285 12TH STREET

AFFORDABLE FAMILY HOUSING

MINOR DESIGN REVISION, CASE FILE NO. PLN16-133

DEFERRED SUBMITTALS. BUILDING/PUBLIC INFRASTRUCTURE PERMIT SET WILL INCLUDE:
- Sidewalk and streetscape design details
- Exterior lighting and signage plans
- Public Art Plan
- Bicycle storage equipment details and dimensions

PROJECT CONTACTS

OWNER:
EBALDC
1825 San Pablo Ave., Suite 200
Oakland, CA 94612
www.ebaldc.org

Project Manager: Capri Roth
(510) 606-1799
croth@ebaldc.org

ARCHITECT:
David Baker Architects
461 2nd Street, Loft C-127
San Francisco, CA 94107
www.dbarchitect.com

Principal in Charge: Daniel Simons
(415) 799-4585
danielsimons@dbarchitect.com

PROJECT SITE

ADDRESS: 285 12th Street, Oakland, CA 94607

LOT APN: 002 006900301

CURRENT USE: Staging area for new construction project across the street

LOT AREA: 15,000 SF

SHEET INDEX

VICINITY MAP

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East Bay Asian Local Development Corporation

TITLE SHEET
285 12th Street

project number	21808
scale	when printed on 22x34
date	8/29/2018

PROJECT DESCRIPTION

The project is located between 11th, 12th, Harrison and Alice Streets, in Oakland's Chinatown and within the Lake Merritt Station Area Plan. The site was entitled for a similar 8-story residential project. A comparison of the two projects is below. This proposal is a seven-story building housing 65 afforable family apartments. It is five levels of Type III construction over a two-level Type-I podium. The podium includes some residentail units on level 2, as well as, a ground floor garage, open space, retail, and common program areas. This proposal shows the residential entrance on Harrison Street.

ZONING COMPLIANCE

GENERAL PLAN LAKE MERRIT STATION AREA
ZONING D-LM-4, Mixed Commercial [17.101G]

PROPERTY DEVELOPMENT STANDARDS [17.101G.050]
Maximum Front and Street Side Setback for the First Story = 10'
Minimum Height of the Ground Floor = 15'
Minimum Width of Storefronts = 15'
Minimum Depth of Storefront Bay = 50'

HEIGHT, DENSITY, BULK, AND TOWER REGULATIONS [17.101G.050
Maximum Building Base Height = 45', 85' upon granting of CUP
Maximum Tower Height = 175'
Minimum Building Height = 35'
Maximum Density (SF of Lot Area Required per Unit) = 110 SF / DU

REQUIRED AMOUNTS OF USABLE OPEN SPACE [17.101G.060]
Affordable Housing Unit = 60 SF / DU

OFF-STREET PARKING REQUIREMENT [17.116.060]
Required parking ratio of 0.25 vehicle spaces per dwelling unit
Reduction of the total number of required spaces, up to 5%, is allowed provided that six additional bicycle parking spaces are provided for every vehicle parking space

OFF-STREET LOADING REQUIREMENT [17.116.120]
Less than 50,000 SF of Residential Activity = No Berth Required
50,000 SF or more of Residential Activity = 1 Berth

BICYCLE PARKING REQUIREMENT [17.117.090]
Long-term Bicycle Parking Requirement = 1 space for each 4 Dwelling Units
Short-term Bicycle Parking Requirement = 1 space for each 20 Dwelling Units

PROJECT COMPARISON

ITEM	PREVIOUSLY ENTITLED BUILDING Martin Group/ VTBS Architects		PROPOSED BUILDING	
Height - Roof	89'		83'	
Height - Top of Mechanical	94'		93'	
Building Footprint	15,000 SF		14,020 SF	
Lot Coverage	100 %		95 %	
Total Open Space	approximately 11,000 SF		4,255 SF	
Total Project Area*	68,975 SF		69,288 SF	
Commercial Area	1,650 SF		3,436 SF	
Residential Area	56,550 SF		49,049 SF	
Common + Circulation	10,750 SF		16,803 SF	
Total Unit Count	77 units		65 units	
Studios	24 units	31%	15 units	23%
1 BR	30 units	39%	16 units	25%
2 BR	23 units	30%	17 units	26%
3 BR	0 units	0%	17 units	26%
Parking Provided	44 stalls		15 stalls	

*Total Area does not include Parking and Service

PROJECT DATA

GROSS FLOOR AREA

VerticalCirculation	5,236 SF
Parking	5,312 SF
Residential	49,049 SF
Circulation	8,460 SF
Service	2,882 SF
Common	3,107 SF
Retail	3,436 SF
	77,482 SF

DWELLING UNIT MIX

	Unit Qty.	Typ. Area	%
3 BR	17	1,064 SF	26%
2 BR	17	840 SF	26%
1 BR	16	616 SF	25%
Studio	15	364 SF	23%

Total: 65 Units

VEHICLE PARKING

	Count
Accessible Stalls	2
Standard Stalls	3
Intermediate Stalls	8
Compact Stalls	2

Total: 15 Stalls*

Parking Ratio: 0.23 Stalls per 1 Unit
(15 Stalls / 65 Units)

* This is a reduction of 1 space from the required 0.25 parking ratio (5% of 16 required stalls), based on an increase in bicycle parking, per section 17.117.090.

BICYCLE PARKING

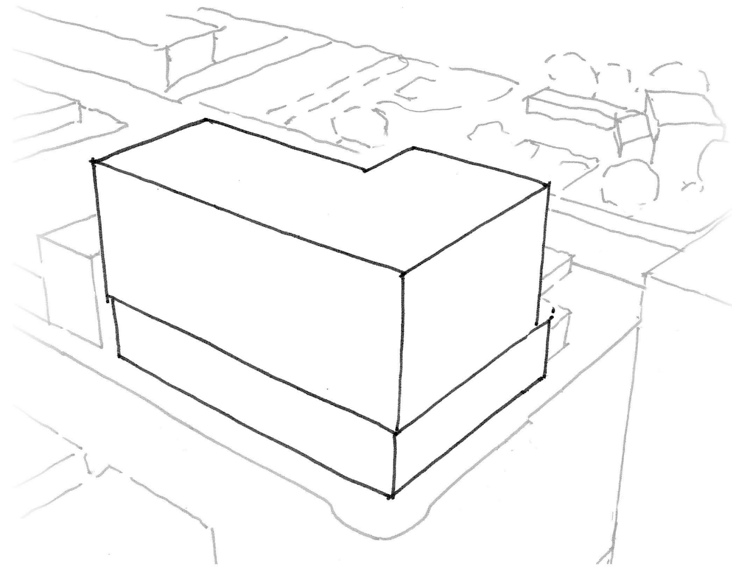
	Count
CLASS I (Bike room)	64
CLASS II (Street rack)	6

Total: 70 Spaces

USABLE OPEN SPACE

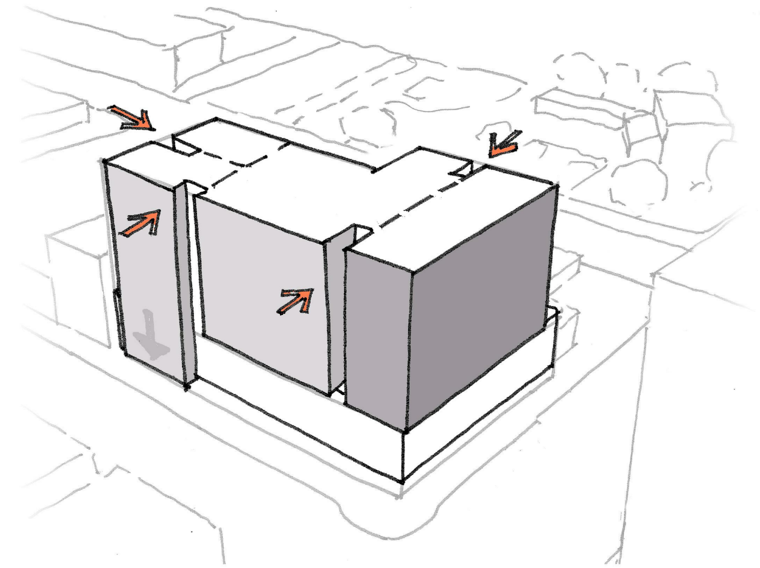
Light Court	776 SF
Common Room	1,211 SF
Courtyard	2,268 SF
	4,255 SF

4,255 SF / 65 Dwelling Units = 65.5 SF / DU



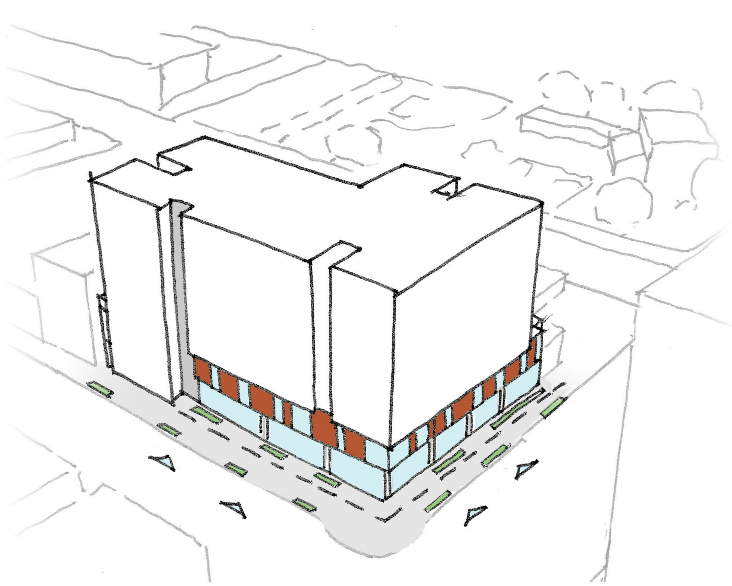
1 Base Building

FIve stories of wood-frame construction over a two-story concrete podium



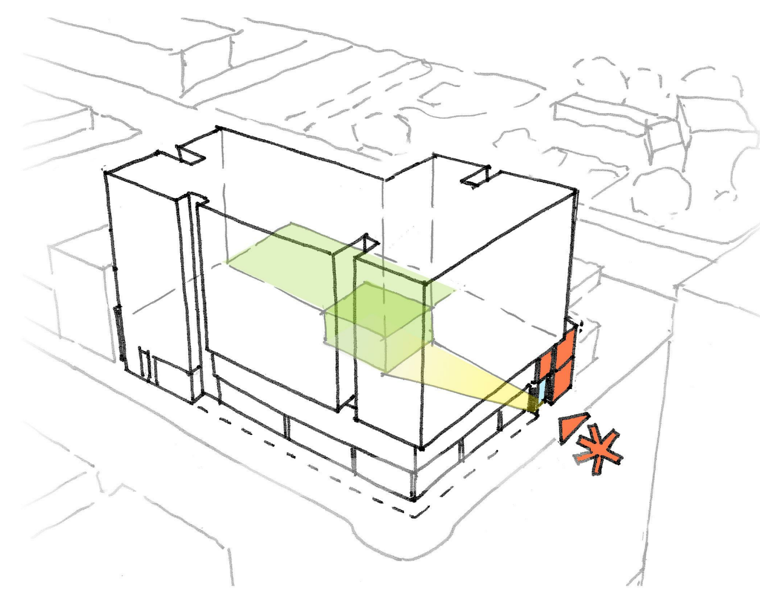
2 Three Volumes

Deep recesses at the stairs and corridor ends breaks up the mass into separate blocks



3 Tiered Step Back at Podium

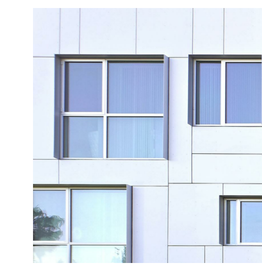
The ground level is set back five feet from the property line at the retail space, creating an active edge with generous space for landscape and outdoor seating areas.



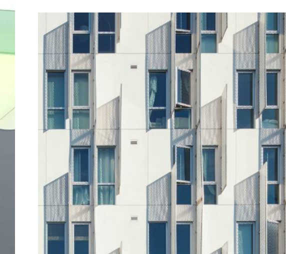
4 Welcoming Entry

A two-story bay and recessed door highlights the residential entry. Warm materials differentiate the commercial from residential program. The entry offers visual connection to green space in the heart of the building.

12TH STREET VOLUME
Mosaic fiber cement panel with varied windows



HARRISON STREET VOLUME:
Vertical fiber cement panel cladding with staggered windows and sunshades



PODIUM VOLUME
Aluminum storefront, concrete pillars, and wood siding

4 Facade Composition

Alignment of large windows and vertical sunshades are used to further break up the volumes and provide texture to the facades.

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DESIGN NARRATIVE
285 12th Street

project number 21808
scale
when printed on 22x34
date 8/29/2018

A - site from northwest

B - site from northeast

(1) Key Plan
1" = 80'-0"

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SITE PHOTOS
285 12th Street

project number	21808
scale	1" = 80'-0" when printed on 22x34
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G.20

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RENDERING
285 12th Street

project number	21808
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G.30

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RENDERING
285 12th Street

project number 21808
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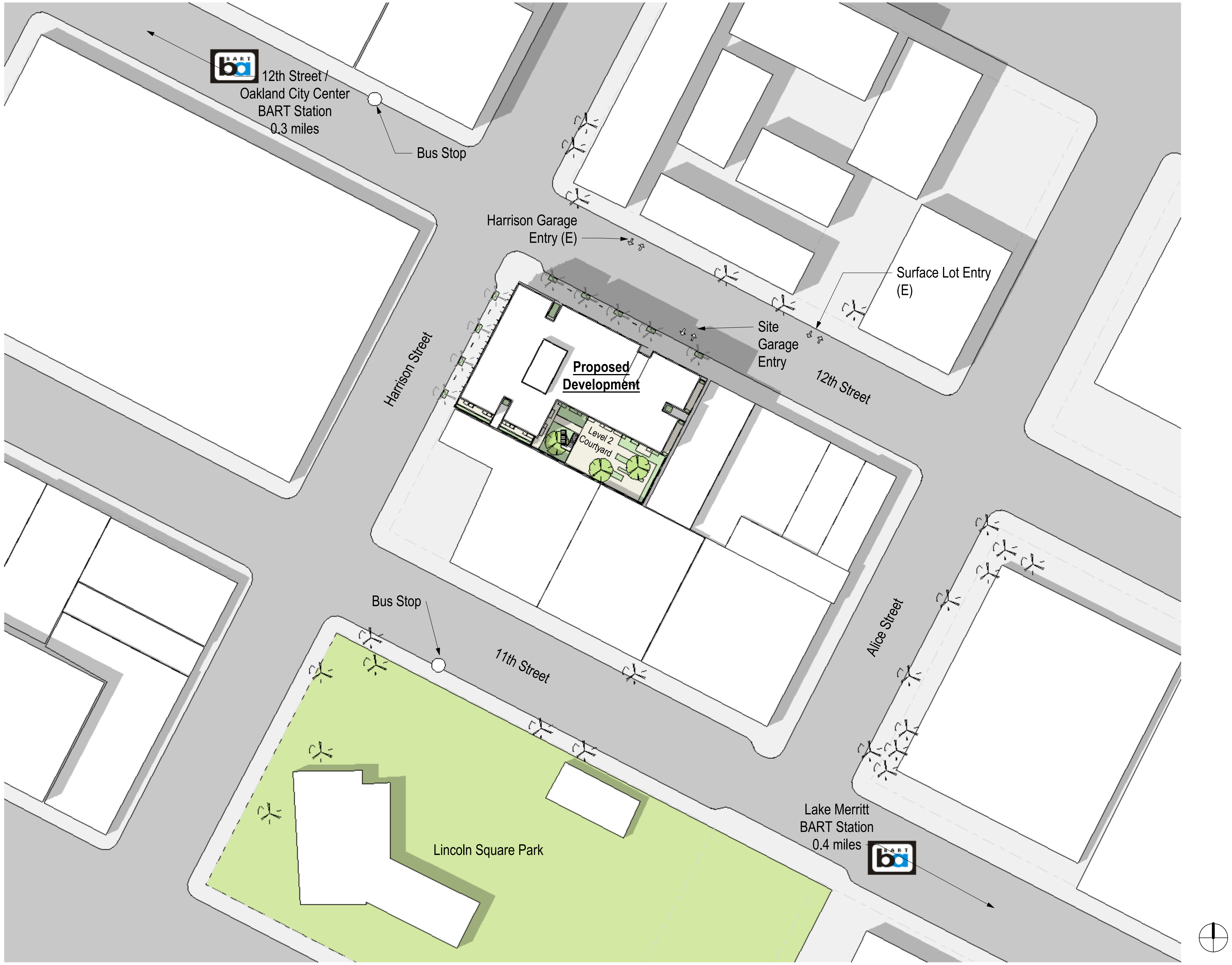
G.31



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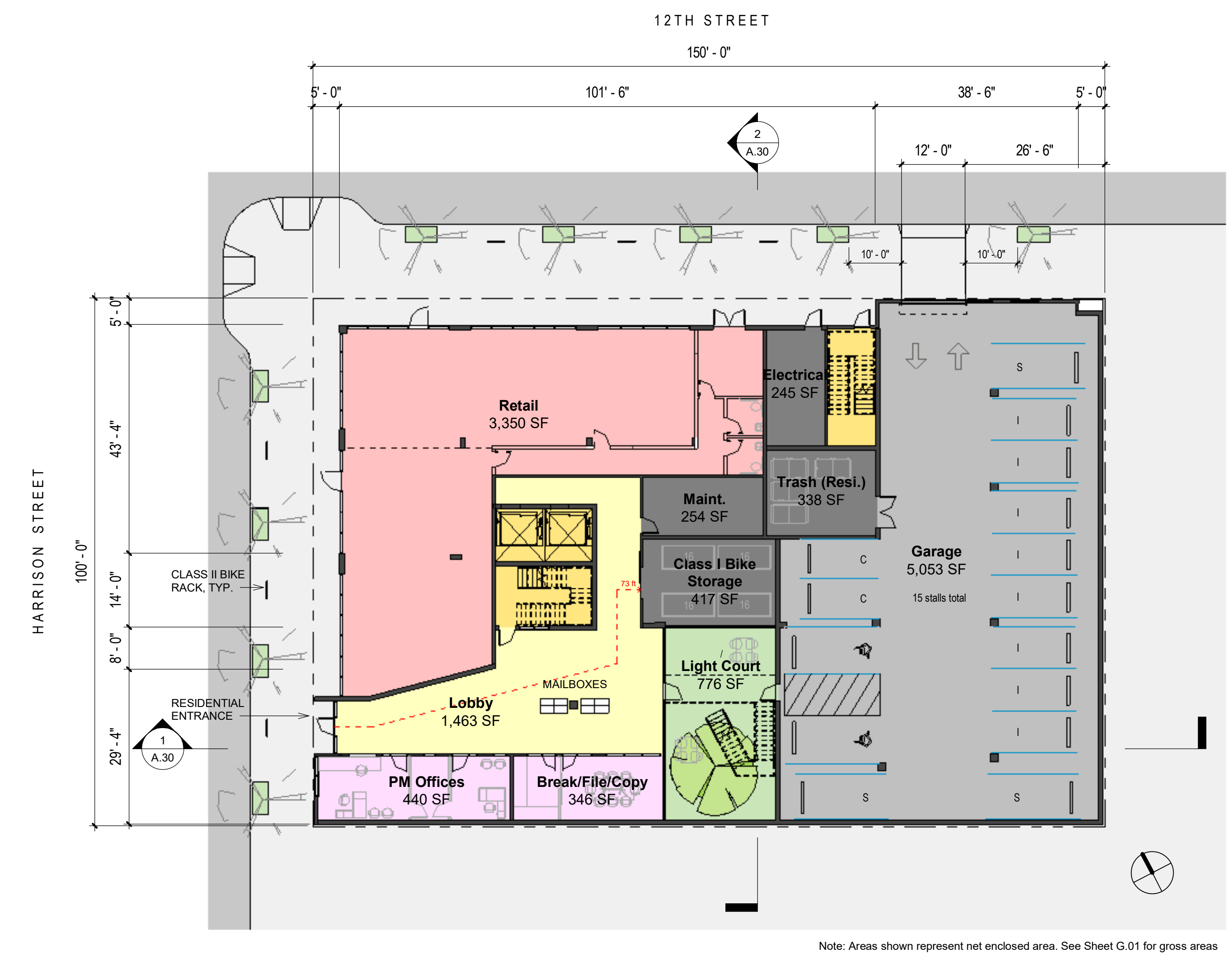
SITE PLAN
285 12th Street

project number 21808
scale 1" = 40'-0" when printed on 22x34
date 8/29/2018

A.00

2 LEVEL 2 PLAN
1/16" = 1'-0"



1 GROUND FLOOR PLAN
1/16" = 1'-0"

- CIRCULATION
- COMMON
- GARAGE
- LOBBY
- OPEN SPACE
- RESIDENTIAL
- RETAIL
- SERVICE

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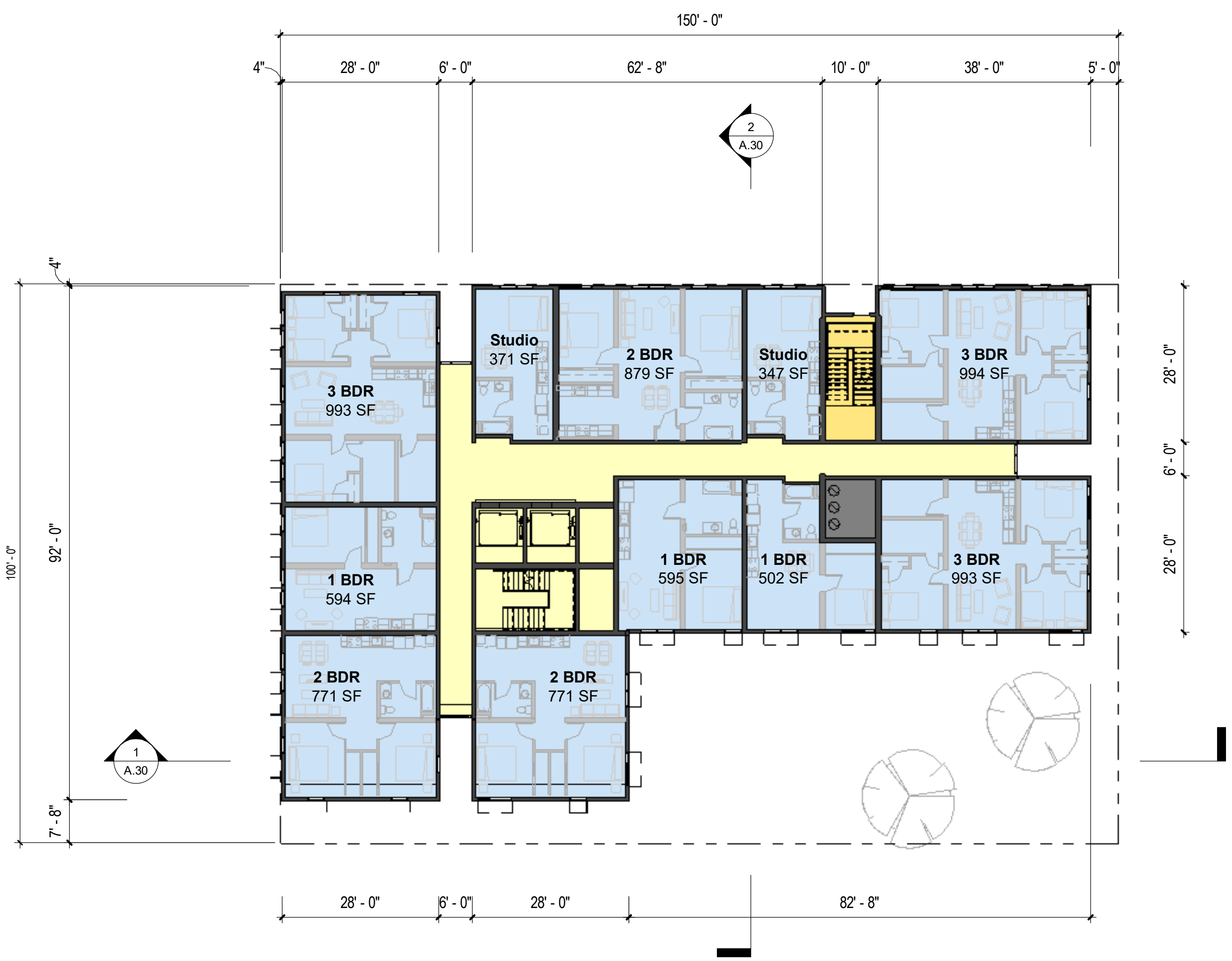
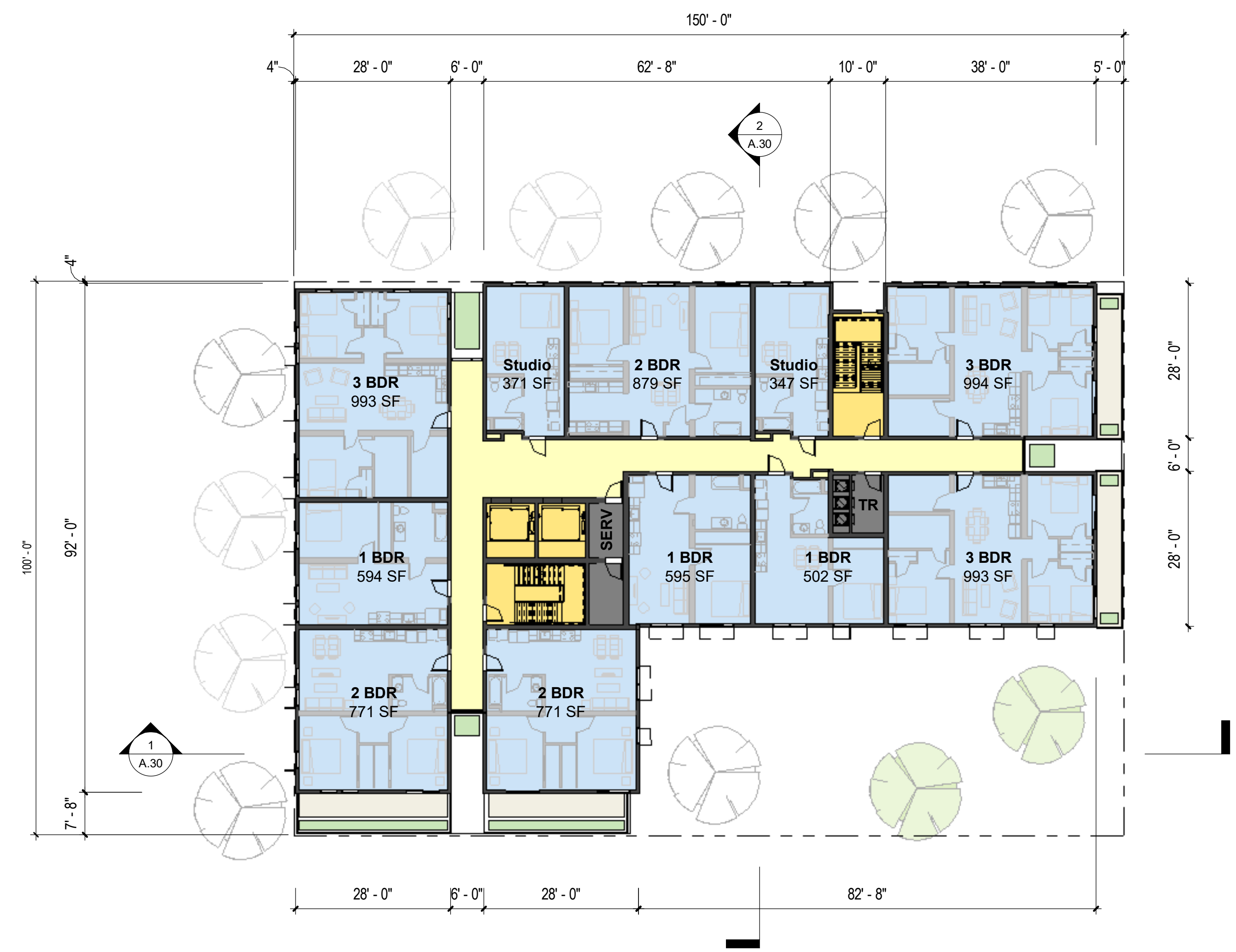
FLOOR PLANS
285 12th Street

project number 21808
scale 1/16" = 1'-0"
when printed on 22x34
date 8/29/2018

A.10



2 TYPICAL UPPER FLOOR PLAN
1/16" = 1'-0"



1 LEVEL 3 PLAN
1/16" = 1'-0"

- CIRCULATION
- COMMON
- GARAGE
- LOBBY
- OPEN SPACE
- RESIDENTIAL
- RETAIL
- SERVICE

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FLOOR PLANS
285 12th Street

project number	21808
scale	1/16" = 1'-0" when printed on 22x34
date	8/29/2018

A.11

2 SOUTHEAST ELEVATION
1/16" = 1'-0"

1 12TH STREET (NORTHEAST) ELEVATION
1/16" = 1'-0"

*17.108.030 - Allowed Projections Above Height Limits
The height restrictions prescribed in the applicable indivisual zone regulations may be exceeded in accordance with the following table.

Facilities Allowed Above the Prescribed Height	Max. Aggregate Coverage of the Building's Horizontal Area	Max. Vertical Projection Above the Prescribed Height	Min. Horizontal Distance from any Abutting Res. Zoned Lot
A. Chimneys, ventilators, plumbing vent stacks, water tanks, cooling towers, machinery rooms, and other equipment.	10%, minus any percentage covered pursuant to Subsection B of this Section	10', except upon the granting of a CUP	15', except upon the granting of a CUP; but no restriction if projection height does not exceed 4'
B. Elevator or stair towers	10%, minus any percentage covered pursuant to Subsection A of this Section	12', except upon the granting of a CUP	10', except upon the granting of a CUP; but no restriction if projection height does not exceed 4'

MATERIALS LEGEND (SEE SHEET A.40):

1. FIBER CEMENT PANEL
2. WOOD SIDING
3. VERTICAL BOARD-FORMED CONCRETE
4. GLASS AND ALUMINUM STOREFRONT
5. ALUMINUM CASEMENT WINDOW, PTD WHITE
6. PERFORATED ALUMINUM SUNSHADE
7. BAR GRATING
8. PAINTED STEEL GUARDRAIL/RAILING

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BUILDING ELEVATIONS
285 12th Street

project number 21808
scale 1/16" = 1'-0" when printed on 22x34
date 8/29/2018

A.20

1 SOUTHWEST ELEVATION
1/16" = 1'-0"

2 HARRISON STREET (NORTHWEST) ELEVATION
1/16" = 1'-0"

MATERIALS LEGEND (SEE SHEET A.40):

1. FIBER CEMENT PANEL
2. WOOD SIDING
3. VERTICAL BOARD-FORMED CONCRETE
4. GLASS AND ALUMINUM STOREFRONT
5. ALUMINUM CASEMENT WINDOW, PTD WHITE
6. PERFORATED ALUMINUM SUNSHADE
7. BAR GRATING
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BUILDING ELEVATIONS
285 12th Street

project number 21808
scale 1/16" = 1'-0" when printed on 22x34
date 8/29/2018

A.21

1 EAST-WEST SECTION
1/16" = 1'-0"

2 NORTH-SOUTH SECTION
1/16" = 1'-0"

- CIRCULATION
- COMMON
- GARAGE
- LOBBY
- OPEN SPACE
- RESIDENTIAL
- RETAIL
- SERVICE

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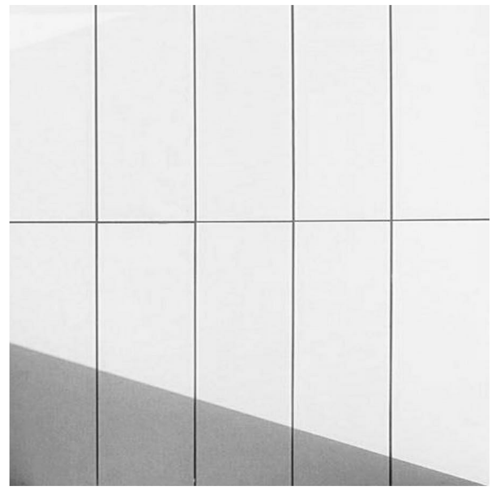
BUILDING SECTIONS
285 12th Street

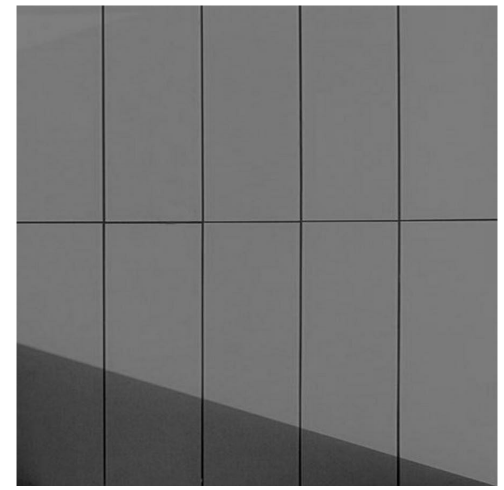
project number 21808
scale 1/16" = 1'-0"
when printed on 22x34
date 8/29/2018

A.30

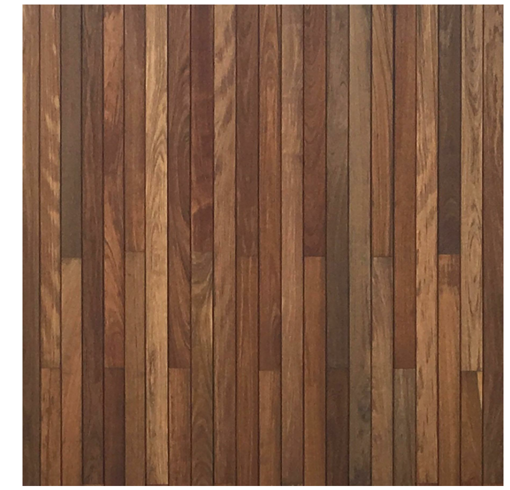
1a FIBER CEMENT PANEL, WHITE, IRREGULAR PATTERN



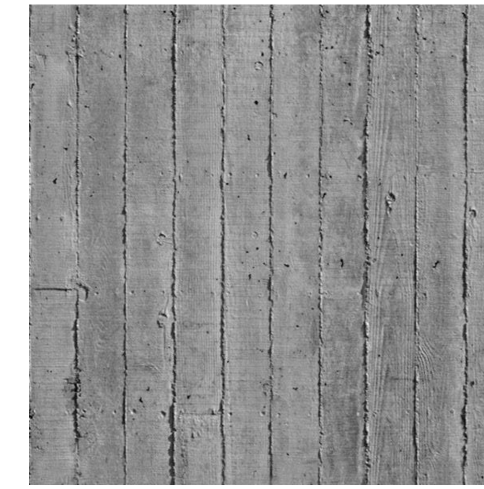
1b FIBER CEMENT PANEL, WHITE, REGULAR PATTERN



1c FIBER CEMENT PANEL, ACCENT COLOR, REGULAR PATTERN

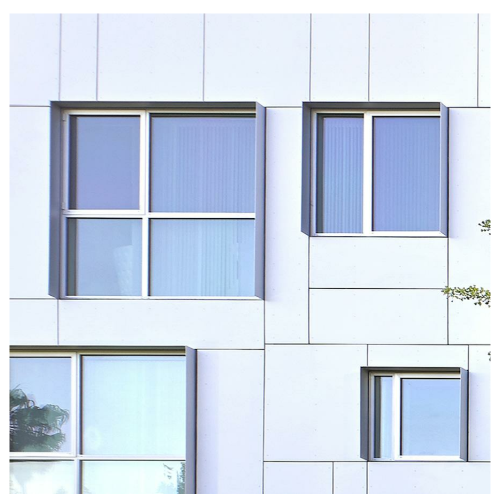


2 WOOD SIDING

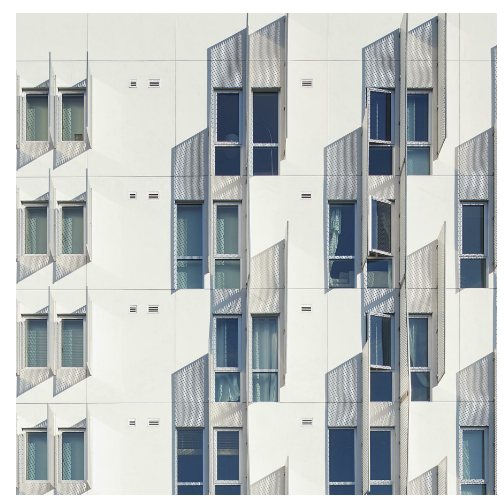


3 VERTICAL BOARD-FORMED CONCRETE

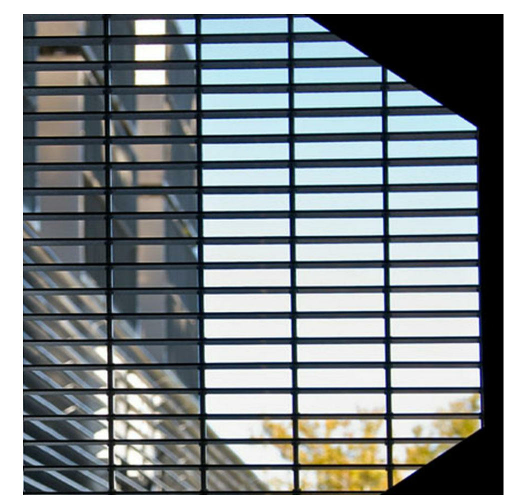
4 GLASS AND ALUMINUM STOREFRONT



5 ALUMINUM CASEMENT WINDOW, PTD WHITE



6 PERFORATED ALUMINUM SUNSHADE



7 BAR GRATING

8 VERTICAL STEEL PICKET GUARDRAIL

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EBALDC
East Bay Asian Local Development Corporation

MATERIALS/FINISHES
285 12th Street

3 November 2015

Mr. Walid Mando
Emerge Development, LLC
896 Folsom Street
San Francisco, California 94105

Subject: Preliminary Geotechnical Evaluation
285 and 301 12th Street
Oakland, California
Project No. 731664601

Dear Mr. Mando:

Langan Treadwell Rollo (Langan) is pleased to present this which provides our preliminary geotechnical evaluation for the proposed W12 Development at 285 and 301 12th Street in Oakland, California. Our services were performed in general accordance with our Geotechnical Engineering task outlined in our proposal dated 2 July 2015. As part of Langan's overall services for this project, we also performed a Phase II Environmental Site Assessment (ESA) for the site; the results of which will be submitted under a separate cover.

Our preliminary conclusions and recommendations may be used for preliminary design and pricing exercises. The intent of this letter is to inform you regarding the geotechnical conditions at the site for use during initial design and cost estimating. During final design, we should perform a geotechnical investigation which will allow us to evaluate the conditions across the site and develop final geotechnical and foundation conclusions and recommendations for the project.

The site totals approximately 75,000 square-feet (sf) and consists of two parcels: an approximately 60,000 sf parcel at 301 12th Street and an approximately 15,000 sf parcel at 285 12th Street. The 301 12th Street parcel encompasses the city block bounded by 12th Street to the north, Harrison Street to the east, 11th Street to the south, and Webster Street to the west, assuming project north is parallel to Webster Street. The 301 12th Street parcel is currently occupied by several 1- to 2-story commercial and warehouse buildings. The 285 12th Street parcel is on the northeast corner of the city block bound by 12th Street to the north, Alice Street to the east, 11th Street to the south, and Harrison Street to the west, is currently occupied by an asphalt paved basketball court. The approximate locations of the parcels are shown on Figures 1 and 2.

PROPOSED DEVELOPMENT

Based on our correspondence with you and a review of site concept plans by Forma we understand four primary building schemes are being contemplated. All four plans, labeled A through D, include construction of mixed-use residential buildings on both parcels. The buildings are each planned to occupy their entire site and will be constructed over one below-grade parking garage. The planned garages each have a finished floor elevation about 10 feet beneath existing site grades. Above the below-grade garage all four development plans include construction of an 8-story building on the larger 301 12th Street parcel. On the smaller 285 12th Street parcel is where the development options differ; Option A includes an 8-story building on this parcel, Option B includes a 15-story building on this parcel, Option C includes an 8-story building on this parcel (with slightly lower density than Option A), and Option D includes construction of an 18-story building on this parcel. We understand the buildings will likely be constructed with concrete.

SCOPE OF SERVICES

Our scope of services included using available geologic information and existing subsurface data available in our files from nearby projects to evaluate the likely subsurface conditions at the site. In addition, we made use of the environmental borings that were advanced as part of our Phase II ESA. However, our scope did not include performing any site-specific geotechnical borings/investigations at the site.

On the basis of the subsurface data available at and near the site, we developed preliminary geotechnical and foundation conclusions and recommendations regarding:

- soil and groundwater conditions at the site
- site seismicity and seismic hazards
- probable foundation type(s) for the proposed buildings
- preliminary design criteria for foundations, including appropriate depth and bearing pressures
- estimated settlement behavior for the proposed foundation types
- probable shoring and underpinning types
- 2013 California Building Code (CBC) seismic design criteria
- preliminary construction considerations.

Note that the closest geotechnical subsurface data available in our library is about one block away from the site.

PROBABLE SUBSURFACE CONDITIONS

We reviewed the results of previous geotechnical investigations performed in the vicinity of the project and the results of the environmental borings performed at the site. On the basis of this data we anticipate the site is likely blanketed by approximately one to four feet of undocumented fill. In addition, in the location of likely former underground storage tanks (USTs), undocumented fill likely extends to greater depths. The fill generally consists of sand, clayey sand, and silt with varying amounts of brick, concrete, and building debris.

The fill is likely underlain by medium dense sand which typically increases in density with depth, becoming dense at a depth of about 20 to 24 feet. The dense sand likely extends to a depth of about 35 feet below the existing ground surface (bgs). Beneath the dense sand, nearby projects encountered very stiff to hard clay with occasional dense silty sand layers to depths of up to 90 feet bgs.

During advancement of the environmental borings conducted as part of our Phase II ESA, groundwater was encountered between 24 and 26 feet bgs. However, these levels were recorded during a period of severe drought. Monitoring well measurements performed by others in the vicinity indicate groundwater has historically been encountered as shallow as about 18½ feet bgs. A depth of 18 feet may be considered as a design high groundwater level for use in design.

The site is not within a seismic hazard zone mapped by the State of California.

SITE SEISMICITY

The major active faults in the area are the Hayward, Mount Diablo Thrust, Calaveras, and San Andreas faults. These and other faults of the region are shown on Figure 3. For each of the active faults within about 50 kilometers of the site, the distance from the site and estimated mean characteristic Moment magnitude[1] [Working Group on California Earthquake Probabilities (WGCEP) (2008) and Cao et al. (2003)] are summarized in Table 1.

TABLE 1

Regional Faults and Seismicity

Fault Name	Approximate Distance from Fault (kilometers)	Direction from Site	Mean Characteristic Moment Magnitude, M_w
Total Hayward	5.7	East	7.00
Total Hayward-Rodgers Creek	6	East	7.33
Mount Diablo Thrust	22	East	6.70
Total Calaveras	23	East	7.03
N. San Andreas – Peninsula	23	West	7.23
N. San Andreas (1906 event)	23	West	8.05
Green Valley Connected	27	East	6.80
N. San Andreas - North Coast	27	West	7.51
San Gregorio Connected	30	West	7.50
Rodgers Creek	35	Northwest	7.07
Greenville Connected	39	East	7.00
West Napa	41	North	6.70
Monte Vista-Shannon	41	South	6.50

1 Moment magnitude is an energy-based scale and provides a physically meaningful measure of the size of a faulting event. Moment magnitude is directly related to average slip and fault rupture area.

Figure 4 also shows the earthquake epicenters for events with magnitude greater than 5.0 from January 1800 through August 2014. In 1868 an earthquake with an estimated maximum intensity of X on the MM scale occurred on the southern segment (between San Leandro and Fremont) of the Hayward Fault. The estimated M_w for the earthquake is 7.0. In 1861, an earthquake of unknown magnitude (probably an M_w of about 6.5) was reported on the Calaveras Fault. The most recent significant earthquake on this fault was the 1984 Morgan Hill earthquake (M_w = 6.2).

Since 1800, four major earthquakes have been recorded on the San Andreas Fault. In 1836 an earthquake with an estimated maximum intensity of VII on the Modified Mercalli (MM) scale (Figure 4) occurred east of Monterey Bay on the San Andreas Fault (Toppozada and Borchardt 1998). The estimated Moment magnitude, $M_{w,}$ for this earthquake is about 6.25. In 1838, an earthquake occurred with an estimated intensity of about VIII-IX (MM), corresponding to an M_w of about 7.5. The San Francisco Earthquake of 1906 caused the most significant damage in the history of the Bay Area in terms of loss of lives and property damage. This earthquake created a surface rupture along the San Andreas Fault from Shelter Cove to San Juan Bautista approximately 470 kilometers in length. It had a maximum intensity of XI (MM), an M_w of about 7.9, and was felt 560 kilometers away in Oregon, Nevada, and Los Angeles. The most recent earthquake on the San Andreas Fault was the Loma Prieta Earthquake of 17 October 1989, in the Santa Cruz Mountains with an M_w of 6.9, approximately 92 km from the site.

The most recent significant earthquake felt in the Bay Area occurred on 24 August 2014 and was located on the West Napa fault with a M_W of 6.0.

The WGCEP at the U.S. Geologic Survey (USGS) predicted a 63 percent chance of a magnitude 6.7 or greater earthquake occurring in the San Francisco Bay Area in 30 years. More specific estimates of the probabilities for different faults in the Bay Area are presented in Table 2.

TABLE 2

WGCEP (2008) Estimates of 30-Year Probability of a Magnitude 6.7 or Greater Earthquake

Fault	Probability (percent)
Hayward-Rodgers Creek	31
N. San Andreas	21
Calaveras	7
San Gregorio	6
Concord-Green Valley	3
Greenville	3
Mount Diablo Thrust	1

POSSIBLE SEISMIC HAZARDS

The site is in a seismically active area and will be subject to strong shaking during a major earthquake on a nearby fault. Strong shaking during an earthquake can result in ground failure such as that associated with soil liquefaction[2] and lateral spreading[3]. Each of these conditions has been evaluated based on available subsurface information from the site vicinity and engineering studies, and is discussed in the remainder of this section.

Liquefaction and Lateral Spreading

If a soil liquefies during an earthquake, it experiences a significant temporary loss of strength. Flow failure, lateral spreading, differential settlement, loss of bearing, ground fissures, and sand boils are evidence of excess pore pressure generation and liquefaction.

Based on our analysis of the subsurface information derived from nearby sites, we preliminarily conclude the sand encountered beneath the groundwater has sufficient relative density to resist liquefaction. Similarly, the very stiff to hard clays encountered at depth likely have sufficient cohesion to resist liquefaction. We therefore preliminarily conclude the potential for soil liquefaction and liquefaction-related ground failure occurring at the site is low.

Considering the likelihood of liquefaction to occur at the site is low, we conclude the potential for lateral spreading to occur at the site is nil.

Cyclic Densification

Cyclic densification (also referred to as seismic densification and differential compaction) can occur during strong ground shaking in loose, clean granular deposits above the water table, resulting in ground surface settlement. The near surface soils encountered at nearby sites were loose to medium dense and susceptible to cyclic densification. Accordingly, we conclude these layers may settle during a major earthquake, with associated ground surface settlements ranging from ½ to 1½ inches beneath the ground surface.

However, within the project sites the majority of these sands will likely be excavated during the installation of the planned basements. We conclude cyclic densification induced settlement beneath the planned basement levels could be on the order of ½ to ¾ inches.

Fault Rupture

Historically, ground surface fault rupture closely follows the trace of geologically young faults. The site is not within an Earthquake Fault Zone, as defined by the Alquist-Priolo Earthquake

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2 Liquefaction is a transformation of soil from a solid to a liquefied state during which saturated soil temporarily loses strength resulting from the buildup of excess pore water pressure, especially during earthquake-induced cyclic loading. Soil susceptible to liquefaction includes loose to medium dense sand and gravel, low-plasticity silt, and some low-plasticity clay deposits.

3 Lateral spreading is a phenomenon in which surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. Upon reaching mobilization, the surficial blocks are transported downslope or in the direction of a free face by earthquake and gravitational forces.

Fault Zoning Act and no known active or potentially active faults exist on the site. We therefore preliminarily conclude the risk of fault offset rupture at the site from a known active fault is low.

PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

On the basis of our preliminary geotechnical evaluation, we conclude that from a geotechnical standpoint, the site can be developed as planned. The primary geotechnical concerns are: 1) the support of the sides of the excavation, including adjacent buildings, during construction of the basements and 2) foundation support for the proposed buildings.

Foundations and Settlement

The primary factor influencing the selection of a safe, economical foundation system for the proposed structures is the anticipated building settlements under the anticipated building loads.

For an 8-story concrete building, we estimate the average bearing pressure would be on the order of 1,800 pounds per square foot (psf). Higher pressures will be imposed beneath columns and other concentrated loads. Similarly, for a 15- and 18- story towers, we would estimate average bearing pressures would be on the order of 3,400 and 4,000 psf respectively, however the concentrated loads beneath the tower foundations will likely be high when subjected to earthquake loading.

At the anticipated foundation depths, about 12½ to 15 feet bgs, we anticipate native medium dense sand will be exposed. The native medium sand should be capable of supporting moderate building loads (such as from an 8 story building) without excessive settlement. However, under higher building loads, such as those expected beneath a 15- or 18-story tower, the estimated static settlements would likely be excessive.

We therefore conclude 8-story buildings can be supported by mat foundations bearing on the native medium dense sand at a depth of 12½ to 15 feet bgs. For design, the mat foundations bearing on native medium dense sand can be designed using an allowable bearing pressure equal to 5,000 psf for dead plus live loads. These pressures may be increased by one third for total load conditions, including wind or seismic forces. For these estimated bearing pressures, we estimate an 8-story building will be subjected to total settlements on the order of 1 to 1½ inches. The majority of this settlement will likely occur during construction. This static settlement is in addition to the proposed ½ to ¾ inches of cyclic densification induced settlement expected during a major earthquake.

The medium dense sand above a depth of about 20 feet lacks sufficient strength/density to properly support the planned taller towers, such as a 15- or 18-story tower planned under development Options B and D, without excessive settlements. We therefore preliminarily conclude that a 15- or 18-story tower should be supported on shallow foundations bearing on a zone of improved ground. The ground improvement should be designed to transfer the tower building loads into the dense sand anticipated below a depth of 20 to 22 feet bgs. For design, a mat foundation bearing on improved ground may preliminarily be designed using an allowable bearing pressure equal to 8,000 psf, provided the ground improvement technique is properly designed to accommodate these loads. If ground improvement is used to transfer buildings loads to the dense sand beneath a depth of 20 to 22 feet, the estimated cyclic densification discussed above would be eliminated beneath the taller towers. However, for these heavier buildings, the building loads will impose additional stresses in the very stiff to hard clays encountered beneath a depth of 35 feet, potentially causing recompression of these clays. We therefore anticipate total settlements of 15- to 18-story towers will range from 1½ to 2 inches. Approximately half of this settlement is expected to occur during construction of the buildings as the loads are implied.

Ground Improvement

As previously discussed, ground improvement can be used to improve the medium dense sand and transfer building loads to deeper strata. On the basis of our experience with different methods of improvement, we preliminary judge that the most appropriate methods to perform ground improvement include:

- compacted aggregate piers (CAP)
- deep soil mixing (DSM)
- drilled displacement columns (DDC).

These ground improvement techniques could be used separately or in combination. These systems are installed under design-build contracts by specialty contractors, and we do not provide specific design recommendations or settlement estimates for these systems.

CAPs are used to reduce settlement potential and increase allowable bearing capacities by strengthening the soil matrix with compacted aggregate (gravel) columns and by densifying the soil between the columns. CAPs are designed and installed by specialty contractors on a design-build basis. CAPs are typically installed by drilling 24- to 33-inch-diameter shafts with an auger or specialty vibration tooling and then backfilling the shaft in lifts with compacted aggregate material. Because the medium dense sand likely lacks cohesion, CAPs installed in this soil will be prone to caving. If conventional auger tooling is used to create CAPs, casing will be required.

DSM is used to treat soil in-situ with cement grout using mixing shafts consisting of auger cutting heads, discontinuous flight augers, or blades/paddles to create below-ground deep soil mixed elements. DSM may be installed in a variety of patterns including cellular blocks, a grid pattern, or individual columns/panels. Typical DSM columns have a minimum diameter or width of three feet. Typical minimum replacement ratios (ratio of treated soil to building footprint) are on the order of 40 to 50 percent.

DDCs are installed under design-build contracts by specialty contractors. DDCs are constructed by using a displacement auger to create a soil shaft that is filled with CLSM (Controlled Low Strength Material) injected under pressure as the displacement auger is withdrawn from the hole. DDCs typically vary between 18 to 30 inches in diameter. Installation of DDCs produces minimal soil cuttings because the soil is displaced during column installation.

Shoring and Underpinning

The proposed one-level-deep basements will require excavations on the order of 12 to 15 feet below the existing ground surface surrounding the sites. Considering the depth of the excavation and the planned footprint of the buildings, the excavations will need to be shored to protect the surrounding improvements and buildings (for the eastern 285 12th Street parcel). There are several key considerations in selecting a suitable shoring system. Those we consider of primary concern are:

- protection of surrounding improvements, including roadways, utilities, and nearby structures
- the ability of the shoring system to reduce potential for ground movement
- the presence of existing foundations or other obstructions
- cost.

On the basis of our understanding of the subsurface conditions and our experience with similar projects, we conclude a soldier-pile-and-lagging system is a viable shoring system for the project. This system consists of steel beams that are placed in predrilled holes; the annulus between the beams and sides of the hole are backfilled with concrete. Alternatively, the steel beams may be 'wet-set' in soil-cement mixed columns. Wood lagging is placed between the soldier beams as excavation proceeds. For excavation deeper than about 15 feet, tiebacks or internal bracing will likely be required to provide additional lateral resistance and limit shoring deflections. If tiebacks are installed in the City of Oakland's or neighbor's properties, encroachment permits/permission from the neighbor will be required.

Although a soldier-pile-and-lagging system is likely the most cost-effective, great care will need to be taken by the shoring contractor to properly install the wall and limit the loss of ground. Drilling of the shafts for the soldier piles will likely require casing and the use of drilling slurry to prevent caving of the sand. The near-surface soil is loose to medium dense and because of the cohesionless nature of the soil some caving may occur while lagging boards are installed. It is the responsibility of the shoring contractor to limit caving and prevent the loss of ground from behind the shoring system.

We do not have information regarding the type of foundation and embedment depth of the adjacent buildings around the eastern 285 12th Street parcel. However, considering the age and height of the adjacent buildings, it is likely these adjacent buildings are supported on shallow footings. This should be confirmed by test pits and/or review of existing foundation drawings. If the excavation for the below-grade level extends below these foundations, then these buildings should be underpinned during construction. Underpinning may consist of hand-excavated, end-bearing piers or slant drilled soldier piles that extended into competent material beneath the planned excavation depth. A monitoring program should be established to evaluate the effects of the construction, if any, on the adjacent buildings.

Seismic Design

We preliminarily conclude that the proposed buildings can be designed in accordance with the criteria for a Site Class D under the 2013 California Building Code (CBC). For a site class D, the following seismic design parameters may be used in preliminary design:

- Risk Targeted Maximum Considered Earthquake (MCE_R) S_S and S_1 of 1.696g and 0.670g, respectively.
- Site Modification Factors, F_a and F_v of 1.0 and 1.5.
- Risk Targeted MCE_R spectral response acceleration parameters at short periods, S_{MS}, and at one-second period, S_{M1}, of 1.696g and 1.005g, respectively.
- Design Earthquake (DE) spectral response acceleration parameters at short period, S_{DS}, and at one-second period, S_{D1}, of 1.130g and 0.670g, respectively.

Construction Considerations

During excavation debris and concrete rubble may be encountered and should be removed. Hoe-rams, jack-hammers and other similar equipment will likely be needed to remove some of the larger obstacles, if encountered. The soil to be excavated consists predominantly of sand that can likely be excavated with conventional excavation equipment, but will be susceptible to caving.

If loose soil or undocumented fill is encountered at the planned foundation level it should either be improved (if ground improvement is being implemented) or it should be removed and replaced with engineered fill. This may be necessary in area were former USTs were present at the site.

Design Level Investigation and Future Services

As the project design becomes finalized, a geotechnical investigation that includes site specific field exploration, collection of soil samples, and laboratory testing should be performed. Additionally we should consult with the design team as geotechnical questions arise.

Recognizing that construction observation is the final stage of geotechnical design, quality assurance observation during construction by Langan Treadwell Rollo will be necessary to confirm the design assumptions and design elements, to maintain our continuity of responsibility on this project, and allow us to make changes to our recommendations, as necessary.

LIMITATIONS

The conclusions and recommendations provided in this preliminary geotechnical report result from our interpretation of the geotechnical conditions from nearby sites. Actual subsurface conditions will likely vary and should be evaluated during a detailed geotechnical investigation.

We trust this letter provides the information you require at this time. If you have any questions or require additional information, please call.

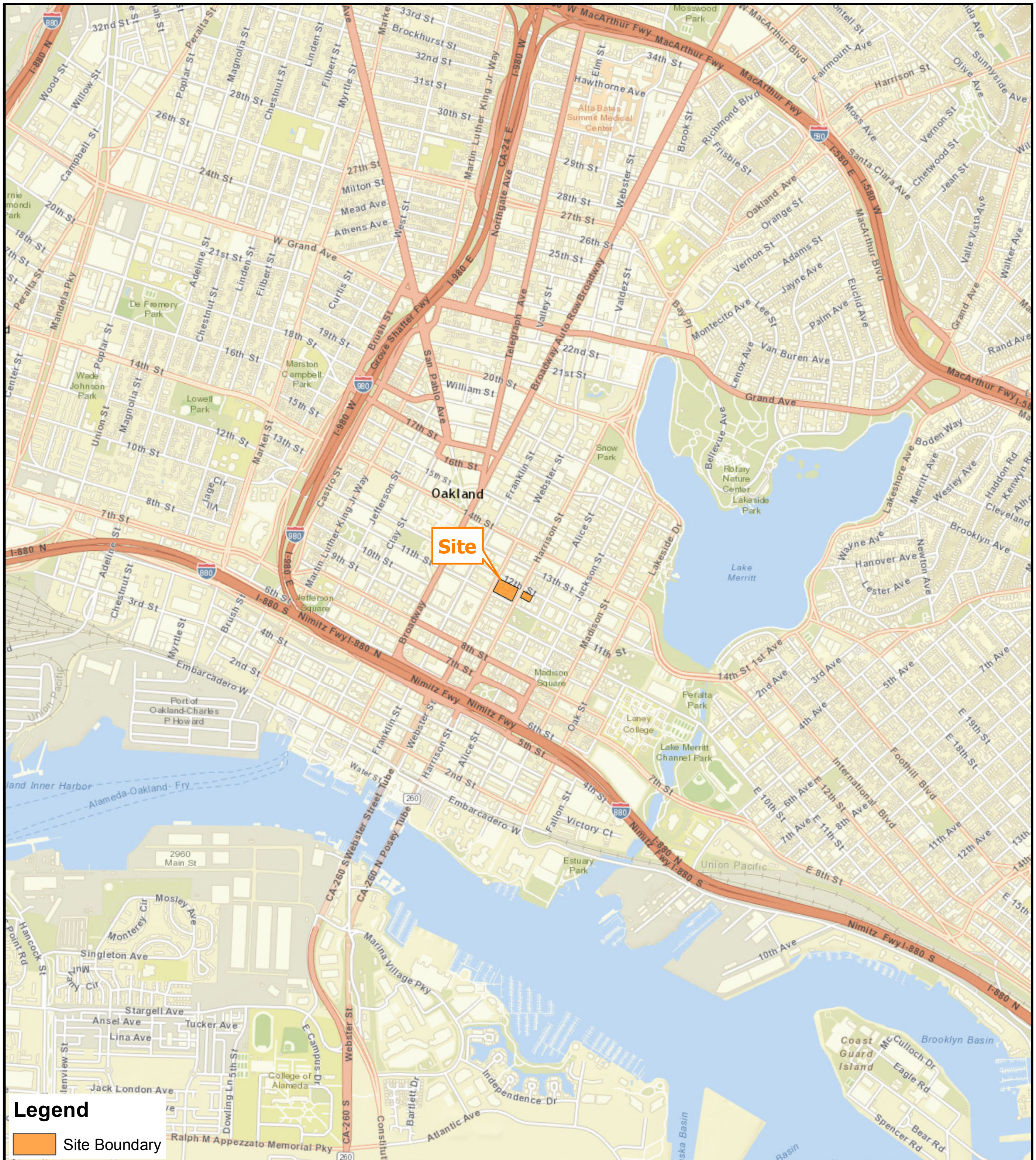
Sincerely yours,
Langan Treadwell Rollo

Scott A. Walker, GE
Associate

Richard D. Rodgers, GE
Managing Principal

731664601.03 SAW

Attachments: Figures 1 through 4



NOTES:

1. Parcel Boundary provided by Alemeda County GIS.
2.World street basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online.

Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN.

0 1,000 2,000
Feet

N W E S

301 AND 285 12TH SRTEET Oakland, California	**SITE LOCATION MAP**
LANGAN TREADWELL ROLLO	Date 10/30/2015 | Project No. 731664601 | Figure 1

N

Legend

- Approximate Environmental Boring Location
- Approximate Monitoring Well Location
- Site Boundary

NOTES:
1. Parcel Boundary provided by Alemeda County GIS.
2. World aerial imagery basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online. Source of aerial imagery is Microsoft from 2011. Credits: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community.

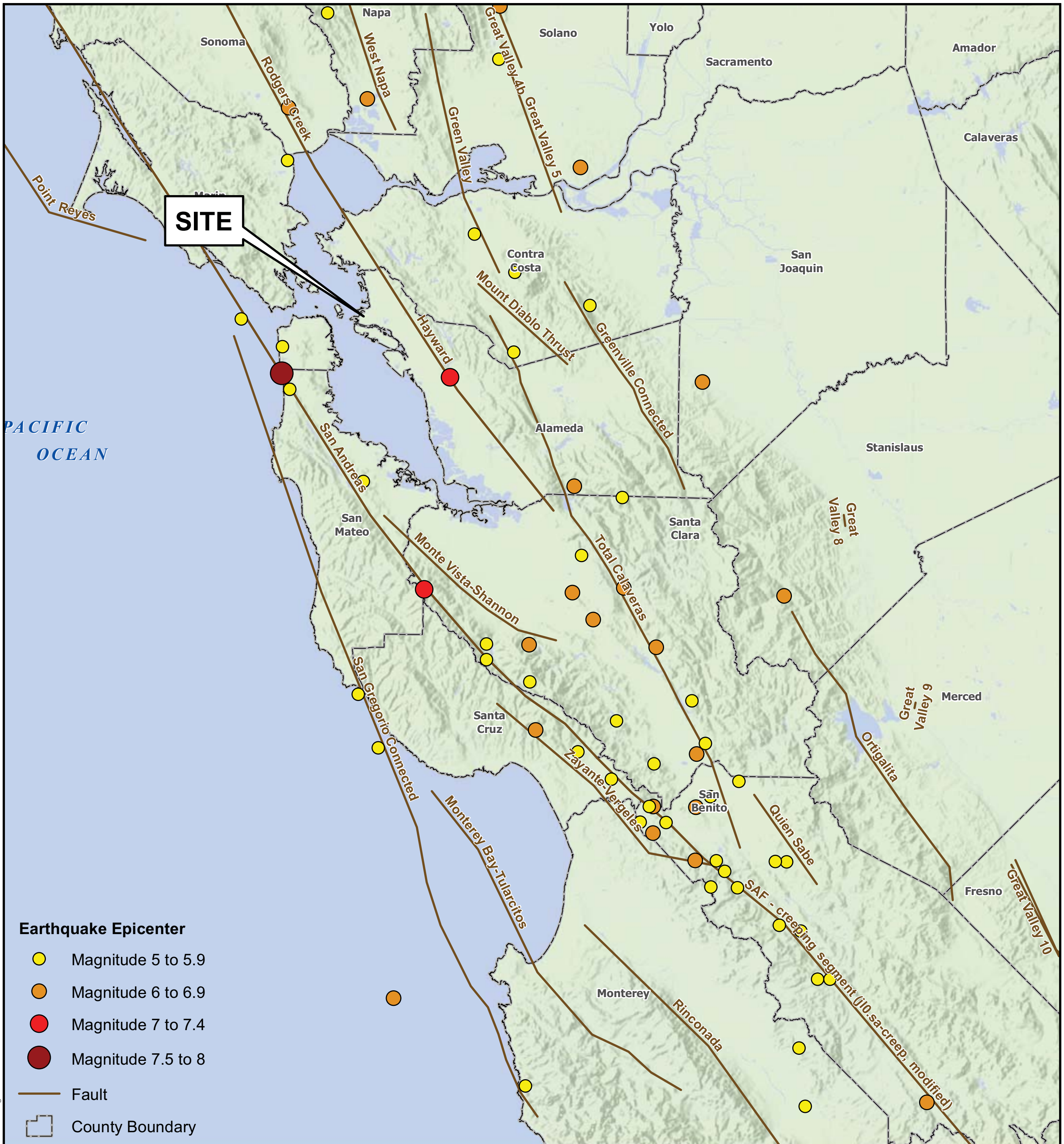
0 25 50 100
Scale in Feet

301 AND 285 12TH SRTEET
Oakland, California

SITE PLAN

Date 10/30/2015	Project 731664601	Figure 2

LANGAN TREADWELL ROLLO



Notes:

1. Quaternary fault data displayed are based on a generalized version of U.S Geological Survey (USGS) Quaternary Fault and fold database, 2010. For cartographic purposes only.
2. The Earthquake Epicenter (Magnitude) data is provided by the USGS and is current through 08/26/2014.
3. Basemap hillshade and County boundaries provided by USGS and California Department of Transportation.
4. Map displayed in California State Coordinate System, California (Teale) Albers, North American Datum of 1983 (NAD83), Meters.

0 5 10 20
Miles

N

301 AND 285 12TH STREET
Oakland, California

LANGAN TREADWELL ROLLO

MAP OF MAJOR FAULTS AND EARTHQUAKE EPICENTERS IN THE SAN FRANCISCO BAY AREA

Date 10/30/2015	Project No. 731664601	Figure 3

\\langan.com\data\SF\data6\731664601\ArcGIS\ArcMap_Documents\Fault Map.mxd User: agekas

I **Not felt by people, except under especially favorable circumstances. However, dizziness or nausea may be experienced.**
Sometimes birds and animals are uneasy or disturbed. Trees, structures, liquids, bodies of water may sway gently, and doors may swing very slowly.

II **Felt indoors by a few people, especially on upper floors of multi-story buildings, and by sensitive or nervous persons.**
As in Grade I, birds and animals are disturbed, and trees, structures, liquids and bodies of water may sway. Hanging objects swing, especially if they are delicately suspended.

III **Felt indoors by several people, usually as a rapid vibration that may not be recognized as an earthquake at first. Vibration is similar to that of a light, or lightly loaded trucks, or heavy trucks some distance away. Duration may be estimated in some cases.**
Movements may be appreciable on upper levels of tall structures. Standing motor cars may rock slightly.

IV **Felt indoors by many, outdoors by a few. Awakens a few individuals, particularly light sleepers, but frightens no one except those apprehensive from previous experience. Vibration like that due to passing of heavy, or heavily loaded trucks. Sensation like a heavy body striking building, or the falling of heavy objects inside.**
Dishes, windows and doors rattle; glassware and crockery clink and clash. Walls and house frames creak, especially if intensity is in the upper range of this grade. Hanging objects often swing. Liquids in open vessels are disturbed slightly. Stationary automobiles rock noticeably.

V **Felt indoors by practically everyone, outdoors by most people. Direction can often be estimated by those outdoors. Awakens many, or most sleepers. Frightens a few people, with slight excitement; some persons run outdoors.**
Buildings tremble throughout. Dishes and glassware break to some extent. Windows crack in some cases, but not generally. Vases and small or unstable objects overturn in many instances, and a few fall. Hanging objects and doors swing generally or considerably. Pictures knock against walls, or swing out of place. Doors and shutters open or close abruptly. Pendulum clocks stop, or run fast or slow. Small objects move, and furnishings may shift to a slight extent. Small amounts of liquids spill from well-filled open containers. Trees and bushes shake slightly.

VI **Felt by everyone, indoors and outdoors. Awakens all sleepers. Frightens many people; general excitement, and some persons run outdoors.**
Persons move unsteadily. Trees and bushes shake slightly to moderately. Liquids are set in strong motion. Small bells in churches and schools ring. Poorly built buildings may be damaged. Plaster falls in small amounts. Other plaster cracks somewhat. Many dishes and glasses, and a few windows break. Knickknacks, books and pictures fall. Furniture overturns in many instances. Heavy furnishings move.

VII **Frightens everyone. General alarm, and everyone runs outdoors.**
People find it difficult to stand. Persons driving cars notice shaking. Trees and bushes shake moderately to strongly. Waves form on ponds, lakes and streams. Water is muddied. Gravel or sand stream banks cave in. Large church bells ring. Suspended objects quiver. Damage is negligible in buildings of good design and construction; slight to moderate in well-built ordinary buildings; considerable in poorly built or badly designed buildings, adobe houses, old walls (especially where laid up without mortar), spires, etc. Plaster and some stucco fall. Many windows and some furniture break. Loosened brickwork and tiles shake down. Weak chimneys break at the roofline. Cornices fall from towers and high buildings. Bricks and stones are dislodged. Heavy furniture overturns. Concrete irrigation ditches are considerably damaged.

VIII **General fright, and alarm approaches panic.**
Persons driving cars are disturbed. Trees shake strongly, and branches and trunks break off (especially palm trees). Sand and mud erupts in small amounts. Flow of springs and wells is temporarily and sometimes permanently changed. Dry wells renew flow. Temperatures of spring and well waters varies. Damage slight in brick structures built especially to withstand earthquakes; considerable in ordinary substantial buildings, with some partial collapse; heavy in some wooden houses, with some tumbling down. Panel walls break away in frame structures. Decayed pilings break off. Walls fall. Solid stone walls crack and break seriously. Wet grounds and steep slopes crack to some extent. Chimneys, columns, monuments and factory stacks and towers twist and fall. Very heavy furniture moves conspicuously or overturns.

IX **Panic is general.**
Ground cracks conspicuously. Damage is considerable in masonry structures built especially to withstand earthquakes; great in other masonry buildings - some collapse in large part. Some wood frame houses built especially to withstand earthquakes are thrown out of plumb, others are shifted wholly off foundations. Reservoirs are seriously damaged and underground pipes sometimes break.

X **Panic is general.**
Ground, especially when loose and wet, cracks up to widths of several inches; fissures up to a yard in width run parallel to canal and stream banks. Landsliding is considerable from river banks and steep coasts. Sand and mud shifts horizontally on beaches and flat land. Water level changes in wells. Water is thrown on banks of canals, lakes, rivers, etc. Dams, dikes, embankments are seriously damaged. Well-built wooden structures and bridges are severely damaged, and some collapse. Dangerous cracks develop in excellent brick walls. Most masonry and frame structures, and their foundations are destroyed. Railroad rails bend slightly. Pipe lines buried in earth tear apart or are crushed endwise. Open cracks and broad wavy folds open in cement pavements and asphalt road surfaces.

XI **Panic is general.**
Disturbances in ground are many and widespread, varying with the ground material. Broad fissures, earth slumps, and land slips develop in soft, wet ground. Water charged with sand and mud is ejected in large amounts. Sea waves of significant magnitude may develop. Damage is severe to wood frame structures, especially near shock centers, great to dams, dikes and embankments, even at long distances. Few if any masonry structures remain standing. Supporting piers or pillars of large, well-built bridges are wrecked. Wooden bridges that "give" are less affected. Railroad rails bend greatly and some thrust endwise. Pipe lines buried in earth are put completely out of service.

XII **Panic is general.**
Damage is total, and practically all works of construction are damaged greatly or destroyed. Disturbances in the ground are great and varied, and numerous shearing cracks develop. Landslides, rock falls, and slumps in river banks are numerous and extensive. Large rock masses are wrenched loose and torn off. Fault slips develop in firm rock, and horizontal and vertical offset displacements are notable. Water channels, both surface and underground, are disturbed and modified greatly. Lakes are dammed, new waterfalls are produced, rivers are deflected, etc. Surface waves are seen on ground surfaces. Lines of sight and level are distorted. Objects are thrown upward into the air.

EJSCREEN Report (Version 2020)

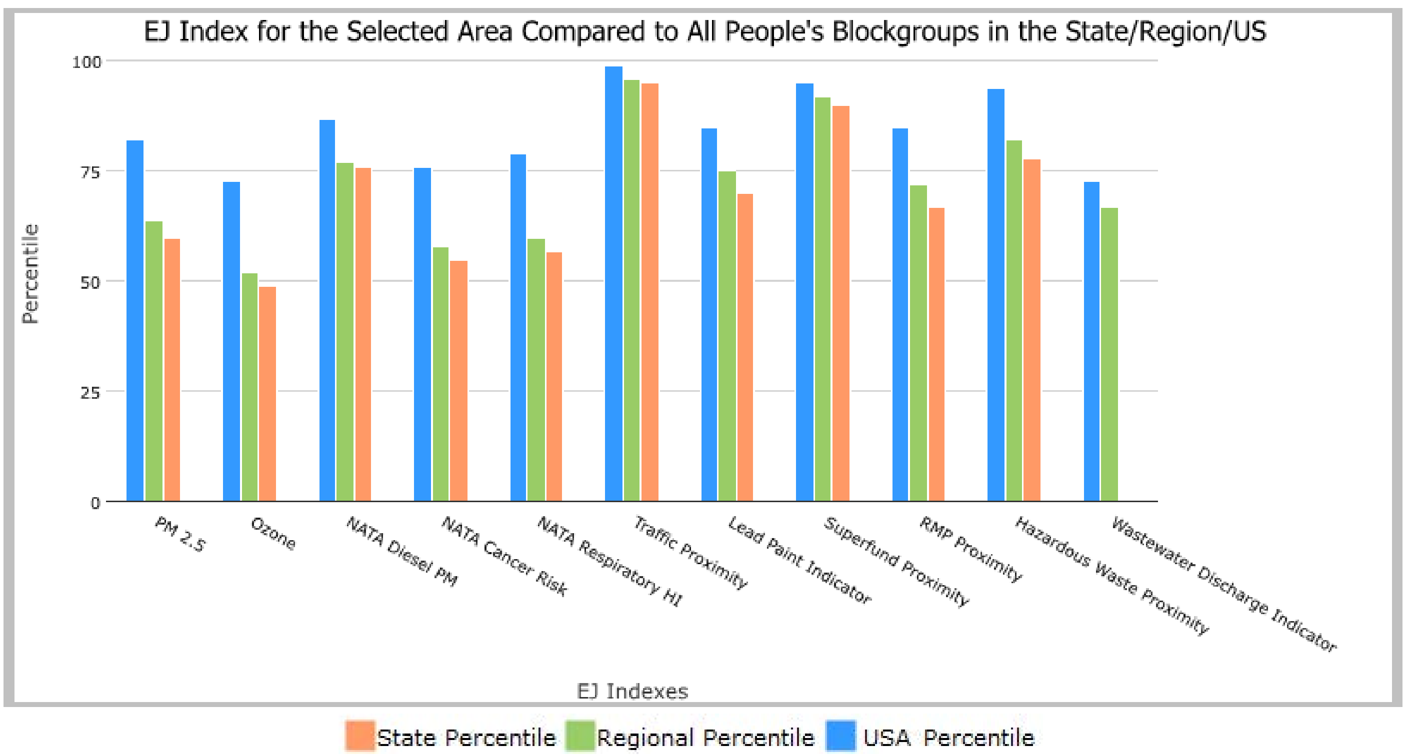
1 mile Ring Centered at 37.801235,-122.268252, CALIFORNIA, EPA Region 9

Approximate Population: 39,786

Input Area (sq. miles): 3.14

285 12th Street

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	60	64	82
EJ Index for Ozone	49	52	73
EJ Index for NATA* Diesel PM	76	77	87
EJ Index for NATA* Air Toxics Cancer Risk	55	58	76
EJ Index for NATA* Respiratory Hazard Index	57	60	79
EJ Index for Traffic Proximity and Volume	95	96	99
EJ Index for Lead Paint Indicator	70	75	85
EJ Index for Superfund Proximity	90	92	95
EJ Index for RMP Proximity	67	72	85
EJ Index for Hazardous Waste Proximity	78	82	94
EJ Index for Wastewater Discharge Indicator	N/A	67	73



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report (Version 2020)

1 mile Ring Centered at 37.801235,-122.268252, CALIFORNIA, EPA Region 9

Approximate Population: 39,786

Input Area (sq. miles): 3.14

285 12th Street

No map available

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	4

EJSCREEN Report (Version 2020)

1 mile Ring Centered at 37.801235,-122.268252, CALIFORNIA, EPA Region 9

Approximate Population: 39,786

Input Area (sq. miles): 3.14

285 12th Street

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m^3)	11.2	10.6	58	9.99	66	8.55	94
Ozone (ppb)	28	49.2	3	50.1	3	42.9	1
NATA* Diesel PM (µg/m^3)	0.894	0.467	94	0.479	90-95th	0.478	90-95th
NATA* Cancer Risk (lifetime risk per million)	29	36	21	35	<50th	32	<50th
NATA* Respiratory Hazard Index	0.48	0.55	34	0.53	<50th	0.44	60-70th
Traffic Proximity and Volume (daily traffic count/distance to road)	9900	2000	96	1700	97	750	99
Lead Paint Indicator (% Pre-1960 Housing)	0.42	0.29	68	0.24	74	0.28	72
Superfund Proximity (site count/km distance)	0.48	0.17	94	0.15	95	0.13	94
RMP Proximity (facility count/km distance)	0.93	1.1	63	0.99	67	0.74	74
Hazardous Waste Proximity (facility count/km distance)	13	6.2	86	5.3	89	5	94
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0	18	N/A	18	52	9.4	33
Demographic Indicators							
Demographic Index	56%	47%	64	46%	66	36%	79
People of Color Population	71%	62%	55	60%	59	39%	79
Low Income Population	41%	33%	67	33%	67	33%	69
Linguistically Isolated Population	22%	9%	87	8%	89	4%	94
Population With Less Than High School Education	18%	17%	60	16%	63	13%	75
Population Under 5 years of age	3%	6%	19	6%	20	6%	21
Population over 64 years of age	20%	14%	81	14%	79	15%	75

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.