County of San Mateo - Planning and Building Department

ATTACHMENT D


BLENHEIM AVE
BERKSHIRE AVE
MARKHAM AVE
WAVERLY AVE
DEXTER AVE
ALLEY
SELBY LN
STATE HIGHWAY 82
(EL CAMINO REAL)
060271060
060271070
060271080
060271090
060271100
060271110
PROJECT SITE
N. FAIR OAKS
Redwood City
101
84
0
100
200 Ft
N
Vicinity Map

County of San Mateo - Planning and Building Department

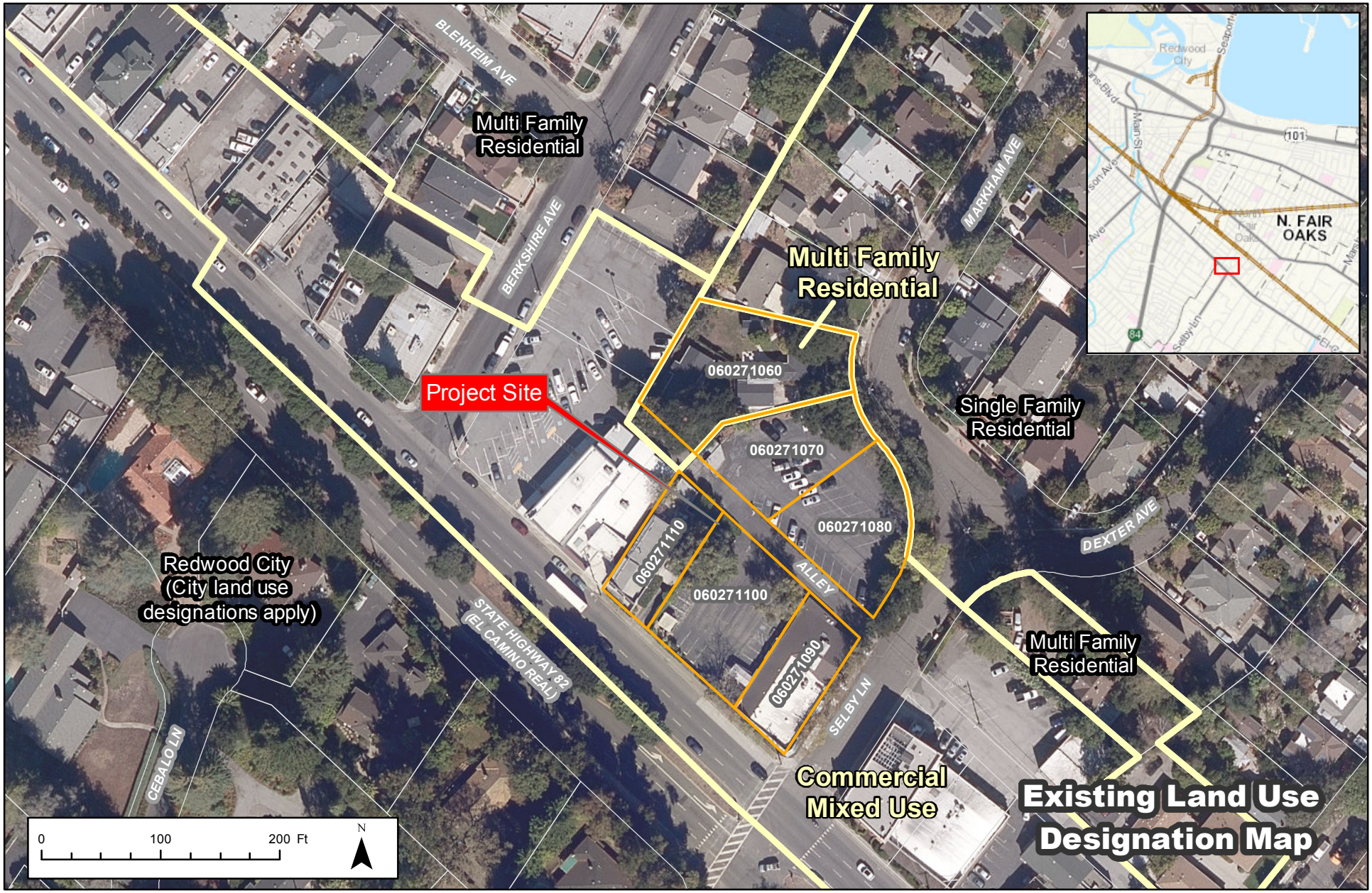
ATTACHMENT E


BLENHEIM AVE
BERKSHIRE AVE
MARKHAM AVE
Redwood City (City Zoning Applies)
R-3/S-5
CMU-1
CMU-2
R-2/S-5
060271060
R-1/S-73
060271070
Project Site
060271080
060271110
060271100
060271090
ALLEY
DEXTER AVE
STATE HIGHWAY 82 (EL CAMINO REAL)
SELBY LN
NMU-ECR
R-3/S-5
CEBALO LN
Redwood City (City Zoning Applies)
0
100
200 Ft
N
N. FAIR OAKS
Existing Zoning Map


BLENHEIM AVE
BERKSHIRE AVE
MARKHAM AVE
DEXTER AVE
SELBY LN
CEBALO LN
STATE HIGHWAY 82
(EL CAMINO REAL)
Redwood City (City Zoning Applies)
Redwood City (City Zoning Applies)
R-3/S-5
CMU-1
CMU-2
R-1/S-73
R-3/S-5
NMU-ECR
PUD
Project Site
N. FAIR OAKS
Redwood City
Main St
101
84
0
100
200 Ft
N
Proposed Zoning Map

County of San Mateo - Planning and Building Department

ATTACHMENT F


Multi Family Residential
Multi Family Residential
Project Site
Single Family Residential
Redwood City (City land use designations apply)
Multi Family Residential
Commercial Mixed Use
Existing Land Use Designation Map
BLENHEIM AVE
BERKSHIRE AVE
MARKHAM AVE
DEXTER AVE
ALLEY
SELBY LN
CEBALO LN
STATE HIGHWAY 82 (EL CAMINO REAL)
060271060
060271070
060271080
060271090
060271100
060271110
N. FAIR OAKS
Redwood City
0
100
200 Ft
N


BLENHEIM AVE
Multi Family Residential
BERKSHIRE AVE
MARKHAM AVE
Commercial Mixed Use
Commercial Mixed Use
Project Site
Single Family Residential
DEXTER AVE
Redwood City (City land use designations apply)
STATE HIGHWAY 82 (EL CAMINO REAL)
SELBY LN
Multi Family Residential
CEBALO LN
Commercial Mixed Use
0
100
200 Ft
N
N. FAIR OAKS
Proposed Land Use Designation Map

County of San Mateo - Planning and Building Department

ATTACHMENT G

SUNRISE REDWOOD CITY

ASSISTED LIVING FACILITY
REDWOOD CITY, CA

VICINITY MAP NOT TO SCALE

CONTACTS

OWNER
SUNRISE SENIOR LIVING
7900 WESTPARK DRIVE, SUITE T-900
McLEAN, VA 22102
Tel. 703.744.1830
CONTACT: MR. JERRY LIANG

ARCHITECT
HPI ARCHITECTURE
115 22ND ST., NEWPORT BEACH, CA 92663
Tel. 949.675.6442 Fax. 949.675.4543
CONTACT: LEA BROUKHIM, PROJECT MANAGER
JOHN PARIS, PRINCIPAL

LANDSCAPE ARCHITECT
LINDA GATES & ASSOCIATES
2671 CROW CANYON RD
SAN RAMON, CA 94583
Tel. 925.736.8176
CONTACT: LINDA GATES

CIVIL
KIER & WRIGHT
CIVIL ENGINEERS & SURVEYORS, INC.
2850 COLLIER CANYON ROAD
LIVERMOORE, CA 94551
Tel. 925.245.8788 Fax. 925.245.8796
CONTACT: EMAD SABIE-DHINE

APPLICABLE CODES

APPLICABLE CODES

PART 1 2016 CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE, TITLE 24 C.C.R.
PART 2 2016 CALIFORNIA BUILDING CODE, TITLE 24 C.C.R.
(2016 INTERNATIONAL BUILDING CODE OF THE INTERNATIONAL CODE COUNCIL, WITH CALIFORNIA AMENDMENTS)
2016 CALIFORNIA ELECTRICAL CODE, TITLE 24 C.C.R.
PART 3 (2011 NATIONAL ELECTRICAL CODE OF THE NATIONAL FIRE PROTECTION ASSOCIATION, NFPA)
2016 CALIFORNIA MECHANICAL CODE, TITLE 24 C.C.R.
PART 4 (2016 UNIFORM MECHANICAL CODE OF THE INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS, IAPMO)
2016 CALIFORNIA PLUMBING CODE, TITLE 24 C.C.R.
PART 5 (2016 UNIFORM PLUMBING CODE OF THE INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS, IAPMO)
2016 CALIFORNIA ENERGY CODE, TITLE 24 C.C.R.
PART 6 *CURRENTLY VACANT*
PART 7 2016 CALIFORNIA HISTORICAL BUILDING CODE, TITLE 24 C.C.R.
PART 8 2016 CALIFORNIA FIRE CODE, TITLE 24 C.C.R.
PART 9 (2016 INTERNATIONAL FIRE CODE OF THE INTERNATIONAL CODE COUNCIL)
2016 CALIFORNIA EXISTING BUILDING CODE, TITLE 24 C.C.R.
PART 10 (2016 INTERNATIONAL EXISTING BUILDING CODE OF THE INTERNATIONAL CODE COUNCIL, WITH CALIFORNIA AMENDMENTS)
2016 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN CODE), TITLE 24 C.C.R.
PART 11 2016 CALIFORNIA REFERENCED STANDARDS CODE, TITLE 24 C.C.R.
PART 12

PARTIAL LIST OF APPLICABLE STANDARDS

2016 CALIFORNIA BUILDING CODE (FOR SFM) REFERENCED STANDARDS CHAPTER 35

NFPA 13 AUTOMATIC SPRINKLER SYSTEMS (CALIFORNIA AMENDED) 2016 EDITION
NFPA 14 STANDPIPE SYSTEMS (CALIFORNIA AMENDED) 2016 EDITION
NFPA 17 DRY CHEMICAL EXTINGUISHING SYSTEMS 2016 EDITION
NFPA 17A WET CHEMICAL EXTINGUISHING SYSTEMS 2016 EDITION
NFPA 20 STATIONARY PUMPS 2016 EDITION
NFPA 24 PRIVATE FIRE SERVICE MAINS (CALIFORNIA AMENDED) 2016 EDITION
NFPA 72 NATIONAL FIRE ALARM AND SIGNALING CODE (CALIFORNIA AMENDED)
(NOTE: SEE UL STANDARD 1971 FOR "VISUAL DEVICES") 2016 EDITION
NFPA 80 FIRE DOOR AND OTHER OPENING PROTECTIVES 2016 EDITION
NFPA 253 CRITICAL RADIANT FLUX OF FLOOR COVERING SYSTEMS 2016 EDITION
NFPA 2001 CLEAN AGENT FIRE EXTINGUISHING SYSTEMS (CALIFORNIA AMENDED) 2016 EDITION

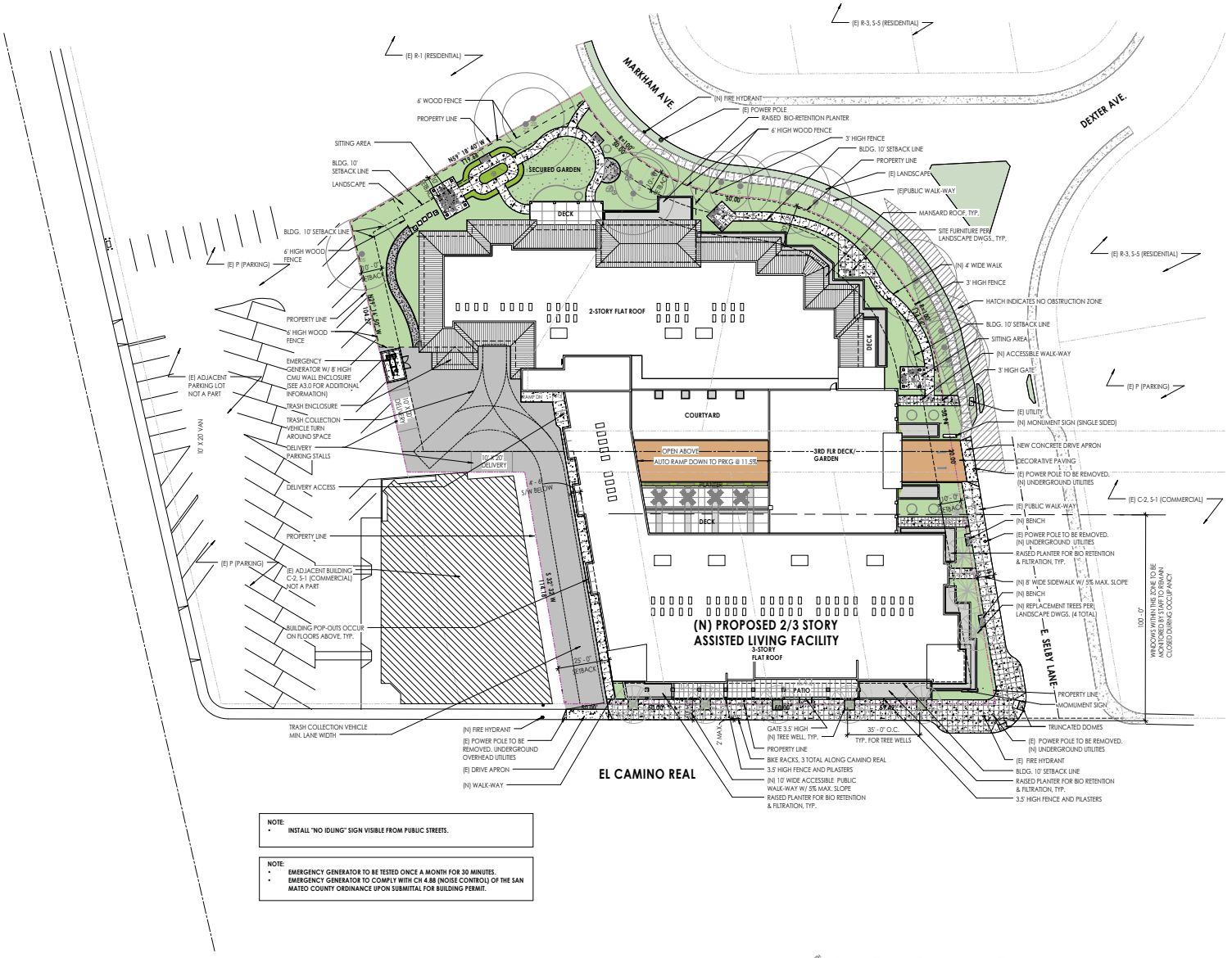
SITE INFORMATION

ADDRESS:	SUNRISE SENIOR LIVING 2991 EL CAMINO REAL REDWOOD CITY, CA 94063
APN:	254-285-260, 060-271-118, 054-285-210, 060-271-060
PIN:	SEE CIVIL DWGS.
TRACT:	SEE CIVIL DWGS.
LOT #	SEE CIVIL DWGS.
LOT SIZE:	1.42 ACRES (61,725 S.F.)
LEGAL DESCRIPTION:	SEE CIVIL DWGS.

PROPOSED DEVELOPMENT

24-HOUR RESIDENTIAL CARE FACILITY FOR THE ELDERLY LICENSED BY THE STATE OF CALIFORNIA
2/3 STORY BUILDING WITH BELOW GRADE PARKING GARAGE
90 UNITS
1.42 ACRES
28,965 S.F. FOOT BUILDING FOOTPRINT
78,026 S.F. BUILDING AREA

SHEET INDEX



NOTE:
- **INSTALL "NO IDLING" SIGN VISIBLE FROM PUBLIC STREETS.**

NOTE:
- **EMERGENCY GENERATOR TO BE TESTED ONCE A MONTH FOR 30 MINUTES.**
- **EMERGENCY GENERATOR TO COMPLY WITH CH 4.88 (NOISE CONTROL) OF THE SAN MATEO COUNTY ORDINANCE UPON SUBMITTAL FOR BUILDING PERMIT.**

SITE DATA:

APN'S: 060-271-060; 060-271-070; 060-271-080; 060-271-090; 060-271-100; 060-271-110

SITE AREA: 61,725 SF

EXISTING LAND USE: C-2, S-1, P, R-2/S-5
PROPOSED LAND USE:C-2, S-1, P, R-2/S-5

PROPOSED DEVELOPMENT

3 STORY - 90 UNITS - ASSISTED LIVING FACILITY
BUILDING AREA: 78,026 SF
FAR: 1.28
BUILDING FOOTPRINT: 28,965 SF
LOT COVERAGE: 46.9%

PARKING REQUIREMENTS:

1 SPACE PER 5 BEDS
100 BEDS - **20** PARKING REQUIRED

56 STANDARD STALLS PROVIDED
(03 ACCESSIBLE STALLS REQUIRED, CBC 11B-208.2)
03 ACCESSIBLE STALLS PROVIDED
(04 ELEC. VEHICLE STALLS REQUIRED(GREEN CODE)
03 ELECT. VEHICLE STALLS PROVIDED
01 ACCESSIBLE ELEC. STALL PROVIDED
63 TOTAL SPACES PROVIDED (SUBTERRANEAN PARKING)

BICYCLE PARKING REQUIREMENTS:

25 (PER COUNTY REQUIREMENT)

15 BIKE STALLS PROVIDED ON GARAGE LEVEL**
10 BIKE STALLS PROVIDED ON GROUND LEVEL**
25 BIKE STALLS PROVIDED

*3 BIKE RACKS (6 STALLS) ALSO PROVIDED ALONG EL CAMINO REAL, NOT A PART OF CALCULATION.
** SEE FIRST FLOOR & GARAGE PLANS

UNIT MIX:

STUDIO	350 SF	53
DOUBLE	550 SF	19
SEMI-PRIVATE	470 SF	18
TOTAL UNITS		90

BUILDING CODE ANALYSIS

CODE REFERENCE SECTION - 2016 CBC

TYPE OF CONSTRUCTION: **I-B** **SECTIONS 601, 602.2 & TABLE 601** - FULLY SPRINKLERED PER NFPA13 (SEPARATE PERMIT)

OCCUPANCY GROUP: MIXED USE AND NON-SEPARATED USE **SECTION 508.2.4**
R-2.1 RESIDENTIAL, **SECTION 310.4.1**
S-2 STORAGE, **SECTION 311.3**

HEIGHT: **HEIGHT REQUIREMENT TO BE DETERMINED**

•ACTUAL BUILDING HEIGHT (FEET): **46'** (ABOVE GRADE)
•ACTUAL NUMBERS OF FLOOR: **2-STORY & 3-STORY** (ABOVE GRADE)

AREA: **CBC** 2016 TABLE 506.2

•ALLOWABLE AREA:	R-2.1	165,000 SF
	S-2	237,000 SF
•ACTUAL AREA:	FIRST FLOOR:	28,965 SF
	SECOND FLOOR:	33,684 SF
	THIRD FLOOR:	15,377 SF
	TOTAL BUILDING AREA:	**78,026 SF**
	DECKS:	5,456 SF
	PARKING STRUCTURE:	38,153 SF

STAFFING REQUIREMENTS: 30 EMPLOYEES PER PEAK SHIFT.

SUSTAINABILITY NOTES

Sunrise is committed to environmental stewardship. The design for the Sunrise of Redwood City is concerned with its impact on the environment as it is constructed, and with a long-range commitment to energy efficiency as it operates.

Exterior Envelope
A robust, continuous thermal envelope with a continuous air infiltration barrier, continuous exterior insulation and a high R value will ensure minimal heat loss/gain and reduce the load on heating systems.

The windows will have a low U value, low E coating and will be argon gas-filled, which also translates to heat/cold resistance and reduces the load on heating and cooling the building. They are also carefully detailed to prevent thermal bridging and avoid air infiltration.

Windows are plentiful and placed to take advantage of daylighting opportunities.

The flat roof portions of the building will be covered in white, light reflecting TPO, which will reduce the heat gain.

The roof will be "solar ready", meaning that both structurally and electrically, if solar panels are added in the future they can be very easily accommodated.

The building will also be computer modeled to show compliance with the new Mass IECC and stretch code requirements.

After construction, the mechanical systems will be commissioned to ensure that they are installed correctly to reach maximum efficiency during operation.

Interior of Building
We will use LED lighting wherever possible and will utilize occupancy sensors and lighting controls.

Exterior lighting is on automatic controls to conserve energy.

The interior environment is planned to enhance the resident's well-being. Fresh ventilation is provided to each room. Low VOC paints will be specified, and low emitting materials will be utilized.

Energy Recovery Units will be provided as part of the mechanical system. They utilize the temperature of exhausting air to temper the incoming ventilation air, thus reducing the energy required to either heat or cool incoming air to the desired temperature.

Units will be equipped with indoor air quality monitoring.

Site
The site design uses permeable paving that allows water to drain through which then recharges the storm water system replenishing the natural water supply.

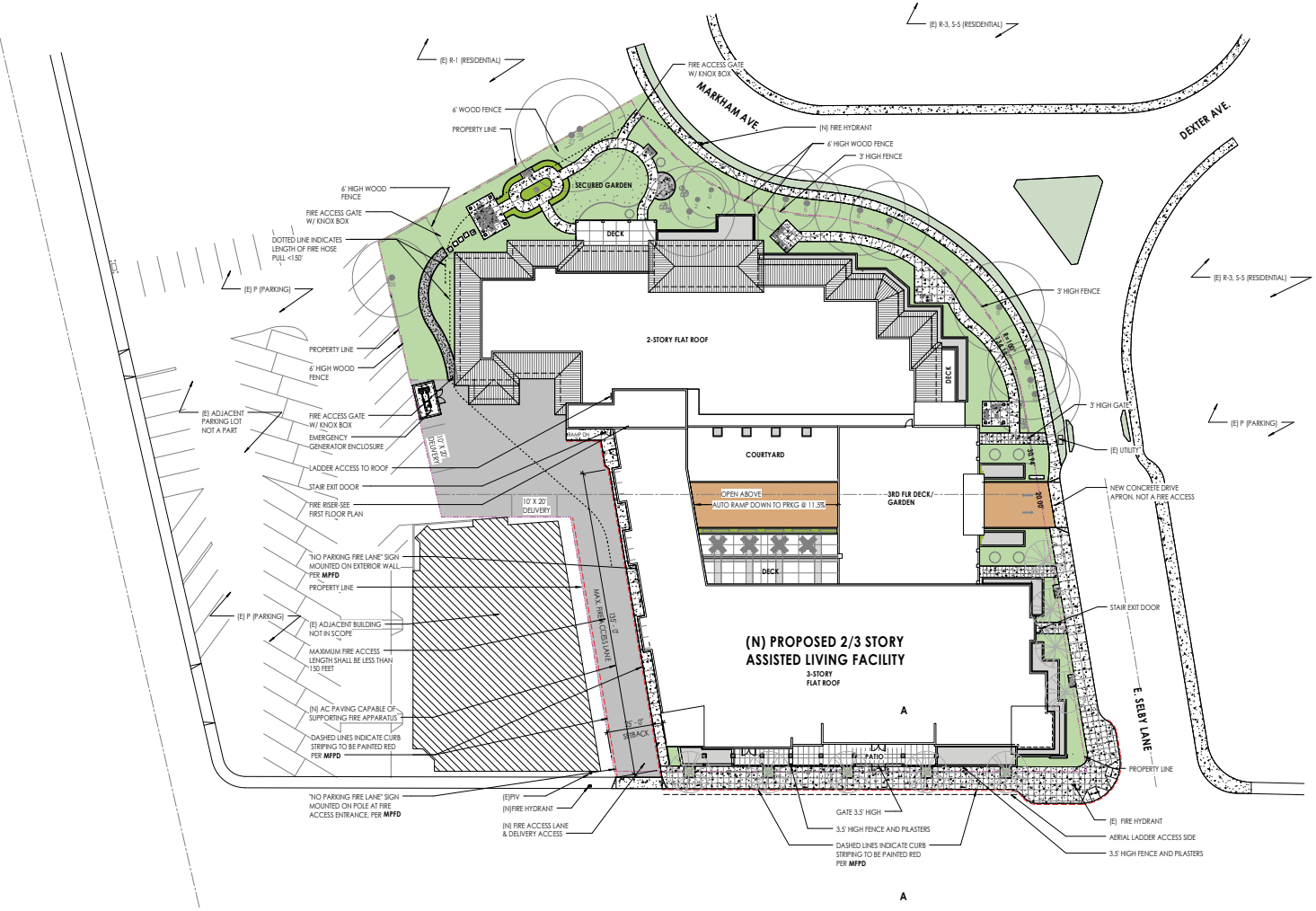
Plants are specified as drought tolerant, and indigenous to the area.

Irrigation is provided with a "smart" system which gathers local weather data and regulates the amount of water that goes out to the heads. This reduces water use and prevents over-watering and potential damage to the hardscape.

The building is located within walking distance to a public bus stop, and employees are encouraged to car pool and use public transit.

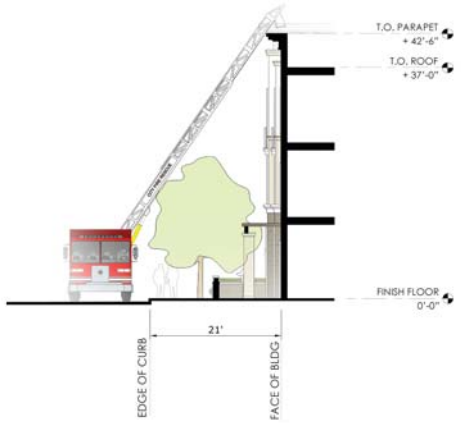
Post Construction
After construction, during normal operation, Sunrise has committed to being certified by the EPA Energy Star Program. The EPA Energy Star Program is a voluntary energy efficiency program. It promotes products and practices that help protect the environment. Sunrise is already committed to the Energy Star Program and enrolls its communities in the program. Since the EPA created "Senior Housing" as a building type for Energy Star Certification, Sunrise Senior Living communities have been certified every year. The water, gas and electric bills for all these communities are monitored monthly and rated against other Energy Star participants. The ENERGY STAR certification signifies that these buildings perform in the top 25 percent of similar buildings nationwide for energy efficiency and meet strict performance levels set by the EPA. These communities use an average of 35 percent less energy and release 35 percent less carbon dioxide than typical communities.

This Sunrise community will have a comprehensive maintenance program in place to maintain equipment and conserve energy costs; they will focus on best practices for efficiency in the areas of kitchen and laundry operations, lighting and HVAC&R (Heating Ventilation Air Conditioning and Refrigeration).

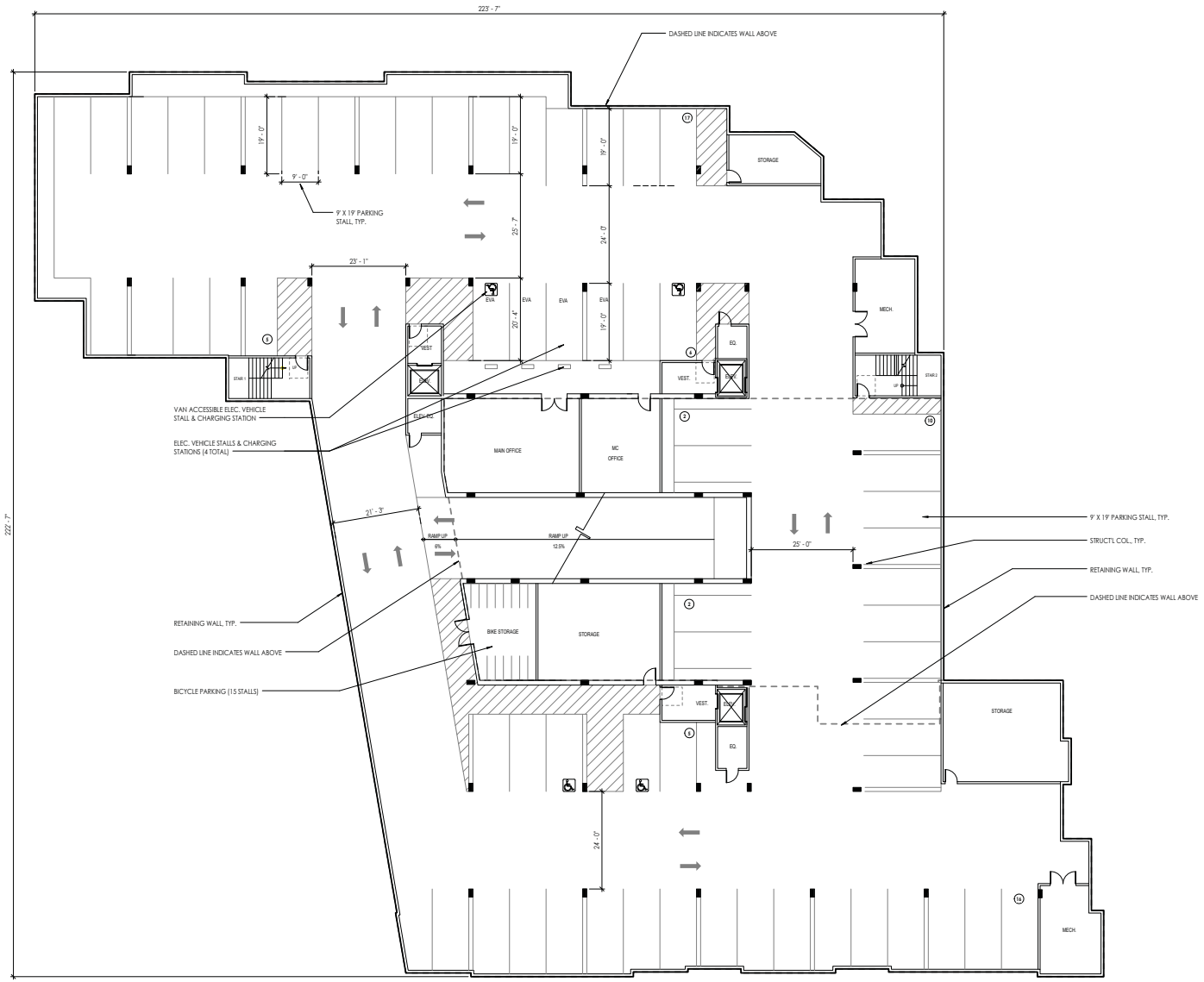


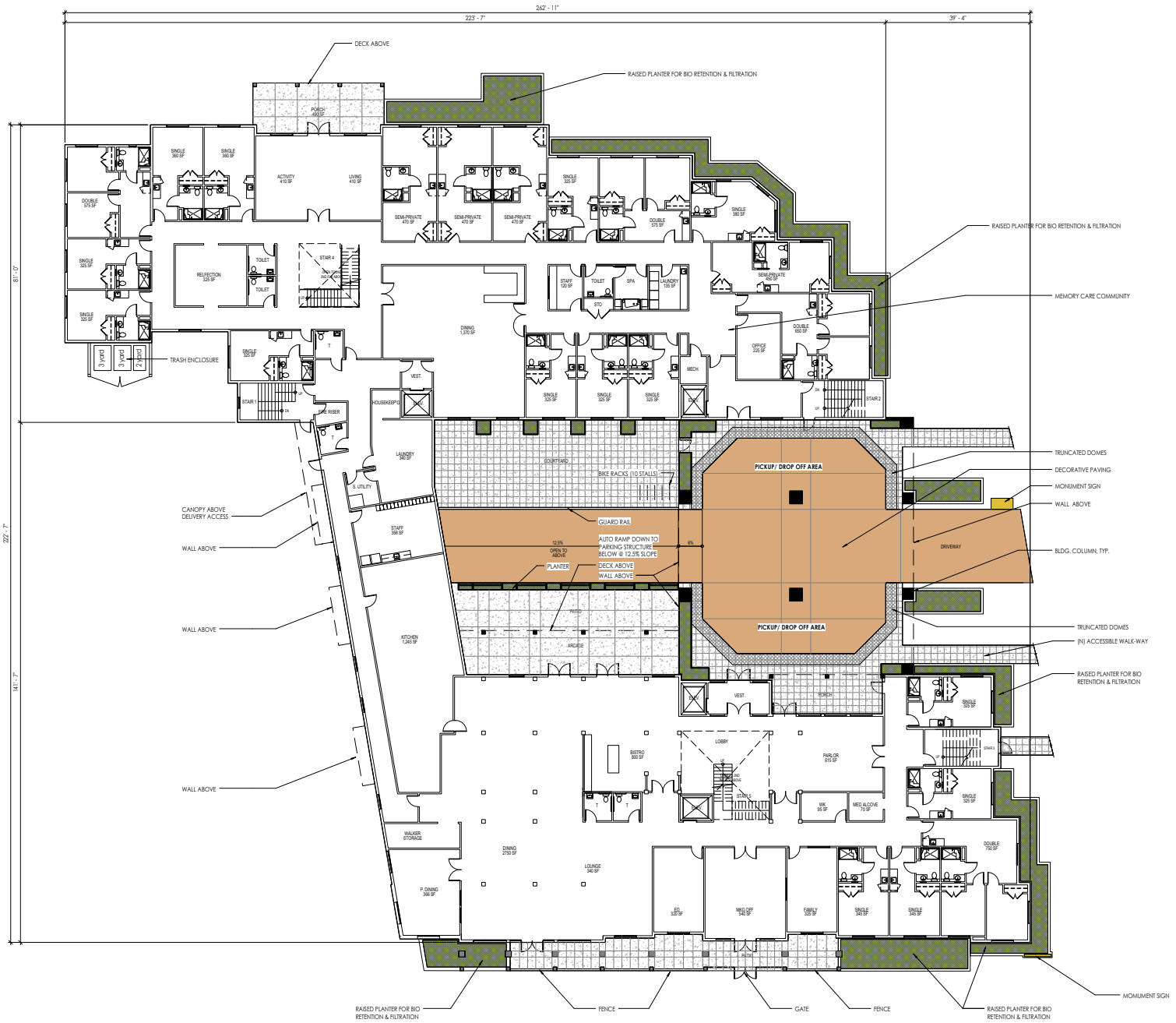
FIRE DEPARTMENT GENERAL NOTES

- All utility's in front of building on El Camino to go underground including around East Selby Lane past Pavilion entrance. Aerial Ladder Access to be established along full length of the building facing El Camino Real. The aerial ladder placement shall meet the prescriptive distance requirements outlined in CFC Appendix D105.
- Fire apparatus roadways, including public and private streets and in some cases driveways used for vehicle access, shall be capable of supporting the imposed weight of a 75,000 pound (34,050 kg) fire apparatus and shall be provided with an all-weather driving surface per CFC 2016, Appendix D.
- Private Roadways shall be all-weather roads with a minimum width of 20 feet and a clear height of 13 feet 6 inches. Roadways shall be designed to accommodate the weight of the fire apparatus and the minimum turning radii of 36 feet for fire apparatus. Dead end roads in excess of 150 feet in length shall be provided with a turn-a-round as specified by CFC Appendix D, Table D103.4. Access roads exceeding 1 mile in length shall be provided with approved turn-a-round areas at ½ Mile intervals.
- All curbing located within the complex that has not been assigned as onsite parking shall be designated as "No Parking Fire Lane". All fire lanes to comply with MPFPD standard for "Designation and Marking of Fire Lane"; since there are only two points of access to the complex "Entrance Sign B" will be used at each pint of access to complex. Provide a complete no parking-fire lane stripping plan with no parking signage in accordance to MPFPD standard on subsequent submittal:
  1) 20 feet roadway width shall require curb stripping with no parking signage as per MPFPD Standard.
  2) Required no parking signage installed at an approved location at entrances.
- Fire apparatus roadways, including public or private streets or roads used for vehicle access shall be installed and in service prior to construction. Fire protection water serving all hydrants shall be provided as soon as combustible material arrives on the site.
  3) Prior to combustible material arriving on the site, contact the Menlo Park Fire Protection District (MPFPD) to schedule an inspection of roadways and fire hydrants. CFC 2016.
  e. For buildings 30 feet (9144 mm) and over in height above natural grade, the required fire apparatus access roadway shall be a minimum of 26 feet (7925 mm) in width, and shall be positioned parallel to at least one entire side of the building, and the fire lane shall be located within a minimum of 15 feet (4573 mm) and a maximum of 30 feet (9144 mm) from the building. CFC 2016, Appendix D105.
  4) Fire District staging areas to be located and provides details for Aerial Ladder Truck Minimum and Maximum climbing angles, if a climbing angle is less than 50 degrees the roadway shall be adjusted to comply to the charging condition listed above. Note Aerial Ladder requires minimum 4-foot setback on any side to allow for outriggers.



SECTION A-A
AERIAL LADDER ACCESS DIAGRAM


223' - 7"
DASHED LINE INDICATES WALL ABOVE
19' - 0"
9' - 0"
9' X 19' PARKING STALL, TYP.
25' - 7"
24' - 0"
23' - 1"
EVA
20' - 4"
STORAGE
MECH.
EQ.
VEST.
STAIR 1
STAIR 2
ELEV. EQ.
MAIN OFFICE
MC OFFICE
VAN ACCESSIBLE ELEC. VEHICLE STALL & CHARGING STATION
ELEC. VEHICLE STALLS & CHARGING STATIONS (4 TOTAL)
222' - 7"
21' - 3"
RAMP UP 6%
RAMP UP 12.5%
25' - 0"
9' X 19' PARKING STALL, TYP.
STRUCTL COL., TYP.
RETAINING WALL, TYP.
DASHED LINE INDICATES WALL ABOVE
BIKE STORAGE
STORAGE
RETAINING WALL, TYP.
DASHED LINE INDICATES WALL ABOVE
BICYCLE PARKING (15 STALLS)
24' - 0"
MECH.



UNIT MIX (FIRST FLOOR):

SINGLE	14
DOUBLE	04
SEMI-PRIVATE	04
TOTAL	22

HPI architecture

planning | interiors |

115 twenty second street, newport beach, california 92663 www.hpiarchitecture.com

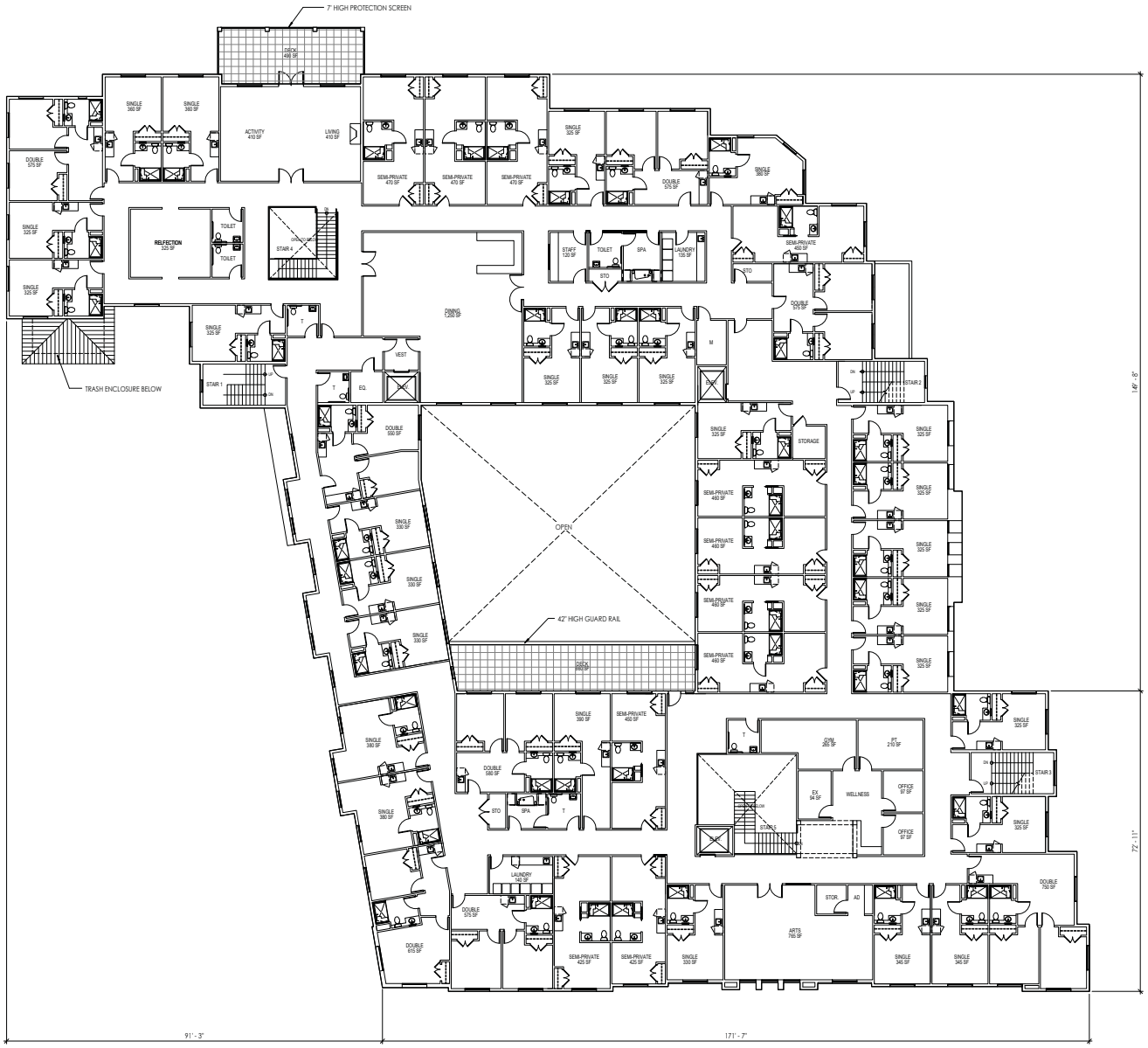
NORTH 0 20' 40' 80'

22 UNITS 28,965 S.F.

FIRST FLOOR PLAN A2.1

| JANUARY 22 2018 | REDWOOD CITY ASSISTED LIVING

SUNRISE SENIOR LIVING



UNIT MIX (SECOND FLOOR):	
SINGLE	27
DOUBLE	08
SEMI-PRIVATE	11
TOTAL	46

HPI architecture

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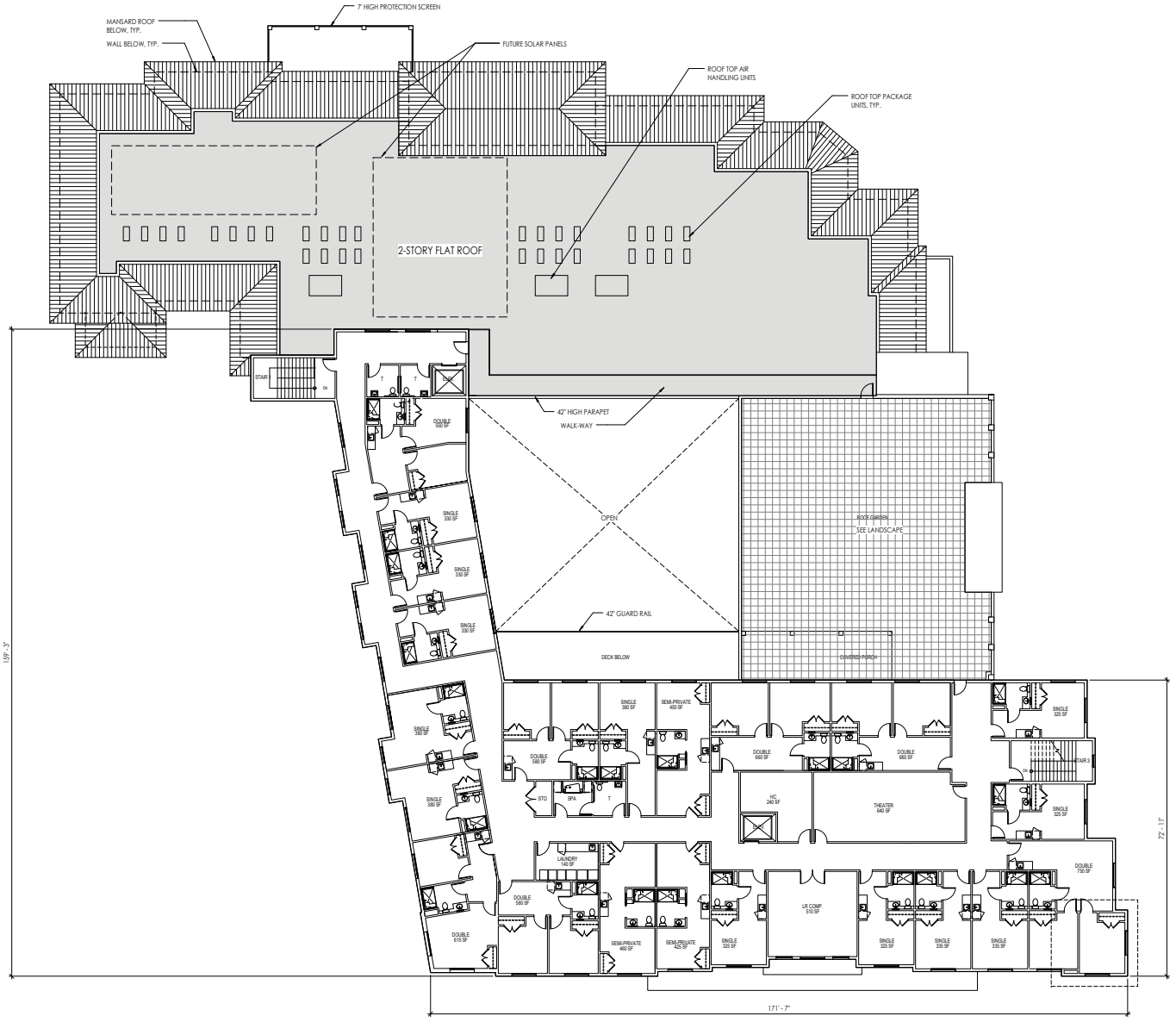
NORTH 0 20' 40' 80'

46 UNITS 33,684 S.F.

SECOND FLOOR PLAN A2.2

| JANUARY 22 2018 | REDWOOD CITY ASSISTED LIVING

SUNRISE SENIOR LIVING



UNIT MIX (THIRD FLOOR):	
SINGLE	12
DOUBLE	07
SEMI-PRIVATE	03
TOTAL	22

HPI architecture

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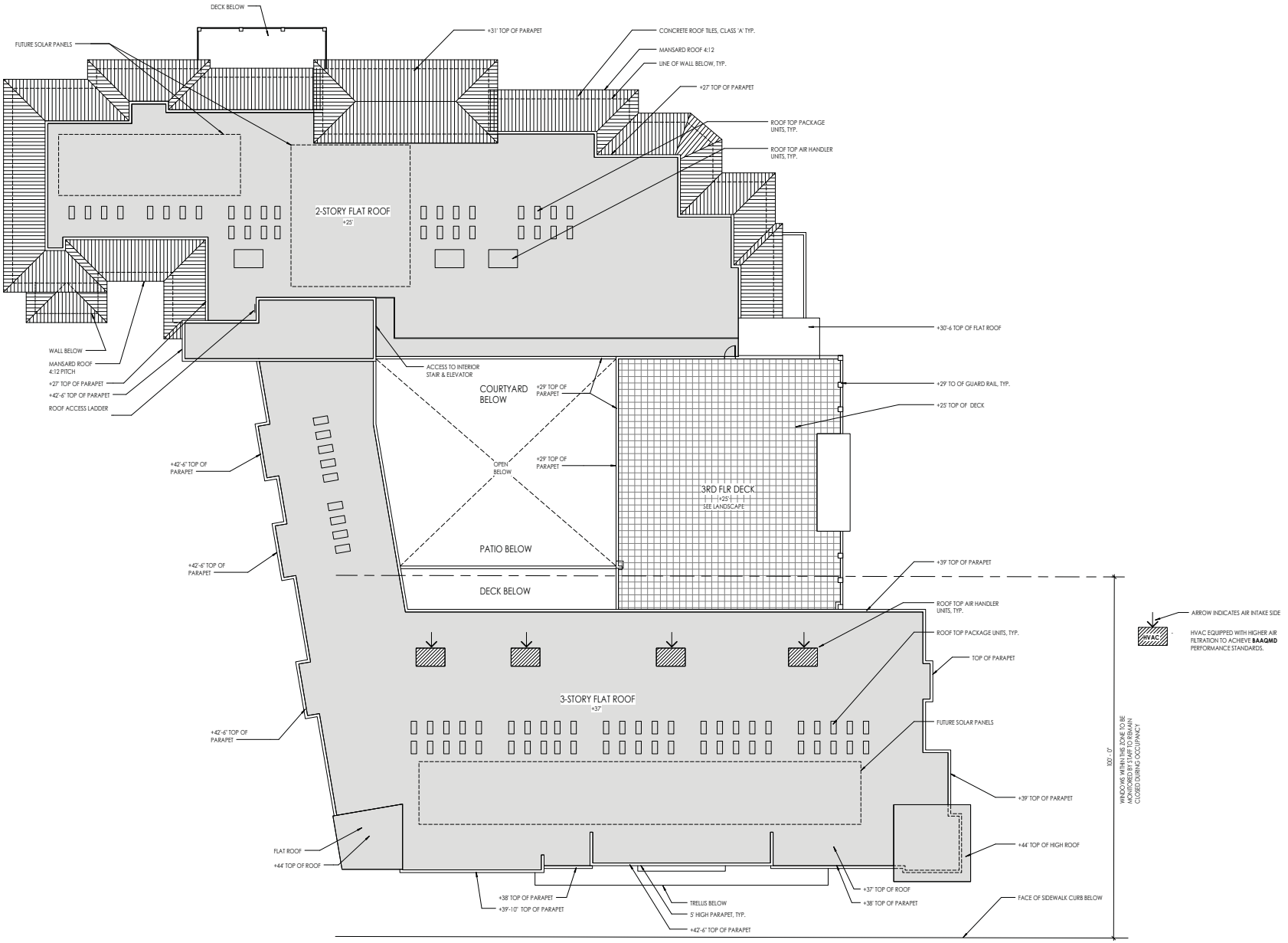
NORTH 0 20' 40' 80'

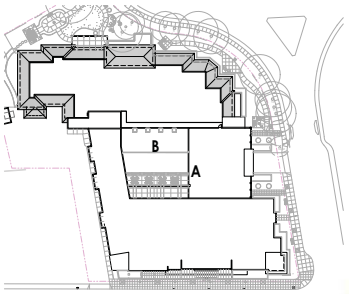
22 UNITS 15,377 S.F.

THIRD FLOOR PLAN A2.3

| JANUARY 22 2018 | REDWOOD CITY ASSISTED LIVING

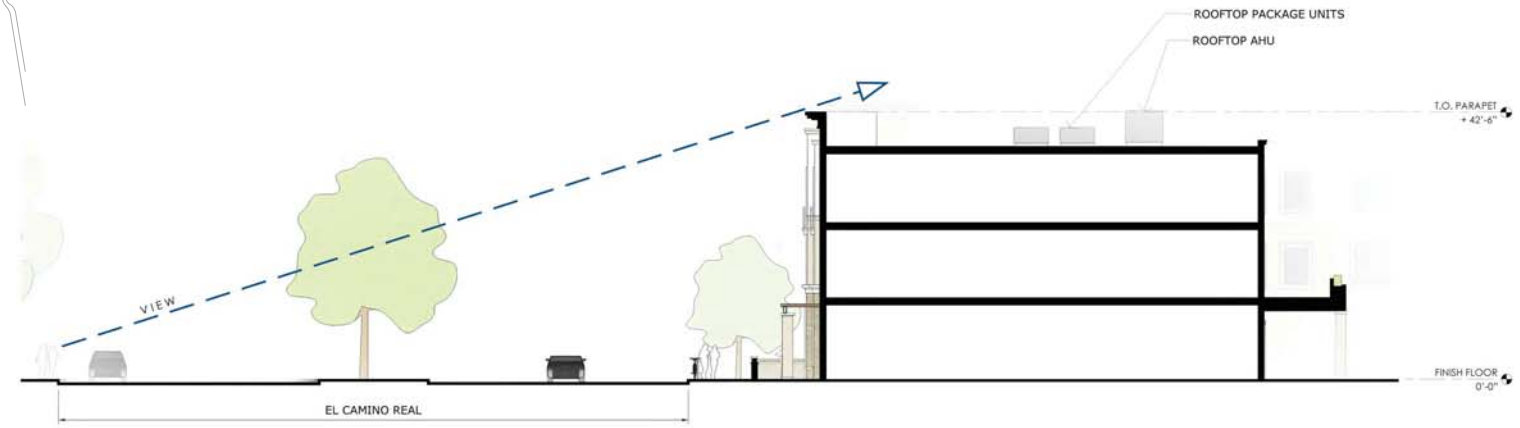
SUNRISE SENIOR LIVING


DECK BELOW
FUTURE SOLAR PANELS
+31' TOP OF PARAPET
CONCRETE ROOF TILES, CLASS 'A' TYP.
MANSARD ROOF 4:12
LINE OF WALL BELOW, TYP.
+27' TOP OF PARAPET
ROOF TOP PACKAGE UNITS, TYP.
ROOF TOP AIR HANDLER UNITS, TYP.
2-STORY FLAT ROOF
+25'
WALL BELOW
MANSARD ROOF 4:12 PITCH
+27' TOP OF PARAPET
+42'-6" TOP OF PARAPET
ROOF ACCESS LADDER
+30'-6 TOP OF FLAT ROOF
ACCESS TO INTERIOR STAIR & ELEVATOR
COURTYARD BELOW
+29' TOP OF PARAPET
+29' TO OF GUARD RAIL, TYP.
+25' TOP OF DECK
+42'-6" TOP OF PARAPET
OPEN BELOW
+29' TOP OF PARAPET
3RD FLR DECK
+25'
SEE LANDSCAPE
PATIO BELOW
+42'-6" TOP OF PARAPET
+39' TOP OF PARAPET
DECK BELOW
ROOF TOP AIR HANDLER UNITS, TYP.
ROOF TOP PACKAGE UNITS, TYP.
TOP OF PARAPET
3-STORY FLAT ROOF
+37'
+42'-6" TOP OF PARAPET
FUTURE SOLAR PANELS
+39' TOP OF PARAPET
FLAT ROOF
+44' TOP OF ROOF
+44' TOP OF HIGH ROOF
+38' TOP OF PARAPET
+39'-10" TOP OF PARAPET
TRELLIS BELOW
5' HIGH PARAPET, TYP.
+42'-6" TOP OF PARAPET
+37' TOP OF ROOF
+38' TOP OF PARAPET
FACE OF SIDEWALK CURB BELOW
100'-0"
WINDOWS WITHIN THE ZONE TO BE MONITORED BY STAFF TO REMAIN CLOSED DURING OCCUPANCY
ARROW INDICATES AIR INTAKE SIDE
HVAC EQUIPPED WITH HIGHER AIR FILTRATION TO ACHIEVE BAAQMD PERFORMANCE STANDARDS.



KEYPLAN

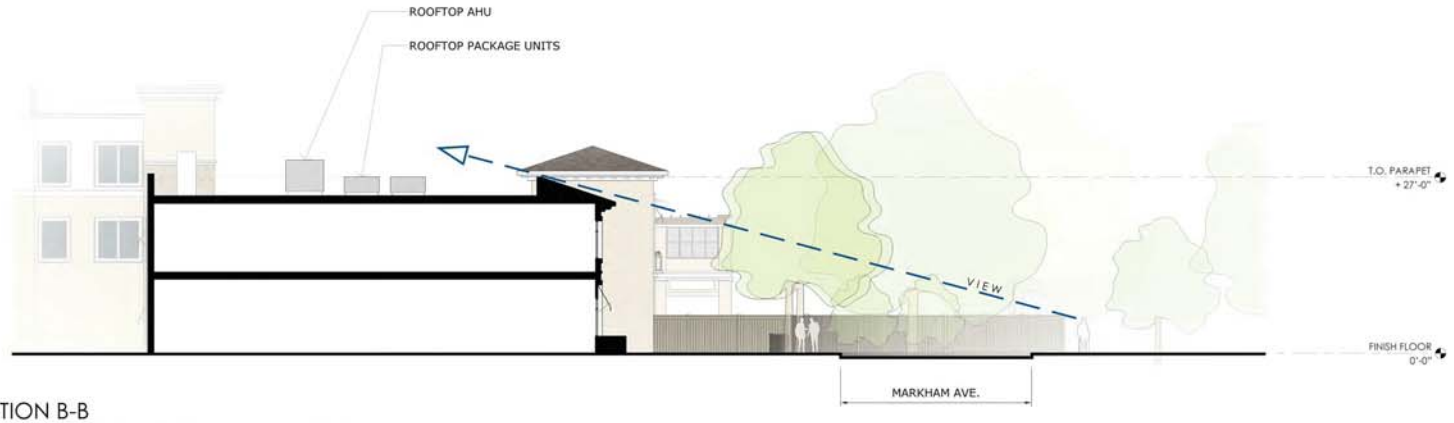
A



SECTION A-A
MECHANICAL EQUIPMENT SCREENING

NOTE:

EMERGENCY GENERATOR TO BE TESTED ONCE A MONTH FOR 30 MINUTES.



SECTION B-B
MECHANICAL EQUIPMENT SCREENING

VIEW FROM EL CAMINO REAL (SOUTH ELEVATION)

VIEW FROM SELBY (EAST ELEVATION)

VIEW FROM MARKHAM (NORTH ELEVATION)

VIEW FROM PARKING (WEST ELEVATION)

KEY NOTES

1 STUCCO FINISH (FIELD)*
2 STUCCO FINISH (ACCENT)*
3 3' HIGH WOOD FENCE
4 STONE VENEER*
5 CONCRETE TILE ROOF*
6 AWNING*
7 MOULDINGS @ WINDOWS*
8 PUNCHED WINDOWS
9 DECORATIVE BALCONIES
10 ROOF DECK PATIO TRELLIS
11 STONE MOULDING @ PARAPET*
12 BOX PLANTER
13 6' HIGH WOOD FENCE
14 DOUBLE GLAZED DIVIDED LITE WINDOW
15 OPEN @ ENTRY DRIVE
16 PANEL REVEAL
17 OUTRIGGER TRELLIS*
18 MONUMENT SIGN

* SEE MATERIALS DESCRIPTION BELOW

MATERIALS

ROOFING:
Eagle Roofing
Bel Air Flat Concrete Tile
4645 Sunrise Blend

STONE VENEER:
CORONADO Country Rubble
Antique Cream (Stacked)

PAINT:
STUCCO** FIELD:
Sherwin Williams
SW6140 Moderate White

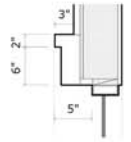
STUCCO** / CORNICE ACCENT:
Sherwin Williams
SW6141 Softer Tan

CORNICE / WINDOW TRIM:
Sherwin Williams
SW7138 Lavender Wisp

TRELLIS / WROUGHT IRON:
Sherwin Williams
SW7040 Smokehouse

AWNINGS:
Hunter Douglas M Screen 6005
Charcoal / Mandarin

** LaHabra stucco: 7/8" 3-coat stucco over approved substrate



WINDOW TRIM PROFILE

0 20' 40' 80'

1 VIEW FROM CORNER OF EL CAMINO REAL AND E. SELBY LANE

KEY SITE PLAN

2 VIEW FROM CORNER OF E. SELBY LANE AND MARKHAM AVE.

KEY SITE PLAN

3 VIEW OF MAIN ENTRY FROM E. SELBY LANE

KEY SITE PLAN

4 VIEW FROM MARKHAM AVE.

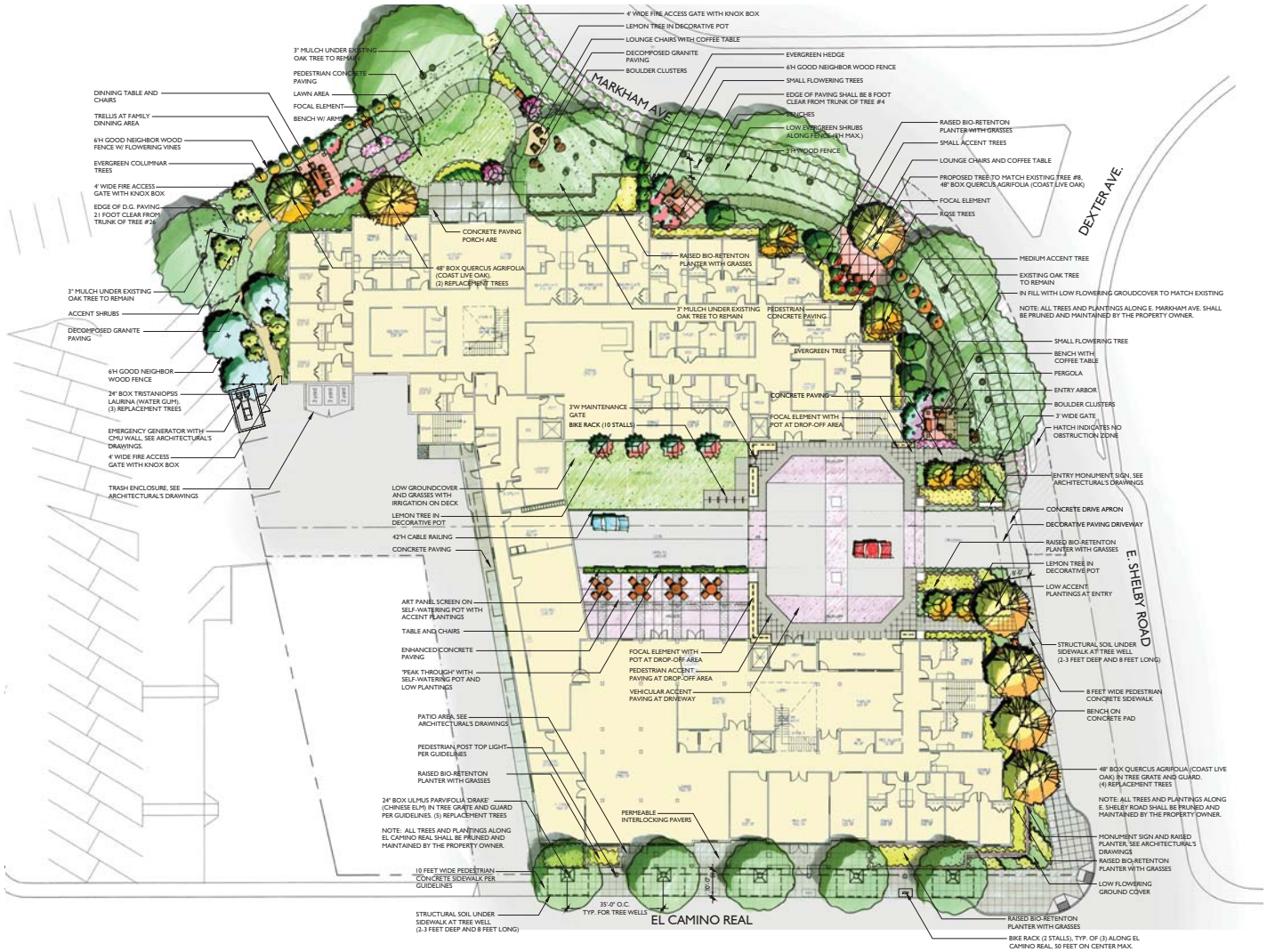
KEY SITE PLAN

5 VIEW OF MAIN ENTRY FROM E. SELBY LANE

KEY SITE PLAN

AERIAL VIEW FROM NORTH-EAST

AERIAL VIEW FROM SOUTH-EAST



0 8' 16' 32'

L-1

GATES +ASSOCIATES

SUNRISE REDWOOD CITY SAN MATEO COUNTY

LANDSCAPE CONCEPTUAL PLAN (GROUND LEVEL)

MARCH 2, 2018

ASSISTED LIVING COURTYARD


PERGOLA


ENTRY ARBOR


LARGE BENCH W/ ARM


TABLE AND CHAIRS


3' HIGH WOOD FENCE


BIRD BATH


BIRD HOUSE


RAISED VEGETABLE PLANTER

MEMORY CARE COURTYARD


6H GOOD NEIGHBOR WOOD FENCE


TRELLIS AT FAMILY DINNING AREA


DINNING TABLE AND CHAIRS


SMALL BENCH W/ ARM


LOUNGE CHAIR AND COFFEE TABLE


BOULDERS

"GREEN" COURTYARD AND DROP-OFF AREA


LEMON TREES IN POT


42"H CABLE RAILING


GREEN COURTYARD

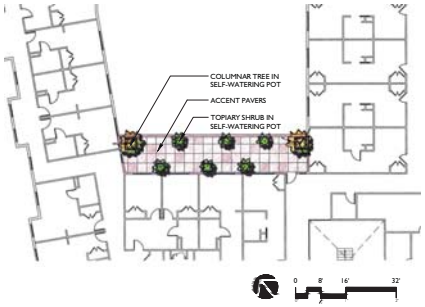

FOCAL ELEMENT AT AT DROP-OFF AREA

OUTDOOR DINNING


ART PANEL SCREEN ON POTS


TABLE AND CHAIRS

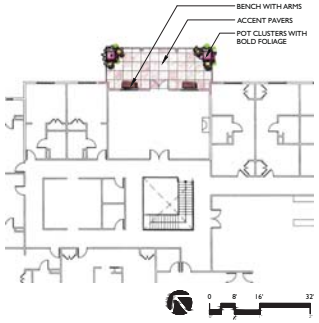

BIKE RACK




TOPIARY SHRUB IN POT


ITALIAN CYPRESS IN POT

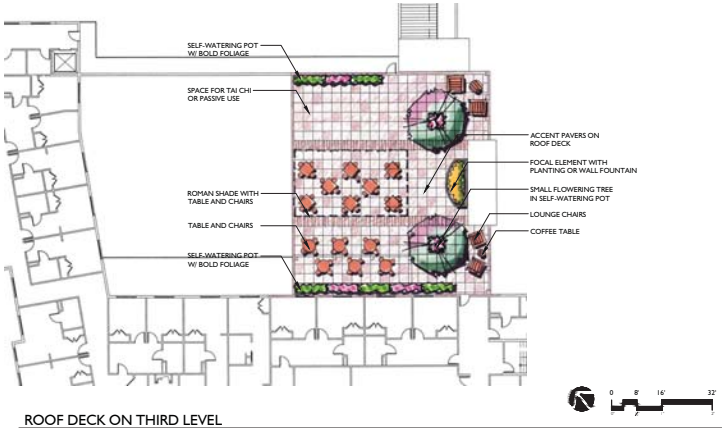
TOPIARY DECK ON SECOND LEVEL




BOLD FOLIAGE ON POT


SMALL BENCH W/ ARM

ACTIVITY DECK ON SECOND LEVEL



ROOF DECK ON THIRD LEVEL


SELF-WATERING TREE POT


SELF-WATERING POT


LOUNGE CHAIR AND COFFEE TABLE


TABLE AND CHAIRS


TAI CHI ACTIVITY


WALL WATER FEATURE


ROMAN SHADE STRUCTURE


ACCENT PAVERS ON ROOF DECK

TREES


ACER GRISEUM


CITRUS TREES

CUPRESSUS SEMPERVIRENS


LAGERSTROEMIA 'MUSKOGEE'


QUERCUS AGRIFOLIA


TRISTANIOPSIS LAURINA


ROSA TREE


ULMUS PARVIFOLIA 'DRAKE'

SHRUBS/ GROUND COVER/ GRASSES


BUXUS SEMPERVIRENS


CAREX TUMULICOLA


CISTUS 'SUNSET'


DIETES GRANDIFLORA 'VARIEGATA'


ERIGERON KARVINSKIANUS


HEBE 'VERONICA LAKE'


HEMEROCALLIS HYBRID 'SPARKLES'


HELICTOTRICHON SEMPERVIRENS


LAVENDULA INTERMEDIA 'PROVENCE'


LIRIOPE MUSCARI


LOMANDRIA LONGIFOLIA 'BREEZE'


SALVIA MICROPHYLLA 'LITTLE KISS'

RAISED BIO-RETENTION PLANTER


CHONDROPETALUM TECTORUM


JUNCUS PATENS

VINES


HARDENBERGIA VIOLACEA


JASMINUM POLYANTHUM


SOLANUM JASMINOIDES

PLANT LIST

TREES

Symbol	Botanical Name	Common Name	Size	Spacing	Water Needs
AS	Acer grisuem	Paperbark Maple	15 Gallon	AS SHOWN	MOD
CT	x Chitalpa tashkentensis	Chitalpa	24" Box	AS SHOWN	LOW
CI	Citrus trees	Lemon	15 Gallon	AS SHOWN	MOD
CS	Cupressus sempervirens	Italian Cypress	15 Gallon	AS SHOWN	LOW
LU	Lagerstroemia 'Muskogee'	Crape Myrtle	24" Box	AS SHOWN	LOW
LT	Lagerstroemia 'Tuscarora'	Crape Myrtle	24" Box	AS SHOWN	LOW
QA	Quercus agrifolia	Coast Live Oak	36" Box	AS SHOWN	VERY LOW
RS	Rosa spp. Standard	Rose Standard	15 Gallon	AS SHOWN	MOD
TL	Tristaniopsis laurina	Water Gum	24" Box	AS SHOWN	MOD
UP	Ulmus parvifolia 'Drake'	Chinese Lacebark Elm	24" Box	AS SHOWN	LOW

SHRUBS

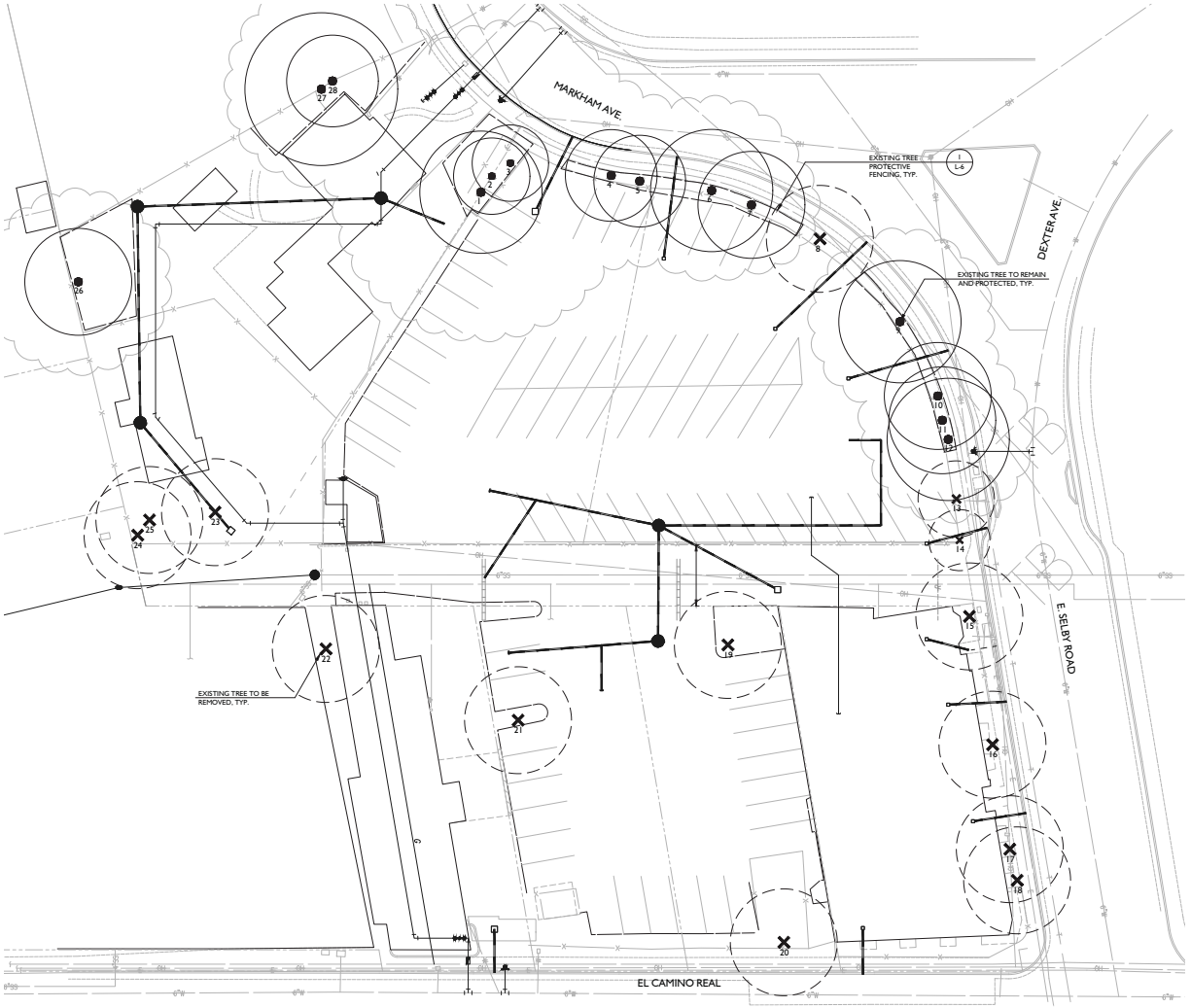
Symbol	Botanical Name	Common Name	Size	Spacing	Water needs
AA	Agapanthus 'Peter Pan'	Peter Pan's Lily of the Nile	1 Gallon	2'-0" O.C.	MOD
AG	Agapanthus 'Elaine'	Elaine's Lily of the Nile	1 Gallon	2'-0" O.C.	MOD
AJ	Aucuba japonica 'Variegata'	Variegated Japanese Aucuba	5 Gallon	3'-0" O.C.	MOD
BD	Buddleja davidii 'Blue Chip'	Blue Chip Butterfly Bush	1 Gallon	3'-0" O.C.	LOW
BS	Buxus sempervirens	Common Boxwood	1 Gallon	3'-0" O.C.	LOW
CA	Camellia x 'Buttermint'	Buttermint Camellia	5 Gallon	4'-0" O.C.	MOD
CS	Cistus 'Sunset'	Sunset Rockrose	1 Gallon	3'-0" O.C.	LOW
CO	Correa pulchella	Australian Fuchsia	1 Gallon	3'-0" O.C.	LOW
DV	Dietes grandiflora 'Variegata'	Striped Fortnight Lily	5 Gallon	3'-0" O.C.	LOW
EC	Escallonia 'Compakta'	Compact Escallonia	5 Gallon	3'-0" O.C.	MOD
GJ	Gardenia jasminoides	Gardenia	1 Gallon	3'-0" O.C.	MOD
HB	Hebe 'Veronica Lake'	Veronica Lake Hebe	5 Gallon	3'-0" O.C.	MOD
HH	Hemerocallis hybrid 'Sparkles'	Evergreen Day Lily	1 Gallon	2'-0" O.C.	MOD
LI	Lavendula intermedia 'Provence'	Provence Lavender	1 Gallon	2'-6" O.C.	LOW
LC	Loropetalum chinensis	Loropetalum	5 Gallon	4'-0" O.C.	LOW
ND	Nadina domestica 'Gulf Stream'	Heavenly Bamboo	5 Gallon	3'-0" O.C.	LOW
RC	Rhaphiolepis indica 'Ballerina'	Ballerina Indian Hawthorn	5 Gallon	4'-0" O.C.	LOW
RJ	Rhaphiolepis indica 'Jack Evans'	Jack Evans Indian Hawthorn	5 Gallon	4'-0" O.C.	LOW
RO	Rhododendron Molla Hybrid	Yellow Rhododendron	5 Gallon	4'-6" O.C.	MOD
SL	Salvia microphylla 'Little Kiss'	Little Kiss Sage	5 Gallon	2'-0" O.C.	MOD
VB	Viburnum xburkwoodii 'Mohawk'	Mohawk Viburnum	5 Gallon	5'-0" O.C.	MOD

GROUND COVERS/GRASSES

Symbol	Botanical Name	Common Name	Size	Spacing	Water needs
CT	Carex tumulicola	Berkeley Sedge	1 Gallon	1'-6" O.C.	MOD
CH	Chondropetalum tectorum	Little Cape Rush	5 Gallon	3'-6" O.C.	MOD
EK	Erigeron karvinskianus	Fleabane	1 Gallon	2'-0" O.C.	LOW
FI	Festuca idahoensis	Idaho Fescue	1 Gallon	1'-0" O.C.	LOW
HS	Helictotrichon sempervirens	Blue Oat Grass	1 Gallon	1'-0" O.C.	LOW
JP	Juncus patens	California Gray Rush	1 Gallon	2'-6" O.C.	MOD
GJ	Geranium 'Johnson's Blue'	Johnson's Blue Geranium	1 Gallon	2'-0" O.C.	MOD
LR	Lantana 'Rainbow'	Rainbow Lantana	1 Gallon	3'-0" O.C.	LOW
LE	Limonium perezii	Sea Lavender	1 Gallon	3'-0" O.C.	LOW
LM	Liriope muscari	Lily Turf	1 Gallon	1'-0" O.C.	MOD
LL	Lomandria longifolia 'Breeze'	Mat Rush	1 Gallon	3'-0" O.C.	LOW
RM	Rosa meidiland - yellow	Yellow Carpet Rose	2 Gallon	4'-0" O.C.	MOD
TJ	Trachelospermum jasminoides	Star Jasmine	1 Gallon	2'-6" O.C.	MOD

VINES

Symbol	Botanical Name	Common Name	Size	Spacing	Water needs
HV	Hardenbergia violacea	Lilac Vine	1 Gallon	AS SHOWN	MOD
JF	Jasminum polyanthum	Jasmine	1 Gallon	AS SHOWN	MOD
SJ	Solanum jasminoides	Potato Vine	1 Gallon	AS SHOWN	MOD



TREE INVENTORY SPREADSHEET

TREE NO.	COMMON NAME	BOTANICAL NAME	DBH (IN.)	HEIGHT & SPREAD (FT.)	HEIGHT & STRUCTURE RATINGS (0-100% EACH)	REMOVE?	PROTECTED TREE PER COUNTY OF SAN MATEO
1	COAST LIVE OAK	QUERCUS AGRIFOLIA	30.4	30/40	90/65		X
2	COAST LIVE OAK	QUERCUS AGRIFOLIA	18.8	35/25	80/70		X
3	COAST LIVE OAK	QUERCUS AGRIFOLIA	28.2	30/25	75/65		X
4	CALIFORNIA VALLEY OAK	QUERCUS LOBATA	16.5	45/30	86/77		X
5	CALIFORNIA VALLEY OAK	QUERCUS LOBATA	20.4	45/30	85/80		X
6	COAST LIVE OAK	QUERCUS AGRIFOLIA	24	35/45	75/75		X
7	COAST LIVE OAK	QUERCUS AGRIFOLIA	14.3	35/35	80/70		X
8	COAST LIVE OAK	QUERCUS AGRIFOLIA	22	40/30	20/20	X	X
9	TREE OF HEAVEN	AILANTHUS ALTISSIMA	22	45/40	75/75		X
10	COAST LIVE OAK	QUERCUS AGRIFOLIA	18.8	35/35	85/75		X
11	COAST LIVE OAK	QUERCUS AGRIFOLIA	15.8	27/30	90/55		X
12	COAST LIVE OAK	QUERCUS AGRIFOLIA	19.4	35/40	85/80		X
13	COAST LIVE OAK	QUERCUS AGRIFOLIA	13.6	35/25	85/75	X	X
14	COAST LIVE OAK	QUERCUS AGRIFOLIA	12	20/20	75/50	X	X
15	EUROPEAN BIRCH	BETULA PENDULA	27	35/45	65/50	X	X
16	TULIP POPLAR	LIRIODENDRON TULIPIFERA	17.5	25/30	70/45	X	X
17	TULIP POPLAR	LIRIODENDRON TULIPIFERA	17.3	25/30	65/55	X	X
18	TULIP POPLAR	LIRIODENDRON TULIPIFERA	15.6	30/25	65/55	X	X
19	AMERICAN ELM	ULMUS AMERICANA	29.7	35/40	25/25	X	X
20	TREE OF HEAVEN	AILANTHUS ALTISSIMA	28.1	35/30	20/15	X	X
21	AMERICAN ELM	ULMUS AMERICANA	43.5	45/45	40/30	X	X
22	TREE OF HEAVEN	AILANTHUS ALTISSIMA	21	35/30	70/55	X	X
23	COAST LIVE OAK	QUERCUS AGRIFOLIA	35	40/50	90/60	X	X
24	COAST LIVE OAK	QUERCUS AGRIFOLIA	26	35/30	90/60	X	X
25	COAST LIVE OAK	QUERCUS AGRIFOLIA	26	27/30	90/40	X	X
26	CALIFORNIA VALLEY OAK	QUERCUS LOBATA	30	35/35	75/65		X
27	COAST LIVE OAK	QUERCUS AGRIFOLIA	30.5	50/50	90/70		X
28	COAST LIVE OAK	QUERCUS AGRIFOLIA	30.3	30/30	75/60		X

LEGEND:

- EXISTING TREE TO BE REMOVED
- EXISTING TREE TO REMAIN
- TREE PROTECTIVE FENCING

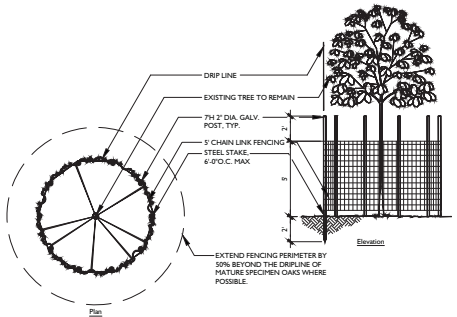
NOTE:
1. INFORMATION PROVIDED ON THIS PLAN IS BASED ON THE MAY 2, 2017 TREE REPORT BY WALTER LEVISON, CONSULTING ARBORIST. AND REVISED REPORT DATED OCTOBER 25, 2017.
2. TREE NUMBERING ARE PER ARBORIST REPORT.
3. SEE SHEET L-6 FOR TREE PROTECTION NOTES AND DETAIL.
4. REPLACEMENT TREES FOR TREES REMOVED SHALL BE 1:1 RATIO.
5. (6) COAST LIVE OAK PROPOSED TO BE REMOVED SHALL BE REPLACED WITH 48" BOX SIZE COAST LIVE OAK TREE.
6. AN ARBORIST'S REPORT IS REQUIRED FOR SIGNIFICANT OR HERITAGE TREES PROPOSED FOR REMOVAL ON THE BASIS OF POOR HEALTH, POTENTIAL HAZARD, OR WHEN A SIGNIFICANT OR HERITAGE TREE(S) IS PROPOSED TO REMAIN, BUT NEW DEVELOPMENT WOULD ENCROACH WITHIN THE DRIP LINE OF THE TREE.
7. THE ARBORIST'S REPORT SHALL ASSESS TREE CONDITION FOR ALL SIGNIFICANT OR HERITAGE TREES, AND ANY MEASURES NECESSARY TO PROTECT TREES ON SITE DURING DEMOLITION OR CONSTRUCTION, INCLUDING ANY REMEDIAL MEASURES NECESSARY TO SUSTAIN IMPACTED TREES. TREE PROTECTION MEASURES SHALL COMPLY WITH SAN MATEO COUNTY'S TREE PROTECTION REQUIREMENTS.
8. FOR DEVELOPMENT WITHIN A TREE DRIPLINE THE REPORT SHALL ASSESS POTENTIAL TREE SURVIVAL AND LONGEVITY, AND SPECIAL MEASURES NEEDED TO PROTECT ANY SUCH TREES OR POST CONSTRUCTION.

0 8' 16' 32'

L-5

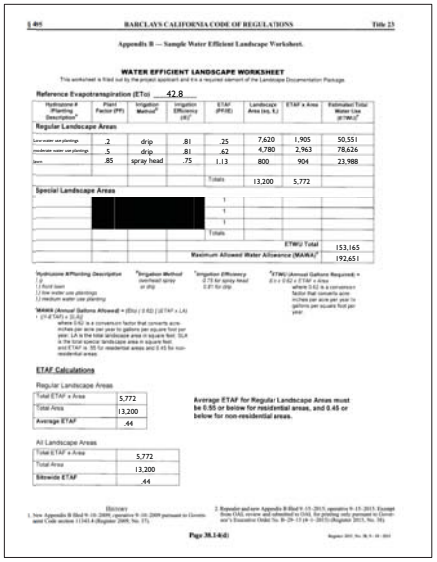
TREE PROTECTION NOTES

1. PRIOR TO INITIATING ANY CONSTRUCTION ACTIVITY IN THE AREA, INCLUDING GRADING, TEMPORARY PROTECTIVE FENCING SHALL BE INSTALLED AT EACH SITE TREE. FENCING SHALL BE LOCATED AT OR BEYOND THE CANOPY DRIP LINE SO THAT 100% OF THE DRIP LINE WILL BE PROTECTED BY FENCING. TO REDUCE SOIL COMPACTION FROM EQUIPMENT.
2. THE CONTRACTOR IS REQUIRED TO WATER, FERTILIZE AND ATTEND TO OTHER MAINTENANCE NEEDS OF EXISTING TREES AS NEEDED PER ARBORIST'S RECOMMENDATIONS TO MAINTAIN HEALTHY GROWTH THROUGHOUT THE CONSTRUCTION PERIOD. SIX FEET DIAMETER, MINIMUM, BY SIX INCH TALL EARTH BERMS SHALL BE CONSTRUCTED AT THE BASE OF EACH TREE TO FUNCTION AS TEMPORARY WATERING BASINS DURING THE CONSTRUCTION PERIOD. TREES SHALL BE WATERED ACCORDING TO WEATHER AND TREE REQUIREMENTS. APPROVED MULCH OF 1-2 INCH SIZED WOOD CHIPS SHALL BE PLACED AT A DEPTH OF 4 INCHES WHERE NO EXCAVATION IS TO OCCUR IN THE VICINITY OF THE TREES TO BE PROTECTED.
3. THE TREE PROTECTION FENCE SHALL BE 5' HIGH CHAIN LINK FENCE WITH IMMOVABLE POSTS. THE FENCING SHALL FORM A CONTINUOUS BARRIER WITHOUT ENTRY POINTS AROUND EACH TREE. ANY ENCROACHMENT INTO THE DRIP LINE FOR FENCING OR CONSTRUCTION PURPOSES SHALL NOT BE PERMITTED.
4. LOW HANGING LIMBS OF SAVED TREES SHALL BE PRUNED PRIOR TO GRADING, OR ANY EQUIPMENT MOBILIZATION ON SITE. THE PURPOSE OF THIS REQUIREMENT IS TO AVOID TEARING LIMBS BY HEAVY EQUIPMENT. ALL LIMBS TO BE PRUNED SHALL BE SUPERVISED BY THE ARBORIST OF RECORD FOR THE JOB.
5. THIS FENCING SHALL SERVE AS A BARRIER TO PREVENT DRIP LINE ENCROACHMENT OF ANY TYPE OF CONSTRUCTION ACTIVITIES AND EQUIPMENT. NO OILS, GAS, CHEMICALS, LIQUID WASTE, SOLID WASTE CONSTRUCTION MACHINERY OR CONSTRUCTION MATERIALS SHALL BE STORED OR ALLOWED TO STAND FOR ANY PERIOD OF TIME WITHIN THE DRIP LINE OF THE TREE. FURTHER, NO ONE SHALL ENTER THE FENCE PERIMETER FOR ANY REASON EXCEPT FOR THE PURPOSE OF MONITORING THE HEALTH OF THE TREE. ACCIDENTAL DAMAGE TO BARK, ROOT CROWN, OR LIMBS MAY INCREASE POTENTIAL FOR FUTURE DECLINE.
6. CONTRACTORS AND SUBCONTRACTORS SHALL DIRECT ALL EQUIPMENT AND PERSONNEL TO REMAIN OUTSIDE THE FENCED AREA AND AT ALL TIMES UNTIL PROJECT IS COMPLETE, AND SHALL INSTRUCT EMPLOYEES AS TO THE PURPOSE AND IMPORTANCE OF FENCING.
7. A 'TREE PROTECTION ZONE' SIGN SHALL BE POSTED AT EACH TREE INDICATING THE PURPOSE OF THE FENCING.
8. THE ARBORIST OF RECORD FOR THE JOB OR THE CITY ARBORIST SHALL BE RESPONSIBLE FOR INSPECTION AND APPROVAL OF THE FENCING PRIOR TO ANY GRADING OPERATIONS.
9. FENCING MUST REMAIN IN PLACE AND SHALL NOT BE REMOVED UNTIL ALL CONSTRUCTION ACTIVITIES ARE COMPLETED. THIS SHALL INCLUDE GRADING AND COMPACTION ACTIVITIES, INSTALLATION OF UNDERGROUND, ALL CONSTRUCTION ACTIVITIES AND ANY OTHER CONSTRUCTION OR ACTIVITY WHICH IS SCHEDULED PRIOR OR LANDSCAPE INSTALLATION.
10. ROOTS OF SINGLE STANDING TREES OFTEN EXTEND UP TO THREE TIMES THE DISTANCE OF THE ACTUAL DRIP LINE AND FUNCTION PRIMARILY IN THEY UPTAKE OF NUTRIENTS AND WATER. THE DRIP LINE IS ARBITRARILY ESTABLISHED AS THE MINIMUM ROOT AREA GENERALLY REQUIRED TO PRESERVE TREE HEALTH. AS MUCH AREA AROUND THE CIRCUMFERENCE OF THE TREE SHOULD HAVE MINIMUM INTRUSION TO FURTHER INSURE TREE SURVIVAL AND HEALTH.
11. UNAUTHORIZED TREE REMOVAL IS SUBJECT TO IN-KIND REPLACEMENT EQUAL TO THE VALUE OF THE MATURE RESOURCE LOST, AS DETERMINED BY THE COUNTY OF SAN MATEO.
12. NO MECHANICAL TRENCHING SHALL OCCUR WITHIN THE TREE PROTECTION ZONE. ANY EXCAVATION IF REQUIRED SHALL BE BY HAND, AIR SPADE OR BY VACUUM. CUTTING OF ANY ROOTS OVER 3" DIA SHALL BE REVIEWED BY AN ARBORIST.
13. THE CONTRACTOR SHALL CONTRACT WITH AN ARBORIST AS REQUIRED TO ENSURE PROPER TREE HEALTH IF A PROJECT ARBORIST OR CITY ARBORIST HAS NOT BEEN CONTRACTED.



1 EXISTING TREE PROTECTIVE FENCING
SCALE: 1/4" = 1'-0"

WATER EFFICIENCY LANDSCAPE ORDINANCE (WELO) WORKSHEET



§ 495 BARCLAYS CALIFORNIA CODE OF REGULATIONS Title 23

Appendix B — Sample Water Efficient Landscape Worksheet.

WATER EFFICIENT LANDSCAPE WORKSHEET

This worksheet is filled out by the project applicant and it is a required element of the Landscape Documentation Package.

Reference Evapotranspiration (ETo) 42.8

Hydrozone # /Planting Description*	Plant Factor (PF)	Irrigation Method*	Irrigation Efficiency (IE)*	ETAF (PF/IE)	Landscape Area (sq. ft.)	ETAF x Area	Estimated Total Water Use (ETWU)*
Regular Landscape Areas							
Low water use plantings	.2	drip	.81	.25	7,620	1,905	50,551
moderate water use plantings	.5	drip	.81	.62	4,780	2,963	78,626
lawn	.85	spray head	.75	1.13	800	904	23,988
				Totals	13,200	5,772	
Special Landscape Areas							
[redacted]				1			
				1			
				1			
				Totals			
						ETWU Total	153,165
						Maximum Allowed Water Allowance (MAWA)*	192,651

*Hydrozone #/Planting Description
1) Area1 lawn
2) low water use plantings
3) medium water use planting

*Irrigation Method
overhead spray or drip

*Irrigation Efficiency
0.75 for spray head
0.81 for drip

*ETWU (Annual Gallons Required) =
ETo x 0.62 x ETAF x Area
where 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year.

*MAWA (Annual Gallons Allowed) = (ETo) (.62) ([.45]ETAF x LA) + ([1-ETAF] x [LA])
where 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year, LA is the total landscape area in square feet, and ETAF is .55 for residential areas and 0.45 for non-residential areas.

ETAF Calculations

Regular Landscape Areas

Total ETAF x Area	5,772
Total Area	13,200
Average ETAF	.44

Average ETAF for Regular Landscape Areas must be 0.55 or below for residential areas, and 0.45 or below for non-residential areas.

All Landscape Areas

Total ETAF x Area	5,772
Total Area	13,200
Sitewide ETAF	.44

History
1. New Appendix B filed 9-10-2009; operative 9-10-2009 pursuant to Govern. [illegible] Code section 11343.4 (Register 2009, No. 37).
2. Repealer and new Appendix B filed 9-15-2015; operative 9-15-2015. Exempt from OAL review and submitted to OAL for printing only pursuant to Governor's Executive Order No. B-29-15 (B-29-15 (2015) (Register 2015, No. 38).

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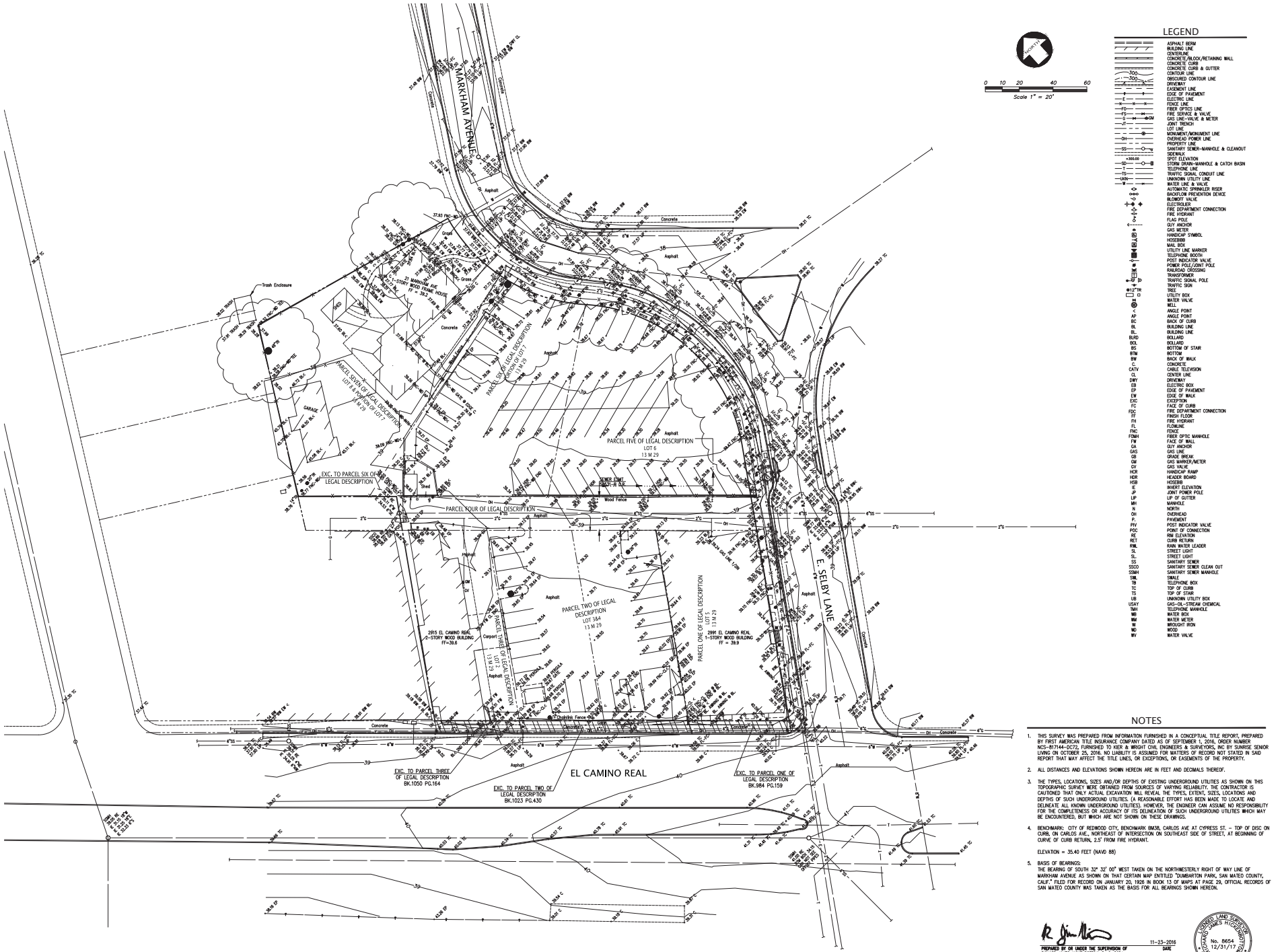
WATER EFFICIENT LANDSCAPE STATEMENT

1. THE IRRIGATION SYSTEM SHALL BE DESIGNED TO MEET CURRENT WATER EFFICIENCY STANDARDS AND STATE MODEL WATER EFFICIENT LANDSCAPE ORDINANCE AB1881 AS REQUIRED BY LOCAL JURISDICTIONS WHILE ACHIEVING THE GOAL OF EFFECTIVELY AND EFFICIENTLY PROVIDING THE LANDSCAPE WITH WATER BY MEANS OF HIGH EFFICIENCY SPRAY IRRIGATION TO THE TURF AND GROUND COVER AREAS AND DRIP IRRIGATION BUBBLERS TO RESTRICTED SHRUB PLANTING AND SHRUB MASS PLANTING AREAS AS APPLICABLE.
2. IRRIGATION SYSTEMS SHALL BE DESIGNED TO ACCOMMODATE RECYCLED WATER WHERE AVAILABLE EITHER CURRENTLY OR IN THE FUTURE AS DIRECTED BY THE LOCAL WATER PURVEYOR. RECYCLED WATER SYSTEMS SHALL BE DESIGNED IN ACCORDANCE WITH LOCAL AND STATE CODES.
3. IRRIGATION SYSTEMS FOR LANDSCAPES GREATER THAT 5,000 SF SHALL HAVE A DEDICATED WATER METER FOR IRRIGATION.
4. A WATER EFFICIENT LANDSCAPE WORKSHEET SHALL BE INCLUDED WITH HYDROZONE INFORMATION TABLE, WATER BUDGET CALCULATIONS AND IRRIGATION OPERATION SCHEDULES.
5. A STATE OF THE ART ET BASED SELF ADJUSTING IRRIGATION CONTROLLER SHALL BE SPECIFIED FOR THIS PROJECT TO AUTOMATICALLY CONTROL THE WATER ALLOCATED TO EACH VALVE GROUPED PER INDIVIDUAL HYDROZONE (BASED ON PLANT TYPE AND EXPOSURE). THIS SHALL INCLUDE RAIN AND FLOW SENSORS AS APPLICABLE FOR A HIGHER LEVEL OF WATER CONSERVATION.
6. TREE BUBBLERS SHALL BE INCLUDED ON SEPARATE CIRCUITS TO ISOLATE THE IRRIGATION TO THE TREES AND PROVIDE DEEP WATERING TO PROMOTE A DEEPER ROOT STRUCTURE.
7. SPRAY IRRIGATION SYSTEMS FOR GROUNDCOVER AREAS GREATER THAN 8' WIDE IN ANY DIRECTION SHALL BE DESIGNED WITH COMMERCIAL SERIES SPRAY HEADS WITH HIGH EFFICIENCY NOZZLES THAT INCLUDE INTERNAL CHECK VALVES AND PRESSURE COMPENSATION DEVICES. THE HEADS SHALL BE DESIGNED IN A HEAD TO HEAD LAYOUT TO ACHIEVE AN EVEN LEVEL OF PRECIPITATION THROUGHOUT THE IRRIGATION SYSTEM. THE NOZZLES DELIVER WATER AT MINIMUM 70% EFFICIENCY WITH A LOW PRECIPITATION RATE THAT MATCHES THE INFILTRATION RATE OF THE SOIL.
8. THE DRIP SYSTEM WILL INCORPORATE PRESSURE COMPENSATING DRIP BUBBLERS WITH 1/4" DRIP TUBES TO EACH PLANT WHICH DELIVERS WATER AT 90% EFFICIENCY AT AN APPLICATION RATE THAT MATCHES THE SOIL TYPE.



LEGEND

- ASPHALT BERM
- BUILDING LINE
- CENTERLINE
- CONCRETE/BLOCK/RETAINING WALL
- CONCRETE CURB
- CONCRETE CURB & GUTTER
- CONTOUR LINE
- OBSCURED CONTOUR LINE
- DRIVEWAY
- EASEMENT LINE
- EDGE OF PAVEMENT
- ELECTRIC LINE
- FENCE LINE
- FIBER OPTICS LINE
- FIRE SERVICE & VALVE
- GAS LINE-VALVE & METER
- JOINT TRENCH
- LOT LINE
- MONUMENT/MONUMENT LINE
- OVERHEAD POWER LINE
- PROPERTY LINE
- SANITARY SEWER-MANHOLE & CLEANOUT
- SIDEWALK
- SPOT ELEVATION
- STORM DRAIN-MANHOLE & CATCH BASIN
- TELEPHONE LINE
- TRAFFIC SIGNAL CONDUIT LINE
- UNKNOWN UTILITY LINE
- WATER LINE & VALVE
- AUTOMATIC SPRINKLER RISER
- BACKFLOW PREVENTION DEVICE
- BLOWOFF VALVE
- ELECTROLIER
- FIRE DEPARTMENT CONNECTION
- FIRE HYDRANT
- FLAG POLE
- GUY ANCHOR
- GAS METER
- HANDICAP SYMBOL
- HOSEBIBB
- MAIL BOX
- UTILITY LINE MARKER
- TELEPHONE BOOTH
- POST INDICATOR VALVE
- POWER POLE/JOINT POLE
- RAILROAD CROSSING
- TRANSFORMER
- TRAFFIC SIGNAL POLE
- TRAFFIC SIGN
- TREE
- UTILITY BOX
- WATER VALVE
- WELL
- ANGLE POINT
- AP ANGLE POINT
- BC BACK OF CURB
- BL BUILDING LINE
- BL BUILDING LINE
- BLRD BOLLARD
- BOL BOLLARD
- BS BOTTOM OF STAIR
- BTM BOTTOM
- BW BACK OF WALK
- C. CONCRETE
- CATV CABLE TELEVISION
- CL CENTER LINE
- DWY DRIVEWAY
- EB ELECTRIC BOX
- EP EDGE OF PAVEMENT
- EW EDGE OF WALK
- EXC EXCEPTION
- FC FACE OF CURB
- FDC FIRE DEPARTMENT CONNECTION
- FF FINISH FLOOR
- FH FIRE HYDRANT
- FL FLOWLINE
- FNC FENCE
- FOMH FIBER OPTIC MANHOLE
- FW FACE OF WALL
- GA GUY ANCHOR
- GAS GAS LINE
- GB GRADE BREAK
- GM GAS MARKER/METER
- GV GAS VALVE
- HCR HANDICAP RAMP
- HDR HEADER BOARD
- HSB HOSEBIB
- IE INVERT ELEVATION
- JP JOINT POWER POLE
- LIP LIP OF GUTTER
- MH MANHOLE
- N NORTH
- OH OVERHEAD
- P. PAVEMENT
- PIV POST INDICATOR VALVE
- POC POINT OF CONNECTION
- RE RIM ELEVATION
- RET CURB RETURN
- RWL RAIN WATER LEADER
- SL STREET LIGHT
- SL STREET LIGHT
- SS SANITARY SEWER
- SSCO SANITARY SEWER CLEAN OUT
- SSMH SANITARY SEWER MANHOLE
- SWL SWALE
- TBX TELEPHONE BOX
- TC TOP OF CURB
- TS TOP OF STAIR
- UB UNKNOWN UTILITY BOX
- USAY GAS-OIL-STREAM CHEMICAL
- TMH TELEPHONE MANHOLE
- WB WATER BOX
- WM WATER METER
- WI WROUGHT IRON
- WO WOOD
- WV WATER VALVE

0 10 20 40 60
Scale 1" = 20'

NOTES

1. THIS SURVEY WAS PREPARED FROM INFORMATION FURNISHED IN A CONCEPTUAL TITLE REPORT, PREPARED BY FIRST AMERICAN TITLE INSURANCE COMPANY DATED AS OF SEPTEMBER 1, 2016, ORDER NUMBER NCS-817144-OC72, FURNISHED TO KIER & WRIGHT CIVIL ENGINEERS & SURVEYORS, INC BY SUNRISE SENIOR LIVING ON OCTOBER 25, 2016. NO LIABILITY IS ASSUMED FOR MATTERS OF RECORD NOT STATED IN SAID REPORT THAT MAY AFFECT THE TITLE LINES, OR EXCEPTIONS, OR EASEMENTS OF THE PROPERTY.
2. ALL DISTANCES AND ELEVATIONS SHOWN HEREON ARE IN FEET AND DECIMALS THEREOF.
3. THE TYPES, LOCATIONS, SIZES AND/OR DEPTHS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS TOPOGRAPHIC SURVEY WERE OBTAINED FROM SOURCES OF VARYING RELIABILITY. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE TYPES, EXTENT, SIZES, LOCATIONS AND DEPTHS OF SUCH UNDERGROUND UTILITIES. (A REASONABLE EFFORT HAS BEEN MADE TO LOCATE AND DELINEATE ALL KNOWN UNDERGROUND UTILITIES). HOWEVER, THE ENGINEER CAN ASSUME NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF ITS DELINEATION OF SUCH UNDERGROUND UTILITIES WHICH MAY BE ENCOUNTERED, BUT WHICH ARE NOT SHOWN ON THESE DRAWINGS.
4. BENCHMARK: CITY OF REDWOOD CITY, BENCHMARK BM38, CARLOS AVE AT CYPRESS ST. - TOP OF DISC ON CURB, ON CARLOS AVE., NORTHEAST OF INTERSECTION ON SOUTHEAST SIDE OF STREET, AT BEGINNING OF CURVE OF CURB RETURN, 2.5' FROM FIRE HYDRANT.

   ELEVATION = 35.40 FEET (NAVD 88)
5. BASIS OF BEARINGS:
   THE BEARING OF SOUTH 32° 32' 00" WEST TAKEN ON THE NORTHWESTERLY RIGHT OF WAY LINE OF MARKHAM AVENUE AS SHOWN ON THAT CERTAIN MAP ENTITLED "DUMBARTON PARK, SAN MATEO COUNTY, CALIF." FILED FOR RECORD ON JANUARY 20, 1926 IN BOOK 13 OF MAPS AT PAGE 29, OFFICIAL RECORDS OF SAN MATEO COUNTY WAS TAKEN AS THE BASIS FOR ALL BEARINGS SHOWN HEREON.

R. J. Hickenbotham 11-23-2016
PREPARED BY OR UNDER THE SUPERVISION OF DATE
RICHARD JAMES HICKENBOTHAM, P.L.S. 8654
LICENSE EXPIRES: 12-31-17

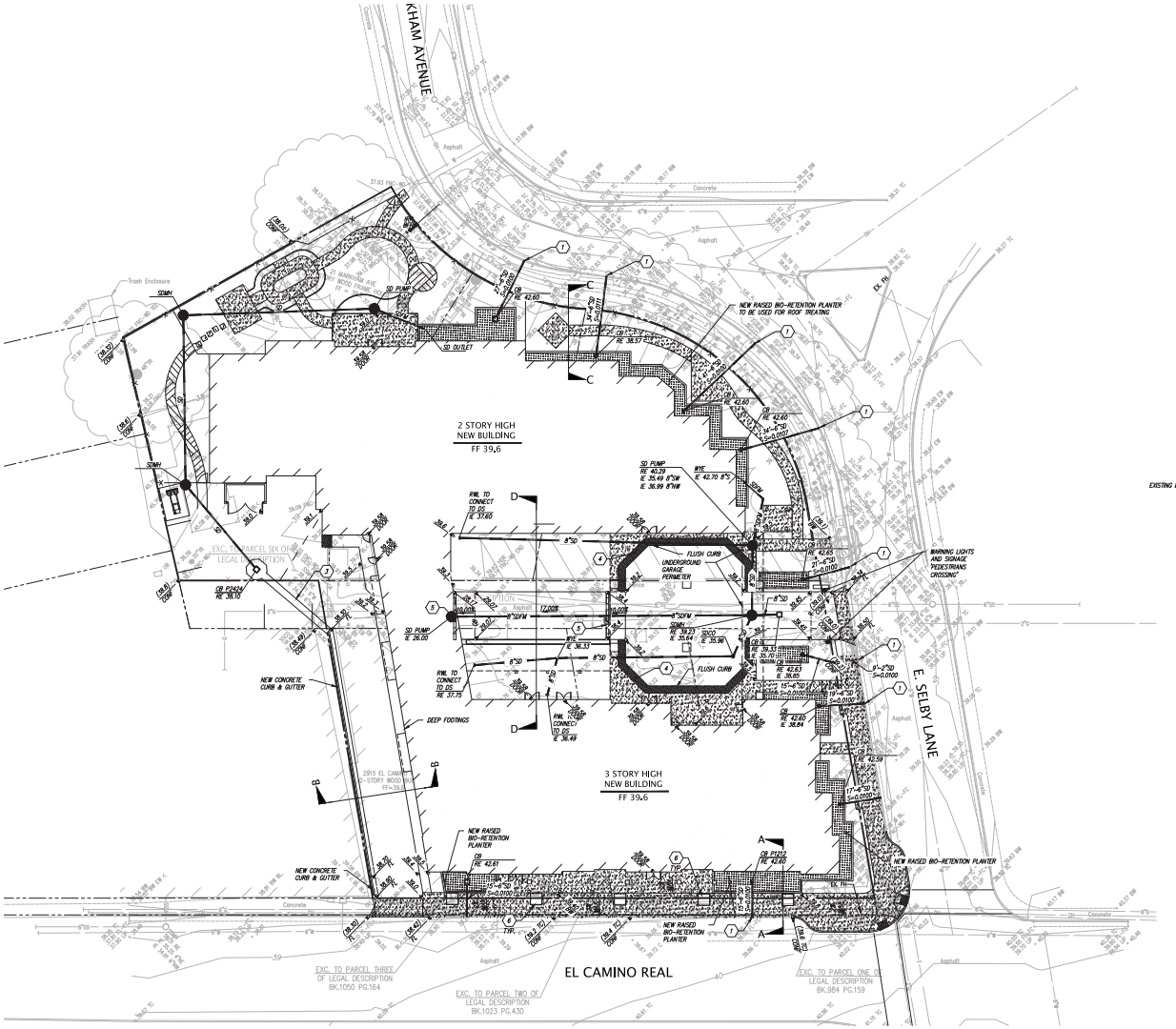
No. 8654 12/31/17 REGISTERED LAND SURVEYOR RICHARD JAMES HICKENBOTHAM STATE OF CALIFORNIA

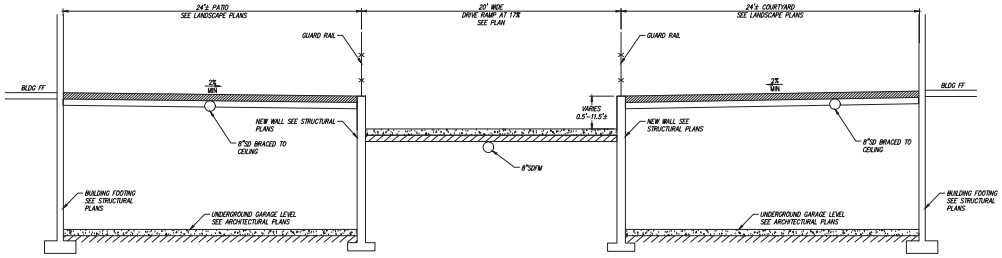
NO	REVISION	BY
1	PLANNING SUBMITTAL 06/07/2017	
2	PLANNING SUBMITTAL 09/14/2017	
3	PLANNING RESUBMITTAL 10/31/2017	
4	PLANNING RESUBMITTAL 1/22/2018	
5	PLANNING RESUBMITTAL 3/2/2018	

KIER & WRIGHT
CIVIL ENGINEERS & SURVEYORS, INC.
2850 Collier Canyon Road
Livermore, California 94551
Phone (925) 245-8788
Fax (925) 245-8796

TOPOGRAPHIC SURVEY
OF
2915 EL CAMINO REAL
FOR
SUNRISE SENIOR LIVING
REDWOOD CITY, CALIFORNIA

DATE	NOV, 2016
SCALE	1" = 20'
DESIGNER	EYS
JOB NO.	A16704
SHEET	C1
OF	- SHEETS





SECTION D
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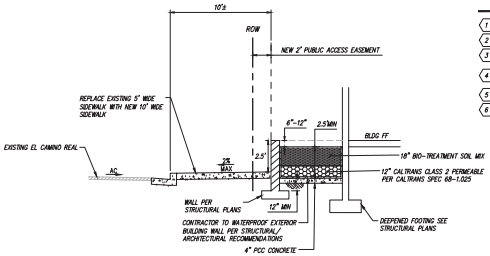

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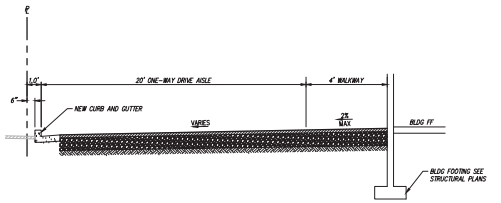

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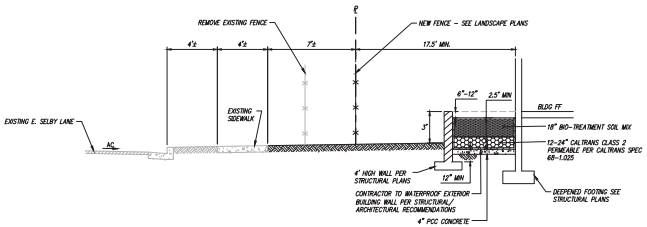

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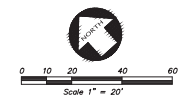

EARTHWORK SUMMARY

CUT: 11,000± CY

FILL: 0 CY

NOTES:
1. THE EARTHWORK QUANTITIES LISTED ON THESE PLANS ARE STATED ONLY FOR CALCULATION OF GRADING AND BUILDING PERMIT FEES. THESE QUANTITIES DO NOT INCLUDE TRENCH OR FOOTING SPOILS, SHRINK OR SWELL FROM COMPACTING EFFORTS OR OTHER VARIABLES. THE ENGINEER MAKES NO REPRESENTATION THIS SITE WILL BALANCE. THE CONTRACTOR SHALL DETERMINE HIS OWN EARTHWORK QUANTITIES AND BASE HIS BID ACCORDINGLY.

LEGEND

- AREA DRAIN
- STORM DRAIN CATCH BASIN
- STORM DRAIN JUNCTION BOX
- STORM DRAIN MANHOLE
- FL FLOW LINE
- FF FINISH FLOOR
- PV PAVEMENT
- RE RIM ELEVATION
- ROW RIGHT-OF-WAY
- 23.8 SPOT ELEVATION
- 4"SD STORM DRAIN LINE
- TC TOP OF CURB
- BIO-RETENTION PLANTER
- NEW IMPERVIOUS PAVEMENT
- 6" SLOPE CONCRETE SIDEWALK, 5.5" PCC OVER 6" CLASS II AB
- PERMEABLE PAVERS

LEGEND

1. DAY LIGHT THROUGH CURB
2. VACATE EXISTING 20' PUBLIC ACCESS ROAD
3. 3' WIDE VALLEY GUTTER
4. 3' WIDE TRUNCATED DOMES TO BE EMBEDDED IN CONCRETE
5. TRENCH DRAIN
6. NEW TREE WELLS

NO	REVISION	BY
1	PLANNING SUBMITTAL 06/05/2017	
2	PLANNING SUBMITTAL 09/14/2017	
3	PLANNING RESUBMITTAL 10/31/2017	
4	PLANNING RESUBMITTAL 1/22/2018	
5	PLANNING RESUBMITTAL 3/2/2018	

KIER & WRIGHT
CIVIL ENGINEERS & SURVEYORS, INC.
2850 Collier Canyon Road
Livermore, California 94551
Phone (925) 245-8788
Fax (925) 245-8796

CONCEPTUAL GRADING AND DRAINAGE PLAN
OF
2915 EL CAMINO REAL
FOR
SUNRISE SENIOR LIVING
REDWOOD CITY, CALIFORNIA

DATE	NOV, 2016
SCALE	1" = 20'
DESIGNER	EYS
JOB NO.	A16704
SHEET	C2
OF	– SHEETS

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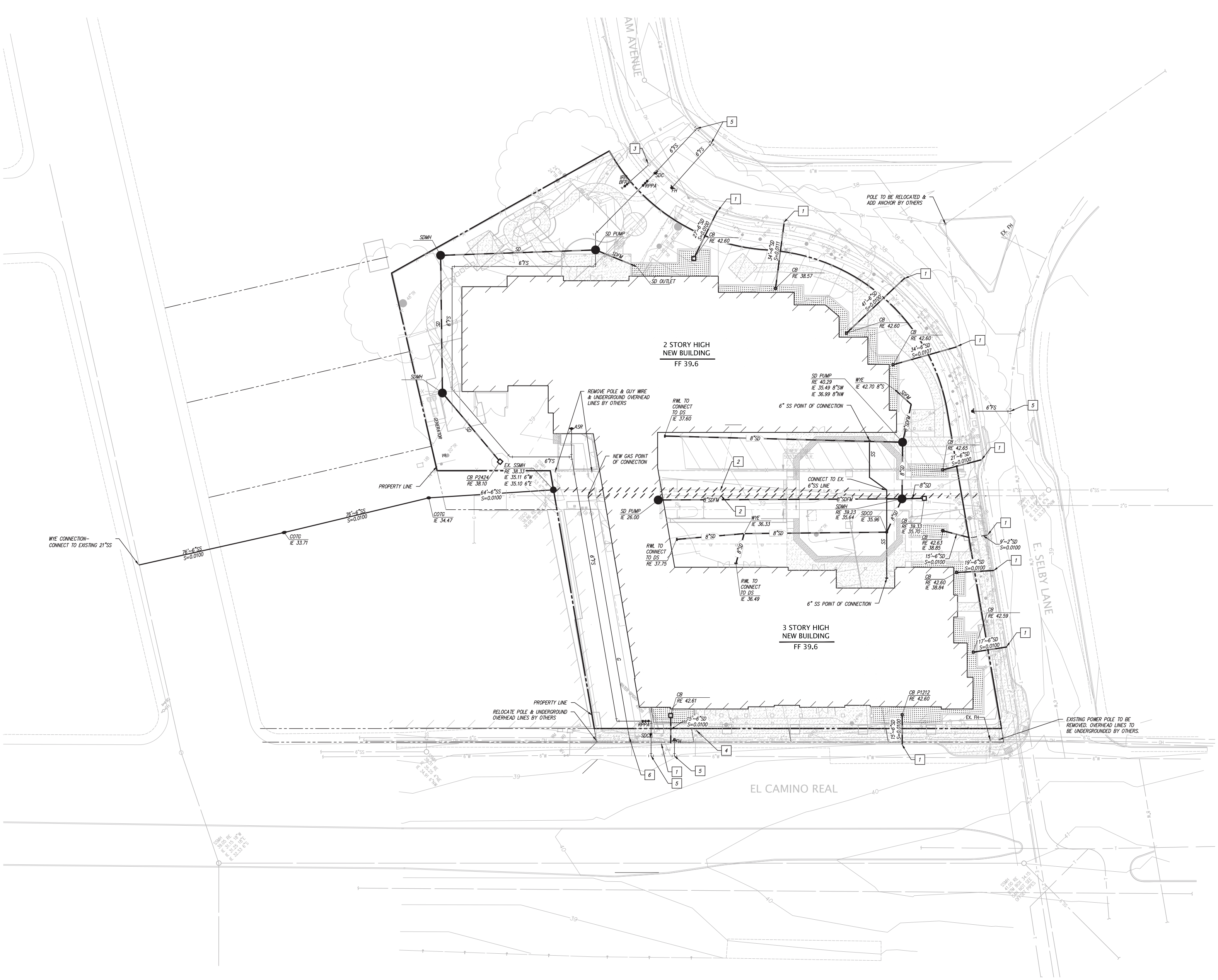

Scale 1" = 20'

LEGEND

ASR	AUTOMATIC SPRINKLER RISER
RE	RIM ELEVATION
TC	TOP OF CURB
WS	WATER SERVICE
	EXISTING UTILITY TO BE ABANDONDED BY REMOVAL
FS	FIRE SERVICE
SS	SANITARY SEWER
COTG	CLEANOUT TO GRADE
	STORM DRAIN LINE
	AREA DRAIN
	STORM DRAIN CATCH BASIN
	STORM DRAIN JUNCTION BOX
	STORM DRAIN MANHOLE
	REDUCED PRESSURE PRINCIPLE ASSEMBLY
	FIRE DEPARTMENT CONNECTION
	FIRE HYDRANT & VALVE
	POST INDICATOR VALVE
SSMH	SANITARY SEWER MANHOLE
	SINGLE DETECTOR CHECK
SDMH	STORM DRAIN MANHOLE
	WATER METER

LEGEND

1	DAYLIGHT THROUGH CURB
2	ABANDON EXISTING SEWER AND GAS LINE IN PUBLIC ACCESS ROAD
3	EXISTING WATER METER TO BE REUSED FOR IRRIGATION USE
4	EXISTING WATER METER TO BE REUSED FOR DOMESTIC USE
5	CONNECT TO EXISTING WATER MAIN
6	CONNECT TO EXISTING GAS LINE

NO.	REVISION	BY
	PLANNING SUBMITTAL 06/05/2017	
	PLANNING SUBMITTAL 09/14/2017	
	PLANNING RESUBMITTAL 10/31/2017	
	PLANNING RESUBMITTAL 1/22/2018	
	PLANNING RESUBMITTAL 3/2/2018	

NO.	REVISION	BY

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CIVIL ENGINEERS & SURVEYORS, INC.
2850 Collier Canyon Road
Livermore, California 94551
Phone (925) 245-8788
Fax (925) 245-8796

REGISTERED PROFESSIONAL ENGINEER EMAD Y. SARTEDDINE No. 65112 CIVIL STATE OF CALIFORNIA

PRELIMINARY UTILITY PLAN
OF
2915 EL CAMINO REAL
FOR
SUNRISE SENIOR LIVING

REDWOOD CITY, CALIFORNIA

DATE	NOV, 2016
SCALE	1" = 20'
DESIGNER	EYS
JOB NO.	A16704
SHEET	C3
OF	- SHEETS

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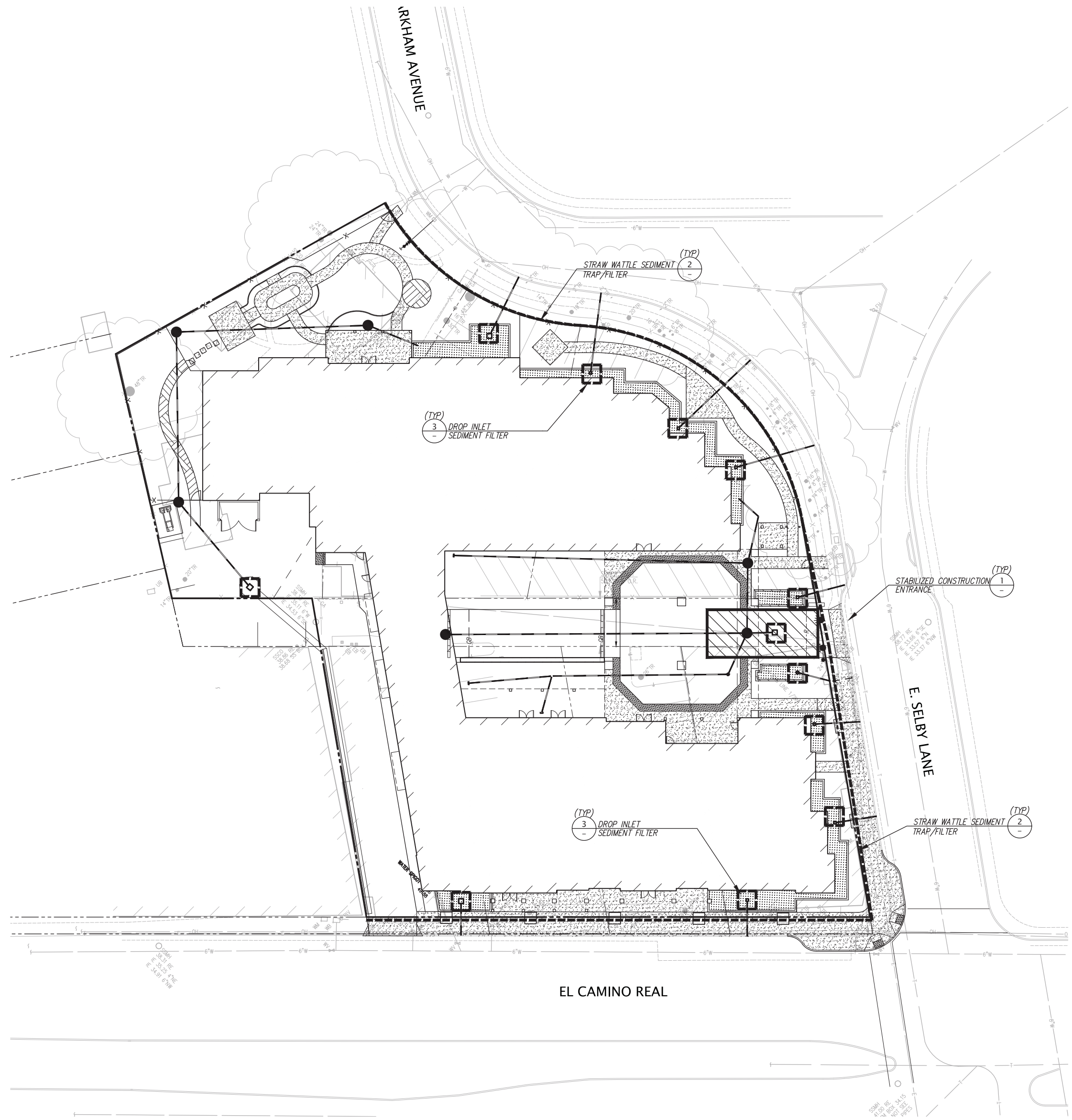
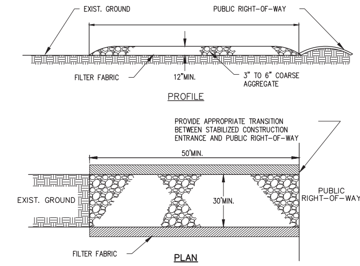
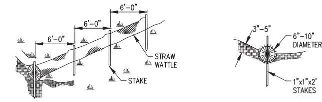




STABILIZED CONSTRUCTION ENTRANCE (1)

NOT TO SCALE

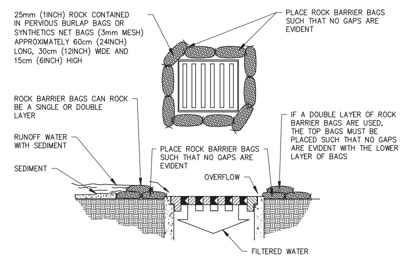


NOTE:

1. STRAW WATTLES ARE TUBES MADE FROM STRAW BOUND W/BIO-DEGRADABLE NETTING. THEY ARE APPROX. 6"-10" DIA AND 20-30 FT LONG.
2. STRAW WATTLES TRAP SEDIMENT AND REDUCE SHEET AND HILL EROSION BY REDUCING SLOPE GRADIENT. INCREASING INFILTRATION RATES AND BY PRODUCING A FAVORABLE ENVIRONMENT FOR PLANT ESTABLISHMENT.
3. STRAW WATTLE INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE WATTLE IN A TRENCH 3"-5" DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND WATTLE.

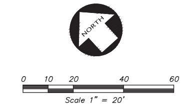
STRAW WATTLE SEDIMENT TRAP/FILTER (2)

NOT TO SCALE



DROP INLET SEDIMENT FILTER UTILIZING ROCK BARRIER BAGS (3)

NOT TO SCALE



LEGEND

[hatched box]	1	STABILIZED CONSTRUCTION ENTRANCE
[dashed line]	2	STRAW WATTLE SEDIMENT TRAP/FILTER
[dashed square]	3	DROP INLET SEDIMENT FILTER

EROSION & SEDIMENT CONTROL MEASURES

1. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE EFFECTIVE FOR THE DURATION OF CONSTRUCTION.
2. AFTER THE UNDERGROUND STORM DRAIN SYSTEM IS INSTALLED, THE CATCH BASINS WILL BE INSTALLED (AS SOON AS PRACTICAL) AND ROCK BARRIER BAGS WILL BE PLACED AROUND THOSE CATCH BASINS AS SHOWN ON THIS PLAN UNTIL THIS SITE IS PAVED.
3. SHOULD THE ON-SITE STORM DRAINS NOT BE INSTALLED COMPLETELY BY OCTOBER 15, THE CONTRACTOR SHALL CONSTRUCT TEMPORARY SEDIMENT BASINS AT THE EXISTING STORM PIPES STUBBED TO THE SITE.
4. PERSON RESPONSIBLE FOR IMPLEMENTATION OF EROSION AND SEDIMENTATION PLAN.

   NAME: TBD
   ADDRESS: TBD
   TELEPHONE: TBD
5. THE CONTRACTOR SHALL PLACE 3"-6" COARSE AGGREGATE AS A GRAVEL ROADWAY (12" MIN. THICK FOR THE FULL WIDTH AND 50 FEET LONG) AT EACH D/W ENTRANCE TO SITE. ANY MUD THAT IS TRACKED ONTO PUBLIC STREETS SHALL BE REMOVED THAT SAME DAY AND AS REQUIRED BY THE CITY OF REDWOOD CITY.
6. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL DISTURBED AREAS ARE STABILIZED AND CHANGES TO THIS EROSION AND SEDIMENT CONTROL PLAN SHALL BE MADE TO MEET FIELD CONDITIONS ONLY WITH THE APPROVAL OF OR AT THE DIRECTION OF THE CITY ENGINEER.
7. ALL PAVED AREAS SHALL BE KEPT CLEAR OF EARTH MATERIAL AND DEBRIS. THE SITE SHALL BE MAINTAINED SO AS TO MINIMIZE SEDIMENT-LADEN RUN-OFF TO ANY STORM DRAINAGE SYSTEM.
8. THIS PLAN COVERS ONLY THE FIRST WINTER FOLLOWING GRADING. PLANS ARE TO BE RESUBMITTED FOR CITY APPROVAL PRIOR TO THE SEPTEMBER FIRST OF EACH SUBSEQUENT YEAR UNTIL THE SITE IMPROVEMENTS ARE ACCEPTED BY THE CITY.
9. ALL EROSION CONTROL FACILITIES MUST BE INSPECTED AND REPAIRED AT THE END OF EACH WORKING DAY.
10. SEDIMENT BASINS SHALL BE CLEANED OUT WHENEVER SEDIMENT REACHES THE SEDIMENT CLEANOUT LEVEL INDICATED ON THE PLANS.
11. BORROW AREAS AND TEMPORARY STOCKPILES SHALL BE PROTECTED WITH APPROPRIATE EROSION CONTROL MEASURES TO THE SATISFACTION OF THE CITY ENGINEER.
12. ALL CUT AND FILL SLOPES ARE TO BE PROTECTED TO PREVENT OVERBANK FLOW.
13. INLETS WHICH ARE NOT USED IN CONJUNCTION WITH ROCK BARRIER BAGS OR SEDIMENT BASINS SHOULD BE COVERED, OR OTHERWISE ADJUSTED TO PREVENT INFLOW, UNLESS THE AREA DRAINED IS UNDISTURBED OR STABILIZED.
14. THIS PLAN MAY NOT COVER ALL THE SITUATIONS THAT ARISE DURING CONSTRUCTION DUE TO ANTICIPATED FIELD CONDITIONS. VARIATIONS MAY BE MADE TO THE PLAN IN THE FIELD SUBJECT TO THE APPROVAL OF THE ENGINEER.
15. DETAILS FOR THE CONSTRUCTION OF FACILITIES ARE SHOWN ON THESE PLANS.
16. THIS PLAN IS INTENDED TO BE USED FOR EROSION CONTROL ONLY. OTHER INFORMATION SHOWN HEREIN MAY NOT BE THE MOST CURRENT. SEE SHEET **C2** FOR OTHER INFORMATION.
17. EROSION CONTROL POINT OF CONTACT. (PLEASE PROVIDE AN EROSION CONTROL POINT OF CONTACT INCLUDING NAME, TITLE/QUALIFICATION, EMAIL, AND PHONE NUMBER. THE EC POINT OF CONTACT WILL BE THE COUNTY'S MAIN POINT OF CONTACT IF EROSION CONTROL OR TREE PROTECTION CORRECTIONS ARE REQUIRED).
18. PERFORM CLEARING AND EARTH-MOVING ACTIVITIES ONLY DURING DRY WEATHER. MEASURES TO ENSURE ADEQUATE EROSION AND SEDIMENT CONTROL SHALL BE INSTALLED PRIOR TO EARTH-MOVING ACTIVITIES AND CONSTRUCTION.
19. MEASURES TO ENSURE ADEQUATE EROSION AND SEDIMENT CONTROL ARE REQUIRED YEAR-ROUND. STABILIZE ALL DENUDED AREAS AND MAINTAIN EROSION CONTROL MEASURES CONTINUOUSLY BETWEEN OCTOBER 1 AND APRIL 30.
20. STORE, HANDLE, AND DISPOSE OF CONSTRUCTION MATERIALS AND WASTES PROPERTY, SO AS TO PREVENT THEIR CONTACT WITH STORMWATER.
21. CONTROL AND PREVENT THE DISCHARGE OF ALL POTENTIAL POLLUTANTS, INCLUDING PAVEMENT CUTTING WASTES, PAINTS, CONCRETE, PETROLEUM PRODUCTS, CHEMICALS, WASH WATER OR SEDIMENTS, AND NON-STORMWATER DISCHARGES TO STORM DRAINS AND WATERCOURSES.
22. USE SEDIMENT CONTROLS OR FILTRATION TO REMOVE SEDIMENT WHEN DEWATERING SITE AND OBTAIN REGIONAL WATER QUALITY CONTROL BOARD (RWQCB) PERMIT(S) AS NECESSARY.
23. AVOID CLEANING, FUELING, OR MAINTAINING VEHICLES ON-SITE, EXCEPT IN A DESIGNATED AREA WHERE WASH WATER IS CONTAINED AND TREATED.
24. LIMIT AND TIME APPLICATIONS OF PESTICIDES AND FERTILIZERS TO PREVENT POLLUTED RUNOFF.
25. LIMIT CONSTRUCTION ACCESS ROUTES TO STABILIZED, DESIGNATED ACCESS POINTS.
26. AVOID TRACKING DIRT OR OTHER MATERIALS OFF-SITE; CLEAN OFF-SITE PAVED AREAS AND SIDEWALKS USING DRY SWEEPING METHODS.
27. TRAIN AND PROVIDE INSTRUCTION TO ALL EMPLOYEES AND SUBCONTRACTORS REGARDING THE WATERSHED PROTECTION MAINTENANCE STANDARDS AND CONSTRUCTION BEST MANAGEMENT PRACTICES.
28. PLACEMENT OF EROSION MATERIALS AT THESE LOCATIONS ARE REQUIRED ON WEEKENDS AND DURING RAIN EVENTS: (LIST LOCATIONS)
29. THE AREAS DELINEATED ON THE PLANS FOR PARKING, GRUBBING, STORAGE, ECT., SHALL NOT BE ENLARGED OR "RUN OVER."
30. CONSTRUCTION SITES ARE REQUIRED TO HAVE EROSION CONTROL MATERIALS ON-SITE DURING THE "OFF-SEASON."
31. DUST CONTROL IS REQUIRED YEAR-ROUND.
32. EROSION CONTROL MATERIALS SHALL BE STORED ON-SITE.
33. USE OF PLASTIC SHEETING BETWEEN OCTOBER 1 AND APRIL 30 IS NOT ACCEPTABLE, UNLESS FOR USE ON STOCKPILES WHERE THE STOCKPILE IS ALSO PROTECTED WITH FIBER ROLLS CONTAINING THE BASE OF THE STOCKPILE.
34. TREE PROTECTION SHALL BE IN PLACE BEFORE ANY DEMOLITION, GRADING, EXCAVATING OR GRUBBING IS STARTED.
35. LENGTH OF CONSTRUCTION IS APPROXIMATELY 18 MONTHS.

NO.	REVISION	BY
△	PLANNING SUBMITTAL 06/05/2017	
△	PLANNING SUBMITTAL 09/14/2017	
△	PLANNING RESUBMITTAL 10/31/2017	
△	PLANNING RESUBMITTAL 1/22/2018	
△	PLANNING RESUBMITTAL 3/2/2018	

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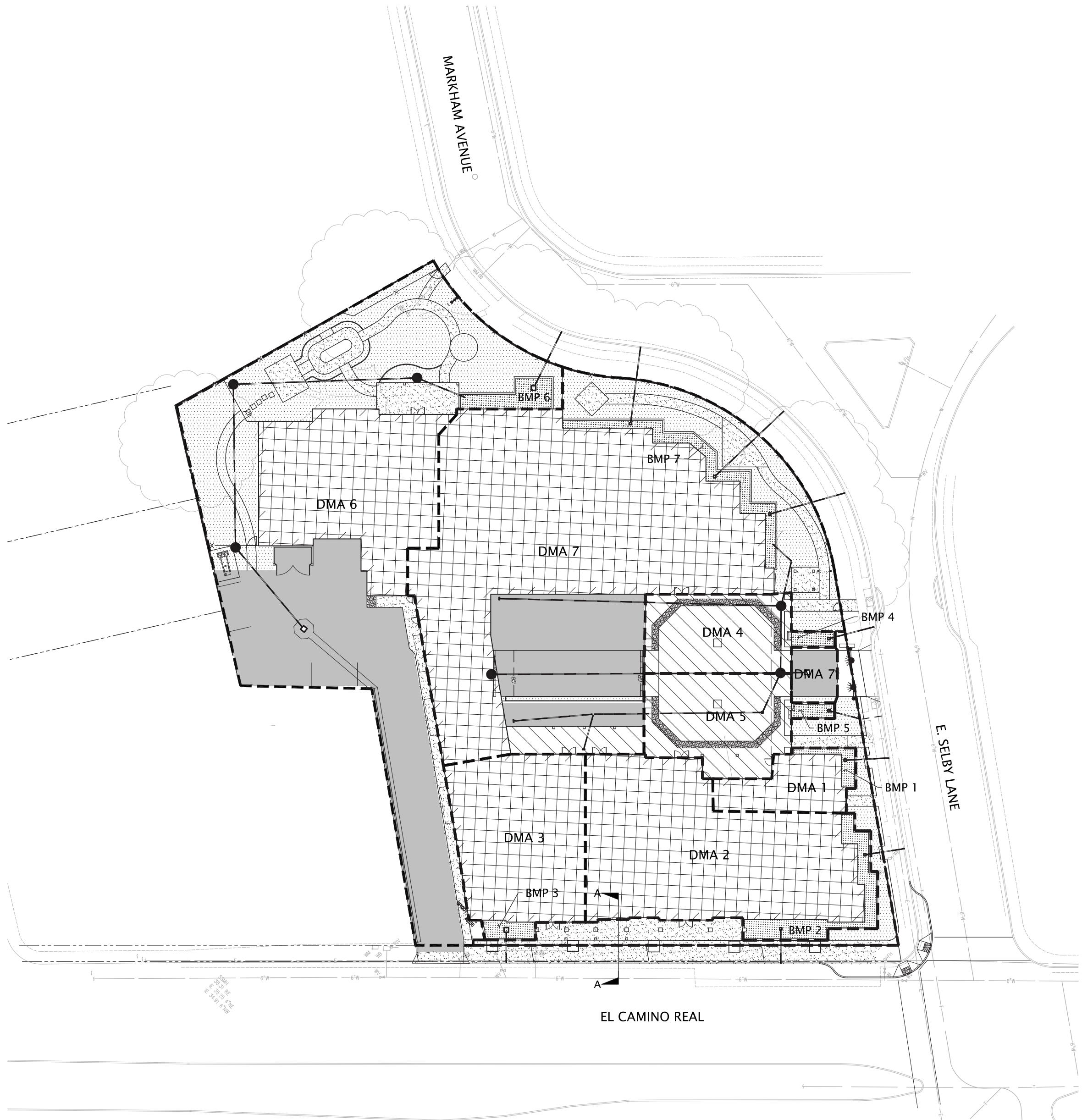
Phone (925) 245-8788
Fax (925) 245-8796

REGISTERED PROFESSIONAL ENGINEER
EMAD Y. SARIEDDINE
No. 65112
CIVIL
STATE OF CALIFORNIA

PRELIMINARY EROSION CONTROL PLAN
OF
2915 EL CAMINO REAL
FOR
SUNRISE SENIOR LIVING

REDWOOD CITY, CALIFORNIA

DATE	N0V, 2016
SCALE	1" = 20'
DESIGNER	EYS
JOB NO.	A16704
SHEET	C4
OF	- SHEETS



Scale 1" = 20'

LEGEND

- TRIBUTARY AREA LIMITS
- PERVIOUS AREA
- IMPERVIOUS ROOFTOP DRAINING TO FLOW THROUGH PLANTER
- IMPERVIOUS PAVEMENT DRAINING TO FLOW THROUGH PLANTER
- BIO-RETENTION TREATMENT AREA
- CONCRETE AREA
- DECK AREA

BIO-RETENTION SIZING CALCULATIONS

Calculations are based off the San Mateo County C.3 Techincal Guidance, Chapter 5, Section 5.1, Version 4.1 "Combination Flow and Volume Sizing Approach"

Refer to sheet C5.1 for calculation spreadsheets of each DMA.

Drainage Area	Area (SF)	Area (AC)	Pervious (SF)	Pervious (AC)	Impervious (SF)	Impervious (AC)	Total Treatment Area* (SF)	ponding depth (in.)	BMP Required (SF)	BMP Provided (SF)	BMP Dimensions	Sizing Ratio	BMP Provided
1	1,300	0.030	0	0.000	1,174	0.027	1,174	6	37	126	(2'x21')+(6'x14')	10.73%	Flow-through planter
2	7,325	0.168	0	0.000	6,710	0.154	6,710	6	210	615	see plan	9.17%	Flow-through planter
3	4,196	0.096	0	0.000	4,032	0.093	4,032	12	103	164	(10'x8')+(12'x7')	4.07%	Flow-through planter
4	2,320	0.053	0	0.000	2,212	0.051	2,212	12	57	108	18'x6'	4.88%	Flow-through planter
5	2,736	0.063	0	0.000	2,634	0.060	2,634	12	68	102	17'x6'	3.87%	Flow-through planter
6	20,033	0.460	5,997	0.138	13,671	0.314	14,271	12	364	365	see plan	2.56%	Flow-through planter
7	21,052	0.483	2,302	0.053	18,107	0.416	18,337	6	572	643	see plan	3.51%	Flow-through planter
Total:	58,962	1.354											
Self-retaining	2,763	0.063											
TOTAL SITE	**61,725**	**1.417**											

*: Total Treatment Area is equal to Impervious Area + 0.10 * Landscape Area.

SAN MATEO COUNTYWIDE WATER POLLUTION PREVENTION PROGRAM

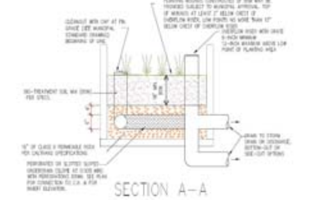


Figure 6-11: Cross section A-A of flow-through planter, shows side view of underdrain (Not to Scale)

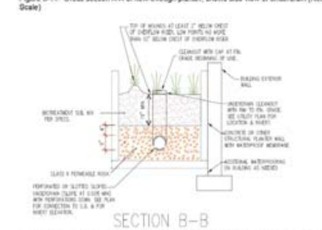


Figure 6-12: Cross section B-B of flow-through planter, shows cross section of underdrain

6-14 CHAPTER 6

REVISION	BY	NO.
PLANNING SUBMITTAL 06/05/2017		
PLANNING SUBMITTAL 09/14/2017		
PLANNING RESUBMITTAL 10/31/2017		
PLANNING RESUBMITTAL 1/22/2018		
PLANNING RESUBMITTAL 3/2/2018		

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CIVIL ENGINEERS & SURVEYORS, INC.
2850 Collier Canyon Road
Livermore, California 94551
Phone (925) 245-8788
Fax (925) 245-8796

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EMAD Y. SARIEDDINE
No. 65112
CIVIL
STATE OF CALIFORNIA

PRELIMINARY STORM WATER QUALITY CONTROL

OF

2915 EL CAMINO REAL

FOR

SUNRISE SENIOR LIVING

REDWOOD CITY, CALIFORNIA

DATE	NOV, 2016
SCALE	1" = 20'
DESIGNER	EYS
JOB NO.	A16704
SHEET	C5
OF	- SHEETS

Z:\2016\A16704\A16704-PC.dwg 3-05-18 03:11:53 PM ejohnson

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1	Project Name:	Sunrise Senior Living
1-2	City application ID:	
1-3	Site Address or APN:	
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	4
1-6	Region Mean Annual Precipitation (MAP	14.60
1-7	Site Mean Annual Precipitation (MAP)	19

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** **1.30**

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: **DMA 1**

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	1,174	1.0	1,174
2-3	Pervious surface	126	0.1	13
	Total DMA Area (square feet) =	1,300		

2-4 ***Total Effective Impervious Area (EIA)*** **1,187** **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** **0.64**
(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** **0.83** **Inches**
(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** **82** **Cubic feet**
(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1 Rainfall intensity **0.2 Inches per hour**
4-2 Divide Item 3-2 by Item 4-1 **4.16 Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1 4% of DMA EIA (Item 2-4) **47 Square feet**
5-2 Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA) **36 Square feet**
5-3 Volume of treated runoff for area in Item 5-2 **62 Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1 Subtract Item 5-3 from Item 3-3 **21 Cubic feet** (Amount of runoff to be stored in ponding area)
6-2 Divide Item 6-1 by Item 5-2 **0.58 Feet** (Depth of stored runoff in surface ponding area)
6-3 Convert Item 6-2 from feet to inches **6.94 Inches** (Depth of stored runoff in surface ponding area)
6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1 Enter an area larger than Item 5-2 **37 Sq.ft.** (enter larger area if you need less ponding depth.)
7-2 Volume of treated runoff for area in Item 7-1 **64 Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3 Subtract Item 7-2 from Item 3-3 **18 Cubic feet** (Amount of runoff to be stored in ponding area)
7-4 Divide Item 7-3 by Item 7-1 **0.49 Feet** (Depth of stored runoff in surface ponding area)
7-5 Convert Item 7-4 from ft. to inches **5.89 Inches** (Depth of stored runoff in surface ponding area)
7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1 Final surface area of treatment **37** **Square feet** (Either Item 5-2 or final amount in Item 7-1)

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1	Project Name:	Sunrise Senior Living
1-2	City application ID:	
1-3	Site Address or APN:	
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	4
1-6	Region Mean Annual Precipitation (MAP	14.60
1-7	Site Mean Annual Precipitation (MAP)	19

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** **1.30**

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: **DMA 2**

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	6,710	1.0	6,710
2-3	Pervious surface	615	0.1	62
	Total DMA Area (square feet) =	7,325		

2-4 ***Total Effective Impervious Area (EIA)*** **6,772** **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** **0.64**
(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** **0.83** **Inches**
(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** **470** **Cubic feet**
(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1 Rainfall intensity **0.2 Inches per hour**
4-2 Divide Item 3-2 by Item 4-1 **4.16 Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1 4% of DMA EIA (Item 2-4) **271 Square feet**
5-2 Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA) **203 Square feet**
5-3 Volume of treated runoff for area in Item 5-2 **352 Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1 Subtract Item 5-3 from Item 3-3 **117 Cubic feet** (Amount of runoff to be stored in ponding area)
6-2 Divide Item 6-1 by Item 5-2 **0.58 Feet** (Depth of stored runoff in surface ponding area)
6-3 Convert Item 6-2 from feet to inches **6.94 Inches** (Depth of stored runoff in surface ponding area)
6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1 Enter an area larger than Item 5-2 **210 Sq.ft.** (enter larger area if you need less ponding depth.)
7-2 Volume of treated runoff for area in Item 7-1 **364 Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3 Subtract Item 7-2 from Item 3-3 **106 Cubic feet** (Amount of runoff to be stored in ponding area)
7-4 Divide Item 7-3 by Item 7-1 **0.50 Feet** (Depth of stored runoff in surface ponding area)
7-5 Convert Item 7-4 from ft. to inches **6.03 Inches** (Depth of stored runoff in surface ponding area)
7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1 Final surface area of treatment **210** **Square feet** (Either Item 5-2 or final amount in Item 7-1)

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1	Project Name:	Sunrise Senior Living
1-2	City application ID:	
1-3	Site Address or APN:	
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	4
1-6	Region Mean Annual Precipitation (MAP	14.60
1-7	Site Mean Annual Precipitation (MAP)	19

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** **1.30**

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: **DMA 3**

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	4,032	1.0	4,032
2-3	Pervious surface	164	0.1	16
	Total DMA Area (square feet) =	4,196		

2-4 ***Total Effective Impervious Area (EIA)*** **4,048** **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** **0.64**
(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** **0.83** **Inches**
(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** **281** **Cubic feet**
(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1 Rainfall intensity **0.2 Inches per hour**
4-2 Divide Item 3-2 by Item 4-1 **4.16 Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1 4% of DMA EIA (Item 2-4) **162 Square feet**
5-2 Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA) **121 Square feet**
5-3 Volume of treated runoff for area in Item 5-2 **211 Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1 Subtract Item 5-3 from Item 3-3 **70 Cubic feet** (Amount of runoff to be stored in ponding area)
6-2 Divide Item 6-1 by Item 5-2 **0.58 Feet** (Depth of stored runoff in surface ponding area)
6-3 Convert Item 6-2 from feet to inches **6.94 Inches** (Depth of stored runoff in surface ponding area)
6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1 Enter an area larger than Item 5-2 **103 Sq.ft.** (enter larger area if you need less ponding depth.)
7-2 Volume of treated runoff for area in Item 7-1 **179 Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3 Subtract Item 7-2 from Item 3-3 **102 Cubic feet** (Amount of runoff to be stored in ponding area)
7-4 Divide Item 7-3 by Item 7-1 **0.99 Feet** (Depth of stored runoff in surface ponding area)
7-5 Convert Item 7-4 from ft. to inches **11.91 Inches** (Depth of stored runoff in surface ponding area)
7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1 Final surface area of treatment **103** **Square feet** (Either Item 5-2 or final amount in Item 7-1)

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1	Project Name:	Sunrise Senior Living
1-2	City application ID:	
1-3	Site Address or APN:	
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	4
1-6	Region Mean Annual Precipitation (MAP	14.60
1-7	Site Mean Annual Precipitation (MAP)	19

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** **1.30**

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: **DMA 4**

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	2,212	1.0	2,212
2-3	Pervious surface	108	0.1	11
	Total DMA Area (square feet) =	2,320		

2-4 ***Total Effective Impervious Area (EIA)*** **2,223** **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** **0.64**
(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** **0.83** **Inches**
(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** **154** **Cubic feet**
(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1 Rainfall intensity **0.2 Inches per hour**
4-2 Divide Item 3-2 by Item 4-1 **4.16 Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1 4% of DMA EIA (Item 2-4) **89 Square feet**
5-2 Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA) **67 Square feet**
5-3 Volume of treated runoff for area in Item 5-2 **116 Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1 Subtract Item 5-3 from Item 3-3 **39 Cubic feet** (Amount of runoff to be stored in ponding area)
6-2 Divide Item 6-1 by Item 5-2 **0.58 Feet** (Depth of stored runoff in surface ponding area)
6-3 Convert Item 6-2 from feet to inches **6.94 Inches** (Depth of stored runoff in surface ponding area)
6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1 Enter an area larger than Item 5-2 **57 Sq.ft.** (enter larger area if you need less ponding depth.)
7-2 Volume of treated runoff for area in Item 7-1 **99 Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3 Subtract Item 7-2 from Item 3-3 **55 Cubic feet** (Amount of runoff to be stored in ponding area)
7-4 Divide Item 7-3 by Item 7-1 **0.97 Feet** (Depth of stored runoff in surface ponding area)
7-5 Convert Item 7-4 from ft. to inches **11.66 Inches** (Depth of stored runoff in surface ponding area)
7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1 Final surface area of treatment **57** **Square feet** (Either Item 5-2 or final amount in Item 7-1)

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1	Project Name:	Sunrise Senior Living
1-2	City application ID:	
1-3	Site Address or APN:	
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	4
1-6	Region Mean Annual Precipitation (MAP	14.60
1-7	Site Mean Annual Precipitation (MAP)	19

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** **1.30**

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: **DMA 5**

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	2,634	1.0	2,634
2-3	Pervious surface	102	0.1	10
	Total DMA Area (square feet) =	2,736		

2-4 ***Total Effective Impervious Area (EIA)*** **2,644** **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** **0.64**
(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** **0.83** **Inches**
(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** **184** **Cubic feet**
(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1 Rainfall intensity **0.2 Inches per hour**
4-2 Divide Item 3-2 by Item 4-1 **4.16 Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1 4% of DMA EIA (Item 2-4) **106 Square feet**
5-2 Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA) **79 Square feet**
5-3 Volume of treated runoff for area in Item 5-2 **138 Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1 Subtract Item 5-3 from Item 3-3 **46 Cubic feet** (Amount of runoff to be stored in ponding area)
6-2 Divide Item 6-1 by Item 5-2 **0.58 Feet** (Depth of stored runoff in surface ponding area)
6-3 Convert Item 6-2 from feet to inches **6.94 Inches** (Depth of stored runoff in surface ponding area)
6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1 Enter an area larger than Item 5-2 **68 Sq.ft.** (enter larger area if you need less ponding depth.)
7-2 Volume of treated runoff for area in Item 7-1 **118 Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3 Subtract Item 7-2 from Item 3-3 **66 Cubic feet** (Amount of runoff to be stored in ponding area)
7-4 Divide Item 7-3 by Item 7-1 **0.96 Feet** (Depth of stored runoff in surface ponding area)
7-5 Convert Item 7-4 from ft. to inches **11.56 Inches** (Depth of stored runoff in surface ponding area)
7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1 Final surface area of treatment **68** **Square feet** (Either Item 5-2 or final amount in Item 7-1)

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1	Project Name:	Sunrise Senior Living
1-2	City application ID:	
1-3	Site Address or APN:	
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	4
1-6	Region Mean Annual Precipitation (MAP	14.60
1-7	Site Mean Annual Precipitation (MAP)	19

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** **1.30**

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: **DMA 6**

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	13,671	1.0	13,671
2-3	Pervious surface	6,362	0.1	636
	Total DMA Area (square feet) =	20,033		

2-4 ***Total Effective Impervious Area (EIA)*** **14,307** **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** **0.64**
(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** **0.83** **Inches**
(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** **993** **Cubic feet**
(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1 Rainfall intensity **0.2 Inches per hour**
4-2 Divide Item 3-2 by Item 4-1 **4.16 Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1 4% of DMA EIA (Item 2-4) **572 Square feet**
5-2 Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA) **429 Square feet**
5-3 Volume of treated runoff for area in Item 5-2 **745 Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1 Subtract Item 5-3 from Item 3-3 **248 Cubic feet** (Amount of runoff to be stored in ponding area)
6-2 Divide Item 6-1 by Item 5-2 **0.58 Feet** (Depth of stored runoff in surface ponding area)
6-3 Convert Item 6-2 from feet to inches **6.94 Inches** (Depth of stored runoff in surface ponding area)
6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1 Enter an area larger than Item 5-2 **364 Sq.ft.** (enter larger area if you need less ponding depth.)
7-2 Volume of treated runoff for area in Item 7-1 **632 Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3 Subtract Item 7-2 from Item 3-3 **361 Cubic feet** (Amount of runoff to be stored in ponding area)
7-4 Divide Item 7-3 by Item 7-1 **0.99 Feet** (Depth of stored runoff in surface ponding area)
7-5 Convert Item 7-4 from ft. to inches **11.91 Inches** (Depth of stored runoff in surface ponding area)
7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1 Final surface area of treatment **364** **Square feet** (Either Item 5-2 or final amount in Item 7-1)

Worksheet for Calculating the Combination Flow and Volume Method

Instructions: After completing Section 1, make a copy of this Excel file for each Drainage Management Area within the project. Enter information specific to the project and DMA in the cells shaded in yellow. Cells shaded in light blue contain formulas and values that will be automatically calculated.

1.0 Project Information

1-1	Project Name:	Sunrise Senior Living
1-2	City application ID:	
1-3	Site Address or APN:	
1-4	Tract or Parcel Map No:	
1-5	Rainfall Region	4
1-6	Region Mean Annual Precipitation (MAP	14.60
1-7	Site Mean Annual Precipitation (MAP)	19

The calculations presented here are based on the **combination flow and volume sizing method** provided in the Countywide Program's C.3 Technical Guidance, Version 4.0. The steps presented below are explained in Section 5.1 of the Guidance, applicable portions of which are included in this file, in the sheet named "Guidance from Chapter 5".

Click here for map

1-8 ***MAP adjustment factor is automatically calculated as:*** **1.30**

(The "Site Mean Annual Precipitation (MAP)" is divided by the MAP for the applicable rain gauge, showin in Table 5-3, below.)
Refer to the map in Appendix C of the C.3 Technical Guidance to identify the Rainfall Region for the site.

2.0 Calculate Percentage of Impervious Surface for Drainage Management Area (DMA)

2-1 Name of DMA: **DMA 7**

For items 2-2 and 2-3, enter the areas in square feet for each type of surface within the DMA.

	Type of Surface	Area of surface type within DMA (Sq. Ft.)	Adjust Pervious Surface	Effective Impervious Area
2-2	Impervious surface	18,107	1.0	18,107
2-3	Pervious surface	2,945	0.1	295
	Total DMA Area (square feet) =	21,052		

2-4 ***Total Effective Impervious Area (EIA)*** **18,402** **Square feet**

3.0 Calculate Unit Basin Storage Volume in Inches

Table 5-3. Unit Basin Storage Volumes in Inches for 80 Percent Capture Using 48-Hour Drawdowns, based on runoff coefficient

Region	Station, and Mean Annual Precipitation (Inches)	Runoff Coefficient of 1.0
1	Boulder Creek, 55.9"	2.04"
2	La Honda, 24.4"	0.86"
3	Half Moon Bay, 25.92"	0.82"
4	Palo Alto, 14.6"	0.64"
5	San Francisco, 21.0"	0.73"
6	San Francisco airport, 20.1"	0.85"
7	San Francisco Oceanside, 19.3"	0.72"

3-1 ***Unit basin storage volume from Table 5-3:*** **0.64**
(The coefficient for this method is always 1.0, due to the conversion of any landscaping to effective impervious area.)

3-2 ***Adjusted unit basin storage volume:*** **0.83** **Inches**
(The unit basin storage volume [Item 3-1] is adjusted by applying the MAP adjustment factor [Item 1-8].)

3-3 ***Required Capture Volume (in cubic feet):*** **1,277** **Cubic feet**
(The adjusted unit basin sizing volume [Item 3-2] is multiplied by the DMA EIA [Item 2-4] and converted to cubic feet)

4.0 Calculate the Duration of the Rain Event

4-1 Rainfall intensity **0.2 Inches per hour**
4-2 Divide Item 3-2 by Item 4-1 **4.16 Hours of Rain Event Duration**

5.0 Preliminary Estimate of Surface Area of Treatment Measure

5-1 4% of DMA EIA (Item 2-4) **736 Square feet**
5-2 Area 25% smaller than Item 5-1 (i.e., 3% of DMA EIA) **552 Square feet**
5-3 Volume of treated runoff for area in Item 5-2 **958 Cubic feet** (Item 5-2 * 5 inches per hour * 1/12 * Item 4-2)

6.0 Initial Adjustment of Depth of Surface Ponding Area

6-1 Subtract Item 5-3 from Item 3-3 **319 Cubic feet** (Amount of runoff to be stored in ponding area)
6-2 Divide Item 6-1 by Item 5-2 **0.58 Feet** (Depth of stored runoff in surface ponding area)
6-3 Convert Item 6-2 from feet to inches **6.94 Inches** (Depth of stored runoff in surface ponding area)
6-4 If ponding depth in Item 6-3 meets your target depth (recommend 6"), skip to Item 8-1. If not, continue to Step 7-1.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

7.0 Optimize Size of Treatment Measure

7-1 Enter an area larger than Item 5-2 **572 Sq.ft.** (enter larger area if you need less ponding depth.)
7-2 Volume of treated runoff for area in Item 7-1 **993 Cubic feet** (Item 7-1 * 5 inches per hour * 1/12 * Item 4-2)
7-3 Subtract Item 7-2 from Item 3-3 **285 Cubic feet** (Amount of runoff to be stored in ponding area)
7-4 Divide Item 7-3 by Item 7-1 **0.50 Feet** (Depth of stored runoff in surface ponding area)
7-5 Convert Item 7-4 from ft. to inches **5.97 Inches** (Depth of stored runoff in surface ponding area)
7-6 If the ponding depth in Item 7-5 meets target, stop here. If not, repeat Steps 7-1 through 7-5 until you obtain target depth.
(Note: Overflow outlet elevation should be set based on the calculated ponding depth.)

8.0 Surface Area of Treatment Measure for DMA

8-1 Final surface area of treatment **572** **Square feet** (Either Item 5-2 or final amount in Item 7-1)

NO.	REVISION	BY
△	PLANNING SUBMITTAL 06/05/2017	
△	PLANNING SUBMITTAL 09/14/2017	
△	PLANNING RESUBMITTAL 10/31/2017	
△	PLANNING RESUBMITTAL 1/22/2018	
△	PLANNING RESUBMITTAL 3/2/2018	

KIER & WRIGHT
CIVIL ENGINEERS & SURVEYORS, INC.
2850 Collier Canyon Road Phone (925) 245-8788
Livermore, California 94551 Fax (925) 245-8796

REGISTERED PROFESSIONAL ENGINEER
EMAD Y. SARTEDDINE
No. 55112
CIVIL
STATE OF CALIFORNIA

PRELIMINARY STORM WATER QUALITY CONTROL
OF
2915 EL CAMINO REAL
FOR
SUNRISE SENIOR LIVING

REDWOOD CITY, CALIFORNIA

DATE	N0V, 2016
SCALE	1" = 20'
DESIGNER	EYS
JOB NO.	A16704
SHEET	C5.1
OF	– SHEETS

County of San Mateo - Planning and Building Department

ATTACHMENT H


GLENDALE AVE
Installation of bulb outs and neighborhood street signage
MARKHAM AVE
Upgrade of existing triangular island.
WAVERLY AVE
DEXTER AVE
COLUMBIA AVE
5TH AVE
Upgrade bulb outs and neighborhood street signage.
Installation of neighborhood street signage
5TH AVE
5TH AVE
5TH AVE
SELBY LN
ALLEY
5TH AVE
KRAMER LN
EL CAMINO
Installation of bulb outs and neighborhood street signage.
Street Improvements
Streets
Project Site
0
100
200 Ft
PLN 2017-00251: Sunrise Senior Living
Street Improvements for Selby Park Neighborhood

County of San Mateo - Planning and Building Department

ATTACHMENT I

SUNRISE
SENIOR LIVING

November 17, 2017

Via E-mail (cjmorales@smcgov.org)

Carmelisa Morales
Project Planner
County of San Mateo
455 County Center, 2nd Floor
Redwood City, CA 94063

Re: Sunrise Senior Living- Application PLN 2017-00251 and PRE 2017-00006 (Health Risk Assessment)

Dear Ms. Morales:

In response to your email dated October 31 2017, this letter reiterate our plan and commitment to comply with the requirements of the North Fair Oaks Community Plan Environmental Impact Report Mitigation Measure 5-2(2)(b) in the project design and operation to mitigate any potential risk as a sensitive receptors located within the specified distance (within 100 feet) from El Camino Real, an identified source of TACs and PM2.5. Specifically, consistent with Mitigation Measure 5-2(2)(b), the Sunrise Team is committed to do all of the following (with references to the project plans for confirmation) and we would anticipate and accept a condition of approval for the project to confirm compliance as part of the final design.

- Air Filtration. Install and maintain air filtration for HVAC equipment that achieve BAAQMD effectiveness performance standards in removing $PM_{2.5}$ from indoor air. The system effectiveness will be confirmed during final design. See sheet A2.4.

- Location of Air Intakes. Locate ventilation air intakes and operable windows away from El Camino Real as possible. Operable windows are required by code for emergency egress purposes, but management will monitor operable windows to remain close during occupancy. See A1.0 for location of effected windows.

- Passive Filtering System. Installing passive (drop-in) electrostatic filtering systems where appropriate, especially those with low air velocities (i.e., 1 mph);

- Trees. Plantings of trees, such as Quercus agrifolia (Coast Live Oak), Ulmus parvifolia 'Drake' (Chinese Elm), and Tristaniopsis laurina (Water Gum), between the building and El Camino Real. See sheet L-1.

- Phasing. In light of the fact that the project involves only a single phase, there is no opportunity to phase occupancy of units.

- Truck Loading. There will be no truck parking along El Camino Real and alley. See A1.1.

- Truck Idling. Illegal parking and/or idling restrictions on heavy-duty trucks in the vicinity will be signed and enforced. "No Idling" signs will be installed. See note on A1.0.

- Air Quality Monitoring. Air quality monitoring units in buildings will be installed. See A1.0 (Sustainability Notes).

Attached to this letter (Appendix A) is a copy of the full mitigation measure addressing the "Community Risk and Hazard Impacts," with the relevant portion highlighted in yellow for ease of reference.

Yours truly,

Jerry Liang, SVP Development

APPENDIX A

Impacts	Potential Significance Without Mitigation	Mitigation Measures	Mitigation Responsibility	Potential Significance With Mitigation	Applicability to Sunrise Senior Living Project
AIR QUALITY					
Impact 5-2: Community Risk and Hazard Impacts. Future development in accordance with the updated Plan could expose sensitive receptors to levels of toxic air contaminants (TACs) or $PM_{2.5}$ that cause an unacceptable cancer risk or hazard, which represents a ***potentially significant impact.***	S	**Mitigation 5-2.** For future discretionary development intended for occupancy by sensitive receptors located within the following specified distances from the identified sources of TACs and $PM_{2.5}$ within the Plan area, the County shall implement one of the mitigation measure options listed below: • El Camino Real – 100 feet, • Caltrain and Dumbarton Rail Corridor – 100 feet, • Dry cleaning operations – 300 feet (see Figure 5.1), and • Other stationary sources — 100 feet (see Figure 5.1). (Site-specific modeling for future development projects proposed within these distances may provide a data basis upon which this buffer distance may be reconsidered and reduced.) (1) Change the updated Plan proposed land use map to avoid the siting of new sensitive receptors (e.g., residential uses) within these setback areas. (This mitigation option may be considered by the County to be inconsistent with the basic objectives of the updated Plan to provide additional housing along these corridors in order to generate additional vitality and foot traffic, ridership for transit, and social and business activity.)	County	LS	Applicable due to the Project's proximity to El Camino Real

		(2) Alternatively, require future individual discretionary development projects within the Plan area that would place air quality sensitive receptors within these specified distances from identified sources, to either: (a) For projects within the specified distances from identified sources, conduct a site-specific health risk assessment using air quality dispersion modeling methodologies and screening thresholds recommended by the BAAQMD to demonstrate that, despite a location within the screening setback distances, modeled site-specific exposures would be less-than-significant. *or* (b) Mitigate anticipated community risks and hazards through implementation of the following mitigations: • Where residential uses or other sensitive receptors are proposed to be located within the setback distances specified above or identified through site-specific health risk assessment using air quality dispersion modeling to indicate potentially significant exposure, air filtration units shall be installed and maintained. The air filtration systems shall be installed to achieve BAAQMD effectiveness performance standards in removing $PM_{2.5}$ from indoor air. The system effectiveness requirement shall be determined during final design, when the exact level of exposure is known,			

		based on proximity to these sources; • Locate ventilation air intakes and operable windows away from these sources; • Where appropriate, install passive (drop-in) electrostatic filtering systems, especially those with low air velocities (i.e., 1 mph); • Consider tiered plantings of trees, such as redwood, deodar cedar, live oak and oleander, between sensitive uses and these sources; • Consider plan implementation phasing that delays occupancy of units with highest exposure so that source emissions regulations and vehicle fleet turnover that would result in lower emissions may take more effect and lower exposure levels (since emission rates will decrease in the future, projects developed later in the updated Plan buildout timeframe would have less exposure); • Avoid locating truck loading zones near sensitive units; • Require rerouting of nearby heavy-duty truck routes; • Enforce illegal parking and/or idling restrictions on heavy-duty trucks in the vicinity; and • Install indoor air quality monitoring units in buildings. With implementation of either one of these mitigation options, the potential TAO and $PM_{2.5}$ exposure impacts of the updated Plan would be reduced to a ***less-than-significant level.***			

		Potential future preparation and implementation by the County of a Community Risk Reduction Plan (CRRP) to bring TAC and $PM_{2.5}$ concentrations for the entire community down below BAAQMD thresholds of significance as an alternative to addressing associated community health risk on a project-by-project basis would also reduce this impact to a ***less-than-significant level.***			

County of San Mateo - Planning and Building Department

ATTACHMENT J

FEHR PEERS

MEMORANDUM

Date: June 26, 2017

To: Jerry Liang, Sunrise Senior Living Communities

From: Jane Bierstedt and Ashley Brooks, Fehr & Peers

Subject: Transportation Assessment for Proposed Sunrise Senior Community in San Mateo County

SJ16-1709

A new Sunrise Senior Living community with 90 units and 63 parking spaces (the Project) is proposed for the site located at 2915 El Camino Real in unincorporated San Mateo County near the border of the Town of Atherton and the City of Redwood City, California. The site is currently occupied by John Bentley's Restaurant, an unoccupied single-story office building, and a single-family residence and is included in the North Fair Oaks (NFO) Community Plan. The impacts of future development on the site was addressed in the *North Fair Oaks Community Plan Environmental Impact Report* (EIR) (2011).

This memorandum assesses potential transportation impacts of the Project based on its trip generation estimates and information contained in the NFO Community Plan EIR.

PROJECT DESCRIPTION

The site location is shown on **Figure 1**. The new Sunrise Senior Living community with have 90 continuing care units including 49 studio units, 21 double units, and 20 semi-private units. The project site is bounded by Selby Lane on the southeast side, Markham Avenue on the northeast side, El Camino Real on the southwest side and office and residential parcels on the northwest side. It will have 63 parking spaces in an underground parking garage with access on Selby Lane. It will also have two van parking spaces accessed via a driveway on El Camino Real. The site plan is shown on **Figure 2**.

PROJECT TRAFFIC ESTIMATES

The amount of traffic added by the Project to the surrounding roadways includes traffic generated by the proposed Senior Living community minus traffic generated by the existing uses on the site. Traffic generated by the Project was estimated by applying trip generation rates from surveys of similar Sunrise Senior Living communities on the San Francisco Peninsula. They are located in Palo Alto and Belmont (the Palo Alto site is on El Camino Real) and have comparable numbers of units with 81 and 78, respectively. The amount of traffic generated by the existing restaurant on the site was measured with driveway counts. The amount of traffic generated by the single-family residence was estimated using rates from the Institute of Transportation Engineers (ITE). No traffic credits for the office building were applied as it is vacant and not currently generating traffic.

EXISTING SITE USES

The existing restaurant on the site is served by two driveways: an inbound driveway on El Camino Real and a two-way driveway on Selby Lane. Machine counts were conducted at the driveways to measure the amount of generated traffic on a typical weekday, and during the morning and evening commute period peak hours. The results are summarized in **Table 1**.

TABLE 1: EXISTING RESTAURANT TRAFFIC FROM DRIVEWAY COUNTS

Driveway	Daily			Morning Peak Hour			Evening Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Selby Lane Driveway	116	204	320	7	4	11	5	4	9
El Camino Real – Inbound Driveway	100	0	100	1	0	1	12	0	12
Total	**216**	**204**	**420**	**8**	**4**	**12**	**17**	**4**	**21**

The restaurant generates 420 vehicle trips on an average weekday with 12 during the morning peak hour and 21 during the evening peak hour. During the lunchtime peak hour it generates 58 trips. Between 6:00 and 7:00 pm, when there is more dinner-related traffic, it generates 61 trips.

The house is estimated to generate 10 vehicle trips per day, with one outbound trip during the morning peak hour and one inbound trip during the evening peak hour.

There are a wide variety of restaurants including fast food restaurants, family-style restaurants, chain restaurants, cafes, fine dining establishments, etc. Therefore, restaurants can generate a wide- range of traffic volumes. Trip estimates were made using ITE average rates for "quality restaurants" for comparison purposes. With these rates, the 3,100-square foot restaurant would generate 280 daily

trips, 3 morning peak hour trips, and 23 evening peak hour trips. Traffic generated by the 6,360-square foot office was also estimate using ITE rates. The results are 70 daily trips, 10 morning peak hour trips, and 9 evening peak hour trips.

PROPOSED PROJECT

Driveway counts were conducted at two survey sites (see **Table 2**, footnote 1) and the results were divided by the number of units to obtain trip generation rates. The resulting rates are presented in **Table 2**. Applying these rates to the proposed number of units (90) yields 332 daily trips with 22 occurring during the morning peak hour and 31 occurring during the evening peak hour.

TABLE 2: TRIP GENERATION RATES FOR SUNRISE SENIOR LIVING COMMUNITIES[1]

Item	Daily			Morning Peak Hour			Evening Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Rates per Unit	1.72	1.96	3.68	0.14	0.10	0.24	0.14	0.20	0.34
Proposed Sunrise Community	166	166	332	13	9	22	13	18	31

1. Based on surveys conducted at Sunrise Palo Alto with 81 units and Sunrise Belmont with 78 units.

NET-ADDED TRAFFIC

The amount of net-added traffic generated by the Project is presented in **Table 3**.

TABLE 3: PROPOSED SUNRISE COMMUNITY VEHICLE TRIP GENERATION ESTIMATES

Driveway	Daily			Morning Peak Hour			Evening Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Proposed Sunrise Community	166	166	332	13	9	22	13	18	31
Existing Uses	-215	-215	-430	-8	-5	-13	-18	-4	-22
Net Added Traffic	-49	-49	-90	5	4	9	-5	14	9

The proposed Sunrise Community would generate fewer daily vehicle trips and slightly more (approximately 10) morning and evening peak hour vehicle trips than the restaurant and house currently on the site. The difference in trips is due to the different operating characteristics: the restaurant generates many more vehicle trips during the midday lunch time and evening dinner time periods. If the office space on the site was occupied and generating traffic, the Sunrise Community would show no change in vehicle trips during the morning and evening peak hours and a greater reduction on a daily basis.

COMPARISON TO NFO COMMUNITY PLAN EIR TRAFFIC ESTIMATES

The Project site is located within the NFO Community Plan area and the majority of the site is designated for commercial mixed-use (medium-high density), with one parcel designated as multifamily residential. At buildout, the NFO Community Plan area is projected to contain approximately:

- 2,700 single-family dwelling units
- 4,700 multi-family dwelling units
- 680,000 square feet (sf) of retail space
- 335,000 sf of office space
- 1,270,000 sf of industrial space
- 215,000 sf of research & development space
- 110,000 sf of institutional space (e.g., community centers and schools).

These uses were estimated to add approximately 30,200 daily vehicle trips, 2,060 morning peak hour vehicle trips, and 2,870 evening peak hour vehicle trips to the surrounding roadway system in the *NFO Community Plan EIR*. The Project's trip generation estimates are well below these totals.

INTERSECTION IMPACTS AND MITIGATION MEASURES

The *NFO Community Plan EIR* evaluated impacts of buildout of the Plan on 10 intersections. Only two of the intersections are located on major Project traffic travel routes near the site: El Camino Real (SR 82) / Dumbarton Avenue and El Camino Real (SR 82) / Fifth Avenue. These intersections were reviewed to determine whether the Project would have significant impacts at them and to assess its contributions to the mitigation measures.

IMPACTS OF NFO COMMUNITY PLAN

The *NFO Community Plan EIR* indicated that additional project traffic would have a less-than-significant project and cumulative impacts at the intersection of El Camino Real (SR 82) and Dumbarton Avenue. The EIR also found that the Community Plan would result in a significant project impact on the El Camino Real (SR 82) / Fifth Avenue intersection during the morning peak hour by causing its operation to deteriorate from an acceptable LOS C to unacceptable LOS D based on Caltrans LOS criteria. The EIR found that buildout of the NFO Community Plan would also result in a significant cumulative impact at this intersection during both the morning and evening peak

hours; buildout of the NFO Community Plan would contribute to the unacceptable LOS D operations during the morning peak hour and cause its operation to deteriorate from an acceptable LOS C to unacceptable LOS D during the evening peak hour.

PROJECT IMPACTS

Based on the trip distribution pattern in the EIR (see **Figure 3**), approximately 50 percent of the Project traffic would approach the site from the south on El Camino Real. Therefore the Project would only contribute 5 vehicles to the intersection of El Camino Real (SR 82) / Fifth Avenue. This small amount of traffic would not affect intersection operations and therefore the Project would not have a significant impact on El Camino Real (SR 82) / Fifth Avenue intersection at a project nor cumulative level.

MITIGATION MEASURE

The project-level mitigation measure for the El Camino Real (SR 82) / Fifth Avenue intersection is to restripe the southbound approach to a left-turn lane, a right-turn lane, and a shared left-turn/right-turn lane. The intersection is projected to continue to operate at LOS D under Cumulative plus Project conditions during the evening peak hour with this mitigation measure. No other feasible physical improvements were identified and the impact was considered significant and unavoidable.

Buildout of the NFO Community Plan would add 303 vehicles to this intersection during the morning peak hour and 458 vehicles during the evening peak hour. The Project is estimated to add 5 morning and 5 evening peak hour trips to the intersection. Therefore, the Project would be responsible for 1.6 percent of the cost of the restriping, which is estimated to be approximately $10,000[1].

TRANSIT IMPACTS

The *NFO Community Plan EIR* found that buildout of the NFO Community Plan would generate additional transit trips which would place substantial demands on the existing and planned SamTrans, Caltrain, and High Speed Rail Authority transit networks. It further found that due to the long-term buildout of the NFO Community Plan area, uncertainty of the amount and timing of

[1] The actual cost would be determined by the design engineer and would be based on county-approved plans, specifications, and estimates of the intersection improvement.

service increases, and lack of control of the County over transit services, the impact was considered significant and unavoidable.

The Project site is served by two SamTrans bus routes, Route 72 (to Selby Lane school) and Route ECR (El Camino Real between Daly City BART and the Palo Alto Transit Center). Most of the transit trips generated by the Project would be generated by the employees who would use Route ECR. (Route 72 is solely for school trips.) Route ECR operates from approximately 4:00 am to 2:00 am on weekdays with service every 15 minutes during peak commute hours and 30 minutes at other times of the day. On Saturdays and Sundays, the route operates between approximately 5:00 am and 2:00 am with service every 20 to 30 minutes. The closest bus stops for Route ECR are located on El Camino Real at Dumbarton Avenue in the northbound directions and at 5th Avenue in the southbound direction. These stops are approximately 1,000 feet (less than a ¼ mile) from the site.

Route ECR has the capacity to carry approximately 660 passengers per hour.[2] The amount of transit ridership generated by the Project is estimated to be equivalent to 10 percent of the vehicle trips, or 3 passenger per peak hour. This amount of transit ridership is much lower than the capacity.

SamTrans has long range plans to add bus rapid transit (BRT) on El Camino Real. The Project will not interfere with these plans.

Since Route ECR has sufficient capacity to accommodate the transit riders generated by the Project and the Project will not interfere with transit plans and policies, the Project would have a less-than significant transit impact.

PEDESTRIAN IMPACTS

The thresholds of significance for pedestrian impacts from the NFO Community Plan EIR are, "A significant impact related to the pedestrian system would occur if implementation of the project causes:

- Disruption to existing pedestrian facilities, or interference with planned pedestrian facilities:
- Inconsistencies with adopted pedestrian system plans, guidelines, policies, or standards; or
- Vehicles to cross pedestrian facilities on a regular basis without adequate design and/or warning systems, causing hazards."

[2] Estimates provided by SamTrans staff.

The Project would improve the sidewalk on El Camino Real and only generate a small amount of pedestrian traffic. Therefore the Project's impact to pedestrian facilities would be less-than-significant.

TRANSIT PRIORITY STATUS

A Project is located within a "Transit Priority Area" if it meets one of two criteria: 1) located at the intersection of two or more major bus routes with a service frequency of 15 minutes or less during peak commute periods or 2) located on a high quality transit corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours. El Camino Real is cited as an example of the second criterion. Since the site is located on El Camino Real and Route ECR has service intervals of 15 minutes (or less) during peak commute hours, the Project is located within a "Transit Priority Area".

IMPACTS AT AT-GRADE RAILROAD CROSSINGS

The two railroad crossings closest to the site are located at Fifth Avenue (0.40 miles) and Woodside Road (0.90 miles). Both of these crossings are grade separated. It is unlikely that the Project would add any pedestrian or vehicle traffic to at-grade crossings as they closest ones are located at Fair Oaks Lane (1.0 mile) and Chestnut Street (1.1 miles), both farther from the site than the grade-separated crossings. Therefore the Project would have a less-than-significant safety impact to at-grade railroad crossings because it would not increase hazards between incompatible uses (i.e., pedestrians and trains) nor would it increase vehicles queues at intersections near crossings.

PARKING

The Project will provide 63 parking spaces for employees and visitors of the residents, and 2 van spaces. Parking surveys were conducted at the Belmont and Palo Alto Sunrise Senior Community site to assess whether the parking supply would be sufficient. The surveys were conducted by counting the number of parked vehicles in hourly increments. The survey results and resulting peak parking demand rates are presented in **Table 5**. Using the highest rate of 0.44 parked vehicles per unit would yield a peak parking demand for the Project of 40 parked vehicles. Therefore the 63 provided spaces would be more than sufficient to accommodate the Project's parking demand.

TABLE 4: PARKING SURVEY RESULTS AND RATES

Item	Value
Sunrise Palo Alto	
Survey Results (Parked Vehicles)	36
Rate (Parked Vehicles per Unit)	0.44
Sunrise Belmont	
Survey Results (parked vehicles)	26
Rate (Parked Vehicles per Unit)	0.33

CONCLUSIONS

This memorandum addresses the transportation impacts of the proposed Sunrise Senior Living Community (the Project) located at 2915 El Camino Real.

The Project is projected to generate fewer daily vehicle trips and slightly more (approximately 10) morning and evening peak hour vehicle trips than the restaurant and house currently on the site. This amount of traffic is well within the traffic estimates for the North Fair Oaks Community Plan (approximately 30,200 daily trips, 2,060 morning peak hour trips, and 2,870 evening peak hour trips) and therefore the Project's traffic impacts have been accounted for in the *NFO Community Plan EIR*.

The *NFO Community Plan EIR* identified one significant intersection impact near the site at the intersection of El Camino Real and Fifth Avenue at the project and cumulative-level. The Project would add 5 peak hour vehicle trips to this intersection; a small amount of traffic and the associated impacts would be de minimus. The Project will contribute is fair share contribution, 1.6 percent of the cost, towards the restriping of this intersection as described in the *NFO Community Plan EIR* mitigation measure.

The Project is served by SamTrans bus route ECR. It would add a small number of transit passengers this route compared to its capacity. Therefore the Project's transit impact would be less-than-significant.

The Project would improve the sidewalk on El Camino Real and only generate a small amount of pedestrian traffic. Therefore the Project's impact to pedestrian facilities would be less-than-significant.

The site is located on El Camino Real which has bus service in intervals of 15 minutes (or less) during peak commute hours. Therefore the Project is located within a "Transit Priority Area".

The Project would have a less-than-significant safety impact to at-grade railroad crossings because it would not add traffic to them and therefore not increase hazards between incompatible uses (i.e., pedestrians and trains) nor would it increase vehicle queues at intersections near crossings.

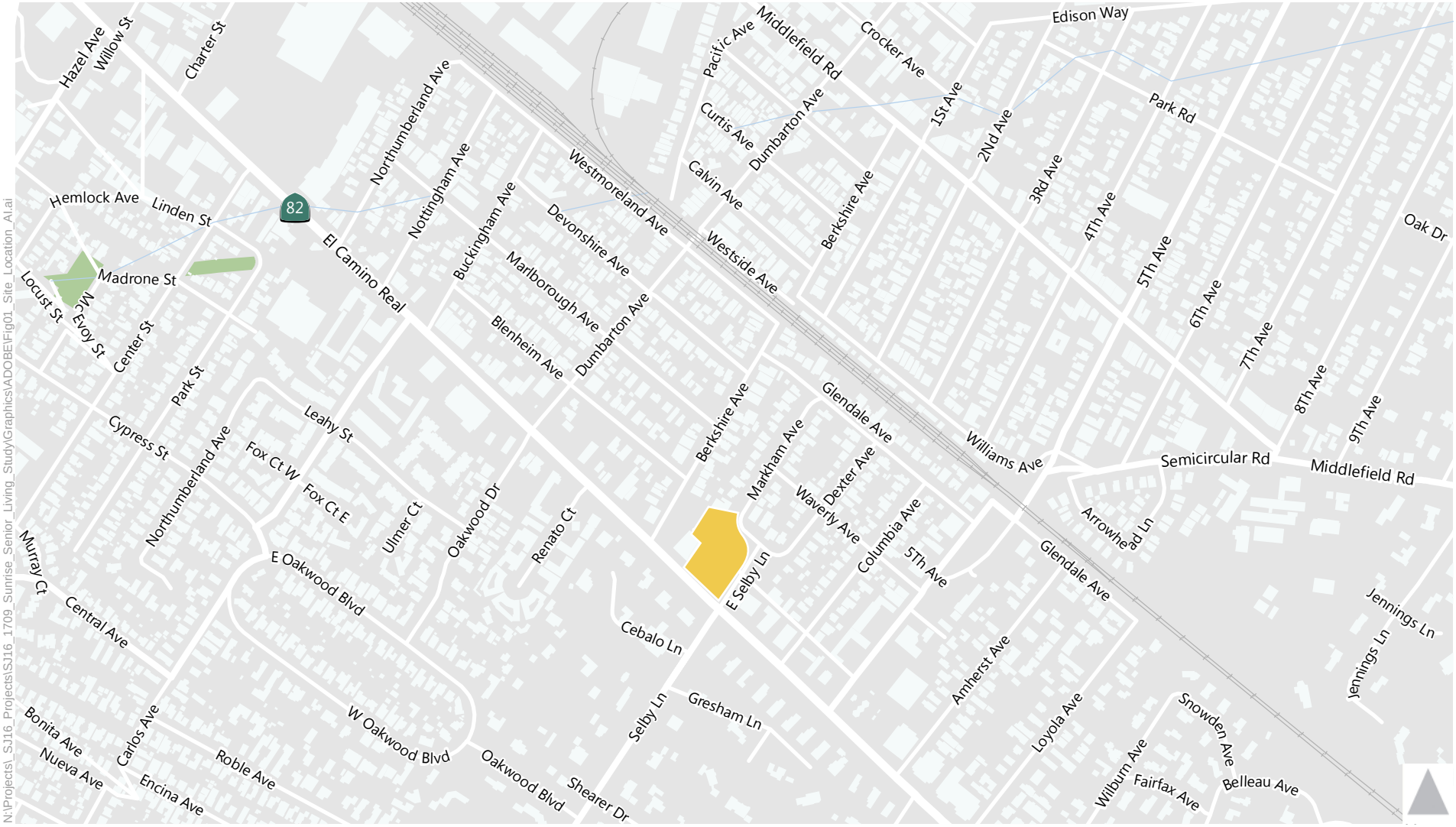
The proposed parking supply of 63 spaces is more than sufficient based on the results of parking surveys at other similar Sunrise Communities.

Attachments

Figure 1: Site Location

Figure 2: Site Plan

Figure 3: NFO Community Plan EIR Trip Distribution



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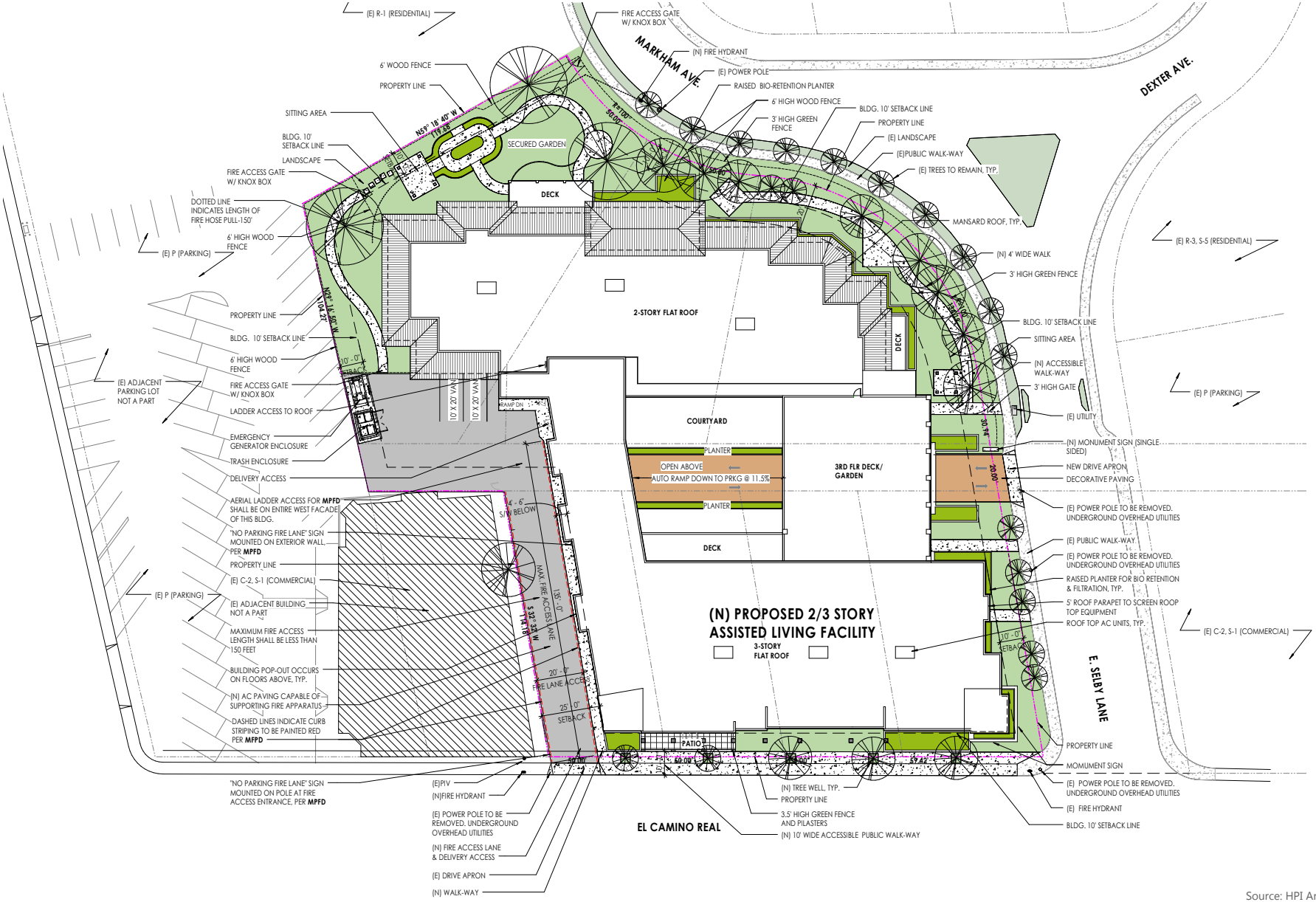
Project Site

Figure 1

Site Location



Source: HPI Architecture

Figure 2

Site Plan

Figure 3

NFO Community Plan EIR Trip Distribution

County of San Mateo - Planning and Building Department

ATTACHMENT K

FEHR PEERS

MEMORANDUM

Date: November 17, 2017

To: Jerry Liang, Sunrise Senior Living

From: Jane Bierstedt, Fehr & Peers

Subject: Supplemental Information Regarding Parking and TDM for the Sunrise Redwood City Project

SJ16-1709

A new Sunrise Senior Living community with 90 units and 63 parking spaces (the Project) is proposed for the site located at 2915 El Camino Real in unincorporated San Mateo County near the border of the Town of Atherton and the City of Redwood City, California. This memorandum provides information regarding employee shifts and visiting times, supplementary parking data, and a preliminary Transportation Demand Management (TDM) plan in response to San Mateo County staff comments.

EMPLOYEE SHIFTS AND VISITING TIMES

There will be approximately 75 employees (in full time equivalents (FTEs)) at the site working in three shifts. The shift times and approximate number of FTEs per shift are:

Morning shift (7 am to 3 pm)	45
Afternoon shift (3 pm to 11 pm)	20
Night shift (11 pm to 7 am)	10
Total	75

Visiting hours are between 9 am and 5 pm. The doors will be locked at 5 pm.

PARKING INFORMATION

Published parking rates and the results of parking surveys conducted at two Sunrise communities on the San Francisco Peninsula are discussed in this section.

PUBLISHED RATES

Parking rates from the Institute of Transportation Engineers (ITE) *Parking Generation* manual for assisted living developments are presented in **Table 1**. Both the average and the 85th percentile of the peak demand rates from the survey are included for information and comparison purposes. The average rate is the average of the peak parking demand rates. The 85th percentile rate is the rate where 85 percent of the surveyed peak parking rates are lower (and only 15 percent are higher). These higher rates can be used to create conservative parking estimates.

TABLE 1: ITE PARKING GENERATION RATES

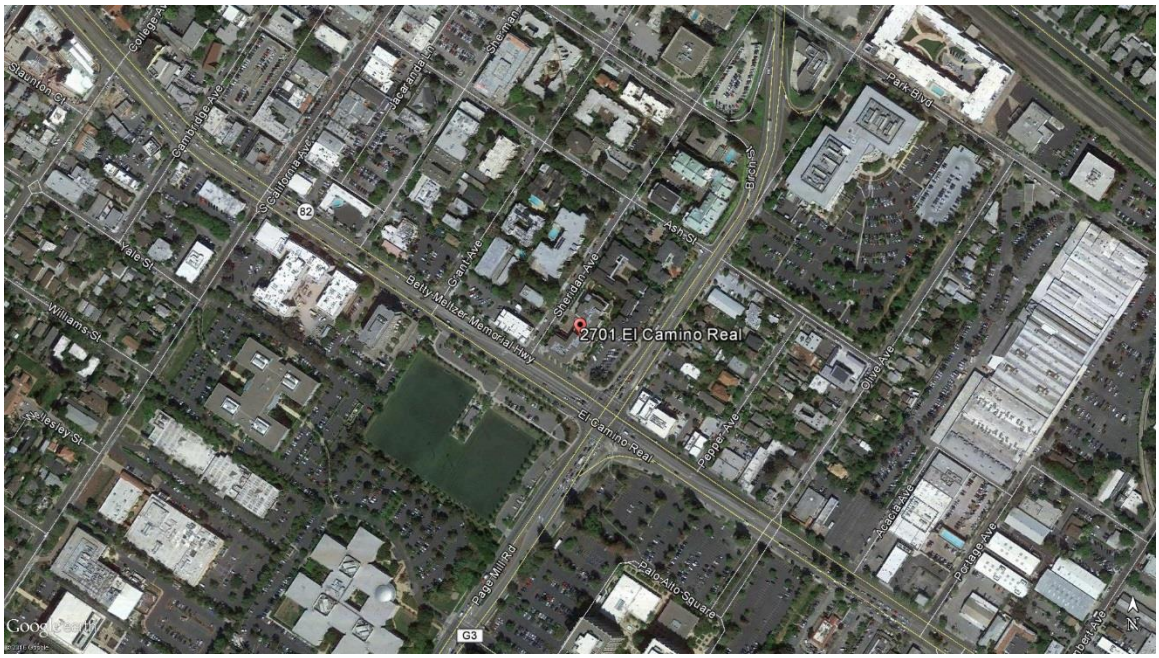
Land Use	Rates (Spaces per unit)	
	Avg.	**85th**
Assisted Living	0.41	0.54

PARKING SURVEYS

Parking surveys were conducted at two similarly-sized Sunrise communities on the San Francisco Peninsula: one is located in Palo Alto and the other in Belmont. These Sunrise communities also have similar employee ratios as the proposed Project.

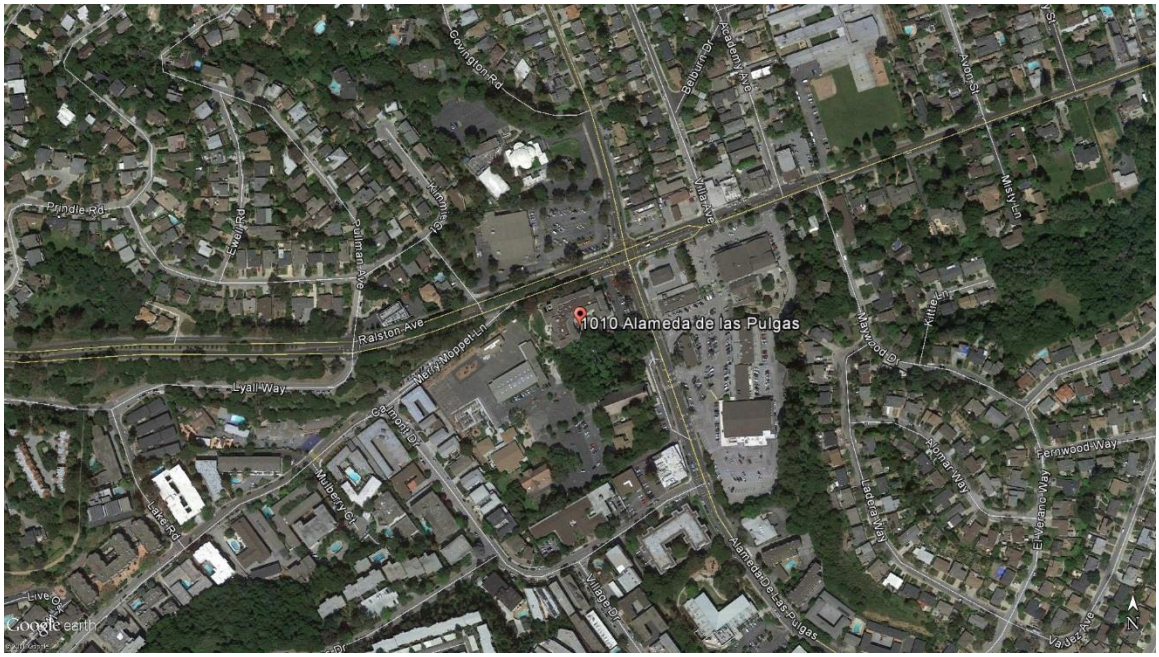
Palo Alto Site

The Palo Alto site is located at 2701 El Camino Real. The facility has 81 units accommodating up to 97 residents. At the time of the survey 75 of the units were occupied with 89 residents, representing an occupancy of 93 percent. There were 30 employees during the morning and afternoon shifts, and 10 on the night shift. The site has 44 total parking spaces including 2 handicapped spaces, 1 Sunrise vehicle space, 2 resident spaces, 1 future resident space, and 7 visitor spaces. Vehicle access is provided via two driveways (one inbound and one outbound) on Sheridan Avenue.



Belmont Site

The Belmont site is located at 1010 Alameda de las Pulgas. The facility has 78 units accommodating up to 89 residents. At the time of the survey 71 of the units were occupied with 82 residents, representing an occupancy of 92 percent. There were 27 employees during the morning shift, 24 on the afternoon shift, and 5 on the night shift. The site has 25 total parking spaces including 2 handicapped spaces, 1 Sunrise vehicle space, 2 resident spaces, and 1 reserved for the team member of the month. Sunrise also has 15 spaces on the adjacent church property. Vehicle access is provided via two driveways; one on Ralston Avenue that it gated and rarely used, and one off of the adjacent church and school parking lot.



Parking Survey Results

The parking surveys were conducted by counting the number of parked vehicles in hourly increments. Survey days were selected with input from Sunrise staff to capture the days with the highest parking demands. The surveys were conducted from 9:00 am to 5:00 pm on Tuesday, December 13 and Wednesday, December 14, 2016. Supplemental surveys were conducted in January 2017. The peak parking times occurred at 12:00 noon and 1:00 pm. The survey results and resulting peak parking demand rates are presented in **Table 2**. The parking data is attached.

TABLE 2: PARKING SURVEY RESULTS AND RATES

Item	Value
Sunrise Palo Alto	
Survey Results (highest number of parked vehicles)	36
Rates (per Unit)	0.44
Rates (per Occ. Unit)	0.48
Sunrise Belmont	
Survey Results (highest number of parked vehicles)	26
Rates (per Unit)	0.33
Rates (per Occ. Unit)	0.37

The results of the survey from the Palo Alto site are very similar to the ITE average parking demand rate.

Conclusions

The proposed parking supply of 63 spaces is lower than the County's requirement for "Other Compatible Uses" which is 1 space per 1,000 square feet or 81 spaces. However, this requirement is not specific to assisted living communities. The proposed parking supply rate of 0.70 spaces per unit is higher than the ITE and surveyed parking demand rates for assisted living communities. Therefore the proposed parking supply will be sufficient to accommodate the Project's parking without encroachment into the adjacent neighborhood.

PRELIMINARY TDM PLAN

The primary purpose of any TDM plan is to reduce the amount of vehicle traffic and parking generated by a development by creating measures, strategies, incentives, and policies to shift people (primarily employees) from driving alone to using other travel modes including transit, carpooling, cycling, and walking. TDM strategies include physical site amenities, informational resources, monetary incentives, management strategies and more. First transit service near the site is described to provide information regarding potential transit use for employees. Then measures to be provided by Sunrise at the Project site are described.

NEARBY TRANSIT SERVICE

One way to reduce project generated traffic and parking is to encourage staff to travel by transit. The Project site is served by one non-school SamTrans bus route, Route ECR (El Camino Real

between Daly City BART and the Palo Alto Transit Center). Route ECR operates from approximately 4:00 am to 2:00 am on weekdays with service every 15 minutes during peak commute hours and 30 minutes at other times of the day. On Saturdays and Sundays, the route operates between approximately 5:00 am and 2:00 am with service every 20 to 30 minutes. The closest bus stops for Route ECR are located on El Camino Real at Dumbarton Avenue in the northbound direction and at 5th Avenue in the southbound direction. These stops are approximately 1,000 feet (less than a ¼ mile) from the site.

SamTrans has long range plans to add bus rapid transit (BRT) on El Camino Real which will increase bus service frequency and capacity.

TDM MEASURES

Sunrise will be providing the following TDM measures at the Project site:

- Bicycle parking
- Showers and changing facilities
- Transportation Coordinator
- Commuter assistance center
- New employee TDM packet
- TDM marketing
- Carpool matching service

If additional measures are needed to manage the parking demand, these measures will be considered:

- Subsidized transit passes
- Guaranteed ride home program

Bicycle Parking

Safe, secure, and easily accessible bicycle parking facilities support bicycling as a mode choice. A bicycle storage room will be located in the parking garage so employees can safely store their bicycles. Bike racks will be located along the El Camino Real frontage and can be used by visitors.

Showers and Changing Facilities

Showers and changing facilities will be provided for use by employees to encourage commuting by bicycle.

Transportation Coordinator

A staff member will be designated as the Transportation Coordinators who will be responsible for developing, marketing, and implementing the TDM program. Having dedicated personnel on staff helps to make the TDM program more robust, consistent and reliable.

Commuter Assistance Center

The Commuter Assistance Center is an on-site, one-stop shop for transit and commute alternatives information and provides education and support for easy use of alternative modes.

New Employee TDM Packet

Each new employee will be provided with a TDM packet explain all transportation options. Introducing new employees to the TDM program creates an awareness and culture of drive-alone alternatives prior to establishing their commute behavior.

TDM Marketing

The Transportation Coordinator will create a TDM marketing program. Messaging keeps TDM options in front of employees on a regular basis and reminds people to think about alternative modes.

Carpool Matching

Carpool programs help carpools to form by matching drivers and passengers.

Subsidized Transit Passes

Sunrise may elect to subsidize transit passes for employees through programs such as Commuter Check or by purchasing Caltrain or SamTrans passes to provide a financial incentive for employees to use transit.

Guaranteed Ride Home

Employees who use transit or carpools would be guaranteed a ride home in case of emergency or if they need to work late which helps to reduce concerns about using alternative modes.

Sunrise of Palo Alto Parking Surveys

12/13/2016	On-site					On-Street	Total
	Guest	Driveway	Handicap	Total	Occ.		
Spaces	42	N/A	2	44			
9:00	No Access	0	No Access				
10:00	24	1	1	26	59%	4	30
11:00	24	1	1	26	59%	4	30
12:00	30	1	1	**32**	**73%**	4	**36**
13:00	26	0	2	28	64%	4	32
14:00	27	1	0	28	64%	4	32
15:00	24	1	0	25	57%	4	29
16:00	24	3	1	28	64%	4	32

12/14/2016	On-site					On-Street	Total
	Guest	Driveway	Handicap	Total	Occ.		
Spaces	42		2	44			
9:00	18	3	1	22	50%	4	26
10:00	25	1	1	27	61%	4	31
11:00	21	1	2	24	55%	4	28
12:00	23	1	2	26	59%	4	30
13:00	29	0	2	**31**	**70%**	4	**35**
14:00	25	1	1	27	61%	4	31
15:00	23	1	1	25	57%	4	29
16:00	26	1	1	28	64%	4	32

On-Street = estimate from January observations

Sunrise of Belmont Parking Surveys

12/13/2016	On-Site						Adj Lot	Total
	Guest	Driveway	Handicap	Reserved	Total	Occu.		
Spaces	19	0	4	2	25			
9:00	15	0	1	1	17	68%	1	18
10:00	16	0	1	1	18	72%	1	19
11:00	17	0	2	2	21	84%	1	22
12:00	19	0	2	2	23	92%	1	**24**
13:00	14	2	2	2	20	80%	1	21
14:00	17	1	3	2	23	92%	1	24
15:00	15	1	1	2	19	76%	1	20
16:00	13	0	1	2	16	64%	1	17

12/14/2016	On-Site						Adj Lot	Total
	Guest	Driveway	Handicap	Reserved	Total	Occu.		
Spaces	19	0	4	2	25			
9:00	16	0	2	2	20	80%	1	21
10:00	18	0	2	2	22	88%	1	23
11:00	18	2	2	2	24	96%	1	25
12:00	19	2	2	2	25	100%	1	**26**
13:00	18	0	2	2	22	88%	1	23
14:00	18	1	2	2	23	92%	1	24
15:00	16	1	2	2	21	84%	1	22
16:00	18	1	2	2	23	92%	1	24

Adj Lot = estimate from January observations

County of San Mateo - Planning and Building Department

ATTACHMENT L

Assessment of Twenty-Eight (28) Trees
At Sunrise Senior Living Facility, Redwood City (Proposed)
(Multiple Residential and Commercial Lots)
2915 El Camino Real
Redwood City, California

draft

Prepared for:

Sunrise Senior Living
Attn: Ms. Jackie Dominguez
7902 Westpark Drive
McLean, VA 22102

Site Visit:

Walter Levison, Consulting Arborist (WLCA)

5/2/2017

Report:

WLCA

5/5/2017

Registered Member, American Society of Consulting Arborists and Member of the International Society of Arboriculture

Cell (415) 203-0990 / Email drtree@sbcglobal.net

Table of Contents

Registered Member, American Society of Consulting Arborists and Member of the International Society of Arboriculture

Cell (415) 203-0990 / Email drtree@sbcglobal.net

1.0 Summary

Twenty-eight (28) protected-size trees on the proposed project area and directly adjacent to the proposed Sunrise Senior Living facility build area were tagged as #1 through #28 and visually assessed by Walter Levison, Consulting Arborist (WLCA) on 5/2/2017. The following is a summary of tree disposition based on the current conceptual site plan project build parameters shown on plan sheets received by WLCA from Sunrise Senior Living:

a. Retain Pending Plan Adjustments (8 trees): Trees that appear to be retainable if certain adjustments are made to the proposed utility trench alignments, storm drain alignments, walkways, and other items include **trees #1, #2, #3, #6, #7, #11, #12, and #13**. See WLCA's color-coded tree map markup below in this report to see all potential tree conflicts on one sheet.

b. Prune & Retain (4 trees): Trees that will require significant pruning to clear the proposed new building footprint include (**trees #1 and #6 noted above in 'a'), #7, and #10,** along the north side and at the northeast corner of the proposed building. Other trees in this area may also require significant pruning (to be determined).

   Given the complexity of dealing with tree canopy driplines and proposed construction work, it may be necessary for Sunrise to retain a surveyor to accurately render the southward and westward lopsided canopy dripline edges of trees such as trees #1 through #14 onto a survey plot sheet in order to more accurately assess negative impacts to the trees from buildout of the Sunrise building footprint.

c. Conflict Removals (8 trees): Trees required to be removed due to direct conflicts **include trees #15, #19, #20, #21, #22, #23, #24, and #25.**

   Three large oaks #23, 24, and #25 are within this grouping of removals. It is not known if impacts to these three trees could be mitigated to an insignificant level, since a site plan amendment to restrict the driveway width at the west side of the facility might not be feasible. Also, even if the driveway build area were to be restricted, that driveway work may require deep excavation for replacement of baserock, etc. which may in itself cause severe loss of lateral roots connected to these trees, even if the above-ground portions of the trees were preserved.

d. Author-Recommended Removals (4 trees): Additional trees suggested to be removed due to poor health, poor structure, and/or other issues include **trees #8, #16, #17, and #18.**

e. Trees to be Retained (6 trees): Trees that appear to be easily retained (pending review of the proposed irrigation pipe trench routes for new landscaping), include **trees #4, #5, #9, #14, #27, and #28**.

Registered Member, American Society of Consulting Arborists and Member of the International Society of Arboriculture

Cell (415) 203-0990 / Email drtree@sbcglobal.net

2.0 Assignment & Background

The author Walter Levison Consulting Arborist (WLCA) was retained by Sunrise Senior Living to tag and assess 28 trees of protected size within and adjacent to the proposed lot merger area in Redwood City at the corner of El Camino Real and E. Selby Lane. WLCA was also retained to prepare a formal written arborist report with a tree map, tree images, tree data, discussion of expected impacts to trees, and detailed comprehensive recommendations for tree protection and maintenance, based on the conceptual proposed plan sheets available for review as of the date of writing.

WLCA tagged the trees as #1 through #28 using racetrack shaped aluminum numbered tags affixed to a mainstem at eye level, with one or two trees being tagged at lower elevation due to shrubs surrounding the trunks.

Some of the trees such as #22, #23, #24, #25, and #26 were not accessible due to locked gates that prevented WLCA from tagging the trunks, measuring the trunks, or assessing the lower trunk and root crown areas. These trees are on private residential lots currently occupied by residents.

The trees in this study are noted by number on the color-coded tree location map markup by WLCA inserted below in this report. The sheet used for this purpose was a conceptual site plan sheet dated 2016 showing both the existing tree plot dots and the proposed building and below-ground parking garage footprints. WLCA subsequently added yellow highlighting to indicate current proposed walkways, magenta lines to indicate various proposed storm drain trenches and utility trenches, and a heavy black outline to indicate the proposed extent of excavation for the underground parking facility which matches the proposed new building exterior wall footprint.

Note that WLCA also included thin black lines attached to each numeric tree tag number on the WLCA tree map. The black lines extend exactly to each surveyed tree plot dot, and can be used as a relatively accurate reference of actual offset distances between proposed work and the tree trunks.

Trees mainstems were measured at between 6 and 36 inches above grade (standard City of Redwood City tree measuring height) using a forester's D-tape that converts actual trunk circumference into diameter inches and tenths of inches. Trees that measure less than approximately 12 inches diameter at this height range were excluded from the study.

Tree heights were determined through use of a Nikon forestry pro 550 digital hypsometer.

Tree canopy spreads were estimated visually, and were noted as a total maximum observed spread diameter in the "height/spread" column in WLCA's tree data tables.

Canopy driplines were not indicated on the WLCA tree map markup. However, lopsided canopies with lopsided azimuth were noted in the attached WLCA Excel tree data tables under a dedicated column for canopy lopsidedness. Given the complexity of dealing with tree canopy driplines and proposed construction work, it may be necessary for Sunrise to retain a surveyor to accurately render the southward and westward lopsided canopy dripline edges of trees such as trees #1 through #7, etc. onto a survey plot sheet in order to more accurately assess negative impacts to the trees from buildout of the Sunrise building footprint.

Digital images of the study trees are included in this report, and show the trees mainly in groupings.

Tree data charts (Excel) are attached to the end of this report. The data charts contain both existing data for reference of pre-project conditions, as well as detailed notes and suggested tree protection and maintenance recommendations for each tree that correspond to the recommendations outlined in section 5.0 of this report.

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3.0 Observations & Discussion

Existing Parking Lot & Tree Canopy Lopsidedness

The trees

The Sunrise project proposes to amalgamate a number of separate lots that include an existing asphalt parking lot, a number of single family residential dwellings, and a restaurant. Many of the trees are native evergreen coast live oak (*Quercus agrifolia*) which tend to grow well without any supplemental irrigation. Most of these coast live oaks in the project area are growing along the fence line that separates the existing parking lot from East Selby Lane to the east (see WLCA tree map markup below in this report).

Phototropism

Unfortunately, most of the oaks have developed phototropic growth that tends toward the south and west which is the direction receiving the most intense sunlight as the sun tracks across the sky. The trees are thus in many cases lopsided with most of their canopies hanging into the project area. The current concept plan shows the proposed new building footprint and excavated underground garage within the canopy driplines of these trees (driplines not shown on WLCA tree map).

Building Footprint

Many of the oaks would be required to be significantly pruned back using branch and limb length reduction type pruning to reduce their southward and westward extension, thereby gaining adequate clearance between the new building and the trees. It is not entirely clear that this can be achieved, and it is suggested that an architect and/or surveyor plot the canopies accurately on a scaled architectural drawing to determine how much pruning would actually be required on each tree to achieve adequate clearance, accounting for such items as exterior scaffold erection around the perimeter of the building, staging, bucket lift vehicle travel, etc.

Roots Growing Horizontally

Another issue is the fact that older parking lots have less than modern standard baserock base compaction. This means that the lateral woody roots of trees such as trees #1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, etc. have likely developed extensive lateral woody root systems that extend horizontally as far as 30 to 40 feet or more southward and westward into the existing parking lot area, with roots mainly present in the uppermost 24 inches of the soil profile (i.e. between the bottom of the existing asphalt, and 24 inches below the baserock surface elevation). This is the typical Bay Area peninsula growth pattern of tree roots in clay-based soils, especially in urban areas where soil has been compacted to percentages higher than normal background compaction percent. These roots may be severely damaged or destroyed during demolition of the existing parking lot and during excavation for the new underground garage and new building footprint.

The solution from an arborist consultant's standpoint would be to simply allow the existing asphalt to remain as-is between the trunks and out to approximately 30 feet radius from trunks during the entire site plan development period, and then carefully demolish only the uppermost asphalt surfacing at the very end of the project, just prior to landscape and irrigation pipe installation. This would allow the existing asphalt to remain as a "ground protection barrier" or "soil buffer" throughout the entire site demolition and construction phase, preventing unnecessary soil pore space compaction, rutting, etc. that would normally occur on open soil tree root zone areas stripped of asphalt surface protection.

It is clear that there are both potential canopy conflicts and root extension conflicts with the proposed building footprint and proposed garage excavation footprint, which are both currently set at the same limit line shown on the author's tree map markup below in this report.

Tree Species' Desirability & Overhead Utility Line Clearance Pruning Damage

Some of the trees at this project site are of lower desirability, such as tree of heaven #9, birch #15, and tulip poplars #16, 17, and #18. These trees are considered to be weaker (#9) and of shorter lifespans than would be species such as coast live oak. Additionally, tulip poplars are susceptible to various pest insects which secrete fecal matter as sugary "honeydew" that sticks to car paint and is a serious and legitimate nuisance.

Another issue to consider is the fact that many of the trees have been pruned to clear overhead high voltage electrical utility wires than run at approximately 30 to 35 feet elevation.

Some of the trees have also been pruned to clear lower elevation wires such as low voltage cable TV and/or telephone communications wires. It is not known why this would have occurred, since these low voltage wires are never normally cleared by utility company pruning contractors unless a tree fails and has destroyed the wire system.

Trees #16, 17, and #18 are potentially retainable. However, considering the above-noted factors, it may be better to simply remove the trees and replace them with more desirable species that attain shorter ultimate heights such that the trees do not end up being pruned to clear the wires in the future. The landscape arborist of record (LAOR) on this project can be consulted to recommend appropriate replacement tree species, or WLCA can work with the LAOR to determine appropriate species.

Tree #9 can either be retained or removed. Although the tree of heaven is typically considered a weak wooded, fast growing, short lived trash tree, specimens in good condition in terms of structure and vigor (such as this particular specimen #9) can be retained as shade trees for relatively long periods of time in the landscape. Some specimens of this species have been known to provide good site screening and shade value for many decades in and around the Bay Area peninsula area. As always, good maintenance practices are warranted, such as periodic monitoring for branch splitouts, regular irrigation application, etc.

Oaks #23, #24, and #25 in Proposed Driveway Area

Construction of the current proposed driveway area that extends west of the proposed new building footprint will require removal of large diameter coast live oaks #23, 24, and #25 in good, good, and fair overall condition respectively.

Native oaks of this diameter class size and canopy size in the landscape are typically not allowed by City Planners and City Councilmembers to be removed on a residential area site plan project, especially when the trees are located as these are at the outermost perimeter area of a proposed site. However, given the extensive reach of the proposed Sunrise project, it is possible that these trees will be allowed to be removed.

If the City of Redwood City Staff and Council is flexible in terms of allowing removal of these trees and allowing replacement of lost evergreen canopy value with new landscape trees, then we can reach a solution. Two basic options for retention or removal of these coast live oaks exist:

a. Request removal of the trees, with the understanding that each large diameter oak is replaced with an on-site irrigated planting of three 48" box size native oaks or other high value tree species to be determined.

   This would be a total of nine 48" box size trees as on-site landscape replacement for the loss of these three oaks.

b. Adjust the proposed driveway plan to eliminate the northmost 50% of the proposed paved area that connects the proposed building to the existing neighbor parking lot to the west of the project site.

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The drawback to this solution is that if the southmost 50% of the proposed drive area is demolished and renovated, the use of modern over-excavation and subbase soil compaction to 95% proctor, etc. along the southmost half of the current proposed asphalt driveway might in itself result in extensive root loss or root damage to the three oaks, ending in possible decline or death of the trees that were intended to be preserved.

Also, it is not likely that the existing older asphalt drive located south of the three oaks would be allowed to remain "as-is" in order to avoid damages to the oak trees' root systems growing horizontally beneath the asphalt, no matter how valuable or important the oaks might be. This means that the trees' root systems may end up being damaged by driveway renovations occurring south of the trees, even if the tree canopies themselves were to be preserved and protected above ground.

4.0 Tree Ordinance / City of Redwood City, California

All trees on street right of ways, and all private property trees of all species measuring 12.1 inches diameter at between 6" and 36" above mean grade are protected within the City of Redwood City, California areas that are not "County-controlled" areas.

Per this definition, all 28 study trees in this report are considered to be of protected size, and cannot be removed without formal City approval.

5.0 Tree Protection and Maintenance Recommendations

a. Project Arborist:

Prior to commencement of the project work, retain the services of a project arborist ("PA") if required per Redwood City Staff conditions of approval (COA). The PA shall be either an ASCA registered consulting arborist, or an ISA certified arborist, with at least 5 years of experience inspecting construction around trees in the Bay Area.

The PA may perform such services as, but not limited to the following:

a. Soil moisture monitoring with a Lincoln moisture meter or equivalent.
b. Trunk buffer verification.
c. Fencing erection verification.
d. Preparation of periodic inspection reports to be sent to the project team and City Staff.
e. Assessment of root damages, root pruning quality, trench alignment "field adjustments", etc.

b. Trunk Buffers:

Prior to any site demolition work commencement, **install trunk buffers around the trunks of all of the subject trees assessed in this report that are to be retained.** Use at least one (1) entire roll of orange plastic snow fencing, wrapping the roll around the lowermost eight feet of the trunk of each tree. Place 2X4 wood boards or waste wood pieces standing upright, side by side, over the plastic buffer, and secure the boards with duct tape per the sample spec image above right.

c. Root Protection Zone Fencing:

Chain Link Fencing Protection:

Erect five-foot tall chain link fence on seven-foot long, two-inch diameter iron tube posts pounded 24 inches into the ground. Alternatively, use chain link fence panels set on small moveable concrete block footings and affixed to rebar or steel layout stakes pounded into the ground at the end of each fence panel to make the fence perimeters rigid and immobile (see sample image at right).

Pre-demolition fence:

This fencing must be erected prior to any heavy machinery traffic or construction material arrival on site.

The protective fencing must not be temporarily moved during construction . No materials, tools, excavated soil, liquids, substances, etc. are to be placed or dumped, even temporarily, inside the root protection zone or “RPZ”.

The general route for fencing erection should be at least 15 to 30 feet radius offset from each tree trunk, or the canopy dripline, or as far as possible offset from trunk to allow for proposed work to occur.

No storage, staging, work, or other activities will be allowed inside the RPZ except with PA monitoring.

Signage:

The RPZ fencing shall have one sign affixed with UV-stabilized zip ties to the chain link at eye level for every 20-linear feet of fencing, minimum 8”X11” size each, plastic laminated, with wordage that includes the Town Code section that refers to tree fence protection requirements (wordage can be adjusted):

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TREE PROTECTION ZONE FENCE

ZONA DE PROTECCION PARA ARBOLES

-NO ENTRE SIN PERMISO-
-LLAME EL ARBOLISTA-
REMOVAL OF THIS FENCE IS SUBJECT TO PENALTY ACCORDING TO CITY OF REDWOOD CITY CODE

(ADD APPROPRIATE CODE HERE)

PROJECT ARBORIST:
TELEFONO CELL: **EMAIL:**

d. Project Team Plan Adjustments & Verifications:

i. Demolition of Asphalt Parking Lot / Special Notes:

.

Demolition Phasing:

Surface materials such as the older **asphalt (A/C) parking lot areas within 30 feet of oaks being retained** should be demolished only at the end of the project, and **should be allowed to remain as-is throughout the entire building period**, such that the asphalt acts as ground protection for the root zones of oaks #1 through #7, etc. This will avoid rutting, soil pore space compaction, etc. from machinery and vehicle travel.

Demolish the asphalt just prior to final landscape and irrigation work at the very end of the project.

Demolition Methods / Special:

Use the “shallow-peel” technique which involves peeling laterally with the bucket teeth of an excavator. If possible, all baserock base course beneath the surfacing shall be allowed to remain in-situ, to avoid damaging or destroying existing woody lateral roots extended from oaks from trunks to 30 feet out from trunks.

ii. Tree / Pipe Trench Offsets:

It is suggested that the project team verify that all proposed trench routes for all utilities and drainage pipe alignments (including landscape plant and tree irrigation pipes). **The finalized alignments need to maintain a minimum of 20 to 30 lateral feet offset between trench edges and tree trunk edges of all trees being retained**, except in special cases such as for trees #27 and #28 where the trenches will be aligned through a historical residence foundation at 10 to 20 feet from trunks (i.e. an area which is assumed to have been an impediment for most tree root growth and would therefore theoretically not contain a dense tree root mass).

Trees most likely to be affected by trenching are **trees #1, 2, 3, 6, 7, 11, and #12.**

iii. Walkway Offsets:

Consider realignment of the proposed walkway that is currently proposed to extend directly adjacent to tree #13 being retained. WLCA suggests adjusting the walkway such that the walk edge is at least **10 feet offset from the tree #13 trunk.**

Alternatively, the walkway could be raised up and floated over the existing soil root zone surface to become what is known as a “root bridge” or a “no dig system”, with zero cut below grade for baserock placement. These systems are simple to install, and will either have no baserock or a shallow layer of baserock. Edging is typically a feathered (tapered) edge, or a very shallow wood header board set at maximum 2 inches below existing grade.

iv. Building Footprint vs. Lopsided Oak Canopies:

Oaks #1, 6, 7, and #10 are lopsided to the south and/or west, and will be in direct conflict with the proposed new Sunrise building footprint exterior, or at least the scaffolding that will be erected around the perimeter of the new building. Other tree specimens may also be in conflict with the proposed building footprint (not verified at the time of writing).

In order to preserve as many trees as possible along the E. Selby Lane corridor area of the site, we will need to either push the proposed building footprint farther south and west, or **perform extensive limb length reduction to reduce the trees’ extension to the south and west.**

Given the complexity of dealing with tree canopy driplines and proposed construction work**, it may be necessary for Sunrise to retain a surveyor to accurately render the southward and westward lopsided canopy dripline edges of trees such as trees #1 through #14, etc. onto a survey plot sheet with the proposed building footprint overlaid, in order to more accurately assess negative impacts to the trees from required lateral clearance pruning to clear the buildout of the Sunrise building footprint and any additional offset required for scaffold erection around the building.**

The project team may want to physically set up some type of **spray paint or survey markers along the route of the current proposed building footprint exterior**, so that City Staff and the project team (including the chosen tree pruning contractor) can assess actual conflicts between oak canopies and the building north side and northeast corner areas, and spray paint or otherwise note exact locations of where to prune oaks #1, 6, 7, and #10 (and other trees as necessary) to clear the proposed building and any required standard scaffolding that may extend an additional five to six horizontal feet around the building.

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All pruning shall be performed only by, or under direct full time supervision of an ISA-Certified Arborist, and shall conform to the most current iteration of the American National Standard Institute pruning guidelines and accompanying ISA Best Management Practices / Pruning booklet:

- ANSI A300 (Part 1) tree, shrub, and other wood plant maintenance / standard practices (*pruning*). 2001.

- Best Management Practices / Tree Pruning: companion publication to the ANSI A300 Part 1: tree, shrub, and other wood plant maintenance / standard practices (*pruning*). International Society of Arboriculture. 2002.

v. Underground Garage Excavation vs. Oak Root Systems:

Oaks #1 through #7 likely exhibit horizontally extended root systems that extend 30 to 40 feet radius (or more) southward and westward, coursing through the old base rock just underneath the existing asphalt parking lot.
It is suggested that the project team consider modification of the proposed building footprint exterior foundation work limit, and the underground parking garage excavation work limit which coincides exactly with the building exterior. The modification suggested is a push to the south and/or west to allow for better lateral offset distance between the oaks' root systems and the excavation cut which will destroy 100% of all lateral woody and absorbing root mass at that distance.

A suggested minimum distance is 25 to 30 feet from excavation cut to tree trunks.

Also note that an "**OSHA layback cut",** often used during deep excavation for new underground parking garages as a safety device that continues a slope cut away from the vertical cut area, is **suggested to be eliminated** (if proposed) for this project, as it would cause severe root damage to the oaks being preserved and protected to the north and east of the building footprint.

Use of vertical shoring is the preferred alternative to use of an OSHA layback cut. Shoring can be used to hold up the soil in a safe manner for construction personnel while the garage area is built below grade.

See WLCA's sample image above right showing vertical wooden shoring we used at College of Notre Dame to save a large redwood tree specimen adjacent to a retaining wall cut. Because the OSHA layback type cut was eliminated on this project, we were able to preserve most of this tree's root system, and it survived easily. Pumpable aluminum shoring devices are available for other types of shoring situations.

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vi. Landscape Plan and Irrigation Plan:

Route the proposed landscape and irrigation plan through WLCA or another consulting arborist to verify that proposed new **irrigation pipe trench routes** are offset adequately from the trunks of all trees being retained (e.g. **20 to 30 feet offset minimum**), and also verify that new tree species and planting locations selected for new site tree installations are appropriate for the site.

vii. Tree Removals / Required Under Current Concept Plan:

Obtain formal tree removal permits for trees that are to be removed due to direct conflicts with the proposed site plan (e.g. **trees #15, 19, 20, 21, 22, 23, 24, and #25**).

Consider redesigning the asphalt area at the west most end of the site to allow for retention of oaks #23, 24, and #25. Note however that the driveway area south of these three trees, if renovated using standard deep baserock base section excavation, could in itself have a serious negative impact on the trees' horizontally extended root systems, which could damage or kill the trees from below ground impacts, even if their canopies were preserved and protected above ground.

Consider installation of large size boxed trees such as 48" or 60" native coast live oak or other species at a 3:1 mitigation ratio for loss of existing oak #23, 24, and #25 canopy value (if removed). Work with City Staff to determine adequate replacement ratios, etc.

b. Tree Removals / Author Suggested:

WLCA suggests considering removal of **trees #8, 16, 17, and #18** due to poor condition and/or low species value in the landscape.

c. Irrigation / Permanent:

Keep all trenched irrigation piping 20 to 30 feet offset from all trees being retained.

Keep all irrigation water output (high flow adjustable bubblers, low flow bubblers, overhead spray, microspray, inline emitters, soaker tubes, etc.) at least 25 feet offset from the trunk edge of any existing native coast live oak or valley oak specimen being retained on site (*Quercus agrifolia, Quercus lobata*).

d. Irrigation Temporary During Construction:

Apply temporary irrigation to certain specified trees being retained, at a frequency and duration or total output to be specified by the project arborist (PA).

Method of water delivery can be soaker hose, emitter line, garden hose trickle, water truck, tow-behind water tank with spray apparatus, etc.

Most native oaks will only require water on a once-monthly basis, and it will need to be applied as far as possible offset from the trunk edges (e.g. **15 to 20 feet out from trunks only**).

Unlike native oak trees, the non-oaks at this site such as **tree of heaven #9** can be irrigated heavily on a regular basis (e.g. twice weekly, etc.) throughout all areas of their root zones, near to trunks and far from trunks, and will greatly benefit from such construction period temporary irrigation.

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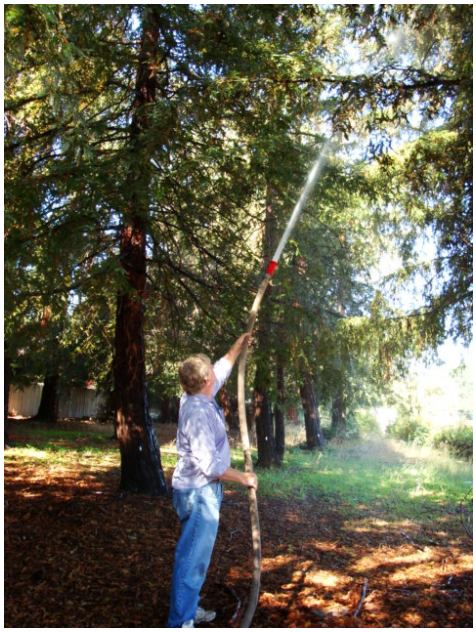
e. Root Pruning:

If **woody roots measuring greater than 1-inch in diameter** are encountered within 25-feet of any tree being retained during site work, contractors shall immediately alert the project arborist, and shall proceed to sever roots at right angles to the direction of root growth using sharp hand tools such as professional grade loppers, hand shears, chain saw, A/C sawzall, or other tools only under his/her direct supervision. See spec images at right. Note that a Sawzall blade indicating use for "bimetal" or "demolition" is typically not a good choice for this work. Instead, opt for a relatively large-toothed blade that indicates use for "pruning" or "wood" (see images at right).

Woody roots shall not be shattered or broken in any way as a result of site activities. Shattered or broken areas shall be hand dug back into clear healthy root tissue and re-severed at right angles to root growth direction under the direct supervision of the project arborist (PA). Immediately (same day) backfill over roots and heavily irrigate (same day) after backfill to saturate the uppermost 24 inches of the soil profile.

f. Water Spray:

Spray off foliage of all trees within 30 feet of construction activity using a very high power garden hose or a pressure washer system set on low pressure setting to wash both the upper and lower surfaces of foliage. This helps keep the gas portals (stomata) unclogged for better gas exchange which is crucial for normal tree function (see image at right in which a fire hose system was used to wash approximately 50 redwood tree specimens during a one-year long demolition period). Spray should be applied approximately twice yearly, or when ambient airborne dust concentration is unusually high.



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g. Optional Tree Maintenance:

It is suggested that the tree owner consider retaining a qualified tree care service provider to install **through-bolt braces** through the bark inclusion type mainstem forks of **oaks #1 and #3**.

All tree support systems would need to be installed per the detailed specifications noted in the most current iteration of ANSI A300 standard for tree support systems.

If **oak #8** is retained, then monitor vigor in 2017. If the tree does not rebound with relatively good vigor in 2017 (e.g. good live twig and foliar density and good live twig extension, etc.), then consider soil injection fertilization with **Greenbelt 22-14-14** (this is the Best Management Practice fertilizer formula currently in use in the Bay Area by local tree care providers who have soil injection fertilization trucks).

6.0 Consultant's Qualifications

- Contract City Arborist to the City of Belmont Department of Planning and Community Development
  5/99-present
- Contract Town Arborist, Town of Los Gatos, California Planning and Community Development
  11/15-present
- Continued education through attendance of arboriculture lectures and forums sponsored by The American Society of Consulting Arborists, The International Society of Arboriculture (Western Chapter), and various governmental and non-governmental entities.
- ISA Qualified Tree Risk Assessor
- ISA Qualified Tree Risk Assessor Course, Palo Alto, CA. 2013
- PNW-ISA Certified Tree Risk Assessor Course graduate, 2009
  Vancouver, B.C., Canada
- ASCA Registered Consulting Arborist (RCA) #401
- Millbrae Community Preservation Commission (Tree Board)
  2001-2006
- ASCA Arboriculture Consulting Academy graduate, class of 2000
- ISA Certified Arborist (CA) #WC-3172
- Associate Consulting Arborist
  Barrie D. Coate and Associates
  4/99-8/99
- U.S. Peace Corps Soil and Water Conservation Extension Agent (Agroforestry, etc.)
  Chiangmai Province, Thailand 1991-1993
- B.A. Environmental Studies/Soil and Water Resources
  UC Santa Cruz, Santa Cruz, California 1990

  Chancellor's Award, 1990

  Wildlands Studies Joint U.S./China Field Ecology Study (12 Weeks). 1989
  Xujiaba Forest Reserve, Yunnan, China

  Rocky Mountain Wilderness Field Ecology Study (5 Weeks). 1986
  UC Santa Cruz Extension

(My full curriculum vitae is available upon request)

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7.0 Assumptions and Limiting Conditions

Any legal description provided to the consultant/appraiser is assumed to be correct. Any titles and ownership to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised and evaluated as through free and clean, under responsible ownership and competent management.

It is assumed that any property is not in violation of any applicable codes, ordinance, statutes, or other government regulations.

Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant/appraiser can neither guarantee nor be responsible for the accuracy of information provided by others.

The consultant/appraiser shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

Unless required by law otherwise, the possession of this report or a copy thereof does not imply right of publication or use for any other purpose by any other than the person to whom it is addressed, without the prior expressed written or verbal consent of the consultant/appraiser.

Unless required by law otherwise, neither all nor any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales, or other media, without the prior expressed conclusions, identity of the consultant/appraiser, or any reference to any professional society or institute or to any initiated designation conferred upon the consultant/appraiser as stated in his qualifications.

This report and any values expressed herein represent the opinion of the consultant/appraiser, and the consultant's/appraiser's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.

Sketches, drawings, and photographs in this report, being intended for visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys unless expressed otherwise. The reproduction of any information generated by engineers, architects, or other consultants on any sketches, drawings, or photographs is for the express purpose of coordination and ease of reference only. Inclusion of said information on any drawings or other documents does not constitute a representation by Walter Levison to the sufficiency or accuracy of said information.

Unless expressed otherwise:

- information contained in this report covers only those items that were examined and reflects the conditions of those items at the time of inspection; and
- the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.

Loss or alteration of any part of this report invalidates the entire report.

Arborist Disclosure Statement:

Arborists are tree specialists who use their education, knowledge, training, and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of the arborist, or to seek additional advice.

Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Tree are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees and below ground. Arborist cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like any medicine, cannot be guaranteed.

Treatment, pruning, and removal of trees may involve considerations beyond the scope of the arborist's services such as property boundaries, property ownership, site lines, disputes between neighbors, and other issues. Arborists cannot take such considerations into account unless complete and accurate information is disclosed to the arborist. An arborist should then be expected to reasonably rely upon the completeness and accuracy of the information provided.

Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate the trees.

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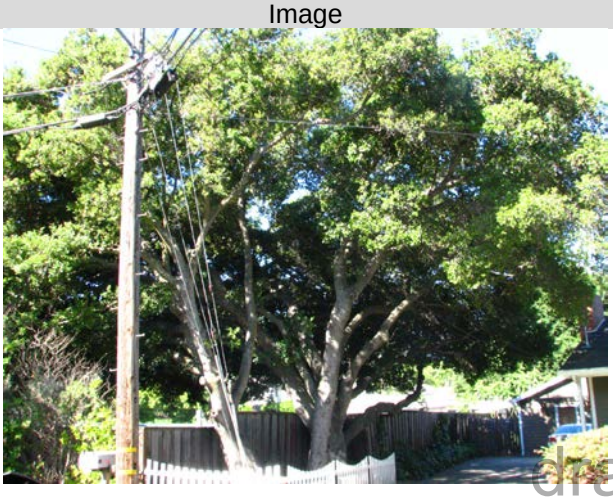
8.0 Certification

I hereby certify that all the statements of fact in this report are true, complete, and correct to the best of my knowledge and belief, and are made in good faith.

Signature of Consultant

9.0 Digital Images

Tag #	Image	Tag #	Image
1, 2, 3		R to L 4, 5	
R to L 6, 7, 8		8 center of image	

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R to L

10, 11, 12

13, 14

North view of oaks 10, 11, 12, 13, & 14 extend-ed south and west into the (e) lot.

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15

R to L
16, 17,
18

19

20

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21

22

23

24, 25

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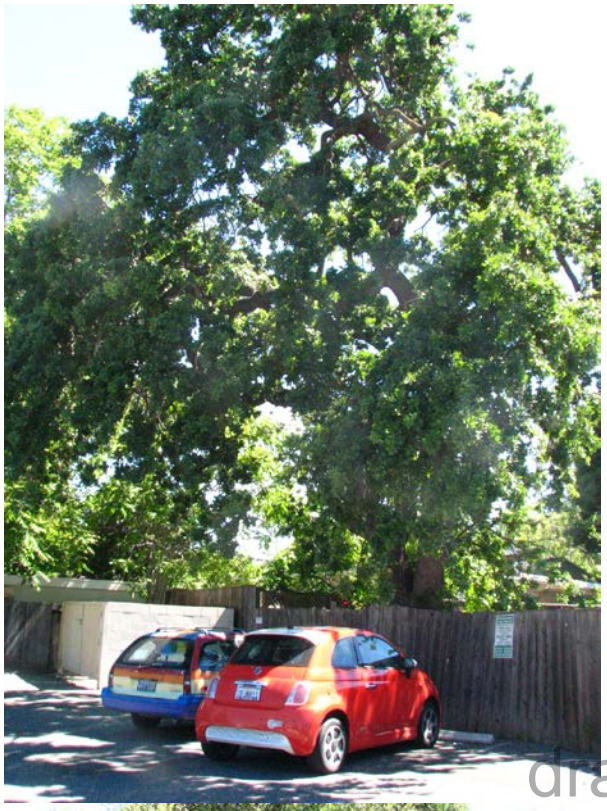
26



R to L

27, 28

R to L

27, 28

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10.0 Tree Location Map Mark-Up (WLCA)

The following map is a markup by WLCA utilizing the current proposed grading and drainage plan sheet. The tree plot dots were surveyed by the project surveyor. Numbers indicated on the markup are tree tag numbers affixed to each tree by WLCA. The black lines shown next to each tree tag number end at each trunk plot dot.

Magenta colored lines are the current team-proposed utility and drainage pipe alignments.

Yellow highlighted areas are the current team-proposed walkways.

Black heavy lines outline the limit of current-proposed underground garage excavation, which coincides with the proposed building foundation footprint.

WLCA assumes that these proposed utility, drainage, and walkway items can be adjusted as necessary to avoid destroying the root systems of important trees being retained, such as native oaks in good overall condition (see the Excel tree data charts for more details in individual trees).

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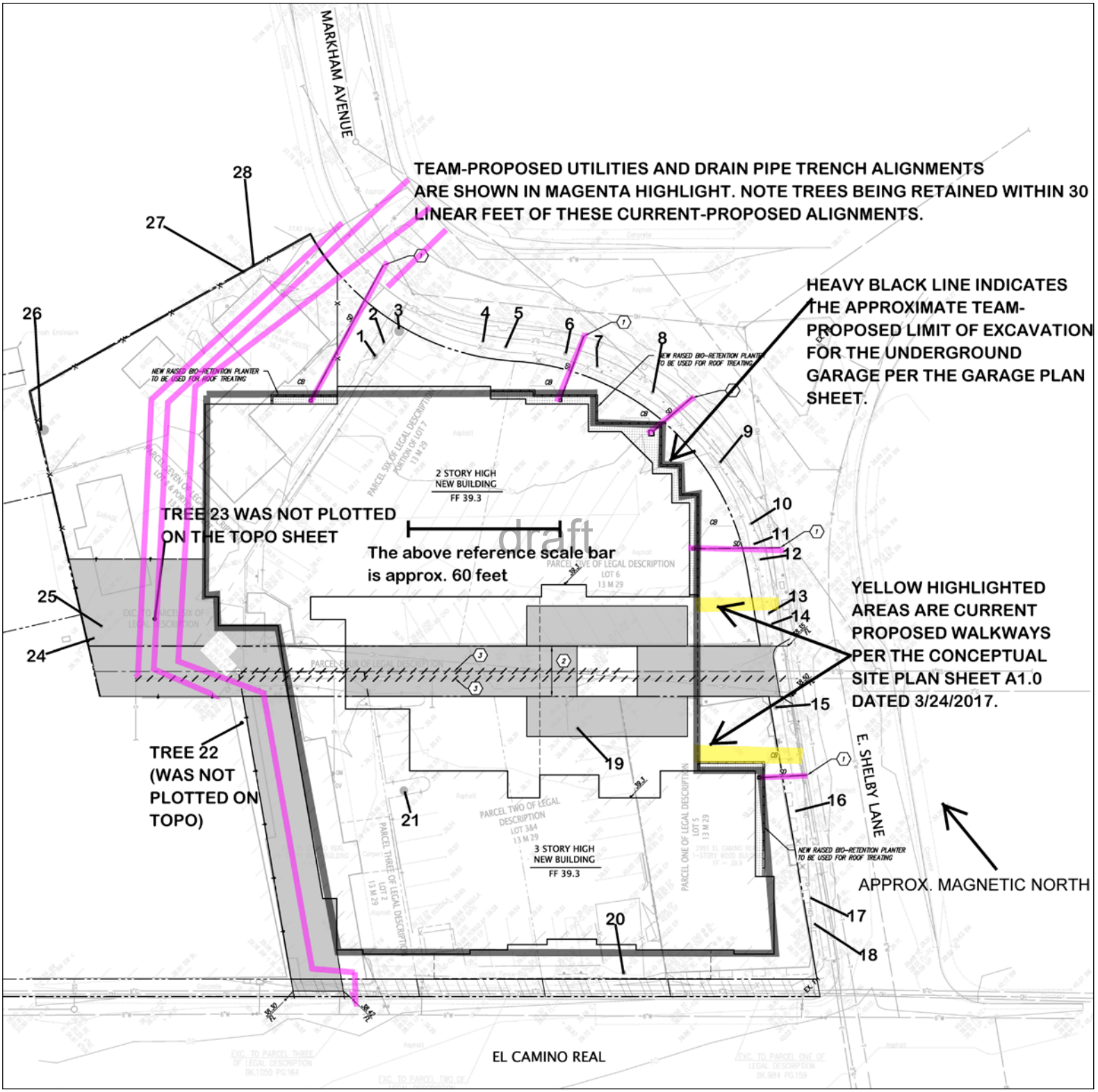

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11.0 Tree Data Table Attached (WLCA)

(ATTACHED EXCEL DOC)

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Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per Redwood City Tree Ordinance (12.1" dia at between 0 and 36" elev.)	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes on Utility, Drainage, and Foundation Conflicts, etc.	Protection and Maintenance
1	coast live oak	*Quercus agrifolia*	30.4	0	0	0	30.4	Yes	30/40	90/85	78% good	good				south and west	south and west		yes					X								Possible canopy and root zone conflict with proposed foundation footprint.	TB, RPZ, endweight reduction pruning, fork bracing
2	coast live oak	*Quercus agrifolia*	18.8	0	0	0	18.8	Yes	35/25	80/70	75% good	mod to good				west	north															Possible root zone conflict with proposed foundation footprint.	TB, RPZ
3	coast live oak	*Quercus agrifolia*	28.2	0	0	0	28.2	Yes	30/25	75/65	70% good	mod to good				south	south		yes.														Was pruned to clear overhead wires.	TB, RPZ, and possible fork bracing
4	California valley oak	*Quercus lobata*	16.5	0	0	0	16.5	Yes	45/30	86/77	80% good	good																					Was pruned to clear overhead wires.	TB, RPZ
5	California valley oak	*Quercus lobata*	20.4	0	0	0	20.4	Yes	45/30	85/80	83% good	good				southwest	south west																Was pruned to clear overhead wires.	TB, RPZ
6	coast live oak	*Quercus agrifolia*	est. 24	0	0	0	est. 24	Yes	35/45	75/75	75% good	mod to good				southwest	south																Was pruned to clear overhead wires. Proposed storm drain conflicts with root system. Possible canopy conflict with proposed new building.	TB, RPZ, adjust storm drain trench to another location at least 20 feet or more offset from trunk edge of this tree.
7	coast live oak	*Quercus agrifolia*	14.3	0	0	0	14.3	Yes	35/35	80/70	74% good	mod to good				southwest																	Was pruned to clear overhead wires. Proposed storm drain conflicts with root system. Possible canopy conflict with proposed new building.	TB, RPZ, adjust storm drain trench to another location at least 20 feet or more offset from trunk edge of this tree (tree may be destroyed due to heavy clearance pruning).
8	coast live oak	*Quercus agrifolia*	est. 22	0	0	0	est. 22	Yes	40/30	20/20	20% very poor	very poor																			X	Tree may or may not rebound in terms of live twig density over time. Possible severe pruning required to clear proposed new building footprint.	If retain tree, then use TB, RPZ, and Greenbelt 22-14-14 fertilizer over open soil root zone areas, and monitor over time to determine if tree is increasing in live twig density. Clearance pruning may destroy tree.
9	tree of heaven	*Ailanthus altissima*	est. 22	0	0	0	est. 22	Yes	45/40	75/75	75% good	mod																					Tree appears to be retainable based on current proposed site plan work limits. Tree is considered to be a trash tree by many, but this specimen is in good condition.	TB, RPZ, W
10	coast live oak	*Quercus agrifolia*	18.8	0	0	0	18.8	Yes	35/35	85/75	80% good	good				west	west								X								Canopy is lopsided west, and may require significant pruning to reduce size and maintain adequate lateral airspace.	TB, RPZ, Prune to clear proposed work area.

Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per Redwood City Tree Ordinance (12.1" dia at between 0 and 36" elev.)	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes on Utility, Drainage, and Foundation Conflicts, etc.	Protection and Maintenance
11	coast live oak	*Quercus agrifolia*	15.8	0	0	0	15.8	Yes	27/30	90/55	75% good	good				west	west							X								Proposed storm drain will destroy root system. Need to realign the SD. Note severe lean. Prune to reduce extension?	TB, RPZ, Prune to reduce westward extension? Realign proposed storm drain to at least 15 or 20 feet offset from trunk.
12	coast live oak	*Quercus agrifolia*	19.4	0	0	0	19.4	Yes	35/40	85/80	84% good	good				south west	south west															Proposed storm drain will destroy root system. Need to realign the SD.	TB, RPZ Realign proposed storm drain to at least 15 or 20 feet offset from trunk.
13	coast live oak	*Quercus agrifolia*	13.6	0	0	0	13.6	Yes	35/25	85/75	83% good	good				south																Proposed walkway is in conflict with the root system of this tree, unless it is relocated or built as a floating baserock system over existing soil grade with zero excavation.	TB, RPZ, and either relocate proposed walkway or eliminate baserock excavation cut to keep this as a "no dig" walkway system.
14	coast live oak	*Quercus agrifolia*	12.0	0	0	0	12	Yes	20/20	75/50	66% fair	good				south west	south west	Yes. And truck hits noted														Tree appears retainable, even with proposed roadway work just south of tree. Tree was pruned to clear various low voltage phone or TV utility wires in the past.	TB, RPZ, and prune to clear proposed roadway footprint as necessary.
15	European birch	*Betula pendula*	14	8	5	0	27	Yes	35/45	65/50	55% fair	mod						X												X	X	Was topped to clear various overhead utility wires in the past. Tree appears to be less than 5 feet offset from proposed new roadway. Expect tree to be removed if roadway base is rebuilt, due to deep excavation for new baserock, etc. that will destroy the north side of this tree's root system.	——
16	tulip poplar	*Liriodendron tulipifera*	17.5	0	0	0	17.5	Yes	25/30	70/45	57% fair	mod	X					X													?	Was topped to clear various overhead utility wires in the past. Tree is susceptible to various insect pests. Root system extension westward is very limited, due to presence of existing building foundation. Root system expansion causing severe sidewalk slab displacement.	TB, RPZ, W if retained.
17	tulip poplar	*Liriodendron tulipifera*	17.3	0	0	0	17.3	Yes	25/30	65/55	59% fair	mod	X					X													?	(Same as #16 above)	TB, RPZ, W if retained.

Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per Redwood City Tree Ordinance (12.1" dia at between 0 and 36" elev.)	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes on Utility, Drainage, and Foundation Conflicts, etc.	Protection and Maintenance
18	tulip poplar	*Liriodendron tulipifera*	15.6	0	0	0	15.6	Yes	30/25	65/55	59% fair	mod	X					X													?	(Same as #16 above)	TB, RPZ, W if retained.
19	American elm	*Ulmus americana*	29.7	0	0	0	29.7	Yes	35/40	25/25	25% very poor	poor	X																	X	X	Twig and branch dieback throughout noted. Root crown decay noted. Tree is slated for removal due to conflicts with plan.	—
20	tree of heaven	*Ailanthus altissima*	28.1	0	0	0	28.1	Yes	35/30	20/15	18% very poor	very poor	X																	X	X	Twig and branch dieback throughout noted. Root crown decay noted. Flux noted on bark. Assymetrical root plate noted. Tree is slated for removal due to conflicts with plan.	——
21	American elm	*Ulmus americana*	43.5	0	0	0	43.5	Yes	45/45	40/30	35% poor	poor	X					X	X											X	X	Tree has been limbed up many times to clear the existing Bentley's restaurant parking lot stall areas. Tree exhibits multiple codominant mainstems with bark inclusions (structural defect). Tree to be removed due to conflicts with building footprint.	———
22	tree of heaven (tree located in a locked fence area)	*Ailanthus altissima*	Est. 21	0	0	0	Est. 21	Yes	35/30	70/55	65% fair								X											X	X	Tree not plotted on surveyor's topo sheet. Tree was added as a rough plot dot by WLCA. Tree expected to be removed during excavation for new commercial vehicle access road.	———
23	coast live oak (not plotted on project topo)	*Quercus agrifolia*	est. 35	0	0	0	est. 35	Yes	40/50	90/60	80% good	good				east			X											X		There was no access to this tree which is located within a locked fenced area. Tree located in the proposed multiple pipe trenching zone. It is assumed tree will be removed anyway, due to the proposed asphalt driveway footprint for the west side of the site.	—
24	coast live oak	*Quercus agrifolia*	est. 26	0	0	0	est. 26	Yes	35/30	90/60	73% good	good				south east	south east													X		Tree to be removed due to proposed asphalt driveway at the west side of the site	—

Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per Redwood City Tree Ordinance (12.1" dia at between 6 and 36" elev.)	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes on Utility, Drainage, and Foundation Conflicts, etc.	Protection and Maintenance
25	coast live oak	*Quercus agrifolia*	est. 26	0	0	0	est. 26	Yes	27/30	90/40	65% fair	good				west	west													X		Tree to be removed due to proposed asphalt driveway at the west side of the site. Note severe trunk lean off vertical to the west.	----
26	California valley oak	*Quercus lobata*	est. 30	0	0	0	est. 30	Yes	35/35	75/65	70% good	mod																				Tree is shown on the conceptual site plan sheet A1.0 to be retained at the northwest corner of the merged lot area. Tree was not fully assessed due to lack of access to the lower trunk. Assume "good" overall condition rating.	TB, RPZ, and maintain offsets of at least 30 feet between trunk and nearest trenching for irrigation, utilities, drainage.
27	coast live oak	*Quercus agrifolia*	30.5	0	0	0	30.5	Yes	50/50	90/70	80% good	good				south west																Note root extension to south may be severely limited due to presence of existing house foundation 4 or 5 feet south of trunk, but this cannot be verified. Current proposed utility trenching appears far enough offset to south that it will not interfere with the root system of this tree.	TB, RPZ, and maintain offsets of at least 15 to 20 feet between trunk and nearest trenching for irrigation, utilities, drainage. Do not renovate driveway to the north of trunk, as this could cause severe root loss and death of the tree.
28	coast live oak	*Quercus agrifolia*	30.3	0	0	0	30.3	Yes	30/30	75/60	67% fair	good	X		X	south east																Sycamore bark moth larvae feeding causing severe wood tissue necrosis in lower trunk area. Root expansion causing severe displacement of the existing driveway to north (neighbor property). As noted above, root extension to south is limited due to existing house to be demolished. However, WLCA still recommends keeping all utilities offset from trunk at least 15 to 20 feet.	TB, RPZ, and maintain offsets of at least 15 to 20 feet between trunk and nearest trenching for irrigation, utilities, drainage. Do not renovate driveway to the north of trunk, as this could cause severe root loss and death of the tree.

Notes:

1. On-site survey trees include all existing specimens of tree species with at least one (1) mainstem measuring greater than or equal to 12.1 inches diameter when measured at between 6 inches and 36 inches above mean grade.

2. Various trees in this study were located behind locked private property gates, and were therefore assessed from afar without access to the lower trunks. These trees are noted with trunk diameters of "estimated" in the table above.

3. Heights measured using a Nikon 550 Forestry Pro. Diameters were measured at between Redwood City standard height of between six and thirty-six inches above mean grade using a forestry D-tape that converts circumference to an average diameter. Canopy spread is noted in visually estimated feet (shown with both height and spread data for each tree in a single cell).

4. Locations of the trees are shown on a tree plot sheet provided by Sunrise, marked up by WLCA.

Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per Redwood City Tree Ordinance (12.1" dia at between 0 and 36" elev.)	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes on Utility, Drainage, and Foundation Conflicts, etc.	Protection and Maintenance

Protection and Maintenance Specifications:

RPZ: Root protection zone fence, chain link, with 2" diameter iron posts driven 24" into the ground, 6 to 8 feet on center max. spacing.
RB: Root buffer consisting of wood chip mulch lain over existing soil as a 12 inch thick layer, overlain with 1 inch or greater plywood strapped together with metal plates. This root buffer or soil buffer should be placed over the entire width of the construction corridor between tree trunks and construction.
RP: Root pruning. Prune woody roots measuring greater than or equal to 1 inch diameter by carefully back-digging into the soil around each root using small hand tools until an area is reached where the root is undamaged. Cleanly cut through the root at right angle to the root growth direction, using professional grade pruning equipment and/or a Sawzall with wood pruning blade. Backfill around the cut root immediately (same day), and thoroughly irrigate the area to saturate the uppermost 24 inches of the soil profile.
TB: Trunk buffer consists of 20-40 wraps of orange plastic snow fencing to create a 2 inch thick buffer over the lowest 8 feet of tree trunk (usually takes at least an entire roll of orange fencing). Lay 2X4 wood boards vertically, side by side, around the entire circumference of the trunk. Secure buffer using duct tape (not wires).
F: Fertilization with Greenbelt 22-14-14 tree formula.
M: 4-inch thick layer of wood chip mulch (Lyngso, self pickup). Do not use bark chips or shredded redwood bark.
W: Irrigate using various methods to be determined through discussion with General Contractor. Irrigation frequency and duration to be determined through discussion.
P: Pruning per specifications noted elsewhere. All pruning must be performed only under direct site supervision of an ISA Certified Arborist, or performed directly by an ISA Certified Arborist, and shall conform to all ANSI A300 standards.
MON: Project Arborist must be present to monitor specific work as noted in the notes box for each tree.

County of San Mateo - Planning and Building Department

ATTACHMENT M

Assessment of Twenty-Eight (28) Trees
At Sunrise Senior Living Facility, Redwood City (Proposed)
(Multiple Residential and Commercial Lots)
2915 El Camino Real
Redwood City, California

Prepared for:

Sunrise Senior Living
Attn: Ms. Jackie Dominguez
7902 Westpark Drive
McLean, VA 22102

Site Visit:

Walter Levison, Consulting Arborist (WLCA)

5/2/2017

Report:

WLCA

Revised 10/25/2017

Registered Member, American Society of Consulting Arborists and Member of the International Society of Arboriculture

Cell (415) 203-0990 / Email drtree@sbcglobal.net

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1.0 Summary

Twenty-eight (28) protected-size trees on the proposed project area and directly adjacent to the proposed Sunrise Senior Living facility build area were tagged as #1 through #28 and visually assessed by Walter Levison, Consulting Arborist (WLCA) on 5/2/2017. The following is a summary of tree disposition based on the current plan sheets received by WLCA from Sunrise Senior Living:

a. Fourteen (14) trees **#1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 26, 27, and #28** are to be retained per the current tree disposition plan sheet L-5 by Gates and Associates Landscape Architecture, dated 9/14/2017.

   See WLCA's color-coded tree map markup below in this report to see all potential tree conflicts on one sheet.

   There are various conflicts which may cause significant to severe root loss on one or more sides of the roots zones of the above trees. A table outlining all of the conflicts is includes as table 3.0(a) on pages 5, 6, and 7 of this report Observations/Discussion section. Below is a summary of these conflicts:

   - A proposed bioretention facility south of **trees #1, 2, and #3.**
   - A proposed walkway throughout the north corner of the site with expected base section excavation requirements near **trees #1, 2, 3, 26, 27, and #28**.
   - A proposed walkway along the east side of the site with expected base section requirements near to **trees #4, 5, 6, 7, 9, 10, 11, and #12.**
   - Storm drain trench alignments at various locations will encroach to distances less than 20 feet from the trunk edges of **trees #1, 2, 3, 6, 7, 10, and #26.**
   - Pruning clearance requirements for both the new building footprint and for scaffold erection around the exterior siding to allow for finish work to occur. This pruning will need to be performed on **trees #1, 6, 7, 9, 10, 11, and #12. The most severe pruning will need to occur on the proposed building sides of trees #1, 6, 7, and #10. The severity of pruning required may cause tree decline or even death.**
   - Other pruning to clear the landscape airspace may be required on other trees such as **tree #26.**

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2.0 Assignment & Background

The author Walter Levison Consulting Arborist (WLCA) was retained by Sunrise Senior Living to tag and assess 28 trees of protected size within and adjacent to the proposed lot merger area in Redwood City at the corner of El Camino Real and E. Selby Lane. WLCA was also retained to prepare a formal written arborist report with a tree map, tree images, tree data, discussion of expected impacts to trees, and detailed comprehensive recommendations for tree protection and maintenance, based on the conceptual proposed plan sheets available for review as of the date of writing.

WLCA tagged the trees as #1 through #28 using racetrack shaped aluminum numbered tags affixed to a mainstem at eye level, with one or two trees being tagged at lower elevation due to shrubs surrounding the trunks.

Some of the trees such as #22, #23, #24, #25, and #26 were not accessible due to locked gates that prevented WLCA from tagging the trunks, measuring the trunks, or assessing the lower trunk and root crown areas. These trees are on private residential lots currently occupied by residents.

The trees in this study are noted by number on the color-coded tree location map markup by WLCA inserted below in this report. The sheet used for this purpose was a conceptual site plan sheet dated 2016 showing both the existing tree plot dots and the proposed building and below-ground parking garage footprints. WLCA subsequently added yellow highlighting to indicate current proposed walkways, magenta lines to indicate various proposed storm drain trenches and utility trenches, and a heavy black outline to indicate the proposed extent of excavation for the underground parking facility which matches the proposed new building exterior wall footprint.

Note that WLCA also included thin black lines associated with each numeric tree tag number on the WLCA tree map. The black lines extend exactly to each surveyed tree plot dot, and can be used as a relatively accurate reference of actual offset distances between proposed work and the tree trunks. The approximate canopy driplines were noted on the WLCA tree map markup as grey colored clouding so that conflicts with the proposed new building can be roughly assessed.

Trees mainstems were measured at between 6 and 36 inches above grade (standard City of Redwood City tree measuring height) using a forester's D-tape that converts actual trunk circumference into diameter inches and tenths of inches. Trees that measure less than approximately 12 inches diameter at this height range were excluded from the study.

For protection status purposes, WLCA used the County of San Mateo, California standards, which protect tree specimens of all species with at least one mainstem of 12-inches diameter or more as "significant trees", and all native oak specimens with a mainstem of 48-inches or larger as "heritage trees".

Tree heights were determined through use of a Nikon forestry pro 550 digital hypsometer.

Tree canopy spreads were estimated visually, and were noted as a total maximum observed spread diameter in the "height/spread" column in WLCA's tree data tables.

Canopy driplines were not indicated on the WLCA tree map markup. However, lopsided canopies with lopsided azimuth were noted in the attached WLCA Excel tree data tables under a dedicated column for canopy lopsidedness. Given the complexity of dealing with tree canopy driplines and proposed construction work, it may be necessary for Sunrise to retain a surveyor to accurately render the southward and westward lopsided canopy dripline edges of trees such as trees #1 through #7, etc. onto a survey plot sheet in order to more accurately assess negative impacts to the trees from buildout of the Sunrise building footprint.

Digital images of the study trees are included in this report, and show the trees mainly in groupings.

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Tree data charts (Excel) are attached to the end of this report. The data charts contain both existing data for reference of pre-project conditions, as well as detailed notes and suggested tree protection and maintenance recommendations for each tree that correspond to the recommendations outlined in section 5.0 of this report.

This entire report document was requested to be updated by Sunrise Senior Living in October, 2017, to account for an updated set of plans being submitted to the County of San Mateo Planning Division for review.

3.0 Observations & Discussion

Table 3.0(a) is an exhibit that shows potential conflicts between trees being retained, and the proposed grading, drainage, and utility plan work as it appeared on 10/23/2017:

Tree Being Retained	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5
1	Proposed bioretention area excavation 7 feet from trunk.	New pathway paver base section excavation and subgrade prep at 7 feet from trunk edge.	Storm drain pipe trenching at roughly 8 feet west of trunk edge.	Storm drain pipe trenching to street at 15 feet east of trunk edge.	Pruning to clear the proposed new building footprint and scaffolding for exterior work.
2	Proposed bioretention area excavation 7 feet from trunk.	New pathway paver base section excavation and subgrade prep at 7 feet from trunk edge.	Storm drain pipe trenching at roughly 14 feet west of trunk edge.	Storm drain pipe trenching to street at 14 feet east of trunk edge.	
3	Proposed bioretention area excavation 9 feet from trunk.	New pathway paver base section excavation and subgrade prep at 12 feet from trunk edge.	Storm drain pipe trenching to street at 8 feet east of trunk edge.		
4	New pathway base section excavation and subgrade prep at 7 feet from trunk edge.				
5	New pathway paver base section excavation and subgrade prep at 10 feet from trunk edge.				

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Tree Being Retained	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5
6	New pathway paver base section excavation and subgrade prep at 10 feet from trunk edge.	New building foundation at 20 feet.	Prune south side of canopy to clear building footprint and scaffold erection airspace.	Proposed storm drain pipe trench alignment will encroach to 3 feet from trunk.	
7	New pathway paver base section excavation and subgrade prep at 8 feet from trunk edge.	New building foundation at 20 to 25 feet.	Prune south side of canopy to clear building footprint and scaffold erection airspace.	Proposed storm drain pipe trench alignment will encroach to 6 feet from trunk.	
9	New pathway paver base section excavation and subgrade prep at 10 feet from trunk edge.	New building foundation at 20 to 25 feet.	Prune south side of canopy to clear building footprint and scaffold erection airspace.		
10	New pathway paver base section excavation and subgrade prep at 7 feet from trunk edge.	Prune south side of canopy to clear scaffold erection airspace.	Proposed storm drain pipe trench alignment will encroach to 4 to 5 feet from trunk.		
11	New pathway paver base section excavation and subgrade prep at 5 feet from trunk edge.	Prune south side of canopy to clear building footprint and scaffold erection airspace.			
12	New pathway paver base section excavation and subgrade prep at 6 feet from trunk edge.	Prune south side of canopy to clear building footprint and scaffold erection airspace.			

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Tree Being Retained	Issue 1	Issue 2	Issue 3	Issue 4	Issue 5
26	**New pathway paver base section excavation and subgrade prep at 1 to 2 feet from trunk edge.**	**New storm drain pipe trench at 16 to 17 feet from trunk.**	**Prune to clear new pathway airspace as needed.**		
27	**New pathway paver base section excavation and subgrade prep at 8 feet from trunk edge.**				
28	**New pathway paver base section excavation and subgrade prep at 8 feet from trunk edge.**				

Existing Parking Lot & Tree Canopy Lopsidedness

The trees

The Sunrise project proposes to amalgamate a number of separate lots that include an existing asphalt parking lot, a number of single family residential dwellings, and a restaurant. Many of the trees are native evergreen coast live oak (*Quercus agrifolia*) which tend to grow well without any supplemental irrigation. Most of these coast live oaks in the project area are growing along the fence line that separates the existing parking lot from East Selby Lane to the east (see WLCA tree map markup below in this report).

Phototropism

Unfortunately, most of the oaks have developed phototropic growth that tends toward the south and west which is the direction receiving the most intense sunlight as the sun tracks across the sky. The trees are thus in many cases lopsided with most of their canopies hanging into the project area. The current concept plan shows the proposed new building footprint and excavated underground garage within the canopy driplines of these trees (driplines not shown on WLCA tree map).

Building Footprint

Many of the oaks would be required to be significantly pruned back using branch and limb length reduction type pruning to reduce their southward and westward extension, thereby gaining adequate clearance between the new building and the trees. It is not entirely clear that this can be achieved, and it is suggested that an architect and/or surveyor plot the canopies accurately on a scaled architectural drawing to determine how much pruning would actually be required on each tree to achieve adequate clearance, accounting for such items as exterior scaffold erection around the perimeter of the building, staging, bucket lift vehicle travel, etc.

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Roots Growing Horizontally

Another issue is the fact that older parking lots have less than modern standard baserock base compaction. This means that the lateral woody roots of trees such as trees #1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, etc. have likely developed extensive lateral woody root systems that extend horizontally as far as 30 to 40 feet or more southward and westward into the existing parking lot area, with roots mainly present in the uppermost 24 inches of the soil profile (i.e. between the bottom of the existing asphalt, and 24 inches below the baserock surface elevation). This is the typical Bay Area peninsula growth pattern of tree roots in clay-based soils, especially in urban areas where soil has been compacted to percentages higher than normal background compaction percent. These roots may be severely damaged or destroyed during demolition of the existing parking lot and during excavation for the new underground garage and new building footprint.

The solution from an arborist consultant's standpoint would be to simply allow the existing asphalt to remain as-is between the trunks and out to approximately 30 feet radius from trunks during the entire site plan development period, and then carefully demolish only the uppermost asphalt surfacing at the very end of the project, just prior to landscape and irrigation pipe installation. This would allow the existing asphalt to remain as a "ground protection barrier" or "soil buffer" throughout the entire site demolition and construction phase, preventing unnecessary soil pore space compaction, rutting, etc. that would normally occur on open soil tree root zone areas stripped of asphalt surface protection.

It is clear that there are both potential canopy conflicts and root extension conflicts with the proposed building footprint and proposed garage excavation footprint.

Tree Species' Desirability & Overhead Utility Line Clearance Pruning Damage

Some of the trees at this project site are of lower desirability, such as tree of heaven #9, birch #15, and tulip poplars #16, 17, and #18. These trees are considered to be weaker (#9) and of shorter lifespans than would be species such as coast live oak. Additionally, tulip poplars are susceptible to various pest insects which secrete fecal matter as sugary "honeydew" that sticks to car paint and is a serious and legitimate nuisance.

Another issue to consider is the fact that many of the trees have been pruned to clear overhead high voltage electrical utility wires than run at approximately 30 to 35 feet elevation.

Some of the trees have also been pruned to clear lower elevation wires such as low voltage cable TV and/or telephone communications wires. It is not known why this would have occurred, since these low voltage wires are never normally cleared by utility company pruning contractors unless a tree fails and has destroyed the wire system.

Trees #16, 17, and #18 are potentially retainable. However, considering the above-noted factors, it may be better to simply remove the trees and replace them with more desirable species that attain shorter ultimate heights such that the trees do not end up being pruned to clear the wires in the future. The landscape arborist of record (LAOR) on this project can be consulted to recommend appropriate replacement tree species, or WLCA can work with the LAOR to determine appropriate species. Per the September 2017 revised landscape plan and tree disposition sheet L-5, these trees are to be removed.

Tree #9 can either be retained or removed. Although the tree of heaven is typically considered a weak wooded, fast growing, short lived trash tree, specimens in good condition in terms of structure and vigor (such as this particular specimen #9) can be retained as shade trees for relatively long periods of time in the landscape. Some specimens of this species have been known to provide good site screening and shade value for many decades in and around the Bay Area peninsula area. As always, good maintenance practices are warranted, such as periodic monitoring for branch splitouts, regular irrigation application, etc. Per the September 2017 version of tree disposition sheet L-5, this tree is to be retained.

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Oaks #23, #24, and #25 in Proposed Driveway Area

Construction of the current proposed driveway area that extends west of the proposed new building footprint will require removal of large diameter coast live oaks #23, 24, and #25 in good, good, and fair overall condition respectively. These trees are proposed to be removed per sheet L-5 tree disposition dated September, 2017.

REPLACEMENT TREE SPECIES PER LANDSCAPE PLANS DATED SEPTEMBER, 2017

The tree species and cultivars noted on the landscape plan set of sheets reviewed for this assignment, dated September 2017, contains some trees that need to be adjusted or clarified to avoid common disease issues to which these trees are susceptible. The current landscape palette and WLCA's suggested adjustments are outlined in the table below for clarity:

TABLE 3.0(b) WLCA Suggested Tree Palette Changes

Current Proposed Tree / Cultivar	Problems	Suggested by WLCA
1) Japanese maple.	**Finicky in dry weather such as at this site, unless given very fast drainage and heavy irrigation. Susceptible to wind burn if foliage is exposed to frequent winds without protection.**	**Try paperbark maple instead. (*Acer griseum*)**
2) Marina strawberry tree (*Arbutus* 'Marina').	**Has started to become susceptible to various maladies over the last few years.**	**Try evergreen swamp myrtle (*Tristaniopsis laurina*), or mix and match with Marina strawberry tree. They are sometimes planted together.**
3)* Flowering crabapple *Malus floribunda	**Bacterial fireblight, etc.**	**Use tree genera that are not in the fireblight-susceptible rose family of trees. I suggest we delete this tree from the palette.**
4) Chinese elm.	**Most of the cultivars are susceptible to Chinese elm anthracnose fungal infections, which are cankers that appear as concentric circles (like targets).**	**Use 'Drake', and/or another cultivar that is claimed by the tree grower to be resistant to Chinese elm anthracnose.**

IRRIGATION PLAN

There was no irrigation plan sheet available for review by WLCA at the time of writing.

4.0 Tree Ordinance / County of San Mateo, California

All trees measuring 12 inches and greater are considered "significant trees". All native oaks (coast live oak, California valley oak, etc.) are considered protected as "heritage trees" at the 48 inch diameter threshold.

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Per this definition, all 28 study trees in this report are considered to be protected as "**significant trees**" per County of San Mateo tree ordinance governing privately owned tree specimens, and cannot be removed without formal County approval. There are zero (0) heritage size trees included in this tree study of 28 tree specimens.

5.0 Tree Protection and Maintenance Recommendations

1) Project Arborist:

Prior to commencement of the project work, retain the services of a project arborist ("PA") if required per County of San Mateo conditions of approval (COA). The PA shall be either an ASCA registered consulting arborist, or an ISA certified arborist, with at least 5 years of experience inspecting construction around trees in the Bay Area.

The PA may perform such services as, but not limited to the following:

a. Soil moisture monitoring with a Lincoln moisture meter or equivalent.
b. Trunk buffer verification.
c. Fencing erection verification.
d. Preparation of periodic inspection reports to be sent to the project team and County Staff.
e. Assessment of root damages, root pruning quality, trench alignment "field adjustments", walkway base section excavation and subbase prep activity monitoring to verify maximum suggested cut depths.

2) Trunk Buffers:

Prior to any site demolition work commencement, **install trunk buffers around the trunks of all of the subject trees assessed in this report that are to be retained.** Use at least one (1) entire roll of orange plastic snow fencing, wrapping the roll around the lowermost eight feet of the trunk of each tree. Place 2X4 wood boards or waste wood pieces standing upright, side by side, over the plastic buffer, and secure the boards with duct tape per the sample spec image above right.

3) Root Protection Zone Fencing:

Erect five-foot tall chain link fence on seven-foot long, two-inch diameter iron tube posts pounded 24 inches into the ground. Alternatively, use chain link fence panels set on small moveable concrete block footings and affixed to rebar or steel layout stakes pounded into the ground at the end of each fence panel to make the fence perimeters rigid and immobile (see sample image at right).

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Pre-demolition fence:

This fencing must be erected prior to any heavy machinery traffic or construction material arrival on site.

The protective fencing must not be temporarily moved during construction . No materials, tools, excavated soil, liquids, substances, etc. are to be placed or dumped, even temporarily, inside the root protection zone or "RPZ".

The general route for initial fencing erection should be per the red-dashed lines shown on the color-coded WLCA tree map markup sheet attached to this report. The fencing routes may need to be continually adjusted over time to allow for landscape walkways, paths, plantings, irrigation, etc. to be installed.

No storage, staging, work, or other activities will be allowed inside the RPZ except with PA monitoring.

Signage:

The RPZ fencing shall have one sign affixed with UV-stabilized zip ties to the chain link at eye level for every 20-linear feet of fencing, minimum 8"X11" size each, plastic laminated, with wordage that includes the Town Code section that refers to tree fence protection requirements (wordage can be adjusted):

TREE PROTECTION ZONE FENCE

ZONA DE PROTECCION PARA ARBOLES

-NO ENTRE SIN PERMISO-
-LLAME EL ARBOLISTA-
REMOVAL OF THIS FENCE IS SUBJECT TO PENALTY ACCORDING TO SAN MATEO COUNTY CODE

(ADD APPROPRIATE CODE HERE)

PROJECT ARBORIST:

TELEFONO CELL: **EMAIL:**

4) Project Team Plan Adjustments & Verifications:

i. Demolition of Asphalt Parking Lot / Special Notes:

Demolition Phasing:

Surface materials such as the older **asphalt (A/C) parking lot areas within 30 feet of oaks being retained** should be demolished only at the end of the project, and **should be allowed to remain as-is throughout the entire building period**, such that the asphalt acts as ground protection for the root zones of oaks #1 through #7, etc. This will avoid rutting, soil pore space compaction, etc. from machinery and vehicle travel.

Demolish the asphalt just prior to final landscape and irrigation work at the very end of the project.

Demolition Methods / Special:

Use the "shallow-peel" technique which involves peeling laterally with the bucket teeth of an excavator. If possible, all baserock base course beneath the surfacing shall be allowed to remain in-situ, to avoid damaging or destroying existing woody lateral roots extended from oaks from trunks to 20 or 30 feet south and west of the trunk edges.

Maximum depth of demolition excavation cut work shall be roughly 4 inches of asphalt and base rock material, stopping at the soil root zones of trees #1 through #12 below. Under no circumstances shall the open soil tree root zone areas between the proposed new Sunrise residential building and garage footprint edge and the trunks of trees #1 through #12 be demolished or adulterated. This zone shall be preserved as a no-dig zone where shallow-cut storm drains and shallow-cut or no-dig type walkway base work shall be performed. See recommendation #5(d)iii below for further information, and a side cut detail sketch.

ii. East Selby Lane Sidewalk:

Do not replace the existing sidewalk along E. Selby Lane sections adjacent to trees #1 through #12, as there may be an extensive network of both fibrous and woody roots coursing through the baserock of the existing older walkway, except in small areas where the storm drain pipes will need to shallow-run through the sidewalk slab to the street surface.

iii. Storm Drain Pipe Trenching / Shallow Cut Protocol:

It is suggested that the project team shallow-cut all proposed trench routes for all utilities and drainage pipe alignments (including landscape plant and tree irrigation pipes) which are proposed for the areas within 15 linear feet of trees being retained. Per WLCA's markup below, and per WLCA's discussion with the project civil engineer Kier and Wright[1], the new storm drain pipes will run from over-grade generally eastward toward E. Selby Lane, as very shallow cut trenches at or slightly below existing soil grade (i.e. soil grade elevations after existing older asphalt and baserock parking lot materials roughly 4 inches thickness or more are removed from the site). The storm drains are to run through the existing sidewalk slabs, and outfall onto the roadway surface at E. Selby Lane.

[1] Personal communication, Kier and Wright Civil. 10/25/2017.

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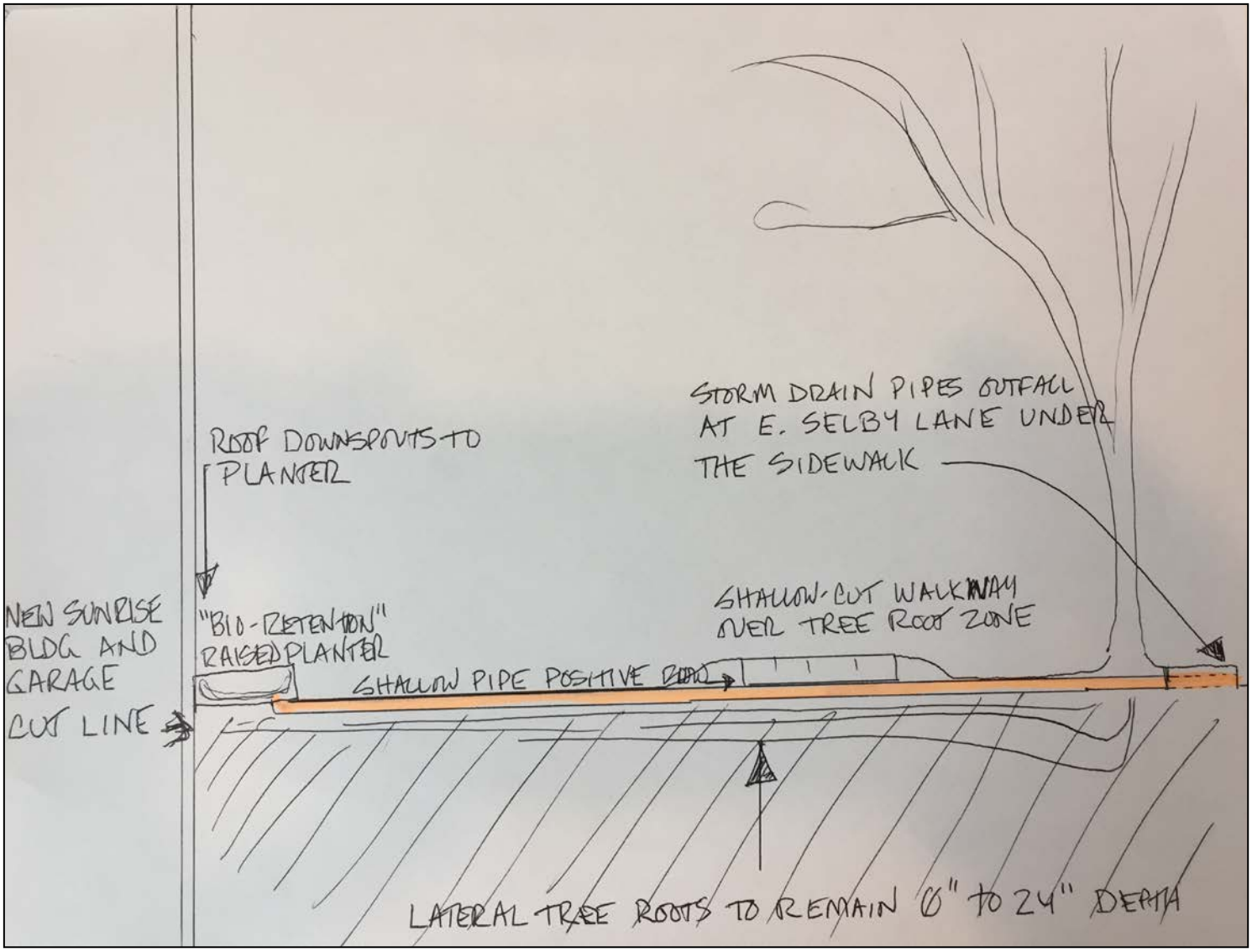
If possible, the actual storm drain pipe cut depth should be no deeper than 1 to 2 inches below soil grade, through the zone between the raised bed bio-retention planters and E. Selby Lane. See the WLCA side cut detail sketch below on page 13 (conceptual only, not to scale), showing how the shallow-cut storm drain pipe system would be installed with relatively very little loss of lateral woody tree roots from **trees #1, 2, 3, 4, 6, 7, and #10.** In order for the system to work, the construction phase team will need to limit scarification of the existing parking lot area, removing only 4-inches of material from over the soil root zones of the trees, thereby preserving the lateral woody roots extended westward and southward from trees #1 through #12 along E. Selby Lane. The construction team will also need to ensure that all excavation for the new base rock base section of the walkway is actually at or above original soil grade so as to avoid destroying the root systems of trees #1 through #12 between the trunks of the trees shown at the right of the image, and the new Sunrise building and garage siding limit at the left side of the image:



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iv. Walkway Base Section Installation / Shallow Cut:

Walkways proposed for areas within 15 feet of **trees #1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, and #26** will need to be kept shallow in terms of subbase prep work and base rock base section excavation and compaction. The maximum depth of work should be **2 to 4-inches or less below existing soil grade**[2]. In order to raise the elevation of the walkway finish surface and allow for the storm drain shallow-cut pipe to run through the base of the walkway, the base section of the walkway will need to be crowned up over existing soil grade and placed in or on top of a fill soil layer. Edging for these shallow cut or no-dig type systems is typically a feathered (tapered) tamped soil edge against a very shallow header board set at maximum 2 to 4-inches or so below existing grade. Mulch of various types can also be used to feather out the edge such that the floating raised or crowned walkway conforms to ADA slope requirements and is not a trip hazard.

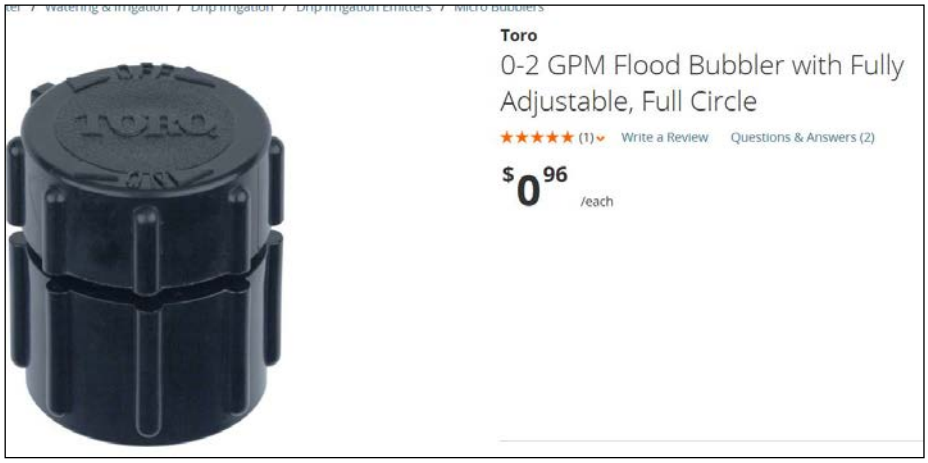
v. Trees in Landscape Palette:

It is suggested that the trees in the Gates and Associates landscape palette be adjusted to account for the information provided by WLCA in table 3.0(b) above in this report.

vi. Irrigation:

It is suggested that the irrigation pipe trenching routes for new landscaping be aligned such that there is at least 15 to 20 feet minimum offset from pipe trench edge to the tree trunk edges of all trees being retained.

Bubblers for new trees shall be minimum two (2) count ½" diameter adjustable high-flow type Toro or equivalent flood bubblers (0 to 2 gallons per minute adjustable) set on the soil surface and either covered with mulch or left uncovered, directly over the rootball of each tree (see sample image below):



Route all final plan sheet versions to the project arborist (i.e. the "PA") for review and comment.

vii. Bio-retention:

It is suggested that the bioretention facility be relocated such that all excavation associated with this item be offset at least **15 lateral feet from the trunks of trees #1, 2, 3, and #4. Alternatively, build the bio-retention area over-grade in order to avoid excavation within 15 feet of the trunk edges of the trees.**

[2] Personal communication with project architect 10/25/2017. WLCA directed the project architect to design a walkway that either floated completed over soil grade, or involved very minor excavation cuts into the soil root systems of trees #1 through #12, in order to preserve the lateral woody root systems extended southward and westward from the trunks of the trees through the existing older asphalt parking lot area to be demolished. The estimated thickness of materials to be demolished is 4 inches of asphalt and baserock, which will expose the soil tree root zone beneath.

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viii. Building Footprint vs. Lopsided Oak Canopies:

Oaks #1, 6, 7, and #10 are lopsided to the south and/or west, and will be in conflict with the proposed new Sunrise building footprint exterior, or at least the scaffolding that will be erected around the perimeter of the new building. Other tree specimens may also be in conflict with the proposed building footprint (not verified at the time of writing). In order to preserve as many trees as possible along the E. Selby Lane corridor area of the site, **perform extensive limb length reduction to remove the outermost sections of the trees' canopies, reducing their radial canopy extension to the south and west.**

All pruning shall be performed only by, or under direct full time supervision of an ISA-Certified Arborist, and shall conform to the most current iteration of the American National Standard Institute pruning guidelines and accompanying ISA Best Management Practices / Pruning booklet:

- ANSI A300 (Part 1) tree, shrub, and other wood plant maintenance / standard practices (*pruning*). 2001.
- Best Management Practices / Tree Pruning: companion publication to the ANSI A300 Part 1: tree, shrub, and other wood plant maintenance / standard practices (*pruning*). International Society of Arboriculture. 2002.

ix. Underground Garage Excavation vs. Oak Root Systems:

Oaks #1 through #7 likely exhibit horizontally extended root systems that extend 30 to 40 feet radius (or more) southward and westward, coursing through the old base rock just underneath the existing asphalt parking lot.

In order to avoid unnecessary excavation which would destroy the root systems of the trees, avoid using "OSHA layback cuts", often used during deep excavation for new underground parking garages as a safety device that continues a slope cut away from the vertical cut face.

Use of vertical shoring is the preferred alternative to use of an OSHA layback cut. Shoring can be used to hold up the soil in a safe manner for construction personnel while the garage area is built below grade.

See WLCA's sample image above right showing vertical wooden shoring we used at College of Notre Dame to save a large redwood tree specimen adjacent to a retaining wall cut. Because the OSHA layback type cut was eliminated on this project, we were able to preserve most of this tree's root system, and it survived easily.

5) Tree Removals Requiring County of San Mateo Permit:

Obtain formal tree removal permits for fourteen (14) "significant trees" in this tree study that are to be removed due to direct and indirect conflicts with the proposed site plan (e.g. **trees #8, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, and #25).**

6) Irrigation / Permanent:

Keep all trenched irrigation piping 20 to 30 feet offset from all trees being retained where possible.

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Keep all irrigation water output (high flow adjustable bubblers, low flow bubblers, overhead spray, microspray, inline emitters, soaker tubes, etc.) at least 20 feet offset from the trunk edge of any existing native coast live oak or valley oak specimen being retained on site (*Quercus agrifolia, Quercus lobata*).

7) Irrigation Temporary During Construction:

Apply temporary irrigation to certain specified trees being retained, at a frequency and duration or total output to be specified by the project arborist (PA).

Method of water delivery can be soaker hose, emitter line, garden hose trickle, water truck, tow-behind water tank with spray apparatus, etc.

Most native oaks will only require water on a once-monthly basis, and it will need to be applied as far as possible offset from the trunk edges (e.g. **15 to 20 feet out from trunks only, or as directed by the PA**).

Unlike native oak trees, the non-oaks at this site such as **tree of heaven #9** can be irrigated heavily on a regular basis (e.g. twice weekly, etc.) throughout all areas of their root zones, near to trunks and far from trunks, and will greatly benefit from such construction period temporary irrigation.

8) Root Pruning:

If **woody roots measuring greater than 1-inch in diameter** are encountered within 25-feet of any tree being retained during site work, contractors shall immediately alert the project arborist, and shall proceed to sever roots at right angles to the direction of root growth using sharp hand tools such as professional grade loppers, hand shears, chain saw, A/C sawzall, or other tools only under his/her direct supervision. See spec images at right. Note that a Sawzall blade indicating use for “bimetal” or “demolition” is typically not a good choice for this work. Instead, opt for a relatively large-toothed blade that indicates use for “pruning” or “wood” (see images at right).

Woody roots shall not be shattered or broken in any way as a result of site activities. Shattered or broken areas shall be hand dug back into clear healthy root tissue and re-severed at right angles to root growth direction under the direct supervision of the project arborist (PA). Immediately (same day) backfill over roots and heavily irrigate (same day) after backfill to saturate the uppermost 24 inches of the soil profile.

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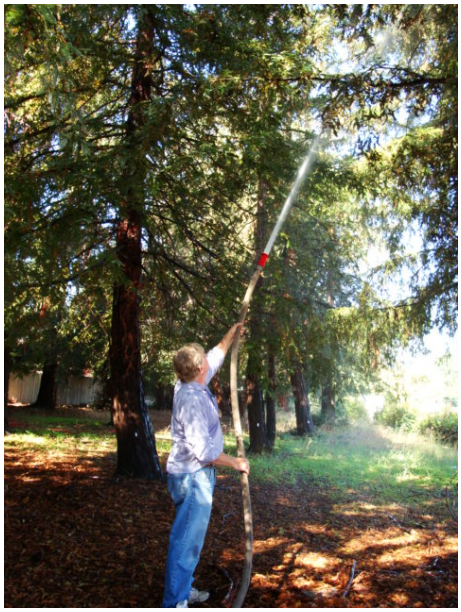
9) Water Spray:

Spray off foliage of all trees within 30 feet of construction activity using a very high power garden hose or a pressure washer system set on low pressure setting to wash both the upper and lower surfaces of foliage. This helps keep the gas portals (stomata) unclogged for better gas exchange which is crucial for normal tree function (see image at right in which a fire hose system was used to wash approximately 50 redwood tree specimens during a one-year long demolition period). Spray should be applied approximately twice yearly, or when ambient airborne dust concentration is unusually high.



10) Optional Tree Maintenance:

It is suggested that the tree owner consider retaining a qualified tree care service provider to install **through-bolt braces** through the bark inclusion type mainstem forks of **oaks #1 and #3**.

All tree support systems would need to be installed per the detailed specifications noted in the most current iteration of ANSI A300 standard for tree support systems.

6.0 Consultant's Qualifications

- Contract City Arborist to the City of Belmont Department of Planning and Community Development
  5/99-present
- Contract Town Arborist, Town of Los Gatos, California Planning and Community Development
  11/15-present
- Continued education through attendance of arboriculture lectures and forums sponsored by The American Society of Consulting Arborists, The International Society of Arboriculture (Western Chapter), and various governmental and non-governmental entities.
- ISA Qualified Tree Risk Assessor
- ISA Qualified Tree Risk Assessor Course, Palo Alto, CA. 2013
- PNW-ISA Certified Tree Risk Assessor Course graduate, 2009
  Vancouver, B.C., Canada
- ASCA Registered Consulting Arborist (RCA) #401
- Millbrae Community Preservation Commission (Tree Board)
  2001-2006
- ASCA Arboriculture Consulting Academy graduate, class of 2000
- ISA Certified Arborist (CA) #WC-3172
- Associate Consulting Arborist
  Barrie D. Coate and Associates
  4/99-8/99
- U.S. Peace Corps Soil and Water Conservation Extension Agent (Agroforestry, etc.)
  Chiangmai Province, Thailand 1991-1993
- B.A. Environmental Studies/Soil and Water Resources
  UC Santa Cruz, Santa Cruz, California 1990

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Chancellor's Award, 1990

Wildlands Studies Joint U.S./China Field Ecology Study (12 Weeks). 1989
Xujiaba Forest Reserve, Yunnan, China

Rocky Mountain Wilderness Field Ecology Study (5 Weeks). 1986
UC Santa Cruz Extension

(My full curriculum vitae is available upon request)

7.0 Assumptions and Limiting Conditions

Any legal description provided to the consultant/appraiser is assumed to be correct. Any titles and ownership to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised and evaluated as through free and clean, under responsible ownership and competent management.

It is assumed that any property is not in violation of any applicable codes, ordinance, statutes, or other government regulations.

Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant/appraiser can neither guarantee nor be responsible for the accuracy of information provided by others.

The consultant/appraiser shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

Unless required by law otherwise, the possession of this report or a copy thereof does not imply right of publication or use for any other purpose by any other than the person to whom it is addressed, without the prior expressed written or verbal consent of the consultant/appraiser.

Unless required by law otherwise, neither all nor any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales, or other media, without the prior expressed conclusions, identity of the consultant/appraiser, or any reference to any professional society or institute or to any initiated designation conferred upon the consultant/appraiser as stated in his qualifications.

This report and any values expressed herein represent the opinion of the consultant/appraiser, and the consultant's/appraiser's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.

Sketches, drawings, and photographs in this report, being intended for visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys unless expressed otherwise. The reproduction of any information generated by engineers, architects, or other consultants on any sketches, drawings, or photographs is for the express purpose of coordination and ease of reference only. Inclusion of said information on any drawings or other documents does not constitute a representation by Walter Levison to the sufficiency or accuracy of said information.

Unless expressed otherwise:

- information contained in this report covers only those items that were examined and reflects the conditions of those items at the time of inspection; and
- the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.

Loss or alteration of any part of this report invalidates the entire report.

Arborist Disclosure Statement:

Arborists are tree specialists who use their education, knowledge, training, and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of the arborist, or to seek additional advice.

Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Tree are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees and below ground. Arborist cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like any medicine, cannot be guaranteed.

Treatment, pruning, and removal of trees may involve considerations beyond the scope of the arborist's services such as property boundaries, property ownership, site lines, disputes between neighbors, and other issues. Arborists cannot take such considerations into account unless complete and accurate information is disclosed to the arborist. An arborist should then be expected to reasonably rely upon the completeness and accuracy of the information provided.

Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate the trees.

8.0 Certification

I hereby certify that all the statements of fact in this report are true, complete, and correct to the best of my knowledge and belief, and are made in good faith.

Signature of Consultant 

9.0 Digital Images

Tag #	Image	Tag #	Image
1, 2, 3		R to L 4, 5	

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R to L

6, 7, 8

8

center of image

9

R to L

10, 11, 12

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13, 14

North view of oaks 10, 11, 12, 13, & 14 extend-ed south and west into the (e) lot.

15

R to L 16, 17, 18

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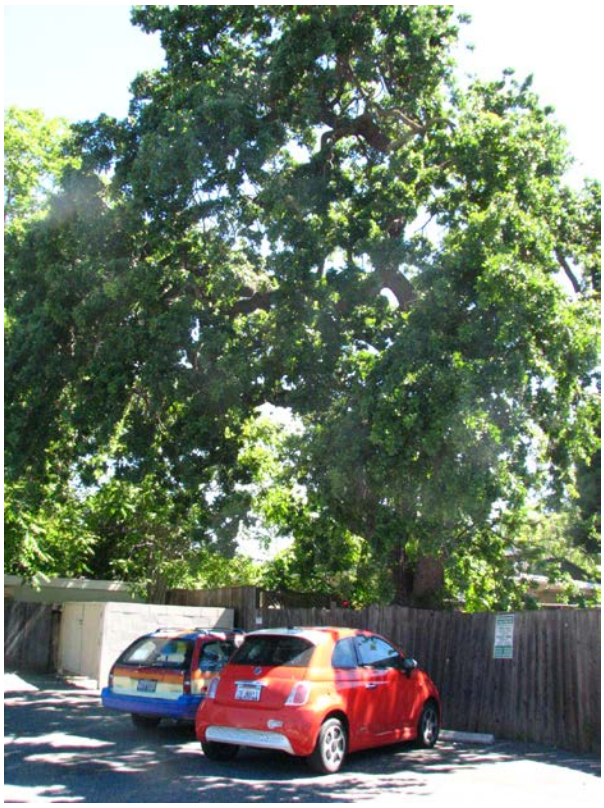
23

24, 25

26



R to L

27, 28

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R to L

27, 28

10.0 Tree Data Table Attached (WLCA)

11.0 Tree Location Map Mark-Up Attached (WLCA)

The following map is a markup by WLCA utilizing the current proposed grading and drainage plan sheet. The tree plot dots were surveyed by the project surveyor. Numbers indicated on the markup are tree tag numbers affixed to each tree by WLCA. The black lines shown next to each tree tag number end at each trunk plot dot.

Magenta colored lines are the current team-proposed utility and drainage pipe alignments, which may or may not be able to be realigned by the project engineer to farther offset from the trunk edges of trees being retained and protected.

Grey colored clouding indicates approximate scaled tree canopy driplines as they were originally rough-surveyed by WLCA.

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Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per County of San Mateo (12-Inches "Significant Tree", or Native Oaks 48-Inches "Heritage Tree")	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes On Conflicts with Proposed New Work	Protection and Maintenance
1	coast live oak	*Quercus agrifolia*	30.4	0	0	0	30.4	Significant tree	30/40	90/65	78% good	good				south and west	south and west		yes					X								Storm drain pipes will cut two separate routes around this tree. Possible canopy and root zone conflict with proposed bio-retention area. Possible pathway base section excavation conflict with root system.	TB, RPZ, endweight reduction pruning, fork bracing, and limit paver path base section excavation to 2 to 4 inches cut depth max. Move the proposed bio-retention area? Keep storm drain as shallow-cut 2 inches below grade.
2	coast live oak	*Quercus agrifolia*	18.8	0	0	0	18.8	Significant tree	35/25	80/70	75% good	mod to good				west	north															Possible conflicts with proposed bio-retention work, walkway base excavation. Two storm drain pipe trenches will be cut at 14 feet on two sides of tree.	TB, RPZ, Limit paver base excavation to 2 to 4 inches. Move proposed bioretention area? Keep storm drain pipe trench 2 inches max. cut below grade.
3	coast live oak	*Quercus agrifolia*	28.2	0	0	0	28.2	Significant tree	30/25	75/65	70% good	mod to good				south	south		yes.														Possible conflicts with proposed bio-retention work, walkway base excavation. Storm drain trench to be cut at 8 feet from trunk edge.	TB, RPZ, and possible fork bracing. Move proposed bioretention area or keep as shallow-cut system or over-grade no-dig system. Keep storm drain pipe trench shallow cut at 2 inches max. cut depth below grade. Limit walkway base prep to max. of 2 to 4 inches cut depth.
4	California valley oak	*Quercus lobata*	16.5	0	0	0	16.5	Significant tree	45/30	86/77	80% good	good																				Was pruned to clear overhead wires. New walkway base excavation will occur at 7 feet from trunk edge.	TB, RPZ. Limit new walkway base excacvation to 2 to 4 inches cut depth max.
5	California valley oak	*Quercus lobata*	20.4	0	0	0	20.4	Significant tree	45/30	85/80	83% good	good				southwest	south west																Was pruned to clear overhead wires. New walkway base excavation will occur at 10 feet from trunk edge.	TB, RPZ. Limit new walkway base excacvation to 2 to 4 inches cut depth max.
6	coast live oak	*Quercus agrifolia*	est. 24	0	0	0	est. 24	Significant tree	35/45	75/75	75% good	mod to good				southwest	south																Was pruned to clear overhead wires. New walkway base excavation work to occur at 10 feet from trunk edge. New building foundation cuts will be at 20 feet from trunk edge. Will need pruning to clear new building and also scaffold erection airspace for exterior finishing work. Storm drain pipe trench to encroach to 3 feet from trunk.	TB, RPZ, P. Limit walkway base excavation to max. 2 to 4 inches cut depth. Keep storm drain pipe trench shallow cut at max. 2 inches cut depth below grade.

Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per County of San Mateo (12-Inches "Significant Tree", or Native Oaks 48-Inches "Heritage Tree")	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes On Conflicts with Proposed New Work	Protection and Maintenance
7	coast live oak	*Quercus agrifolia*	14.3	0	0	0	14.3	Significant tree	35/35	80/70	74% good	mod to good				southwest																Was pruned to clear overhead wires. Proposed walkway to be excavated at 8 feet from trunk. Will need clearance pruning to clear proposed building and expected scaffolding. Storm drain trench to encroach to 6 feet from trunk.	TB, RPZ, adjust storm drain trench to farther offset from trunk. Limit pathway base excavation to 2 to 4 inches cut depth max. Note that this tree may be destroyed due to heavy clearance pruning.
8	coast live oak	*Quercus agrifolia*	est. 22	0	0	0	est. 22	Significant tree	40/30	20/20	20% very poor	very poor																		X	X		
9	tree of heaven	*Ailanthus altissima*	est. 22	0	0	0	est. 22	Significant tree	45/40	75/75	75% good	mod																				Tree appears to be retainable based on current proposed site plan work limits. Tree is considered to be a trash tree by many, but this specimen is in good condition. New walkway base excavation to occur within 10 feet of trunk edge. Tree will need south side clearance pruning for building footprint and scaffold areas.	TB, RPZ, W, P. Limit walkway base excavation to 2 to 4 inches cut max.
10	coast live oak	*Quercus agrifolia*	18.8	0	0	0	18.8	Significant tree	35/35	85/75	80% good	good				west	west								X							Canopy is lopsided west, and may require significant pruning to reduce size and maintain adequate lateral airspace. Walkway base to cut within 7 feet of trunk edge. Storm drain trench to cut within 4 or 5 feet of trunk edge.	TB, RPZ, Prune to clear proposed building and scaffolding areas. Limit walkway base cut depth to 2 to 4 inches max. Keep storm drain pipe trench shallow-cut at max. 2 inches cut below soil grade.
11	coast live oak	*Quercus agrifolia*	15.8	0	0	0	15.8	Significant tree	27/30	90/55	75% good	good				west	west								X							New walkway base excavation to encroach to within 5 feet of trunk edge. Will require clearance pruning for both new building footprint and scaffolding clearance.	TB, RPZ, Prune to reduce westward extension. Keep storm drain pipe trench cut to max. 2 inches depth of cut below soil grade. Limit walkway base excavation to 2 to 4 inches max. cut.

Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per County of San Mateo (12-Inches "Significant Tree", or Native Oaks 48-Inches "Heritage Tree")	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes On Conflicts with Proposed New Work	Protection and Maintenance
12	coast live oak	*Quercus agrifolia*	19.4	0	0	0	19.4	Significant tree	35/40	85/80	84% good	good				south west	south west															New walkway base excavation to encroach to within 6 feet of trunk edge. Will require south side clearance pruning for both new building footprint and scaffolding clearance.	TB, RPZ, Prune to reduce westward extension. Keep storm drain pipe trench shallow-cut at max. 2 inches cut depth below existing soil grade. Limit walkway base excavation to 2 to 4 inches max. cut.
13	coast live oak	*Quercus agrifolia*	13.6	0	0	0	13.6	Significant tree	35/25	85/75	83% good	good				south															X			
14	coast live oak	*Quercus agrifolia*	12.0	0	0	0	12	Significant tree	20/20	75/50	66% fair	good				south west	south west	Yes. And truck hits noted													X		Tree was pruned to clear various low voltage phone or TV utility wires in the past.	
15	European birch	*Betula pendula*	14	8	5	0	27	Significant tree	35/45	65/50	55% fair	mod						X													X		Was topped to clear various overhead utility wires in the past. Tree appears to be less than 5 feet offset from proposed new roadway. Expect tree to be removed if roadway base is rebuilt, due to deep excavation for new baserock, etc. that will destroy the north side of this tree's root system.	
16	tulip poplar	*Liriodendron tulipifera*	17.5	0	0	0	17.5	Significant tree	25/30	70/45	57% fair	mod	X					X													X		Was topped to clear various overhead utility wires in the past. Tree is susceptible to various insect pests. Root system extension westward is very limited, due to presence of existing building foundation. Root system expansion causing severe sidewalk slab displacement.	
17	tulip poplar	*Liriodendron tulipifera*	17.3	0	0	0	17.3	Significant tree	25/30	65/55	59% fair	mod	X					X													X		(Same as #16 above)	
18	tulip poplar	*Liriodendron tulipifera*	15.6	0	0	0	15.6	Significant tree	30/25	65/55	59% fair	mod	X					X													X		(Same as #16 above)	

Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per County of San Mateo (12-Inches "Significant Tree", or Native Oaks 48-Inches "Heritage Tree")	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes On Conflicts with Proposed New Work	Protection and Maintenance
19	American elm	*Ulmus americana*	29.7	0	0	0	29.7	Significant tree	35/40	25/25	25% very poor	poor	X																	X		Twig and branch dieback throughout noted. Root crown decay noted. Tree is slated for removal due to conflicts with plan.	
20	tree of heaven	*Ailanthus altissima*	28.1	0	0	0	28.1	Significant tree	35/30	20/15	18% very poor	very poor	X																	X		Twig and branch dieback throughout noted. Root crown decay noted. Flux noted on bark. Assymetrical root plate noted. Tree is slated for removal due to conflicts with plan.	
21	American elm	*Ulmus americana*	43.5	0	0	0	43.5	Significant tree	45/45	40/30	35% poor	poor	X					X	X											X		Tree has been limbed up many times to clear the existing Bentley's restaurant parking lot stall areas. Tree exhibits multiple codominant mainstems with bark inclusions (structural defect). Tree to be removed due to conflicts with building footprint.	
22	tree of heaven (tree located in a locked fence area)	*Ailanthus altissima*	Est. 21	0	0	0	Est. 21	Significant tree	35/30	70/55	65% fair								X											X		Tree not plotted on surveyor's topo sheet. Tree was added as a rough plot dot by WLCA. Tree expected to be removed during excavation for new commercial vehicle access road.	
23	coast live oak (not plotted on project topo)	*Quercus agrifolia*	est. 35	0	0	0	est. 35	Significant tree	40/50	90/60	80% good	good				east			X											X		There was no access to this tree which is located within a locked fenced area. Tree located in the proposed multiple pipe trenching zone. It is assumed tree will be removed anyway, due to the proposed asphalt driveway footprint for the west side of the site.	-----
24	coast live oak	*Quercus agrifolia*	est. 26	0	0	0	est. 26	Significant tree	35/30	90/60	73% good	good				south east	south east													X		Tree to be removed due to proposed asphalt driveway at the west side of the site	

Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per County of San Mateo (12-Inches "Significant Tree", or Native Oaks 48-Inches "Heritage Tree")	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes On Conflicts with Proposed New Work	Protection and Maintenance
25	coast live oak	*Quercus agrifolia*	est. 26	0	0	0	est. 26	Significant tree	27/30	90/40	65% fair	good				west	west													X		Tree to be removed due to proposed asphalt driveway at the west side of the site. Note severe trunk lean off vertical to the west.	
26	California valley oak	*Quercus lobata*	est. 30	0	0	0	est. 30	Significant tree	35/35	75/65	70% good	mod																				Tree was not fully assessed due to lack of access to the lower trunk. Assume "good" overall condition rating. New walkway base prep will encroach to 1 or 2 feet from trunk edge. This walkway routing will probably have to be changed to farther offset from trunk, and the base cut depth limited to avoid killing the tree. New storm drain pipe route appears far enough from trunk (16 to 17 feet) that root loss will be minimized, though farther would be better (e.g. 20 to 25 feet offset from trunk).	TB, RPZ. Limit new walkway base excacvation to 6 inches cut depth max. Move proposed walkway route to at least 4 to 5 feet offset from trunk edge. Realign the proposed storm drain pipe trench if possible to 20 feet or more from trunk edge.
27	coast live oak	*Quercus agrifolia*	30.5	0	0	0	30.5	Significant tree	50/50	90/70	80% good	good				south west																Note root extension to south may be severely limited due to presence of existing house foundation 4 or 5 feet south of trunk, but this cannot be verified. New walkway will be roughly 8 feet from trunk, in the area where an older residence foundation will be demolished (expect zero root extension in this area, though roots may still be present if they somehow plunged under the older foundation and grew southward).	TB, RPZ, Do not renovate driveway to the north of trunk, as this could cause severe root loss and death of the tree.
28	coast live oak	*Quercus agrifolia*	30.3	0	0	0	30.3	Significant tree	30/30	75/60	67% fair	good	X		X	south east																Sycamore bark moth larvae feeding causing severe wood tissue necrosis in lower trunk area. Root expansion causing severe displacement of the existing driveway to north (neighbor property). As noted above, root extension to south is limited due to existing house to be demolished. However, WLCA still recommends keeping all utilities offset from trunk at least 15 to 20 feet.	TB, RPZ. Do not renovate driveway to the north of trunk, as this could cause severe root loss and death of the tree.

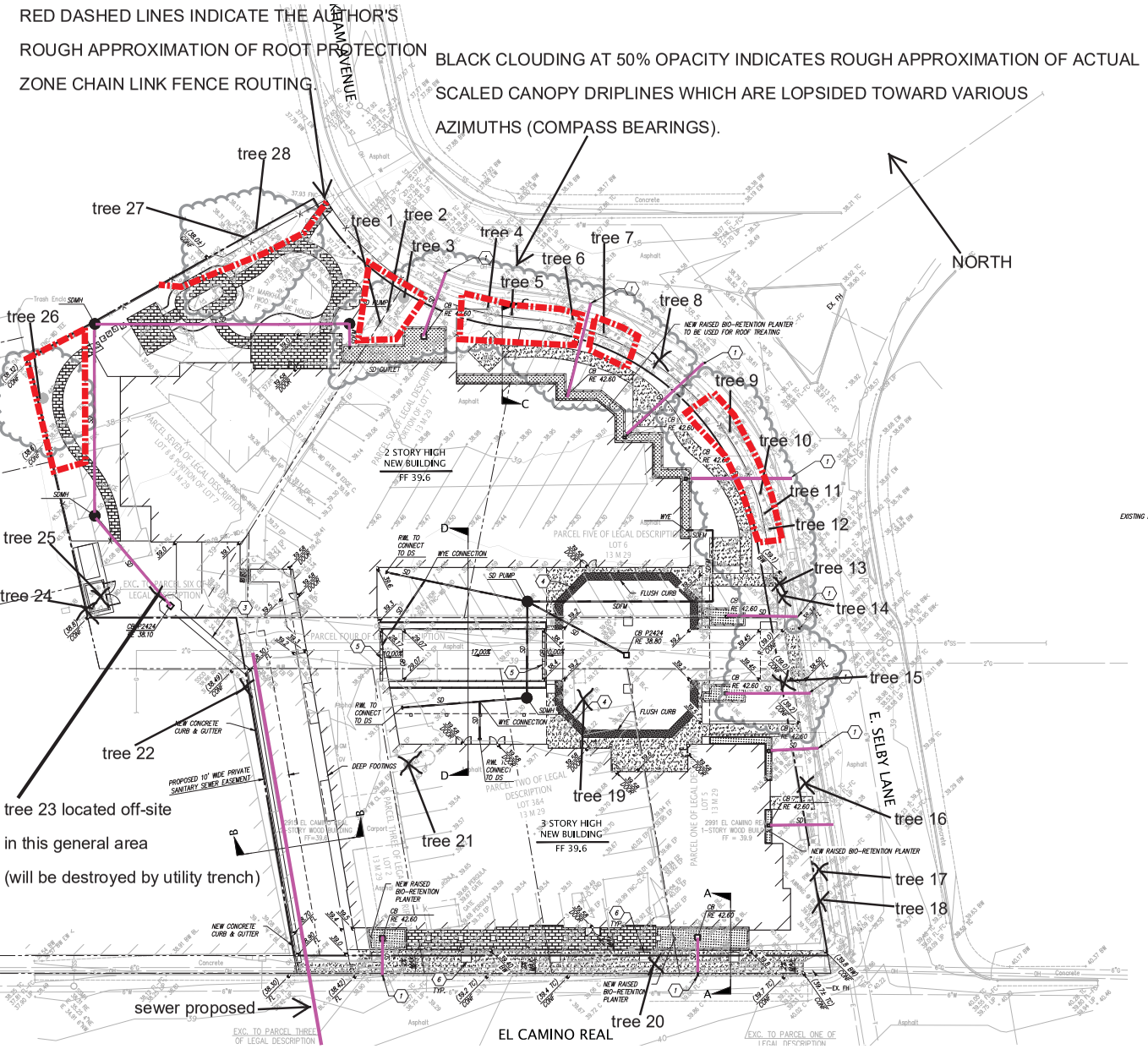
Tag Number	Common Name	Genus and species	Diameter (in.) Stem 1	Diameter (in.) Stem 2	Diameter (in.) Stem 3	Diameter (in.) Stem 4	Total of All Stem Diameters	Protected Tree per County of San Mateo (12-Inches "Significant Tree", or Native Oaks 48-Inches "Heritage Tree")	Height & Spread (ft.)	Health and Structure Ratings (0-100% each)	Overall Condition Rating (0-100%)	Twig Density and Extension	Pest or Disease Presence	Girdling Root(s)	Buried Root Crown	Lopsided Direction	Trunk Lean Direction	Topped/Sheared/ Severely Pruned	Codominant Mainstems with Bark Inclusion(s)	Resistograph Testing	Root Crown Excavation	Prune Girdling Root(s)	Remove Dead Wood	End Weight Reduction Pruning	Crown Raise	Crown Reduce	Crown Balance	Structural Training Pruning	Thin Crowded Branches (Structural Renovation)	Remove Tree (Per Conceptual Site Plan)	Remove Tree (Author Recommendation)	Notes On Conflicts with Proposed New Work	Protection and Maintenance
Notes: **1. On-site survey trees include all existing specimens of tree species with at least one (1) mainstem measuring greater than or equal to 12.1 inches diameter when measured at between 6 inches and 36 inches above mean grade.** **2. Various trees in this study were located behind locked private property gates, and were therefore assessed from afar without access to the lower trunks. These trees are noted with trunk diameters of "estimated" in the table above.** **3. Heights measured using a Nikon 550 Forestry Pro. Diameters were measured at between Redwood City standard height of between six and thirty-six inches above mean grade using a forestry D-tape that converts circumference to an average diameter. Canopy spread is noted in visually estimated feet (shown with both height and spread data for each tree in a single cell).** **4. Locations of the trees are shown on a tree plot sheet provided by Sunrise, marked up by WLCA.**																																	

Protection and Maintenance Specifications:

RPZ: Root protection zone fence, chain link, with 2" diameter iron posts driven 24" into the ground, 6 to 8 feet on center max. spacing.
RB: Root buffer consisting of wood chip mulch lain over existing soil as a 12 inch thick layer, overlain with 1 inch or greater plywood strapped together with metal plates. This root buffer or soil buffer should be placed over the entire width of the construction corridor between tree trunks and construction.
RP: Root pruning. Prune woody roots measuring greater than or equal to 1 inch diameter by carefully back-digging into the soil around each root using small hand tools until an area is reached where the root is undamaged. Cleanly cut through the root at right angle to the root growth direction, using professional grade pruning equipment and/or a Sawzall with wood pruning blade. Backfill around the cut root immediately (same day), and thoroughly irrigate the area to saturate the uppermost 24 inches of the soil profile.
TB: Trunk buffer consists of 20-40 wraps of orange plastic snow fencing to create a 2 inch thick buffer over the lowest 8 feet of tree trunk (usually takes at least an entire roll of orange fencing). Lay 2X4 wood boards vertically, side by side, around the entire circumference of the trunk. Secure buffer using duct tape (not wires).
F: Fertilization with Greenbelt 22-14-14 tree formula.
M: 4-inch thick layer of wood chip mulch (Lyngso, self pickup). Do not use bark chips or shredded redwood bark.
W: Irrigate using various methods to be determined through discussion with General Contractor. Irrigation frequency and duration to be determined through discussion.
P: Pruning per specifications noted elsewhere. All pruning must be performed only under direct site supervision of an ISA Certified Arborist, or performed directly by an ISA Certified Arborist, and shall conform to all ANSI A300 standards.
MON: Project Arborist must be present to monitor specific work as noted in the notes box for each tree.

RED DASHED LINES INDICATE THE AUTHOR'S ROUGH APPROXIMATION OF ROOT PROTECTION ZONE CHAIN LINK FENCE ROUTING.

BLACK CLOUDING AT 50% OPACITY INDICATES ROUGH APPROXIMATION OF ACTUAL SCALED CANOPY DRIPLINES WHICH ARE LOPSIDED TOWARD VARIOUS AZIMUTHS (COMPASS BEARINGS).



EARTHWORK SUMMARY

CUT: 11,000± CY

FILL: 0 CY

NOTES:

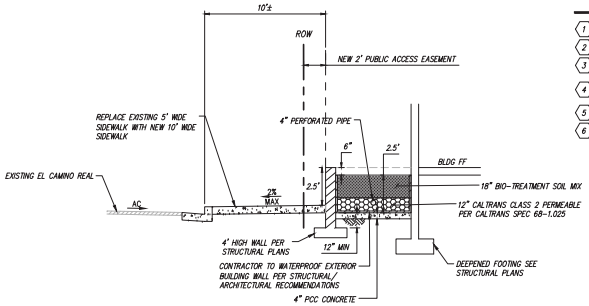
1. THE EARTHWORK QUANTITIES LISTED ON THESE PLANS ARE STATED ONLY FOR CALCULATION OF GRADING AND BUILDING PERMIT FEES. THESE QUANTITIES DO NOT INCLUDE TRENCH OR FOOTING SPOILS, SHRINK OR SWELL FROM COMPACTING EFFORTS OR OTHER VARIABLES. THE ENGINEER MAKES NO REPRESENTATION THIS SITE WILL BALANCE. THE CONTRACTOR SHALL DETERMINE HIS OWN EARTHWORK QUANTITIES AND BASE HIS BID ACCORDINGLY.

LEGEND

- AREA DRAIN
- STORM DRAIN CATCH BASIN
- STORM DRAIN JUNCTION BOX
- STORM DRAIN MANHOLE
- FL FLOW LINE
- FF FINISH FLOOR
- PV PAVEMENT
- RE RIM ELEVATION
- ROW RIGHT-OF-WAY
- 23.8 SPOT ELEVATION
- X"SD STORM DRAIN LINE
- TC TOP OF CURB
- BIO-RETENTION PLANTER
- NEW IMPERVIOUS PAVEMENT
- CONCRETE SIDEWALK: 5.5" PCC OVER 6" CLASS II AB
- PERMEABLE PAVERS

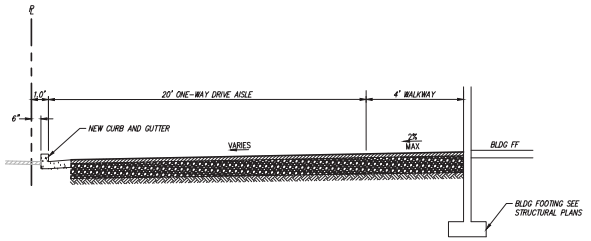
LEGEND

1. DAY LIGHT THROUGH CURB
2. VACATE EXISTING 20' PUBLIC ACCESS ROAD
3. 3" WIDE VALLEY GUTTER
4. 3" WIDE TRUNCATED DOMES TO BE EMBEDDED IN CONCRETE
5. TRENCH DRAIN
6. NEW TREE WELLS



SECTION A

NOT TO SCALE



SECTION B

County of San Mateo - Planning and Building Department

ATTACHMENT N

CORNERSTONE EARTH GROUP

TYPE OF SERVICES	Geotechnical Investigation
PROJECT NAME	Sunrise Senior Living of Redwood City
LOCATION	2991 El Camino Real Redwood City, California
CLIENT	Sunrise Senior Living
PROJECT NUMBER	935-1-2
DATE	December 21, 2016

CORNERSTONE EARTH GROUP

Type of Services	**Geotechnical Investigation**
Project Name	**Sunrise Senior Living of Redwood City**
Location	**2991 El Camino Real** **Redwood City, California**
Client	**Sunrise Senior Living**
Client Address	**7902 Westpark Drive** **McLean, Virginia**
Project Number	**935-1-2**
Date	**December 21, 2016**

Prepared by

Matthew J. Schaffer, P.E.
Project Engineer
Geotechnical Project Manager

Danh T. Tran, P.E.
Senior Principal Engineer
Quality Assurance Reviewer

1259 Oakmead Parkway | Sunnyvale, CA 94085
T 408 245 4600 | F 408 245 4620

1270 Springbrook Road, Suite 101 | Walnut Creek, CA 94597
T 925 988 9500 | F 925 988 9501

www.cornerstoneearth.com

CORNERSTONE EARTH GROUP

TABLE OF CONTENTS

CORNERSTONE EARTH GROUP

Type of Services	**Geotechnical Investigation**
Project Name	**Sunrise Senior Living of Redwood City**
Location	**2991 El Camino Real** **Redwood City, California**

SECTION 1: INTRODUCTION

This geotechnical report was prepared for the sole use of Sunrise Senior Living for the Sunrise Senior Living of Redwood City project in Redwood City, California. The location of the site is shown on the Vicinity Map, Figure 1. For our use, we were provided with the following documents:

- A set of conceptual plans titled "Sunrise Senior Living, Redwood City, CA, Assisted Living Facility," prepared by HPI Architecture, dated December 5, 2016.
- A set of civil plans, Sheet C1 titled "Topographic Survey of 2915 El Camino Real for Sunrise Senior Living," Sheet C2 titled "Conceptual Grading and Drainage Plan of 2915 El Camino Real for Sunrise Senior Living," and Sheet C3 titled "Conceptual Utility Plan of 2915 El Camino Real for Sunrise Senior Living," prepared by Kier & Wright Civil Engineers & Surveyors, Inc., dated November, 2016.

1.1 PROJECT DESCRIPTION

The project will consist of demolishing the existing buildings and improvements on the approximately 1.4 acres, multiple parcel site and constructing a new two and three stories of above-grade, 88-unit assisted living facility over one story of below-grade parking. The building footprint will be approximately 27,810 square feet and we anticipate the parking garage will be of concrete construction while the assisted living facility floors will likely be of wood or steel-frame construction. Associated improvements and amenities necessary for site development will also be constructed as part of the overall project.

Structural loads are not available at the time of our report; however, structural loads are expected to be representative of this type of structure. We anticipate cuts on the order of 12 to 15 feet will be required for the one-level below grade parking.

1.2 SCOPE OF SERVICES

Our scope of services was presented in our proposal dated October 23, 2016 and consisted of field and laboratory programs to evaluate physical and engineering properties of the subsurface soils, engineering analysis to prepare recommendations for site work and grading, building foundations, flatwork, retaining walls, and pavements, and preparation of this report. Brief descriptions of our exploration and laboratory programs are presented below.

1.3 EXPLORATION PROGRAM

Field exploration consisted of three borings drilled on November 10 and 11, 2016 with truck-mounted, hollow-stem auger drilling equipment and five Cone Penetration Tests (CPTs) advanced on November 8, 2016. The borings were drilled to depths of approximately 41 to 50 feet; the CPTs were advanced to depths of approximately 40 to 100 feet. Practical refusal was encountered at a depth of approximately 40 feet in CPT-4. Seismic shear wave velocity measurements were collected from CPT-2. Borings EB-1, EB-2, and EB-3 were advanced adjacent to CPT-1, CPT-2, and CPT-3, respectively, for direct evaluation of physical samples to correlated soil behavior.

The borings and CPTs were backfilled with cement grout in accordance with local requirements; exploration permits were obtained as required by local jurisdictions.

The approximate locations of our exploratory borings and CPTs are shown on the Site Plan, Figure 2. Details regarding our field program are included in Appendix A.

1.4 LABORATORY TESTING PROGRAM

In addition to visual classification of samples, the laboratory program focused on obtaining data for foundation design and seismic ground deformation estimates. Testing included moisture contents, dry densities, washed sieve analyses, a Plasticity Index test, triaxial compression tests, and consolidation tests. Details regarding our laboratory program are included in Appendix B.

1.5 CORROSION EVALUATION

Three samples from our borings at depths of 1½ to 14½ feet were tested for saturated resistivity, pH, and soluble sulfates and chlorides. In general, the on-site soils can be characterized as moderately to severely corrosive to buried metal, and non-corrosive to buried concrete.

1.6 ENVIRONMENTAL SERVICES

Cornerstone Earth Group also provided environmental services for this project, including a Phase 1 site assessment; environmental findings and conclusions are provided under a separate report.

SECTION 2: REGIONAL SETTING

2.1 REGIONAL SEISMICITY

The San Francisco Bay area region is one of the most seismically active areas in the Country. While seismologists cannot predict earthquake events, geologists from the U.S. Geological Survey have recently updated earlier estimates from their 2014 Uniform California Earthquake Rupture Forecast (Version 3) publication. The estimated probability of one or more magnitude 6.7 earthquakes (the size of the destructive 1994 Northridge earthquake) expected to occur somewhere in the San Francisco Bay Area has been revised (increased) to 72 percent for the period 2014 to 2043 (Aagaard et al., 2016). The faults in the region with the highest estimated probability of generating damaging earthquakes between 2014 and 2043 are the Hayward (33%), Rodgers Creek (33%), Calaveras (26%), and San Andreas Faults (22%). In this 30-year period, the probability of an earthquake of magnitude 6.7 or larger occurring is 22 percent along the San Andreas Fault and 33 percent for the Hayward or Rodgers Creek Faults.

The faults considered capable of generating significant earthquakes are generally associated with the well-defined areas of crustal movement, which trend northwesterly. The table below presents the State-considered active faults within 25 kilometers of the site.

Table 1: Approximate Fault Distances

Fault Name	Distance	
	(miles)	(kilometers)
Monte Vista-Shannon	3.1	5.0
San Andreas (1906)	4.8	7.8
San Gregorio	13.7	22.0
Hayward (Total Length)	14.5	23.3

A regional fault map is presented as Figure 3, illustrating the relative distances of the site to significant fault zones.

SECTION 3: SITE CONDITIONS

3.1 SURFACE DESCRIPTION

The multiple parcel site is located at the northwest corner of East Selby Lane and El Camino Real in Redwood City, California. The site is bounded by El Camino Real to the southwest, a one- and two-story building and parking lot to the northwest, residential houses to the north, Markham Avenue to the northeast, and East Selby Lane to the southeast. The site is approximately 1.4 acres and currently occupied by a one-story building in the southern corner, a two-story building in the western corner, and one-story residential homes in the northern corner. The central portion and eastern corner of the site is an asphalt concrete parking lot and an asphalt concrete alley runs northwest-southeast through the middle of the site. The site is

relatively level with elevations generally about Elevation 37 to 39 feet (NAVD 88) based on the topographic map provided to us. Various landscaping areas are generally around the perimeter of the site and consist of mature trees and shrubs with some areas of grass.

Surface pavements generally consisted of 2 to 3½ inches of asphalt concrete over 4 inches of aggregate base. Based on visual observations, the existing pavements are in good to fair shape with minor cracking.

3.2 SUBSURFACE CONDITIONS

Below the surface pavements, our explorations encountered hard, highly expansive clay to a depth of approximately 4 feet. Below the highly expansive surficial clays, generally stiff to hard lean clays with variable amounts of sand were encountered to the maximum depth explored of 100 feet. Some loose to very dense silty sand, clayey sand, and poorly graded sands with variable amounts of silt and clay were interbedded within the lean clays with some larger sand layers ranging up to about 10 feet thick at depths generally around 25 to 35 feet and 45 to 55 feet below the surface. Sandy silts were also encountered in Boring EB-1 beneath the surficial highly expansive clay to a depth of about 7½ feet and in Boring EB-3 at a depth of about 37½ feet down to the terminal depth in the boring at 41 feet beneath the surface.

3.2.1 Plasticity/Expansion Potential

We performed one Plasticity Index (PI) test on a representative sample. The test result was used to evaluate the expansion potential of surficial soils. The results indicated a PI of 35 and a Liquid Limit (LL) of 53, indicating a high expansion potential to wetting and drying cycles.

3.2.2 In-Situ Moisture Contents

Laboratory testing indicated that the in-situ moisture contents within the upper 15 feet range from about 5 percent below optimum to about 10 percent over the estimated laboratory optimum moisture.

3.2.3 Sulfate Contents

Laboratory testing indicated that the soluble sulfate contents were 24 to 51 parts per million (ppm), indicating negligible corrosion potential to buried concrete.

3.3 GROUND WATER

Ground water was encountered in our borings (Borings EB-1, EB-2, and EB-3) at depths ranging from approximately 23½ to 30 feet below current grades. Ground water was inferred from CPT pore pressure measurements in CPT-1 and CPT-3 at depths of approximately 21 to 24 feet, respectively, below currents grades. All measurements were taken at the time of drilling and may not represent the stabilized levels that can be higher than the initial levels encountered. Based on review of depth to ground water maps (CGS, Palo Alto 7.5 minute quadrangle, 2006), we anticipate that the high ground water level will be on the order of 20 feet

below current grades. We recommend a design ground water depth of 20 feet below the existing ground surface be used. This correlates to about Elevations 17 to 19 feet based on the topographic map provided to us and referenced in Section 1.

Fluctuations in ground water levels occur due to many factors including seasonal fluctuation, underground drainage patterns, regional fluctuations, and other factors.

3.4 CORROSION SCREENING

We tested three samples collected at depths ranging from approximately 1½ to 14½ feet for resistivity, pH, soluble sulfates, and chlorides. The laboratory test results are summarized in Table 2.

Table 2: Summary of Corrosion Test Results

Boring/Sample	Depth (feet)	Soil pH[1]	Resistivity[2] (ohm-cm)	Chloride[3,5] (mg/kg)	Sulfate[4,5] (mg/kg)
EB-1/1A	1½	6.0	1,344	5	24
EB-3/2A	5½	6.4	1,836	8	50
EB-3/4A	14½	6.9	2,815	5	51

Notes: [1]ASTM G51
[2]ASTM G57 - 100% saturation
[3]ASTM D4327/Cal 422 Modified
[4]ASTM D4327/Cal 417 Modified
[5]1 mg/kg = 0.0001 % by dry weight

Many factors can affect the corrosion potential of soil including moisture content, resistivity, permeability, and pH, as well as chloride and sulfate concentration. Typically, soil resistivity, which is a measurement of how easily electrical current flows through a medium (soil and/or water), is the most influential factor. In addition to soil resistivity, chloride and sulfate ion concentrations, and pH also contribute in affecting corrosion potential.

Based on the laboratory test results summarized in Table 2 and published correlations between resistivity and corrosion potential, the soils may be considered moderately to severely corrosive to buried metallic improvements (Chaker and Palmer, 1989).

In accordance with the 2016 CBC Section 1904A.1, alternative cementitious materials for sulfate exposure shall be determined in accordance with ACI 318-11 Table 4.2.1 and Table 4.3.1. Based on the laboratory test results, no cement type restriction is required, although, in our opinion, it is generally a good practice to include some sulfate resistance and to maintain a relatively low water-cement ratio. We have summarized applicable design values and parameters from ACI 318 Table 4.3.1 below in Table 3.

We recommend the structural engineer and a corrosion engineer be retained to confirm the information provided and for additional recommendations, as required.

Table 3: ACI Sulfate Soil Corrosion Design Values and Parameters

Category	Water-Soluble Sulfate (SO4) in Soil (% by weight)	Class	Severity	Cementitious Materials
S, Sulfate	< 0.10	S0	not applicable	no type restriction

Notes: (1) above values and parameters are from on ACI 318-11, Table 4.2.1 and Table 4.3.1
(2) cementitious materials are in accordance with ASTM C150, ASTM C595 and ASTM C1157

SECTION 4: GEOLOGIC HAZARDS

4.1 FAULT RUPTURE

As discussed above several significant faults are located within 25 kilometers of the site. The site is not located within a State-designated Alquist Priolo Earthquake Fault Zone. As shown in Figure 3, no known surface expression of fault traces is thought to cross the site; therefore, fault rupture hazard is not a significant geologic hazard at the site.

4.2 ESTIMATED GROUND SHAKING

Moderate to severe (design-level) earthquakes can cause strong ground shaking, which is the case for most sites within the Bay Area. A peak ground acceleration $(PGA)_M$ was estimated for analysis using a value equal to F_{PGA} x PGA, as allowed in the 2016 edition of the California Building Code. For our liquefaction analysis we used a PGA of 0.672g.

4.3 LIQUEFACTION POTENTIAL

The site is within a State-designated Liquefaction Hazard Zone (CGS, Palo Alto Quadrangle, 2006). Our field and laboratory programs addressed this issue by testing and sampling potentially liquefiable layers to depths of at least 50 feet, performing visual classification on sampled materials, evaluating CPT data, and performing various tests to further classify soil properties.

4.3.1 Background

During strong seismic shaking, cyclically induced stresses can cause increased pore pressures within the soil matrix that can result in liquefaction triggering, soil softening due to shear stress loss, potentially significant ground deformation due to settlement within sandy liquefiable layers as pore pressures dissipate, and/or flow failures in sloping ground or where open faces are present (lateral spreading) (NCEER 1998). Limited field and laboratory data is available regarding ground deformation due to settlement; however, in clean sand layers settlement on the order of 2 to 4 percent of the liquefied layer thickness can occur. Soils most susceptible to liquefaction are loose, non-cohesive soils that are saturated and are bedded with poor drainage, such as sand and silt layers bedded with a cohesive cap.

4.3.2 Analysis

As discussed in the "Subsurface" section above, several sand layers were encountered below the design ground water depth of 20 feet. Following the liquefaction analysis framework in the 2008 monograph, *Soil Liquefaction During Earthquakes* (Idriss and Boulanger, 2008), incorporating updates in *CPT and SPT Based Liquefaction Triggering Procedures* (Boulanger and Idriss, 2014), and in accordance with CDMG Special Publication 117A guidelines (CDMG, 2008) for quantitative analysis, these layers were analyzed for liquefaction triggering and potential post-liquefaction settlement. These methods compare the ratio of the estimated cyclic shaking (Cyclic Stress Ratio - CSR) to the soil's estimated resistance to cyclic shaking (Cyclic Resistance Ratio - CRR), providing a factor of safety against liquefaction triggering. Factors of safety less than or equal to 1.3 are considered to be potentially liquefiable and capable of post-liquefaction re-consolidation (i.e. settlement).

The CSR for each layer quantifies the stresses anticipated to be generated due to a design-level seismic event, is based on the peak horizontal acceleration generated at the ground surface discussed in the "Estimated Ground Shaking" section above, and is corrected for overburden and stress reduction factors as discussed in the procedure developed by Seed and Idriss (1971) and updated in the 2008 Idriss and Boulanger monograph.

The soil's CRR is estimated from the in-situ measurements from CPTs and laboratory testing on samples retrieved from our borings. SPT "N" values obtained from hollow-stem auger borings were not used in our analyses, as the "N" values obtained are less reliable in sands below ground water. The tip pressures are corrected for effective overburden stresses, taking into consideration both the ground water level at the time of exploration and the design ground water level, and stress reduction versus depth factors. The CPT method utilizes the soil behavior type index (I_C) to estimate the plasticity of the layers.

In estimating post-liquefaction settlement at the site, we have implemented a depth weighting factor proposed by Cetin (2009). Following evaluation of 49 high-quality, cyclically induced, ground settlement case histories from seven different earthquakes, Cetin proposed the use of a weighting factor based on the depth of layers. The weighting procedure was used to tune the surface observations at liquefaction sites to produce a better model fit with measured data. Aside from the better model fit it produced, the rationale behind the use of a depth weighting factor is based on the following: 1) upward seepage, triggering void ratio redistribution, and resulting in unfavorably higher void ratios for the shallower sublayers of soil layers; 2) reduced induced shear stresses and number of shear stress cycles transmitted to deeper soil layers due to initial liquefaction of surficial layers; and 3) possible arching effects due to nonliquefied soil layers. All these may significantly reduce the contribution of volumetric settlement of deeper soil layers to the overall ground surface settlement (Cetin, 2009).

The results of our CPT analyses (CPT-1 through CPT-5) are presented on Figures 4A through 4E of this report.

4.3.3 Summary

Our analyses indicate that several layers could potentially experience liquefaction triggering that could result in post-liquefaction total settlement below the bottom of the one-level basement (estimated to be about 15 feet below the surface) ranging up to ¾-inch based on the Yoshimine (2006) method. As discussed in Special Publication 117A, differential movement for level ground sites over deep soil sites will be up to about two-thirds of the total settlement between independent foundation elements. In our opinion, differential settlements are anticipated to be on the order of ½-inch between independent foundation elements.

4.3.4 Ground Rupture Potential

The methods used to estimate liquefaction settlements assume that there is a sufficient cap of non-liquefiable material to prevent ground rupture or sand boils. For ground rupture to occur, the pore water pressure within the liquefiable soil layer will need to be great enough to break through the overlying non-liquefiable layer, which could cause significant ground deformation and settlement. The work of Youd and Garris (1995) indicates that the 25-foot thick layer of non-liquefiable cap is sufficient to prevent ground rupture; therefore the above total settlement estimates are reasonable.

4.4 LATERAL SPREADING

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. As failure tends to propagate as block failures, it is difficult to analyze and estimate where the first tension crack will form.

There are no open faces within a distance considered susceptible to lateral spreading; therefore, in our opinion, the potential for lateral spreading to affect the site is low.

4.5 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING

Loose to medium dense unsaturated sandy soils can settle during strong seismic shaking. We evaluated the potential for seismic compaction of the unsaturated soils above the design ground water level of 20 feet based on the work by Robertson and Shao (2010). Based on our analysis, the potential for significant differential seismic settlement affecting the proposed improvements is low.

4.6 TSUNAMI/SEICHE

The terms tsunami or seiche are described as ocean waves or similar waves usually created by undersea fault movement or by a coastal or submerged landslide. Tsunamis may be generated at great distance from shore (far field events) or nearby (near field events). Waves are formed, as the displaced water moves to regain equilibrium, and radiates across the open water, similar to ripples from a rock being thrown into a pond. When the waveform reaches the coastline, it

quickly raises the water level, with water velocities as high as 15 to 20 knots. The water mass, as well as vessels, vehicles, or other objects in its path create tremendous forces as they impact coastal structures.

Tsunamis have affected the coastline along the Pacific Northwest during historic times. The Fort Point tide gauge in San Francisco recorded approximately 21 tsunamis between 1854 and 1964. The 1964 Alaska earthquake generated a recorded wave height of 7.4 feet and drowned eleven people in Crescent City, California. For the case of a far-field event, the Bay area would have hours of warning; for a near field event, there may be only a few minutes of warning, if any.

A tsunami or seiche originating in the Pacific Ocean would lose much of its energy passing through San Francisco Bay. Based on the study of tsunami inundation potential for the San Francisco Bay Area (Ritter and Dupre, 1972), areas most likely to be inundated are marshlands, tidal flats, and former bay margin lands that are now artificially filled, but are still at or below sea level, and are generally within 1½ miles of the shoreline. The site is approximately 2½ miles inland from the San Francisco Bay shoreline, and is at approximately Elevation 37 to 39 feet. Therefore, the potential for inundation due to tsunami or seiche is considered low.

4.7 FLOODING

Based on our internet search of the Federal Emergency Management Agency (FEMA) flood map public database, the site is located within Zone X, described as "areas determined to be outside the 0.2% annual chance floodplain." We recommend the project civil engineer be retained to confirm this information and verify the base flood elevation, if appropriate.

SECTION 5: CONCLUSIONS

5.1 SUMMARY

From a geotechnical viewpoint, the project is feasible provided the concerns listed below are addressed in the project design. Descriptions of each concern with brief outlines of our recommendations follow the listed concerns.

- Potential for liquefaction-induced settlements
- Presence of highly expansive surficial soils
- Differential movement at on-grade to on-structure transitions
- Presence of granular soils
- Soil corrosion potential

5.1.1 Potential for Liquefaction-Induced Settlements

As discussed, our liquefaction analysis indicates that there is a potential for liquefaction of localized sand layers during a significant seismic event. Although the potential for liquefied sands to vent through the overlying soils is considered low, our analyses indicates that total

liquefaction-induced settlement of up to approximately ¾ inch could occur below the bottom of basement, resulting in differential settlement up to about ½-inch. Foundations should be designed to tolerate the anticipated total and differential settlements. Detail foundation recommendations are presented in the "Foundations" section.

5.1.2 Presence of Highly Expansive Surficial Soils

Highly expansive surficial soils generally blanket the site. Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. To reduce the potential for damage to the planned structures, slabs-on-grade bearing on expansive soil should have sufficient reinforcement and be supported on a layer of non-expansive fill; any at-grade footings should extend below the zone of seasonal moisture fluctuation. In addition, it is important to limit moisture changes in the surficial soils by using positive drainage away from buildings as well as limiting landscaping watering. Detailed grading and foundation recommendations addressing this concern are presented in the following sections.

5.1.3 Differential Movement At On-grade to On-Structure Transitions

Some improvements may transition from on-grade support to overlying the basement (on-structure). Where the improvements transition from on-grade to the basement, these transition areas typically experience increased differential movement due to a variety of causes, including difficulty in achieving compaction of retaining wall backfill closest to the wall. We recommend consideration be given to including subslabs beneath flatwork or pavers that can cantilever at least 3 feet beyond the wall. If surface improvements are included that are highly sensitive to differential movement, additional measures may be necessary. We also recommend that retaining wall backfill be compacted to 95 percent where surface improvements are planned (see "Retaining Wall" section).

5.1.4 Presence of Granular Soils

As mentioned, the soils encountered at the site were generally clayey in the upper 15 feet of the soil profile. However, some silty sands were encountered at the approximate basement excavation depth in Boring EB-1. These sands at this depth contained high fines content however the fines were silty with low cohesion. If these soils, as well as any sands with lower fines are encountered, contractors may need to form footings as well as prepared slab-on-grade subgrade shortly prior to concrete placement and other similar construction issues as relates to temporary shoring, utility excavations, and granular material at the base of the basement excavation. These concerns are discussed further within the "Earthwork" and "Foundations" sections of this report.

5.1.5 Soil Corrosion Potential

As discussed, we performed a preliminary soil corrosion screening based on the results of analytical tests on samples of the near-surface soil. In general, test results indicate the use of sulfate resistant concrete is not required for buried concrete; however, the corrosion potential for

buried metallic structures, such as metal pipes, is considered moderately to severely corrosive. We recommend that special requirements for corrosion control be made to protect metal pipes. We recommend the structural engineer and a corrosion engineer be retained to confirm the information provided and for additional recommendations, as required.

5.2 PLANS AND SPECIFICATIONS REVIEW

We recommend that we be retained to review the geotechnical aspects of the project structural, civil, and landscape plans and specifications, allowing sufficient time to provide the design team with any comments prior to issuing the plans for construction.

5.3 CONSTRUCTION OBSERVATION AND TESTING

As site conditions may vary significantly between the small-diameter borings performed during this investigation, we also recommend that a Cornerstone representative be present to provide geotechnical observation and testing during earthwork and foundation construction. This will allow us to form an opinion and prepare a letter at the end of construction regarding contractor compliance with project plans and specifications, and with the recommendations in our report. We will also be allowed to evaluate any conditions differing from those encountered during our investigation, and provide supplemental recommendations as necessary. For these reasons, the recommendations in this report are contingent of Cornerstone providing observation and testing during construction. Contractors should provide at least a 48-hour notice when scheduling our field personnel.

SECTION 6: EARTHWORK

6.1 SITE DEMOLITION, CLEARING AND PREPARATION

6.1.1 Site Stripping

The site should be stripped of all surface vegetation, and surface and subsurface improvements within the proposed development area. Demolition of existing improvements is discussed in detail below. A detailed discussion of removal of existing fills is provided later in this report. Surface vegetation and topsoil should be stripped to a sufficient depth to remove all material greater than 3 percent organic content by weight.

6.1.2 Tree and Shrub Removal

Trees and shrubs designated for removal should have the root balls and any roots greater than ½-inch diameter removed completely. Mature trees are estimated to have root balls extending to depths of 2 to 4 feet, depending on the tree size. Significant root zones are anticipated to extend to the diameter of the tree canopy. Grade depressions resulting from root ball removal should be cleaned of loose material and backfilled in accordance with the recommendations in the "Compaction" section of this report.

6.1.3 Demolition of Existing Slabs, Foundations and Pavements

All slabs, foundations, and pavements should be completely removed from within planned building areas. Slabs, foundations, and pavements that extend into planned flatwork, pavement, or landscape areas may be left in place provided there is at least 3 feet of engineered fill overlying the remaining materials, they are shown not to conflict with new utilities, and that asphalt and concrete more than 10 feet square is broken up to provide subsurface drainage. A discussion of recycling existing improvements is provided later in this report.

6.1.4 Abandonment of Existing Utilities

All utilities should be completely removed from within planned building areas. For any utility line to be considered acceptable to remain within building areas, the utility line must be completely backfilled with grout or sand-cement slurry (sand slurry is not acceptable), the ends outside the building area capped with concrete, and the trench fills either removed and replaced as engineered fill with the trench side slopes flattened to at least 1:1, or the trench fills are determined not to be a risk to the structure. The assessment of the level of risk posed by the particular utility line will determine whether the utility may be abandoned in place or needs to be completely removed. The contractor should assume that all utilities will be removed from within building areas unless provided written confirmation from both the owner and the geotechnical engineer.

Utilities extending beyond the building area may be abandoned in place provided the ends are plugged with concrete, they do not conflict with planned improvements, and that the trench fills do not pose significant risk to the planned surface improvements.

The risks associated with abandoning utilities in place include the potential for future differential settlement of existing trench fills, and/or partial collapse and potential ground loss into utility lines that are not completely filled with grout. In general, the risk is relatively low for single utility lines less than 4 inches in diameter, and increases with increasing pipe diameter.

6.2 REMOVAL OF EXISTING FILLS

Fills were not encountered in our explorations, but we anticipate any existing fill present within the proposed building footprint will be removed for the basement excavation that is anticipated to extend to about 12 to 15 feet below existing surrounding grades. If any fills are encountered in at-grade building areas, they should be completely removed from within the building footprint and to a lateral distance of at least 5 feet beyond the building footprint or to a lateral distance equal to fill depth below the perimeter footing, whichever is greater. Provided the fills meet the "Material for Fill" requirements below, the fills may be reused when backfilling the excavations. If materials are encountered that do not meet the requirements, such as debris, wood, trash, those materials should be screened out of the remaining material and removed from the site. Backfill of excavations should be placed in lifts and compacted in accordance with the "Compaction" section below.

Fills extending into planned pavement and flatwork areas may be left in place provided they are determined to be a low risk for future differential settlement and that the upper 12 to 18 inches of fill below pavement subgrade is re-worked and compacted as discussed in the "Compaction" section below.

6.3 TEMPORARY CUT AND FILL SLOPES

The contractor is responsible for maintaining all temporary slopes and providing temporary shoring where required. Temporary shoring, bracing, and cuts/fills should be performed in accordance with the strictest government safety standards. On a preliminary basis, the upper 15 feet at the site may be classified as OSHA Soil Type C materials. Recommended soil parameters for temporary shoring are provided in the "Temporary Shoring" section of this report.

Excavations performed during site demolition and fill removal should be sloped at 3:1 (horizontal:vertical) within the upper 5 feet below building subgrade. Excavations extending more than 5 feet below building subgrade and excavations in pavement and flatwork areas should be sloped at a 1.5:1 inclination unless the OSHA soil classification indicates differently.

6.4 BELOW-GRADE EXCAVATIONS

Below-grade excavations may be constructed with temporary slopes in accordance with the "Temporary Cut and Fill Slopes" section above if space allows. Alternatively, temporary shoring may support the planned cuts up to about 15 feet. We have provided geotechnical parameters for shoring design in the section below. The choice of shoring method should be left to the contractor's judgment based on experience, economic considerations and adjacent improvements such as utilities, pavements, and foundation loads. Temporary shoring should support adjacent improvements without distress and should be the contractor's responsibility. A pre-condition survey including photographs and installation of monitoring points for existing site improvements should be included in the contractor's scope. We should be provided the opportunity to review the geotechnical parameters of the shoring design prior to implementation; the project structural engineer should be consulted regarding support of adjacent structures.

6.4.1 Temporary Shoring

Based on the site conditions encountered during our investigation, the cuts may be supported by soldier beams and tie-backs, braced excavations, soil nailing, or potentially other methods. Where shoring will extend more than about 10 feet, restrained shoring will most likely be required to limit detrimental lateral deflections and settlement behind the shoring. In addition to soil earth pressures, the shoring system will need to support adjacent loads such as construction vehicles and incidental loading, existing structure foundation loads, and street loading. We recommend that heavy construction loads (cranes, etc.) and material stockpiles be kept at least 15 feet behind the shoring. Where this loading cannot be set back, the shoring will need to be designed to support the loading. The shoring designer should provide for timely and uniform mobilization of soil pressures that will not result in excessive lateral deflections. Minimum suggested geotechnical parameters for shoring design are provided in the table below.

Table 4: Suggested Temporary Shoring Design Parameters

Design Parameter	Design Value
Minimum Lateral Wall Surcharge (upper 5 feet)	120 psf
Cantilever Wall – Triangular Earth Pressure	45 pcf (2)
Restrained Wall – Trapezoidal Earth Pressure	Increase from 0 to 25H* psf at ¼ H from top of shoring (1) (2)
Passive Pressure – Starting below the bottom of the adjacent excavation(3)	350 pcf up to 1,400 psf maximum uniform pressure

(1) H equals the height of the excavation; passive pressures are assumed to act over twice the soldier pile diameter
(2) The cantilever and restrained pressures are for drained designs with dewatering. If undrained shoring is designed, an additional 40 pcf should be added for hydrostatic pressures.
(3) Bottom of adjacent excavation is bottom of mass excavation or bottom of footing excavation, whichever is deeper directly adjacent to the shoring element.

If shotcrete lagging is used for the shoring facing, the permanent retaining wall drainage materials, as discussed in the "Wall Drainage" section of this report, will need to be installed during temporary shoring construction. At a minimum, 2-foot-wide vertical panels should be placed between soil nails or tiebacks that are spaced at 6-foot centers. For 8-foot centers, 4-foot-wide vertical panels should be provided. A horizontal strip drain connecting the vertical panels should be provided, or pass-through connections should be included for each vertical panel.

We performed our borings with hollow-stem auger drilling equipment and as such were not able to evaluate the potential for caving soils, which can create difficult conditions during soldier beam, tie-back, or soil nail installation; caving soils can also be problematic during excavation and lagging placement. The contractor is responsible for evaluating excavation difficulties prior to construction. Where relatively clean sands or difficult drilling or cobble conditions were encountered during our exploration, pilot holes performed by the contractor may be desired to further evaluate these conditions prior to the finalization of the shoring budget.

In addition to anticipated deflection of the shoring system, other factors such as voids created by soil sloughing, and erosion of granular layers due to perched water conditions can create adverse ground subsidence and deflections. The contractor should attempt to cut the excavation as close to neat lines as possible; where voids are created they should be backfilled as soon as possible with sand, gravel, or grout.

As previously mentioned, we recommend that a monitoring program be developed and implemented to evaluate the effects of the shoring on adjacent improvements. All sensitive improvements should be located and monitored for horizontal and vertical deflections and distress cracking based on a pre-construction survey. The monitoring frequency should be established and agree to by the project team prior to start of shoring construction.

The above recommendations are for the use of the design team; the contractor in conjunction with input from the shoring designer should perform additional subsurface exploration they

deem necessary to design the chosen shoring system. A California-licensed civil or structural engineer must design and be in responsible charge of the temporary shoring design. The contractor is responsible for means and methods of construction, as well as site safety.

6.5 SUBGRADE PREPARATION

After site clearing and demolition is complete, and prior to backfilling any excavations resulting from fill removal or demolition, the excavation subgrade and subgrade within areas to receive additional site fills, slabs-on-grade and/or pavements should be scarified to a depth of 6 inches, moisture conditioned, and compacted in accordance with the "Compaction" section below.

Sandier soils may be encountered in areas of the basement subgrade elevation. We recommend that subgrade compaction and proof rolling be performed within 24 hours of capillary break layer or slab-on-grade construction.

6.6 SUBGRADE STABILIZATION MEASURES

Soil subgrade and fill materials, especially soils with high fines contents such as clays and silty soils, can become unstable due to high moisture content, whether from high in-situ moisture contents or from winter rains. As the moisture content increases over the laboratory optimum, it becomes more likely the materials will be subject to softening and yielding (pumping) from construction loading or become unworkable during placement and compaction.

As discussed in the "Subsurface" section in this report, the in-situ moisture contents range from about 5 percent below optimum to about 10 percent over the estimated laboratory optimum in the upper 15 feet of the soil profile. The contractor should anticipate drying and moisture conditioning the soils prior to reusing them as fill. The in-situ moisture contents at the anticipated bottom of basement excavation range up to about 10 percent over the estimated laboratory optimum moisture. Repetitive rubber-tire loading may de-stabilize these soils.

There are several methods to address potentially unstable soil conditions and facilitate fill placement and trench backfill. Some of the methods are briefly discussed below. Implementation of the appropriate stabilization measures should be evaluated on a case-by-case basis according to the project construction goals and the particular site conditions.

6.6.1 Scarification and Drying

The subgrade may be scarified to a depth of 8 to 12 inches and allowed to dry to near optimum conditions, if sufficient dry weather is anticipated to allow sufficient drying. More than one round of scarification may be needed to break up the soil clods.

6.6.2 Removal and Replacement

As an alternative to scarification, the contractor may choose to over-excavate the unstable soils and replace them with dry on-site or import materials. A Cornerstone representative should be present to provide recommendations regarding the appropriate depth of over-excavation,

whether a geosynthethic (stabilization fabric or geogrid) is recommended, and what materials are recommended for backfill.

6.6.3 Chemical Treatment

Where the unstable area exceeds about 5,000 to 10,000 square feet and/or site winterization is desired, chemical treatment with quicklime (CaO), kiln-dust, or cement may be more cost-effective than removal and replacement. Recommended chemical treatment depths will typically range from 12 to 18 inches depending on the magnitude of the instability.

6.7 MATERIAL FOR FILL

6.7.1 Re-Use of On-site Soils

On-site soils with an organic content less than 3 percent by weight may be reused as general fill. General fill should not have lumps, clods or cobble pieces larger than 6 inches in diameter; 85 percent of the fill should be smaller than 2½ inches in diameter. Minor amounts of oversized material (smaller than 12 inches in diameter) may be allowed provided the oversized pieces are not allowed to nest together and the compaction method will allow for loosely placed lifts not exceeding 12 inches.

6.7.2 Re-Use of On-Site Site Improvements

We anticipate that asphalt concrete (AC) grindings and aggregate base (AB) will be generated during site demolition. If the AC grindings are mixed with the underlying AB to meet Class 2 AB specifications, they may be reused within the new pavement and flatwork structural sections. AC/AB grindings may not be reused beneath the habitable areas. Laboratory testing will be required to confirm the grindings meet project specifications.

6.7.3 Potential Import Sources

Imported and non-expansive material should be inorganic with a Plasticity Index (PI) of 15 or less, and not contain recycled asphalt concrete where it will be used within the structure's footprint. To prevent significant caving during trenching or foundation construction, imported material should have sufficient fines. Samples of potential import sources should be delivered to our office at least 10 days prior to the desired import start date. Information regarding the import source should be provided, such as any site geotechnical reports. If the material will be derived from an excavation rather than a stockpile, potholes will likely be required to collect samples from throughout the depth of the planned cut that will be imported. At a minimum, laboratory testing will include PI tests. Material data sheets for select fill materials (Class 2 aggregate base, ¾-inch crushed rock, quarry fines, etc.) listing current laboratory testing data (not older than 6 months from the import date) may be provided for our review without providing a sample. If current data is not available, specification testing will need to be completed prior to approval.

Environmental and soil corrosion characterization should also be considered by the project team prior to acceptance. Suitable environmental laboratory data to the planned import quantity should be provided to the project environmental consultant; additional laboratory testing may be required based on the project environmental consultant's review. The potential import source should also not be more corrosive than the on-site soils, based on pH, saturated resistivity, and soluble sulfate and chloride testing.

6.8 COMPACTION REQUIREMENTS

All fills, and subgrade areas where fill, slabs-on-grade, and pavements are planned, should be placed in loose lifts 8 inches thick or less and compacted in accordance with ASTM D1557 (latest version) requirements as shown in the table below. In general, clayey soils should be compacted with sheepsfoot equipment and sandy/gravelly soils with vibratory equipment; open-graded materials such as crushed rock should be placed in lifts no thicker than 18 inches and consolidated in place with vibratory equipment. Each lift of fill and all subgrade should be firm and unyielding under construction equipment loading in addition to meeting the compaction requirements to be approved. The contractor (with input from a Cornerstone representative) should evaluate the in-situ moisture conditions, as the use of vibratory equipment on soils with high moistures can cause unstable conditions. General recommendations for soil stabilization are provided in the "Subgrade Stabilization Measures" section of this report. Where the soil's PI is 20 or greater, the expansive soil criteria should be used.

Table 5: Compaction Requirements

Description	Material Description	Minimum Relative[1] Compaction (percent)	Moisture[2] Content (percent)
General Fill (within upper 5 feet)	On-Site Expansive Soils	87 – 92	>3
	Low Expansion Soils	90	>1
General Fill (below a depth of 5 feet)	On-Site Expansive Soils	95	>3
	Low Expansion Soils	95	>1
Basement Wall Backfill	Without Surface Improvements	90	>1
Basement Wall Backfill	With Surface Improvements	95[4]	>1
Trench Backfill	On-Site Expansive Soils	87 – 92	>3
Trench Backfill	Low Expansion Soils	90	>1
Trench Backfill (upper 6 inches of subgrade)	On-Site Low Expansion Soils	95	>1

1 – Relative compaction based on maximum density determined by ASTM D1557 (latest version)
2 – Moisture content based on optimum moisture content determined by ASTM D1557 (latest version)
3 – Class 2 aggregate base shall conform to Caltrans Standard Specifications, latest edition, except that the relative compaction should be determined by ASTM D1557 (latest version)
4 – Using light-weight compaction or walls should be braced

Table 5 Continues

Table 5: Compaction Requirements (Continued)

Description	Material Description	Minimum Relative[1] Compaction (percent)	Moisture[2] Content (percent)
Crushed Rock Fill	¾-inch Clean Crushed Rock	Consolidate In-Place	NA
Non-Expansive Fill	Imported Non-Expansive Fill	90	Optimum
Flatwork Subgrade	On-Site Expansive Soils	87 - 92	>3
Flatwork Subgrade	Low Expansion Soils	90	>1
Flatwork Aggregate Base	Class 2 Aggregate Base[3]	90	Optimum
Pavement Subgrade	On-Site Expansive Soils	87 - 92	>3
Pavement Subgrade	Low Expansion Soils	95	>1
Pavement Aggregate Base	Class 2 Aggregate Base[3]	95	Optimum
Asphalt Concrete	Asphalt Concrete	95 (Marshall)	NA

1 – Relative compaction based on maximum density determined by ASTM D1557 (latest version)
2 – Moisture content based on optimum moisture content determined by ASTM D1557 (latest version)
3 – Class 2 aggregate base shall conform to Caltrans Standard Specifications, latest edition, except that the relative compaction should be determined by ASTM D1557 (latest version)
4 – Using light-weight compaction or walls should be braced

6.8.1 Construction Moisture Conditioning

Expansive soils can undergo significant volume change when dried then wetted. The contractor should keep all exposed expansive soil subgrade (and also trench excavation side walls) moist until protected by overlying improvements (or trenches are backfilled). If expansive soils are allowed to dry out significantly, re-moisture conditioning may require several days of re-wetting (flooding is not recommended), or deep scarification, moisture conditioning, and re-compaction.

6.9 TRENCH BACKFILL

Utility lines constructed within public right-of-way should be trenched, bedded and shaded, and backfilled in accordance with the local or governing jurisdictional requirements. Utility lines in private improvement areas should be constructed in accordance with the following requirements unless superseded by other governing requirements.

All utility lines should be bedded and shaded to at least 6 inches over the top of the lines with crushed rock (⅜-inch-diameter or greater) or well-graded sand and gravel materials conforming to the pipe manufacturer's requirements. Open-graded shading materials should be consolidated in place with vibratory equipment and well-graded materials should be compacted to at least 90 percent relative compaction with vibratory equipment prior to placing subsequent backfill materials.

General backfill over shading materials may consist of on-site native materials provided they meet the requirements in the "Material for Fill" section, and are moisture conditioned and compacted in accordance with the requirements in the "Compaction" section.

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

On expansive soils sites it is desirable to reduce the potential for water migration into building and pavement areas through the granular shading materials. We recommend that a plug of low-permeability clay soil, sand-cement slurry, or lean concrete be placed within trenches just outside where the trenches pass into building and pavement areas.

6.10 SITE DRAINAGE

Ponding should not be allowed adjacent to building foundations, slabs-on-grade, or pavements. Hardscape surfaces should slope at least 2 percent towards suitable discharge facilities; landscape areas should slope at least 3 percent towards suitable discharge facilities. Roof runoff should be directed away from building areas on splash blocks or in closed conduits, to approved infiltration facilities, or on to hardscaped surfaces that drain to suitable facilities. Retention, detention or infiltration facilities should be spaced at least 10 feet from buildings, and preferably at least 5 feet from slabs-on-grade or pavements. However, if retention, detention or infiltration facilities are located within these zones, we recommend that these treatment facilities meet the requirements in the Storm Water Treatment Design Considerations section of this report.

6.11 LOW-IMPACT DEVELOPMENT (LID) IMPROVEMENTS

The Municipal Regional Permit (MRP) requires regulated projects to treat 100 percent of the amount of runoff identified in Provision C.3.d from a regulated project's drainage area with low impact development (LID) treatment measures onsite or at a joint stormwater treatment facility. LID treatment measures are defined as rainwater harvesting and use, infiltration, evapotranspiration, or biotreatment. A biotreatment system may only be used if it is infeasible to implement harvesting and use, infiltration, or evapotranspiration at a project site.

Technical infeasibility of infiltration may result from site conditions that restrict the operability of infiltration measures and devices. Various factors affecting the feasibility of infiltration treatment may create an environmental risk, structural stability risk, or physically restrict infiltration. The presence of any of these limiting factors may render infiltration technically infeasible for a proposed project. To aid in determining if infiltration may be feasible at the site, we provide the

following site information regarding factors that may aid in determining the feasibility of infiltration facilities at the site.

- The near-surface soils at the site are clayey, and categorized as Hydrologic Soil Group D, and are expected to have infiltration rates of less than 0.2 inches per hour. In our opinion, these clayey soils will significantly limit the infiltration of stormwater.
- Locally, seasonal high ground water is mapped at a depth of about 20 feet, and therefore is expected to be at least 10 feet below the base of the infiltration measure.
- In our opinion, infiltration locations within 10 feet of the basement walls would create a geotechnical hazard.
- Infiltration measures, devices, or facilities may conflict with the location of existing or proposed underground utilities or easements. Infiltration measures, devices, or facilities should not be placed on top of or very near to underground utilities such that they discharge to the utility trench, restrict access, or cause stability concerns.

6.11.1 Storm Water Treatment Design Considerations

If storm water treatment improvements, such as shallow bio-retention swales, basins or pervious pavements, are required as part of the site improvements to satisfy Storm Water Quality (C.3) requirements, we recommend the following items be considered for design and construction.

6.11.1.1 General Bioswale Design Guidelines

- If possible, avoid placing bioswales or basins within 10 feet of the building perimeter or within 5 feet of exterior flatwork or pavements. If bioswales must be constructed within these setbacks, the side(s) and bottom of the trench excavation should be lined with 10-mil visqueen to reduce water infiltration into the surrounding expansive clay.
- Where bioswales will parallel foundations and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the foundation, the foundation will need to be deepened so that the bottom edge of the bioswale filter material is above the foundation plane of influence.
- The bottom of bioswale or detention areas should include a perforated drain placed at a low point, such as a shallow trench or sloped bottom, to reduce water infiltration into the surrounding soils near structural improvements, and to address the low infiltration capacity of the on-site clay soils.

6.11.1.2 Bioswale Infiltration Material

- Gradation specifications for bioswale filter material, if required, should be specified on the grading and improvement plans.

- Compaction requirements for bioswale filter material in non-landscaped areas or in pervious pavement areas, if any, should be indicated on the plans and specifications to satisfy the anticipated use of the infiltration area.

- If required, infiltration (percolation) testing should be performed on representative samples of potential bioswale materials prior to construction to check for general conformance with the specified infiltration rates.

- It should be noted that multiple laboratory tests may be required to evaluate the properties of the bioswale materials, including percolation, landscape suitability and possibly environmental analytical testing depending on the source of the material. We recommend that the landscape architect provide input on the required landscape suitability tests if bioswales are to be planted.

- If bioswales are to be vegetated, the landscape architect should select planting materials that do not reduce or inhibit the water infiltration rate, such as covering the bioswale with grass sod containing a clayey soil base.

- If required by governing agencies, field infiltration testing should be specified on the grading and improvement plans. The appropriate infiltration test method, duration and frequency of testing should be specified in accordance with local requirements.

- Due to the relatively loose consistency and/or high organic content of many bioswale filter materials, long-term settlement of the bioswale medium should be anticipated. To reduce initial volume loss, bioswale filter material should be wetted in 12 inch lifts during placement to pre-consolidate the material. Mechanical compaction should not be allowed, unless specified on the grading and improvement plans, since this could significantly decrease the infiltration rate of the bioswale materials.

- It should be noted that the volume of bioswale filter material may decrease over time depending on the organic content of the material. Additional filter material may need to be added to bioswales after the initial exposure to winter rains and periodically over the life of the bioswale areas, as needed.

6.11.1.3 Bioswale Construction Adjacent to Pavements

If bio-infiltration swales or basins are considered adjacent to proposed parking lots or exterior flatwork, we recommend that mitigative measures be considered in the design and construction of these facilities to reduce potential impacts to flatwork or pavements. Exterior flatwork, concrete curbs, and pavements located directly adjacent to bio-swales may be susceptible to settlement or lateral movement, depending on the configuration of the bioswale and the setback between the improvements and edge of the swale. To reduce the potential for distress to these improvements due to vertical or lateral movement, the following options should be considered by the project civil engineer:

- Improvements should be setback from the vertical edge of a bioswale such that there is at least 1 foot of horizontal distance between the edge of improvements and the top edge of the bioswale excavation for every 1 foot of vertical bioswale depth, or

- Concrete curbs for pavements, or lateral restraint for exterior flatwork, located directly adjacent to a vertical bioswale cut should be designed to resist lateral earth pressures in accordance with the recommendations in the "Retaining Walls" section of this report, or concrete curbs or edge restraint should be adequately keyed into the native soil or engineered to reduce the potential for rotation or lateral movement of the curbs.

6.12 LANDSCAPE CONSIDERATIONS

Since the near-surface soils are highly expansive, we recommend greatly reducing the amount of surface water infiltrating these soils near foundations and exterior slabs-on-grade. This can typically be achieved by:

- Using drip irrigation

- Avoiding open planting within 3 feet of the building perimeter or near the top of existing slopes

- Regulating the amount of water distributed to lawns or planter areas by using irrigation timers

- Selecting landscaping that requires little or no watering, especially near foundations.

We recommend that the landscape architect consider these items when developing landscaping plans.

SECTION 7: FOUNDATIONS

7.1 SUMMARY OF RECOMMENDATIONS

In our opinion, the proposed structure may be supported on shallow foundations provided the recommendations in the "Earthwork" section and the sections below are followed.

7.2 SEISMIC DESIGN CRITERIA

The project structural design should be based on the 2016 California Building Code (CBC), which provides criteria for the seismic design of buildings in Chapter 16. The "Seismic Coefficients" used to design buildings are established based on a series of tables and figures addressing different site factors, including the soil profile in the upper 100 feet below grade and mapped spectral acceleration parameters based on distance to the controlling seismic source/fault system. Shear wave velocity measurements performed at CPT-2 to a depth of 100 feet resulted in an average shear wave velocity of 902 feet per second (or 275 meters per second). Therefore, we have classified the site as Soil Classification D. The mapped spectral

acceleration parameters S_S and S_1 were calculated using the USGS computer program *U.S. Seismic Design Maps*, located at http://earthquake.usgs.gov/designmaps/us/application.php, based on the site coordinates presented below and the site classification. The table below lists the various factors used to determine the seismic coefficients and other parameters.

Table 6: CBC Site Categorization and Site Coefficients

Classification/Coefficient	Design Value
Site Class	D
Site Latitude	37.46913°
Site Longitude	-122.21085°
0.2-second Period Mapped Spectral Acceleration[1], S_S	1.689g
1-second Period Mapped Spectral Acceleration[1], S_1	0.779g
Short-Period Site Coefficient – Fa	1.0
Long-Period Site Coefficient – Fv	1.5
0.2-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects - S_{MS}	1.689g
1-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects – S_{M1}	1.168g
0.2-second Period, Design Earthquake Spectral Response Acceleration – S_{DS}	1.126g
1-second Period, Design Earthquake Spectral Response Acceleration – S_{D1}	0.779g
Mapped MCE Geometric Mean Peak Ground Acceleration - PGA	0.672g
Site Coefficient Based on PGA and Site Class - F_{PGA}	1.0

[1]For Site Class B, 5 percent damped.

7.3 SHALLOW FOUNDATIONS

7.3.1 Spread Footings

Spread footings should bear on natural, undisturbed soil or engineered fill, be at least 18 inches wide, and extend at least 24 inches below the lowest adjacent grade. Lowest adjacent grade is defined as the deeper of the following: 1) bottom of the adjacent interior slab-on-grade, or 2) finished exterior grade, excluding landscaping topsoil.

Footings constructed to the above dimensions and in accordance with the "Earthwork" recommendations of this report are capable of supporting maximum allowable bearing pressures of 2,000 psf for dead loads, 3,000 psf for combined dead plus live loads, and 4,000 psf for all loads including wind and seismic. These pressures are based on factors of safety of 3.0, 2.0, and 1.5 applied to the ultimate bearing pressure for dead, dead plus live, and all loads, respectively. These pressures are net values; the weight of the footing may be neglected for the portion of the footing extending below grade (typically, the full footing depth). Top and bottom mats of reinforcing steel should be included in continuous footings to help span irregularities and differential settlement.

7.3.2 Footing Settlement

Structural loads were not provided to us at the time this report was prepared; therefore, we estimated the typical loading in the following table.

Table 7: Estimated Structural Loading

Foundation Area	Range of Assumed Loads
Interior Isolated Column Footing	400 to 500 kips
Exterior Isolated Column Footing	200 to 250 kips
Perimeter Strip Footing	7 to 9 kips per lineal foot

Based on the above loading and the allowable bearing pressures presented above, we estimate that the total static footing settlement will be on the order of ½ inch, with less than about ½-inch of post-construction differential settlement between adjacent foundation elements. In addition we estimate that differential seismic movement will be on the order of ½-inch over a horizontal distance of 30 feet, resulting in a total estimated differential footing movement of about ¾-inch between foundation elements, assumed to be on the order of 30 feet. As our footing loads were assumed, we recommend we be retained to review the final footing layout and loading, and verify the settlement estimates above.

7.3.3 Lateral Loading

Lateral loads may be resisted by friction between the bottom of footing and the supporting subgrade, and also by passive pressures generated against footing sidewalls. An ultimate frictional resistance of 0.35 applied to the footing dead load, and an ultimate passive pressure based on an equivalent fluid pressure of 350 pcf may be used in design. The structural engineer should apply an appropriate factor of safety to the ultimate values above. Where footings are adjacent to landscape areas without hardscape, the upper 12 inches of soil should be neglected when determining passive pressure capacity.

7.3.4 Spread Footing Construction Considerations

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

Footing excavations should be filled as soon as possible or be kept moist until concrete placement by regular sprinkling to prevent desiccation. A Cornerstone representative should

observe all footing excavations prior to placing reinforcing steel and concrete. If there is a significant schedule delay between our initial observation and concrete placement, we may need to re-observe the excavations.

SECTION 8: CONCRETE SLABS AND PEDESTRIAN PAVEMENTS

8.1 BELOW-GRADE GARAGE SLAB-ON-GRADE

The garage slab-on-grade should be at least 5 inches thick and if constructed with minimal reinforcement intended for shrinkage control only, should have a minimum compressive strength of 3,000 psi. If the slab will have heavier reinforcing because the slab will also serve as a structural diaphragm, the compressive strength may be reduced to 2,500 psi at the structural engineer's discretion. The garage slab should also be supported on subgrade prepared in accordance with the recommendations in the "Earthwork" section of this report, and at least 6 inches of either Class 2 aggregate base or ¾-inch clean, crushed rock placed and compacted in accordance with the "Compaction" section of this report. If there will be areas within the garage that are moisture sensitive, such as equipment and elevator rooms, the recommendations in the "Interior Slabs Moisture Protection Considerations" section below may be incorporated in the project design if desired. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness.

8.2 INTERIOR SLABS MOISTURE PROTECTION CONSIDERATIONS

The following general guidelines for concrete slab-on-grade construction where floor coverings are planned are presented for the consideration by the developer, design team, and contractor. These guidelines are based on information obtained from a variety of sources, including the American Concrete Institute (ACI) and are intended to reduce the potential for moisture-related problems causing floor covering failures, and may be supplemented as necessary based on project-specific requirements. The application of these guidelines or not will not affect the geotechnical aspects of the slab-on-grade performance.

- Place a minimum 10-mil vapor retarder conforming to ASTM E 1745, Class C requirements or better directly below the concrete slab; the vapor retarder should extend to the slab edges and be sealed at all seams and penetrations in accordance with manufacturer's recommendations and ASTM E 1643 requirements. A 4-inch-thick capillary break, consisting of ½- to ¾-inch crushed rock with less than 5 percent passing the No. 200 sieve, should be placed below the vapor retarder and consolidated in place with vibratory equipment.

- The concrete water:cement ratio should be 0.45 or less. Mid-range plasticizers may be used to increase concrete workability and facilitate pumping and placement.

- Water should not be added after initial batching unless the slump is less than specified and/or the resulting water:cement ratio will not exceed 0.45.

- Polishing the concrete surface with metal trowels is not recommended.

- Where floor coverings are planned, all concrete surfaces should be properly cured.
- Water vapor emission levels and concrete pH should be determined in accordance with ASTM F1869-98 and F710-98 requirements and evaluated against the floor covering manufacturer's requirements prior to installation.

8.3 EXTERIOR FLATWORK

Exterior concrete flatwork subject to pedestrian traffic only should be at least 4 inches thick and supported on at least 12 inches of non-expansive fill (NEF) overlying subgrade prepared in accordance with the "Earthwork" recommendations of this report. In addition, the upper 4 inches of the NEF should also meet Class 2 aggregate base requirements. As an alternative, the Class 2 aggregate base can also be increased to the full depth of NEF as recommended above.

To help reduce the potential for uncontrolled shrinkage cracking, adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness. Flatwork should be isolated from adjacent foundations except where limited sections of structural slabs are included to help span irregularities at the transitions between at-grade and on-structure flatwork.

SECTION 9: VEHICULAR PAVEMENTS

9.1 ASPHALT CONCRETE

The following asphalt concrete pavement recommendations tabulated below are based on the Procedure 608 of the Caltrans Highway Design Manual, estimated traffic indices for various pavement-loading conditions, and on a design R-value of 5. The design R-value was chosen based on engineering judgment considering the variable surface conditions.

Table 8: Asphalt Concrete Pavement Recommendations, Design R-value = 5

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base* (inches)	Total Pavement Section Thickness (inches)
4.0	2.5	7.5	10.0
4.5	2.5	9.5	12.0
5.0	3.0	10.0	13.0
5.5	3.0	12.0	15.0
6.0	3.5	13.0	16.5
6.5	4.0	14.0	18.0

*Caltrans Class 2 aggregate base; minimum R-value of 78

Frequently, the full asphalt concrete section is not constructed prior to construction traffic loading. This can result in significant loss of asphalt concrete layer life, rutting, or other pavement failures. To improve the pavement life and reduce the potential for pavement distress through construction, we recommend the full design asphalt concrete section be constructed prior to construction traffic loading. Alternatively, a higher traffic index may be chosen for the areas where construction traffic will be using the pavements.

Asphalt concrete pavements constructed on expansive subgrade where the adjacent areas will not be irrigated for several months after the pavements are constructed may experience longitudinal cracking parallel to the pavement edge. These cracks typically form within a few feet of the pavement edge and are due to seasonal wetting and drying of the adjacent soil. The cracking may also occur during construction where the adjacent grade is allowed to significantly dry during the summer, pulling moisture out of the pavement subgrade. Any cracks that form should be sealed with bituminous sealant prior to the start of winter rains. One alternative to reduce the potential for this type of cracking is to install a moisture barrier at least 24 inches deep behind the pavement curb.

9.2 PORTLAND CEMENT CONCRETE

The exterior Portland Cement Concrete (PCC) pavement recommendations tabulated below are based on methods presented in the Portland Cement Association (PCA) design manual (PCA, 1984). Recommendations for garage slabs-on-grade were provided in the "Concrete Slabs and Pedestrian Pavements" section above. We have provided a few pavement alternatives as an anticipated Average Daily Truck Traffic (ADTT) was not provided. An allowable ADTT should be chosen that is greater than what is expected for the development.

Table 9: PCC Pavement Recommendations, Design R-value = 5

Allowable ADTT	Minimum PCC Thickness (inches)
13	5.5
130	6.0

The PCC thicknesses above are based on a concrete compressive strength of at least 3,500 psi, supporting the PCC on at least 6 inches of Class 2 aggregate base compacted as recommended in the "Earthwork" section, and laterally restraining the PCC with curbs or concrete shoulders. Adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness. Due to the expansive surficial soils present, we recommend that the construction and expansion joints be dowelled.

9.3 TRASH ENCLOSURES

Trash enclosures and the associated stress pads should be supported on at least 8 inches of Portland cement concrete (PCC) over at least 6 inches of Class 2 aggregate base, where the aggregate base should be compacted to 95 percent relative compaction. The top 6 inches of the underlying subgrade should be moisture conditioned and compacted according to the "Compaction" section of this report. The compressive strength and construction details should be consistent with the above recommendations for PCC pavements.

9.4 PAVEMENT CUTOFF

Surface water penetration into the pavement section can significantly reduce the pavement life, due to the native expansive clays. While quantifying the life reduction is difficult, a normal 20-year pavement design could be reduce to less than 10 years; therefore, increased long-term maintenance may be required.

It would be beneficial to include a pavement cut-off, such as deepened curbs, redwood-headers, or "Deep-Root Moisture Barriers" that are keyed at least 4 inches into the pavement subgrade. This will help limit the additional long-term maintenance.

SECTION 10: RETAINING WALLS

10.1 STATIC LATERAL EARTH PRESSURES

The structural design of any site retaining wall should include resistance to lateral earth pressures that develop from the soil behind the wall, any undrained water pressure, and surcharge loads acting behind the wall. Provided a drainage system is constructed behind the wall to prevent the build-up of hydrostatic pressures as discussed in the section below, we recommend that the walls with level backfill be designed for the following pressures:

Table 10: Recommended Lateral Earth Pressures

Wall Condition	Lateral Earth Pressure*	Additional Surcharge Loads
Unrestrained – Cantilever Wall	45 pcf	⅓ of vertical loads at top of wall
Restrained – Braced Wall	45 pcf + 8H** psf	½ of vertical loads at top of wall

* Lateral earth pressures are based on an equivalent fluid pressure for level backfill conditions
** H is the distance in feet between the bottom of footing and top of retained soil

Basement walls should be designed as restrained walls. If adequate drainage cannot be provided behind the wall, an additional equivalent fluid pressure of 40 pcf should be added to the values above for both restrained and unrestrained walls for the portion of the wall that will not have drainage. Damp proofing or waterproofing of the walls may be considered where moisture penetration and/or efflorescence are not desired.

10.2 SEISMIC LATERAL EARTH PRESSURES

The 2016 California Building Code (CBC) states that lateral pressures from earthquakes should be considered in the design of basements and retaining walls. We developed seismic earth pressures for the proposed basement using interim recommendations generally based on refinement of the Mononobe-Okabe method (Lew et al., SEAOC 2010). Because the walls are greater than 12 feet in height, and peak ground accelerations are greater than 0.40g, we checked the result of the total seismic increment when added to the recommended active earth pressure against the recommended fixed (restrained) wall earth pressures. Because the wall is restrained, or will act as a restrained wall, and will be designed for 45 pcf (equivalent fluid pressure) plus a uniform earth pressure of 8H psf, based on current recommendations for seismic earth pressures, it appears that active earth pressures plus a seismic increment do not exceed the fixed wall earth pressures. Therefore, an additional seismic increment above the design earth pressures is not required as long as the walls are designed for the restrained wall earth pressures recommended above in accordance with the CBC.

10.3 WALL DRAINAGE

10.3.1 At-Grade Site Walls

Adequate drainage should be provided by a subdrain system behind all walls. This system should consist of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with Class 2 Permeable Material per Caltrans Standard Specifications, latest edition. The permeable backfill should extend at least 12 inches out from the wall and to within 2 feet of outside finished grade. Alternatively, ½-inch to ¾-inch crushed rock may be used in place of the Class 2 Permeable Material provided the crushed rock and pipe are enclosed in filter fabric, such as Mirafi 140N or approved equivalent. The upper 2 feet of wall backfill should consist of compacted on-site soil. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or equivalent drainage matting can be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill. Horizontal strip drains connecting to the vertical drainage matting may be used in lieu of the perforated pipe and crushed rock section. The vertical drainage panel should be connected to the perforated pipe or horizontal drainage strip at the base of the wall, or to some other closed or through-wall system such as the TotalDrain system from AmerDrain. Sections of horizontal drainage strips should be connected with either the manufacturer's connector pieces or by pulling back the filter fabric, overlapping the panel dimples, and replacing the filter fabric over the connection. At corners, a corner guard, corner connection insert, or a section of crushed rock covered with filter fabric must be used to maintain the drainage path.

Drainage panels should terminate 18 to 24 inches from final exterior grade. The Miradrain panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil.

10.3.2 Below-Grade Walls

Miradrain, AmerDrain or other equivalent drainage matting should be used for wall drainage where below-grade walls are temporarily shored and the shoring will be flush with the back of the permanent walls. The drainage panel should be connected at the base of the wall by a horizontal drainage strip and closed or through-wall system such as the TotalDrain system from AmerDrain.

Sections of horizontal drainage strips should be connected with either the manufacturer's connector pieces or by pulling back the filter fabric, overlapping the panel dimples, and replacing the filter fabric over the connection. At corners, a corner guard, corner connection insert, or a section of crushed rock covered with filter fabric must be used to maintain the drainage path. In addition, where drainage panels will connect from a horizontal application for plaza areas to vertical basement wall drainage panels, the drainage path must be maintained. We are not aware of manufactured corner protection suitable for this situation; therefore, we recommend that a section of crushed rock be placed at the transitions. The crushed rock should be at least 3 inches thick, extend at least 12 inches horizontally over the top of the basement roof and 12 inches down from the top of the basement wall, and have a layer of filter fabric covering the crushed rock.

Drainage panels should terminate 18 to 24 inches from final exterior grade unless capped by hardscape. The drainage panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil. If the shoring system will be offset behind the back of permanent wall, the drainage systems discussed in the "At-Grade Site Walls" section may also be used.

10.4 BACKFILL

Where surface improvements will be located over the retaining wall backfill, backfill placed behind the walls with a soil PI less than 20 should be compacted to at least 95 percent relative compaction using light compaction equipment. If the soil's PI is 20 or greater, expansive soil criteria should be used as discussed in the "Compaction" section of this report. Where no surface improvements are planned, backfill should be compacted to at least 90 percent for soils with a PI less than 20. Expansive soil criteria should be followed for soils with a PI of 20 or greater. If heavy compaction equipment is used, the walls should be temporarily braced.

10.5 FOUNDATIONS

The basement retaining walls may be supported on continuous spread footings designed in accordance with the recommendations presented in the "Foundations" section of this report.

SECTION 11: LIMITATIONS

This report, an instrument of professional service, has been prepared for the sole use of Sunrise Senior Living specifically to support the design of the Sunrise Senior Living of Redwood City project in Redwood City, California. The opinions, conclusions, and recommendations

presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in Northern California at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred.

Recommendations in this report are based upon the soil and ground water conditions encountered during our subsurface exploration. If variations or unsuitable conditions are encountered during construction, Cornerstone must be contacted to provide supplemental recommendations, as needed.

Sunrise Senior Living may have provided Cornerstone with plans, reports and other documents prepared by others. Sunrise Senior Living understands that Cornerstone reviewed and relied on the information presented in these documents and cannot be responsible for their accuracy.

Cornerstone prepared this report with the understanding that it is the responsibility of the owner or his representatives to see that the recommendations contained in this report are presented to other members of the design team and incorporated into the project plans and specifications, and that appropriate actions are taken to implement the geotechnical recommendations during construction.

Conclusions and recommendations presented in this report are valid as of the present time for the development as currently planned. Changes in the condition of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Therefore, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes beyond Cornerstone's control. This report should be reviewed by Cornerstone after a period of three (3) years has elapsed from the date of this report. In addition, if the current project design is changed, then Cornerstone must review the proposed changes and provide supplemental recommendations, as needed.

An electronic transmission of this report may also have been issued. While Cornerstone has taken precautions to produce a complete and secure electronic transmission, please check the electronic transmission against the hard copy version for conformity.

Recommendations provided in this report are based on the assumption that Cornerstone will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design, and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, Cornerstone cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of Cornerstone's report by others. Furthermore, Cornerstone will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services.

SECTION 12: REFERENCES

Aagaard, B.T., Blair, J.L., Boatwright, J., Garcia, S.H., Harris, R.A., Michael, A.J., Schwartz, D.P., and DiLeo, J.S., 2016, Earthquake outlook for the San Francisco Bay region 2014–2043 (ver. 1.1, August 2016): U.S. Geological Survey Fact Sheet 2016–3020, 6 p., http://dx.doi.org/10.3133/fs20163020.

American Concrete Institute, 2011, Building Code Requirements for Structural Concrete and Commentary, ACI 318-11.

Boulanger, R.W. and Idriss, I.M., 2004, Evaluating the Potential for Liquefaction or Cyclic Failure of Silts and Clays, Department of Civil & Environmental Engineering, College of Engineering, University of California at Davis.

Boulanger, R.W. and Idriss, I.M., 2014, CPT and SPT Based Liquefaction Triggering Procedures, Department of Civil & Environmental Engineering, College of Engineering, University of California at Davis, Report No. UCD/GCM-14/01, April 2014

California Building Code, 2016, Structural Engineering Design Provisions, Vol. 2.

California Department of Conservation Division of Mines and Geology, 1998, Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada, International Conference of Building Officials, February, 1998.

California Division of Mines and Geology (2008), "Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117A, September.

California Geological Survey, 2006, State of California Seismic Hazard Zones, Palo Alto 7.5-Minute Quadrangle, California: Seismic Hazard Zone Report 111.

Cetin, K.O., Bilge, H.T., Wu, J., Kammerer, A.M., and Seed, R.B., Probablilistic Model for the Assessment of Cyclically Induced Reconsolidation (Volumetric) Settlements, ASCE Journal of Geotechnical and Geoenvironmental Engineering, Vo. 135, No. 3, March 1, 2009.

Federal Emergency Management Administration (FEMA), 2012, FIRM City of Redwood City, California, Community Panel #0603250302E.

Idriss, I.M., and Boulanger, R.W., 2008, Soil Liquefaction During Earthquakes, Earthquake Engineering Research Institute, Oakland, CA, 237 p.

Lew, M. et al, 2010, Seismic Earth Pressures on Deep Building Basements, Proceedings, SEAOC Convention, Indian Wells, CA.

Pampeyan, Earl H., 1993, Geologic Map of the Palo Alto and Part of the Redwood Point 7-1/2' Quadrangles, San Mateo and Santa Clara Counties, California, U. S. Geological Survey, Miscellaneous Investigation Series, Map I-2371.

Portland Cement Association, 1984, Thickness Design for Concrete Highway and Street Pavements: report.

Ritter, J.R., and Dupre, W.R., 1972, Map Showing Areas of Potential Inundation by Tsunamis in the San Francisco Bay Region, California: San Francisco Bay Region Environment and Resources Planning Study, USGS Basic Data Contribution 52, Misc. Field Studies Map MF-480.

Robertson, P.K., Shao, Lisheng, 2010, Estimation of Seismic Compression in Dry Soils Using the CPT, 5th International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, Paper No. 4.05a, May 24-29, 2010.

Seed, H.B. and I.M. Idriss, 1971, A Simplified Procedure for Evaluation soil Liquefaction Potential: JSMFC, ASCE, Vol. 97, No. SM 9, pp. 1249 – 1274.

Seed, H.B. and I.M. Idriss, 1982, Ground Motions and Soil Liquefaction During Earthquakes: Earthquake Engineering Research Institute.

Seed, Raymond B., Cetin, K.O., Moss, R.E.S., Kammerer, Ann Marie, Wu, J., Pestana, J.M., Riemer, M.F., Sancio, R.B., Bray, Jonathan D., Kayen, Robert E., and Faris, A., 2003, Recent Advances in Soil Liquefaction Engineering: A Unified and Consistent Framework., University of California, Earthquake Engineering Research Center Report 2003-06.

Southern California Earthquake Center (SCEC), 1999, Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction Hazards in California, March.

State of California Department of Transportation, 2015, Highway Design Manual, December 31, 2015.

United States Geological Survey, 2014, U.S. Seismic Design Maps, revision date June 23, available at http://geohazards.usgs.gov/designmaps/us/application.php.

Working Group on California Earthquake Probabilities, 2008, Uniform California Youd, T.L. and Hoose, S.N., 1978, Historic Ground Failures in Northern California Triggered by Earthquakes, United States Geologic Survey Professional Paper 993.

Working Group on California Earthquake Probabilities, 2015, The Third Uniform California Earthquake Rupture Forecast, Version 3 (UCERF), U.S. Geological Survey Open File Report 2013-1165 (CGS Special Report 228). KMZ files available at: www.scec.org/ucerf/images/ucerf3_timedep_30yr_probs.kmz

Yoshimine, M., Nishizaki, H., Amano, KI, and Hosono, Y., 2006, Flow Deformation of Liquefied Sand Under Constant Shear Load and Its Application to Analysis of Flow Slide in Infinite Slope, Soil Dynamics and Earthquake Eng. 26, 253-264.

Youd, T.L. and C.T. Garris, 1995, Liquefaction-Induced Ground-Surface Disruption: Journal of Geotechnical Engineering, Vol. 121, No. 11, pp. 805 - 809.

Youd, T.L. and Idriss, I.M., et al, 1997, Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils: National Center for Earthquake Engineering Research, Technical Report NCEER - 97-0022, January 5, 6, 1996.

Youd et al., 2001, "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," ASCE Journal of Geotechnical and Geoenvironmental Engineering, Vo. 127, No. 10, October, 2001.

CORNERSTONE EARTH GROUP

Vicinity Map

Sunrise Senior Living of Redwood City
Redwood City, CA

Project Number	935-1-2
Figure Number	Figure 1
Date	November 2016
Drawn By	RRN

Legend

Approximate location of exploratory boring (EB)

Approximate location of cone penetration test (CPT)

0 50 100

APPROXIMATE SCALE (FEET)

Base by Google Earth, dated 4/5/2016
Overlay by HPI Architecture, Conceptual Site Plan - A1.0, 12/5/2016

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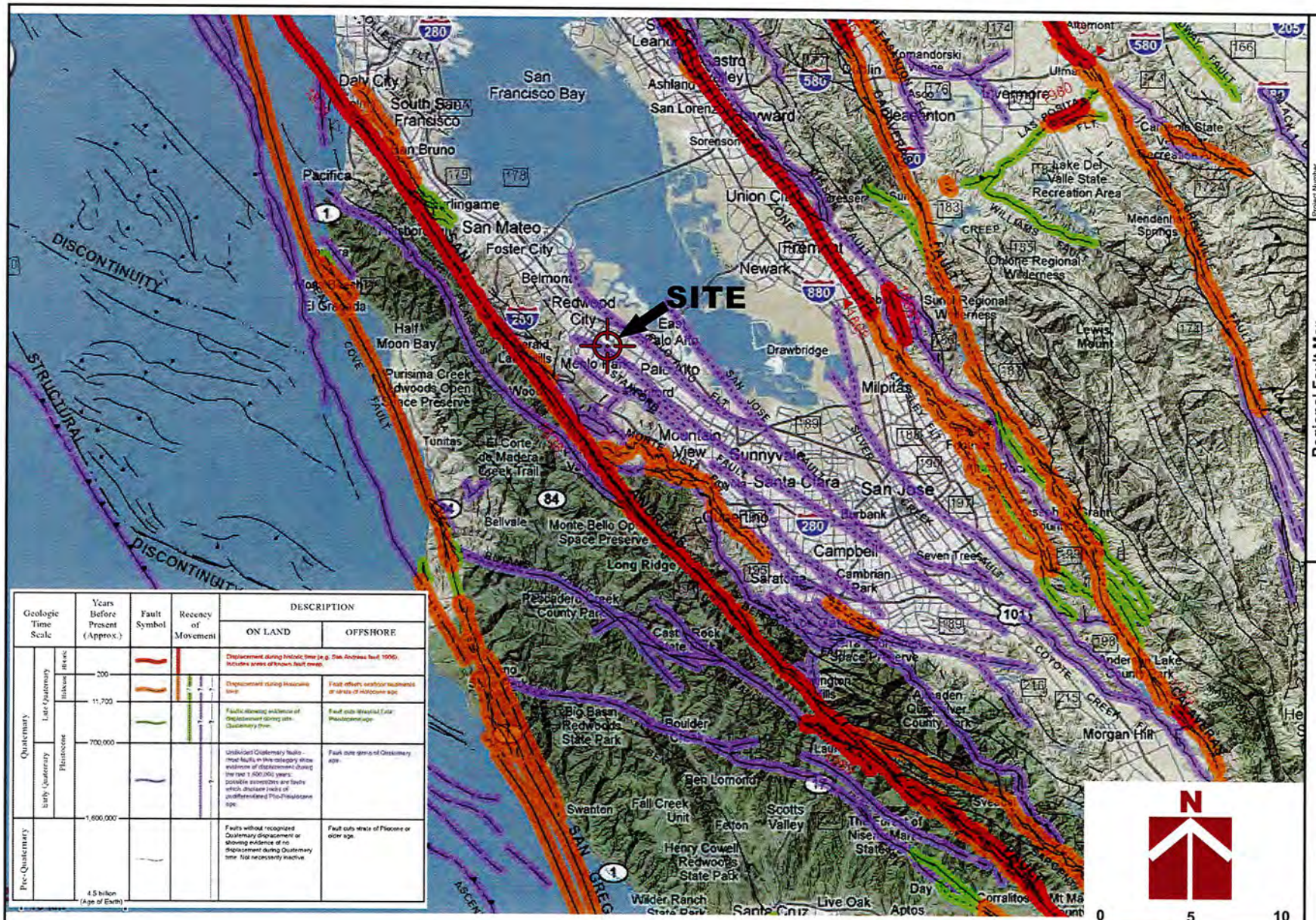
Site Plan

Sunrise Senior Living of Redwood City
Redwood City, CA

Project Number	Figure Number	Date	Drawn By
935-1-2	Figure 2	December 2016	RRN



Base by California Geological Survey - 2010 Fault Activity Map of California (Jennings and Bryant, 2010)

CORNERSTONE EARTH GROUP

Regional Fault Map

Sunrise Senior Living of Redwood City
Redwood City, CA

Project Number 935-1-2

Figure Number Figure 3

Date November 2016

Drawn By RRN

CORNERSTONE EARTH GROUP

FIGURE 4A

CPT NO. 1

PROJECT/CPT DATA

Project Title	Sunrise Senior Living Redwood City
Project No.	935-1-2
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas	
Earthquake Magnitude (Mw)	7.9	
PGA (Amax)	0.672	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	23.5
Design Water Depth (feet)	20
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 20 FEET

0.00 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

0.71 (Inches)

TOTAL SEISMIC SETTLEMENT 0.7 **INCHES**

POTENTIAL LATERAL DISPLACEMENT

LDI[2] 0.00 L/H 80.0

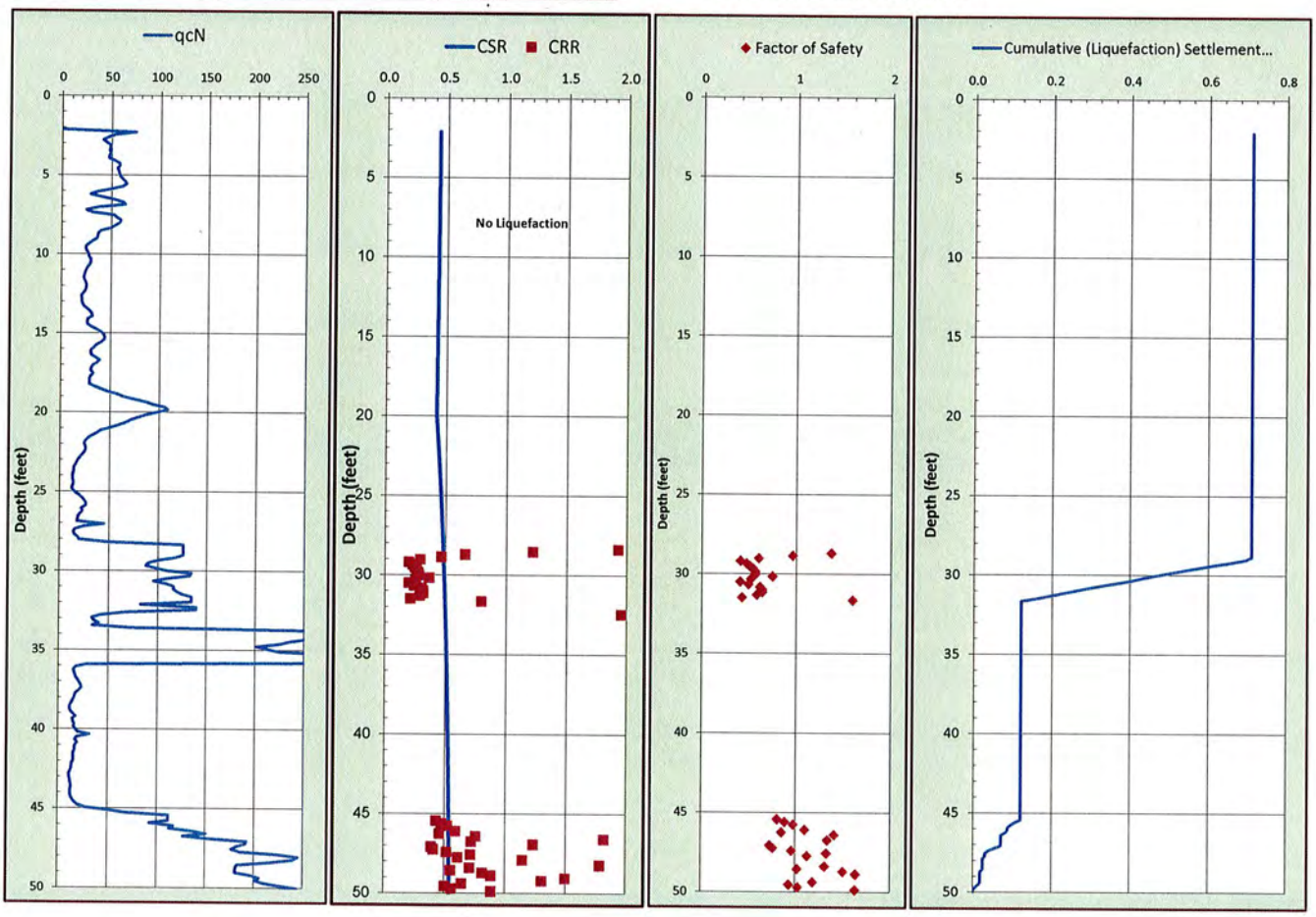
LDI[1] Corrected for Distance 0.00 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.0 to 0.0 feet

[1]Not Valid for L/H Values < 4 and > 40.

[2]LDI Values Only Summed to 2H Below Grade.



CORNERSTONE EARTH GROUP

FIGURE 4B

CPT NO. 2

PROJECT/CPT DATA

Project Title	Sunrise Senior Living Redwood City
Project No.	935-1-2
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas	
Earthquake Magnitude (Mw)	7.9	
PGA (Amax)	0.672	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	27
Design Water Depth (feet)	20
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 20 FEET

0.00 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

0.02 (Inches)

TOTAL SEISMIC SETTLEMENT 0.0 **INCHES**

POTENTIAL LATERAL DISPLACEMENT

LDI[2] 0.00 L/H 80.0

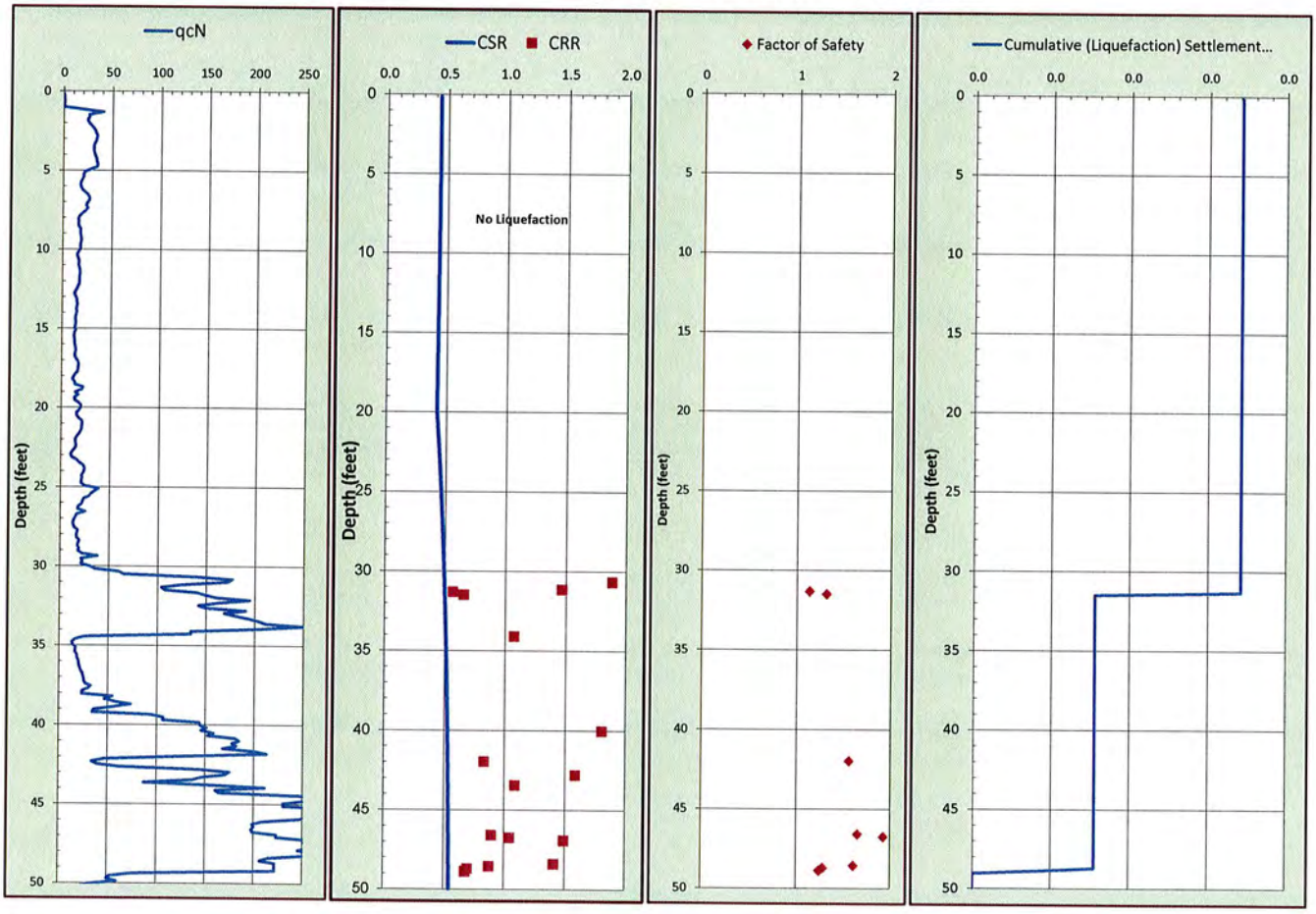
LDI[1] Corrected for Distance 0.00 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.0 to 0.0 feet

[1] Not Valid for L/H Values < 4 and > 40.

[2] LDI Values Only Summed to 2H Below Grade.



CORNERSTONE EARTH GROUP

FIGURE 4C

CPT NO. 3

PROJECT/CPT DATA

Project Title	Sunrise Senior Living Redwood City
Project No.	935-1-2
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas	
Earthquake Magnitude (Mw)	7.9	
PGA (Amax)	0.672	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	30
Design Water Depth (feet)	20
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM	20	FEET
	0.03	(Inches)
LIQUEFACTION SETTLEMENT FROM	50	FEET
	0.11	(Inches)
TOTAL SEISMIC SETTLEMENT	0.1	INCHES

POTENTIAL LATERAL DISPLACEMENT

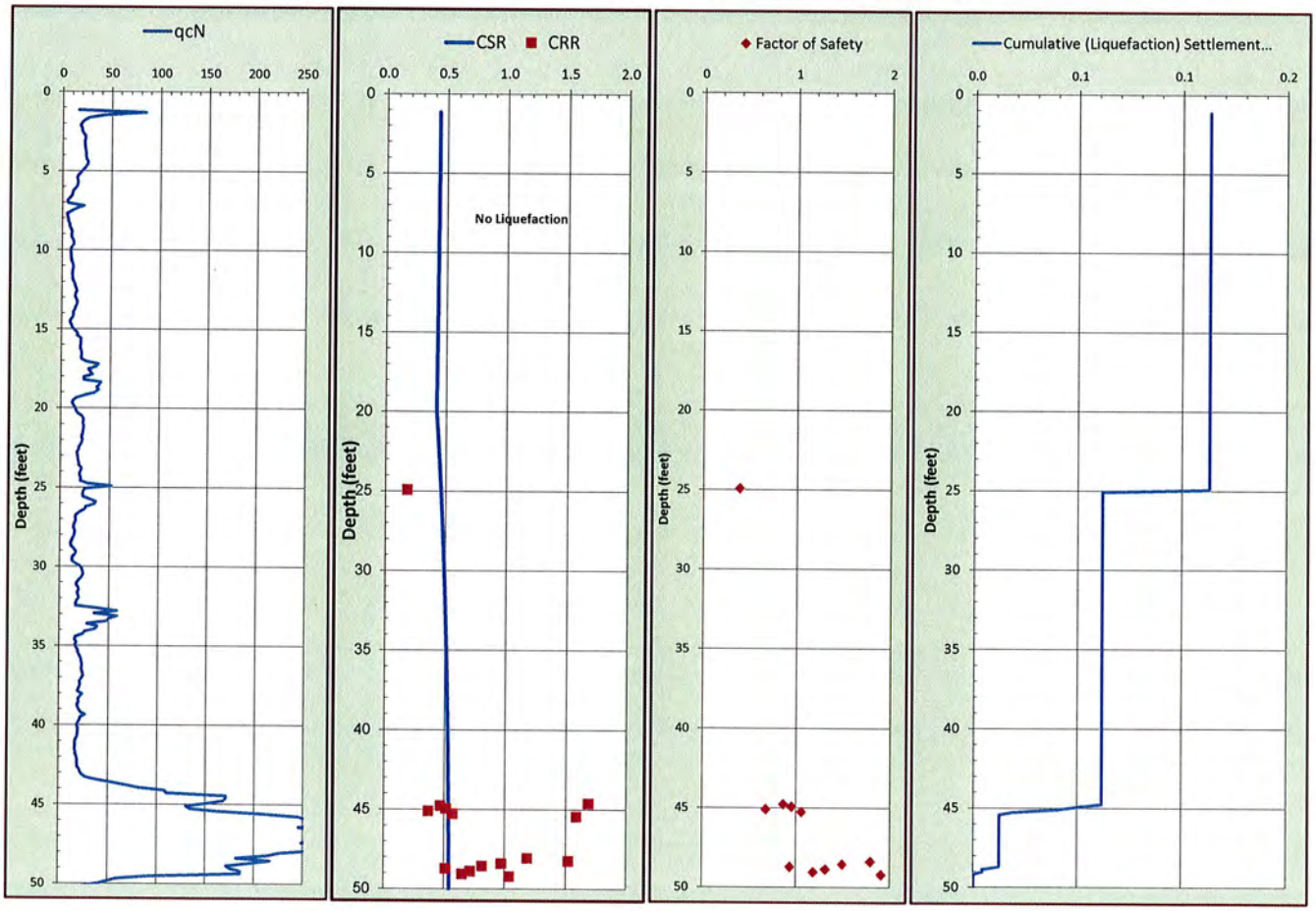
LDI[2]	0.00	L/H	80.0
LDI[1] Corrected for Distance	0.00	(4 < L/H < 40)	

EXPECTED RANGE OF DISPLACEMENT

0.0 to 0.0 feet

[1]Not Valid for L/H Values < 4 and > 40.

[2]LDI Values Only Summed to 2H Below Grade.



CORNERSTONE EARTH GROUP

FIGURE 4D

CPT NO. 4

PROJECT/CPT DATA

Project Title	Sunrise Senior Living Redwood City
Project No.	935-1-2
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas	
Earthquake Magnitude (Mw)	7.9	
PGA (Amax)	0.672	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	27
Design Water Depth (feet)	20
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 20 FEET

0.01 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

0.01 (Inches)

TOTAL SEISMIC SETTLEMENT 0.0 **INCHES**

POTENTIAL LATERAL DISPLACEMENT

LDI^2 0.00 L/H 80.0

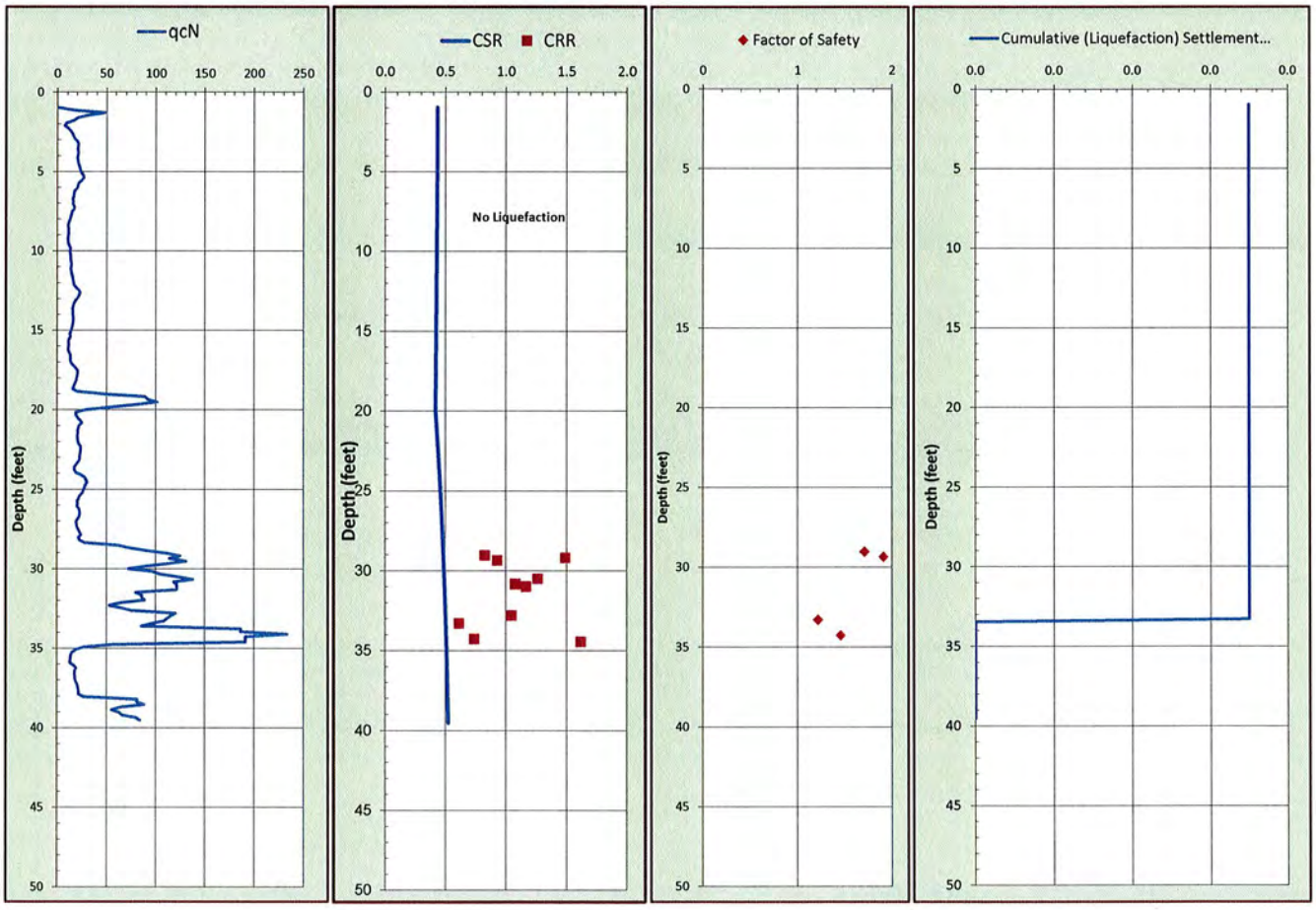
$LDI^1_{\text{Corrected for Distance}}$ 0.00 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.0 to 0.0 feet

[1]Not Valid for L/H Values < 4 and > 40.

[2]LDI Values Only Summed to 2H Below Grade.



CORNERSTONE EARTH GROUP

FIGURE 4E

CPT NO. 5

PROJECT/CPT DATA

Project Title	Sunrise Senior Living Redwood City
Project No.	935-1-2
Project Manager	MJS

SEISMIC PARAMETERS

Controlling Fault	San Andreas	
Earthquake Magnitude (Mw)	7.9	
PGA (Amax)	0.672	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	27
Design Water Depth (feet)	20
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 20 FEET

0.00 (Inches)

LIQUEFACTION SETTLEMENT FROM 50 FEET

0.06 (Inches)

TOTAL SEISMIC SETTLEMENT 0.1 **INCHES**

POTENTIAL LATERAL DISPLACEMENT

LDI^2 0.00 L/H 80.0

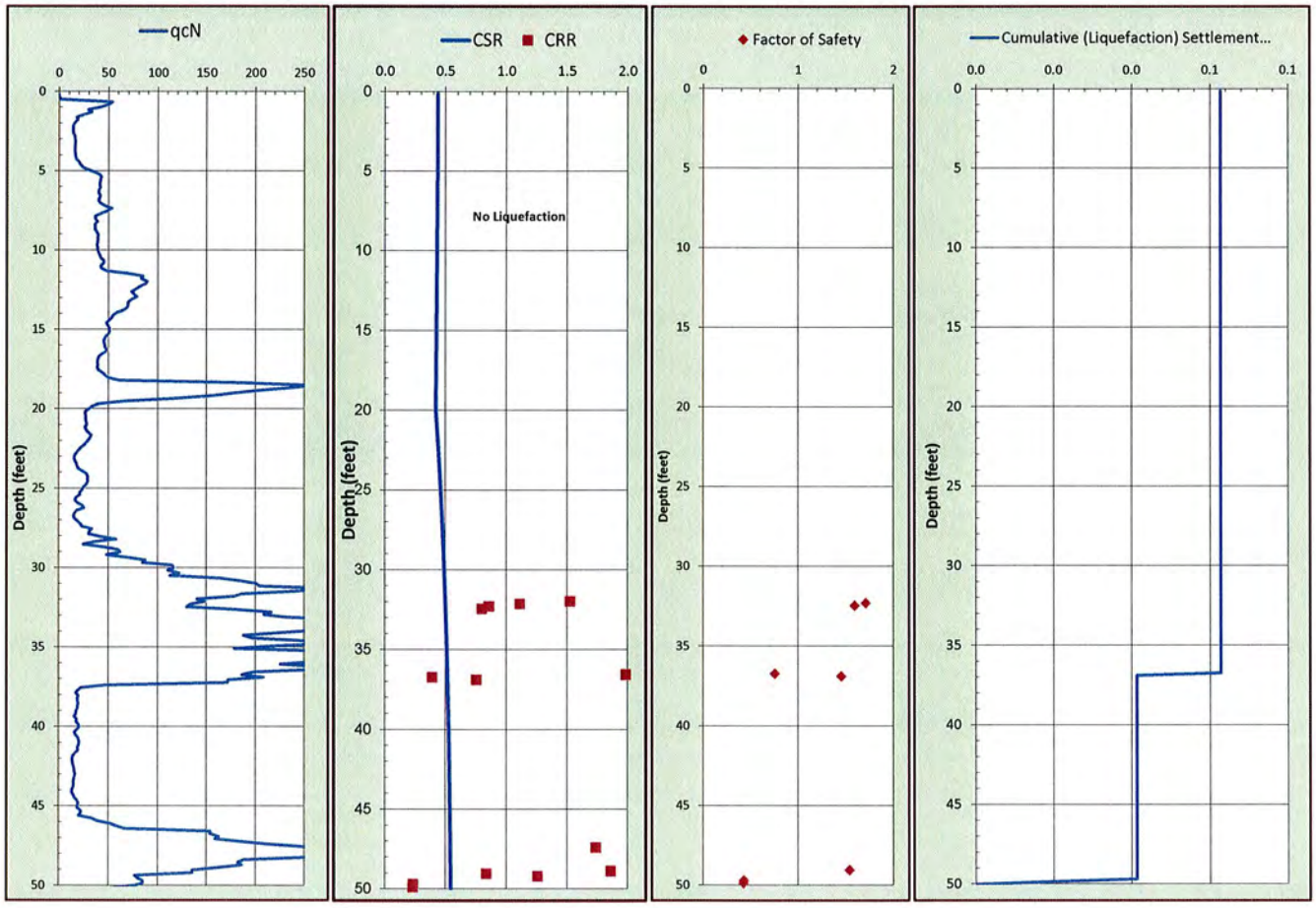
$LDI^1_{\text{Corrected for Distance}}$ 0.00 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT

0.0 to 0.0 feet

[1]Not Valid for L/H Values < 4 and > 40.

[2]LDI Values Only Summed to 2H Below Grade.



APPENDIX A: FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using truck-mounted, hollow-stem auger drilling equipment and 20-ton truck-mounted Cone Penetration Test equipment. Three 8-inch-diameter exploratory borings were drilled on November 10 and 11, 2016 to depths of approximately 41 to 50 feet. Five CPT soundings were also performed in accordance with ASTM D 5778-95 (revised, 2002) on November 8, 2016, to depths ranging from approximately 40 to 100 feet. The approximate locations of exploratory borings and CPTs are shown on the Site Plan, Figure 2. The soils encountered were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). Boring logs, as well as a key to the classification of the soil, are included as part of this appendix.

Boring and CPT locations were approximated using existing site boundaries and other site features as references. Boring elevations were not determined. The locations of the borings and CPTs should be considered accurate only to the degree implied by the method used.

Representative soil samples were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing. The standard penetration resistance blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The 2-inch O.D. split-spoon sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration (ASTM D1586). 2.5-inch I.D. samples were obtained using a Modified California Sampler driven into the soil with the 140-pound hammer previously described. Relatively undisturbed samples were also obtained with 2.875-inch I.D. Shelby Tube sampler which were hydraulically pushed. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last 12 inches. The various samplers are denoted at the appropriate depth on the boring logs.

The CPT involved advancing an instrumented cone-tipped probe into the ground while simultaneously recording the resistance at the cone tip (q_c) and along the friction sleeve (f_s) at approximately 5-centimeter intervals. Based on the tip resistance and tip to sleeve ratio (R_f), the CPT classified the soil behavior type and estimated engineering properties of the soil, such as equivalent Standard Penetration Test (SPT) blow count, internal friction angle within sand layers, and undrained shear strength in silts and clays. A pressure transducer behind the tip of the CPT cone measured pore water pressure (u_2). Graphical logs of the CPT data is included as part of this appendix.

Field tests included an evaluation of the unconfined compressive strength of the soil samples using a pocket penetrometer device. The results of these tests are presented on the individual boring logs at the appropriate sample depths.

Attached boring and CPT logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring and CPT locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition,

any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-98)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY
			PI>4 AND PLOTS<"A" LINE	ML	SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY
			PI PLOTS <"A" LINE	MH	ELASTIC SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT

OTHER MATERIAL SYMBOLS

- Poorly-Graded Sand with Clay
- Clayey Sand
- Sandy Silt
- Artificial/Undocumented Fill
- Poorly-Graded Gravelly Sand
- Topsoil
- Well-Graded Gravel with Clay
- Well-Graded Gravel with Silt
- Sand
- Silt
- Well Graded Gravelly Sand
- Gravelly Silt
- Asphalt
- Boulders and Cobble

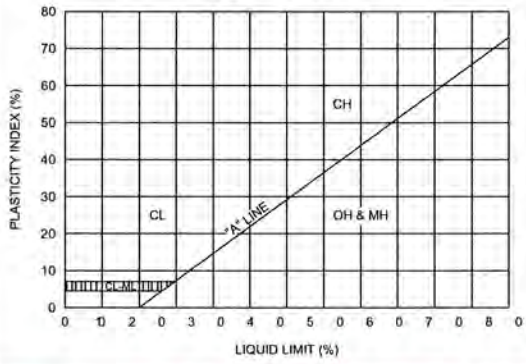
SAMPLER TYPES

- SPT
- Modified California (2.5" I.D.)
- Rock Core
- Shelby Tube
- No Recovery
- Grab Sample

ADDITIONAL TESTS

CA	-	CHEMICAL ANALYSIS (CORROSIVITY)	PI	-	PLASTICITY INDEX
CD	-	CONSOLIDATED DRAINED TRIAXIAL	SW	-	SWELL TEST
CN	-	CONSOLIDATION	TC	-	CYCLIC TRIAXIAL
CU	-	CONSOLIDATED UNDRAINED TRIAXIAL	TV	-	TORVANE SHEAR
DS	-	DIRECT SHEAR	UC	-	UNCONFINED COMPRESSION
PP	-	POCKET PENETROMETER (TSF)	(1.5)	-	(WITH SHEAR STRENGTH IN KSF)
(3.0)	-	(WITH SHEAR STRENGTH IN KSF)			
RV	-	R-VALUE	UU	-	UNCONSOLIDATED UNDRAINED TRIAXIAL
SA	-	SIEVE ANALYSIS: % PASSING #200 SIEVE			
	-	WATER LEVEL			

PLASTICITY CHART



PENETRATION RESISTANCE
(RECORDED AS BLOWS / FOOT)

SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	STRENGTH** (KSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.5
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.5 - 1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

** UNDRAINED SHEAR STRENGTH IN KIPS/SQ. FT. AS DETERMINED BY LABORATORY TESTING OR APPROXIMATED BY THE STANDARD PENETRATION TEST, POCKET PENETROMETER, TORVANE, OR VISUAL OBSERVATION.

CORNERSTONE EARTH GROUP

LEGEND TO SOIL DESCRIPTIONS

Figure Number A-1

BORING NUMBER EB-1

CORNERSTONE EARTH GROUP

PROJECT NAME Sunrise Senior Living of Redwood City
PROJECT NUMBER 935-1-2
PROJECT LOCATION Redwood City, CA
DATE STARTED 11/10/16 DATE COMPLETED 11/10/16
GROUND ELEVATION _____ BORING DEPTH 50 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE _____ LONGITUDE _____
DRILLING METHOD Mobile B-40, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY DL
AT TIME OF DRILLING 27 ft.
NOTES _____
AT END OF DRILLING 23.5 ft.

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
	0		3½ inches asphalt concrete over 4 inches aggregate base							
			Fat Clay (CH) hard, moist, dark brown, some fine sand, high plasticity Liquid Limit = 53, Plastic Limit = 18	43	MC-1B	105	15	35		>4.5 ○
	5		**Sandy Silt (ML)** hard, moist, light brown, fine sand, low plasticity	17	MC-2B	89	13			>4.5 ○
			Sandy Lean Clay (CL) hard, moist, brown, fine sand, low plasticity	13	MC-3B	103	14			>4.5 ○
	10		**Silty Sand (SM)** medium dense, moist, brown, fine to medium sand	25	MC-4B	90	10		48	
	15		**Lean Clay with Sand (CL)** hard, moist, brown, fine sand, moderate plasticity	22	MC-5B	112	15			>4.5 ○
	20		becomes stiff		ST-6	93	29			▲
	25									

Continued Next Page

BORING NUMBER EB-1

CORNERSTONE EARTH GROUP

PROJECT NAME Sunrise Senior Living of Redwood City

PROJECT NUMBER 935-1-2

PROJECT LOCATION Redwood City, CA

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
			Poorly Graded Sand with Silt (SP-SM) loose, moist, brown and gray, fine to coarse sand, some fine gravel	11	MC-7B	104	21		6	
			becomes dense	42	SPT					
	30			31	SPT					
			becomes medium dense	23	SPT					
	35			22	SPT					○
			Lean Clay (CL) stiff, moist, brown, some fine sand, moderate plasticity	16	MC-12B	102	20			○
	40									
				23	MC-13B	99	24			○
	45									
			Poorly Graded Sand with Clay (SP-SC) dense, wet, brown and gray, fine to coarse sand, some fine gravel	63	MC-14		18			
	50		Bottom of Boring at 50.0 feet.							
	55									

BORING NUMBER EB-2

CORNERSTONE EARTH GROUP

PROJECT NAME Sunrise Senior Living of Redwood City
PROJECT NUMBER 935-1-2
PROJECT LOCATION Redwood City, CA
DATE STARTED 11/11/16 DATE COMPLETED 11/11/16
GROUND ELEVATION _____ BORING DEPTH 46.5 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE _____ LONGITUDE _____
DRILLING METHOD Mobile B-56, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY AA
AT TIME OF DRILLING 27 ft.
NOTES _____
AT END OF DRILLING 27 ft.

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
	0		2 inches asphalt concrete over 4 inches aggregate base							
			Fat Clay (CH) hard, moist, dark brown, some fine sand, high plasticity	57	MC-1B	106	17			>4.5
	5		**Lean Clay with Sand (CL)** stiff, moist, brown, fine sand, low to moderate plasticity	9	MC-2		22			
			Lean Clay (CL) very stiff, moist, brown, some fine sand, low to moderate plasticity	8	MC-3B	102	17			
	10									
			Lean Clay with Sand (CL) stiff, moist, brown with gray mottles, fine sand, low to moderate plasticity	14	MC-4B	95	24			
	15									
			Lean Clay (CL) stiff, moist, brown with gray mottles, some fine sand, moderate plasticity		ST					
	20			18	MC-6B	98	28			
	25									
			Continued Next Page							

BORING NUMBER EB-2

CORNERSTONE EARTH GROUP

PROJECT NAME Sunrise Senior Living of Redwood City

PROJECT NUMBER 935-1-2

PROJECT LOCATION Redwood City, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
			Sandy Lean Clay (CL) stiff, moist, brown, fine to medium sand, low plasticity		ST-7	115	17		
	30		**Clayey Sand (SC)** medium dense, moist, brown, fine to coarse sand, some fine gravel	20	MC-8B	122	14		
			Poorly Graded Sand with Clay and Gravel (SP-SC) dense, moist, brown and gray, fine to coarse sand, fine subangular to subrounded gravel	62	MC-9B	127	12		
	35		**Lean Clay with Sand (CL)** stiff, moist, brown, fine sand, moderate plasticity						
	40			15	MC-10B	114	18		
			Silty Sand (SM) medium dense, wet, brown, fine to medium sand	33	MC-11		17		
	45		**Poorly Graded Sand with Gravel (SP)** dense, wet, brown and gray, fine to coarse sand, some fine gravel	37	SPT				
			Bottom of Boring at 46.5 feet.						
	50								
	55								

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

BORING NUMBER EB-3

CORNERSTONE EARTH GROUP

PROJECT NAME Sunrise Senior Living of Redwood City
PROJECT NUMBER 935-1-2
PROJECT LOCATION Redwood City, CA

DATE STARTED 11/10/16 **DATE COMPLETED** 11/10/16
GROUND ELEVATION _____ **BORING DEPTH** 41 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE _____ **LONGITUDE** _____
DRILLING METHOD Mobile B-40, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY DL
▽ **AT TIME OF DRILLING** 30 ft.
NOTES _____
▼ **AT END OF DRILLING** 30 ft.

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
	0		2 inches asphalt concrete over 4 inches aggregate base							
			Fat Clay (CH) hard, moist, dark brown, some fine sand, high plasticity	12	MC-1B	107	18			>4.5
	5		**Lean Clay with Sand (CL)** very stiff, moist, brown, fine to medium sand, low plasticity	11	MC-2B	102	19			
	10		**Sandy Lean Clay (CL)** stiff, moist, brown, fine to medium sand, low plasticity	17	MC-3B	90	33			
	15		**Lean Clay with Sand (CL)** stiff, moist, brown, fine to medium sand, low plasticity	13	MC-4B	96	25			
			Silty Sand (SM) medium dense, moist, brown, fine to medium sand							
	20		**Lean Clay (CL)** stiff, moist, brown, some fine sand, moderate plasticity	13	MC-5B	89	31			
			Lean Clay with Sand (CL) very stiff, moist, gray and brown mottled, fine to medium sand, low to moderate plasticity							
	25			17	MC-6B	107	20			

Continued Next Page

BORING NUMBER EB-3

CORNERSTONE EARTH GROUP

PROJECT NAME Sunrise Senior Living of Redwood City

PROJECT NUMBER 935-1-2

PROJECT LOCATION Redwood City, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
	30	**Sandy Lean Clay (CL)** stiff, moist, brown, fine to medium sand, low plasticity	27	MC-7B	115	14		
	35	**Lean Clay with Sand (CL)** very stiff, moist, brown and gray mottled, fine sand, moderate plasticity	34	MC-8B	109	19		
				ST-9	113	18		
	40	**Sandy Silt (ML)** stiff, moist, brown and gray mottled, fine sand, low plasticity	41	MC-10B	98	24		
		Bottom of Boring at 41.0 feet.						
	45							
	50							
	55							

UNDRAINED SHEAR STRENGTH, ksf

○ HAND PENETROMETER

△ TORVANE

● UNCONFINED COMPRESSION

▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL

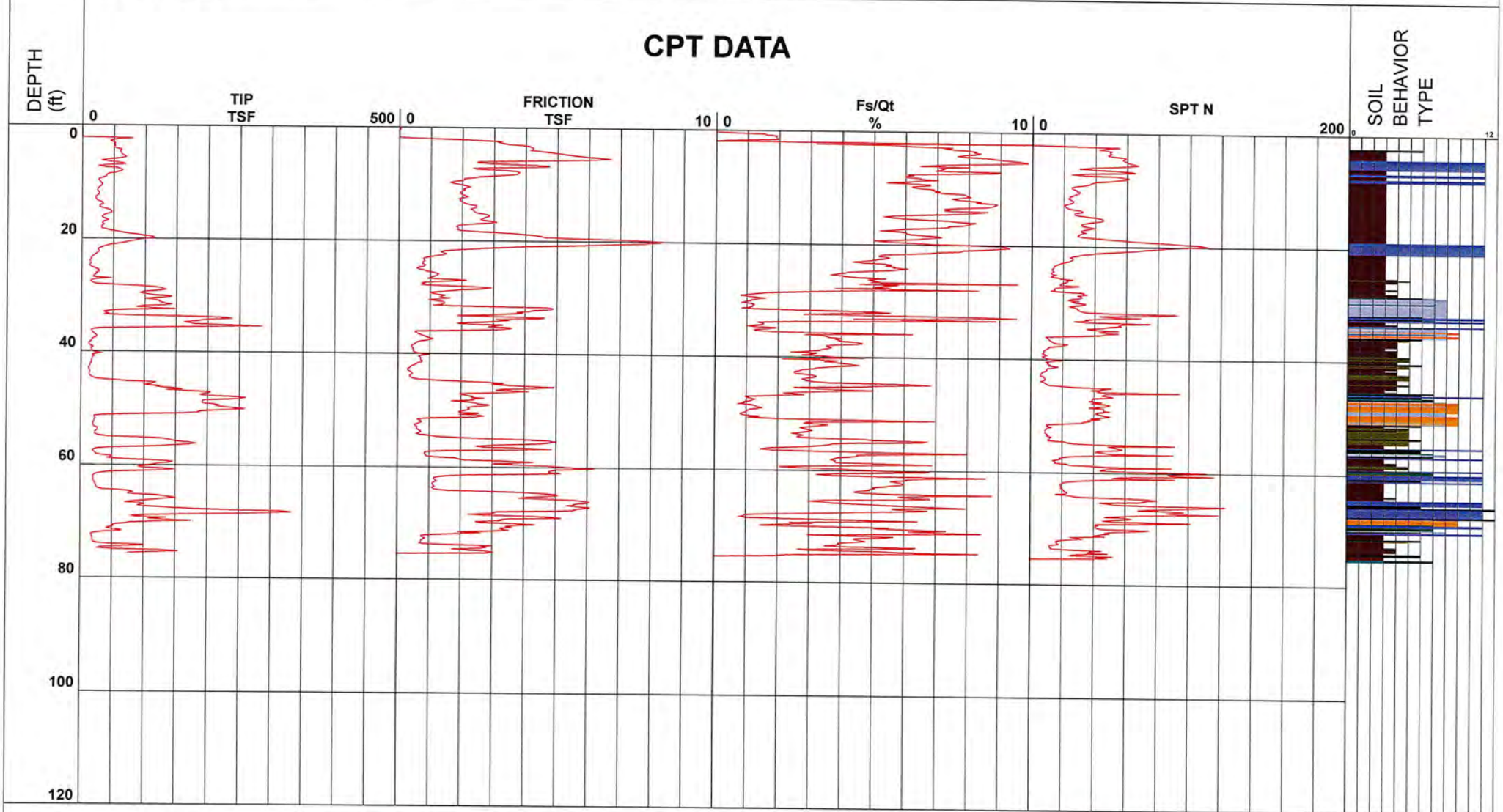
1.0 2.0 3.0 4.0

Cornerstone Earth Group

Project	Sunrise Senior Living	Operator	KK-RB	Filename	SDF(341).cpt
Job Number	935-1-2	Cone Number	DDG1379	GPS	
Hole Number	CPT-01	Date and Time	11/8/2016 8:52:41 AM	Maximum Depth	75.62 ft
EST GW Depth During Test	21.20 ft				

Net Area Ratio .8

CPT DATA



- 1 - sensitive fine grained
- 2 - organic material
- 3 - clay
- 4 - silty clay to clay
- 5 - clayey silt to silty clay
- 6 - sandy silt to clayey silt
- 7 - silty sand to sandy silt
- 8 - sand to silty sand
- 9 - sand
- 10 - gravelly sand to sand
- 11 - very stiff fine grained (*)
- 12 - sand to clayey sand (*)

Cone Size 10cm squared

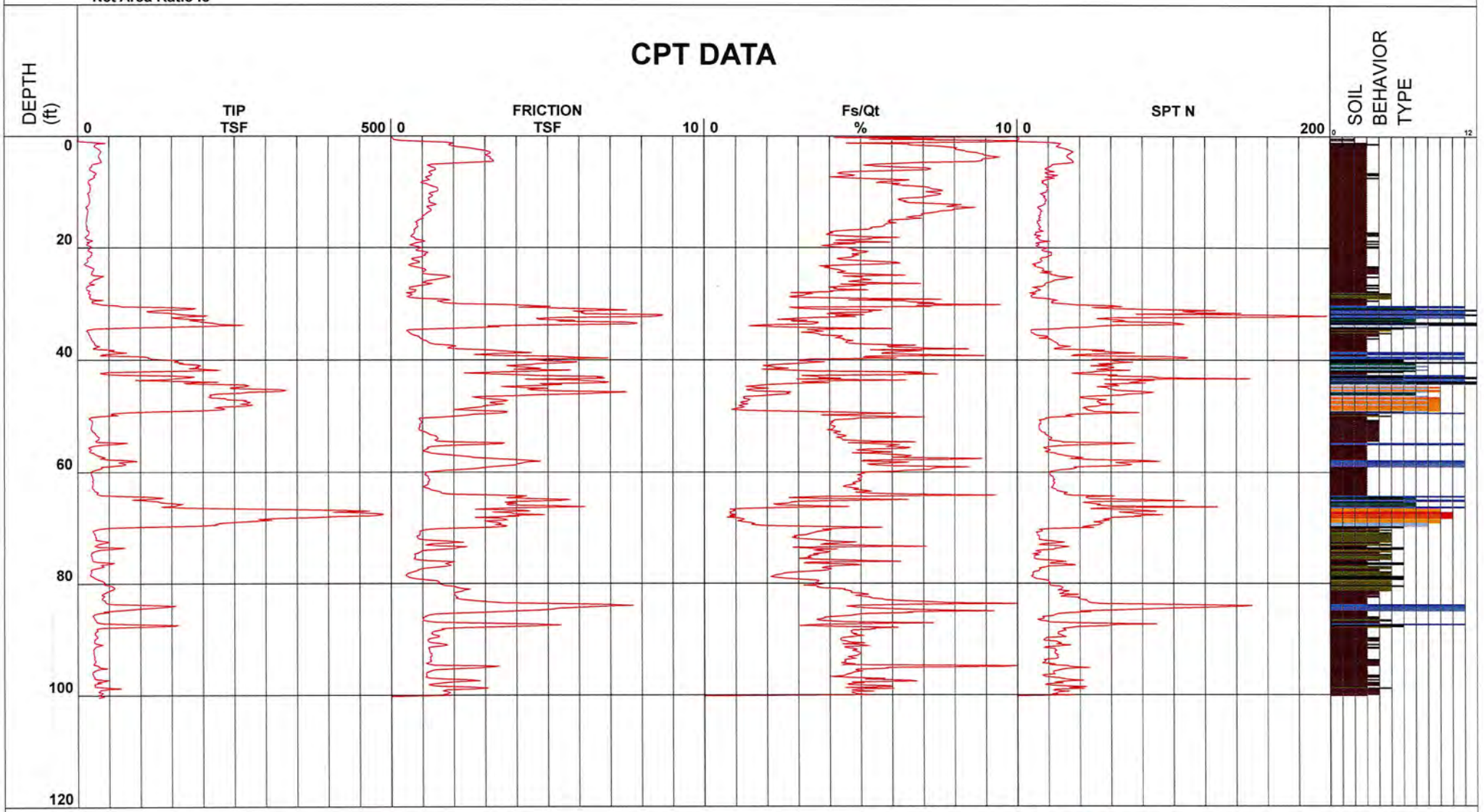
S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Sunrise Senior Living	Operator	KK-RB	Filename	SDF(343).cpt
Job Number	935-1-2	Cone Number	DDG1379	GPS	
Hole Number	CPT-02	Date and Time	11/8/2016 12:27:21 PM	Maximum Depth	100.39 ft
EST GW Depth During Test		22.00 ft			

Net Area Ratio .8

CPT DATA



- 1 - sensitive fine grained
- 2 - organic material
- 3 - clay
- 4 - silty clay to clay
- 5 - clayey silt to silty clay
- 6 - sandy silt to clayey silt
- 7 - silty sand to sandy silt
- 8 - sand to silty sand
- 9 - sand
- 10 - gravelly sand to sand
- 11 - very stiff fine grained (*)
- 12 - sand to clayey sand (*)

Cone Size 10cm squared

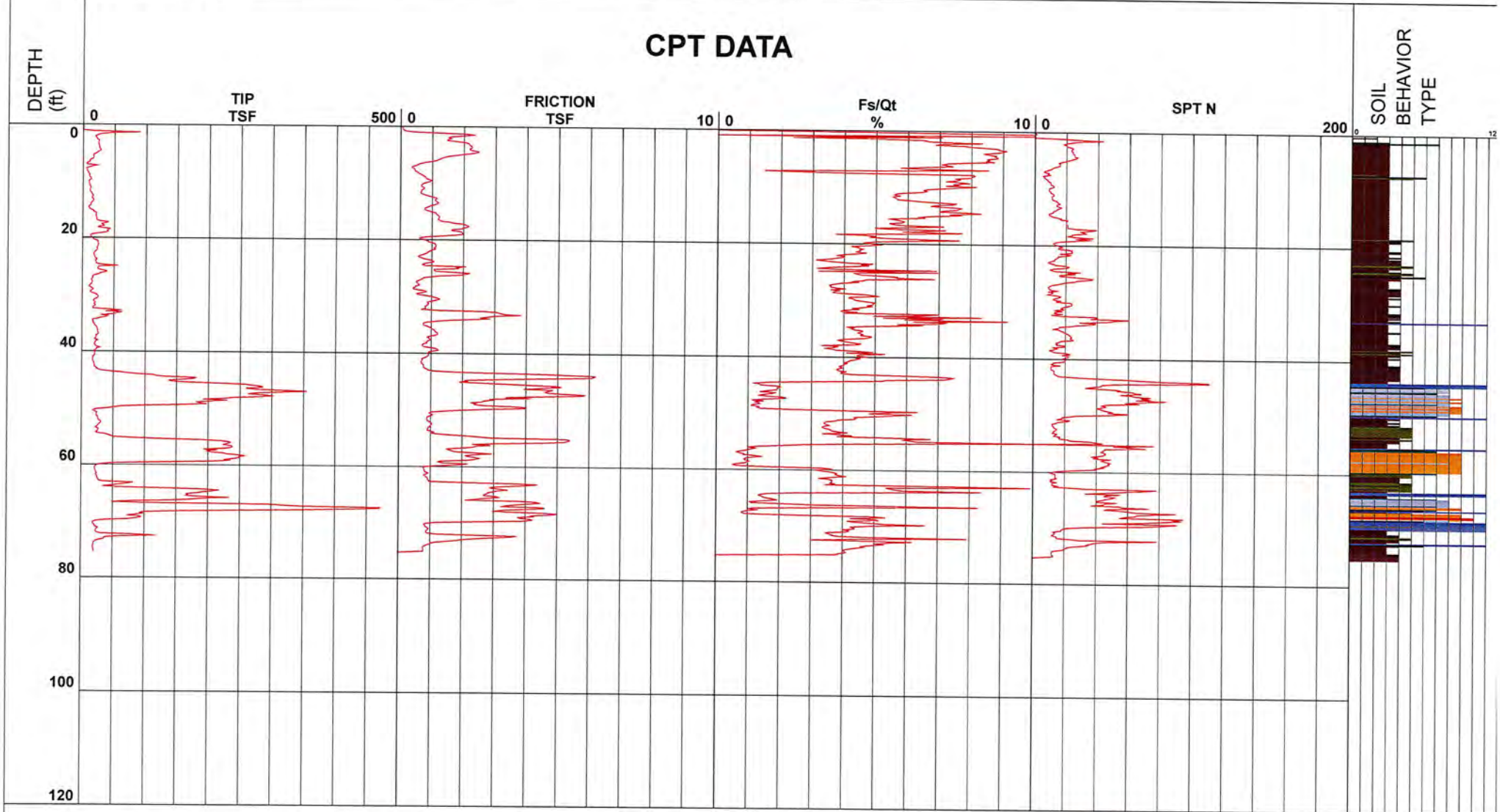
S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Sunrise Senior Living	Operator	KK-RB	Filename	SDF(344).cpt
Job Number	935-1-2	Cone Number	DDG1379	GPS	
Hole Number	CPT-03	Date and Time	11/8/2016 2:36:20 PM	Maximum Depth	75.46 ft
EST GW Depth During Test	23.70 ft				

Net Area Ratio .8

CPT DATA



- 1 - sensitive fine grained
- 2 - organic material
- 3 - clay
- 4 - silty clay to clay
- 5 - clayey silt to silty clay
- 6 - sandy silt to clayey silt
- 7 - silty sand to sandy silt
- 8 - sand to silty sand
- 9 - sand
- 10 - gravelly sand to sand
- 11 - very stiff fine grained (*)
- 12 - sand to clayey sand (*)

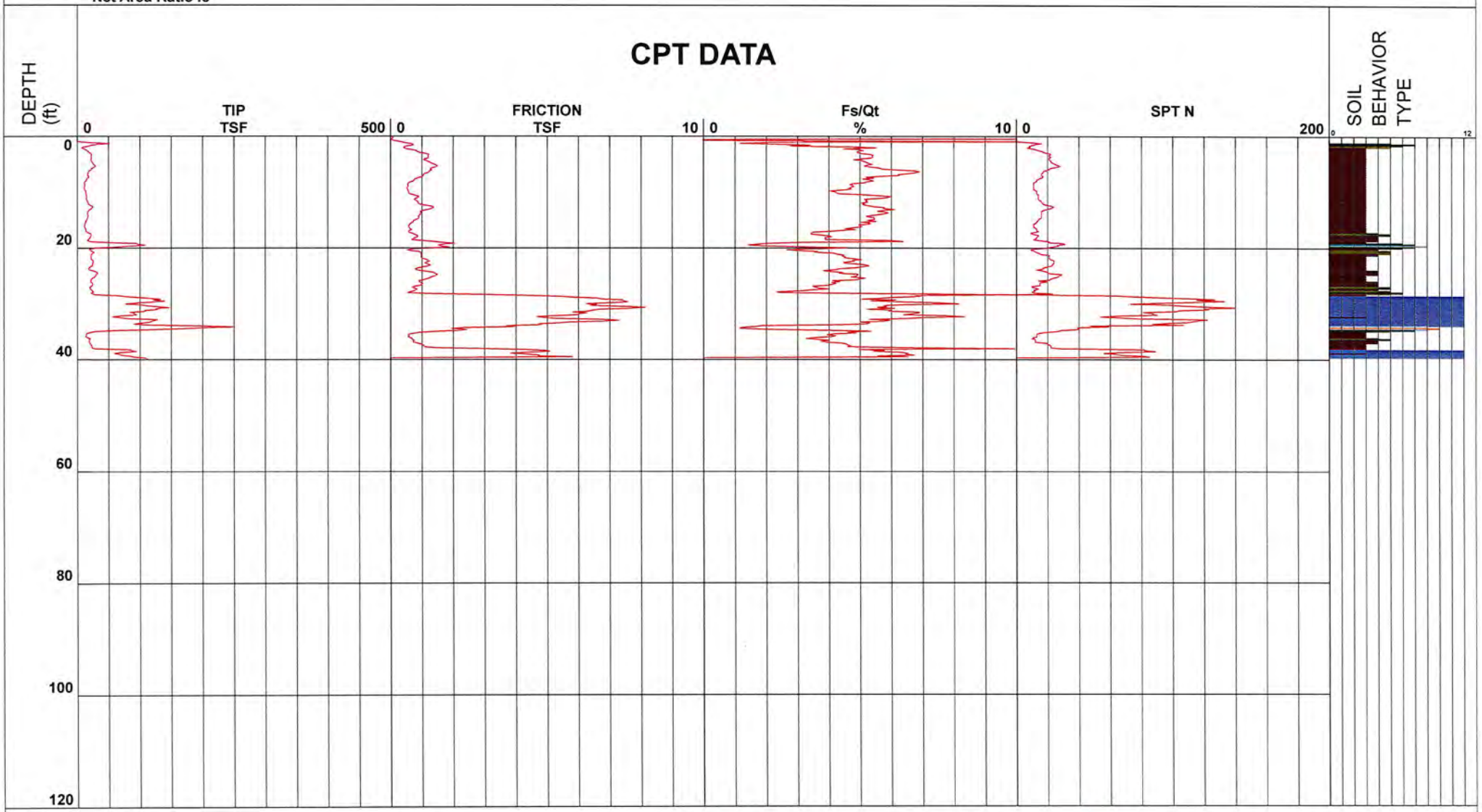
Cone Size 10cm squared

S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Sunrise Senior Living	Operator	KK-RB	Filename	SDF(339).cpt
Job Number	935-1-2	Cone Number	DDG1379	GPS	
Hole Number	CPT-04	Date and Time	11/8/2016 8:06:26 AM	Maximum Depth	39.86 ft
EST GW Depth During Test		22.00 ft			

Net Area Ratio .8



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

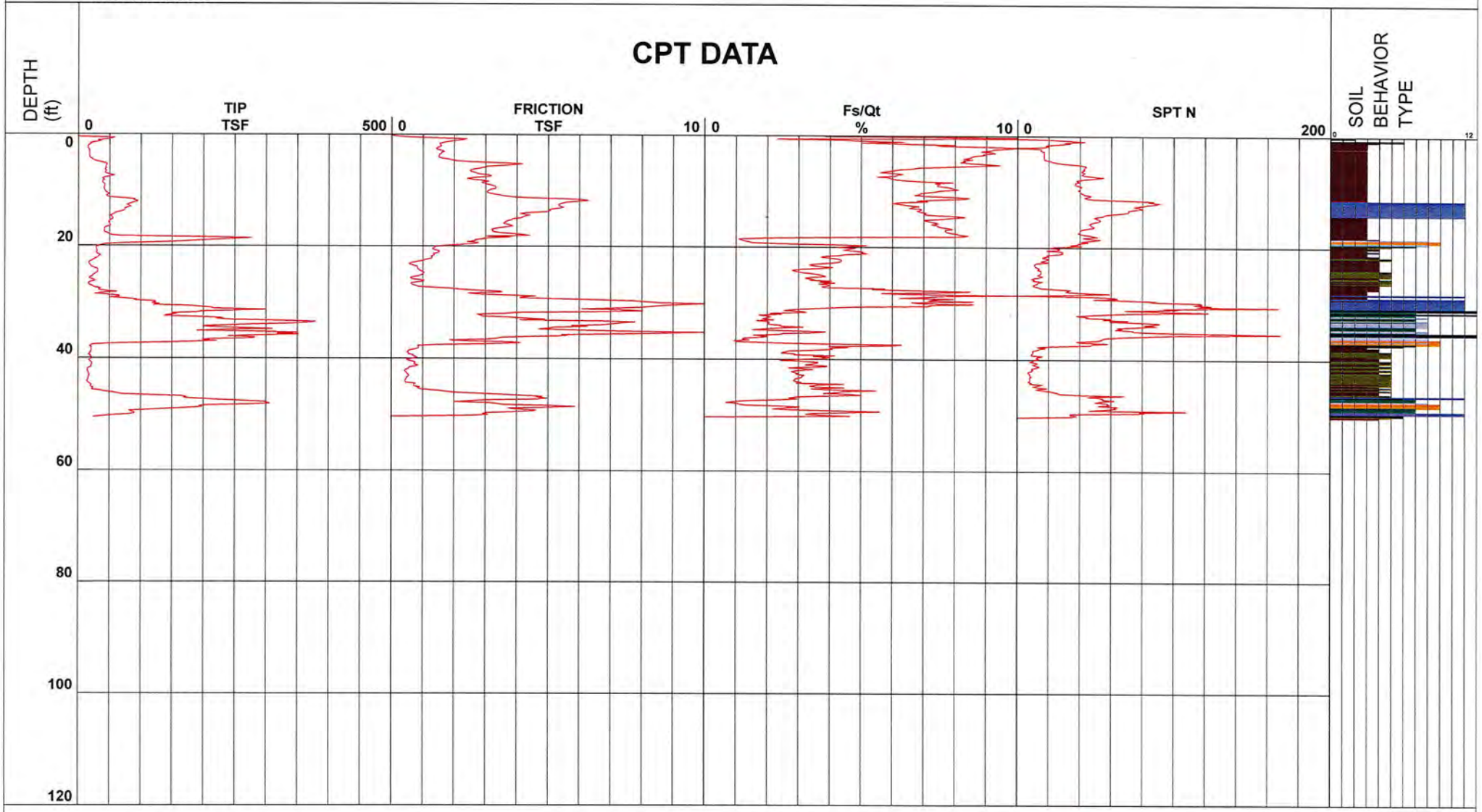
S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Sunrise Senior Living	Operator	KK-RB	Filename	SDF(342).cpt
Job Number	935-1-2	Cone Number	DDG1379	GPS	
Hole Number	CPT-05	Date and Time	11/8/2016 10:50:27 AM	Maximum Depth	50.52 ft
EST GW Depth During Test	22.00 ft				

Net Area Ratio .8

CPT DATA



- 1 - sensitive fine grained
- 2 - organic material
- 3 - clay
- 4 - silty clay to clay
- 5 - clayey silt to silty clay
- 6 - sandy silt to clayey silt
- 7 - silty sand to sandy silt
- 8 - sand to silty sand
- 9 - sand
- 10 - gravelly sand to sand
- 11 - very stiff fine grained (*)
- 12 - sand to clayey sand (*)

Cone Size 10cm squared

S*Soil behavior type and SPT based on data from UBC-1983

APPENDIX B: LABORATORY TEST PROGRAM

The laboratory testing program was performed to evaluate the physical and mechanical properties of the soils retrieved from the site to aid in verifying soil classification.

Moisture Content: The natural water content was determined (ASTM D2216) on 30 samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

Dry Densities: In place dry density determinations (ASTM D2937) were performed on 27 samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Washed Sieve Analyses: The percent soil fraction passing the No. 200 sieve (ASTM D1140) was determined on two samples of the subsurface soils to aid in the classification of these soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

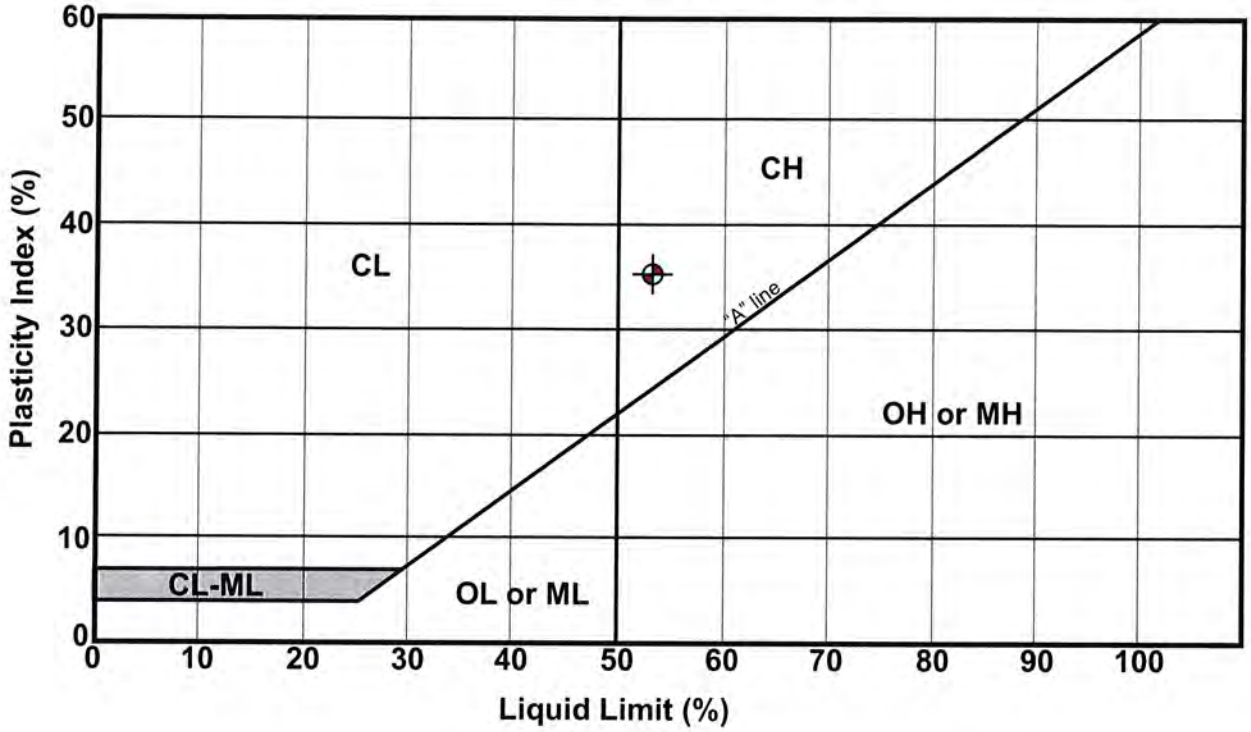
Plasticity Index: One Plasticity Index determination (ASTM D4318) was performed on a sample of the subsurface soil to measure the range of water contents over which this material exhibits plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of this test are shown on the boring log at the appropriate sample depth.

Undrained-Unconsolidated Triaxial Shear Strength: The undrained shear strength was determined on three relatively undisturbed sample(s) by unconsolidated-undrained triaxial shear strength testing (ASTM D2850). The results of these tests are included as part of this appendix.

Consolidation: Two consolidation tests (ASTM D2435) were performed on relatively undisturbed samples of the subsurface clayey soils to assist in evaluating the compressibility property of the soil. Results of the consolidation tests are presented graphically in this appendix.

Corrosion: Three samples were each tested for pH (ASTM G51), resistivity (ASTM G57), chloride (ASTM D4327), and sulfate (ASTM D4327). Results of these tests are attached in this appendix.

Plasticity Index (ASTM D4318) Testing Summary



Symbol	Boring No.	Depth (ft)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Passing No. 200 (%)	Group Name (USCS - ASTM D2487)
⊕	EB-1	2.0	15	53	18	35	—	Fat Clay (CH)

CORNERSTONE EARTH GROUP

Plasticity Index Testing Summary

Sunrise Senior Living of Redwood City
Redwood City, CA

Project Number: 935-1-2

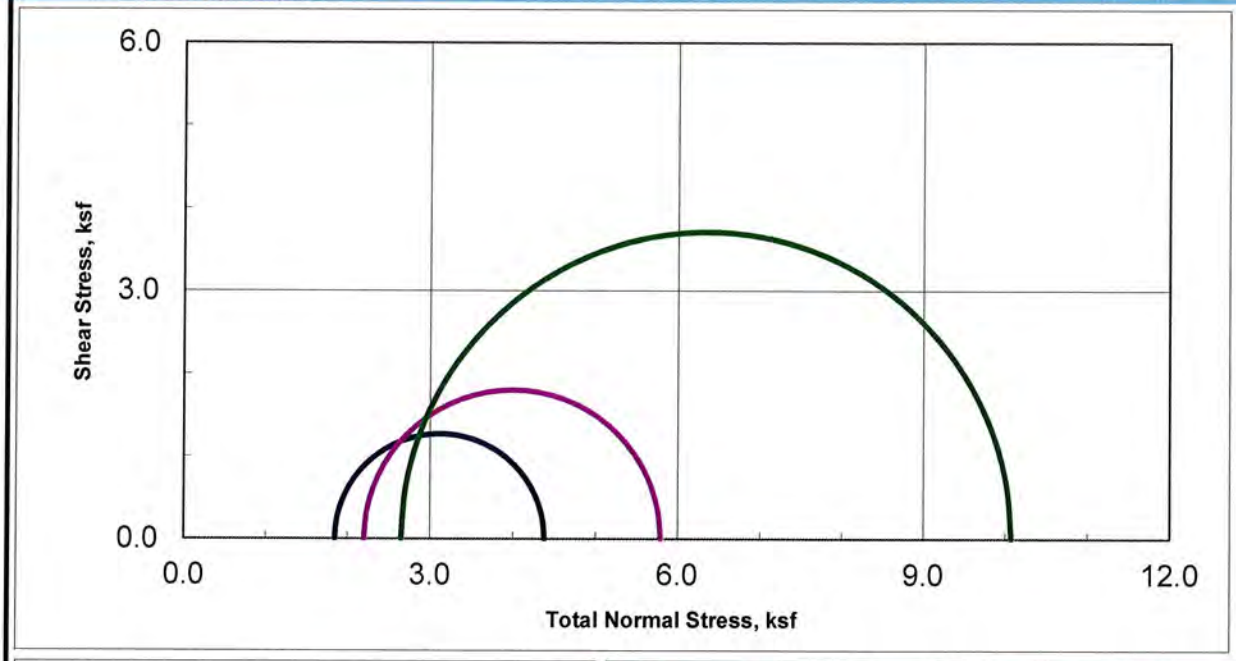
Figure Number: Figure B1

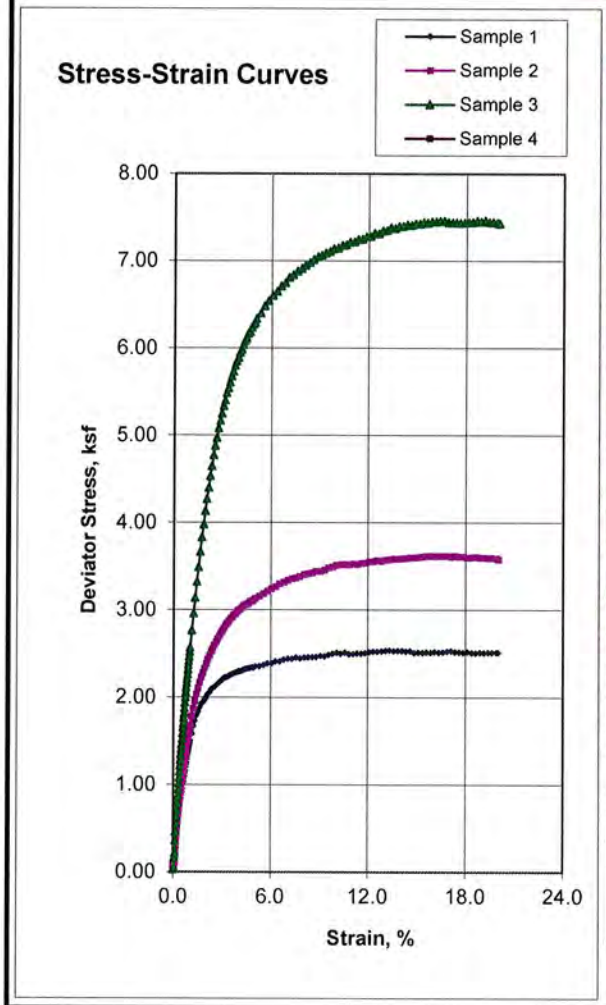
Date: November 2016

Drawn By: FLL

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data	1	2	3	4
Moisture %	29.1	16.8	18.1	
Dry Den,pcf	93.4	114.8	113.2	
Void Ratio	0.806	0.468	0.489	
Saturation %	97.5	96.9	99.7	
Height in	6.06	6.08	6.02	
Diameter in	2.88	2.88	2.87	
Cell psi	12.8	15.3	18.4	
Strain %	13.34	15.00	15.00	
Deviator, ksf	2.539	3.599	7.427	
Rate %/min	1.00	1.00	1.00	
in/min	0.061	0.061	0.060	
Job No.:	640-1054			
Client:	Cornerstone Earth Group			
Project:	Sunrise Senior Living - 935-1-2			
Boring:	EB-1	EB-2	EB-3	
Sample:	6	7	9	
Depth ft:	23.5(Tip-5")	26(Tip-6")	35.5(Tip-1")	

Visual Soil Description	
Sample #	
1	Olive Brown Sandy CLAY
2	Olive Brown Clayey SAND w/ Gravel
3	Olive Gray Sandy CLAY
4	

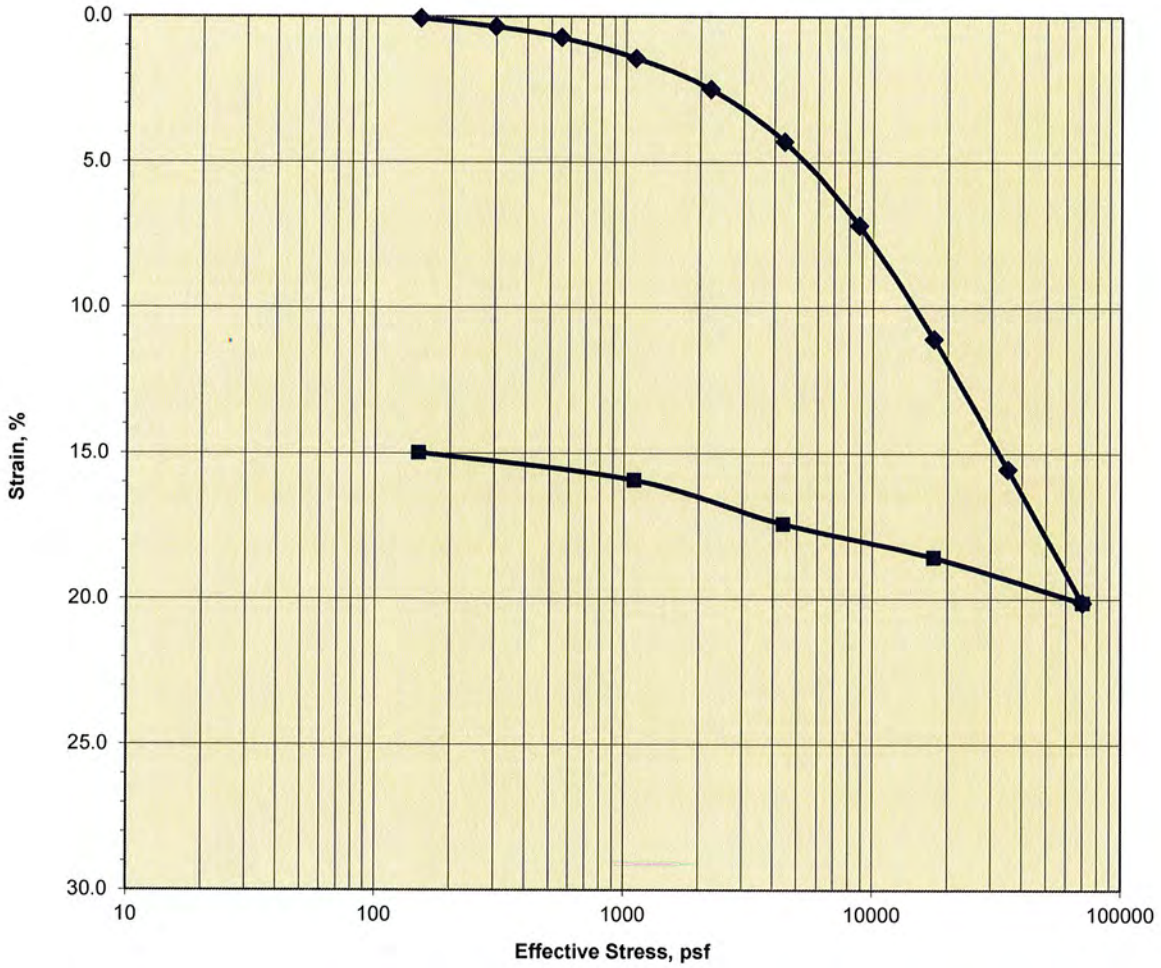
Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Consolidation Test
ASTM D2435

Job No.:	640-1054	**Boring:**	EB-1	**Run By:**	MD
Client:	Cornerstone Earth Group	**Sample:**	6	**Reduced:**	PJ
Project:	935-1-2	**Depth, ft.:**	23.5(Tip-3")	**Checked:**	PJ/DC
Soil Type:	Olive Brown Sandy CLAY			**Date:**	11/29/2016

Strain-Log-P Curve



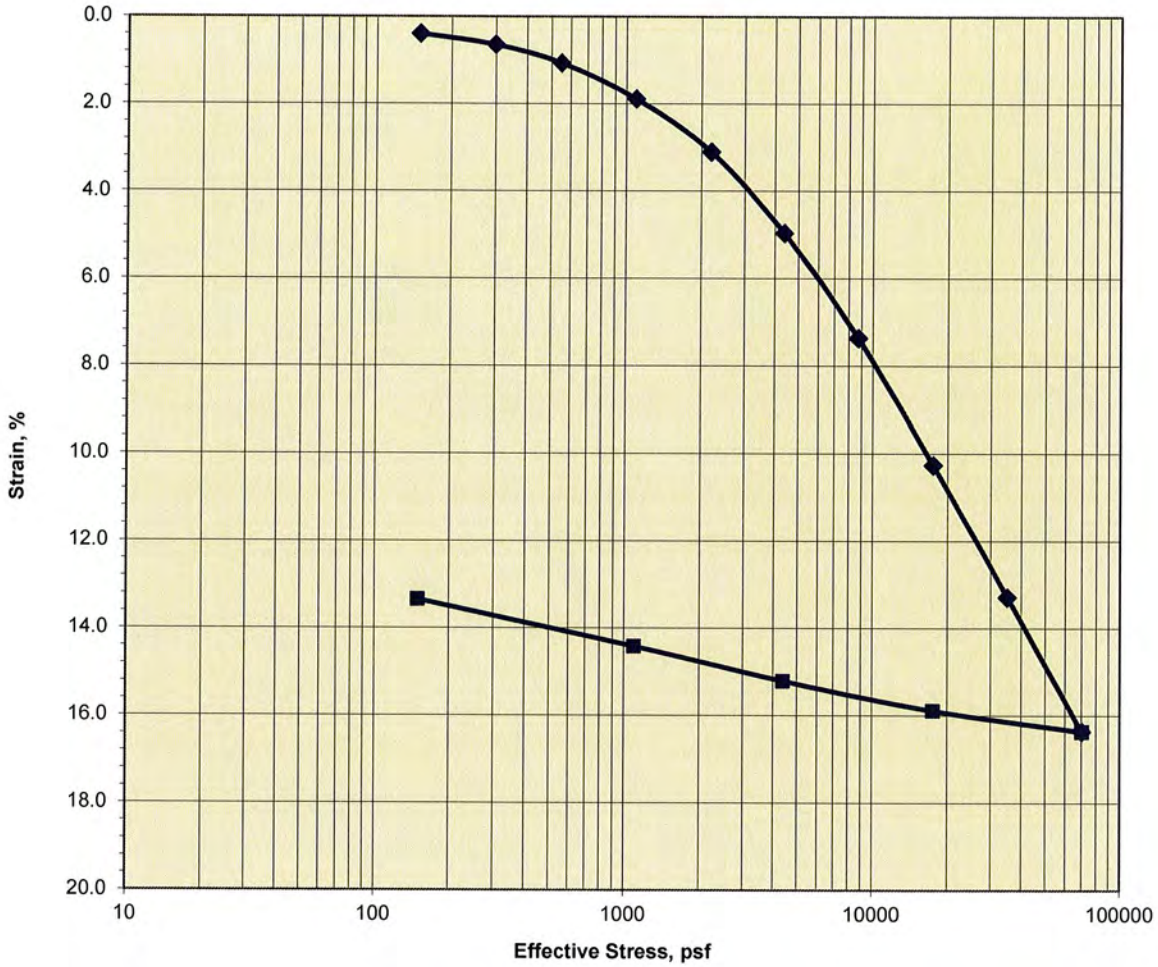
Assumed Gs 2.7	Initial	Final
Moisture %:	23.6	17.8
Dry Density, pcf:	97.5	113.9
Void Ratio:	0.729	0.479
% Saturation:	87.5	100.0

Remarks:

Consolidation Test
ASTM D2435

Job No.:	640-1054	**Boring:**	EB-2	**Run By:**	MD
Client:	Cornerstone Earth Group	**Sample:**	7	**Reduced:**	PJ
Project:	935-1-2	**Depth, ft.:**	26.0(Tip-4")	**Checked:**	PJ/DC
Soil Type:	Olive Brown Clayey SAND w/ Gravel			**Date:**	11/30/2016

Strain-Log-P Curve



Assumed Gs 2.75	Initial	Final
Moisture %:	17.2	13.7
Dry Density, pcf:	107.7	124.7
Void Ratio:	0.594	0.377
% Saturation:	79.7	100.0

Remarks:

Corrosivity Tests Summary

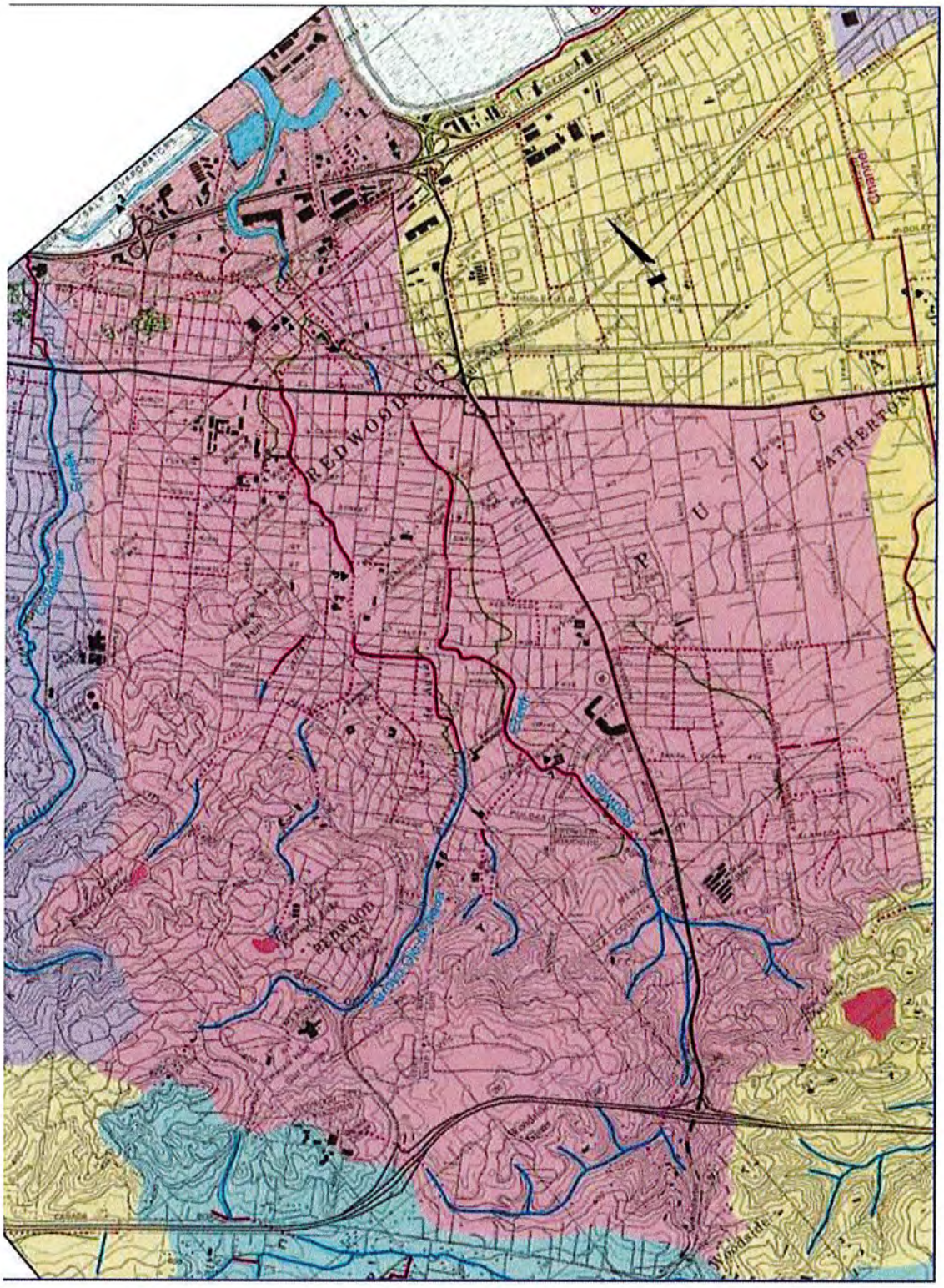
CTL # 640-1054 Date: 11/16/2016 Tested By: PJ Checked: PJ
Client: Cornerstone Earth Group Project: Sunrise Senior Living Proj. No: 935-1-2
Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate		pH	ORP (Redox)		Sulfide	Moisture	Soil Visual Description
			As Rec.	Min	Sat.	mg/kg	mg/kg	%				Qualitative	At Test	
						Dry Wt.	Dry Wt.	Dry Wt.		E_H (mv)	At Test	by Lead	%	
Boring	Sample, No.	Depth, ft.	ASTM G57	Cal 643	ASTM G57	ASTM D4327	ASTM D4327	ASTM D4327	ASTM G51	ASTM G200	Temp °C	Acetate Paper	ASTM D2216	
EB-1	1A	1.5	-	-	1,344	5	24	0.0024	6.0	-	-	-	16.0	Dark Olive Brown CLAY w/ Sand
EB-3	2A	5.5	-	-	1,836	8	50	0.0050	6.4	-	-	-	18.5	Olive Brown Sandy CLAY
EB-3	4A	14.5	-	-	2,815	5	51	0.0051	6.9	-	-	-	24.4	Yellowish Brown Sandy CLAY (Silty)

KIER & WRIGHT
Civil Engineers & Surveyors, Inc.

Appendix I

2850 Collier Canyon Road · Livermore, California 94551 · (925) 245-8788 · FAX (925) 245-8796


REDWOOD CITY
ATHERTON
Woodside

County of San Mateo - Planning and Building Department

ATTACHMENT O

SELBY PARK NEIGHBORHOOD

North Fair Oaks, California

TO: North Fair Oaks Community Council
cc: Jerry Liang, Sunrise Senior Living,
Warren Slocum- San Mateo County Board of Supervisors,
Joe LaClair- SMC Planning Manager,
Michael Callagy- Assistant County Manager
FROM: Selby Park Neighborhood Safety & Health Committee
DATE: 3/19/18
SUBJECT: Sunrise Senior Living development

This letter is in preparation for the March 22 North Fair Oaks Community Council meeting at which Jerry Liang of Sunrise Senior Living will present their proposed development at 2915 El Camino Real. Included at bottom is a summary of letters we have previously written about this project.

The Selby Park Neighborhood supports the Sunrise Senior Living project contingent on the requests outlined in this letter.

In addition to public meetings, we have held several face-to-face with Jerry Laing of Sunrise Senior Living since February 2017. All our interactions have been respectful and productive. Jerry adopted changes to the project based on community feedback. He also is committed to providing “public good” requested by the neighborhood.

The neighborhood began expressing concerns to the County in February 2017. These concerns included: public safety, the County giving away a public right of way to a commercial developer, vacation of a portion of an alley setting precedent to other alley sections and setting a CUP that impedes into a neighborhood by taking over residential properties.

The Selby Park Neighborhood Safety & Health Committee would like these contingencies added to the building permit before the permit is approved. These contingencies are supported by Jerry Liang based on our many face-to-face meetings. These contingencies have been articulated to you, the Board of Supervisors and the Planning Department in letters. A summary of these letters are included at the end of this document.

Public Good Contingencies from Sunrise Senior Living

• Funding to upgrade the existing "Neighborhood Street" Entry Sign Bulb Out at East Selby Lane.
• Funding of ”Neighborhood Street" Entry Sign Bulb Out installations at three addition neighborhood entry points– Glendale Avenue, Waverly Avenue, Columbia Avenue.
• Maintenance of neighborhood entryway landscaping including the triangle at the intersection of East Selby Lane, Markham Avenue and Dexter Avenue.

• Funding for traffic calming devises at strategic locations (should the neighborhood residents support this action).
• Funding for a residential parking permit program in the neighborhood (should the neighborhood residents support this action).
• Maintaining the existing No Left Turn from this properties parking garage on to East Selby Lane.

Contingencies fom San Mateo County
• Assurance that this permit will not set a precedence to how the neighborhoods other three R3 properties (two of which boarder the alley) might be rezoned to become part of an ECR business corridor development.
• Assurance that this permit will not set a precedence for the two remaining alley ways that span from East Selby Lane to 5th Avenue. The County must guarantee protection of these alley ways from any future development that does not include free passage as thoroughfares for a minimum of foot, bicycle and auto traffic for all residents of our North Fair Oaks neighborhoods.

In Conclusion, we hope you will support our requests as outlined in this letter and the history of letters we have written to you and the County. We understand that other people in the community may also request additional/other contingencies.

Sincerely,
Selby Park Neighborhood Safety & Health Committee
David Beres, Dexter Avenue
Fernando Chavez, Waverly Avenue
Mike Dobson, Waverly Avenue
Valerie Frese, Dexter Avenue
Joel Olson, East Selby Lane
Jeremy Reid, Markham Avenue
Nanette Wylde, Dexter Avenue
Nancy Zaro, Columbia Avenue

Summary of Letters regarding the Sunrise Senior Living development

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Date: 10/15/14
Subject: Proposed Solutions to Problems & Concerns
To: North Fair Oaks Community Council, SMC Public Works
From: Selby Park Neighborhood

Summary:
The neighborhood has been requesting safety measures from the County for over two

decades based on the compromised safety of an R1 neighborhood adjacent to the business corridor of ECR and 5th avenue.
In this proposal, the neighborhood presented solutions for protecting the neighborhood. The proposal includes maps, pictures and diagrams

NOTE: This letter predates the Sunrise Senior Living development proposal but this letter has been referenced extensively in letters and community meetings regarding the Sunrise development.

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Date: 4/19/17
Subject: NFO alley from 5th Avenue to Planned Parenthood (almost Berkshire Avenue)
From: Resident Kent Manske
To: North Fair Oaks Community Council Chairs Ever Rodriquez & Beatriz Cerrillo
Cc: Joe LaClair- SMC Planning

Summary:
Request for NFOCC to address the following:
1. What "public good" comes out of giving County land to commercial interests?
2. In exchange for developing public land, what is an equitable “public good” that might be required of a developer? Examples might include: a public park, a pedestrian bridge to the Fair Oaks Health Center, safety improvements the Selby Park Neighborhood has been asking for for over twenty years.

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Date: 4/27/17
Subject: Statement Prior to pre- Application Workshop
From: Selby Park Neighborhood Safety & Health Committee
To: NFOCC, Board of Supervisors, Joe LaClair- County Planning Manager, Michael Callagy, Deputy County Manager

Summary:
Neighborhood would support the Sunrise Senior Living project contingent on:
1. gaining assertions that such a development of said alley way NOT set precedent to the two remaining alley ways that span from East Selby Lane to 5th Avenue. The County must guarantee protection of these alley ways from any future development that does not include free passage as thoroughfares for a minimum of foot, bicycle and auto traffic for all residents of our North Fair Oaks neighborhoods.

2. The following "public good" is rendered for the Selby Park Neighborhood.
A. Funding to upgrading the existing "Neighborhood Street" Entry Sign Bulb Out at East Selby Lane and new "Neighborhood Street" Entry Sign Bulb Out installations at three addition neighborhood entry points– Glendale Avenue, Waverly Avenue, Columbia Avenue.

B. Funding for speed bumps at strategic locations on Waverly, Dexter, Columbia, Glendale and Markham.

C. Funding for a residential parking permit program in the neighborhood.
In Addition,
D. As the Sunrise Senior Living project seeks to expand their development beyond the ECR business corridor and occupy a R2 property, we need assurance from the County that this activity will not set a precedence to how the neighborhoods three R3 properties (two of which boarder the alley) might be rezoned to become part of an ECR business corridor development.

Questions:
What "public good" comes out of giving County land to commercial interests?
- In exchange for developing public land, what is an equitable “public good” that might be required of a developer? Examples might include: a public park, a pedestrian bridge to the Fair Oaks Health Center, safety improvements the Selby Park Neighborhood has been asking for for over twenty years, . . .

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Date: 7/3/17
Subject: Sunrise Living Pre-Application Workshop-Summary Letter PRE2017-00006
To: Jerry Liang
From: County Planning and Building

Summary:
Letter is a summary of the County Departmental comments and questions received at a public workshop held on May 4, 2017 Pre-Application Workshop.

The applicant expressed:
1. a willingness to participate as a community partner toward the maintenance of neighborhood landscaping including the triangle at the intersection of East Selby Lane, Markham Avenue, and Dexter Avenue.
2. that the project will incorporate existing trees that screen the neighborhood from the project on Markham Avenue

In addition:
Mr. Liang responded to each question and comment, generally to the satisfaction of those attending, committing to explore the possibility of including affordable units, looking into some public realm improvements, such as new bulbous at neighborhood street entries, considering some public use of proposed project green space, and continuing to work with the neighborhood through the entitlement process to address concerns.

The County stated that:

the decision to vacate this section of the alley would not establish a precedent for the other segments of the alley/easement.