MEMORANDUM

Date: September 30, 2009
To: Patrick Hannan, City Fields Foundations
From: Ben Larson and Matt Goyne, Fehr & Peers
Subject: Beach Chalet Soccer Fields Improvements

Fehr & Peers has completed an assessment of the potential transportation impacts due to the improvement of the Beach Chalet Soccer Fields. This memorandum presents our observations of the existing conditions and our forecast of future conditions. The objective of this study is to assess the impact of the proposed project on the existing transportation system. This study was not required by City Planning and is not intended for environmental review.

PROJECT UNDERSTANDING

Figure 1 displays the location of the Beach Chalet Soccer Fields, on the west side of Golden Gate Park, close to the Great Highway and Beach Chalet Restaurant. The existing facility is a grass field used primarily for youth soccer leagues. The City Fields Foundation and the San Francisco Recreation & Park Department are proposing to refurbish the four existing grass soccer fields with artificial turf and lighting. The current soccer fields require a considerable amount of maintenance. One of the four fields is always closed while the other three are in use in order to revive the turf. Installing the artificial turf will eliminate the need for this three-on/one-off cycle and will allow for all four fields to be used at once. Essentially, what this means for operations is a 33% increase in use at any given time.

Exhibit 1 – Beach Chalet Soccer Fields
EXISTING CONDITIONS

Fehr & Peers collected traffic counts and performed a field visit on Saturday, September 12, 2009 from 11:30 to 1:30 while the fields were being fully utilized to determine the existing traffic and parking demand within the vicinity of the sports fields. The facilities were at full capacity with three active soccer games and teams waiting to follow. Turning-movement volumes\(^1\), were collected at the following three intersections:

- John F. Kennedy Drive and 47\(^{th}\) Avenue
- John F. Kennedy Drive and Bernice Rodgers Way
- Bernice Rodgers Way and Martin Luther King Jr. Drive

Figure 2 shows the volumes that were counted for each of the three intersections. One of the heaviest approach volumes was observed at John F. Kennedy Drive and Bernice Rodgers Way, where vehicles leaving the fields and heading south arrive at the intersection approximately once every 23 seconds. This corresponds with field observations of light traffic near the fields during the study period and drivers experiencing little or no delays leaving the fields. Transportation engineers would typically rate these conditions as Level of Service (LOS) A\(^2\), where motorists are generally able to maintain desired speeds and face little or no delay waiting at intersections.

The majority of vehicles parked in the area were from people using the soccer fields. The parking lot for the fields was fully occupied during the games and excess vehicles parked on Kennedy Drive between 47\(^{th}\) Ave and John F. Kennedy Drive. Users of the field were observed to arrive by personal vehicle. No buses were observed serving the fields during this time period although some users may have taken nearby transit service and walked to the fields.

---

\(^1\) Turning movement volumes represent the number of vehicles that are counted traveling in each direction through an intersection during a one hour study period. The two hour observance was segmented into 15-minute intervals and the four consecutive intervals that resulted in the highest volume were selected as the peak hour. This is standard practice in transportation engineering.

\(^2\) Transportation engineers and planners commonly use a grading system called level of service (LOS) to measure and describe the conditions of a roadway. The LOS scale ranges from LOS A, indicating free flow traffic conditions with little or no delay, to LOS F, indicating stop and go conditions with long queues and delays.
Existing Peak Hour Traffic Volumes

Parking Analysis

<table>
<thead>
<tr>
<th></th>
<th>Existing - 100 cars</th>
<th>Open Spots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Lot</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>On-Street</td>
<td>40</td>
<td>58</td>
</tr>
</tbody>
</table>

Build Out - 130 cars

<table>
<thead>
<tr>
<th></th>
<th>Parking Lot</th>
<th>On-Street</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Lot</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>On-Street</td>
<td>70</td>
<td>28</td>
</tr>
</tbody>
</table>

Note:
1. Assuming 20 feet per parked car, on-street capacity from 47th Avenue to John F. Kennedy drive is 98 vehicles.

LEGEND:
= Study Intersections
= With Project Parking
= Existing Parking

Note:
Counts were taken 11:30 AM to 1:30 PM on Saturday September 12th, 2009.

Beach Chalet Soccer Fields

STUDY INTERSECTIONS AND PARKING CONDITIONS

FIGURE 2
TRIP GENERATION

We estimated trip generation for conditions with the project two ways: 1) factoring up the observed existing demand by 33%; and 2) comparing to procedures Fehr & Peers developed for the Holly Sugar Sports Park in Tracy, CA and the sports facilities proposed for the Treasure Island redevelopment in San Francisco. The first method is an acceptable approach when existing facilities exist and similar facilities are being introduced. The second method would be the standard approach if these were brand new sports fields and there were no existing conditions at the project site to base the future trip generation on.

Table 1 compares the two sources that we used to determine the trip generation of the fields during a typical peak use.

<table>
<thead>
<tr>
<th>Table 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip Generation Forecasts</td>
</tr>
<tr>
<td><strong>Observed Existing Conditions</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Trip Generation Forecasts</strong>&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

**Notes:**
1. Based on September 12, 2009 field observations.
2. Based on trip generation assumptions for the Holly Sugar Sports Park EIR in Tracy, Ca (Fehr & Peers, 2009) and the Draft Treasure Island Transportation Impact Study (Fehr & Peers, 2009). The weekend game assumptions were as follows:
   - 32 players per field (16 per team), 1 spectator per player
   - Assume an average of 2 people per vehicle
   - Trip per field: 64 total trips, 32 inbound and 32 outbound
3. Assumes turnover of all observed parked cars within peak hour.

Source: Fehr & Peers, 2009
WITH PROJECT CONDITIONS

Both methodologies suggest approximately 65 additional vehicle trips would be introduced from the new field capacity. Since these new trips would be geographically distributed among several approach and departure routes, this would result in only small increases in traffic at any individual location compared to the existing traffic levels. Assuming a worst case scenario where all the additional vehicles leave within an hour, this would result in an additional 33 vehicles on the routes exiting the field site. This would have the following impacts on the surrounding intersections:

- John F. Kennedy Drive and Bernice Rodgers Way – If two-thirds of all vehicles exit to John F. Kennedy Drive and Martin Luther King Drive to the south, an additional 22 vehicles would leave through this intersection. In this case the time between cars arriving at the intersection would decrease from once every 23 seconds to once every 20 seconds. This would maintain the perceived existing operations.

- John F. Kennedy Drive and 47th Avenue – If two-thirds of the additional vehicles exit the site and head north, the time between cars arriving at the intersection from the site would decrease from once every 23 seconds to once every 20 seconds on the northbound approach. This would maintain the perceived existing operations.

As described above, the impact to the study intersections would be negligible. Furthermore, the additional vehicular traffic at the external intersections where the drivers exit Golden Gate Park would be less than the natural daily fluctuation of traffic³.

As Table 1 indicates, each method predicts that the total number of cars parked during game days will be approximately 130 vehicles. Figure 2 shows the additional distance that the on-street parking will extend with the addition of a fourth soccer field. The existing on-street parking supply can handle the additional vehicles expected to be introduced under the proposed project without parked cars extending beyond 47th Avenue or John F. Kennedy Drive.

CONCLUSION

The proposed project would be adequately served by the existing circulation network and parking facilities. The magnitude of additional traffic will be so small compared to the existing traffic that the intersections and surrounding roadway network are expected to maintain current operations after the project is completed. The added lighting, while providing greater utility of the fields, is not expected to negatively affect the operations of the adjacent streets during the peak hours (weekdays from 5 to 6 PM and Saturdays from 12 to 1 PM).

³ Traffic volumes have been found to vary by 10 percent or more due to daily and seasonal variation (FHWA Guide to Urban Traffic Volume Counting, 1980).
Exhibit 4 – Available parking on Kennedy Drive
Tire-Derived Product Business Assistance--Artificial Turf Study

Literature Review Summary

The following is a summary of the report prepared by the California Office of Environmental Health Hazard Assessment (OEHHA) entitled "Chemicals and Particulates in the Air Above the New Generation of Artificial Turf Playing Fields, and Artificial Turf as a Risk Factor for Infection by Methicillin-Resistant Staphylococcus Aureus (MRSA). Literature Review and Data Gap Analysis." See full report here (MS Word, 88 KB). The following summary was prepared by California Integrated Waste Management Board (CIWMB) staff.

Report Summary

OEHHA searched the available literature related to the safety of new generation artificial turf fields (those which contain crumb rubber infill used as artificial "soil") in two main categories.

1. Whether these fields emit levels of chemicals or particulates into the air that cause illness when inhaled.

2. Whether these fields infect athletes with the dangerous bacterium called methicillin-resistant Staphylococcus aureus (MRSA).

OEHHA found that prior to 2009, a study by Dye et al. (2006), which studied indoor fields, contained the most complete and reliable data set. In 2009, two studies were completed in New York which provided additional data from outdoor fields.

Based on the data from the New York Studies OEHHA found that, "Both reports concluded that these fields did not constitute as serious public health concern, since cancer or non-cancer health effects were unlikely to result from these low-level exposures". It was also noted that, of the 65-85 chemicals detected above the fields in New York (depending on the study), "many of these occurred at similar concentrations in the air sampled upwind of the fields." This suggests that the source of these chemicals was not from the turf fields.

Lifetime cancer risks of one cancer in a population of one million are considered a negligible risk level. Many common human activities result in cancer risks that are higher than one in one million; for example, OEHHA states on their website that the cancer risk of breathing California air (in 2000) due to diesel particles was 540 in one million.

Using the data collected from the Dye et al. study, OEHHA created a test scenario to determine the exposure and health risks of an athlete playing on an artificial turf field from age 5 until age 55 for nearly 100 chemicals. The results of this test showed an exposure to five chemicals with a lifetime cancer risk above one in one million. The highest risk was nine in one million, and as OEHHA explains "these estimated risks are low compared to many common human activities" and "they are higher than the negligible risk level of one cancer in a population of one million people." OEHHA also determined that "using indoor data (such as the data in the Dye et al. study) to calculate health risks from outdoor play overestimates the outdoor risks."

Methicillin-resistant Staphylococcus aureus (MRSA) is a bacterial infection that is highly resistant to some antibiotics. "It is not known if the new generation of artificial turf causes more MRSA infections than natural turf. However, one study of high school football players demonstrated more 'surface/epidermal injuries' for games played on the new generation of artificial turf compared to natural turf." OEHHA goes on to state that "it seems unlikely that the new generation of artificial turf is itself a source of MRSA, since MRSA has not been detected in any artificial turf field."

Disclaimer: The CIWMB makes no warranty, express or implied, and assumes no liability for the information provided in this website. References to individual businesses and their commercial products does not constitute an endorsement by the CIWMB. The information contained in this website is not complete, and is provided as a convenience to our website visitors and for informational purposes only.

Back to Artificial Turf Study
Review of the Proposed Rehabilitation of the Beach Chalet Soccer Fields in Relation to the Golden Gate Park Master Plan

By Douglas Nelson, Royston Hanamoto Alley & Abey and Co-Author of the Golden Gate Park Master Plan

Summary
The rehabilitation of the Beach Chalet soccer fields with synthetic turf and lighting for extended use is in compliance with the Golden Gate Park Master Plan.

Background
The Golden Gate Park Master Plan was adopted by the Recreation and Park Commission in October of 1998. At the time of the development of the plan, existing conditions were different than they are today:

- The use of synthetic turf for recreation fields was not contemplated during development of the Master Plan.
- Lighting of the existing grass fields to extend use hours was not considered because the fields were already at or beyond their use limits for proper maintenance.
- There was a recognized deficiency in the number of soccer fields (city wide). The Master Plan partially addressed this with a proposal for an additional soccer field on the site of the former Richmond Sunset water treatment plant.
- Today, the common use of synthetic turf for recreation facilities brings new factors into consideration. The existing four grass fields are rotated with three active fields and one field out of commission for maintenance. Synthetic turf eliminates the need for maintenance rotation, effectively adding an additional field.
- Synthetic turf fields can withstand much higher use levels than grass, so extended use in the evening, with the addition of lighting, is feasible to maximize utilization of the fields. This reduces the need to build additional fields elsewhere.

Use of Synthetic Turf
Because synthetic turf was not contemplated at the time of the Master Plan’s development, there are no direct recommendations or policies that address synthetic turf. There are no specific conflicts between the Master Plan and use of synthetic turf. The use of synthetic turf in a National Register of Historic Places property is likely consistent with the Secretary of the Interior’s Standards for the Treatment of Historic Properties/Guidelines for the Treatment of Cultural Landscapes. Under the rehabilitation treatment guidelines, deteriorated historic materials (grass turf in this case) may be replaced with a substitute material that conveys the same visual appearance (such as synthetic turf).

Lighting
The Master Plan addresses lighting in the park by designating night use areas in the park. Lighting in other areas would generally be limited to a minimal amount of street lighting for safety. The Beach Chalet, but not the soccer fields, was designated as a night use area. Lighting was not considered at the time because the grass fields could not tolerate any additional use. Potential future lighting was identified at the tennis courts and the equestrian center, where future night use was contemplated. If synthetic turf was considered at the time of the Master Plan development, it is likely that the soccer fields would have been included as a potential night use area.
Circulation
Traffic and circulation issues were the number one topic during development of the Master Plan. A report prepared by Fehr & Peers Transportation Consultants states that the increase in the number of trips is so small, that it will have no negative affect on the operation of roads around the soccer fields. Regarding parking, the report anticipates an increase of about 30 cars during game days. Most of this increase will be handed by 20 additional spaces that will be included in the redesigned parking lot. In the Master Plan, an additional 30-40 parking spaces are included for an additional soccer field. An improved path to the Great Highway parking area may also reduce some parking demand within the park. The project also includes 60 bicycle parking spaces to encourage bicycle use and reduce the reliance on cars.

Conclusions
The rehabilitation of the Beach Chalet soccer fields with synthetic turf and lighting for extended use is in compliance with the Golden Gate Park Master Plan. If desired, the Recreation and Park Commission could amend the Master Plan with the addition of the soccer fields to the list of night use areas in Golden Gate Park.

Submitted:

Douglas Nelson
Principal, ASLA, LEED AP