February 1, 2016

Rachael Stoddard
Essex Property Trust, Inc.
925 E. Meadow Dr
Palo Alto, CA 94303

Subject: Wind Impact Analysis of the Proposed 5th and San Mateo Development, San Mateo

Dear Ms. Stoddard:

This letter-report summarizes my findings concerning potential wind and comfort impacts of the proposed 5th and San Mateo project in downtown San Mateo. I have based this analysis on a review of project plans and sections, a site visit, and my knowledge of building aerodynamics gained from nearly 40 years of wind tunnel studies and analysis of building-generated wind problems.

The focus of this analysis is the potential for adverse wind impacts on the Central Park picnic area which is located across East 5th Street from the project site. This portion of Central Park contains a baseball field, a parking garage with upper-level tennis courts and sidewalks and sitting area.

The following analysis examines wind qualitatively. The proposed project is examined to determine where the most important factors that determine wind effects combine to accelerate winds that can adversely affect users of Central Park.

PROJECT DESCRIPTION

The project site is a generally flat, rectangular parcel on the northwest side of East 5th Street between El Camino Real and South San Mateo Drive. The project site is currently a surface parking lot with a ramp providing vehicular access to a rooftop parking area atop an adjacent retail building that fronts East 4th Avenue. The project would redevelop the entire project site as a mixed use development with ground floor commercial space and three levels of residential units. Parking would be provided within a basement and second-
floor garage and the new development would provide vehicle access to the rooftop parking area atop the adjacent retail building site

EXISTING CONDITIONS

San Mateo is located on the eastern side of the San Francisco peninsula. The peninsula region extends from northwest of San Jose to the Golden Gate. The Santa Cruz Mountains run up the center of the peninsula, with elevations exceeding 2000 feet at the southern end, decreasing to 500 feet in South San Francisco.

Two important gaps in the Santa Cruz Mountains occur on the peninsula. The larger of the two is the San Bruno Gap, extending from Fort Funston on the ocean to the San Francisco Airport. The other gap is the Crystal Springs Gap, between Half Moon Bay and San Carlos. As the sea breeze strengthens on summer afternoons, the gap permits maritime air to pass across the mountains, and its cooling effect is commonly seen from San Mateo to Redwood City.

Annual and seasonal wind roses are attached. A wind rose is a graphical display of the frequency of wind direction and speed as measured at the San Mateo Wastewater Treatment Plant, which is located about 1.5 miles northeast of the project site. The wind roses are based on 5 years of data for the hours of 9 am to 10 pm. The data files used were prepared by the Bay Area Air Quality Management District. For each wind direction, the frequency of the wind coming from that direction is plotted from the center (the longer the radiating bar, the more frequent the wind blows from that direction). The various colors of the radiating bar provide the frequency of wind speed classes.

On an annual basis, winds at San Mateo are most frequent and strongest from the north to southwest quadrants, which reflects the alignment of the Santa Cruz Mountains and the location of the Crystal Springs Gap. The strongest winds almost all have a westerly component.

Spring is the windiest season in San Mateo, with an average speed of 6.01 knots between 9 am and 10 pm. The dominant wind directions are northwest through southwest, both in frequency and in average speed.

The summer months show a wind pattern similar to the annual pattern, but the maxima in frequency and strength shifts to the northwest and southwest.

1Wind direction refers to the direction from which the wind is moving. Thus, a westerly or west wind moves from west to east.
Fall has lightest average winds and the predominate wind direction is from the southwest. Winds with an easterly component are more common, but frequencies and average speeds are low.

Winter has light average winds, although the highest winds of the year often occur during winter during storms. North is the predominant wind direction, although generally light. Highest winds generally are from the west through southeast quadrants, reflecting pre- and post-frontal winds generated by storms approaching from the west.

When evaluating wind impacts in San Mateo, winds from the north through southwest quadrants will be of greatest concern because of their frequency and average strength. Although some strong winds can occur from the south direction in winter, these winds are highly correlated with rainy weather when outdoor use of Central Park area is reduced. Winds from the easterly directions are generally not a concern, being neither frequent nor strong.

**IMPACTS**

**Generalized Effects of Buildings**

The construction of a building or buildings results in severe distortions of the wind field because the building acts as an obstacle to wind flow. The deceleration of wind on the upwind side of the structure creates an area of increased atmospheric pressure, while an area of decreased atmospheric pressure develops on the downwind side. Accelerated winds generally occur on the upwind face of the building, particularly near the upwind corners. The downwind side has generally light, variable winds. Where two buildings are close together, the areas of accelerated wind may overlap within the gap between the two structures. It important to note that except very close to the building, wind effects are felt downwind of the structure, and do not propagate very far in the upwind direction.

The strength of ground-level wind accelerations near buildings is controlled by exposure, massing and orientation. The potential for accelerated winds was evaluated based on a review of site exposure, building heights and building orientations to identify locations where exposure, massing or orientation to the prevailing winds would suggest that increased winds would affect the adjacent Central Park.

Exposure is a measure of the extent that the building extends above surrounding structures or terrain into the wind stream. A building that is surrounded by taller structures or sheltered by terrain is not likely to cause adverse wind accelerations at ground level, while even a comparatively small building could cause wind effects if it is freestanding and exposed.
Massing is important in determining wind impact because it controls how much wind is intercepted by the structure and whether building-generated wind accelerations occur above-ground or at ground level. In general, slab-shaped buildings have the greatest potential for wind acceleration effects. Buildings that have an unusual shape, rounded faces or utilize set-backs have a lesser wind effect. A general rule is that the more complex the building is geometrically, the lesser the probable wind impact at ground level.

Building orientation determines how much wind is intercepted by the structure, a factor that directly determines wind acceleration. In general, buildings that are oriented with the wide axis across the prevailing wind direction will have a greater impact on ground-level winds than a building oriented with the long axis along the prevailing wind direction.

Project Impact Analysis

Exposure

The project site is moderately exposed to winds from the prevailing some wind directions. For north through northwest winds the site is receives shelter from 2 to 4-story upwind structures. For westerly winds and southwesterly wind, shelter from existing buildings is greater, as buildings to the west along El Camino Real reach up to 15 stories in height. The site is most exposed to southerly to southeasterly winds, where the only shelter is provided by mature trees within and near Central Park. For all other directions the site is sheltered by 1-3 story structures.

Massing

The proposed office building is relatively long and narrow. It has a complex design with numerous cut-outs and setbacks forming rooftop decks and patios. The second level above ground is a parking floor, which would be naturally ventilated and therefore would allow wind to flow through the building and at the ground level a paseo or public passageway would create an opening through the building nears its center. The ability of wind to flow through the building in response to pressure differences between opposite sides of the structure will limit the strength of ground-level pedestrian wind accelerations generated by the project.

Orientation

The building has a rectangular footprint and has its long axis aligned southwest to northeast. This alignment would tend to maximize amount of wind intercepted by the building when the wind is from the northwest and southeast wind directions.
Probable Project Wind Impacts

As described earlier, winds from the north through southwest quadrants will be of greatest concern in San Mateo during the day because of their frequency and average strength. The following discussion describes probable wind impacts for these critical wind directions.

For north winds, the project site is fairly exposed as the project would be several stories taller than upwind buildings. However, the massing and orientation of the building are such that the structure would not present a large or continuous building face oriented into the approaching wind. Any wind accelerations created by the new building would be weak and affect the driveway along the northwest side of the building and parts of South San Mateo Drive. These effects would not extend into Central Park, which is located too far downwind to be adversely affected by project wind accelerations. The only wind effect the project would have on winds in Central Park would be a small reduction in average wind speed due to the sheltering effect of the new structure.

For northwest winds, the project site is fairly exposed as the project would be several stories taller than upwind buildings. The building is aligned with its wide face toward the wind, which means that wind accelerations would be moderate and affect the driveway along the northwest side of the building and parts of South San Mateo Drive. Light winds would also be expected to flow through the ground level pedestrian passageway. These effects would not extend into Central Park, which is located too far downwind to be adversely affected by project wind accelerations. The only wind effect the project would have on winds in Central Park would be a small reduction in average wind speed due to the sheltering effect of the new structure.

For west winds, the site is less exposed as taller structures along El Camino Real are directly upwind of the project site. The massing and orientation of the building is such that no large or continuous building face would be oriented into the approaching wind. Therefore, any wind accelerations created by the new buildings would be weak and affect the driveway along the northwest side of the building. The only wind effect the project would have on winds in Central Park would be a small reduction in average wind speed due to the sheltering effect of the new structure.

For southwest west winds, the site is somewhat shelter by taller structures directly upwind of the project site. The building has its narrow axis oriented across winds from this direction, which would tend to minimize the strength of wind accelerations which would be expected near the upwind corners of the structure. Any wind accelerations generated by the building would occur along the north side of East Fifth Avenue. No change in wind speeds for the southwesterly direction from the building would be expected within Central Park.
Summary of Impacts

Critical wind directions between 9 am and 10 pm in San Mateo have been identified as the northerly through southwesterly directions. The potential for wind accelerations caused by the project affecting the adjacent Central Park was examined by considering the exposure, massing and orientation of the new buildings for winds from the northerly through southwesterly directions. No potential for accelerated winds reaching Central Park was found. The massing and orientation of the building is such that only weak to moderate wind accelerations would be expected, and that these accelerations would occur close to the new structure and would not extend across East Fifth Avenue to Central Park.

Sincerely,

[Signature]

Donald Ballanti
Consulting Meteorologist
WIND ROSE PLOT: San Jose
San Mateo STP
Summer 9 am to 10 pm

DISPLAY:
Wind Speed
Direction (blowing from)

WIND SPEED
(Knots)
> = 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calm: 0.24%

COMMENTS:

DATA PERIOD:
Start Date: 6/22/2002 - 00:00
End Date: 9/21/2005 - 23:00

COMPANY NAME:
Donald Ballanti, CCM

MODEL:

CALM WINDS:
0.24%

TOTAL COUNT:
8832 hrs.

AVG. WIND SPEED:
5.52 Knots

PROJECT NO.:
WIND ROSE PLOT: San Jose
San Mateo STP
Spring 9 am to 10 pm

DISPLAY:
Wind Speed
Direction (blowing from)

WIND SPEED
(Knots)
- >= 22
- 17 - 21
- 11 - 17
- 7 - 11
- 4 - 7
- 1 - 4
- Calms: 0.37%

COMMENTS:

DATA PERIOD:
Start Date: 3/22/2002 - 00:00
End Date: 6/21/2005 - 23:00

COMPANY NAME:
Donald Ballanti, CCM

MODELER:

CALM WINDS:
0.37%

TOTAL COUNT:
8632 hrs.

AVG. WIND SPEED:
6.01 Knots

DATE:
10/21/2015

PROJECT NO.:
San Mateo STP
Annual 9 am to 10 pm

WIND SPEED
(Knots)

>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calm: 0.19%

COMMENTS:

DATA PERIOD:
Start Date: 1/1/2002 - 00:00
End Date: 12/31/2005 - 23:00

COMPANY NAME:
Donald Ballanti, CCM

MODELER:

CALM WINDS:
0.19%

TOTAL COUNT:
35064 hrs.

AVG. WIND SPEED:
4.88 Knots

DATE:
10/21/2015

PROJECT NO.: