

Appendix F

Wind and Shadow Supporting Information

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F-1 Prevision Design: Shadow Analysis Report for the Proposed Potrero Power Plant Project per SF Planning and CEQA Standards



MARCH 29, 2018
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SHADOW ANALYSIS REPORT FOR THE PROPOSED POTRERO POWER PLANT PROJECT PER SF PLANNING AND CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) STANDARDS



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I. INTRODUCTION AND OVERVIEW

This report describes the results of an analysis conducted by PreVision Design to identify the shadow effects that would be caused by the construction of the Potrero Power Station Mixed-Use Development project (hereafter the “proposed project”), a proposed multi-building, mixed-use development, on publicly-accessible open spaces and recreational facilities, reviewable under the California Environmental Quality Act (CEQA).

An evaluation of shading impacts under CEQA determines whether the proposed project would create new shadow in a manner that substantially affects existing outdoor public areas. Accordingly, this report includes graphical representations and discussion of the shadow effects of the proposed project on publicly-accessible open spaces within the area affected by the project, factoring in the presence of current shadow conditions caused by existing buildings. Additionally, the foreseeable future effects of shading that would be caused by the construction of the adjacent Pier 70 development are reviewed as a separate scenario.

This report does not present opinions or conclusions about whether or not the shadow from the proposed project would or should be considered significant/insignificant or acceptable/unacceptable. Such recommendations and determinations shall be made by San Francisco Planning Department Staff and its Commission. ■



FIGURE 1: Project Rendering

II. PROPOSED PROJECT

The Potrero Power Station Mixed-Use Development project is located on an approximately 29-acre site along San Francisco's central bayshore waterfront, encompassing the site of the former Potrero Power Plant that closed in 2011. The California Barrel Company LLC, the project sponsor, seeks to redevelop the site for a proposed multi-phased, mixed-use development, and activate a new waterfront open space.

The project site is generally bounded by 22nd Street to the north, the San Francisco Bay to the east, 23rd Street to the south, and Illinois Street to the west. Figure 2 shows the project location. The project site is comprised of the following five sub-areas:



FIGURE 2: Area Map

- Power Station sub-area—approximately 21.0 acres, consisting of Assessor’s Block 4175/Lot 002 and Lot 017, and Block 4232/Lot 001 and Lot 006; currently owned by the project sponsor. This site includes a large portion of the site of the former power station formerly owned and operated by the Pacific Gas & Electric Company (PG&E) and by NRG Potrero LLC and their predecessors.

- PG&E sub-area—approximately 4.8 acres, consisting of a portion of Assessor’s Block 4175/Lot 018 and owned by PG&E, located in the northwest corner of the project site, and also a portion of the site of the former power station.
- Port sub-area—approximately 2.9 acres owned by the City and County of San Francisco (the City) through the Port of San Francisco (Port), consisting of three noncontiguous areas. The largest area is 1.6 acres located between the Power Station sub-area and the bay; the second largest is 1.3 acres along 23rd Street between the Power Station site and Illinois Street; and the smallest piece is less than one tenth of an acre on the northeast corner of the site next to the bay.
- Southern sub-area—approximately 0.2 acres consisting of a portion of Assessor’s Block 4232/Lot 010 and owned by Harrigan Weidenmuller Company, located south of the Power Station sub-area along 23rd Street.

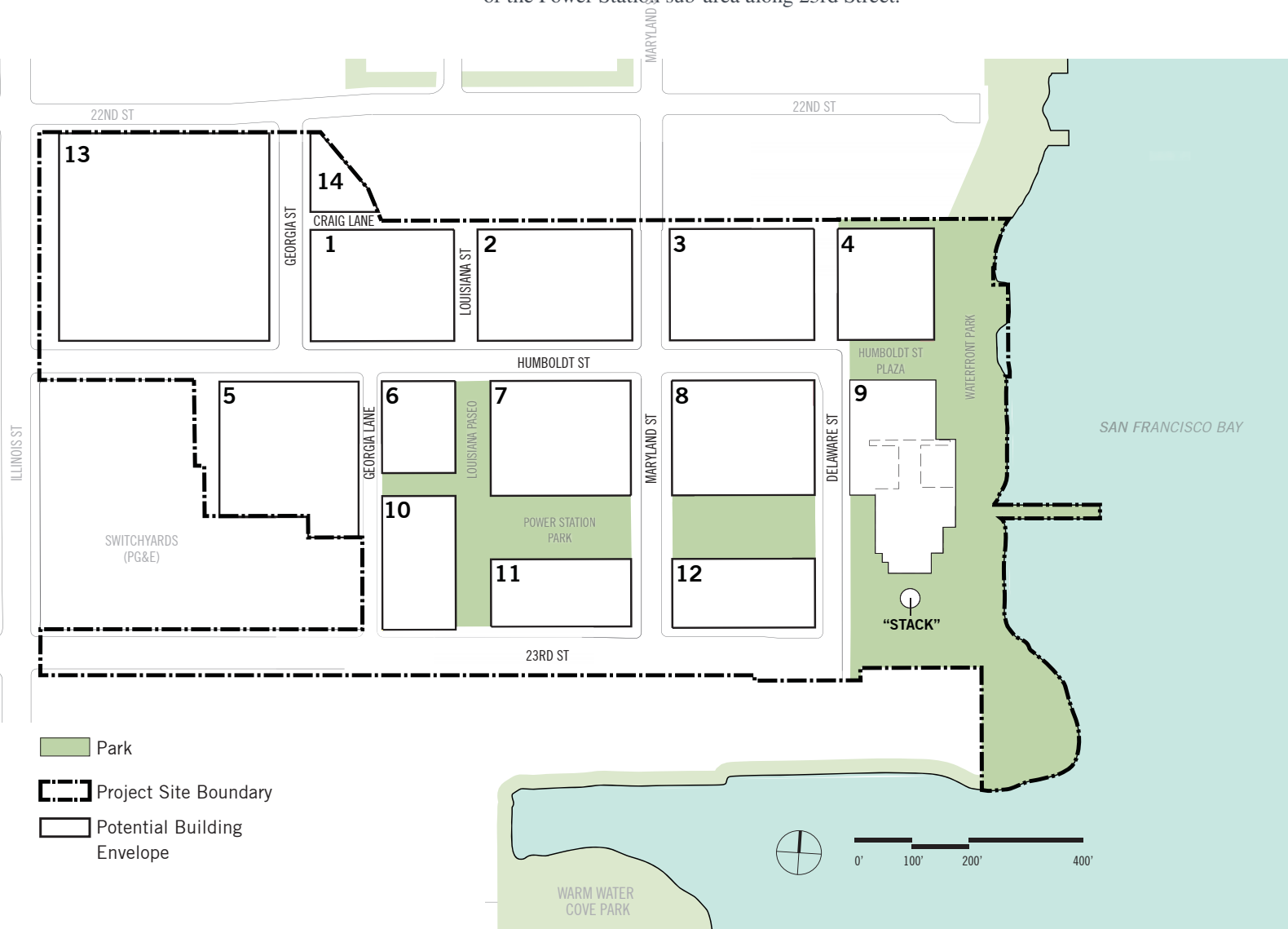


FIGURE 3: Site Plan

- City sub-area—The City owns a triangular-shaped area less than one tenth of an acre between the Power Station and Port sub-areas along 23rd Street.

Existing structures at the project site consist primarily of vacant buildings and facilities. The project site currently has little vegetation other than occasional ruderal weeds and unmaintained landscaping. Current uses on the Power Station sub-area include warehouses, parking, vehicle storage, and office space. Twenty-four structures remain on the site associated with the former power plant.

The proposed project would rezone the site, establish land use controls, develop design standards, and provide for development of residential, commercial, parking, community facilities, and open space land uses.

Overall, the proposed project would construct up to approximately 5.4 million gross square feet (gsf), of uses, including between approximately 2.4 and 3.0 million gsf of residential uses (about 2,400 to 3,000 dwelling units), between approximately 1.2 and 1.9 million gsf of commercial uses (office, R&D/life science, retail, hotel, and PDR), approximately 922,000 gsf of parking, approximately 100,000 gsf of community facilities, and approximately 25,000 gsf of entertainment/assembly uses. Approximately 6.3 acres would be devoted to publicly accessible open space. Most new buildings would range in height from 65 to 180 feet, with one building at 300 feet. Figure 3 shows the project's site plan.

The entitlement process proposed project would include an Environmental Impact Report (EIR), and amendments to the General Plan and Planning Code, creating a new Potrero Power Station Special Use District (SUD). The proposed rezoning would modify the existing height limits of 40 and 65 feet to various heights ranging from 65 to 300 feet. ■

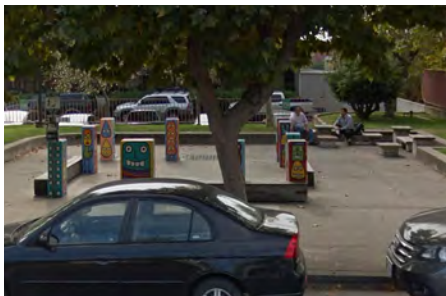


Overview of Woods Yard Park (SFMTA)

III. AFFECTED PUBLICLY-ACCESSIBLE OPEN SPACES



Children's Play Structure



Seating/Sculpture Area

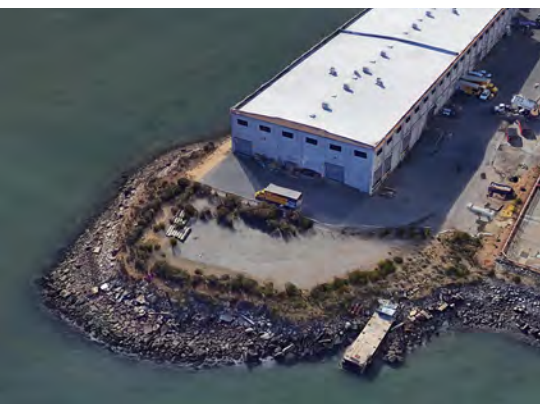
Woods Yard Park

Woods Yard Park is a publicly-accessible open space under the jurisdiction of the San Francisco Municipal Transportation Agency (SFMTA). It is an approximately 12,000sf urban park located in the Potrero Hill neighborhood of San Francisco and is located over portions of Assessor's Block 4170, Lots 1, 6, 7, 10 & 11. It is bounded by 22nd Street to the north, Indiana Street to the west, Minnesota Street to the east, and a SFMTA facility to the south. The park is not fenced in (aside from safety fencing around a play structure), and there are no posted official hours of operation.

The park contains a mix of hardscape and elevated grassy areas, with a centrally-located children's play area with a climbing structure and safety paving. On either side of the play area to the east and west are some seating areas along integrated among low-scale sculptural elements. The park contains approximately 9 small to medium-height trees within its boundary and is additionally bordered by 16 additional street streets located in the sidewalk to the west, north, and east. The entire northern (22nd Street) frontage of the park is open to the sidewalk, so there are no designated public entrances. Figure 4 (next page) shows a site map of Woods Yard Park.



FIGURE 4: Woods Yard Park Map



SF Port Open Space

SF Port Open Space (unimproved)

Located in the southeast corner of the proposed project site at the edge of the waterfront is an approximately 45,000 sf dedicated open space under the jurisdiction of the Port of San Francisco. The property currently is comprised of the rocky shoreline, an asphalt paved area and some low bushes. The area is fenced off from the adjoining property to the west and there is no public right-of way that currently reached this space--23rd street is the nearest but terminates about 845 feet west of the open space boundary. At this time, this lot does not serve as a public open space, however this open space will be incorporated and integrated into the future Waterfront Park, proposed by the Potrero Power Plant project and discussed below.

San Francisco Bay Trail

The San Francisco Bay Trail is a planned 500-mile walking and cycling path around the entire San Francisco Bay running through all nine Bay Area counties, 47 cities, and across seven toll bridges. While not yet completed or fully continuous, the trail is currently over 350 miles long and connects communities to parks, open spaces, schools, transit, and also provides a alternative commute corridor. The ultimate goal of the Bay Trail is to build a continuous shoreline bicycle and pedestrian path for all to enjoy.

The designated bay trail path currently runs down Illinois Street just west of the project, though in this area it doubles as the pedestrian sidewalk. As part of the proposed project, and in coordination with the Pier 70 development, the bay trail will be rerouted to instead run long the waterfront as it passes through both of these project sites.

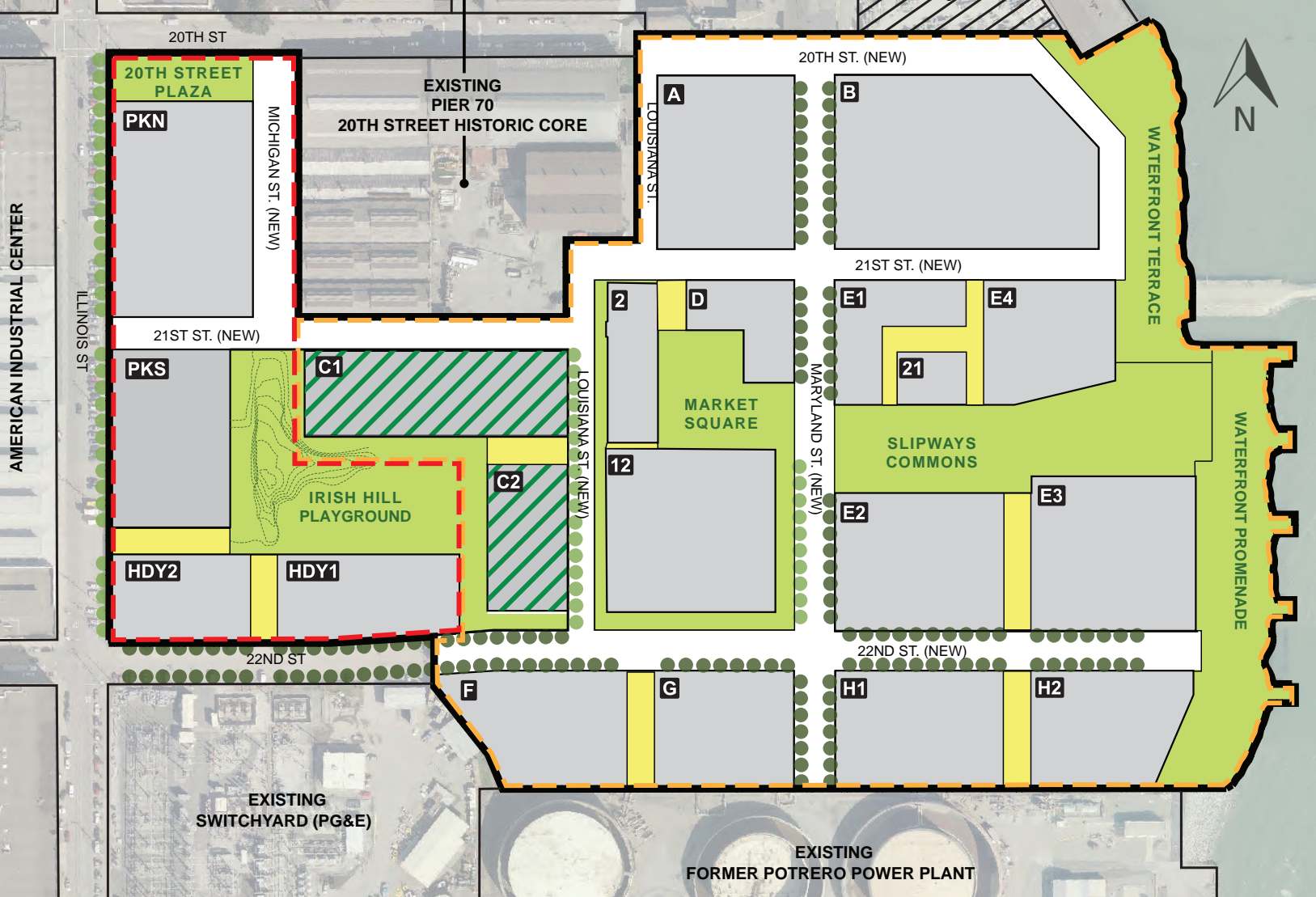


FIGURE 5: Pier 70 Proposed Open Space Map

LEGEND

- Pier 70 Mixed-Use District Project Site
- 28-Acre Site
- Illinois Parcels
- #A Building or Parcel Designation

OPEN SPACE

- Public Open Space
- Potential Public Rooftop Open Space
- Approximate Location of Pedestrian and/or Service Passageways*
- Street Trees Required
- Street Trees Permitted

Pier 70 Future Open Spaces

One of the scenarios reviewed by this analysis considers the effect of project shadow that would be cast on future open spaces that would be developed as part of the Pier 70 Project. Below is a description of the Pier 70 open spaces (per the Pier 70 EIR) that would be affected by shadow cast by the proposed project:

WATERFRONT PROMENADE: The Waterfront Promenade would encompass a minimum 100-foot-wide portion of an approximately 5-acre waterfront park area (which also includes the Waterfront Terrace and Slipways Commons open space areas, described below) located along the central and southern shoreline of the project site. The Waterfront Promenade would include a north-south-running pedestrian and bicycle promenade as part of the 20-foot-wide Blue Greenway and Bay Trail system that extends from Mission Creek to the southern San Francisco County line at Candlestick Point. Anticipated features include outdoor dining terraces east of Parcel E3 and H2, and furnished picnic and seating terraces east of Parcels E3 and H2, which would provide park users with opportunities for waterfront viewing and passive recreation.

A 6-foot-wide informal shoreline pathway would run parallel to the riprap along the water's edge and would connect the various features at the San Francisco Bay edge. The Pier 70 slipway structures along the water's edge would also be made accessible to the public and would offer opportunities for fishing and views of the San Francisco Bay and Pier 70 historic buildings.

The Proposed Project includes installation of four viewing pavilions along the water's edge. These viewing pavilions are large-scale public art and artifact pieces, which would be designed to emphasize the view of the horizon as well as accommodate a variety of public program uses such as cultural events and gatherings. The Waterfront Promenade includes two of the four viewing pavilions; the remaining two would be installed in the Waterfront Terrace and Slipways Commons, discussed below..

SLIPWAYS COMMONS: Slipways Commons open space would connect existing Buildings 2, 12, and 21 to the waterfront. This area would be designed as the most flexible, multi-purpose open space, intended to accommodate community gatherings, festivals, performances, art installations, and nighttime and cultural events, as well as passive recreation. Anticipated features include a multi-function commons, an event plaza, and a viewing pavilion. No roadway would be permitted between Parcels E1, E2, E3 and E4 and Building 21 and the park, in order to maximize recreational use of the park and encourage pedestrian travel.

BUILDING 12 PLAZA AND MARKET SQUARE: The Building 12 Plaza and Market Square would be a series of small plazas and outdoor market spaces. Market Square would be located directly north of Building 12 and east of Building 2 with four pedestrian access points. The approximately 1.5-acre plaza and square would provide the opportunity for informal and formal events, supporting flexible space for open-air markets, market stalls, and small performances and gatherings. Along the eastern and southern edges of Building 12, small plazas (approximately 26 to 28 feet wide) would provide opportunities for artwork displays, seating, and ground-floor uses within adjacent buildings to extend into these outdoor areas. The southern plaza would also have a café terrace. The Proposed Project would potentially retain a metal-frame remnant of Building 15 above the new 22nd Street, directly south of Building 12.

IRISH HILL PLAYGROUND: The Irish Hill Playground installation would be a 2-acre area south and east of the existing remnant of Irish Hill. The Irish Hill Playground would include children's play areas (play slope and play pad), other recreation opportunities, a picnic grove, a lounging terrace, and planted slopes and pathways. The non-native stand of eucalyptus trees located on the remnant of Irish Hill would remain.

The Waterfront Terrace and 20th Street Plaza would not be affected by shadow cast by the proposed project at any time throughout the year.

Potrero Power Plant Future Open Spaces

As shown in Figure 3, the proposed project would provide approximately 6.3 acres of publicly accessible open space, all of which would received varying levels of shadow from the proposed project's buildings. The primary open spaces are described below:

WATERFRONT PARK AND POTRERO POINT PARK: This proposed approximately 2.57-acre waterfront park would extend the Blue Greenway and Bay Trail from the Pier 70 Mixed-Use District project through the project site, and provide spill-out spaces for retail, quiet spaces, waterfront viewing terraces, and a waterfront playground. The adjacent proposed Potrero Point Park on the Port sub-area would contain a 1.13-acre park that would extend as a bulb-shaped area into the bay.

LOUISIANA PASEO: This proposed 0.7-acre plaza-type open space adjacent to Blocks 6 and 10 would have spill out space for outdoor dining, and a path to the proposed Power Station Park.

POWER STATION PARK: This proposed 1.22-acre central green space would extend east-west through the interior of the project site and connect the Louisiana Paseo to the waterfront. This park would contain interior of the project site and connect the Louisiana Paseo to the waterfront. This park would contain flexible lawn spaces suitable to accommodate a U-6 soccer field. The portion of the proposed Power Station Park between the Louisiana Paseo and Maryland Street would be intended for community building activities such as an outdoor game room.

ROOFTOP SOCCER FIELD: A public open space is proposed on a portion of the roof of the parking structure on Block 5. This rooftop open space would include a 0.68-acre U-10 soccer field.

NOTE: "Self-shadowing", or shadow cast by the proposed buildings on the open spaces that will be created as part of this development would not be considered an impact under CEQA, therefore the discussion of how project shading would affect these spaces has been included for informational purposes only.

Open Spaces Unaffected by Project Shadow

Due to their distance and/or location relative to the proposed project, other public parks or privately owned open spaces in the vicinity, including Esprit Park, Warm Water Cove Park, or the proposed Historic Core Plaza would not receive any new shadow. ■

IV. CEQA EVALUATION CRITERIA AND METHODOLOGY

Analysis Review Standards

An evaluation of shading impacts under CEQA determines whether the proposed project would create new shadow in a manner that substantially affects existing outdoor recreational facilities or other public areas. To determine whether new shading may be considered a significant impact, both graphical analysis (size and location of shadow at specified times) as well as qualitative effects (what activities occur in the open spaces, how are the spaces used) must be evaluated.

There is no single established technical standard or methodology for evaluation of shadow impacts under CEQA; however, the methodology implemented by the City of San Francisco under Planning Code Section 295 provides a framework and technical standards for shadow analysis as described below:

PLANNING CODE SECTION 295: New development projects in San Francisco over 40' in height, which could potentially contribute new shading to parks under the jurisdiction of the San Francisco Recreation and Parks Department, are subject to review under Section 295 of the San Francisco Planning Code. Compliance with Section 295 of the Planning Code requires that proposed projects not adversely affect use of existing or proposed open spaces under the jurisdiction of the San Francisco Recreation and Parks Department. Such adverse effect is defined by any development in excess of 40' in height which would add additional levels of new shading in excess of any potentially allowable new shadow increment on that open space throughout the year at times between one hour after sunrise through one hour before sunset, unless the Planning Commission, with input from the general manager of the Recreation and Parks Department and its Commission, determine that such effects would be insignificant.

PreVision Design's analysis has determined that no parks or open spaces under the jurisdiction of the San Francisco Recreation and Parks Department would receive any new shading from the proposed project, therefore Section 295 does not apply to any of the open spaces reviewed by this report; however, San Francisco Planning Department has determined that use of solar angles associated with Section 295 and analysis times (one hour after sunrise through one hour before sunset), which are often used to support CEQA analysis for development projects in San Francisco, would be appropriate to use for this project analysis.

The graphical element of this analysis is consistent with the graphical analysis performed for the adjacent Pier 70 Development, depicting shadow conditions at one

hour after sunrise, 10am, 12 noon, 3pm, and one hour before sunset on the Summer Solstice, Spring/Fall Equinoxes, and Winter Solstice.

Cumulative Analysis

In addition to an analysis of the net new shadow that would be generated by the proposed project as contrasted with existing shadow conditions, this report additionally includes analysis of shadow on each of the open spaces from any nearby reasonably foreseeable future projects (i.e., “cumulative” projects). Shadow profiles from these projects are depicted on shading graphics as an outline with cross-hatching to differentiate them from existing shading and shading by the proposed project. The cumulative condition projects considered by this study include:

| CUMULATIVE PROJECT ADDRESS | PROJECT HEIGHT | DATE OF DESIGN DATA |
|----------------------------|------------------|---------------------|
| Pier 70 Development | Between 66'-106' | 3/27/2017 |

FIGURE 6: Cumulative Condition Projects

Note: Planned projects at 777/888/901/950 Tennessee Street and 2092/2177/2230/2290 Third Street, and 595 Mariposa Street were reviewed by PreVision Design but were excluded from this analysis as the furthest potential reach of their shadows was determined to not reach the affected open spaces reviewed by this study.

Analysis Methodology

The shadow analysis completed by PreVision Design used a 3D virtual model of the proposed project, the potentially affected open spaces (based on park boundaries per city records), and the surrounding urban environment, which coupled with solar angles provided by SF Planning simulates existing shadow, net new shadow that would be cast by the construction of the proposed project, and shadow cast by the Pier 70 development (cumulative condition). To illustrate the range in shading conditions that would be generated in these scenarios, two sets of graphics have been produced:

SCENARIO 1: EXISTING + PROPOSED PROJECT: This scenario compares shadow cast on publicly-accessible open spaces under existing conditions from buildings and other elevated structures, roadways as compared to net new shadow that would be cast due to the construction of the proposed project. This scenario does not assume the construction of the adjacent Pier 70 development nor its associated open spaces.

SCENARIO 2: EXISTING + PROPOSED PROJECT + PIER 70 (CUMULATIVE): This scenario also compares shadow cast on publicly-accessible open spaces under

existing conditions as compared to net new shadow that would be cast due to the construction of the proposed project, but additionally assumed the construction of the Pier 70 development along with its associated open spaces.

Graphical Methodology

In order to provide a visual understanding of the location, size and extent of new shadow under each of the scenarios described above, PreVision has prepared the following graphics to illustrate the shadow effects of the proposed project:

- **Refined Shadow Fan.** Graphics showing the full extent of the areas receiving any net new shadow throughout the year between the daily period of one hour after sunrise through one hour before sunset, taking into account the presence of shadow from existing buildings. These diagrams are shown as Exhibit A1.1 (Scenario 1), and Exhibit A2.1 (Scenario 2).
- **Hourly diagrams.** Graphics showing snapshot shading conditions at one hour after sunrise, 10am, 12 noon, 3pm, and one hour before sunset on the Summer Solstice (June 21), the equinoxes (March 22/September 20) and the Winter Solstice (December 20). These graphics depicting both Scenarios 1 & 2 appear as Exhibits B-D.

Other Factors Affecting Sunlight

Shade contributed by trees and other landscape features are not taken into consideration as part of the quantitative analysis, as such features are considered “impermanent” given they may change over time and often may be added or removed without official notice and/or a public review process. However, at times such features may constitute a *defining* feature of the open space (or features within it) and contribute a significant shadow presence which may capture some or all new shading generated by the proposed project. In such cases, an informal discussion of the presence and nature of such features is included for informational purposes. ■

V. SHADOW ANALYSIS NARRATIVE FINDINGS

The proposed project would result in net new shadow falling on the following existing or proposed (future) open spaces, as detailed below:

Woods Yard Park (existing)

The proposed project would cast net new shadow over approximately one third of this park for a short period of time, starting around 8am during the mid-fall and mid-spring time frame (near the equinoxes). This shading would occur at a time when approximately half to one-quarter of the park is cast in shadow under current conditions. The area affected includes grassy areas as well as portion of the central children's play area. While a children's play area is typically more sensitive to the addition of new shadow, given the early morning hour and short duration when the net new shadow occurs, it is unlikely that the shadow coincides with a time when many users would likely be present..

SF Port Open Space (existing)

This open space area would be affected by project shadow only over the summer months in the late afternoon. As this open space is to be integrated into the proposed Waterfront Park, the effects of shadow on the expanded open space is discussed in that section.

San Francisco Bay Trail (existing + future)

The San Francisco Bay Trail, in its current configuration, runs to the west of the project site along Illinois Street, and in its current location would receive morning shadow in various places lasting from early morning until between 10am-noon throughout the year. While the precise configuration of the bay trail pathway is not yet determined, it is proposed to run along the waterfront to the east of the project, and as such would receive shadow from the proposed project in the mid-to-late afternoon year-round, arriving on the pathway between 2-4pm.

Pier 70 Open Spaces (future)

Note: In the discussion of net new shadow effects on Pier 70 open spaces, the Pier 70 buildings are considered to be existing and serve to capture some of the shadow cast by the proposed project.

WATERFRONT PROMENADE: The proposed project would cast net new shadow on the southern third of this future park during the mid-to-late afternoon from fall through spring, with the greatest area of shadow occurring late in the afternoon on the winter solstice. Net new shading occurs at a time when the park is already substantially cast in shadow by Pier 70 buildings. Based on the planned programming of this portion of the park, the affected area would likely contain furnished picnic and seating terraces, as well as pedestrian pathways. While picnic areas and seating terraces could sponsor user activities that are more sensitive to additional shadow, details of the future park and the precise location(s) of features and uses are not known at this time. As such, it is not possible to further discuss the specific possible effects that such new shadow might have on the users of the Waterfront Promenade.

SLIPWAYS COMMONS: The proposed project would cast net new shadow on a very small portion of the park for a short period of time during the late afternoon on or around the winter solstice. The shadow would occur at a time when the park is already substantially shaded by Pier 70 buildings. Based on the planned programming of this park, the affected area would be comprised of flexible, multi-purpose open space. Users of open, less programmed space are often less affected by the addition of new shadow than users of areas with fixed seating, etc., however as details of the future park and the precise location(s) of features and uses are not known at this time, it is not possible to further discuss specific effects that such new shadow might have on users.

BUILDING 12 PLAZA AND MARKET SQUARE: The proposed project would cast net new shadow over several small portions of this open space for several periods of time over the winter months only, starting around midday through the late afternoon. This shadow occurs at times when the affected areas are already substantially shaded by Pier 70 buildings. Based on the planned programming of this open space, the affected area might be artwork displays, seating, ground-floor uses extending into these outdoor areas, and/or a café terrace. While seating areas could sponsor user activities that are more sensitive to additional shadow, details of the future open space and the precise location(s) of features and uses are not known at this time. As such, it is not possible to further discuss the specific effects that such new shadow might have on users.

IRISH HILL PLAYGROUND: The proposed project would cast net new shadow over several small portions of the playground throughout much of the day, but only over winter months. This affected areas would be primarily along the southern edge of the open space, particularly between the Pier 70 buildings, as well as small area of net new shadow cast on the top of the Irish Hill rock outcropping. Shading from the proposed project would occur at times when the playground is already substantially shaded by Pier 70 buildings. Based on the planned programming of this open space,

the park would contain children's play areas (play slope and play pad), other recreation opportunities, a picnic grove, a lounging terrace, and planted slopes and pathways. While some of these features, in particular children's play areas, would be sensitive to additional new shadow, it would seem unlikely that the sensitive areas would be situated in the areas affected by shadow (alleys between buildings, etc.). As details of the future open space and the precise location(s) of features and uses are not known at this time, it is not possible to further discuss the specific effects that such new shadow might have on users.

Potrero Power Plant Open Spaces (future)

Discussion of the effects of shadow on proposed new open spaces that are part of the Potrero Power Plant development are included below for informational purposes.

WATERFRONT PARK AND POTRERO POINT PARK: As Blocks 4 and 9 are within the park area, shadow would be cast on portions of the park throughout the day year-round, with the largest areas of shadow occurring in the mid-to-late afternoons, with relatively little shadow cast during morning and midday hours. Over the summer months, the middle and souther portions of the park are more shaded during the afternoons, while during fall, winter, and spring, the mid-to-northern portions of the park are shaded and the southern portions are unshaded. Based on the planned programming of this open space, the park would include a continuation of the Bay Trail from the Pier 70 project site, provide spill-out spaces for retail, quiet spaces, waterfront viewing terraces, and a waterfront playground. While some of these features, in particular playgrounds could be sensitive to shadow, details of the future open space and the precise location(s) of features and uses are not known at this time, so it is not possible to further discuss the specific effects that such shadow might have on users.

LOUISIANA PASEO: Surrounded by tall buildings on Blocks 6,7,10 & 11, this open space would be almost entirely cast in shadow much of the day, save for mid-to-late mornings over the summer and a short period around noontime year-round when it would receive some direct sunlight, especially during winter months. Intended as a spill out space for outdoor dining, and a path to the proposed Power Station Park, these spaces would function in shadow a majority of the time.

POWER STATION PARK: Similar to the Louisiana Paseo, this park is located between several tall buildings causing it to be substantially shaded most of the day throughout the year, except from mid-morning though mid-afternoon over the summer. During fall, winter and springtime, the majority of the park is cast in shadow

throughout the day. The intended programming of this park would be for flexible lawn spaces suitable to accommodate a soccer field and community building activities such as an outdoor game room. Again, as with Louisiana Paseo these activities would be shaded a majority of the time.

ROOFTOP SOCCER FIELD: This proposed rooftop space, located on a lower terrace on the southern half of Block 5 of would likely receive a modest amount of shadow along the northern edge of the field, cast by the taller portion of Block 5. The shadow would occur during early mornings and late afternoons/early evenings on the summer solstice and up to a few weeks prior to and after that date.

Net New Shadow Falling on San Francisco Bay

As the proposed project is located adjacent to the western shores of the San Francisco Bay, net new shadows would be cast over the water as far as 950' offshore to the east during periods of the afternoon year-round. Over the summer months, shadow would reach the water after 3pm and at one hour prior to sunset extend out approximately 915' offshore to the southeast (Ref Exhibit B1.5/B2.5). In the fall and spring, afternoon shadow would reach the water just prior to 3pm and extend eastward with the longest shadows cast out approximately 870' from the shore by one hour prior to sunset (Ref Exhibit C1.5/C2.5). Over the winter, new shadows would begin to fall on the bay well before 3pm and at one hour prior to sunset would stretch out to the northeast approximately 950' from shore (Ref Exhibit C1.5/C2.5). ■

EXHIBIT A: AGGREGATE SHADOW FAN DIAGRAM

A1 - Annual net new shadow fan from the proposed project

Diagram showing extents of all areas receiving net new shadow from the proposed project at *some* point during the year.

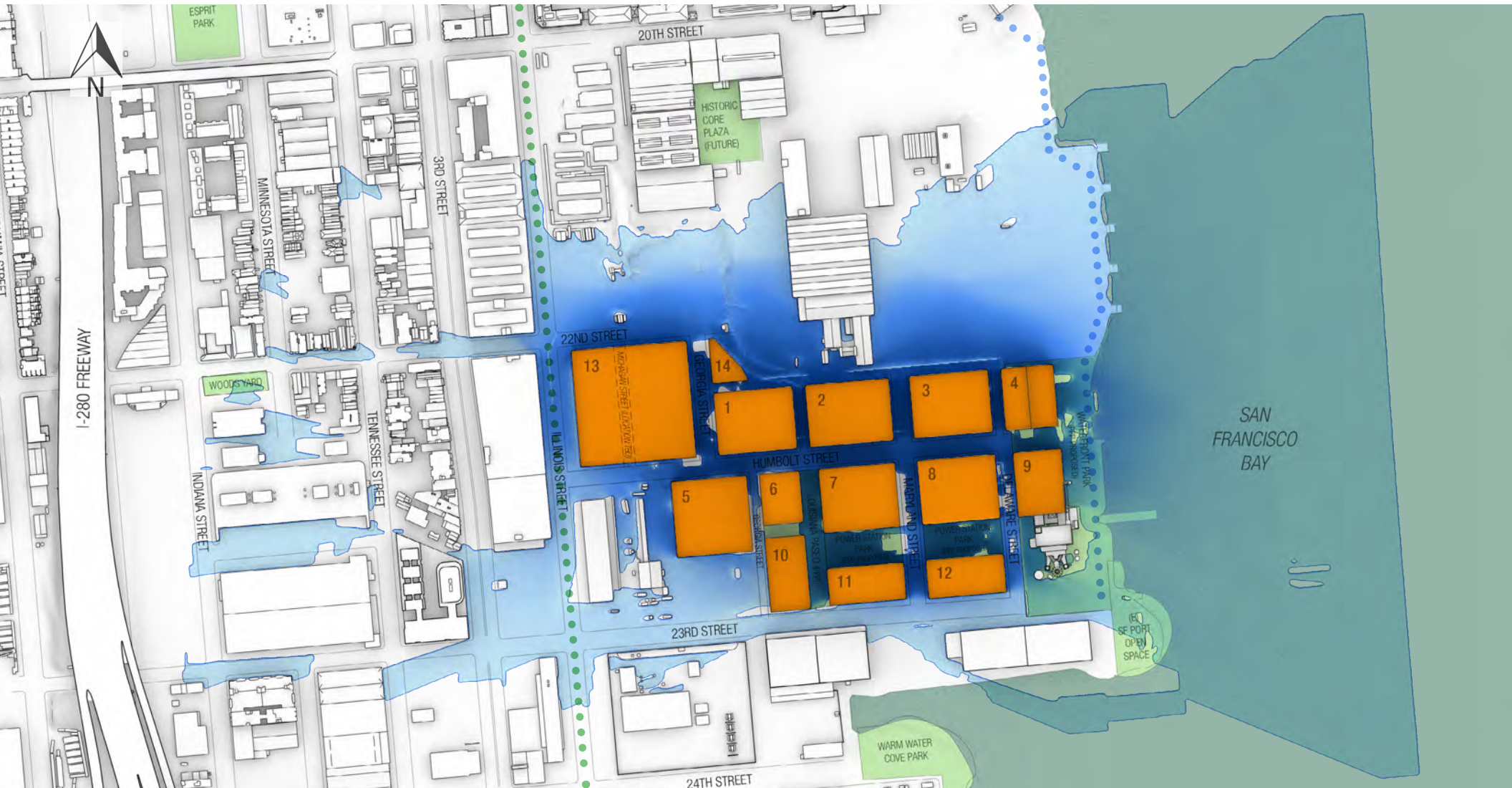
A2 - Shadow fan factoring in Pier 70 Development

Diagram showing extents of all areas receiving net new shadow from the proposed project at *some* point during the year, assuming the construction of the adjacent Pier 70 Development..

A1.1

POTRERO POWER PLANT

Annual Shadow Fan Diagram, Factoring in Existing Shadow



Proposed Potrero Power Plant Development (PPP)

Publicly-Accessible Open Spaces

Refined Shadow Fan of Project

occasional shadow frequent shadow

Bay Trail (current)

Bay Trail (future)

YEAR ROUND

LOCATIONS OF ALL NET NEW SHADOW BY PROJECT

A2.1

POTRERO POWER PLANT

Annual Shadow Fan Diagram, Factoring in Existing Shadow



YEAR ROUND

LOCATIONS OF ALL NET NEW SHADOW BY PROJECT, FACTORING IN PIER 70

EXHIBIT B: SHADOW DIAGRAMS ON SUMMER SOLSTICE

B1 - Existing + Project Shadow Diagrams: June 21

Diagrams at one hour after sunrise, 10am, 12 noon, 3pm and one hour prior to sunset.

B2 - Existing + Project + Pier 70 Shadow Diagrams: June 21

Diagrams at one hour after sunrise, 10am, 12 noon, 3pm and one hour prior to sunset.

B1.1

POTRERO POWER PLANT

Existing vs. Project diagrams on the Summer Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

6:46 AM
JUNE 21 SUMMER SOLSTICE

B1.2

POTRERO POWER PLANT

Existing vs. Project diagrams on the Summer Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

10:00 AM
JUNE 21 SUMMER SOLSTICE

B1.3

POTRERO POWER PLANT

Existing vs. Project diagrams on the Summer Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

12:00 PM
JUNE 21 SUMMER SOLSTICE

B1.4

POTRERO POWER PLANT

Existing vs. Project diagrams on the Summer Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Profiles of PPP Shadow Vectors
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)

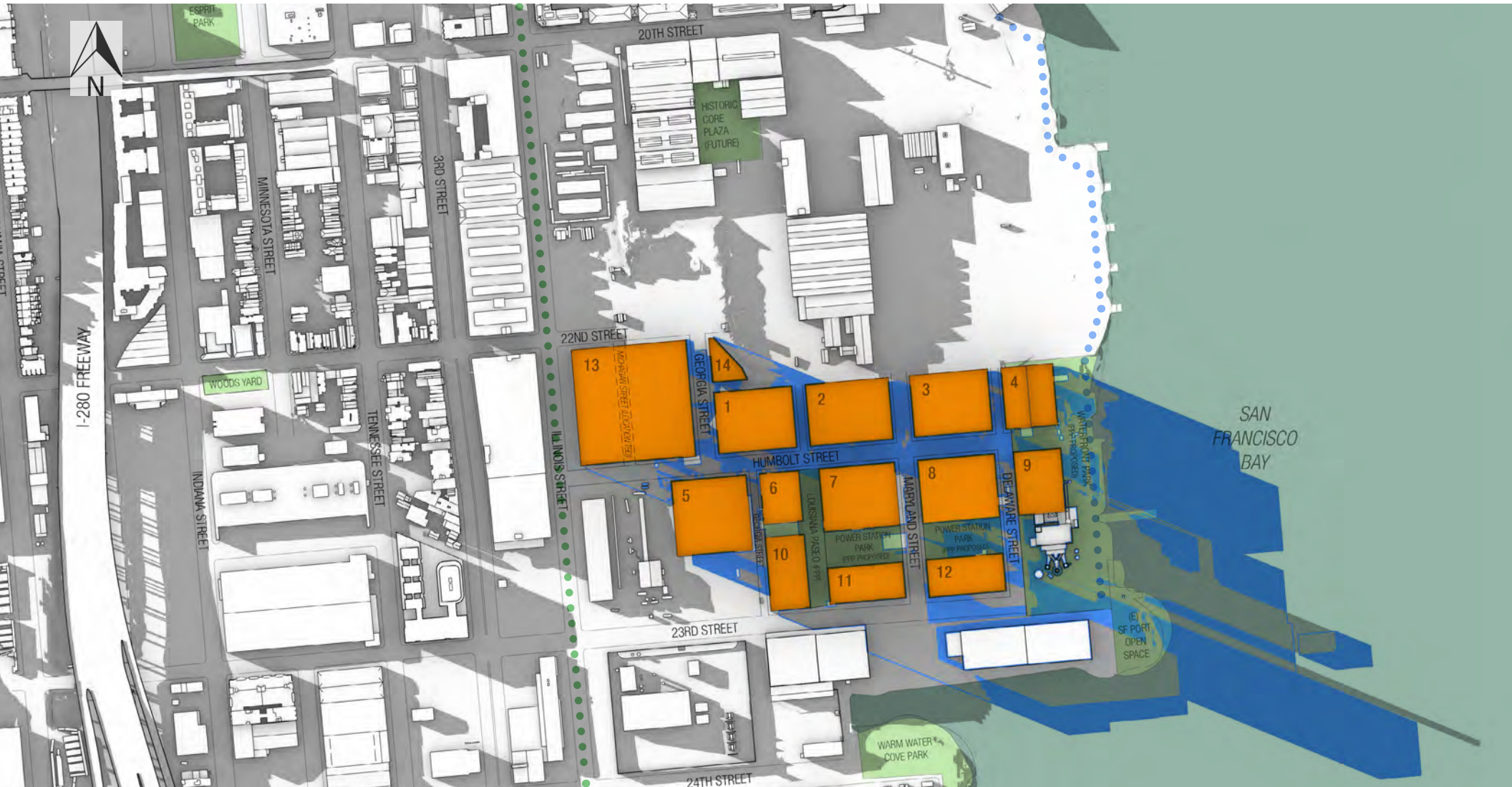
3:00 PM

JUNE 21 SUMMER SOLSTICE

B1.5

POTRERO POWER PLANT

Existing vs. Project diagrams on the Summer Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

7:36 PM

JUNE 21 SUMMER SOLSTICE

B2.1

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams on the Summer Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Profiles of PPP Shadow Vectors
- Proposed Pier 70 Development
- Net New Shadow from Pier 70
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)

6:46 AM

JUNE 21 SUMMER SOLSTICE

B2.2

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams on the Summer Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Proposed Pier 70 Development
- Net New Shadow from Pier 70
- Publicly-Accessible Open Spaces
- Profiles of PPP Shadow Vectors
- Bay Trail (current)
- (future)

10:00 AM
JUNE 21 SUMMER SOLSTICE

B2.3

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams on the Summer Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Profiles of PPP Shadow Vectors
- Proposed Pier 70 Development
- Net New Shadow from Pier 70
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)

12:00 PM

JUNE 21 SUMMER SOLSTICE

B2.4

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams on the Summer Solstice



- | | |
|---|---|
| Proposed Potrero Power Plant Development (PPP) | Proposed Pier 70 Development |
| Existing Shadow (Current Conditions) | Net New Shadow from Pier 70 |
| Net New Shadow from PPP | Publicly-Accessible Open Spaces |
| Profiles of PPP Shadow Vectors | Bay Trail (current) (future) |

3:00 PM
JUNE 21 SUMMER SOLSTICE

B2.5

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams on the Summer Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Proposed Pier 70 Development
- Net New Shadow from Pier 70
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

7:36 PM

JUNE 21 SUMMER SOLSTICE

EXHIBIT C: SHADOW DIAGRAMS NEAR EQUINOXES

C1 - Existing + Project Shadow Diagrams: Sept 20/Mar 22

Diagrams at one hour after sunrise, 10am, 12 noon, 3pm and one hour prior to sunset.

C2 - Existing + Project + Pier 70 Shadow Diagrams: Sept 20/Mar 22

Diagrams at one hour after sunrise, 10am, 12 noon, 3pm and one hour prior to sunset.

C1.1

POTRERO POWER PLANT

Existing vs. Project diagrams near the Equinoxes



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

7:57 AM

MARCH 22/SEPTEMBER 20 - APPROX. SPRING/FALL EQUINOXES

C1.2

POTRERO POWER PLANT

Existing vs. Project diagrams near the Equinoxes



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

10:00 AM

MARCH 22/SEPTEMBER 20 - APPROX. SPRING/FALL EQUINOXES

C1.3

POTRERO POWER PLANT

Existing vs. Project diagrams near the Equinoxes



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

12:00 PM

MARCH 22/SEPTEMBER 20 - APPROX. SPRING/FALL EQUINOXES

C1.4

POTRERO POWER PLANT

Existing vs. Project diagrams near the Equinoxes



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

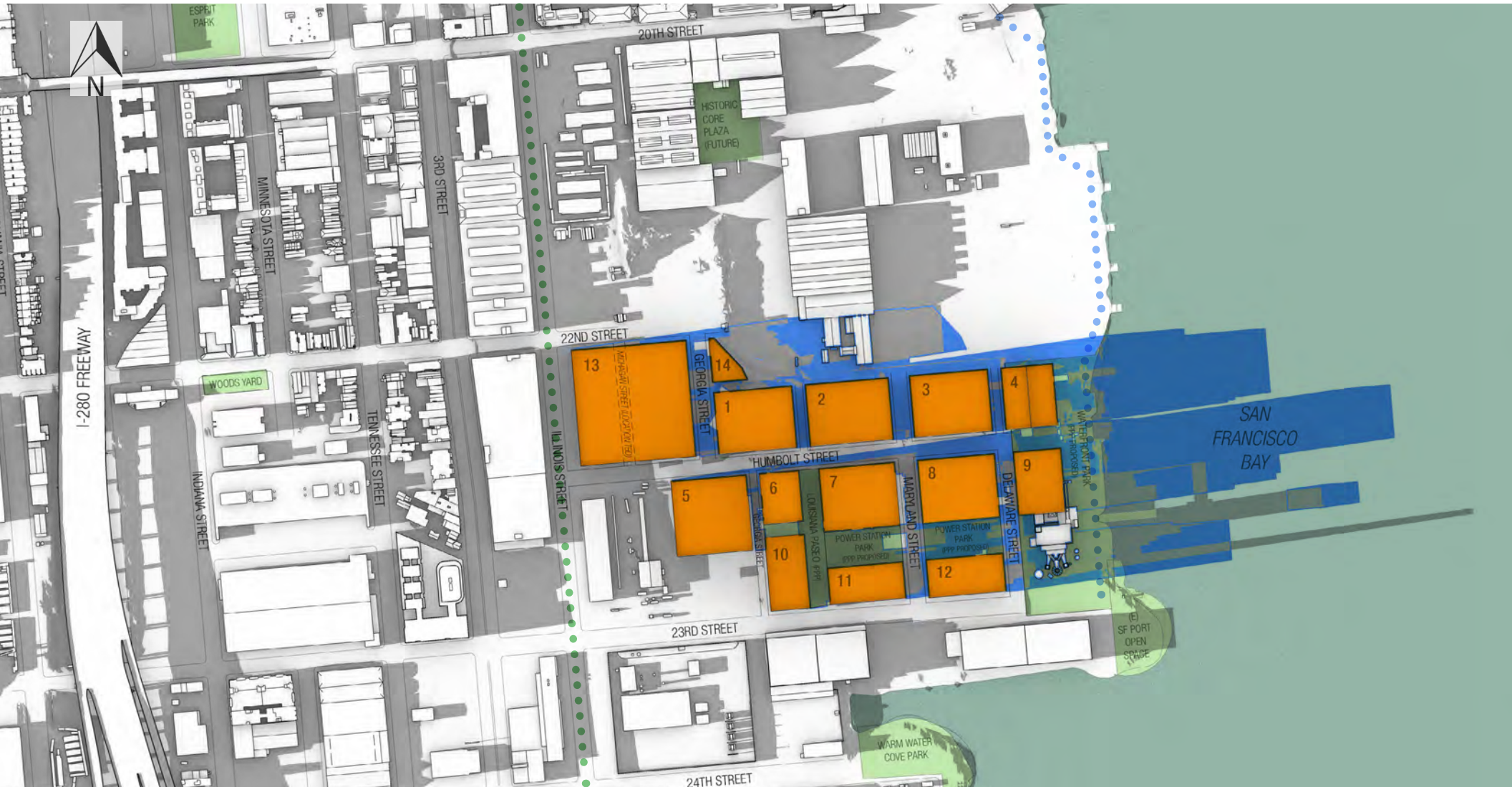
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MARCH 22/SEPTEMBER 20 - APPROX. SPRING/FALL EQUINOXES

C1.5

POTRERO POWER PLANT

Existing vs. Project diagrams near the Equinoxes



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

6:09 PM

MARCH 22/SEPTEMBER 20 - APPROX. SPRING/FALL EQUINOXES

C2.1

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams near the Equinoxes



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Profiles of PPP Shadow Vectors
- Bay Trail (current)
- Bay Trail (future)
- Proposed Pier 70 Development
- Net New Shadow from Pier 70

7:57 AM

MARCH 22/SEPTEMBER 20 - APPROX. SPRING/FALL EQUINOXES

C2.2

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams near the Equinoxes



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Proposed Pier 70 Development
- Net New Shadow from Pier 70
- Publicly-Accessible Open Spaces
- Profiles of PPP Shadow Vectors
- Bay Trail (current)
- Bay Trail (future)

10:00 AM

MARCH 22/SEPTEMBER 20 - APPROX. SPRING/FALL EQUINOXES

C2.3

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams near the Equinoxes



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Profiles of PPP Shadow Vectors
- Proposed Pier 70 Development
- Net New Shadow from Pier 70
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)

12:00 PM

MARCH 22/SEPTEMBER 20 - APPROX. SPRING/FALL EQUINOXES

C2.4

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams near the Equinoxes



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Profiles of PPP Shadow Vectors
- Proposed Pier 70 Development
- Net New Shadow from Pier 70
- Bay Trail (current)
- Bay Trail (future)

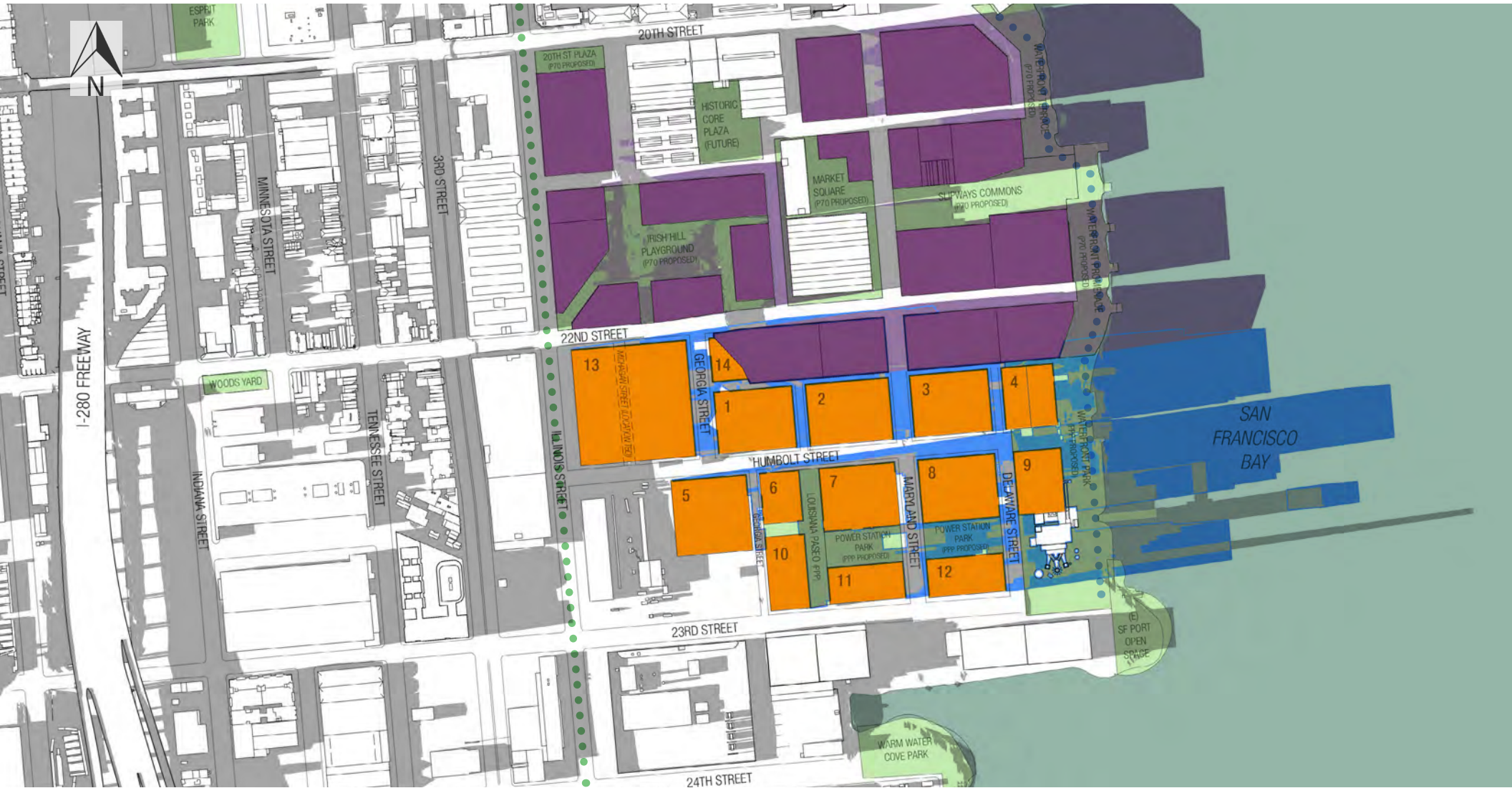
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MARCH 22/SEPTEMBER 20 - APPROX. SPRING/FALL EQUINOXES

C2.5

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams near the Equinoxes



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Profiles of PPP Shadow Vectors
- Proposed Pier 70 Development
- Net New Shadow from Pier 70
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- (future)

6:09 PM

MARCH 22/SEPTEMBER 20 - APPROX. SPRING/FALL EQUINOXES

EXHIBIT D: SHADOW DIAGRAMS ON WINTER SOLSTICE

D1 - Existing + Project Shadow Diagrams: December 21

Diagrams at one hour after sunrise, 10am, 12 noon, 3pm and one hour prior to sunset.

D2 - Existing + Project + Pier 70 Shadow Diagrams: December 21

Diagrams at one hour after sunrise, 10am, 12 noon, 3pm and one hour prior to sunset.

D1.1

POTRERO POWER PLANT

Existing vs. Project diagrams diagrams on the Winter Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

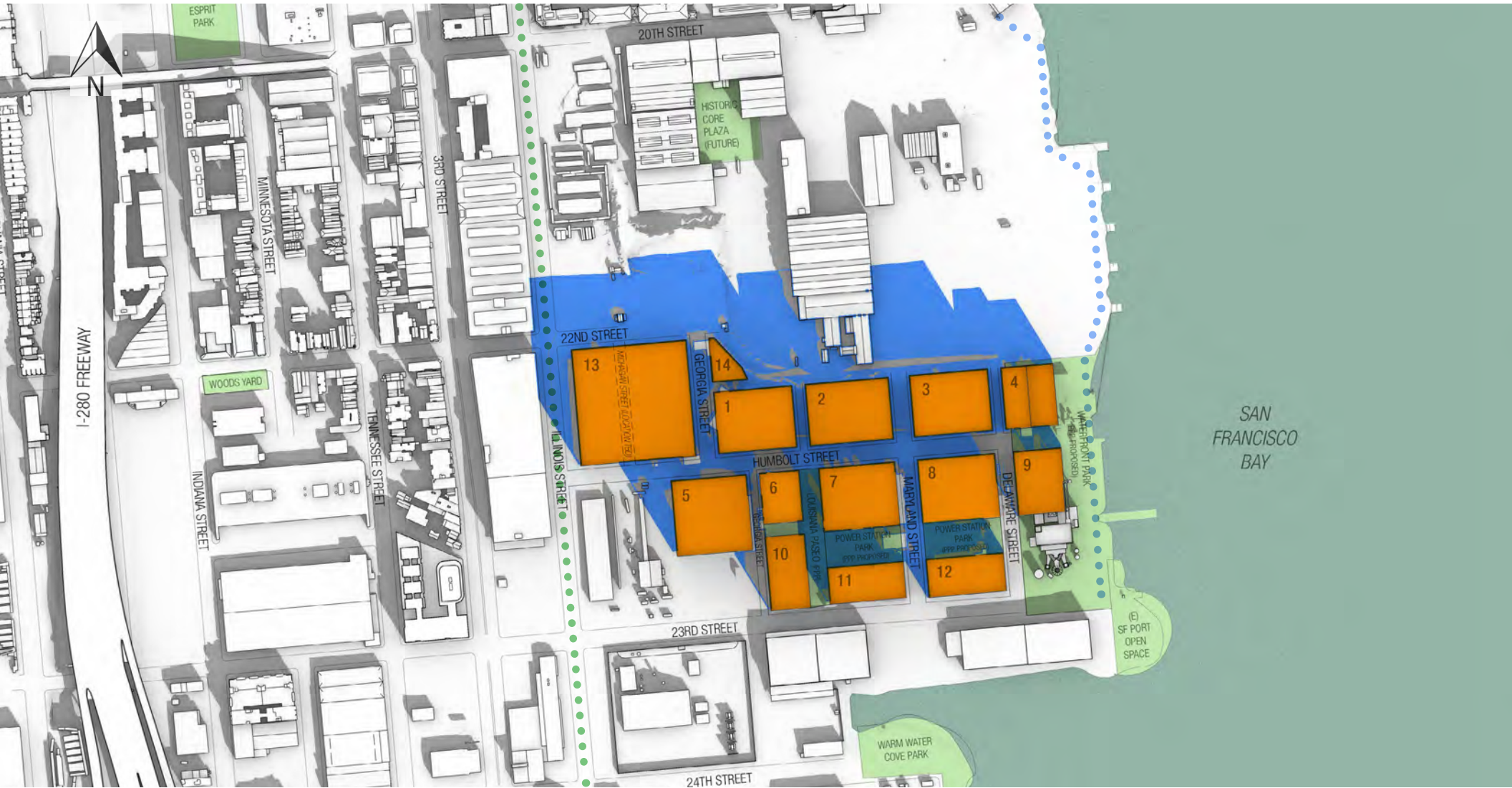
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DECEMBER 20 WINTER SOLSTICE

D1.2

POTRERO POWER PLANT

Existing vs. Project diagrams diagrams on the Winter Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

10:00 AM
DECEMBER 20 WINTER SOLSTICE

D1.3

POTRERO POWER PLANT

Existing vs. Project diagrams diagrams on the Winter Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

12:00 PM
DECEMBER 20 WINTER SOLSTICE

D1.4

POTRERO POWER PLANT

Existing vs. Project diagrams diagrams on the Winter Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

3:00 PM

DECEMBER 20 WINTER SOLSTICE

D1.5

POTRERO POWER PLANT

Existing vs. Project diagrams diagrams on the Winter Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

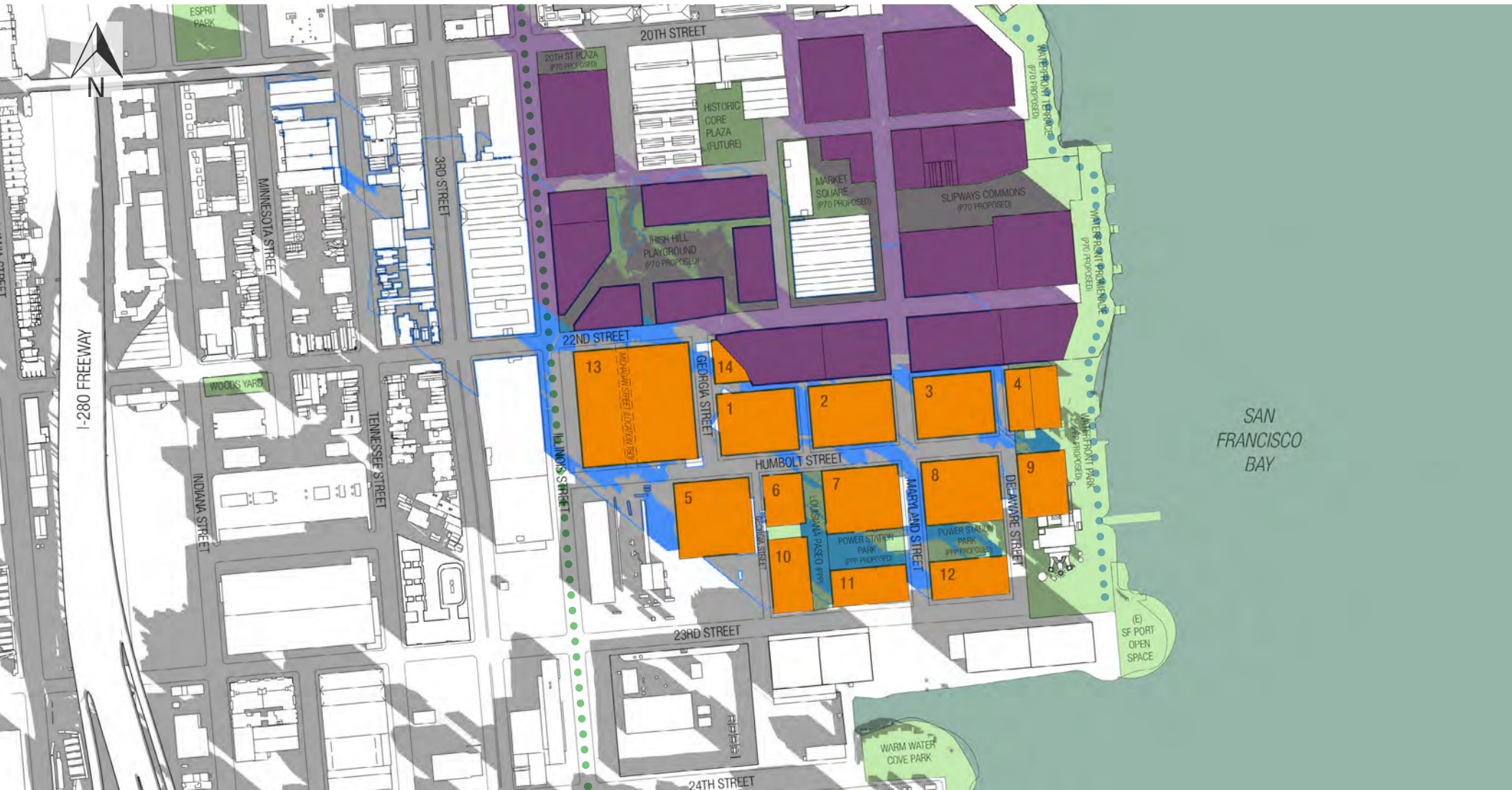
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DECEMBER 20 WINTER SOLSTICE

D2.1

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams diagrams on the Winter Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Proposed Pier 70 Development
- Net New Shadow from Pier 70
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

8:19 AM
DECEMBER 20 WINTER SOLSTICE

D2.2

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams diagrams on the Winter Solstice



10:00 AM

DECEMBER 20 WINTER SOLSTICE

D2.3

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams diagrams on the Winter Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Proposed Pier 70 Development
- Net New Shadow from Pier 70
- Publicly-Accessible Open Spaces
- Profiles of PPP Shadow Vectors
- Bay Trail (current)
- Bay Trail (future)

12:00 PM
DECEMBER 20 WINTER SOLSTICE

D2.4

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams diagrams on the Winter Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Proposed Pier 70 Development
- Net New Shadow from Pier 70
- Publicly-Accessible Open Spaces
- Profiles of PPP Shadow Vectors
- Bay Trail (current)
- (future)

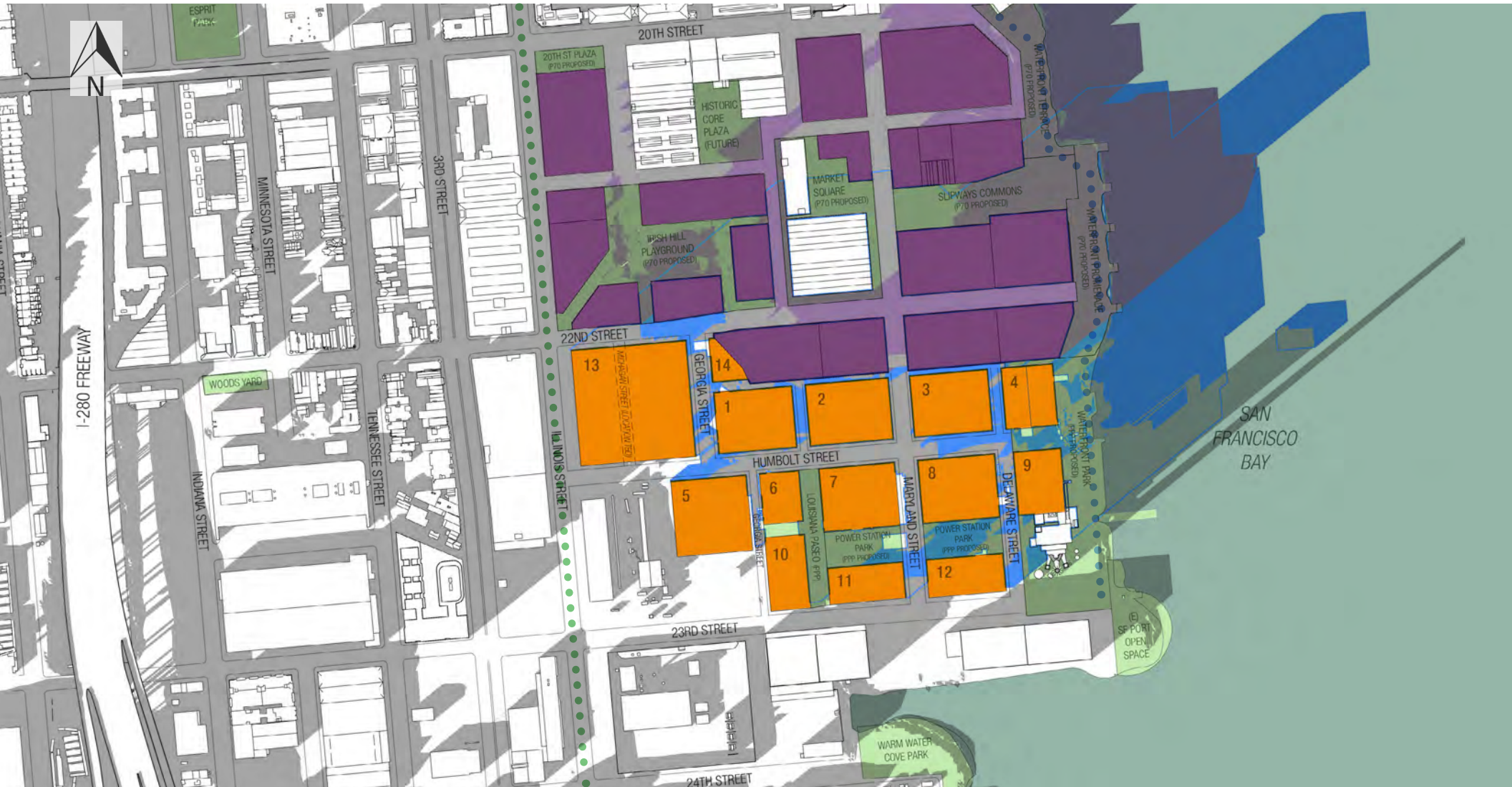
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DECEMBER 20 WINTER SOLSTICE

D2.5

POTRERO POWER PLANT

Existing/Project/Pier 70 diagrams diagrams on the Winter Solstice



- Proposed Potrero Power Plant Development (PPP)
- Existing Shadow (Current Conditions)
- Net New Shadow from PPP
- Publicly-Accessible Open Spaces
- Proposed Pier 70 Development
- Net New Shadow from Pier 70
- Bay Trail (current)
- Bay Trail (future)
- Profiles of PPP Shadow Vectors

3:54 PM

DECEMBER 20 WINTER SOLSTICE



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F-2 RWDI: Pedestrian Wind Study

POTRERO POWER STATION MIXED-USED DEVELOPMENT PROJECT

SAN FRANCISCO, CA

PEDESTRIAN WIND STUDY

RWDI #1702733

March 19, 2018

SUBMITTED TO

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EXECUTIVE SUMMARY

The wind conditions around the proposed Potrero Power Station Mixed-Used Development Project are discussed in detail within the content of this report and are summarized as follows:

Existing Configuration

- Wind conditions around the existing site are generally windy with wind speeds at 155 of 184 locations exceeding the 11-mph pedestrian comfort criterion. 10 of 184 test locations exceed the wind hazard criterion for a total 41 hours/year.

Existing Plus Project Configuration

- The addition of the proposed Potrero Power Station Mixed-Use Development Project would reduce the total number of locations exceeding the 1-hour wind hazard criterion from 10 (in the Existing configuration) to 6 for a total of 28 hours. 120 of 189 grade level locations are expected to exceed the 11-mph pedestrian wind comfort criterion.

Project Plus Cumulative Configuration

- For the Project plus Cumulative configuration, the total number of locations exceeding the 1-hour wind hazard criterion would be the same as the Existing plus Project configuration (i.e., 6 locations), and the number of hours exceeded per year is expected to decrease from 28 to 22.



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EXECUTIVE SUMMARY

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| 2 | METHODOLOGY | 2 |
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| 2.2 | Meteorological Data..... | 4 |
| 2.3 | Planning Code Requirements..... | 4 |
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| 3 | PREDICTED WIND CONDITIONS | 5 |
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| 3.2 | Existing plus Project Configuration..... | 6 |
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- Figure 1a: Wind Comfort Conditions – Existing Configuration
- Figure 1b: Wind Comfort Conditions – Existing + Project Configuration
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- Figure 2a: Wind Hazard Conditions – Existing Configuration
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- Figure 2c: Wind Hazard Conditions – Project + Cumulative Configuration

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- Table 1.1: Wind Comfort Results – Grade Level
- Table 1.2: Wind Comfort Results – Above Grade Level
- Table 2.1: Wind Hazard Results – Grade Level
- Table 2.2: Wind Hazard Results – Above Grade Level

LIST OF APPENDICES

- Appendix A: Drawings List for Model Construction

1 INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by Environmental Science Associates (ESA) to assess and consult on the pedestrian wind conditions on and around the proposed Potrero Power Station Mixed-Use Development Project site in San Francisco, California. The proposed Project will be located along San Francisco's central Bayshore waterfront. The area of the site will be approximately 29 acres, encompassing the site of the former Potrero Power Station that was closed in 2011.

The Project site, as shown in Image 1, is bounded by 22nd Street to the north, San Francisco Bay to the east, 23rd Street to the south and Illinois Street to the west. It is our understanding that some existing structures (about 20) on the project site, will be demolished and replaced with 15 buildings with varying heights of 65 to 300 ft. However, the existing Unit 3 Power Block and adjacent 300 ft tall concrete boiler exhaust stack will not be demolished.

The proposed land use program includes residential, commercial (including office, research and development/life science, retail, hotel, entertainment/assembly, and production, distribution, and repair), parking, community facilities, and open space land uses with a total building area of approximately 5.4 million gross square feet (gsf).



Image 1: Site Plan – Aerial View of Site and Surroundings (Courtesy of Google™ Earth)

The quantitative assessment was based on wind speed measurements on a scale model of the Project and its surroundings in a boundary-layer wind tunnel. This report summarizes the methodology of wind tunnel studies for pedestrian wind conditions, describes the pedestrian wind comfort and safety criteria and presents the local wind conditions and their effects on pedestrians.



2 METHODOLOGY

2.1 Wind Tunnel Study Model

To assess the wind environment around the proposed Project, a 1:400 scale model of the Project site and surroundings was constructed for the study with the following configurations tested:

- | | |
|---------------------------|--|
| A - Existing: | all existing buildings on-site and existing and currently under-construction surrounding buildings in the surroundings (Image 2a); |
| B - Existing + Project: | proposed Potrero Power Station Mixed-Use Development Project with existing and currently under-construction surrounding buildings (Image 2b); and, |
| C - Project + Cumulative: | proposed Potrero Power Station Mixed-Use Development Project with existing and currently under-construction surrounding buildings and proposed cumulative developments (Image 2c). |

Given the geographic limits of the wind model boundary, and anticipated reasonably foreseeable cumulative development anticipated within this model boundary, it was determined that the Project + Cumulative configuration would also be representative of an Existing + Project + Pier 70 configuration, and consequently, a separate Existing + Project + Pier 70 configuration was not required.

The scale model of the proposed Project (as shown in Images 2b and 2c) was constructed using the design information and drawings listed in Appendix A. The wind tunnel model included all relevant surrounding buildings and topography within an approximately 1600 ft radius of the study site. The mean speed profile and turbulence of the natural wind approaching the modeled area were simulated in RWDI's boundary-layer wind tunnel. The wind tunnel model was instrumented with 189 grade-level and 4 above grade level sensors to measure wind speeds at a full-scale height of 5 ft, for 16 compass directions. In the Existing configuration, three grade-level sensors (Locations 64, 69 and 80) were covered by existing surrounding buildings, thereby rendering the data from these locations invalid. The sensors on the proposed dock in the Existing plus Project configuration (Locations 167 and 168), were also not included in the Existing configuration. Hence, making the total number of valid sensors in the Existing configuration 184. The placement for wind measurement locations was based on our experience and understanding of pedestrian usage for this site, and was reviewed by the project team and the City of San Francisco Environmental Planning Department prior to the wind tunnel test.

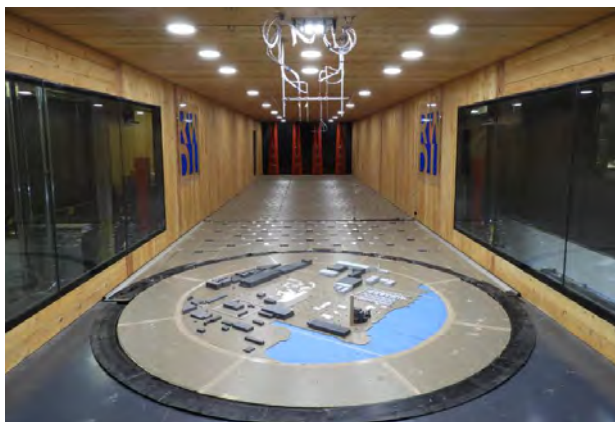


Image 2a: Wind Tunnel Study Model – Existing Configuration

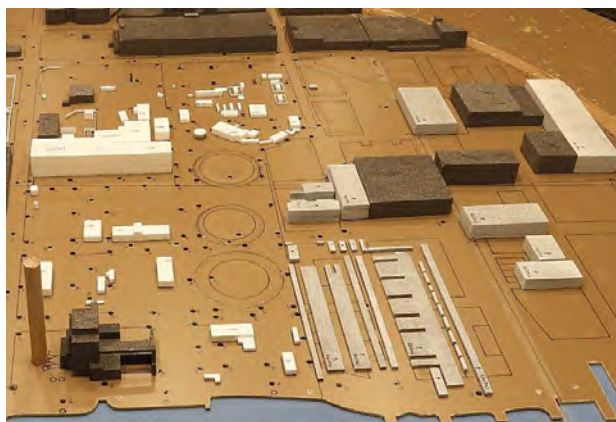


Image 2b: Wind Tunnel Study Model – Existing + Project Configuration

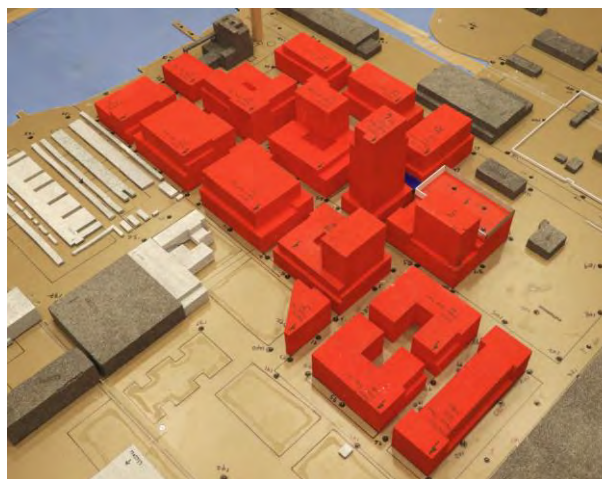


Image 2c: Wind Tunnel Study Model – Project + Cumulative Configuration





2.2 Meteorological Data

Wind statistics recorded at the San Francisco Federal Building between 1945 and 1951 were analyzed as a reference for local wind climate. Wind statistics were combined with the wind tunnel data to predict the frequency of occurrence of full-scale wind speeds. The full-scale wind predictions were then compared against the criteria for wind comfort and hazards as stated in the San Francisco Planning Code Section 148 (See Appendix B).

Data describing the speed, direction, and frequency of occurrence of winds were gathered at the old San Francisco Federal Building at 50 United Nations Plaza (at a height of 132 ft.) during the six-year period, 1945 to 1951. Average wind speeds in San Francisco are the highest in the summer and lowest in winter. However, the strongest peak winds occur in winter. Throughout the year, the highest wind speeds occur in mid-afternoon and are the lowest in the early morning. Westerly to northwesterly winds are the most frequent and strongest winds during all seasons. Of the primary wind directions, four have the greatest frequency of occurrence and make up most the strong winds that occur. These winds include the northwest, west-northwest, west, and west-southwest.

2.3 Planning Code Requirements

The proposed project is subject to the California Environmental Quality Act (CEQA). Therefore, the potential for the Project to result in hazardous winds must be assessed. This analysis is performed using standard wind testing analysis and evaluation methods (used in San Francisco) to determine conformity with the Code.

The Planning Code requires buildings to be shaped so as not to cause ground-level wind currents to exceed defined comfort and hazard criteria. The comfort criteria are that wind speeds will not exceed, more than 10% of the time, 11 mph in substantial pedestrian use areas, and 7 mph in public seating areas. Similarly, the hazard criterion of the Code requires that buildings not cause equivalent wind speeds to reach or exceed the hazard level of 26 mph as averaged from a single full hour of the year.

The equivalent wind speeds were calculated per the specifications in the San Francisco Planning Code Section 825 (d), whereby the mean hourly wind speed is increased when the turbulence intensity is greater than 15% according to the following formula:

$$EWS = V_m \times (2 \times TI + 0.7)$$

where

| | |
|-------------------------|------------------------------------|
| EWS | = equivalent wind speed |
| V_m | = mean pedestrian-level wind speed |
| TI | = turbulence intensity |

Note that the threshold wind speeds in the Planning Code were established by assuming wind speeds were all averaged for one hour, while the local wind data available from the old San Francisco Federal Building at 50 United Nations Plaza were recorded for a minute on each hour. Such a discrepancy has a more significant impact on strong winds that are related to hazardous conditions. Therefore, an equivalent wind speed of 36 mph (based



on the actual one-minute averaged meteorological data), instead of the code value of 26 mph (based on the assumed one-hour averaged meteorological data), is commonly used in San Francisco for the assessment of hazardous winds.

2.4 In-Construction and Cumulative Buildings

Buildings in the surrounding area that are under construction and have been approved were modeled in accordance with the information received on December 5, 2017 from the project team and the City of San Francisco Environmental Planning Department. Buildings within the study radius that are currently in-construction were included in all test configurations and anticipated future buildings were included in the Project plus Cumulative configuration. These sites are shown in Image 3 and listed in the table below.

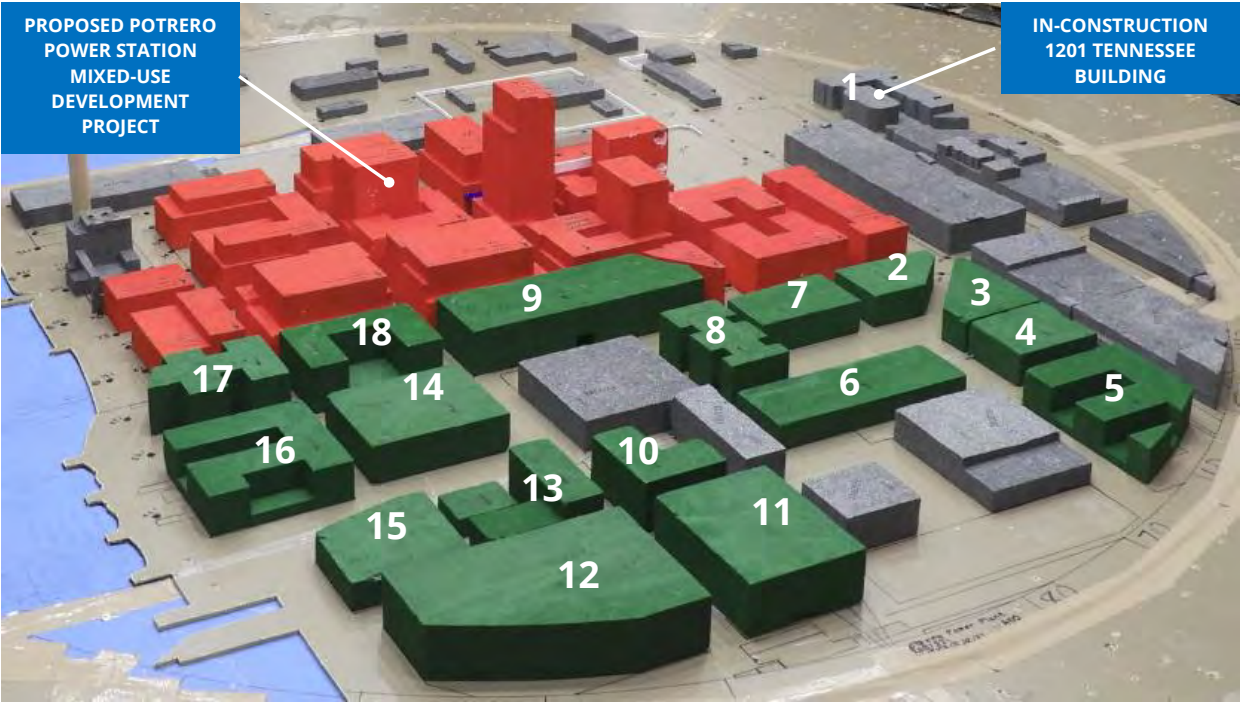


Image 3: In-construction and Cumulative Buildings

| S/N | IN-CONSTRUCTION | S/N | CUMULATIVE |
|-----|--------------------|--------|------------|
| 1 | 1201 TENNESSEE ST. | 2 - 18 | PIER 70 |

3 PREDICTED WIND CONDITIONS

This section presents the results of the wind tunnel measurements analyzed in terms of equivalent wind speeds as defined by the equation in Section 2.3. The text of the report simply refers to the data as wind speeds.



The wind comfort results for the three (3) tested configurations are graphically depicted on a site plan in Figures 1a through 1c located in the “Figures” sections of this report where locations have been color-coded according to the criteria of the 7-mph and 11-mph comfort categories explained in the Planning Code (Appendix B). This same data is also numerically depicted in Tables 1.1 and 1.2, located in the “Tables” section of this report. For each measurement point, the measured 10% exceeded (90th percentile) equivalent wind speed and the percentage of time that the wind speed exceeds 11 mph are listed. The point is marked as a comfort exceedance if the 11-mph threshold is exceeded. A letter “e” in the last column of each configuration indicates a wind comfort exceedance.

Tables 2.1 and 2.2 present the wind hazard results for grade level and above grade level test locations, respectively, and lists the predicted wind speeds to be exceeded 1 hour per year. The predicted number of hours per year that the Section 148 wind hazard criterion (one-minute wind speed of 36 mph) is exceeded is also provided. A letter “e” in the last column of each configuration indicates a wind hazard exceedance. Figures 2a through 2c depicts these locations on and around the project site.

3.1 Existing Configuration

For the Existing configuration, the average 90th percentile wind speed for the 184 test locations is approximately 14 mph, which is above the 11-mph comfort threshold. Wind speeds at 155 of 184 test locations exceed the comfort criterion of 11 mph. Winds currently exceed the comfort criterion 23% of the time (Table 1.1 and Figure 1a).

Of the 184 test locations for the existing configuration, 10 locations currently exceed the hazard criterion for a total of 41 hours/year (Locations 9, 61, 72, 76, 77, 119, 137, 150, 163 and 187 in Figure 1a and Table 2.1). The average wind speed exceeded 1 hour/year is 28 mph.

3.2 Existing plus Project Configuration

Compared to the Existing configuration, the addition of the proposed Project is expected to result in improved wind comfort conditions on and around the project site. The average 90th percentile wind speed for the 189 grade level test locations would be 13 mph. The wind speeds at a total of 120 out of 189 grade level test locations would exceed the comfort criterion of 11 mph (Figure 1b). Compared to the Existing configuration, there would be 35 fewer locations with comfort exceedances under the Existing plus Project configuration. Winds would exceed the 11-mph comfort criterion approximately 17% of the time (Table 1.1).

The addition of the proposed Project is expected to result in improved wind hazard conditions on and around the site. The winds speeds at 6 out of 189 grade level locations are expected to exceed the wind hazard criterion for a total of 28 hours/year. Compared to the Existing configuration, this would be a net reduction of 4 locations and 13 hours. These locations include areas near the southwest corner of Blocks 1, 5 and 10 (Locations 2, 61 and 83, respectively, in Figure 2b), the northeast corner of Building 6 (Location 76), a localized area to the north of Building 14 (Location 140) and a localized area to the west of Building 3, along Maryland Street (Location 17).



Exceedance of the wind hazard criterion near the southwest corner of Buildings 1, 5 and 10 (Locations 2, 61 and 83 in Figure 2b), are caused by strong prevailing winds from the west-northwest direction that are deflected downward by the west façades of the towers and subsequently accelerate around the southwest corners. The wind speed exceedance at locations 17, 76 and 140 are also caused by strong prevailing winds from the west-northwest direction and are expected to be marginal (i.e., 1 – 2 mph above the threshold for 1 – 2 hours/year). For all 189 grade level locations, the average wind speed exceeded 1 hour per year is expected to decrease from 28 mph to 25 mph with the addition of the Project to the site. The total number of hours that winds would exceed the hazard criterion would decrease from 41 hours to 28 hours with the addition of the Project to the site (Table 2.1 and Figure 2b).

With the inclusion of a 20 ft tall 30% porous wind screen around the perimeter of the proposed soccer field on Building 5, the average 90th percentile wind speed on the soccer field would be 11 mph, which meets the comfort threshold of 11 mph. Wind speeds at 1 of 4 (Location 172) test locations on the soccer field would exceed the comfort threshold 19% of the time (Table 1.2). The wind hazard criterion would be met at all test locations on the proposed soccer field on Building 5.

3.3 Project plus Cumulative Configuration

With addition of the proposed cumulative (future) developments in the surrounding area, the average 90th percentile wind speed for the 189 grade level test locations would decrease from 13 mph predicted in the Existing plus Project configuration to 12 mph, with the wind speeds at 105 test locations exceeding the comfort criterion of 11 mph. Compared to the Existing configuration, there would be 50 fewer locations with comfort exceedances under the Project plus Cumulative configuration. Winds would exceed the 11-mph comfort criterion approximately 16% of the time (Table 1.1).

For the Project plus Cumulative configuration, the number of locations exceeding the wind hazard criterion would remain the same as the Existing plus Project configuration, with 6 of 189 grade level locations exceeding the hazard criterion (Locations 2, 61, 76, 83, 175 and 184 in Figure 2c and Table 2.1). The number of hours the wind hazard criterion is exceeded is expected to be reduced from 41 and 28 hours in the Existing and Existing plus Project configurations, respectively, to 22 hours in the Project plus Cumulative configuration (Table 2.1). To improve the marginal exceedance of the wind hazard criterion near location 184, localized wind control features such as landscaping or planters may be included to the south and west of Building 10 around the southwest corner.

Wind speeds at the proposed above grade level soccer field on Building 5, are expected to be similar to conditions in the Existing plus Project configuration, with an average 90th percentile wind speed of 11 mph. The wind hazard criterion would be met at all test locations on the proposed soccer field on Building 5 (Figure 2c and Table 2.2).

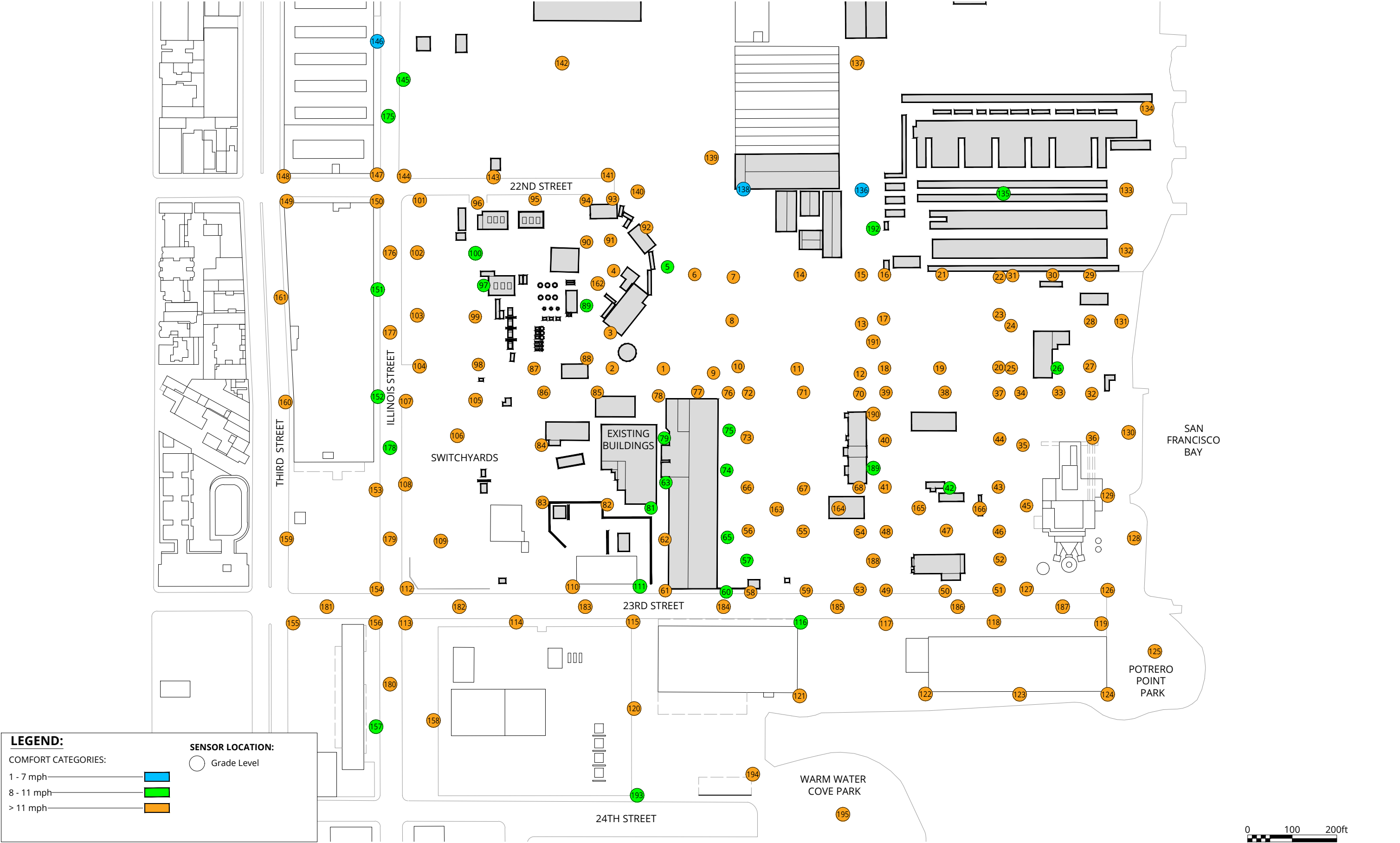
The removal of the 120 ft tall existing Unit 3 structure expected to have inconsequential impact on the predicted wind conditions in the Existing plus Project and Project plus Cumulative configurations.

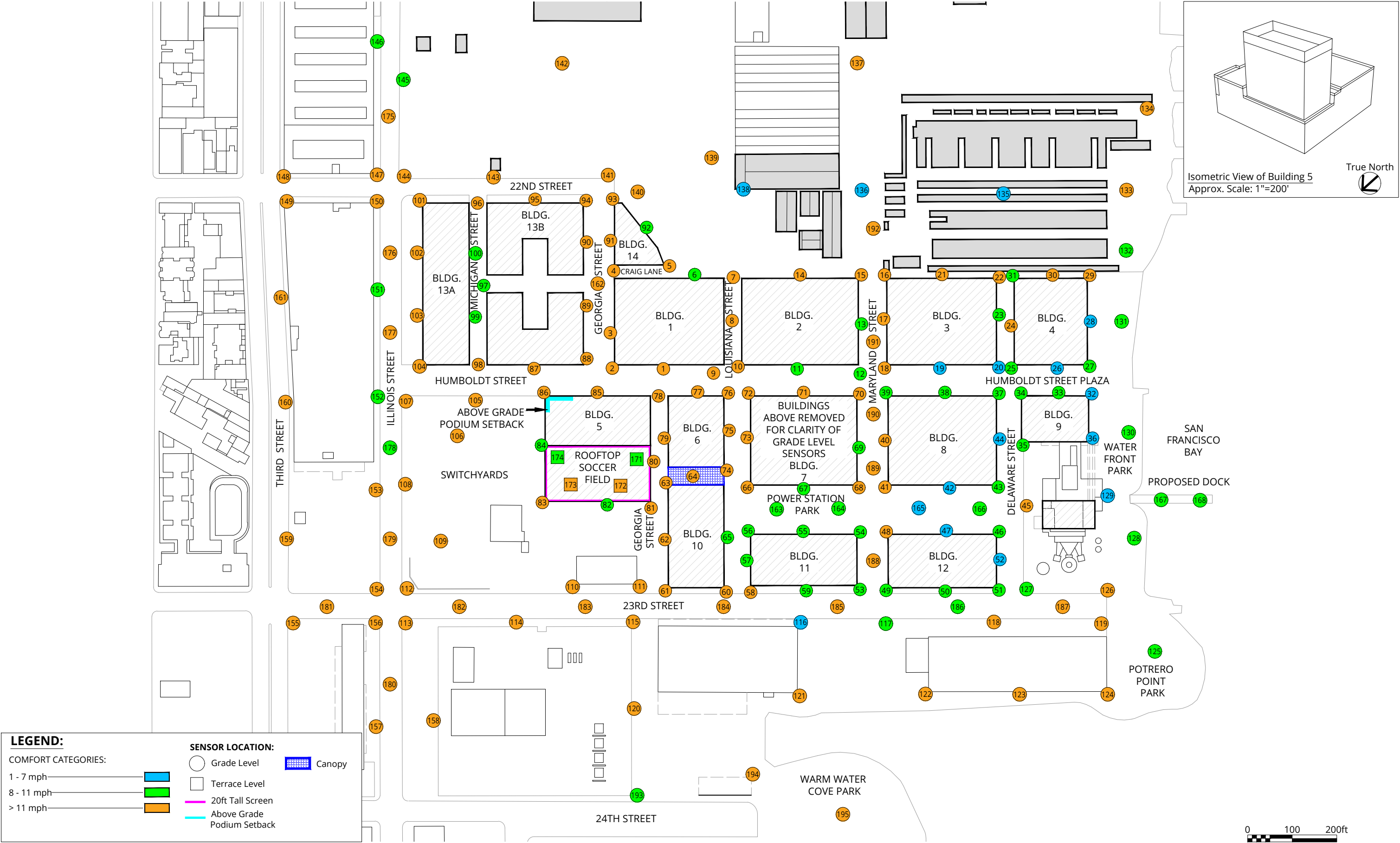


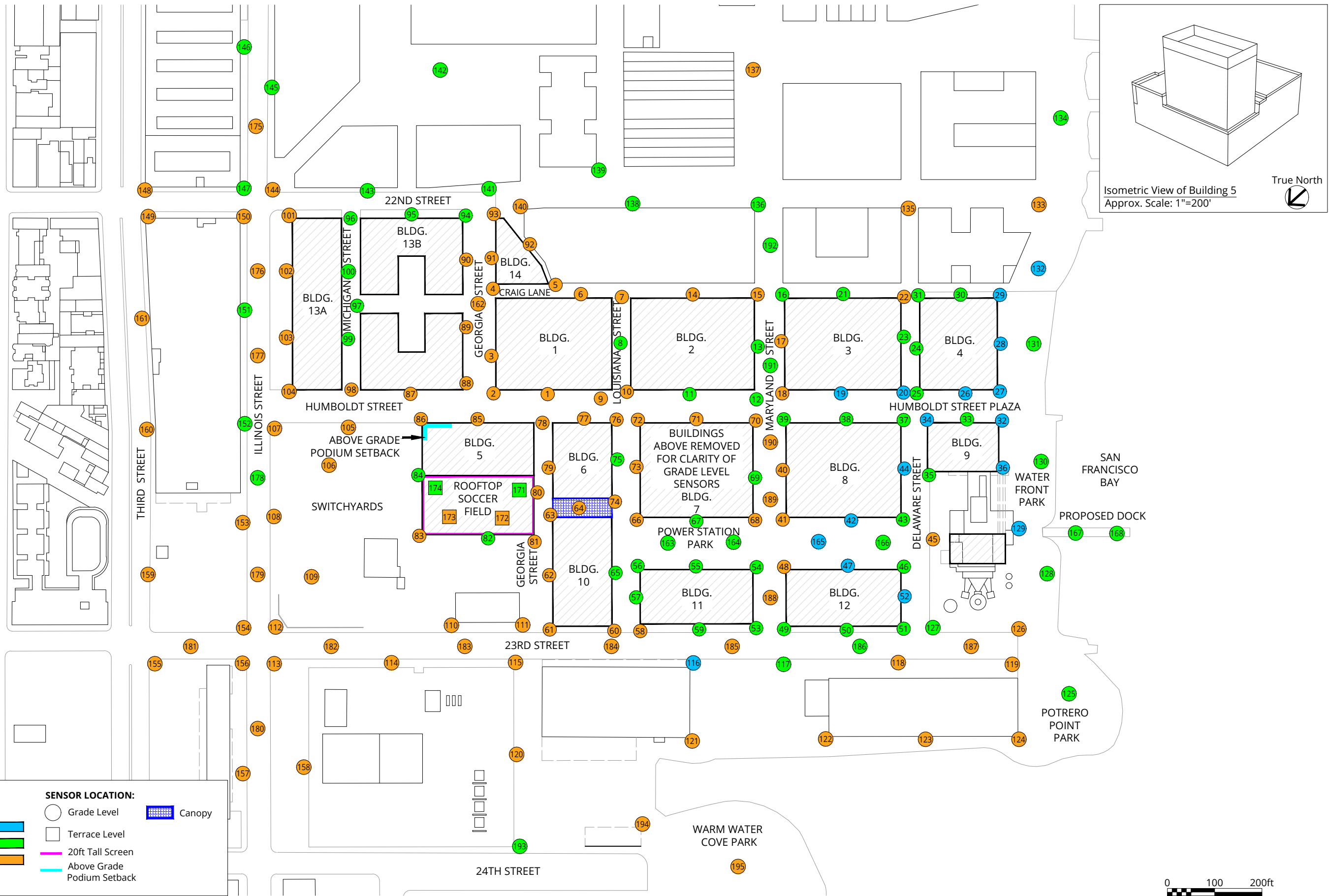
4 APPLICABILITY

The wind conditions presented in this report pertain to the proposed Potrero Power Station Mixed-Use Development Project as detailed in the architectural design drawings listed in Appendix A. Should there be any design changes that deviate from this list of drawings, the wind condition predictions presented may change. Therefore, if changes in the design are made, it is recommended that RWDI be contacted and requested to review their potential effects on wind conditions.

FIGURES




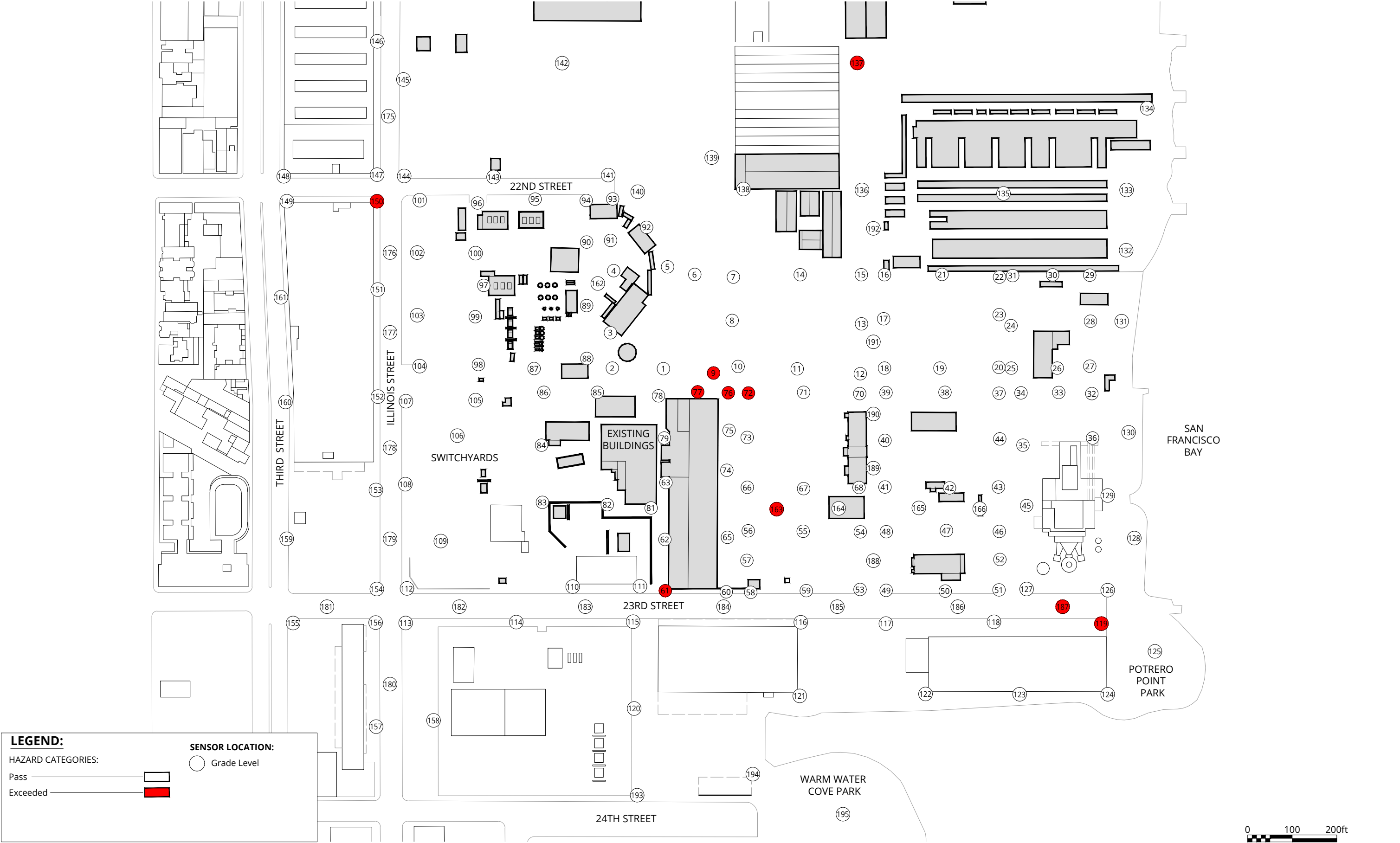


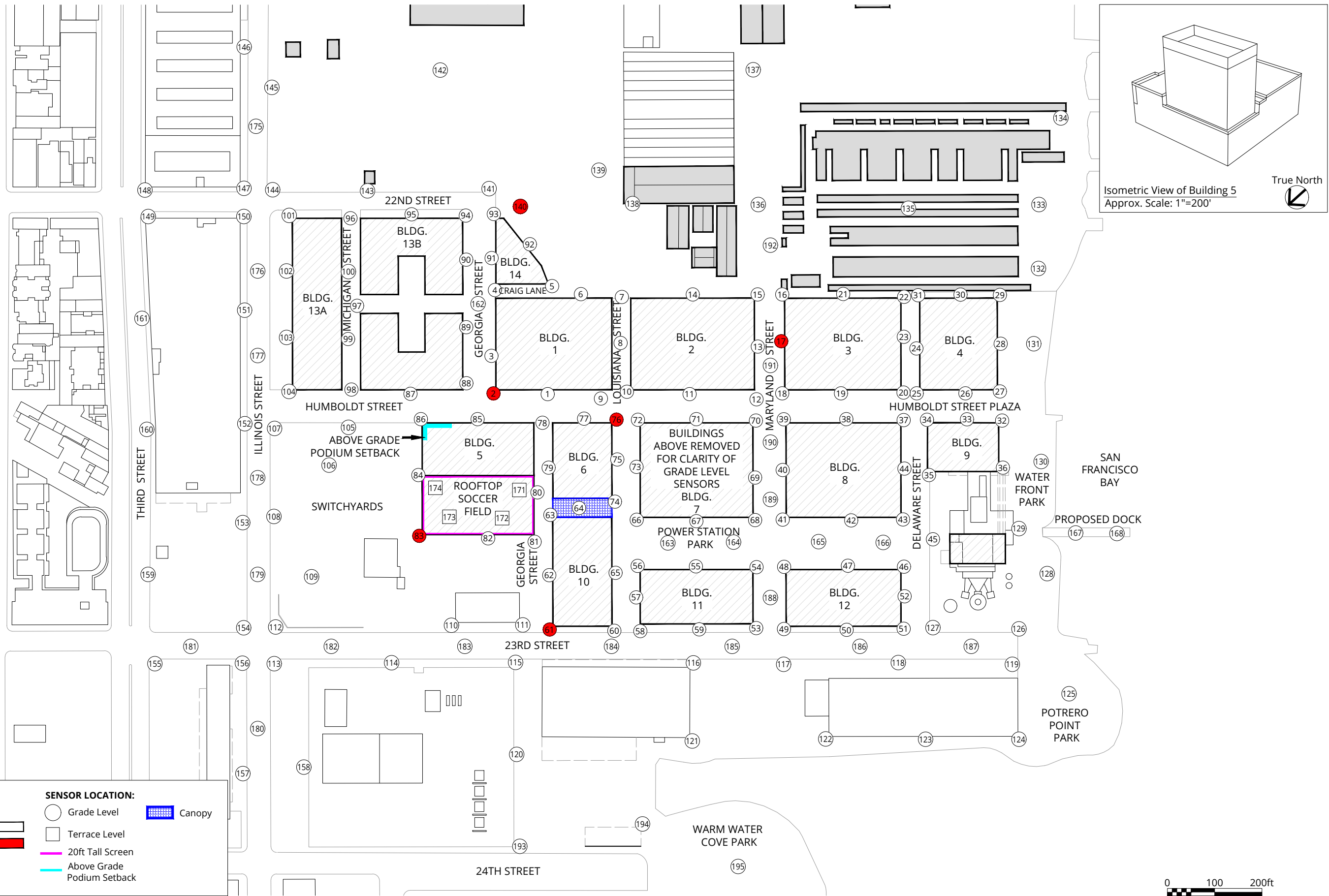


LEGEND:
COMFORT CATEGORIES:
1 - 7 mph
8 - 11 mph
> 11 mph

SENSOR LOCATION:
○ Grade Level
□ Terrace Level
■ 20ft Tall Screen
— Above Grade Podium Setback

 Canopy





LEGEND:

HAZARD CATEGORIES:

Pass ————

Exceeded ————

SENSOR LOCATION:

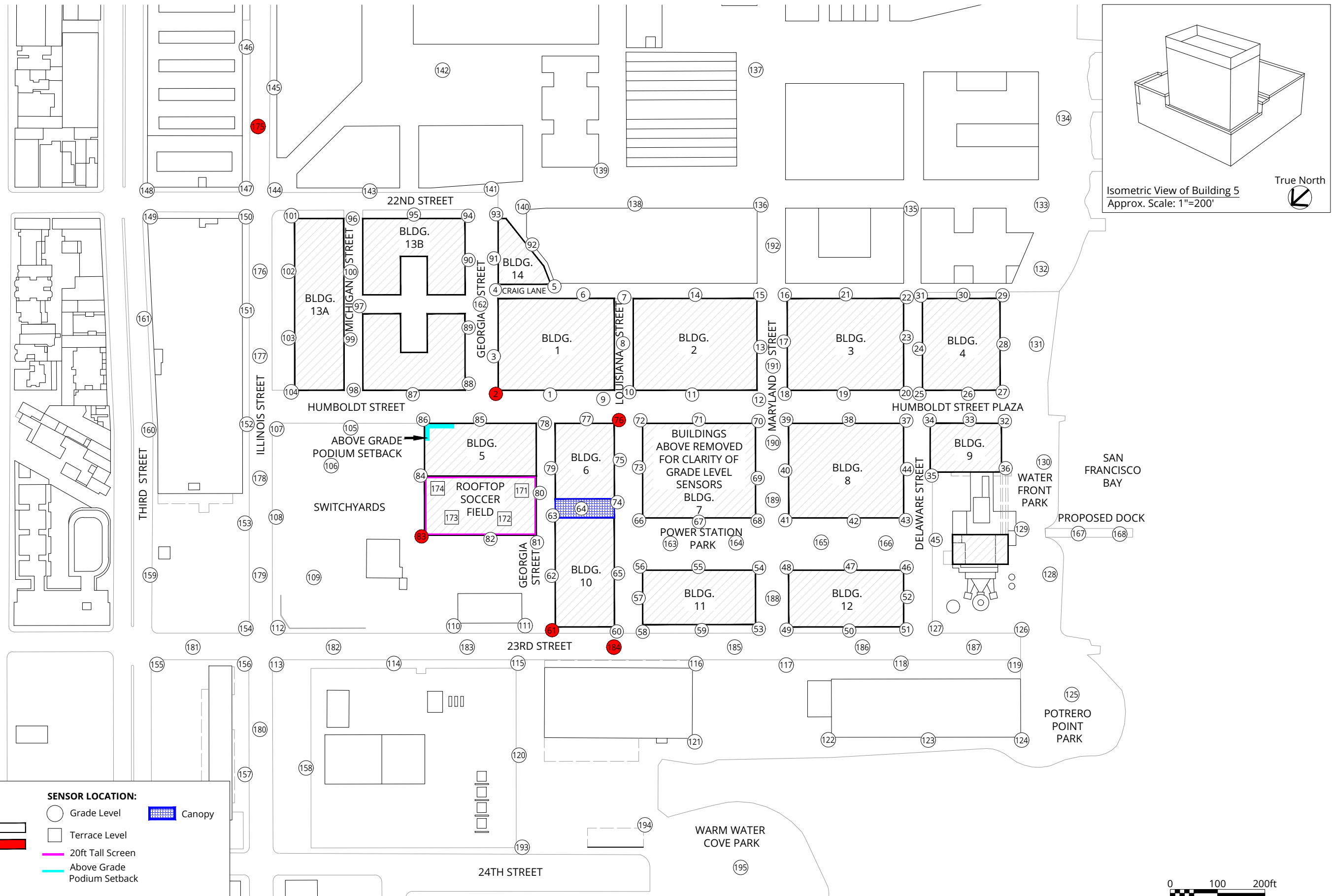
○ Grade Level

□ Terrace Level

— 20ft Tall Screen


— Above Grade Podium Setback


■ Canopy




LEGEND:


HAZARD CATEGORIES:


Pass 


Exceeded 

SENSOR LOCATION:

 Grade Level

 Canopy

 20ft Tall Screen

 Above Grade Podium Setback



TABLES

Table 1.1: Wind Comfort Results - Grade Level

| Location | Existing | | | Existing + Project | | | | Project + Cumulative | | | |
|----------|---------------------------------------|---|---------|---------------------------------------|---|---|---------|---------------------------------------|---|---|---------|
| | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Speed Change Relative to Existing (mph) | Exceeds |
| 1 | 16 | 29 | e | 17 | 34 | 1 | e | 17 | 35 | 1 | e |
| 2 | 14 | 23 | e | 21 | 48 | 7 | e | 20 | 47 | 6 | e |
| 3 | 14 | 23 | e | 13 | 20 | -1 | e | 13 | 19 | -1 | e |
| 4 | 12 | 15 | e | 16 | 29 | 4 | e | 16 | 29 | 4 | e |
| 5 | 11 | 10 | | 16 | 29 | 5 | e | 14 | 24 | 3 | e |
| 6 | 16 | 28 | e | 11 | 10 | -5 | | 12 | 15 | -4 | e |
| 7 | 17 | 35 | e | 13 | 20 | -4 | e | 12 | 14 | -5 | e |
| 8 | 18 | 40 | e | 12 | 15 | -6 | e | 10 | 5 | -8 | |
| 9 | 19 | 45 | e | 17 | 34 | -2 | e | 19 | 44 | 0 | e |
| 10 | 19 | 44 | e | 15 | 27 | -4 | e | 14 | 24 | -5 | e |
| 11 | 18 | 40 | e | 10 | 4 | -8 | | 11 | 10 | -7 | |
| 12 | 17 | 37 | e | 9 | 2 | -8 | | 9 | 2 | -8 | |
| 13 | 17 | 37 | e | 8 | 3 | -9 | | 8 | 3 | -9 | |
| 14 | 16 | 32 | e | 15 | 27 | -1 | e | 12 | 16 | -4 | e |
| 15 | 15 | 26 | e | 13 | 15 | -2 | e | 12 | 12 | -3 | e |
| 16 | 14 | 19 | e | 13 | 15 | -1 | e | 11 | 10 | -3 | |
| 17 | 16 | 32 | e | 17 | 24 | 1 | e | 12 | 14 | -4 | e |
| 18 | 17 | 35 | e | 13 | 16 | -4 | e | 12 | 18 | -5 | e |
| 19 | 17 | 33 | e | 6 | 0 | -11 | | 6 | 0 | -11 | |
| 20 | 15 | 29 | e | 7 | 1 | -8 | | 6 | 0 | -9 | |
| 21 | 13 | 18 | e | 13 | 16 | 0 | e | 8 | 2 | -5 | |
| 22 | 13 | 18 | e | 16 | 30 | 3 | e | 14 | 20 | 1 | e |
| 23 | 16 | 29 | e | 8 | 3 | -8 | | 8 | 2 | -8 | |
| 24 | 15 | 28 | e | 14 | 17 | -1 | e | 11 | 10 | -4 | |
| 25 | 14 | 25 | e | 11 | 10 | -3 | | 8 | 2 | -6 | |
| 26 | 8 | 1 | | 6 | 0 | -2 | | 6 | 0 | -2 | |
| 27 | 13 | 22 | e | 9 | 4 | -4 | | 7 | 0 | -6 | |
| 28 | 17 | 34 | e | 6 | 0 | -11 | | 5 | 0 | -12 | |
| 29 | 14 | 22 | e | 16 | 29 | 2 | e | 7 | 1 | -7 | |
| 30 | 14 | 23 | e | 14 | 19 | 0 | e | 9 | 5 | -5 | |
| 31 | 12 | 14 | e | 10 | 6 | -2 | | 9 | 5 | -3 | |
| 32 | 16 | 32 | e | 7 | 1 | -9 | | 7 | 0 | -9 | |
| 33 | 16 | 31 | e | 10 | 6 | -6 | | 8 | 3 | -8 | |
| 34 | 16 | 31 | e | 8 | 3 | -8 | | 7 | 1 | -9 | |
| 35 | 14 | 25 | e | 9 | 4 | -5 | | 9 | 4 | -5 | |
| 36 | 18 | 41 | e | 5 | 0 | -13 | | 5 | 0 | -13 | |
| 37 | 16 | 29 | e | 10 | 6 | -6 | | 9 | 5 | -7 | |
| 38 | 16 | 30 | e | 10 | 8 | -6 | | 10 | 8 | -6 | |
| 39 | 17 | 33 | e | 11 | 10 | -6 | | 11 | 10 | -6 | |
| 40 | 12 | 16 | e | 12 | 12 | 0 | e | 12 | 14 | 0 | e |
| 41 | 13 | 15 | e | 14 | 17 | 1 | e | 14 | 18 | 1 | e |
| 42 | 9 | 3 | | 7 | 1 | -2 | | 7 | 1 | -2 | |

Table 1.1: Wind Comfort Results - Grade Level

| Location | Existing | | | Existing + Project | | | | Project + Cumulative | | | |
|----------|---------------------------------------|---|---------|---------------------------------------|---|---|---------|---------------------------------------|---|---|---------|
| | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Speed Change Relative to Existing (mph) | Exceeds |
| 43 | 13 | 16 | e | 10 | 5 | -3 | | 10 | 5 | -3 | |
| 44 | 15 | 26 | e | 7 | 0 | -8 | | 7 | 0 | -8 | |
| 45 | 17 | 36 | e | 13 | 21 | -4 | e | 13 | 21 | -4 | e |
| 46 | 14 | 21 | e | 10 | 6 | -4 | | 10 | 7 | -4 | |
| 47 | 14 | 23 | e | 7 | 1 | -7 | | 7 | 0 | -7 | |
| 48 | 13 | 17 | e | 12 | 14 | -1 | e | 12 | 15 | -1 | e |
| 49 | 15 | 22 | e | 9 | 3 | -6 | | 8 | 1 | -7 | |
| 50 | 14 | 21 | e | 10 | 5 | -4 | | 10 | 6 | -4 | |
| 51 | 14 | 24 | e | 10 | 5 | -4 | | 10 | 7 | -4 | |
| 52 | 15 | 27 | e | 7 | 0 | -8 | | 7 | 0 | -8 | |
| 53 | 15 | 22 | e | 10 | 7 | -5 | | 10 | 7 | -5 | |
| 54 | 12 | 12 | e | 10 | 6 | -2 | | 10 | 6 | -2 | |
| 55 | 16 | 26 | e | 9 | 4 | -7 | | 11 | 10 | -5 | |
| 56 | 14 | 17 | e | 11 | 10 | -3 | | 11 | 10 | -3 | |
| 57 | 11 | 10 | | 8 | 3 | -3 | | 9 | 5 | -2 | |
| 58 | 12 | 14 | e | 13 | 21 | 1 | e | 13 | 21 | 1 | e |
| 59 | 16 | 28 | e | 10 | 5 | -6 | | 10 | 7 | -6 | |
| 60 | 11 | 10 | | 14 | 22 | 3 | e | 14 | 23 | 3 | e |
| 61 | 19 | 45 | e | 20 | 48 | 1 | e | 20 | 48 | 1 | e |
| 62 | 13 | 18 | e | 13 | 19 | 0 | e | 13 | 19 | 0 | e |
| 63 | 10 | 8 | | 18 | 40 | 8 | e | 18 | 39 | 8 | e |
| 64 | - | - | - | 17 | 32 | - | e | 17 | 34 | - | e |
| 65 | 8 | 3 | | 10 | 7 | 2 | | 10 | 7 | 2 | |
| 66 | 16 | 22 | e | 14 | 21 | -2 | e | 14 | 22 | -2 | e |
| 67 | 15 | 27 | e | 9 | 2 | -6 | | 9 | 2 | -6 | |
| 68 | 14 | 23 | e | 13 | 14 | -1 | e | 13 | 16 | -1 | e |
| 69 | - | - | - | 9 | 5 | - | | 9 | 5 | - | |
| 70 | 17 | 33 | e | 12 | 16 | -5 | e | 12 | 17 | -5 | e |
| 71 | 17 | 35 | e | 16 | 30 | -1 | e | 15 | 26 | -2 | e |
| 72 | 21 | 48 | e | 13 | 20 | -8 | e | 13 | 22 | -8 | e |
| 73 | 13 | 16 | e | 16 | 28 | 3 | e | 15 | 21 | 2 | e |
| 74 | 11 | 10 | | 13 | 18 | 2 | e | 14 | 21 | 3 | e |
| 75 | 9 | 5 | | 12 | 15 | 3 | e | 11 | 10 | 2 | |
| 76 | 21 | 49 | e | 19 | 43 | -2 | e | 19 | 40 | -2 | e |
| 77 | 22 | 49 | e | 17 | 39 | -5 | e | 18 | 40 | -4 | e |
| 78 | 14 | 23 | e | 15 | 28 | 1 | e | 15 | 29 | 1 | e |
| 79 | 8 | 1 | | 17 | 37 | 9 | e | 17 | 38 | 9 | e |
| 80 | - | - | - | 14 | 23 | - | e | 14 | 23 | - | e |
| 81 | 11 | 10 | | 17 | 36 | 6 | e | 18 | 36 | 7 | e |
| 82 | 13 | 17 | e | 9 | 4 | -4 | | 9 | 4 | -4 | |
| 83 | 13 | 18 | e | 20 | 48 | 7 | e | 21 | 48 | 8 | e |
| 84 | 16 | 27 | e | 11 | 10 | -5 | | 11 | 10 | -5 | |

Table 1.1: Wind Comfort Results - Grade Level

| Location | Existing | | | Existing + Project | | | | Project + Cumulative | | | |
|----------|---------------------------------------|---|---------|---------------------------------------|---|---|---------|---------------------------------------|---|---|---------|
| | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Speed Change Relative to Existing (mph) | Exceeds |
| 85 | 15 | 26 | e | 13 | 20 | -2 | e | 13 | 20 | -2 | e |
| 86 | 15 | 26 | e | 19 | 45 | 4 | e | 18 | 43 | 3 | e |
| 87 | 14 | 24 | e | 14 | 21 | 0 | e | 14 | 20 | 0 | e |
| 88 | 15 | 25 | e | 16 | 28 | 1 | e | 15 | 28 | 0 | e |
| 89 | 10 | 6 | | 13 | 18 | 3 | e | 12 | 17 | 2 | e |
| 90 | 14 | 22 | e | 15 | 26 | 1 | e | 14 | 23 | 0 | e |
| 91 | 13 | 21 | e | 16 | 32 | 3 | e | 13 | 21 | 0 | e |
| 92 | 12 | 16 | e | 8 | 1 | -4 | | 14 | 20 | 2 | e |
| 93 | 15 | 25 | e | 17 | 38 | 2 | e | 14 | 24 | -1 | e |
| 94 | 12 | 18 | e | 15 | 23 | 3 | e | 11 | 10 | -1 | |
| 95 | 14 | 21 | e | 13 | 18 | -1 | e | 11 | 10 | -3 | |
| 96 | 12 | 17 | e | 14 | 18 | 2 | e | 11 | 10 | -1 | |
| 97 | 10 | 7 | | 11 | 10 | 1 | | 8 | 2 | -2 | |
| 98 | 16 | 28 | e | 14 | 20 | -2 | e | 14 | 20 | -2 | e |
| 99 | 14 | 20 | e | 11 | 10 | -3 | | 10 | 4 | -4 | |
| 100 | 11 | 10 | | 9 | 5 | -2 | | 8 | 2 | -3 | |
| 101 | 14 | 21 | e | 13 | 20 | -1 | e | 13 | 20 | -1 | e |
| 102 | 18 | 41 | e | 14 | 22 | -4 | e | 14 | 21 | -4 | e |
| 103 | 15 | 20 | e | 15 | 22 | 0 | e | 14 | 21 | -1 | e |
| 104 | 16 | 30 | e | 14 | 23 | -2 | e | 14 | 19 | -2 | e |
| 105 | 16 | 31 | e | 15 | 26 | -1 | e | 15 | 27 | -1 | e |
| 106 | 16 | 31 | e | 14 | 21 | -2 | e | 14 | 22 | -2 | e |
| 107 | 14 | 25 | e | 14 | 20 | 0 | e | 14 | 20 | 0 | e |
| 108 | 14 | 25 | e | 12 | 16 | -2 | e | 13 | 17 | -1 | e |
| 109 | 15 | 25 | e | 14 | 23 | -1 | e | 14 | 24 | -1 | e |
| 110 | 17 | 35 | e | 18 | 37 | 1 | e | 18 | 38 | 1 | e |
| 111 | 11 | 10 | | 16 | 30 | 5 | e | 16 | 31 | 5 | e |
| 112 | 15 | 26 | e | 15 | 26 | 0 | e | 15 | 26 | 0 | e |
| 113 | 16 | 30 | e | 16 | 28 | 0 | e | 16 | 28 | 0 | e |
| 114 | 15 | 25 | e | 15 | 25 | 0 | e | 14 | 24 | -1 | e |
| 115 | 14 | 21 | e | 13 | 19 | -1 | e | 13 | 19 | -1 | e |
| 116 | 11 | 10 | | 5 | 0 | -6 | | 5 | 0 | -6 | |
| 117 | 15 | 24 | e | 11 | 10 | -4 | | 11 | 10 | -4 | |
| 118 | 16 | 29 | e | 12 | 12 | -4 | e | 12 | 13 | -4 | e |
| 119 | 18 | 39 | e | 14 | 20 | -4 | e | 14 | 21 | -4 | e |
| 120 | 16 | 32 | e | 16 | 30 | 0 | e | 16 | 29 | 0 | e |
| 121 | 12 | 13 | e | 12 | 13 | 0 | e | 13 | 18 | 1 | e |
| 122 | 16 | 33 | e | 15 | 24 | -1 | e | 14 | 23 | -2 | e |
| 123 | 14 | 22 | e | 12 | 12 | -2 | e | 12 | 12 | -2 | e |
| 124 | 15 | 27 | e | 14 | 20 | -1 | e | 14 | 19 | -1 | e |
| 125 | 13 | 17 | e | 10 | 6 | -3 | | 10 | 6 | -3 | |
| 126 | 19 | 41 | e | 12 | 13 | -7 | e | 12 | 15 | -7 | e |

Table 1.1: Wind Comfort Results - Grade Level

| Location | Existing | | | Existing + Project | | | | Project + Cumulative | | | |
|----------|---------------------------------------|---|---------|---------------------------------------|---|---|---------|---------------------------------------|---|---|---------|
| | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Speed Change Relative to Existing (mph) | Exceeds |
| 127 | 16 | 29 | e | 11 | 10 | -5 | | 11 | 10 | -5 | |
| 128 | 13 | 23 | e | 10 | 5 | -3 | | 10 | 5 | -3 | |
| 129 | 13 | 15 | e | 7 | 1 | -6 | | 7 | 0 | -6 | |
| 130 | 18 | 40 | e | 8 | 2 | -10 | | 8 | 1 | -10 | |
| 131 | 16 | 32 | e | 9 | 4 | -7 | | 8 | 2 | -8 | |
| 132 | 13 | 17 | e | 11 | 10 | -2 | | 7 | 3 | -6 | |
| 133 | 12 | 15 | e | 12 | 14 | 0 | e | 13 | 16 | 1 | e |
| 134 | 13 | 20 | e | 14 | 22 | 1 | e | 11 | 10 | -2 | |
| 135 | 9 | 3 | | 6 | 0 | -3 | | 12 | 14 | 3 | e |
| 136 | 7 | 1 | | 7 | 0 | 0 | | 10 | 8 | 3 | |
| 137 | 16 | 24 | e | 13 | 16 | -3 | e | 13 | 17 | -3 | e |
| 138 | 7 | 0 | | 6 | 0 | -1 | | 11 | 10 | 4 | |
| 139 | 15 | 25 | e | 15 | 26 | 0 | e | 8 | 1 | -7 | |
| 140 | 16 | 28 | e | 19 | 42 | 3 | e | 15 | 26 | -1 | e |
| 141 | 16 | 31 | e | 17 | 33 | 1 | e | 10 | 5 | -6 | |
| 142 | 15 | 24 | e | 17 | 34 | 2 | e | 10 | 7 | -5 | |
| 143 | 14 | 23 | e | 13 | 19 | -1 | e | 10 | 7 | -4 | |
| 144 | 13 | 18 | e | 14 | 24 | 1 | e | 15 | 25 | 2 | e |
| 145 | 11 | 10 | | 10 | 7 | -1 | | 11 | 10 | 0 | |
| 146 | 5 | 0 | | 8 | 2 | 3 | | 11 | 10 | 6 | |
| 147 | 13 | 19 | e | 15 | 29 | 2 | e | 11 | 10 | -2 | |
| 148 | 18 | 41 | e | 17 | 36 | -1 | e | 17 | 35 | -1 | e |
| 149 | 17 | 33 | e | 16 | 30 | -1 | e | 16 | 28 | -1 | e |
| 150 | 17 | 31 | e | 13 | 16 | -4 | e | 14 | 20 | -3 | e |
| 151 | 9 | 6 | | 10 | 6 | 1 | | 10 | 4 | 1 | |
| 152 | 8 | 3 | | 11 | 10 | 3 | | 11 | 10 | 3 | |
| 153 | 15 | 25 | e | 12 | 16 | -3 | e | 12 | 16 | -3 | e |
| 154 | 17 | 34 | e | 16 | 31 | -1 | e | 16 | 31 | -1 | e |
| 155 | 16 | 29 | e | 16 | 30 | 0 | e | 16 | 30 | 0 | e |
| 156 | 16 | 28 | e | 16 | 29 | 0 | e | 16 | 30 | 0 | e |
| 157 | 10 | 6 | | 12 | 11 | 2 | e | 12 | 11 | 2 | e |
| 158 | 14 | 23 | e | 15 | 27 | 1 | e | 16 | 28 | 2 | e |
| 159 | 13 | 16 | e | 13 | 16 | 0 | e | 13 | 19 | 0 | e |
| 160 | 16 | 29 | e | 14 | 23 | -2 | e | 15 | 24 | -1 | e |
| 161 | 17 | 36 | e | 18 | 37 | 1 | e | 17 | 36 | 0 | e |
| 162 | 12 | 16 | e | 18 | 39 | 6 | e | 17 | 36 | 5 | e |
| 163 | 16 | 28 | e | 10 | 6 | -6 | | 10 | 6 | -6 | |
| 164 | 15 | 27 | e | 10 | 5 | -5 | | 10 | 5 | -5 | |
| 165 | 14 | 22 | e | 7 | 1 | -7 | | 7 | 0 | -7 | |
| 166 | 12 | 14 | e | 8 | 1 | -4 | | 8 | 2 | -4 | |
| 167 | - | - | - | 8 | 2 | - | | 8 | 2 | - | |
| 168 | - | - | - | 9 | 4 | - | | 9 | 4 | - | |

Table 1.1: Wind Comfort Results - Grade Level

| Location | Existing | | | Existing + Project | | | | Project + Cumulative | | | |
|----------|---------------------------------------|---|---------|---------------------------------------|---|---|---------|---------------------------------------|---|---|---------|
| | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Speed Change Relative to Existing (mph) | Exceeds |
| 175 | 8 | 3 | | 13 | 16 | 5 | e | 19 | 46 | 11 | e |
| 176 | 14 | 16 | e | 15 | 27 | 1 | e | 14 | 20 | 0 | e |
| 177 | 12 | 12 | e | 16 | 29 | 4 | e | 16 | 28 | 4 | e |
| 178 | 11 | 10 | | 11 | 10 | 0 | | 11 | 10 | 0 | |
| 179 | 15 | 24 | e | 14 | 22 | -1 | e | 14 | 22 | -1 | e |
| 180 | 13 | 17 | e | 13 | 17 | 0 | e | 13 | 18 | 0 | e |
| 181 | 17 | 36 | e | 17 | 34 | 0 | e | 17 | 34 | 0 | e |
| 182 | 16 | 30 | e | 16 | 28 | 0 | e | 15 | 28 | -1 | e |
| 183 | 16 | 32 | e | 15 | 28 | -1 | e | 15 | 28 | -1 | e |
| 184 | 16 | 31 | e | 21 | 48 | 5 | e | 21 | 48 | 5 | e |
| 185 | 16 | 24 | e | 12 | 14 | -4 | e | 12 | 15 | -4 | e |
| 186 | 14 | 24 | e | 11 | 10 | -3 | | 11 | 10 | -3 | |
| 187 | 19 | 43 | e | 14 | 20 | -5 | e | 14 | 20 | -5 | e |
| 188 | 15 | 23 | e | 12 | 14 | -3 | e | 12 | 14 | -3 | e |
| 189 | 11 | 10 | | 14 | 18 | 3 | e | 15 | 21 | 4 | e |
| 190 | 17 | 36 | e | 13 | 15 | -4 | e | 13 | 18 | -4 | e |
| 191 | 17 | 36 | e | 12 | 13 | -5 | e | 11 | 10 | -6 | |
| 192 | 10 | 6 | | 12 | 12 | 2 | e | 11 | 10 | 1 | |
| 193 | 9 | 3 | | 8 | 2 | -1 | | 8 | 2 | -1 | |
| 194 | 16 | 29 | e | 15 | 29 | -1 | e | 15 | 29 | -1 | e |
| 195 | 17 | 37 | e | 17 | 37 | 0 | e | 17 | 38 | 0 | e |
| SUMMARY | Average (mph) | Average (%) | Total | Average (mph) | Average (%) | Speed Change (mph) | Total | Average (mph) | Average (%) | Speed Change (mph) | Total |
| | 14 | 23 | 155 | 13 | 17 | -1 | 120 | 12 | 16 | 2 | 105 |
| | | | 184 | | | | 189 | | | | 189 |



Table 1.2: Wind Comfort Results - Above Grade Level

| Location | Existing | | | Existing + Project | | | | Project + Cumulative | | | |
|----------|---------------------------------------|---|---------|---------------------------------------|---|---|-----------------|---------------------------------------|---|---|-----------------|
| | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Speed Change Relative to Existing (mph) | Exceeds | Wind Speed Exceeded 10% of Time (mph) | % of Time Wind Speed Exceeds 11 mph (%) | Speed Change Relative to Existing (mph) | Exceeds |
| 171 | - | - | - | 11 | 10 | - | | 11 | 10 | - | |
| 172 | - | - | - | 14 | 19 | - | e | 13 | 17 | - | e |
| 173 | - | - | - | 11 | 10 | - | | 12 | 12 | - | e |
| 174 | - | - | - | 9 | 4 | - | | 9 | 4 | - | |
| SUMMARY | Average (mph) | Average (%) | Total | Average (mph) | Average (%) | Speed Change (mph) | Total | Average (mph) | Average (%) | Speed Change (mph) | Total |
| | - | - | - | 11 | 11 | - | 1 ----- 4 | 11 | 11 | - | 2 ----- 4 |

Table 2.1: Wind Hazard Results - Grade Level

| Location | Existing | | | Existing + Project | | | | Project + Cumulative | | | |
|----------|------------------------------------|---|---------|------------------------------------|---|-----------------------------------|---------|------------------------------------|---|-----------------------------------|---------|
| | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Exceeds | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Hours Change Relative to Existing | Exceeds |
| 1 | 31 | 0 | | 33 | 0 | 0 | | 34 | 0 | 0 | |
| 2 | 27 | 0 | | 42 | 18 | 18 | e | 41 | 12 | 12 | e |
| 3 | 26 | 0 | | 26 | 0 | 0 | | 25 | 0 | 0 | |
| 4 | 25 | 0 | | 29 | 0 | 0 | | 28 | 0 | 0 | |
| 5 | 22 | 0 | | 29 | 0 | 0 | | 27 | 0 | 0 | |
| 6 | 33 | 0 | | 21 | 0 | 0 | | 22 | 0 | 0 | |
| 7 | 33 | 0 | | 24 | 0 | 0 | | 23 | 0 | 0 | |
| 8 | 34 | 0 | | 26 | 0 | 0 | | 19 | 0 | 0 | |
| 9 | 37 | 2 | e | 29 | 0 | -2 | | 33 | 0 | -2 | |
| 10 | 35 | 0 | | 29 | 0 | 0 | | 26 | 0 | 0 | |
| 11 | 34 | 0 | | 19 | 0 | 0 | | 20 | 0 | 0 | |
| 12 | 32 | 0 | | 16 | 0 | 0 | | 16 | 0 | 0 | |
| 13 | 32 | 0 | | 18 | 0 | 0 | | 17 | 0 | 0 | |
| 14 | 30 | 0 | | 29 | 0 | 0 | | 23 | 0 | 0 | |
| 15 | 27 | 0 | | 26 | 0 | 0 | | 22 | 0 | 0 | |
| 16 | 25 | 0 | | 26 | 0 | 0 | | 24 | 0 | 0 | |
| 17 | 30 | 0 | | 38 | 2 | 2 | e | 24 | 0 | 0 | |
| 18 | 31 | 0 | | 28 | 0 | 0 | | 23 | 0 | 0 | |
| 19 | 30 | 0 | | 12 | 0 | 0 | | 12 | 0 | 0 | |
| 20 | 28 | 0 | | 14 | 0 | 0 | | 10 | 0 | 0 | |
| 21 | 24 | 0 | | 27 | 0 | 0 | | 15 | 0 | 0 | |
| 22 | 23 | 0 | | 34 | 0 | 0 | | 27 | 0 | 0 | |
| 23 | 28 | 0 | | 21 | 0 | 0 | | 16 | 0 | 0 | |
| 24 | 27 | 0 | | 29 | 0 | 0 | | 21 | 0 | 0 | |
| 25 | 27 | 0 | | 24 | 0 | 0 | | 16 | 0 | 0 | |
| 26 | 16 | 0 | | 12 | 0 | 0 | | 10 | 0 | 0 | |
| 27 | 25 | 0 | | 18 | 0 | 0 | | 13 | 0 | 0 | |
| 28 | 32 | 0 | | 13 | 0 | 0 | | 10 | 0 | 0 | |
| 29 | 25 | 0 | | 32 | 0 | 0 | | 15 | 0 | 0 | |
| 30 | 25 | 0 | | 28 | 0 | 0 | | 20 | 0 | 0 | |
| 31 | 21 | 0 | | 20 | 0 | 0 | | 20 | 0 | 0 | |
| 32 | 29 | 0 | | 14 | 0 | 0 | | 13 | 0 | 0 | |
| 33 | 29 | 0 | | 22 | 0 | 0 | | 17 | 0 | 0 | |
| 34 | 29 | 0 | | 17 | 0 | 0 | | 15 | 0 | 0 | |
| 35 | 28 | 0 | | 18 | 0 | 0 | | 18 | 0 | 0 | |
| 36 | 35 | 0 | | 10 | 0 | 0 | | 9 | 0 | 0 | |
| 37 | 28 | 0 | | 20 | 0 | 0 | | 19 | 0 | 0 | |
| 38 | 29 | 0 | | 21 | 0 | 0 | | 21 | 0 | 0 | |
| 39 | 31 | 0 | | 23 | 0 | 0 | | 22 | 0 | 0 | |
| 40 | 24 | 0 | | 25 | 0 | 0 | | 25 | 0 | 0 | |
| 41 | 26 | 0 | | 29 | 0 | 0 | | 30 | 0 | 0 | |
| 42 | 17 | 0 | | 18 | 0 | 0 | | 18 | 0 | 0 | |

Table 2.1: Wind Hazard Results - Grade Level

| Location | Existing | | | Existing + Project | | | | Project + Cumulative | | | |
|----------|------------------------------------|---|---------|------------------------------------|---|-----------------------------------|---------|------------------------------------|---|-----------------------------------|---------|
| | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Exceeds | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Hours Change Relative to Existing | Exceeds |
| 43 | 25 | 0 | | 19 | 0 | 0 | | 19 | 0 | 0 | |
| 44 | 27 | 0 | | 14 | 0 | 0 | | 14 | 0 | 0 | |
| 45 | 31 | 0 | | 26 | 0 | 0 | | 26 | 0 | 0 | |
| 46 | 26 | 0 | | 19 | 0 | 0 | | 19 | 0 | 0 | |
| 47 | 28 | 0 | | 14 | 0 | 0 | | 13 | 0 | 0 | |
| 48 | 26 | 0 | | 28 | 0 | 0 | | 29 | 0 | 0 | |
| 49 | 34 | 0 | | 18 | 0 | 0 | | 18 | 0 | 0 | |
| 50 | 26 | 0 | | 22 | 0 | 0 | | 23 | 0 | 0 | |
| 51 | 30 | 0 | | 20 | 0 | 0 | | 20 | 0 | 0 | |
| 52 | 30 | 0 | | 13 | 0 | 0 | | 13 | 0 | 0 | |
| 53 | 33 | 0 | | 22 | 0 | 0 | | 23 | 0 | 0 | |
| 54 | 26 | 0 | | 19 | 0 | 0 | | 19 | 0 | 0 | |
| 55 | 35 | 0 | | 18 | 0 | 0 | | 20 | 0 | 0 | |
| 56 | 33 | 0 | | 24 | 0 | 0 | | 24 | 0 | 0 | |
| 57 | 30 | 0 | | 28 | 0 | 0 | | 29 | 0 | 0 | |
| 58 | 23 | 0 | | 24 | 0 | 0 | | 23 | 0 | 0 | |
| 59 | 32 | 0 | | 22 | 0 | 0 | | 22 | 0 | 0 | |
| 60 | 22 | 0 | | 26 | 0 | 0 | | 27 | 0 | 0 | |
| 61 | 36 | 1 | e | 38 | 2 | 1 | e | 37 | 1 | 0 | e |
| 62 | 27 | 0 | | 29 | 0 | 0 | | 29 | 0 | 0 | |
| 63 | 21 | 0 | | 33 | 0 | 0 | | 32 | 0 | 0 | |
| 64 | - | - | - | 29 | 0 | - | | 30 | 0 | - | |
| 65 | 23 | 0 | | 21 | 0 | 0 | | 21 | 0 | 0 | |
| 66 | 35 | 0 | | 27 | 0 | 0 | | 27 | 0 | 0 | |
| 67 | 31 | 0 | | 17 | 0 | 0 | | 17 | 0 | 0 | |
| 68 | 30 | 0 | | 28 | 0 | 0 | | 29 | 0 | 0 | |
| 69 | - | - | - | 19 | 0 | - | | 20 | 0 | - | |
| 70 | 32 | 0 | | 23 | 0 | 0 | | 23 | 0 | 0 | |
| 71 | 33 | 0 | | 29 | 0 | 0 | | 29 | 0 | 0 | |
| 72 | 40 | 8 | e | 24 | 0 | -8 | | 24 | 0 | -8 | |
| 73 | 27 | 0 | | 35 | 0 | 0 | | 34 | 0 | 0 | |
| 74 | 23 | 0 | | 25 | 0 | 0 | | 26 | 0 | 0 | |
| 75 | 18 | 0 | | 25 | 0 | 0 | | 24 | 0 | 0 | |
| 76 | 41 | 13 | e | 36 | 1 | -12 | e | 36 | 1 | -12 | e |
| 77 | 38 | 7 | e | 31 | 0 | -7 | | 31 | 0 | -7 | |
| 78 | 25 | 0 | | 30 | 0 | 0 | | 29 | 0 | 0 | |
| 79 | 15 | 0 | | 29 | 0 | 0 | | 30 | 0 | 0 | |
| 80 | - | - | - | 25 | 0 | - | | 25 | 0 | - | |
| 81 | 20 | 0 | | 34 | 0 | 0 | | 34 | 0 | 0 | |
| 82 | 26 | 0 | | 17 | 0 | 0 | | 17 | 0 | 0 | |
| 83 | 28 | 0 | | 39 | 4 | 4 | e | 39 | 5 | 5 | e |
| 84 | 34 | 0 | | 21 | 0 | 0 | | 21 | 0 | 0 | |

Table 2.1: Wind Hazard Results - Grade Level

| Location | Existing | | | Existing + Project | | | | Project + Cumulative | | | |
|----------|------------------------------------|---|---------|------------------------------------|---|-----------------------------------|---------|------------------------------------|---|-----------------------------------|---------|
| | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Exceeds | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Hours Change Relative to Existing | Exceeds |
| 85 | 27 | 0 | | 25 | 0 | 0 | | 25 | 0 | 0 | |
| 86 | 26 | 0 | | 34 | 0 | 0 | | 33 | 0 | 0 | |
| 87 | 27 | 0 | | 28 | 0 | 0 | | 28 | 0 | 0 | |
| 88 | 32 | 0 | | 30 | 0 | 0 | | 29 | 0 | 0 | |
| 89 | 21 | 0 | | 23 | 0 | 0 | | 23 | 0 | 0 | |
| 90 | 27 | 0 | | 27 | 0 | 0 | | 25 | 0 | 0 | |
| 91 | 26 | 0 | | 33 | 0 | 0 | | 23 | 0 | 0 | |
| 92 | 21 | 0 | | 15 | 0 | 0 | | 23 | 0 | 0 | |
| 93 | 29 | 0 | | 33 | 0 | 0 | | 27 | 0 | 0 | |
| 94 | 24 | 0 | | 30 | 0 | 0 | | 22 | 0 | 0 | |
| 95 | 27 | 0 | | 32 | 0 | 0 | | 21 | 0 | 0 | |
| 96 | 22 | 0 | | 28 | 0 | 0 | | 21 | 0 | 0 | |
| 97 | 22 | 0 | | 23 | 0 | 0 | | 20 | 0 | 0 | |
| 98 | 33 | 0 | | 25 | 0 | 0 | | 25 | 0 | 0 | |
| 99 | 32 | 0 | | 20 | 0 | 0 | | 19 | 0 | 0 | |
| 100 | 22 | 0 | | 20 | 0 | 0 | | 17 | 0 | 0 | |
| 101 | 25 | 0 | | 26 | 0 | 0 | | 24 | 0 | 0 | |
| 102 | 34 | 0 | | 28 | 0 | 0 | | 23 | 0 | 0 | |
| 103 | 35 | 0 | | 32 | 0 | 0 | | 30 | 0 | 0 | |
| 104 | 32 | 0 | | 30 | 0 | 0 | | 30 | 0 | 0 | |
| 105 | 31 | 0 | | 31 | 0 | 0 | | 31 | 0 | 0 | |
| 106 | 29 | 0 | | 30 | 0 | 0 | | 30 | 0 | 0 | |
| 107 | 30 | 0 | | 29 | 0 | 0 | | 30 | 0 | 0 | |
| 108 | 27 | 0 | | 25 | 0 | 0 | | 26 | 0 | 0 | |
| 109 | 29 | 0 | | 26 | 0 | 0 | | 25 | 0 | 0 | |
| 110 | 32 | 0 | | 35 | 0 | 0 | | 35 | 0 | 0 | |
| 111 | 23 | 0 | | 29 | 0 | 0 | | 29 | 0 | 0 | |
| 112 | 31 | 0 | | 31 | 0 | 0 | | 30 | 0 | 0 | |
| 113 | 31 | 0 | | 31 | 0 | 0 | | 31 | 0 | 0 | |
| 114 | 29 | 0 | | 29 | 0 | 0 | | 28 | 0 | 0 | |
| 115 | 26 | 0 | | 25 | 0 | 0 | | 24 | 0 | 0 | |
| 116 | 27 | 0 | | 9 | 0 | 0 | | 8 | 0 | 0 | |
| 117 | 32 | 0 | | 19 | 0 | 0 | | 19 | 0 | 0 | |
| 118 | 30 | 0 | | 21 | 0 | 0 | | 22 | 0 | 0 | |
| 119 | 36 | 1 | e | 25 | 0 | -1 | | 26 | 0 | -1 | |
| 120 | 30 | 0 | | 29 | 0 | 0 | | 28 | 0 | 0 | |
| 121 | 21 | 0 | | 20 | 0 | 0 | | 23 | 0 | 0 | |
| 122 | 30 | 0 | | 26 | 0 | 0 | | 25 | 0 | 0 | |
| 123 | 26 | 0 | | 21 | 0 | 0 | | 21 | 0 | 0 | |
| 124 | 27 | 0 | | 25 | 0 | 0 | | 26 | 0 | 0 | |
| 125 | 25 | 0 | | 20 | 0 | 0 | | 20 | 0 | 0 | |
| 126 | 35 | 0 | | 23 | 0 | 0 | | 24 | 0 | 0 | |

Table 2.1: Wind Hazard Results - Grade Level

| Location | Existing | | | Existing + Project | | | | Project + Cumulative | | | |
|----------|------------------------------------|---|---------|------------------------------------|---|-----------------------------------|---------|------------------------------------|---|-----------------------------------|---------|
| | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Exceeds | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Hours Change Relative to Existing | Exceeds |
| 127 | 31 | 0 | | 21 | 0 | 0 | | 22 | 0 | 0 | |
| 128 | 29 | 0 | | 17 | 0 | 0 | | 18 | 0 | 0 | |
| 129 | 32 | 0 | | 15 | 0 | 0 | | 14 | 0 | 0 | |
| 130 | 33 | 0 | | 16 | 0 | 0 | | 15 | 0 | 0 | |
| 131 | 30 | 0 | | 17 | 0 | 0 | | 16 | 0 | 0 | |
| 132 | 24 | 0 | | 22 | 0 | 0 | | 23 | 0 | 0 | |
| 133 | 24 | 0 | | 22 | 0 | 0 | | 28 | 0 | 0 | |
| 134 | 24 | 0 | | 25 | 0 | 0 | | 21 | 0 | 0 | |
| 135 | 16 | 0 | | 12 | 0 | 0 | | 26 | 0 | 0 | |
| 136 | 15 | 0 | | 13 | 0 | 0 | | 19 | 0 | 0 | |
| 137 | 39 | 3 | e | 28 | 0 | -3 | | 23 | 0 | -3 | |
| 138 | 12 | 0 | | 10 | 0 | 0 | | 22 | 0 | 0 | |
| 139 | 29 | 0 | | 28 | 0 | 0 | | 14 | 0 | 0 | |
| 140 | 31 | 0 | | 36 | 1 | 1 | e | 26 | 0 | 0 | |
| 141 | 32 | 0 | | 32 | 0 | 0 | | 18 | 0 | 0 | |
| 142 | 29 | 0 | | 31 | 0 | 0 | | 18 | 0 | 0 | |
| 143 | 27 | 0 | | 26 | 0 | 0 | | 19 | 0 | 0 | |
| 144 | 24 | 0 | | 28 | 0 | 0 | | 29 | 0 | 0 | |
| 145 | 21 | 0 | | 21 | 0 | 0 | | 23 | 0 | 0 | |
| 146 | 11 | 0 | | 16 | 0 | 0 | | 21 | 0 | 0 | |
| 147 | 25 | 0 | | 26 | 0 | 0 | | 20 | 0 | 0 | |
| 148 | 33 | 0 | | 31 | 0 | 0 | | 31 | 0 | 0 | |
| 149 | 32 | 0 | | 31 | 0 | 0 | | 29 | 0 | 0 | |
| 150 | 37 | 2 | e | 28 | 0 | -2 | | 28 | 0 | -2 | |
| 151 | 20 | 0 | | 20 | 0 | 0 | | 17 | 0 | 0 | |
| 152 | 19 | 0 | | 25 | 0 | 0 | | 24 | 0 | 0 | |
| 153 | 25 | 0 | | 22 | 0 | 0 | | 22 | 0 | 0 | |
| 154 | 31 | 0 | | 32 | 0 | 0 | | 31 | 0 | 0 | |
| 155 | 28 | 0 | | 27 | 0 | 0 | | 27 | 0 | 0 | |
| 156 | 32 | 0 | | 34 | 0 | 0 | | 34 | 0 | 0 | |
| 157 | 21 | 0 | | 25 | 0 | 0 | | 24 | 0 | 0 | |
| 158 | 28 | 0 | | 29 | 0 | 0 | | 29 | 0 | 0 | |
| 159 | 27 | 0 | | 26 | 0 | 0 | | 25 | 0 | 0 | |
| 160 | 34 | 0 | | 30 | 0 | 0 | | 30 | 0 | 0 | |
| 161 | 33 | 0 | | 34 | 0 | 0 | | 33 | 0 | 0 | |
| 162 | 25 | 0 | | 34 | 0 | 0 | | 33 | 0 | 0 | |
| 163 | 36 | 1 | e | 20 | 0 | -1 | | 20 | 0 | -1 | |
| 164 | 32 | 0 | | 18 | 0 | 0 | | 18 | 0 | 0 | |
| 165 | 25 | 0 | | 17 | 0 | 0 | | 17 | 0 | 0 | |
| 166 | 22 | 0 | | 19 | 0 | 0 | | 20 | 0 | 0 | |
| 167 | - | - | - | 17 | 0 | - | | 17 | 0 | - | |
| 168 | - | - | - | 20 | 0 | - | | 21 | 0 | - | |

Table 2.1: Wind Hazard Results - Grade Level

| Location | Existing | | | Existing + Project | | | | Project + Cumulative | | | |
|----------|------------------------------------|---|--------------------|------------------------------------|---|-----------------------------------|-------------------|------------------------------------|---|-----------------------------------|-------------------|
| | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Exceeds | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Hours Change Relative to Existing | Exceeds |
| 175 | 19 | 0 | | 23 | 0 | 0 | | 37 | 1 | 1 | e |
| 176 | 35 | 0 | | 29 | 0 | 0 | | 25 | 0 | 0 | |
| 177 | 28 | 0 | | 30 | 0 | 0 | | 31 | 0 | 0 | |
| 178 | 24 | 0 | | 24 | 0 | 0 | | 25 | 0 | 0 | |
| 179 | 29 | 0 | | 24 | 0 | 0 | | 23 | 0 | 0 | |
| 180 | 25 | 0 | | 27 | 0 | 0 | | 27 | 0 | 0 | |
| 181 | 30 | 0 | | 29 | 0 | 0 | | 30 | 0 | 0 | |
| 182 | 28 | 0 | | 29 | 0 | 0 | | 28 | 0 | 0 | |
| 183 | 31 | 0 | | 29 | 0 | 0 | | 29 | 0 | 0 | |
| 184 | 31 | 0 | | 35 | 0 | 0 | | 36 | 2 | 2 | e |
| 185 | 33 | 0 | | 23 | 0 | 0 | | 23 | 0 | 0 | |
| 186 | 27 | 0 | | 21 | 0 | 0 | | 21 | 0 | 0 | |
| 187 | 38 | 3 | e | 26 | 0 | -3 | | 26 | 0 | -3 | |
| 188 | 34 | 0 | | 26 | 0 | 0 | | 27 | 0 | 0 | |
| 189 | 26 | 0 | | 31 | 0 | 0 | | 34 | 0 | 0 | |
| 190 | 34 | 0 | | 26 | 0 | 0 | | 27 | 0 | 0 | |
| 191 | 31 | 0 | | 27 | 0 | 0 | | 23 | 0 | 0 | |
| 192 | 19 | 0 | | 20 | 0 | 0 | | 21 | 0 | 0 | |
| 193 | 17 | 0 | | 16 | 0 | 0 | | 16 | 0 | 0 | |
| 194 | 29 | 0 | | 28 | 0 | 0 | | 28 | 0 | 0 | |
| 195 | 31 | 0 | | 30 | 0 | 0 | | 30 | 0 | 0 | |
| SUMMARY | Average (mph) | Total Hours | Total | Average (mph) | Total Hours | Hours Change | Total | Average (mph) | Total Hours | Hours Change | Total |
| | 28 | 41 | 10 ----- 184 | 25 | 28 | -13 | 6 ----- 189 | 24 | 22 | -19 | 6 ----- 189 |



Table 2.2: Wind Hazard Results - Above Grade Level

| Location | Existing | | | Existing + Project | | | | Project + Cumulative | | | |
|----------|------------------------------------|---|---------|------------------------------------|---|-----------------------------------|-----------------|------------------------------------|---|-----------------------------------|-----------------|
| | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Exceeds | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Hours Change Relative to Existing | Exceeds | Wind Speed Exceeded 1hr/year (mph) | Hours per Year Wind Speed Exceeds Hazard Criteria | Hours Change Relative to Existing | Exceeds |
| 171 | - | - | - | 24 | 0 | - | | 24 | 0 | - | |
| 172 | - | - | - | 30 | 0 | - | | 30 | 0 | - | |
| 173 | - | - | - | 25 | 0 | - | | 25 | 0 | - | |
| 174 | - | - | - | 19 | 0 | - | | 18 | 0 | - | |
| SUMMARY | Average (mph) | Total Hours | Total | Average (mph) | Total Hours | Hours Change | Total | Average (mph) | Total Hours | Hours Change | Total |
| | - | - | - | 25 | 0 | - | 0 ----- 4 | 24 | 0 | - | 0 ----- 4 |

The graphic for Appendix A features a large, light beige circle on the right side of the page. To its left is a solid blue triangle. A thin white curved line separates the blue triangle from the beige circle. The text 'APPENDIX A' is centered in the white space between the triangle and the circle.

APPENDIX A

APPENDIX A: DRAWING LIST FOR MODEL CONSTRUCTION

The drawings and information listed below were received from Perkins + Will and were used to construct the scale model of the proposed Potrero Power Plant Project in San Francisco, CA. Should there be any design changes that deviate from this list of drawings, the results may change. Therefore, if changes in the design are made, it is recommended that RWDI be contacted and requested to review their potential effects on wind conditions.

| File Name | File Type | Date Received (dd/mm/yyyy) |
|---|------------|----------------------------|
| 180901_PPS_Massing.dwg | AutoCAD | 01/09/2017 |
| 171004_Potrero Model for Wind.dwg | AutoCAD | 04/10/2017 |
| 171013_Potrero Massing for Wind_Updated.3dm | Rhinoceros | 13/10/2017 |
| 171013_Potrero Massing for Wind.3dm | Rhinoceros | 13/10/2017 |
| 171120_WIND.3dm | Rhinoceros | 28/11/2017 |
| 171218_WIND.3dm | Rhinoceros | 19/12/2017 |