One raccoon was observed scavenging trash bins near the bathroom facilities.

No birds were observed exhibiting distress or confusion in response to the lights, or reacting to their presence in general.

April 27, 2016 – Morning Sweep 1

The morning sweep was conducted between 5:45am and 7:55am. Surveyor walked meandering transects on the athletic fields scanning for evidence of avian collision with light poles (i.e. feathers, carcasses, tissue, blood, etc.), ensuring 100% visual coverage of the fields.

Weather Conditions

- Survey start: 46°F, overcast with winds 8 mph
- Survey end: 46°F, overcast with winds 8 mph
- First light: 5:46am
- Sunrise: 6:14am

Observations

One raccoon was observed crossing John F. Kennedy Drive, heading away from the athletic fields. Ravens were observed perching on the top of the light poles throughout the morning sweep. Such scavengers are likely to disturb evidence of avian collisions with light poles.

Feathers

A total of 40 feathers were observed on the athletic fields during the morning sweep. Each feather was photographed in context of the nearest light pole and up close with groups of feathers documented together. GPS data was also taken and the feather was collected. **Figure 1** depicts the location of feathers or groups of feathers collected during the survey.

The majority of the feathers were small and downy (Photo 1). Only two larger feathers (wing or portion of a tail feather) were collected (Photo 2). Most feathers were observed within 50 feet of light poles. No sign of blood or other avian body parts were observed in association with the feathers. It is possible that the many ravens which reside in the vicinity of the athletic fields routinely preen atop the light stands and shed these feathers.

Photo 1: Downy feather sample.

Photo 2: Wing or tail feather sample.

May 2, 2016 – Nighttime Survey 2 (Spring Migration)

The nighttime survey was conducted between 8:00pm and 10:00pm while the new lights were in-use. Each of the six monitoring stations, established during the preconstruction surveys in 2014, was visited for 20-minute intervals during the survey period. Avian activity on, over, and in the vicinity of the athletic fields was noted. Any behavior indicating distress or in response to the new lighting was also noted.

Athletic field and security lighting was turned on between 7:33pm – 10:10pm.

Weather Conditions

- Survey start: 58°F, mostly cloudy with light fog, winds 8-10 mph.
- Survey end: 52°F, scattered clouds, winds 6 mph.
- Sunset: 8:01pm
- Last light: 8:30pm

Observations

Only two pitches (1 and 4) were in use throughout the survey. Ravens and gulls observed flying over the Monterey cypress trees and ngio shrubs surrounding the fields. White-crowned sparrows heard singing from dense landscaping along field margins. After last light, avian activity over or on the margins of the fields was difficult to see beyond the glare of the field lights. Surveyor often backed away from the monitoring station to achieve a better perspective of the fields above and below the lighting. One raccoon was again observed scavenging trash bins near the bathroom facilities.

Several moths (18) observed in light paths during survey period.

One unidentified passerine observed flying northwest across the field beneath the lights; no distress or confusion in response to the lights was observed.

One unidentified passerine or bat observed from two pitches away flying briefly into the light path close to the top of the light structure. No impact was observed and once the individual left the light beam, no further activity was observed.

May 3, 2016 – Morning Sweep 2

The morning sweep was conducted between 5:52am and 8:50am. Surveyor walked meandering transects on the athletic fields scanning for evidence of avian collision with light poles (i.e. feathers, carcasses, tissue, blood, etc.), ensuring 100% visual coverage of the fields.

Weather Conditions

- Survey start: 58°F, overcast with winds 0 mph
- Survey end: 59°F, overcast with winds 5-7 mph
- First light: 5:42am
- Sunrise: 6:11am

Observations

Ravens were observed perching on the top of the light poles throughout the morning sweep. One observed landing on the field during the sweep after surveyor had swept that pitch. Spoke with two SFRPD gardeners (Hue and

Toby) who stated no carcasses which would indicate a bird strike or collision with light structures had been observed since installation of the field lights. They come to the fields on a daily basis in the morning.

Feathers

A total of 105 feathers were observed on the athletic fields during the morning sweep. Each feather was photographed in context of the nearest light pole and up close with groups of feathers documented together. GPS data was also taken and the feather was collected. **Figure 2** depicts the location of feathers or groups of feathers collected during the survey.

The majority of the feathers were small and downy though some larger feathers were also observed and collected. Feathers were documented between 15 and 90 feet of light poles with the majority within 50 feet. No sign of blood or other avian body parts were observed in association with the feathers. It is likely these feathers are the result of birds preening in the vicinity of the fields in trees or atop the light poles. The fields within pitches used the previous night contained fewer feathers than unused fields, which may indicate feathers dropped to the field during the day or throughout the week between monitoring events are disturbed by play on the fields.

On future morning sweeps, feathers observed on the fields which appear to be the result of preening or dropped while a bird is in flight over the field (i.e., not the result of an impact or collision with the new light poles) will not be photographed, collected, or their location documented in GIS.

May 10, 2016 – Nighttime Survey 3 (Spring Migration)

The nighttime survey was conducted between 8:00pm and 10:02pm while the new lights were in-use. Each of the six monitoring stations, established during the preconstruction surveys in 2014, was visited for 20-minute intervals during the survey period. Avian activity on, over, and in the vicinity of the athletic fields was noted. Any behavior indicating distress or in response to the new lighting was also noted.

Athletic field and security lighting was turned on between 7:41pm – 10:10pm.

Weather Conditions

- Survey start: 58°F, mostly cloudy with light fog, winds 8-10 mph.
- Survey end: 52°F, scattered clouds, winds 6 mph.
- Sunset: 8:09pm
- Last light: 8:38pm

Observations

American crows, ravens and gulls observed flying over the Monterey cypress trees and ngaio shrubs surrounding the fields. Brown pelican was observed west of the fields on the wing. White-crowned sparrow and mourning dove heard singing or observed in the landscaping surrounding the field margins. After last light, avian activity over or on the margins of the fields was difficult to see beyond the glare of the field lights. Surveyor occasionally backed away from the monitoring station to achieve a better perspective of the fields above and below the lighting. Two raccoons, one adult and one juvenile, were observed nearby the bathroom facility trash bins at the end of the monitoring period.

Several moths (8) observed in light paths during survey period.

No avian activity in response to the field lights (i.e. distress or confusion) was observed during the monitoring period.

May 11, 2016 – Morning Sweep 3 (Spring Migration)

The morning sweep was conducted between 5:30am and 7:15am. Surveyor walked meandering transects on the athletic fields scanning for evidence of avian collision with light poles (i.e. feathers, carcasses, tissue, blood, etc.), ensuring 100% visual coverage of the fields.

Weather Conditions

- Survey start: 59°F, overcast with winds 6-7 mph
- Survey end: 59°F, overcast with winds 9 mph
- First light: 5:34am
- Sunrise: 6:03am

Observations

Several feathers were observed on the fields during the morning sweep; five larger black, wing or tail feathers and numerous smaller downy feathers. These feathers appeared consistent with those found during previous morning sweeps suspected to be the result of birds preening near the fields and not the result of an impact collision with the field lights. Additionally, many of these feathers were observed on the margins of the fields during the monitoring visit the night prior. No evidence of an avian collision with the light poles was observed during the sweep.

May 19, 2016 – Nighttime Survey 4 (Spring Migration)

The nighttime survey was conducted between 8:10pm and 10:10pm while the new lights were in-use. Each of the six monitoring stations, established during the preconstruction surveys in 2014, was visited for 20-minute intervals during the survey period. Avian activity on, over, and in the vicinity of the athletic fields was noted. Any behavior indicating distress or in response to the new lighting was also noted.

Athletic field and security lighting was turned on between 7:48pm – 10:10pm.

Weather Conditions

- Survey start: 54°F, partly cloudy with light fog, winds 21-45 mph.
- Survey end: 58°F, mostly cloudy, winds 27-32 mph.
- Sunset: 8:16pm
- Last light: 8:46pm

Observations

Ravens and gulls observed flying over the Monterey cypress trees and ngaio shrubs surrounding the fields. White-crowned sparrows were heard singing or observed in the landscaping surrounding the field margins. After last light, avian activity over or on the margins of the fields was difficult to see beyond the glare of the field lights. Surveyor occasionally backed away from the monitoring station to achieve a better perspective of the fields above and below the lighting. One raccoon was observed on the southwest side of the field among the ngaio shrubs and Monterey cypress trees toward the end of the monitoring period.

Several moths (6) observed in light paths during survey period.

No avian activity in response to the field lights (i.e. distress or confusion) was observed during the monitoring period.

May 20, 2016 – Morning Sweep 4 (Spring Migration)

The morning sweep was conducted between 5:30am and 6:40am. Surveyor walked meandering transects on the athletic fields scanning for evidence of avian collision with light poles (i.e. feathers, carcasses, tissue, blood, etc.), ensuring 100% visual coverage of the fields.

Weather Conditions

- Survey start: 50°F, overcast with winds 19 mph
- Survey end: 50°F, mostly cloudy with winds 11 mph
- First light: 5:26am
- Sunrise: 5:55am

Observations

Several feathers were observed on the fields during the morning sweep which appeared consistent with those found during previous morning sweeps in size and distribution throughout the fields. These are suspected to be the result of birds preening near the fields and not the result of an impact collision with the field lights. Many of these feathers were also observed on the margins of the fields during the monitoring visit the night prior. No evidence of an avian collision with the light poles was observed during the sweep.

May 23, 2016 – Nighttime Survey 5 (Spring Migration)

The nighttime survey was conducted between 8:07pm and 10:07pm while the new lights were in-use. Each of the six monitoring stations, established during the preconstruction surveys in 2014, was visited for 20-minute intervals during the survey period. Avian activity on, over, and in the vicinity of the athletic fields was noted. Any behavior indicating distress or in response to the new lighting was also noted.

Athletic field and security lighting was turned on between 7:52pm – 10:10pm.

Weather Conditions

- Survey start: 56°F, overcast with light fog, winds 7-17 mph.
- Survey end: 57°F, mostly cloudy, winds 12 mph.
- Sunset: 8:20pm
- Last light: 8:50pm

Observations

Three of the eight pitches were in-use during the monitoring period. Ravens, gulls, and a red-tailed hawk were observed flying over the Monterey cypress trees and ngaio shrubs surrounding the fields. Over 20 brown pelicans were observed west of the fields flying north along the coast. American robin, white-crowned sparrow, and dark-eyed junco were heard singing or observed in the landscaping surrounding the field margins. After last light, avian activity over or on the margins of the fields was difficult to see beyond the glare of the field lights. Surveyor occasionally backed away from the monitoring station to achieve a better perspective of the fields above and below the lighting. One raccoon was observed on the southwest side of the field among the ngaio shrubs and Monterey cypress trees toward the end of the monitoring period.

Several moths (9) observed in light paths during survey period.

No avian activity in response to the field lights (i.e. distress or confusion) was observed during the monitoring period.

May 24, 2016 – Morning Sweep 5 (Spring Migration)

The morning sweep was conducted between 6:21am and 7:25am. Surveyor walked meandering transects on the athletic fields scanning for evidence of avian collision with light poles (i.e. feathers, carcasses, tissue, blood, etc.), ensuring 100% visual coverage of the fields.

Weather Conditions

- Survey start: 55°F, mostly cloudy with winds 0 mph
- Survey end: 55°F, mostly cloudy with light winds
- First light: 5:23am
- Sunrise: 5:53am

Observations

Several feathers were observed on the fields during the morning sweep; four larger black feathers and many small down feathers which appeared consistent with those found during previous morning sweeps in size and distribution throughout the fields. These are suspected to be the result of birds preening near the fields and not the result of an impact collision with the field lights. Larger black feathers were located on the southwest portions of pitches 1 and 2 where ravens are regularly perched throughout monitoring events. Habitual perching in the Monterey cypress west of the fields may be associated with previous nesting efforts and access to food from the Park Chalet garbage bins northwest of the fields. No evidence of an avian collision with the light poles was observed during the sweep.

SOURCE:ESRI, 2014; ESA, 2016

. 130904 : Beach Chalet Athletic Fields Renovation AMP

Figure 1

4.27.2016 Feather Locations

SOURCE:ESRI, 2014; ESA, 2016

. 130904 : Beach Chalet Athletic Fields Renovation AMP

Figure 2

5.3.2016 Feather Locations

ESA Biological Resources

550 Kearny Street
Suite 800
San Francisco, CA 94108
415.896.5900 phone
415.896.0332 fax

www.esassoc.com

memorandum

date February 17, 2017

from Rachel Danielson; Brian Pittman, ESA

subject Beach Chalet Athletic Fields Renovation Post-Construction Monitoring, Fall Migration 2016

Summary

ESA biologist, Rachel Danielson, performed fall migration nighttime and morning sweep surveys at the Beach Chalet Athletic Fields in San Francisco, CA per the Avian Monitoring Plan. No evidence of impact collision with light towers or other adverse effects on birds associated with the use of new lighting at the athletic fields (e.g. entrapment resulting in death by exhaustion) was observed during the fall 2016 monitoring events. Similar surveys by ESA in spring 2016 also found no evidence of adverse effects on birds. The following describes in detail conditions, avian and other wildlife activity observed during these five nighttime surveys and five morning sweeps in fall 2016.

October 17, 2016 – Nighttime Survey 6 (Fall Migration)

The nighttime survey was conducted between 7:30 pm and 9:32 pm while the new lights were in-use. Each of the six monitoring stations, established during the preconstruction surveys in 2014, was visited for 20-minute intervals during the survey period. Avian activity on, over, and in the vicinity of the athletic fields was noted. Any behavior indicating distress or in response to the new lighting was also noted.

Athletic field and security lighting was turned on between 6:01 pm – 10:10 pm.

Weather Conditions

- Survey start: 60°F, mostly cloudy with fog, calm winds.
- Survey end: 58°F, mostly cloudy with fog, calm winds.
- Sunset: 6:28 pm
- Last light: 6:55 pm

Observations

All fields in-use upon ESA's arrival and human noise and activity was high throughout the survey period. After last light, avian activity over or on the margins of the fields was difficult to see beyond the glare of the field lights. Surveyor often backed away from the monitoring station to achieve a better perspective of the fields above and below the lighting. One raccoon was observed scavenging trash bins on the north side of Pitch 4.

No birds were observed exhibiting distress or confusion in response to the lights, or reacting to their presence in general. Two bats were observed flying into the same light located between Pitch 2 and Pitch 3 on the east side of the fields. Many moths were observed in the field light beams throughout the survey period. Bats were hunting moths and other flying invertebrates attracted to the lights while in use. Bats did not appear to be entrapped by the light but avoided a prolonged presence within the light beam.

Photo 1: Athletic field lights in-use.

Photo 2: Raccoon scavenging food waste from field trashcan.

October 18, 2016 – Morning Sweep 6

The morning sweep was conducted between 7:08 am and 9:30 am. Surveyor walked meandering transects on the athletic fields scanning for evidence of avian collision with light poles (i.e. feathers, carcasses, tissue, blood, etc.), ensuring 100% visual coverage of the fields.

Weather Conditions

- Survey start: 54°F, overcast with fog and calm winds
- Survey end: 58°F, sunny with calm winds
- First light: 6:54am
- Sunrise: 7:21am

Observations

Ravens and crows (of the Corvidae family and collectively referred to as "corvids") were observed perching on the top of the light poles and Monterey cypress trees along the field perimeter throughout the morning sweep. These scavengers could remove evidence of avian collisions with light poles, as could raccoons that inhabit the park in the athletic field vicinity. Two red-tailed hawks were heard calling east of the fields.

Feathers

A total of 15 feathers were observed on the athletic fields during the morning sweep and one feather was observed on the perimeter sweep of the fields. The majority of the feathers were small (between 1 and 2.5 inches) or downy (less than half an inch). Four larger feathers (between 4 and 6 inches) likely from the wing or tail of a raven or crow were observed. These feathers appeared consistent with those found during previous morning sweeps conducted during the spring monitoring, and suspected to be the result of birds preening near the fields and not

the result of an impact collision with the field lights. No sign of blood or other avian body parts were observed in association with the feathers.

Photo 3: Athletic fields in morning fog.

October 19, 2016 – Nighttime Survey 7 (Fall Migration)

The nighttime survey was conducted between 7:41 pm and 9:41 pm while the new lights were in-use. Each of the six monitoring stations, established during the preconstruction surveys in 2014, was visited for 20-minute intervals during the survey period. Avian activity on, over, and in the vicinity of the athletic fields was noted. Any behavior indicating distress or in response to the new lighting was also noted.

Athletic field and security lighting was turned on between 5:58 pm – 10:10 pm.

Weather Conditions

- Survey start: 67°F, mostly cloudy with light fog, winds 0-2 mph.
- Survey end: 61°F, mostly clouds, winds 0 mph.
- Sunset: 6:26pm
- Last light: 6:52pm

Observations

All fields in-use upon ESA's arrival and human noise and activity was high throughout the survey period. After last light, avian activity over or on the margins of the fields was difficult to see beyond the glare of the field lights. Surveyor often backed away from the monitoring station to achieve a better perspective of the fields above and below the lighting. Four raccoons were observed in the wooded area east of the athletic fields toward the second half of the survey period.

One unidentified gull was observed flying west to east over the fields during monitoring period at the sixth station of the night. No birds were observed exhibiting distress or confusion in response to the lights, or reacting to their presence in general. Several moths were observed in light paths during the survey period.

October 20, 2016 – Morning Sweep 7

The morning sweep was conducted between 7:15 am and 9:15 am. Surveyor walked meandering transects on the athletic fields scanning for evidence of avian collision with light poles (i.e. feathers, carcasses, tissue, blood, etc.), ensuring 100% visual coverage of the fields.

Weather Conditions

- Survey start: 55°F, overcast with winds 0 mph.
- Survey end: 63°F, clear and sunny with winds 3-5 mph.
- First light: 6:56 am
- Sunrise: 7:23 am

Observations

Crows and ravens were observed perching on the top of the light poles throughout the morning sweep. SFRPD gardeners (Hue and Toby) who ESA spoke with during spring migration monitoring morning sweeps were at the athletic fields this morning. They again stated no carcasses which would indicate a bird strike or collision with light structures had been observed since the spring monitoring and since installation of the field lights. They come to the fields on a daily basis in the morning and sweep the field once a week for debris.

Feathers

A total of 110 feathers were observed on the athletic fields during the morning sweep and 36 feathers were observed on the perimeter sweep of the fields. The majority of the feathers were small (between 1 and 2.5 inches) or downy (less than half an inch). Six larger feathers (between 4 and 6 inches) likely from the wing or tail of a raven or crow were observed. These feathers appeared consistent with those found during previous morning sweeps conducted during the spring monitoring, and suspected to be the result of birds preening near the fields and not the result of an impact collision with the field lights. No sign of blood or other avian body parts were observed in association with the feathers.

Photo 4: Cluster of feathers on the southeast corner of Pitch 3 where corvids regularly observed preening in nearby trees and on top of light poles.

October 25, 2016 – Nighttime Survey 8 (Fall Migration)

The nighttime survey was conducted between 7:48 pm and 9:49 pm while the new lights were in-use. Each of the six monitoring stations, established during the preconstruction surveys in 2014, was visited for 20-minute intervals during the survey period. Avian activity on, over, and in the vicinity of the athletic fields was noted. Any behavior indicating distress or in response to the new lighting was also noted.

Athletic field and security lighting was turned on between 5:51 pm – 10:10 pm.

Weather Conditions

- Survey start: 62°F, partly cloudy with light fog, winds 8 mph.
- Survey end: 64°F, partly cloudy, winds 0 mph.
- Sunset: 6:18 pm
- Last light: 6:45 pm

Observations

Most fields were in-use upon ESA's arrival and human noise and activity was high throughout the survey period. American crows, ravens, gulls, and white-crowned sparrows were observed in and around the trees and shrubs bordering the fields prior to sunset, consistent with previous monitoring events. After last light, avian activity over or on the margins of the fields was difficult to see beyond the glare of the field lights. Surveyor occasionally backed away from the monitoring station to achieve a better perspective of the fields above and below the lighting.

One great horned owl (*Bubo virginianus*) was heard hooting from trees east of the southeast monitoring station between 8:49pm and 9:09pm. Great horned owls are known to inhabit Golden Gate Park and vocalizing at dusk is normal behavior. Moths were consistently observed within light beams during the survey period. One bat was observed hunting moths visible in the light beams between pitches 2 and 3 on the east side of the athletic fields. The bat did not appear to be entrapped by the light but avoided a prolonged presence within the light beam.

No avian activity in response to the field lights (i.e. distress or confusion) was observed during the monitoring period.

October 26, 2016 – Morning Sweep 8

The morning sweep was conducted between 7:05 am and 9:45 am. Surveyor walked meandering transects on the athletic fields scanning for evidence of avian collision with light poles (i.e. feathers, carcasses, tissue, blood, etc.), ensuring 100% visual coverage of the fields.

Weather Conditions

- Survey start: 57°F, light fog, winds 15 mph
- Survey end: 62°F, partly cloudy, winds 8 mph
- First light: 7:02 am
- Sunrise: 7:29 am

Observations

Crows and ravens were observed perching on the top of the light poles and preening throughout the morning sweep. Occasionally these birds would drop to the field to scavenge litter or preen on the field surface.

Feathers

A total of 68 feathers were observed on the athletic fields during the morning sweep and 10 feathers were observed on the perimeter sweep of the fields. The majority of the feathers were small (between 1 and 2.5 inches) or downy (less than half an inch). One larger, brown feather (between 4 and 6 inches) likely from the wing or tail of a raven or crow was observed. The SFRPD gardeners were mowing the lawn which borders the walking path around the fields. Additional feathers around the perimeter of the fields may have been disturbed by mowing activity prior to ESA surveying that portion of the perimeter.

These feathers appeared consistent with those found during previous morning sweeps conducted during the spring monitoring, and suspected to be the result of birds preening near the fields and not the result of an impact collision with the field lights. No sign of blood or other avian body parts were observed in association with the feathers.

November 1, 2016 – Nighttime Survey 9 (Fall Migration)

The nighttime survey was conducted between 7:51 pm and 9:53 pm while the new lights were in-use. Each of the six monitoring stations, established during the preconstruction surveys in 2014, was visited for 20-minute intervals during the survey period. Avian activity on, over, and in the vicinity of the athletic fields was noted. Any behavior indicating distress or in response to the new lighting was also noted.

Athletic field and security lighting was turned on between 5:42 pm – 10:10 pm.

Weather Conditions

- Survey start: 59°F, partly cloudy with light fog, winds 0 mph.
- Survey end: 57°F, partly cloudy, winds 0 mph.
- Sunset: 6:10 pm
- Last light: 6:37 pm

Photo 5: Field light illumination observed west of the primary vegetation bordering the fields.

Observations

All fields were in-use during the monitoring period. American crows and gulls observed flying over the Monterey cypress trees and ngaio shrubs surrounding the fields. After last light, avian activity over or on the margins of the fields was difficult to see beyond the glare of the field lights. Surveyor occasionally backed away from the monitoring station to achieve a better perspective of the fields above and below the lighting.

One raccoon was observed on the northeast side of the field rummaging in the field waste bins between 8:11 and 8:31 pm. Bats were observed repeatedly hunting moths and other small insects in the field light beams during the survey period. This activity was observed four times at the southeast light monitoring station, twice on the southwest light monitoring station, and seven times at the mid-field light monitoring station. The bats hunting under the mid-field lights were observed flying from trees on both the east and west sides of the fields. Bats did not appear to be entrapped by the light but avoided prolonged presence within the light beams.

No avian activity in response to the field lights (i.e. distress or confusion) was observed during the monitoring period.

November 2, 2016 – Morning Sweep 9

The morning sweep was conducted between 7:10 am and 9:30 am. Surveyor walked meandering transects on the athletic fields scanning for evidence of avian collision with light poles (i.e. feathers, carcasses, tissue, blood, etc.), ensuring 100% visual coverage of the fields.

Weather Conditions

- Survey start: 52°F, light fog, winds 0 mph
- Survey end: 58°F, sunny, winds 0 mph
- First light: 7:08 am
- Sunrise: 7:35 am

Observations

Crows and ravens were observed perching on the top of the light poles and preening throughout the morning sweep.

Feathers

A total of 38 feathers were observed on the athletic fields during the morning sweep and 2 feathers were observed on the perimeter sweep of the fields. The majority of the feathers were small (between 1 and 2.5 inches) or downy (less than half an inch). Six larger feathers (between 4 and 6 inches) likely from the wing or tail of a raven or crow were observed on the fields. These feathers appeared consistent with those found during previous morning sweeps conducted during the spring monitoring, and suspected to be the result of birds preening near the fields and not the result of an impact collision with the field lights. No sign of blood or other avian body parts were observed in association with the feathers.

November 2, 2016 – Nighttime Survey 10 (Fall Migration)

The nighttime survey was conducted between 7:54 pm and 9:54 pm while the new lights were in-use. Each of the six monitoring stations, established during the preconstruction surveys in 2014, was visited for 20-minute intervals during the survey period. Avian activity on, over, and in the vicinity of the athletic fields was noted. Any behavior indicating distress or in response to the new lighting was also noted.

Athletic field and security lighting was turned on between 5:41 pm – 10:10 pm.

Weather Conditions

- Survey start: 57°F, partly cloudy, winds 0 mph.
- Survey end: 57°F, partly cloudy, winds 0 mph.
- Sunset: 6:09 pm
- Last light: 6:36 pm

Observations

All fields were in-use during the monitoring period though overall there were less people using the fields. Per usual, raven, American crown, and various gulls were observed in perimeter trees and flying overhead prior to sunset. After last light, avian activity over or on the margins of the fields was difficult to see beyond the glare of the field lights. Surveyor occasionally backed away from the monitoring station to achieve a better perspective of the fields above and below the lighting.

A great horned owl was observed flying north over the Monterey cypress trees on the east side of the field from the southeast light monitoring station. Two red-shouldered hawks (*Buteo lineatus*) were observed flying southeast over the northeast corner of the field into the Monterey cypress trees and heard vocalizing. Several bats were again observed hunting moths in the light beams of the field lights, flying from trees surrounding the fields: three at the northwest light monitoring station; four at the northeast light monitoring station; one at the mid-east light monitoring station; three at the southwest light monitoring station; and one at the mid-west light monitoring station. Bats did not appear to be entrapped by the light but avoided prolonged presence within the light beams.

No avian activity in response to the field lights (i.e. distress or confusion) was observed during the monitoring period.

November 3, 2016 – Morning Sweep 10

The morning sweep was conducted between 7:15 am and 9:35 am. Surveyor walked meandering transects on the athletic fields scanning for evidence of avian collision with light poles (i.e. feathers, carcasses, tissue, blood, etc.), ensuring 100% visual coverage of the fields.

Weather Conditions

- Survey start: 54°F, clear, winds 0 mph
- Survey end: 61°F, clear, winds 3mph
- First light: 7:10 am
- Sunrise: 7:38 am

Observations

Crows and ravens were observed perching on the top of the light poles and preening throughout the morning sweep.

Feathers

A total of 29 feathers were observed on the athletic fields during the morning sweep and 3 feathers were observed on the perimeter sweep of the fields. Again, the majority of the feathers were small (between 1 and 2.5 inches) or downy (less than half an inch). Three larger feathers (between 4 and 6 inches) likely from the wing or tail of a raven or crow were observed on the fields. These feathers appeared consistent with those found during previous morning sweeps conducted during the spring monitoring, and suspected to be the result of birds preening near the fields and not the result of an impact collision with the field lights. No sign of blood or other avian body parts were observed in association with the feathers.