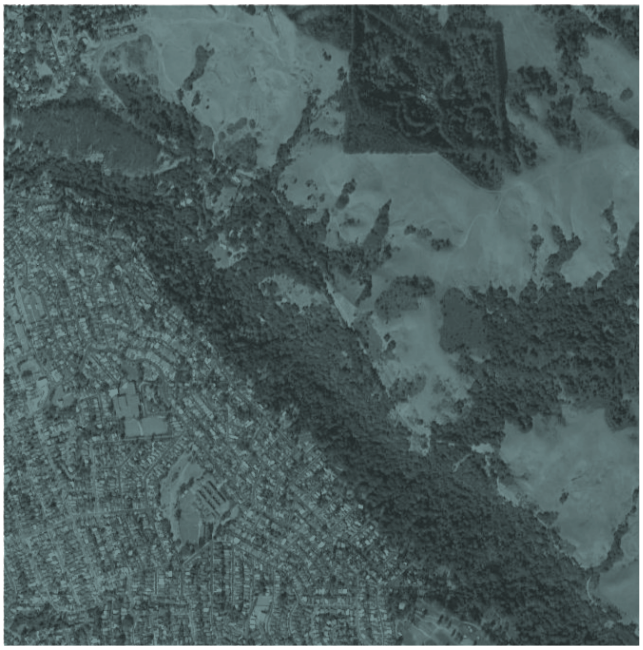

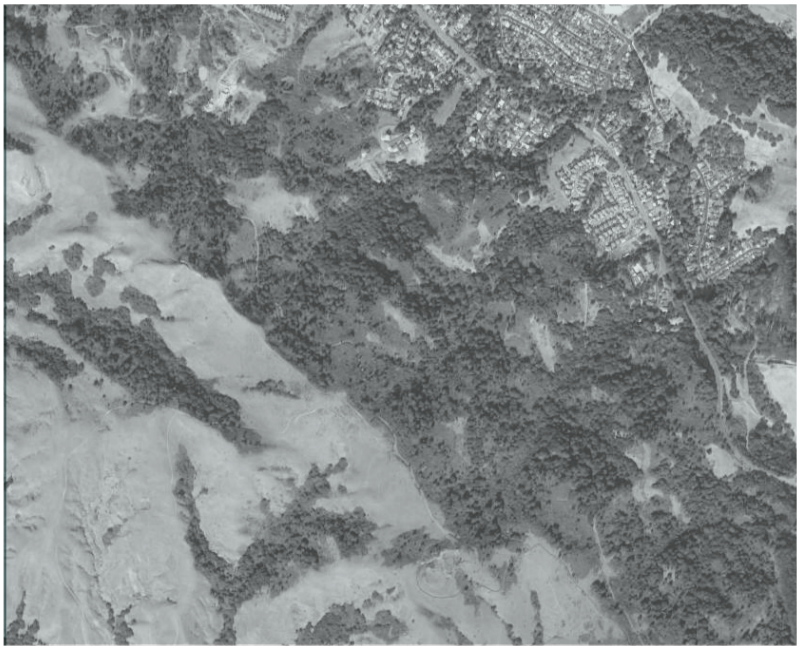

Prepared for:

KENSINGTON
FIRE PROTECTION DISTRICT

PUBLIC SAFETY BUILDING FACILITY ASSESSMENT AND MASTER PLAN

June 2017

Prepared by:

RossDrulisCusenbery

ARCHITECTURE

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TABLE OF CONTENTS

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SECTION 01
PROJECT SUMMARY

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Sonoma Highway
Sonoma
CA 95476

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FAX 707 996 8542

ARCHITECTURE

RossDrulisCusenbery

Date: January 10, 2017

Project: Kensington Fire Station Feasibility and Master Plan Final Report

Owner: Kensington Fire Protection District
217 Arlington Avenue
Kensington, California 94707

Introduction:

RossDrulisCusenbery Architecture Inc. (RDC) is pleased to submit the Kensington Fire Station Feasibility Study and Master Plan Final Report. This document represents the culmination of the collaborative work between the Kensington Fire Protection District Steering Committee, Kensington Fire Department, Kensington Police Department, Mack5 Project Management, Mack5 Cost Consultants and RDC. During the execution of the work, the team has completed the following task categories.

- Data Gathering
- Site Analysis
- Existing Facilities Condition Assessment
- Architectural Programming and Needs Analysis
- Conceptual Design Study Options
- Conceptual Design Cost Analysis
- Development of Draft Findings and Recommendations
- Preparation for Future Public Outreach Meetings
- Development and Compilation of this Final Report Document

While the ultimate course of action for the Kensington Fire Protection District has yet to be determined, the work summarized herein provides critical information for decision making, additional action items, community outreach and future District policies.

RossDrulisCusenbery Architecture, Inc.

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SECTION 02
EXISTING CONDITIONS

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RossDrulisCusenbery
ARCHITECTURE

1" = 40'-0"

EXISTING SITE AERIAL

KENSINGTON FIRE STATION

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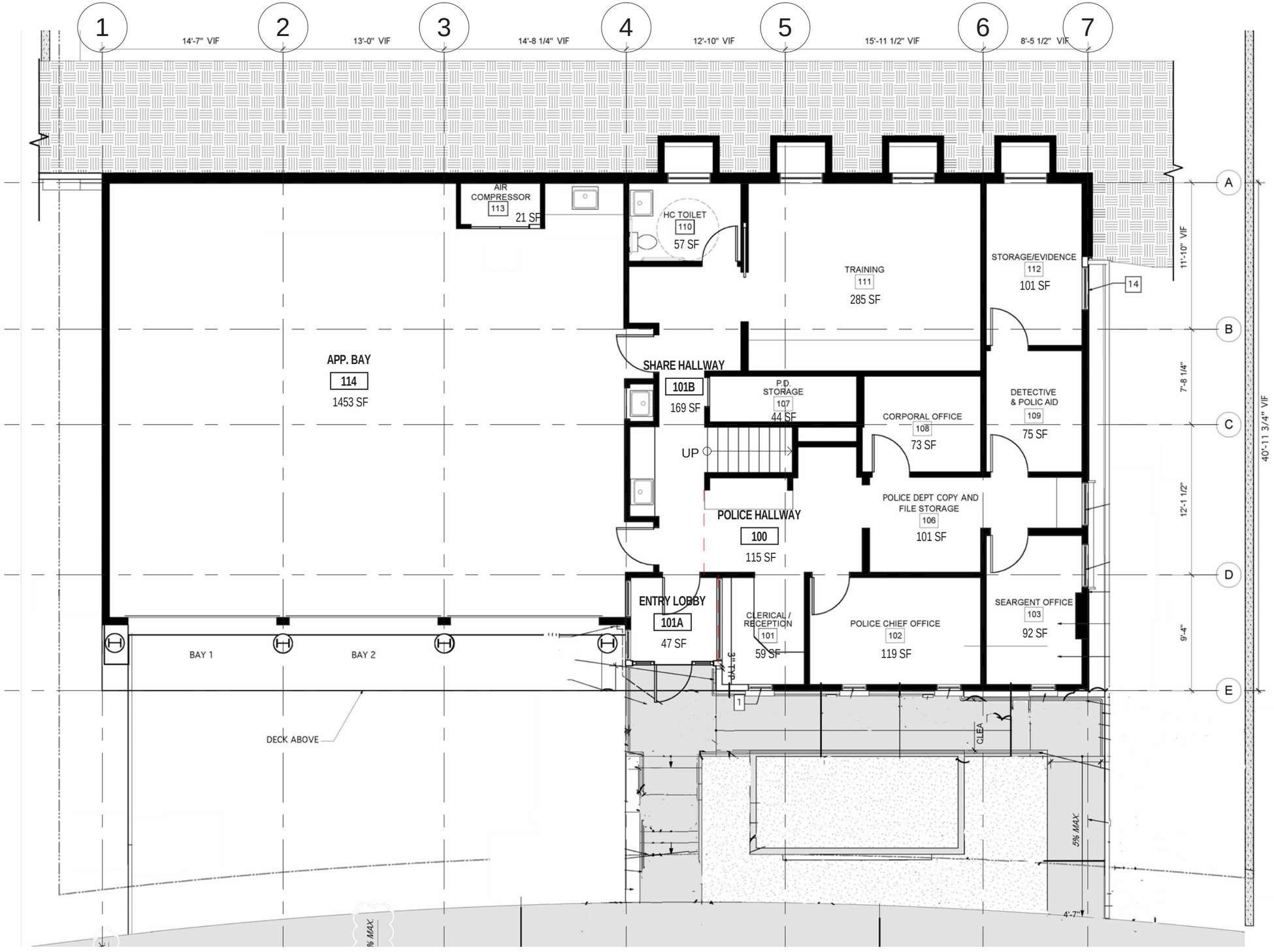
ARCHITECTURE

1" = 40'-0"

ALTERNATE SITE AERIAL

KENSINGTON FIRE STATION



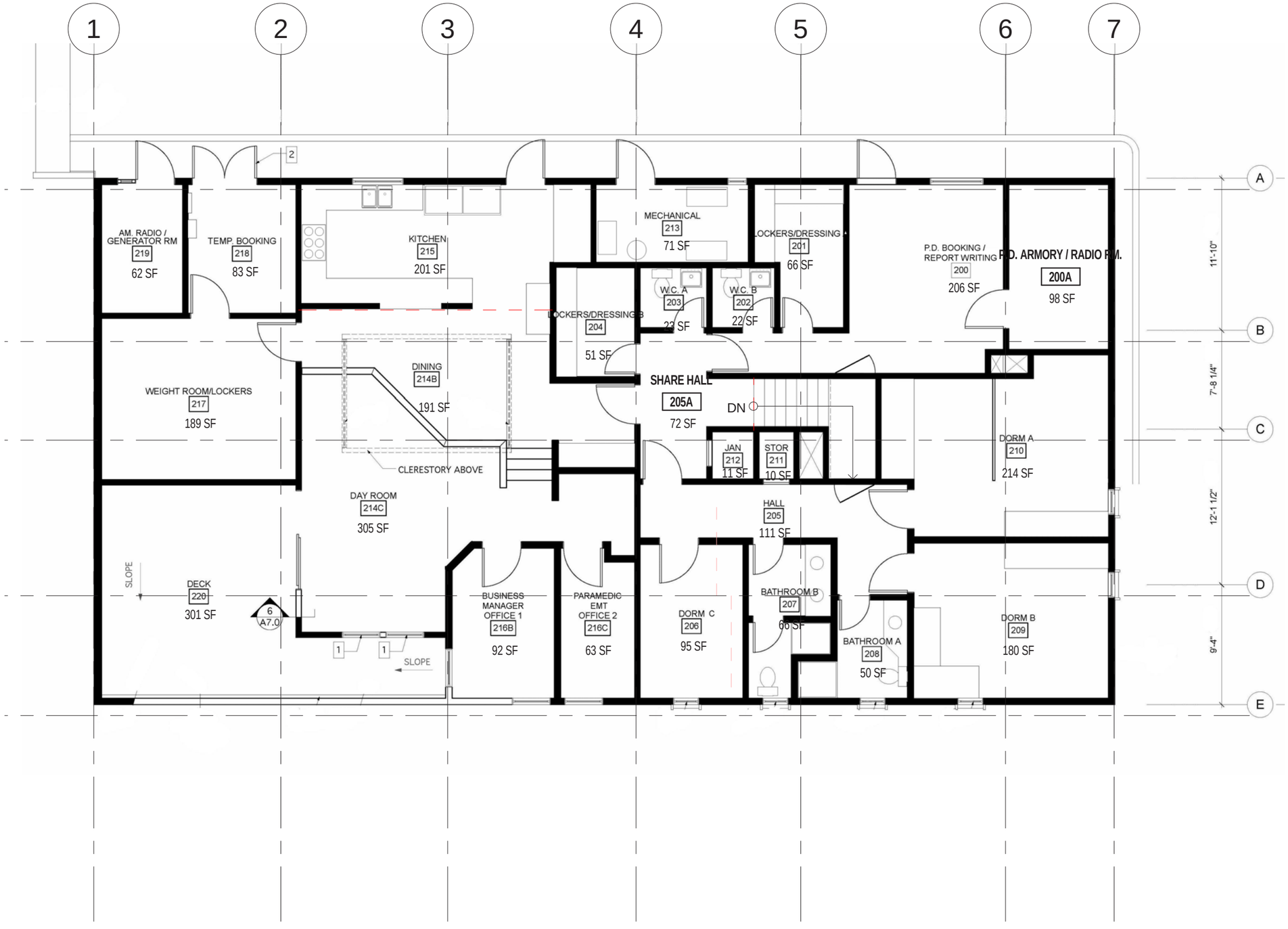
LEVEL 1

RossDrulisCusenbery ARCHITECTURE

1/8” = 1’-0”

EXISTING BUILDING

KENSINGTON FIRE STATION



LEVEL 2

RossDrulisCusenbery ARCHITECTURE

1/8" = 1'-0"

EXISTING BUILDING

KENSINGTON FIRE STATION

Room Schedule			
Name	Number	Area	Comments
POLICE HALLWAY	100	115 SF	P
CLERICAL / RECEPTION	101	59 SF	S
ENTRY LOBBY	101A	47 SF	S
SHARE HALLWAY	101B	169 SF	S
POLICE CHIEF OFFICE	102	119 SF	P
SEARGENT OFFICE	103	92 SF	P
POLICE DEPT. COPY / FILE STORAGE	106	101 SF	P
P.D. STORAGE	107	44 SF	P
CORPORAL OFFICE	108	73 SF	P
DETECTIVE & POLICE AID	109	75 SF	P
HC TOILET	110	57 SF	S
TRAINING	111	285 SF	S
STORAGE/EVIDENCE	112	101 SF	P
AIR COMPRESSOR	113	21 SF	F
APP. BAY	114	1453 SF	F
		2811 SF	

Room Schedule			
Name	Number	Area	Comments
P.D. BOOKING / REPORT WRITING	200	206 SF	P
P.D. ARMORY / RADIO RM.	200A	98 SF	P
LOCKERS/DRESSING A	201	66 SF	P
W.C. B	202	22 SF	P
W.C. A	203	23 SF	S
LOCKERS/DERSSING B	204	51 SF	F
HALL	205	111 SF	F
SHARE HALL	205A	72 SF	S
DORM C	206	95 SF	F
BATHROOM B	207	66 SF	F
BATHROOM A	208	50 SF	F
DORM B	209	180 SF	F
DORM A	210	214 SF	F
STOR	211	10 SF	S
JAN	212	11 SF	S
MECHANICAL	213	71 SF	S
DINING	214B	191 SF	F
DAY ROOM	214C	305 SF	F
KITCHEN	215	201 SF	F
BUSINESS MANAGER OFFICE	216B	92 SF	F
PARAMEDIC EMT OFFICE	216C	63 SF	F
WEIGHT ROOM/LOCKERS	217	189 SF	F
TEMP. BOOKING	218	83 SF	P
AM. RADIO / GENERATOR RM	219	62 SF	S
DECK	220	301 SF	F
		2832 SF	

BUILDING AREAS

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SECTION 03
SITE ASSESSMENT REPORTS

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Built 1971 Address: 217 Arlington Avenue, Kensington, CA 94707

Age 45 yrs Surveyor: Mark Zall AIA

Date(s) 0f Survey: 07/13/2016

A00 GENERAL DESCRIPTION

The Kensington Public Safety Building is located at 217 Arlington Avenue, Kensington, California.
The existing 6,060 GSF, two story, Kensington Public Safety Building houses the Fire Department and the Police Department. It is a wood & steel framed structure constructed in 1971. The building has ungone multiple renovations in 1998, 2004 and 2010. Trash and storage structures have been added behind the building at the north end of the parking lot. In general, the building and site, while showing signs of age, are well maintained, with building systems in good working order.

B20 EXTERIOR ENCLOSURES

B2011 Exterior Wall Construction

a Description:

The exterior shell of the building is clad with painted wood shingles. The building was clad in new shingles and painted in January 2010.

b Recommendation:

The exterior shingles appear to be in good condition with no obvious signs of decay or neglect. The paint is appear to be in good condition with no evident challking. If the shingles remain in place as part of the next renovation repainting is recommended.

B2015 Exterior Soffits - Description:

a Description:

The exterior roof overhangs have a wood soffit with a copper fascia. The soffit is painted wood boards. The sofits do not have vents. The sofits and fascias appear to be in good condition. The copper on the fascias has a brown patina.

b Recommendations:

If the soffits and fascias are to remain in place recommend selectively removing portions of the soffit to check the underlying structure. Recommend adding soffit vents if further investigation indicates that they are not currently vented.

c Field Evaluation

___ Wood Rafters and Decking ____ Dry rot ___ Painted (Not observable)
_X_ Wood Siding ____ Dry rot _X_ Painted
___ Plaster ____ Cracks ____ Painted
Soffit / attic Vents (None observed)

B2021 Exterior Windows

a Description:

Windows in the facility are aluminum-framed casement, awning and fixed windows with dual glazed low e glass. Some windows on the east and south walls are single pane and appear to be the original aluminum windows. Most windows were replaced in a prevous renovation and are dual glazed. All windows have aluminum frames with a dark bronze finish. No broken glass was observed.

b Recommendations:

Windows appear to be properly maintained and in good working order. Most of the windows do not need to be replaced. However, it is recommended that any remaining single glazed windows be replaced with new dual glazed units. Inspect all seals and repace as needed.

Built 1971	Address: 217 Arlington Avenue, Kensington, CA 94707
Age 45 yrs	Surveyor: Mark Zall AIA
	Date(s) 0f Survey: 07/13/2016

c Field Evaluation

Exterior Windows REFER TO PHOTO _X__
Frame _X_ Alum ___ HM ____ Wood ___ Storefront
Operations _X_ Fixed _X_ Casement _X_ Awning _X__ Sliding
___ Double Hung ____ Jalousie ___ Pivoting
Condition ____ Rust ____ Thrown ___ Broken Glass ___
Sealant Replacement Needed ____

B2019 Exterior Doors

a Description:

The building has wood and hollow metal door sets in hollow metal steel frames, with painted surfaces. The Station contains flush, single leaf, painted doors.

b Recommendations:

Doors are in good wortking order and do not need replacement. Examine all harware for any defects repair and replace as needed. Paint all doors.

B2019 Exterior Public Entry Doors

a Description:

The building has a glass and wood public entry door in wood frame with fixed wire glass side lights and transom. The door closer appears to be set with a higher degree of tension than is allowed by accessibility codes.The door and hardware appear to be in good working order. The door and frame are showing signs of age and wear.

b Recommendations:

Recommend patching and painting the door and frame. Recommend testing then adjusting or replacing the door closer so that is it does not exceed the code allowable pull tension.

B2034 Exterior Vehicle Doors

a Description: The fire station contains three insulated sectional metal overhead doors at the apparatus bays. The doors, with motorized operators, are aluminum clad doors with insulated cores, with glass panels in two of the sections, and run on metal overhead tracks. The vehicles have approx 18" of vertical clearance. Doors have gasket seals. Doors appear to be in good condition and are operating properly.

b Recommendations:

Clean and service the mechanical components of the doors. Check all of the door seals for proper closure and repair any defective seals.

Built 1971	Address: 217 Arlington Avenue, Kensington, CA 94707
Age 45 yrs	Surveyor: Mark Zall AIA
	Date(s) 0f Survey: 07/13/2016

c Field Evaluation

Front App Bay Doors
_X_ Quantity_3_ Size L___12'-2"___ x H __10'-0"___
___ Roll Up
___ Roll Up Panel Door ____ No of Panels _____ Glazed
_X_ Vertical Panel Doors __5__ No of Panels __2__ Glazed
_X_ Opener
_X_ Sealant Replacement Needed _TBD___
Refer to Photo(s):

B30 Roofing

B3012 Roof Finishes - Low Slope

a Description:

The roof is an asphalt built up roof with gravel ballast roofing.
Rooftop mechanical equipment: Yes. Rooftop equipment and devices are on floating wood sleepers on the roof but are not anchored to the roof.
Storm water: Three roof drains were observed. The roof drains are sheet metal depressions in the roof with galvanized wire debris screens. In addition, there are two through soffit overflow drains. There is some evidence of past standing water on the SE quadrant of the roof.
At the top of the perimeter parapet roof: There is a low gravel stop edge around the perimeter of the roof
Recent history of roof leaks: Building occupants were asked about roof leaksand none were reported.

b Recommendations:

Roof was installed in December 2000. This type of roof has an EUL of approx 20 years and is nearing the end of its lifespan. The roof drains appear to be at the end of their useful life. Recommend replacing the roofing as part of any renovation project. Recommend installation of prefabicated roof drains and overflow drains. Recommend anchoring all rooftop equipment and devices to the structure below the roof.

c Field Evaluation

Low Sloped Roof - REFER TO PHOTOS
Slope: Rise __1/8"?__ in 12
Material:_X_ Built Up Roofing with Gravel Ballast ___ Single Ply Roofing
Condition ___ Cracks ____ Fish Mouth
Flashing _X_ Galv metal
Roof Drainage Collectors: _X_ Roof Drains ___ Overflow Drains__X_ Over Flow Scuppers
__?__ Year installed
_NO__ Downspouts ____ Galv Metal
Condition _X_ Rust ____ Thrown ___ Broken Glass ___
Sealant Replacement Needed _X_

Built 1971	Address: 217 Arlington Avenue, Kensington, CA 94707
Age 45 yrs	Surveyor: Mark Zall AIA
	Date(s) 0f Survey: 07/13/2016

d Roof Condition

___ Approx Age of the Roof
___ Areas of Patches (None observed due to gravel ballasted roofing)
_X_ Areas of Ponding
_X_ Roof Imperfections

B3013 Roof Specialties

a Description:

Skylights - Yes, original to building.
Communication Antennas - Yes
Mechanical Unit Supports - Yes, not anchored.
Mechanical Ducts and Plumbing and Roof Penetrations -Yes
Conduit on Roof- Yes

b Recommendations:

It is recommended to replace the Roof Specialties with new.
Skylights - Skylights are original to the building (45 years old) and are at the end of their useful life, recommend replacement.
Communication Antennas - At the time of roof replacement provide new attachment mounts for all equipment, devices and antennae.
Solar Panels - It is recommended to add Solar Panels to the roof area.
Equipment and Ducts - Recommend anchoring to the building structure.

C10 INTERIOR CONSTRUCTION

C1011 Interior Partitions

a Description:

The building contains primarily wood-stud framed partitions with gypsum board sheathing.
No areas of water damage or dry rot were observed. These walls are well maintained. The gypsum board has a sand finish and is painted. The base is a 3" or 4" painted wood base. There is some vinyl base in the building in the locker rooms and in some other rooms with resilient flooring. There are some vinyl corner guards in the hallway of the police offices.

b Recommendations:

None. The Police Department areas were painted in 2015. The Fire Department areas have been recently painted and the paint maintained on an ongoing basis.

C1021 Interior Doors

a Description:

The Facility generally contains single-leaf flush wood doors in wood frames.
There are some interior doors with hollow metal frames.
No Broken Glass was observed in the vision panels.

Condition Interior of Doors

_No__ Broken Glass
_No_ Broken Hinges
_No_ Broken Hardware Sets
_No_ Damaged Frames
_No_ Damaged Doors

Built 1971	Address: 217 Arlington Avenue, Kensington, CA 94707
Age 45 yrs	Surveyor: Mark Zall AIA
	Date(s) 0f Survey: 07/13/2016

b Recommendations:
The doors and frames appear to be original have exceeded their 30 year EUL. It is recommended to regularly maintain the hardware and refinish the surfaces.

C1023 Interior Hardware

a Description:
Doors are equipped with Accessible Lever Handles etc.
Security is maintained by using keypad lock doors on the pedestrian doors leading to the exterior.

b Recommendations:
It is recommended that the door hardware be regularly maintained. It is recommended that the facility upgrade to a more contemporary robust security system and door locking devices.

c Field Evaluation
HDW: Door Closer __X__ Threshold __X__ Automatic Door Opener
Handles: _X_ADA Lever ___ Other
Lock: _X_ Keyway _X_ Numeric Pad ___ Card Swipe ____ Dead Bolt

C1031 Toilet Partitions

a Description:
None.

b Recommendations:
None.

Toilet Partitions - Number of Enclosures _____ Refinish _____ Replace ____
Condition:
___Material ___ Mtl ____ Wood ____ Plastic ____ Other:
___ Wood Benches

C1033 Storage Shelving & Lockers

a Description:
The Locker Rooms area consists of steel built-in and freestanding lockers

b Recommendations:
Locker Room 202 Lockers - Number of Lockers _5__ Refinish __X__ Replace ____
Condition:
___Lockers ___ Mtl ____ Wood
___ Wood Benches

Locker Room 204 Lockers - Number of Lockers _____ Refinish _____ Replace ____
Condition:
Yes__Lockers _X__ Mtl ____ Wood Lockers appear to be worn and in need of replacement
_No__ Wood Benches

Storage Shelving - LF_____ Number of Shelves ____
Refinish _____ Replace ____
Condition:
___ Mtl ____ Wood

Built 1971	Address: 217 Arlington Avenue, Kensington, CA 94707
Age 45 yrs	Surveyor: Mark Zall AIA
	Date(s) 0f Survey: 07/13/2016

C1011 Partitions - Free Standing

6'-0 high wood and gypsum board partition in Captain's Dormitory Room

a Description:

Painted and in good condition.

b Recommendations:

None

C1090 Interior Signage

a Description:

Janitor closet and unisex restroom signs in place. Accessible restroom signed but may not meet current code standards..

b Recommendations:

Confirm that signs comply with the current code mandated accessible signage. Add additional signage as needed to comply with the code.

C1095 Other Interior Specialties

a Description:

Window Coverings - Vertical horizontal and vertical metal blinds appear to be in good condition.

b Recommendations: Clean blinds and repair any defective hardware.

C20 STAIRWAYS

C2010 Stair Construction

a Description:

Wood framed wood stairs. No structural or cosmetic deficiencies observed.

b Recommendations:

None.

C2014 Stair Hand Railings

a Description: Wood railing on one side of the stair.
Comply with ADA: No

b Recommendations:

Handrails do not comply with the code requirement to have rails on both sides of the stair and do not meet accessibility codes. Remove and install new code compliant handrails.

C2020 Stair Finishes

a Description:

Stair Risers & Treads - Rubber treads and risers with a carpet runner over the entire stair and landing.
Contrasting stripes at top and bottom of runs not well defined.
Stair Landings - Rubber

b Recommendations:

Install new carpeting over the entire stair.

C30 INTERIOR FINISHES

C3010 Wall Finishes to Interior Walls (Gyp Bd / Plaster EUL 15 Paint EUL 7 ,Ceramic Tile EUL 25)

Built 1971	Address: 217 Arlington Avenue, Kensington, CA 94707
Age 45 yrs	Surveyor: Mark Zall AIA
	Date(s) 0f Survey: 07/13/2016

a Description: Interior walls are generally painted plaster or gypsum wall board with a sand finish.
Apparatus Bay - Gypsum wall board with fiber reinforced panels (FRP) to +8'-0" with painted gypsum wall board above this level.
Offices, Day Room, Kitchen, Locker Room, Sleep Rooms, Hallways - Painted gypsum board with wood base
Restrooms and Bathrooms - Ceramic Tile Wainscot and painted Gyp Bd Above
Showers - Prefabricated FRP shower liner and pan.

b Recommendations:
The painted surfaces show some areas of distress.
The Ceramic Tile surfaces are in fair condition with some areas of water damage. Recommend repair of damaged tile areas. Restrooms 203 & 202 appear to have the original floor tile and it is recommended the tile be replaced.
Ceramic Tile EUL 25 Years.
Painted Gyp Bd - It is believed that the walls were painted in ____ The painted surfaces have exceeded their 7 year EUL anfd are recommended to be repainted.

C3020 Flooring (EUL Conc. 50 ,Tile -25, Rubber - 25+ Res Floor 15, Carpet 10,)

a Description:
Apparatus Bay and Supporting Areas: - Sealed Concrete (Photo)
Offices - Carpet. (Photo)
Day Room - Carpet . (Photo)
Kitchen & Dining- Sheet Vinyl. (Photo)
Restrooms - Ceramic Tile (Photo)
Locker Rooms - Vinyl Composition Tile (VCT) (Photo)
Sleep Rooms - Carpet. (Photo)
Exercise Room - Athletic Rubber Flooring (Photo)
Hallways - Rubber Tile
Training Room - Carpet
Police Report Writing- Rubber Tile
Armory - Rubber tile

b Recommendations:
Apparatus Bay and Supporting Areas: Seal concrete surfaces.
Fire House Areas: Replace all carpet flooring
Police Areas: Replace all carpet flooring. Replace tile in restrooms on second floor

C3031 Ceiling Finishes (EUL AC Tile/Drywall/Plaster 15 Years) (Paint EUL 7)

Built 1971	Address: 217 Arlington Avenue, Kensington, CA 94707
Age 45 yrs	Surveyor: Mark Zall AIA
	Date(s) 0f Survey: 07/13/2016

a Description:
Apparatus Bay and Supporting Areas: - Painted gyp bd. with sand finish
Fire House Areas
Office - Painted gyp bd. with sand finish
Day Room -Painted gyp bd. with sand finish
Kitchen - Painted gyp bd. with sand finish
Washroom - Painted gyp bd. with sand finish
Locker Room -Painted gyp bd. with sand finish
Sleep Room - Painted gyp bd. with sand finish
Weight Room Area - Painted gyp bd. with sand finish

b Recommendations: It is believed that that the ceilings were painted in ____The painted surfaces have exceeded their 7 year EUL. It is recommended at a minimum, to paint the interior surfaces.

D10 Elevator

D1011 Passenger Elevator

a Description: None.

b Recommendations: None

D50 Emergency Generator

D5090 Emergency Generator

a Description: The existing Emergency generator was installed in 2000. An exhaust filter was added in 2002 to reduce noise and oders.

b Recommendations: Refer to the electrical engineers assessment. Recommend mitigations to limit noise.

E 10 EQUIPMENT

E1094 Residential Equipment

a Description:
The Station House kitchen contains residential kitchen appliances, including
_X__ Gas range/oven with six burners, (EUL 20+ Years) Wolf. Appears to be in serviceable condition.
_X__ Stainless steel exhaust hood (EUL 20 + Years) -Appears to be in serviceable condition.
_X__ Residential refrigerators/freezers, (EUL 10 Years) - Two were observed. Appears to be in serviceable condition.
_X__ Residential Dishwasher (EUL -3 Years given the fire house extensive use) - Appears to be in serviceable condition.
_X__ Residential Laundry washer and dryer - Appears to be in serviceable condition.
_NO__ Turnout Washer / Extractor - None observed

b Recommendations: Recommend evaluate reuse of range/oven and refrigerators. Replace dishwasher, washer and dryer during nexxt capital improvement project.

E1098 Fitness Equipment (EUL 10 - 15 years)

Built 1971	Address: 217 Arlington Avenue, Kensington, CA 94707
Age 45 yrs	Surveyor: Mark Zall AIA
	Date(s) 0f Survey: 07/13/2016

a Description: The Weight room Area contains various types of fitness and exercise equipment, including:
_X_ - Benches and free weights. In the electrical room
_X_ - Exercise Cycles - One in Dayroom
_X_ - Treadmills,- One in Dayroom
_X_ - Elliptical trainers, - One in Dayroom
_No_ - Multi-station weight training equipment - None observed

b Recommendations: The fitness equipment appeared to be in good condition. With an EUL of ten to 15 years and based on observed conditions, replacement of equipment is expected to be on an as-needed basis as part of normal operations.The Fitness Room is not adequately sized to contain the fitness equipment.

E 20

E2012 Fixed Casework (EUL 20 - 25 years)

a Description: The Public Safety Building fixed casework
Fire House Areas
_X_ Offices - Systems Furniture
_X_ Day Room - Built in cabinetry. Plastic Laminate Finish Cabinets
_X_ Kitchen - Laminated Wood Finish Cabinets With Stainless Steel Countertops and Back Splash
_X_ Bathrooms and Restrooms - Plastic Laminate Finish Cabinets
_X_ Sleep Room - Plastic Laminate Finish Cabinets & Free Standing Systems Furniture
_X_ Public Counter - Plastic Laminate Finish Counter
Police Areas
_X_ Police Office Areas - Plastic Laminate Finish Cabinets
_X_ Police Storage Rooms - Various Wood and Steel Shelving
_X_ Locker Room - Steel Lockers Fixed and Freestanding.
Shared Rooms
_X_ Conference Room - Plastic Laminate Finish Cabinets.

b Recommendations: The fixed casework appears to be in good condition and suitable for their use. With a typical EUL of twenty-years and based on the observed conditions, replacement of the casework is not recommended during the period of this report.
There are some areas in the batroooms where water damage and delamination of the countertops was observed. Recommend corrective work to repair this damage.
There are areas such as the kitchen that will require some corrective work within the next fifteen years.

Notes:

1 Drawings Provided by KFPD
2 The Expected Useful Life (EUL) figures are based upon the Published Fannie Mae 2009 Appendix for the PNA Property Evaluator
3 Hazardous Material Assessment was not provided. This assessment does not address this issue.
4 Energy Efficiency Analysis was not provided. This assessment does not address this issue.

Built 1971	Address: 217 Arlington Avenue, Kensington, CA 94707
Age 45 yrs	Surveyor: Mark Zall AIA
	Date(s) 0f Survey: 07/13/2016

5	The District's Maintenance Schedule for the replacement of Roof, HVAC, Flooring and Generator _____

ENGINEERS . SURVEYORS . PLANNERS

Project Information:
Kensington Fire Station

Site Civil Facility Evaluation

The following is the site Civil Engineering evaluation of the existing conditions at the Kensington Public Safety Building. The comments here are based on a site visit conducted on July 13, 2016. The existing site will be evaluated in terms of site accessibility and site utilities.

In addition, there is a site Civil Engineering evaluation of the vacant site, between 65 and 79 Arlington Avenue.

EXISTING SITE (217 Arlington Avenue)

Site Accessibility

Based on the site topography, the site is extremely challenging in terms of accessibility. The front entrance on Arlington Avenue can be reached from the public sidewalk by an accessible ramp. Based on the visual observation, the accessible ramp appears to be in compliance. There is currently no hardware on the door to provide automatic opening for disabled visitors. There is also no accessible parking at the site. The rear parking lot was not considered for accessible parking because it is connected at grade to the second floor and the building does not have an elevator. Because public access is limited to the first floor the only potential location for an accessible parking stall would be in the public right of way. In order to provide this accessible stall, the curb would need to be widened to provide enough space for a disabled passenger to exit from the right side of the parallel parked vehicle. This would also require some grading in the street as well as a short retaining wall near the sidewalk.

As mentioned above, the building has no elevator, which means the building does not meet accessibility standards that are currently in effect.

Fire Access

The driveway leading to the rear parking lot is too steep and narrow to be considered a fire lane. Therefore, fire access is currently only provided at the front of the building.

Site Utilities

The evaluation of site wet utilities is based on field observation. There was no significant amount of utility information from the available record drawings.

Domestic Water Service

There is one meter at the front of the site on Arlington Avenue. The meter is equipped with a backflow preventer enclosed in a cage. Both the meter and the backflow preventer appear to be in good working condition. It is anticipated that the existing meter could be reused if another public safety building was constructed on the site. The reuse of the existing meter would allow the project to avoid paying the significant cost of EBMUD's system capacity charge.

Fire Service

There is no onsite fire service. There is not a public fire hydrant within 150 feet of the site frontage.

Irrigation Service

Because the site walk only discovered one meter along the site frontage, it is unlikely that a separate irrigation meter exists.

Sanitary Sewer

Based on observation, there is a sanitary lateral at the surface on the north side of the building. The condition of the pipe is good. There is also a sanitary manhole in the sidewalk at the driveway entrance.

Storm Sewer

Because there is a substantial grade differential from the front to the back of the site, drainage conveyance to the public right of way is excellent. There is an underground storm drain system that conveys surface runoff from the rear parking lot to Arlington Avenue. The gutter in front of the driveway is inundated with groundwater that appears to be present year round. A trench drain has been installed at both the driveway and the entrance to the fire station. The drain is of sufficient size to be easily maintained.

The retaining wall at the site features weep holes at the bottom of the wall to draw down groundwater behind the wall. No drainage from the weep holes was observed during the site visit.

PROPOSED SITE (65-79 Arlington Way)

Site Accessibility

The site has over 50 feet of grade separation between Arlington Avenue and the top of the site at Windsor Avenue. This will provide a significant challenge in terms of constructing on the site in a cost effective manner. Based on the width of Windsor Avenue, it is unlikely that fire trucks could access the site from that side of the project. Fire truck access would need to be on the Arlington Avenue side, preferably near the intersection with Arlington Court. This would facilitate fire truck access as well as providing the largest buffer to neighboring homes.

The northwestern portion of the site provides the most buildable area. Based on the grades, any building would require tall retaining walls as the steepness of the existing topography would be difficult to grade back. A two story fire station would work best with the site.

Site Utilities

The site does not currently have service laterals extending to the property line, but all necessary utilities are available in at the site frontage. A new water meter and system capacity charge would be necessary to develop the site.

STRUCTURAL ENGINEERS

ASCE 41-13 Tier 1 and 2 Seismic Evaluation Report

Prepared for: Ross Drulis Cusenbery Architecture, Inc. **July 19, 2016**

Kensington Public Safety Building
215 Arlington Avenue
Kensington, California 94707

IDA Project Number 1600

1629 Telegraph Avenue, Ste 300 | Oakland, CA 94612 | t: 510.834.1629
ida-se.com

1 Introduction

IDA Structural Engineers (IDA) has performed a seismic evaluation of the Kensington Public Safety Building, located at 215 Arlington Avenue, California, using an ASCE-41-13, Tier 2 seismic evaluation procedure. ASCE 41-13, titled "*Seismic Evaluation and Retrofit of Existing Buildings,*" published by the American Society of Civil Engineers (ASCE) in 2013, is the industry standard procedure for the seismic evaluation and retrofit of existing buildings.

The primary intent of the Tier 1 screening and Tier 2 deficiency based procedure is to evaluate and where warranted, reduce seismic risk efficiently where possible and appropriate by using simplified procedures targeted to a specific building type.

The information below forms the foundation for the evaluation. This information is either derived from owner requirements, such as risk category and desired structural performance level, or is site specific, such as seismic hazard level.

Building	Kensington Public Safety Building
Address	215 Arlington Ave, Kensington, CA
Latitude and Longitude	37.906234, -122.278724
Risk Category	IV, buildings and other structures designated as essential facilities
Basic Performance Objective for Existing Buildings (BPOE)	1-B Immediate Occupancy Structural Performance (S-1) Position Retention Nonstructural Performance (N-B)
Seismic Hazard Level	BSE-1E 20% in 50 years, 225 year return period
Level of Seismicity	High
Soil Type	NEHRP C
Site Class	C
Building Type	Wood framed building, sheathed with wood structural shear panels.

1.1 Performance Objective

The performance objective consists of one or more pairings of a selected Seismic Hazard Level with a target Structural Performance Level and Nonstructural Performance Level.

The Basic Performance Objective for Existing Buildings (BPOE) is a specific, seismic Performance Objective (from several available choices) and is dependent on the Risk Category of the building and the desired seismic performance expected by the owner. The BPOE for existing buildings is a slightly lower category which may result in a lower level of safety and a higher probability of collapse than what may be provided by building codes for new buildings. Buildings meeting the BPOE are expected to incur very little damage from relatively frequent, small to moderate earthquakes but are expected to incur greater levels of damage and economic loss from severe earthquakes. The level of damage and potential economic loss for buildings rehabilitated to the BPOE likely will be greater than expected for the Basic Performance Objective for New Buildings (BPON).

Accepting a seismic performance objective (BPOE) which could be less than "new code" (BPON) allows that relatively new existing buildings are not evaluated as deficient when updated and more conservative codes are adopted over time.

The increase in seismic risk is tempered by the recognition that existing buildings often have a shorter remaining useful lifespan than new buildings. That is, if the traditional code based demand for new buildings presumes a 50 year life, then an existing building with a 30 year remaining lifespan has a lower probability of experiencing a code level (or major) earthquake over its remaining lifespan. The standard also recognizes that the cost of achieving smaller probability of damage caused by the higher level of performance is often disproportionate to the incremental cost.

The Performance Level is 1-B in the BPOE, which provides most of the protection obtained under the Operational Building Performance Level without the added cost of providing standby utilities and performing rigorous seismic qualification of building equipment performance.

1.1.1 Structural Performance Level for BPOE

The structural performance level for BPOE is S-1, which provides for Immediate Occupancy performance of the building following an earthquake meeting the criteria discussed under the seismic hazards section.

A structure conforming to the Immediate Occupancy seismic performance level should be expected to have a very limited damage state following the anticipated seismic event. The basic lateral and vertical force resisting systems of the building should retain almost all of their pre-earthquake strength and stiffness. The risk of life-threatening injury (life safety) as a result of structural damage is very low. Although minor structural repairs might be anticipated, repairs would generally not be required before re-occupancy.

1.1.2 Nonstructural Performance Level for BPOE

The nonstructural performance level is N-B, Position Retention (for BPOE).

Continued use of the building post-earthquake is not only limited by its structural condition but might be limited by damage to or disruption to nonstructural elements of the building, furnishings or equipment or the availability of external utility services. Nonstructural performance level N-B, "Position Retention," is the post-earthquake damage state in which nonstructural components could be damaged, and may not function, but are anchored in place so that they do not fall, topple, or break connections. By avoiding potential component falling or toppling, or breaking of utility connections (such as, water, gasses, or electricity) life safety is provided to building occupants. Building access and life safety systems include doors, hallways, stairways, elevators, emergency lighting, fire alarms and fire suppression systems, are generally expected remain available and operable provided that power and utility services are available at the building. Occupants should be able to occupy the building safely. Potentially, some use may be impaired, and some clean up may be needed. The N-B, Position Retention nonstructural Performance Level essentially mirrors the requirements of new building design for cases where the structure is designed for life safety and not immediate occupancy.

1.1.3 Seismic Hazard Level for BPOE

The Basic Safety Earthquake for BPOE is 1E, which requires ground motions with a 20% probability of exceedance in 50 years (or a 225 year recurrence interval). For reference ASCE 7-10 uses a design procedure based on 2/3 values of the MCEr earthquake at any site for new design (generally based on 2% probability of exceedance in 50 year period earthquake, with a 2500 year recurrence interval, however, in high seismic near fault regions the probabilistic earthquake is modified to a deterministic calculation by USGS which reduces the ground motions from absolute probabilities). The ASCE 7 procedures along with the seismic ground motions strive to achieve a 10% probability of collapse for MCEr for properly designed buildings.

The commentary in ASCE 41-13 notes that for Risk Category III and IV buildings, the BPOE (basic performance objective for existing buildings) using the BSE-1E earthquake (20% in 50 years, 975 year recurrence) has not traditionally been used and instead, Risk Category III and IV buildings have been evaluated to levels consistent with new building design, using 2/3 of MCEr per ASCE 7-10 procedures. This would produce seismic demands greater than what the BSE-1E earthquake demands would be. Given these facts, it is most likely not financially feasible to pursue a new building equivalent seismic hazard level for this building.

2 Site Description

The Kensington Public Safety Building is located along Arlington Avenue constructed amongst single family residential buildings. The building is constructed on a slope into the uphill side of the hill. The first floor is built into the slope with a retaining wall at the rear of

the building. The second floor exits to a parking lot behind the building. There is an additional concrete retaining wall at the rear of the parking lot which supports residential lots above. A sloped driveway along the south side of the building connects the Arlington Avenue to the parking lot in the rear. The building is south of Oberlin Avenue and East of Amherst Avenue.

3 Building Description

The building, constructed in the early 1960's is a two story wood framed structure supported on continuous concrete foundations. The seismic load resisting system appears to be light framed walls sheathed with plywood structural sheathing. The ground floor is constructed into the hillside with a retaining wall at the rear of the building which is approximately the height of the first floor. The top of concrete foundation on the sides slopes from the top of the wall to the bottom of the first floor. The first floor appears to be constructed as a concrete slab-on-grade. The total building area is approximately 5700 square feet. The overall building dimensions are approximately 40 feet by 80 feet with a maximum height of about 45 feet. See Figures 1 to 5 for photos of the

In 1998 a renovation was performed on the building which included a partial seismic retrofit. In this renovation, plywood shear walls were strengthened in the middle of the building at a wall between the apparatus bay and the offices. The front of the building was strengthened with steel moment frames at the entry of the apparatus bay. Drilled piers were also added at the exterior of the building in an attempt to resist sliding of the building downhill.

In 2004 another renovation was performed. In this renovation, some minor framing changes were made at the second floor over the apparatus bay. The shear wall between the apparatus bay and the offices was strengthened again. The beam/column connections at the apparatus bay moment frame were strengthened during this renovation.

4 Geotechnical Information

For this evaluation, two previous geotechnical evaluations were provided. A 1990 geotechnical evaluation by Seidelman Associates, Inc. was performed to evaluate potential fault traces on site. A 1997 geotechnical evaluation by Geomatrix Consultants evaluated potential earthquake-related earthquake hazards such as surface fault rupture and landslide/ slope stabilities. However, these reports do not provide current seismic ground motion data values. Therefore the seismic ground motions used in this evaluation were derived from United States Geological Survey and California Geological Survey maps and fault information. See Appendix C for information used.

The geotechnical reports do not indicate that liquefaction is a consideration at this site.

5 Site Observation Notes:

A site visit to observe the existing building was performed on July 13, 2016. The building generally appeared to be in good shape. There were no visible observed signs of rot or decay. There were areas of the slab in the garage concrete slab exhibiting signs of slab settlement in the form of cracks. Settling of exterior paving at the rear parking lot and minor cracking at the exterior footings along the driveway side of the building appear to be indicators of settlement on site. It is unclear whether the movement occurred before or after the retrofit measures performed as part of the 1998 renovation.

6 Available Documents

The following drawings were available for review for this evaluation:

- Original architectural, dated March 27, 1969 by Jeffries, Lyons, and Hill Architects.
- Renovation drawings dated September 10, 1998, by Marcy Li Wong Architects.
- Renovation drawings dated September 10, 1998, by The Crosby Group.
- Renovation drawings dated June 21, 2004, by Baseline Engineering.
- Renovation drawings dated June 29, 2004, by Italo A. Calpestri III & Associates, AIA.

7 Tier 1 Deficiencies

The checklists and calculations for Tier 1 evaluation are located in Appendix B.

7.1 Vertical irregularities

At the front of the building long Line E, assumed shear walls between 4 and 7 and the second floor do not align vertically with the moment frame at the apparatus bay.

7.2 Slope Failure

The 1997 Geotechnical Evaluation by Geomatrix determined that there was risk of slope failure due to a seismic event. The renovation drawings by Crosby Group from September 1998 appear to have partially addressed this risk by the installation of concrete piers in the driveway outside of the apparatus bay between grid lines 1 to 4. It does not appear any mitigation measures were installed between lines 4 to 7 to resist the movement of the building downslope. Signs such as minor foundation cracking and slab cracks indicate that some foundation movement has occurred. However, it is unclear if this movement is due to normal foundation settlement or indications of slope failure.

7.3 Shear Stress Check

There is insufficient information on the drawings to determine the extent of plywood shear wall nailing in areas of the building not documented in the 1998 and 2004 renovations. For

this analysis we have assumed the presence of nominally nailed plywood around the exterior of the building. This analysis combined the assumed strength of these walls with the addition of the new shear walls documented in the renovation drawings. The shear stresses in the walls exceed the allowable in the Tier 1 checks in several locations.

7.4 Diaphragm Continuity

The diaphragm at the second floor has a split level and does not meet the Tier 1 check for diaphragm continuity.

7.5 Steel Moment Frames with Flexible Diaphragms: Steel Column Connections

This Tier 1 check evaluates the ability of the column anchor connection to resist the foundation.

8 Tier 2 Analysis

The checklists and calculations for Tier 2 evaluation are located in Appendix B.

8.1 Vertical irregularities

A Tier 2 evaluation finds that the collector connections are adequate. The shear wall capacities and moment frame capacities at this line are evaluated further under shear stress checks and moment frame checks. The shear stress check found walls which were not compliant. The moment frame checks for beam and column flexural stresses were compliant. 2nd floor shear walls between grid lines 4 and 7 do not appear to have posts or holdowns to transfer overturning forces to the first floor.

8.2 Shear Stress Check

Tier 2 evaluation of the shear walls finds that the shear stress checks are not compliant. The shear stresses in some walls exceed the assumed capacity of the walls. The wall lines which require strengthening are identified in the mitigation plan.

8.3 Diaphragm Continuity

The diaphragm at the second floor has a split level and therefore does not meet the Tier 1 check. Based on evaluation of the diaphragm load path it appears that the diaphragm is insufficient is insufficient to transfer seismic loads across the discontinuity.

8.4 Steel Moment Frames with Flexible Diaphragms: Steel Column Connections

The existing column connection was evaluated for the seismic demand of the moment frames and is non-compliant for the Tier 2 check.

9 Mitigation

See Appendix A for schematic mitigation plan which identifies the locations of the mitigation measures. Below is a description of the different mitigation items.

9.1 Vertical Irregularity

Provide posts and holdowns at the first floor to transfer overturning forces from the 2nd floor shear walls to the first floor.

9.2 Slope Failure

Obvious signs of slope failure and movement downhill of the building were not observed during the site visit. A monitoring program is recommended to track potential movement of the building over time. Because drilled piers were installed between grid lines 1 and 4, particular attention should be paid to the section between grid lines 4 and 7. If a monitoring program identifies that building is moving downslope, it is recommended to add drilled piers parallel to line E between lines 4 and 7 to mitigate further movement of the building.

9.3 Shear Stress in Wood Shear Walls

Add plywood shear walls and holdowns or increase nailing at existing shear walls and replace holdowns as required.

9.4 Diaphragm Continuity

Increase nailing at floor diaphragm and at split level transition to transfer loads across the diaphragm split level.

9.5 Steel Moment Frames with Flexible Diaphragms: Steel Column Connections

Install additional anchor bolts to strengthen connection of moment frame columns to foundations.

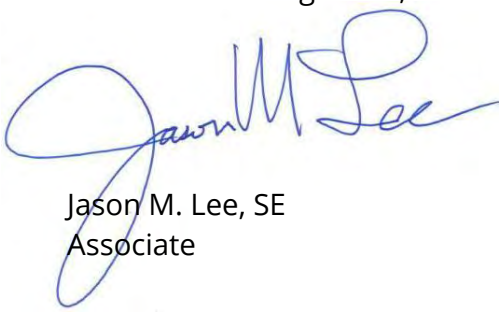
10 Conclusions

The building appears to be in good overall condition. Based on the ASCE 41 evaluation, there are a number of items which should be addressed. It should be noted that these findings are based on limited information on existing drawings and assumptions on existing conditions such as shear wall nailing. Information from investigation of existing conditions through local demolition may result in determining that the elements are compliant.

However, given the vintage of construction, it is likely that these elements require the mitigation recommendations noted in this report to meet the Immediate Occupancy goals for an essential service facility such as the Kensington Public Safety Building.

Please do not hesitate to call with any questions regarding this analysis.

IDA Structural Engineers, Inc.



Jason M. Lee, SE
Associate

Figure 1: Aerial View

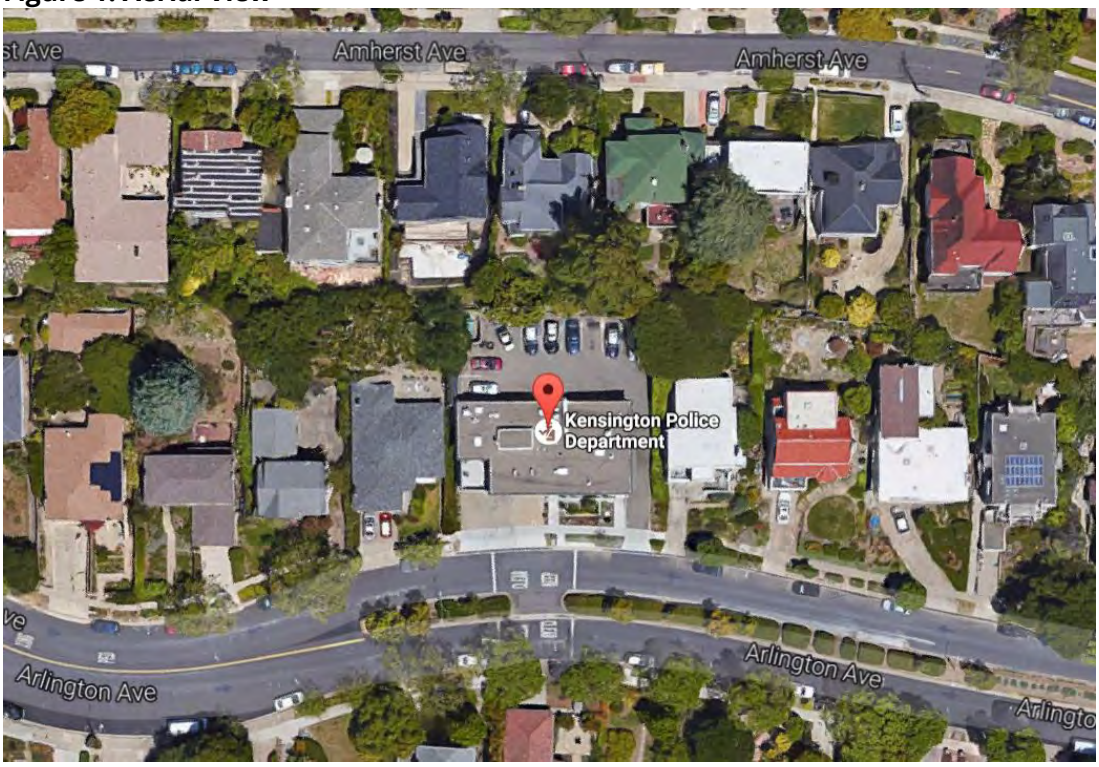


Figure 2: View from the North

Figure 3: View from the South

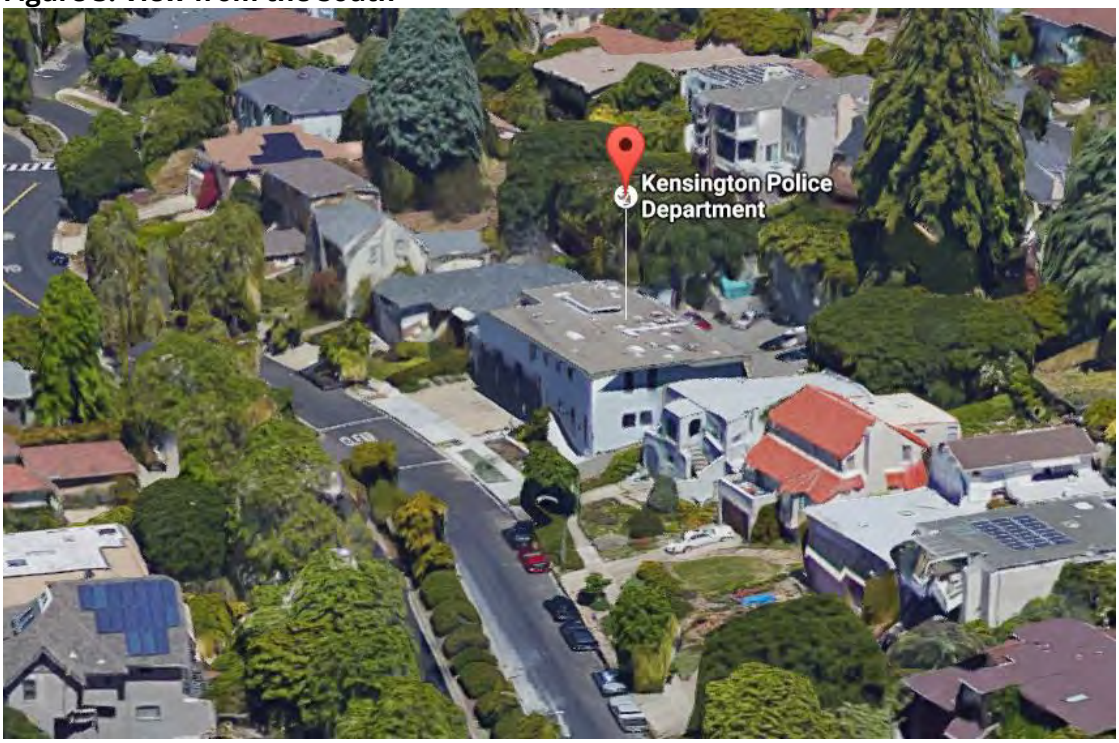
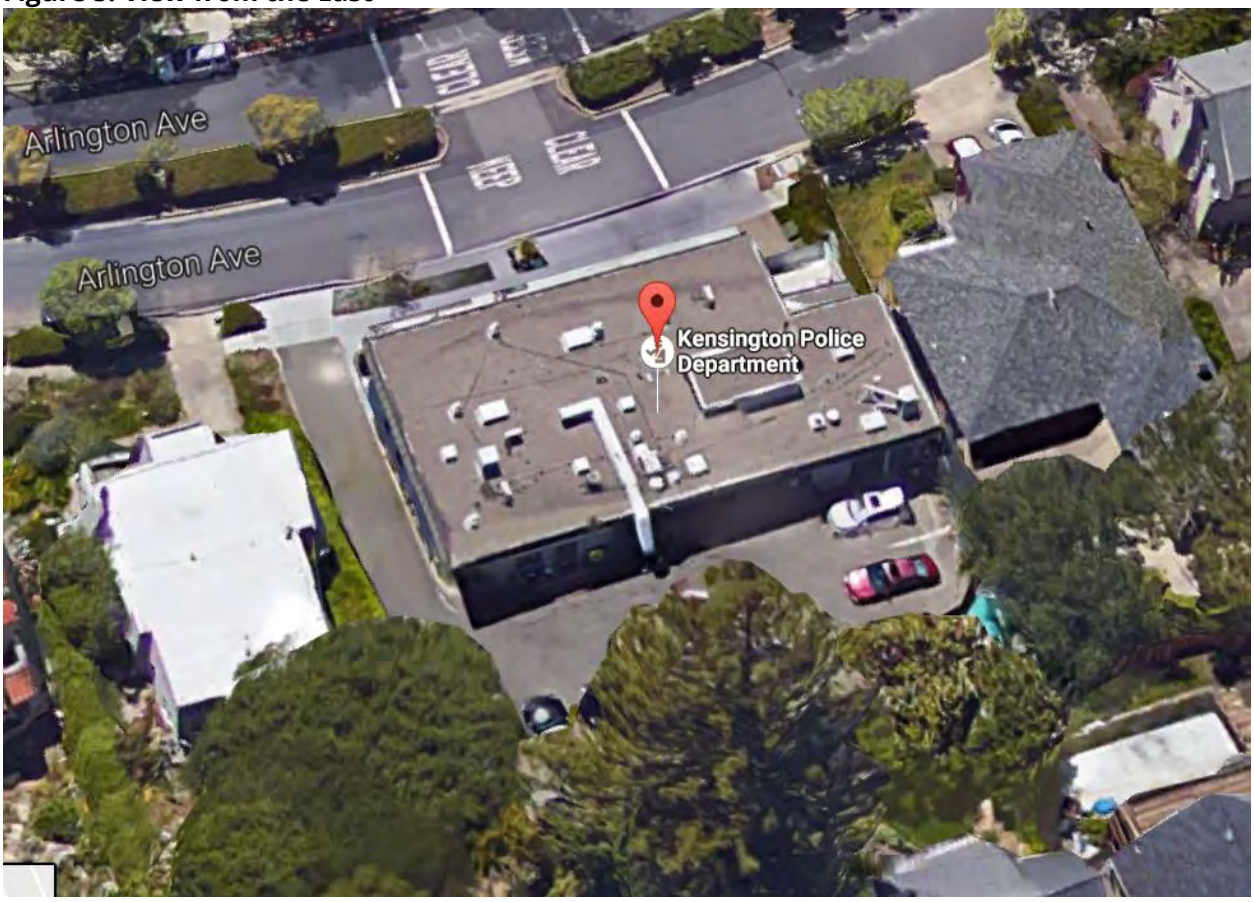


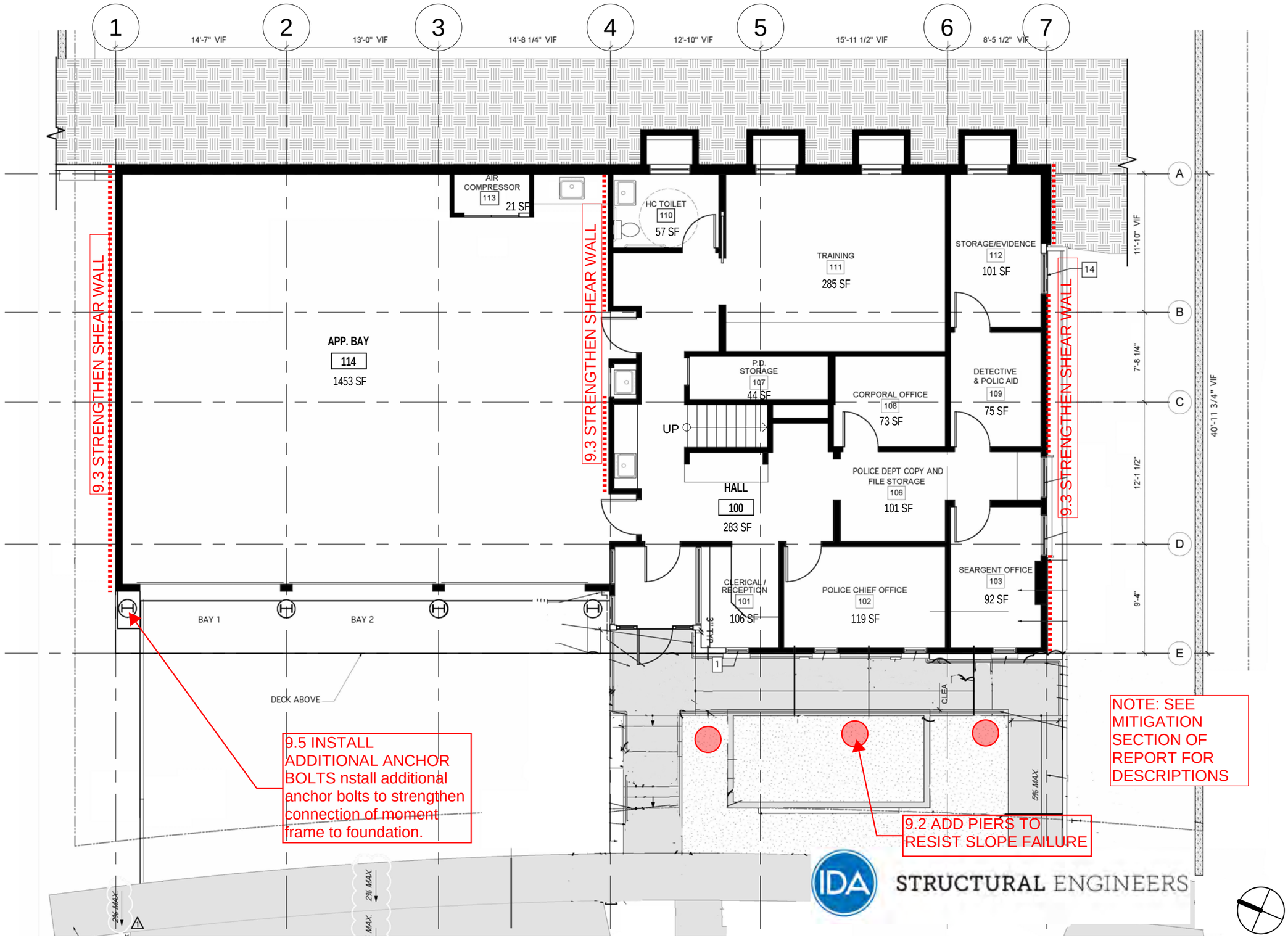
Figure 4: View from the West

Figure 5: View from the East



APPENDIX A

MITIGATION PLANS



1 FIRST FLOOR PLAN
1/8" = 1'-0"

Preliminary design. Not for bidding or construction purposes.

RossDrulisCusenbery
18294 Sonoma Highway
Sonoma
CA 95476
TEL 707 996 8448
FAX 707 996 8542
ARCHITECTURE

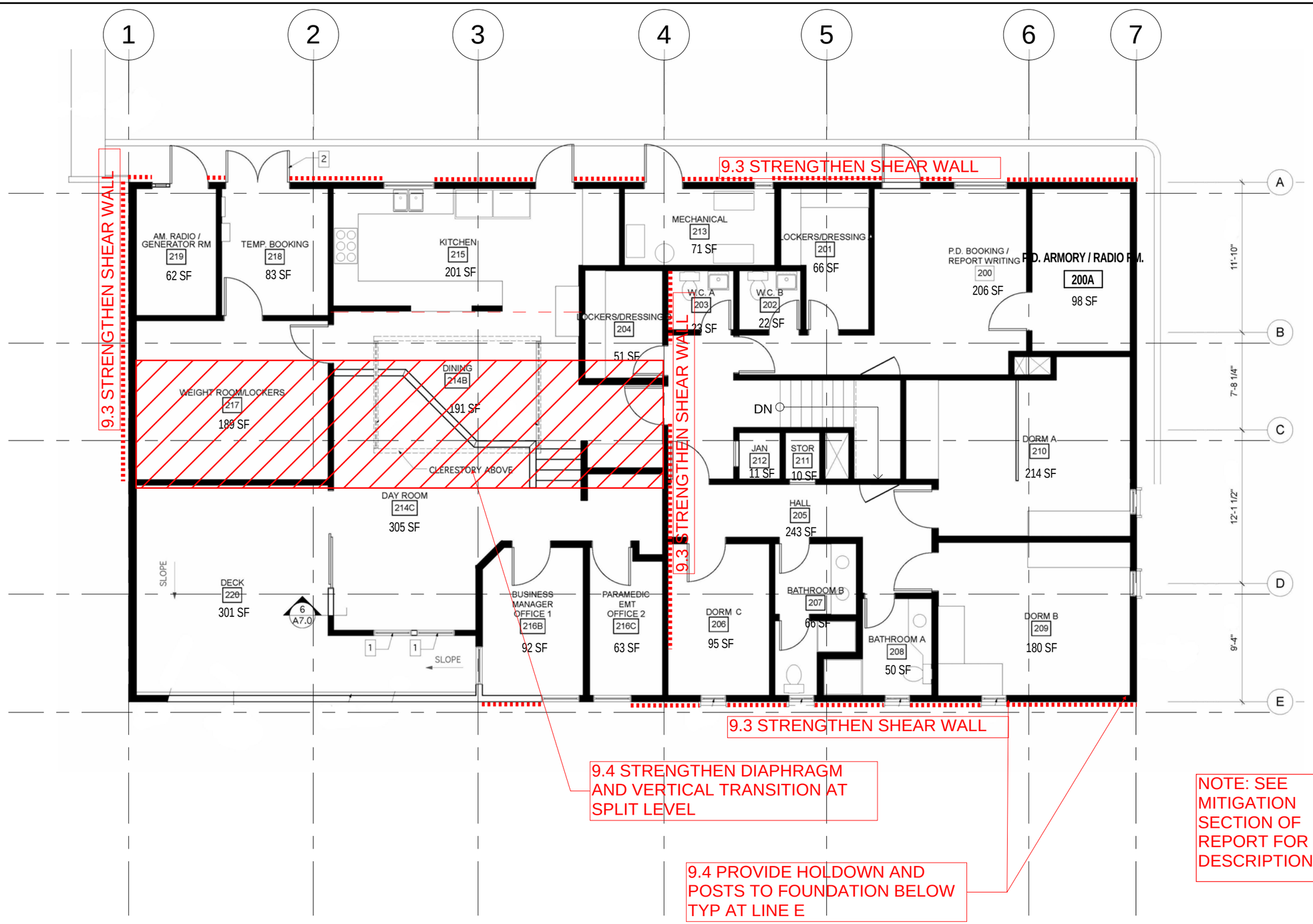
KENSINGTON FIRE STATION
KENSINGTON, CA

Sheet Title
EXISTING FLOOR PLAN - LEVEL 1
STRUCTURAL MITIGATION

Scale: 1/8" = 1'-0"

Date: 2016/07/07

S1
14
Drawing No.



1 EXISTING SECOND FLOOR PLAN
1/8" = 1'-0"

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KENSINGTON FIRE STATION
KENSINGTON, CA

Sheet Title
EXISTING FLOOR PLAN - LEVEL 2
STRUCTURAL MITIGATION

Scale: 1/8" = 1'-0"

Date: 2016/07/07

S2

Drawing No.

APPENDIX B

CHECKLISTS AND CALCULATIONS

APPENDIX C
SUMMARY DATA SHEET

BUILDING DATA

Building Name: Kensington Public Safety Building Date:

Building Address: Kensington Public Safety Building

Latitude: 37.906233 Longitude: -122.278758 By: JML

Year Built: 1969 Year(s) Remodeled: 1998, 2004 Original Design Code:

Area (sf): 5800 Length (ft): 79' 2" Width (ft): 40' 8"

No. of Stories: 2 Story Height: +/- 11' 3" Total Height: 22' 6"

USE ☐ Industrial ☐ Office ☐ Warehouse ☐ Hospital ☐ Residential ☐ Educational ☒ Other: Essential services facility

CONSTRUCTION DATA

Gravity Load Structural System: Light framed wood bearing walls

Exterior Transverse Walls: Openings?

Exterior Longitudinal Walls: Openings?

Roof Materials/Framing: Built up Roofing over 1/2" PW spanning between 2x8 joists @ 16"oc

Intermediate Floors/Framing: 3/4" PW over either 2x10 or 2x14 floor joists @ 16" oc

Ground Floor: Reinforced concrete slab, 7" thick in apparatus bay, 4" thick in remaining areas

Columns: Wood and steel columns Foundation: Continuous reinforced concrete footing, six concrete drilled pier

General Condition of Structure: Well maintained

Levels Below Grade? Ground floor is partially embedded in slope

Special Features and Comments: Building is built into a slope. Parking at rear is elevation of upper floor.

LATERAL-FORCE-RESISTING SYSTEM

	Longitudinal	Transverse
System:	Dual system, Wood shear walls and moment frame	
Vertical Elements:	Wood shear walls and moment frame	
Diaphragms:	Plywood/Flexible	
Connections:		

EVALUATION DATA

BSE-1N Spectral Response Accelerations: S_{Ds} = 1.655 S_{D1} = 1.031

Soil Factors: Class = D F_a = 1.0 F_v = 1.5

BSE-1E Spectral Response Accelerations: S_{XS} = 1.231 S_{X1} = 0.69

Level of Seismicity: High Performance Level: Immediate Occupancy

Building Period: T = 0.207 s

Spectral Acceleration: S_a = 1.231

Modification Factor: $C_mC_1C_2$ = 1.1 Building Weight: W = 211 k

Pseudo Lateral Force: $V = C_mC_1C_2S_aW$ = 286 kip

BUILDING CLASSIFICATION:

REQUIRED TIER 1 CHECKLISTS	Yes	No
Basic Configuration Checklist	☒	☐
Building Type W2 Structural Checklist	☒	☐
Nonstructural Component Checklist	☐	☒

FURTHER EVALUATION REQUIREMENT: Life safety and Immediate Occupancy, Tier 2 as required for Tier 1 non-complicance. Checklist S1 IO also evaluated for moment frame installed in 1998.

Project: Kensington Public Safety Building Location: Kensington, CA

Completed by: JML Date: _____

16.1.2LS LIFE SAFETY BASIC CONFIGURATION CHECKLIST

Low Seismicity

Building System

General

(C) NC N/A U LOAD PATH: The structure shall contain a complete, well defined load path, including structural elements and connections, that serves to transfer the inertial forces associated with the mass of all elements of the building to the foundation. (Commentary: Sec. A.2.1.1. Tier 2: Sec. 5.4.1.1)

(C) NC N/A U ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 4% of the height of the shorter building. This statement shall not apply for the following building types: W1, W1a, and W2. (Commentary: Sec. A.2.1.2. Tier 2: Sec. 5.4.1.2)

C NC (N/A) U MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Commentary: Sec. A.2.1.3. Tier 2: Sec. 5.4.1.3)

Building Configuration

(C) NC N/A U WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Commentary: Sec. A2.2.2. Tier 2: Sec. 5.4.2.1)

(C) NC N/A U SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not less than 70% of the seismic-force-resisting system stiffness in an adjacent story above or less than 80% of the average seismic-force-resisting system stiffness of the three stories above. (Commentary: Sec. A.2.2.3. Tier 2: Sec. 5.4.2.2)

C (NC) N/A U VERTICAL IRREGULARITIES: All vertical elements in the seismic-force-resisting system are continuous to the foundation. (Commentary: Sec. A.2.2.4. Tier 2: Sec. 5.4.2.3)

(C) NC N/A U GEOMETRY: There are no changes in the net horizontal dimension of the seismic-force-resisting system of more than 30% in a story relative to adjacent stories, excluding one-story penthouses and mezzanines. (Commentary: Sec. A.2.2.5. Tier 2: Sec. 5.4.2.4)

(C) NC N/A U MASS: There is no change in effective mass more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Commentary: Sec. A.2.2.6. Tier 2: Sec. 5.4.2.5)

C NC N/A (U) TORSION: The estimated distance between the story center of mass and the story center of rigidity is less than 20% of the building width in either plan dimension. (Commentary: Sec. A.2.2.7. Tier 2: Sec. 5.4.2.6)

Moderate Seismicity: Complete the Following Items in Addition to the Items for Low Seismicity.

Geologic Site Hazards

(C) NC N/A U LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance shall not exist in the foundation soils at depths within 50 ft under the building. (Commentary: Sec. A.6.1.1. Tier 2: 5.4.3.1) Underlain by dense,relatively hard shale per project geotechnical investigation

C (NC) N/A U SLOPE FAILURE: The building site is sufficiently remote from potential earthquake-induced slope failures or rockfalls to be unaffected by such failures or is capable of accommodating any predicted movements without failure. (Commentary: Sec. A.6.1.2. Tier 2: 5.4.3.1)

(C) NC N/A U SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Commentary: Sec. A.6.1.3. Tier 2: 5.4.3.1) Per project geotechnical investigation

High Seismicity: Complete the Following Items in Addition to the Items for Low and Moderate Seismicity.

Foundation Configuration

(C) NC N/A U OVERTURNING: The ratio of the least horizontal dimension of the seismic-force-resisting system at the foundation level to the building height (base/height) is greater than $0.6S_a$. (Commentary: Sec. A.6.2.1. Tier 2: Sec. 5.4.3.3)

(C) NC N/A U TIES BETWEEN FOUNDATION ELEMENTS: The foundation has ties adequate to resist seismic forces where footings, piles, and piers are not restrained by beams, slabs, or soils classified as Site Class A, B, or C. (Commentary: Sec. A.6.2.2. Tier 2: Sec. 5.4.3.4)

Project: Kensington Public Safety Building Location: Kensington, CA

Completed by: JML Date: _____

16.3LS LIFE SAFETY STRUCTURAL CHECKLIST FOR BUILDING TYPE W2: WOOD FRAMES, COMMERCIAL AND INDUSTRIAL

Low and Moderate Seismicity

Lateral Seismic-Force-Resisting System

(C) NC N/A U REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Commentary: Sec. A.3.2.1.1. Tier 2: Sec. 5.5.1.1)

C (NC) N/A U SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.5.3.3, is less than the following values (Commentary: Sec. A.3.2.7.1. Tier 2: Sec. 5.5.3.1.1):

Structural panel sheathing	1,000 lb/ft
Diagonal sheathing	700 lb/ft
Straight sheathing	100 lb/ft
All other conditions	100 lb/ft

(C) NC N/A U STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multi-story buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system. (Commentary: Sec. A.3.2.7.2. Tier 2: Sec. 5.5.3.6.1)

(C) NC N/A U GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used as shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building. (Commentary: Sec. A.3.2.7.3. Tier 2: Sec. 5.5.3.6.1)

(C) NC N/A U NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces. (Commentary: Sec. A.3.2.7.4. Tier 2: Sec. 5.5.3.6.1)

(C) NC N/A U WALLS CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor. (Commentary: Sec. A.3.2.7.5. Tier 2: Sec.5.5.3.6.2)

(C) NC N/A U HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-1. (Commentary: Sec. A.3.2.7.6. Tier 2: Sec. 5.5.3.6.3)

C NC (N/A) U CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels. (Commentary: Sec. A.3.2.7.7. Tier 2: Sec. 5.5.3.6.4)

C NC (N/A) U OPENINGS: Walls with openings greater than 80% of the length are braced with wood structural panel shear walls with aspect ratios of not more than 1.5-to-1 or are supported by adjacent construction through positive ties capable of transferring the seismic forces. (Commentary: Sec. A.3.2.7.8. Tier 2: Sec. 5.5.3.6.5)

Connections

(C) NC N/A U WOOD POSTS: There is a positive connection of wood posts to the foundation. (Commentary: Sec. A.5.3.3. Tier 2: Sec. 5.7.3.3)

(C) NC N/A U WOOD SILLS: All wood sills are bolted to the foundation. (Commentary: Sec. A.5.3.4. Tier 2: Sec. 5.7.3.3)

(C) NC N/A U GIRDER/COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Commentary: Sec. A.5.4.1. Tier 2: Sec. 5.7.4.1)

High Seismicity: Complete the Following Items in Addition to the Items for Low and Moderate Seismicity.

Diaphragms

C NC N/A U DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints. (Commentary: Sec. A.4.1.1. Tier 2: Sec. 5.6.1.1)

C NC N/A U ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation. (Commentary: Sec. A.4.1.3. Tier 2: Sec. 5.6.1.1)

C NC N/A U DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Commentary: Sec. A.4.1.8. Tier 2: Sec. 5.6.1.5)

C NC N/A U STRAIGHT SHEATHING: All straight sheathed diaphragms have aspect ratios less than 2-to-1 in the direction being considered. (Commentary: Sec. A.4.2.1. Tier 2: Sec. 5.6.2)

C NC N/A U SPANS: All wood diaphragms with spans greater than 24 ft consist of wood structural panels or diagonal sheathing. Wood commercial and industrial buildings may have rod-braced systems. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2)

C NC N/A U DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft and aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2)

C NC N/A U OTHER DIAPHRAGMS: The diaphragm does not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Commentary: Sec. A.4.7.1. Tier 2: Sec. 5.6.5)

Connections

C NC N/A U WOOD SILL BOLTS: Sill bolts are spaced at 6 ft or less, with proper edge and end distance provided for wood and concrete. (Commentary: A.5.3.7. Tier 2: Sec. 5.7.3.3)

Project: Kensington Public Safety Building Location: Kensington, CA

Completed by: JML Date: _____

16.3IO IMMEDIATE OCCUPANCY STRUCTURAL CHECKLIST FOR BUILDING TYPE W2: WOOD FRAMES, COMMERCIAL AND INDUSTRIAL

Very Low Seismicity

Seismic-Force-Resisting System

(C) NC N/A U REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Commentary: Sec. A.3.2.1.1. Tier 2: Sec. 5.5.1.1)

C (NC) N/A U SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.5.3.3, is less than the following values (Commentary: Sec. A.3.2.7.1. Tier 2: Sec. 5.5.3.1.1):

Structural panel sheathing	1,000 lb/ft
Diagonal sheathing	700 lb/ft
Straight sheathing	100 lb/ft
All other conditions	100 lb/ft

(C) NC N/A U STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multi-story buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system. (Commentary: Sec. A.3.2.7.2. Tier 2: Sec. 5.5.3.6.1)

(C) NC N/A U GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used as shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building. (Commentary: Sec. A.3.2.7.3. Tier 2: Sec. 5.5.3.6.1)

(C) NC N/A U NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces. (Commentary: Sec. A.3.2.7.4. Tier 2: Sec. 5.5.3.6.1)

(C) NC N/A U WALLS CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor. (Commentary: Sec. A.3.2.7.5. Tier 2: Sec. 5.5.3.6.2)

(C) NC N/A U HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-2. (Commentary: Sec. A.3.2.7.6. Tier 2: Sec. 5.5.3.6.3)

C NC (N/A) U CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels. (Commentary: Sec. A.3.2.7.7. Tier 2: Sec. 5.5.3.6.4)

C NC (N/A) U OPENINGS: Walls with openings greater than 80% of the length are braced with wood structural panel shear walls with aspect ratios of not more than 1.5-to-1 or are supported by adjacent construction through positive ties capable of transferring the seismic forces. (Commentary: Sec. A.3.2.7.8. Tier 2: Sec. 5.5.3.6.5)

(C) NC N/A U HOLD-DOWN ANCHORS: All shear walls have hold-down anchors, constructed per acceptable construction practices, attached to the end studs. (Commentary: Sec. A.3.2.7.9. Tier 2: Sec. 5.5.3.6.6)

Connections

(C) NC N/A U WOOD POSTS: There is a positive connection of wood posts to the foundation. (Commentary: Sec. A.5.3.3. Tier 2: Sec. 5.7.3.3)

(C) NC N/A U WOOD SILLS: All wood sills are bolted to the foundation. (Commentary: Sec. A.5.3.4. Tier 2: Sec. 5.7.3.3)

(C) NC N/A U GIRDER/COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Commentary: Sec. A.5.4.1. Tier 2: Sec. 5.7.4.1)

Foundation System

(C) NC N/A U DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil. (Commentary: Sec. A.6.2.3.)

(C) NC N/A U SLOPING SITES: The difference in foundation embedment depth from one side of the building to another shall not exceed one story high. (Commentary: Sec. A.6.2.4)

Project: Kensington Public Safety Building Location: Kensington, CA

Completed by: TR Date: _____

16.4IO IMMEDIATE OCCUPANCY STRUCTURAL CHECKLIST FOR BUILDING TYPES S1: STEEL MOMENT FRAMES WITH STIFF DIAPHRAGMS AND S1A: STEEL MOMENT FRAMES WITH FLEXIBLE DIAPHRAGMS

Very Low Seismicity

Seismic-Force-Resisting System

(C) NC N/A U DRIFT CHECK: The drift ratio of the steel moment frames, calculated using the Quick Check procedure of Section 4.5.3.1, is less than 0.015. (Commentary: Sec. A.3.1.3.1. Tier 2: Sec. 5.5.2.1.2)

(C) NC N/A U COLUMN AXIAL STRESS CHECK: The axial stress caused by gravity loads in columns subjected to overturning forces is less than $0.10F_y$. Alternatively, the axial stress caused by overturning forces alone, calculated using the Quick Check procedure of Section 4.5.3.6, is less than $0.30F_y$. (Commentary: Sec. A.3.1.3.2. Tier 2: Sec. 5.5.2.1.3)

(C) NC N/A U FLEXURAL STRESS CHECK: The average flexural stress in the moment frame columns and beams, calculated using the Quick Check procedure of Section 4.5.3.9, is less than F_y. Columns need not be checked if the strong column—weak beam checklist item is compliant. (Commentary: Sec. A.3.1.3.3. Tier 2: Sec. 5.5.2.1.2)

Connections

(C) NC N/A U STEEL COLUMNS: The columns in seismic-force-resisting frames are anchored to the building foundation. (Commentary: Sec. A.5.3.1. Tier 2: Sec. 5.7.3.1)

Low Seismicity: Complete the Following Items in Addition to the Items for Very Low Seismicity.

Seismic-Force-Resisting System

(C) NC N/A U REDUNDANCY: The number of lines of moment frames in each principal direction is greater than or equal to 2. The number of bays of moment frames in each line is greater than or equal to 3. (Commentary: Sec. A.3.1.1.1. Tier 2: Sec. 5.5.1.1) Three bays

C NC (N/A) U INTERFERING WALLS: All concrete and masonry infill walls placed in moment frames are isolated from structural elements. (Commentary: Sec. A.3.1.2.1. Tier 2: Sec. 5.5.2.1.1)

Connections

C (NC) N/A U TRANSFER TO STEEL FRAMES: Diaphragms are connected for transfer of seismic forces to the steel frames, and the connections are able to develop the lesser of the strength of the frames or the diaphragms. (Commentary: Sec. A.5.2.2. Tier 2: Sec. 5.7.2)

C (NC) N/A U STEEL COLUMNS: The columns in seismic-force-resisting frames are anchored to the building foundation, and the anchorage is able to develop the least of the tensile capacity of the column, the tensile capacity of the lowest level column splice (if any), or the uplift capacity of the foundation. (Commentary: Sec. A.5.3.1. Tier 2: Sec. 5.7.3.1)

Moderate Seismicity: Complete the Following Items in Addition to the Items for Very Low and Low Seismicity.

Seismic-Force-Resisting System

(C) NC N/A U MOMENT-RESISTING CONNECTIONS: All moment connections are able to develop the expected strength of the adjoining members based on the specified minimum yield stress of the steel. (Commentary: Sec. A.3.1.3.4. Tier 2: Sec. 5.5.2.2.1). Note: more restrictive requirements for High Seismicity.

(C) NC N/A U PANEL ZONES: All panel zones have the shear capacity to resist the shear demand required to develop 0.8 times the sum of the flexural strengths of the girders framing in at the face of the column. (Commentary: Sec. A.3.1.3.5. Tier 2: Sec. 5.5.2.2.2)

C NC (N/A) U COLUMN SPLICES: All column splice details located in moment frames include connection of both flanges and the web, and the splice develops the strength of the column. (Commentary: Sec. A.3.1.3.6. Tier 2: Sec. 5.5.2.2.3)

(C) NC N/A U STRONG COLUMN—WEAK BEAM: The percentage of strong column–weak beam joints in each story of each line of moment-resisting frames is greater than 50%. (Commentary: Sec. A.3.1.3.7. Tier 2: Sec. 5.5.2.1.5)

C NC N/A U COMPACT MEMBERS: All frame elements meet section requirements set forth by AISC 341, Table D1.1, for highly ductile members. (Commentary: Sec. A.3.1.3.8. Tier 2: Sec. 5.5.2.2.4)

C NC N/A U BEAM PENETRATIONS: All openings in frame-beam webs are less than one quarter of the beam depth and are located in the center half of the beams. (Commentary: Sec. A.3.1.3.9. Tier 2: Sec. 5.5.2.2.5)

C NC N/A U GIRDER FLANGE CONTINUITY PLATES: There are girder flange continuity plates at all moment frame joints. (Commentary: Sec. A.3.1.3.10. Tier 2: Sec. 5.5.2.2.6)

C NC N/A U OUT-OF-PLANE BRACING: Beam–column joints are braced out-of-plane. (Commentary: Sec. A.3.1.3.11. Tier 2: Sec. 5.5.2.2.7)

C NC N/A U BOTTOM FLANGE BRACING: The bottom flanges of beams are braced out-of-plane. (Commentary: Sec. A.3.1.3.12. Tier 2: Sec. 5.5.2.2.8)

Diaphragms (Stiff or Flexible)

C NC N/A U PLAN IRREGULARITIES: There is tensile capacity to develop the strength of the diaphragm at reentrant corners or other locations of plan irregularities. (Commentary: Sec. A.4.1.7. Tier 2: Sec. 5.6.1.4)

C NC N/A U DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Commentary: Sec. A.4.1.8. Tier 2: Sec. 5.6.1.5)

C NC N/A U OPENINGS AT FRAMES: Diaphragm openings immediately adjacent to the moment frames extend less than 15% of the total frame length. (Commentary: Sec. A.4.1.5. Tier 2: Sec. 5.6.1.3)

Flexible Diaphragms

C NC N/A U CROSS TIES: There are continuous cross ties between diaphragm chords. (Commentary: Sec. A.4.1.2. Tier 2: Sec. 5.6.1.2)

C NC N/A U STRAIGHT SHEATHING: All straight sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered. (Commentary: Sec. A.4.2.1. Tier 2: Sec. 5.6.2)

C NC N/A U SPANS: All wood diaphragms with spans greater than 12 ft consist of wood structural panels or diagonal sheathing. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2)

C NC N/A U DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft and aspect ratios less than or equal to 3-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2)

C NC N/A U NONCONCRETE FILLED DIAPHRAGMS: Untopped metal deck diaphragms or metal deck diaphragms with fill other than concrete consist of horizontal spans of less than 40 ft and have aspect ratios less than 4-to-1. (Commentary: Sec. A.4.3.1. Tier 2: Sec. 5.6.3)

C NC N/A U OTHER DIAPHRAGMS: The diaphragm does not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Commentary: Sec. A.4.7.1. Tier 2: Sec. 5.6.5)

High Seismicity: Complete theFollowing Items in Addition to the Items for Very Low, Low, and Moderate Seismicity.

Seismic-Force-Resisting System

C NC N/A U MOMENT-RESISTING CONNECTIONS: All moment connections are able to develop the strength of the adjoining members or panel zones based on 110% of the expected yield stress of the steel per AISC 341, Section A3.2. (Commentary: Sec. A.3.1.3.4. Tier 2: Sec. 5.5.2.2.1)

Foundation System

C NC N/A U DEEP FOUNDATIONS: Piles and piers are capable of transferring the seismic forces between the structure and the soil. (Commentary: Sec. A.6.2.3.)

C NC N/A U SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story high. (Commentary: Sec. A.6.2.4)

BUILDING BASE SHEAR AND LATERAL DESIGN:
2013 California Building Code (CBC) Equivalent Lateral Force Procedure Base Shear & Vertical Force Distribution
Based on ASCE 7-10 as amended by the 2013 CBC. All references are made to ASCE 7-10, unless otherwise noted.

Seismic Base Shear

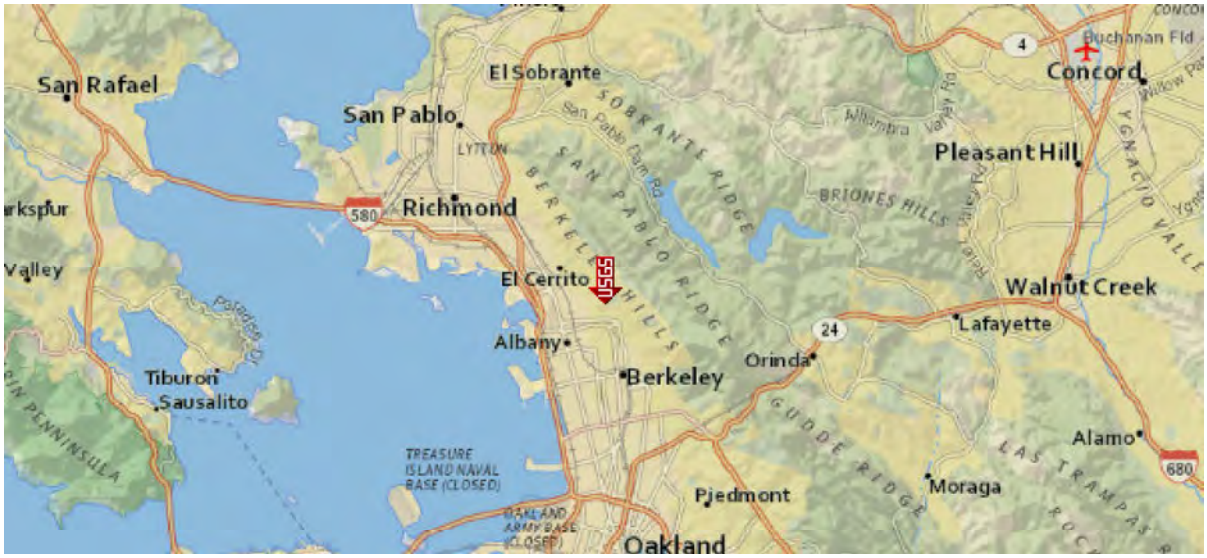
Input Data:

Site Class =	D		Geotechnical Report
Nature of Occupancy =	Essential		Per Architect
Occupancy Category =	IV		Table 1-1
Seismic Design Category based on S_{D1}=	F		CBC, 1613.3.5
Seismic Design Category based on S_{DS}=	D		CBC, 1613.3.5
Governing Seismic Design Category =	**F**		CBC, 1613.3.5
Short Period, S_s =	2.48	g	Geotechnical Report
Site Coefficient, F_A =	1.00		Table 11.4-1
Maximum Considered Earthquake, S_{MS} =	2.48	g	Eqn 11.4-1
Damped Short Period Acceleration, S_{DS} =	1.66	g	Eqn 11.4-3
One Second Period, S_1 =	1.03	g	Geotechnical Report
Site Coefficient, F_V =	1.50		Table 11.4.2
Maximum Considered Earthquake, S_{M1} =	1.55	g	Eqn 11.4-2
Damped One Second Period Acceleration, S_{D1} =	1.03	g	Eqn 11.4-4
Importance factor, I =	1.50		Table 1.5-2

USGS Design Maps Summary Report

User–Specified Input

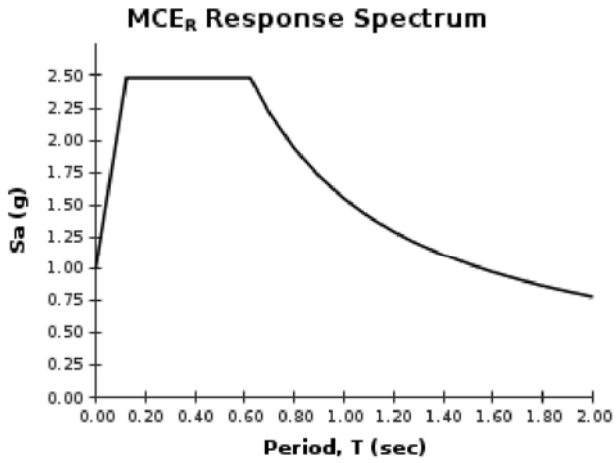
Report Title	Kensington Firestation Tue November 15, 2016 17:41:13 UTC
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	37.90616°N, 122.2789°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	IV (e.g. essential facilities)

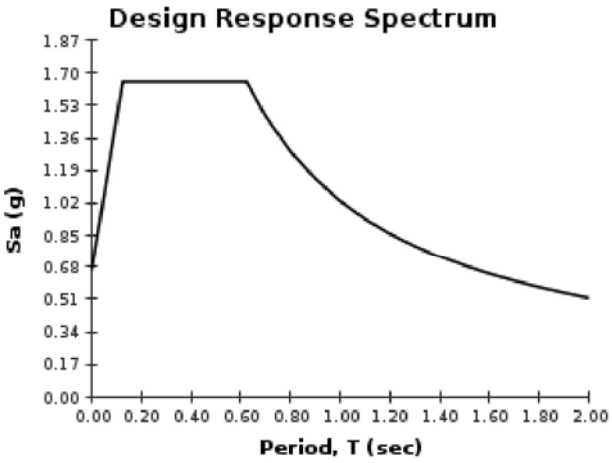


USGS–Provided Output

S_S =	2.483 g	S_{MS} =	2.483 g	S_{DS} =	1.655 g
S_1 =	1.031 g	S_{M1} =	1.547 g	S_{D1} =	1.031 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.



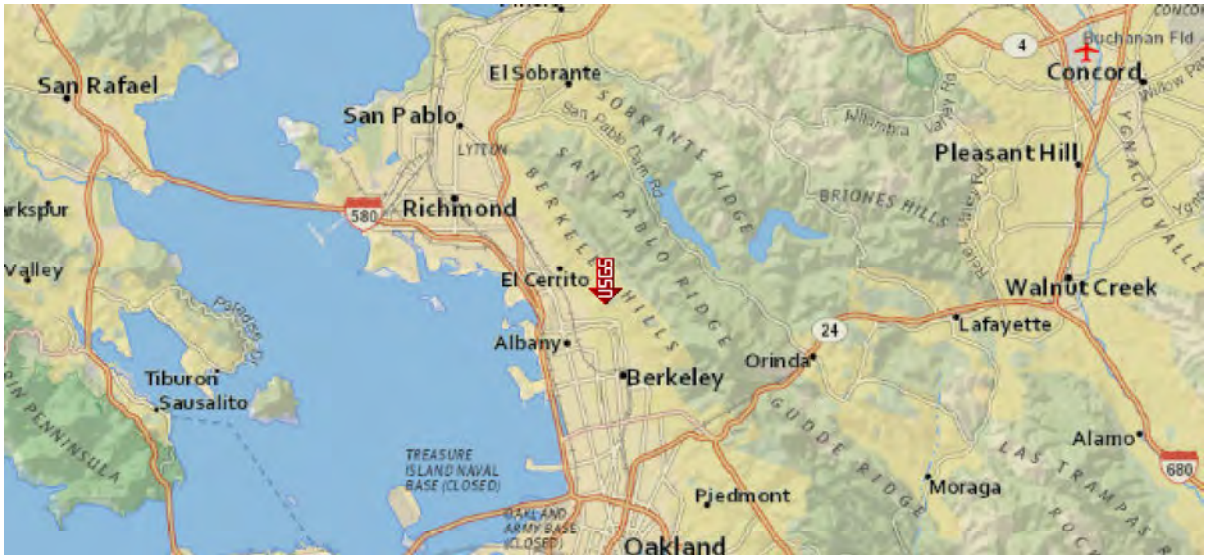


For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Summary Report

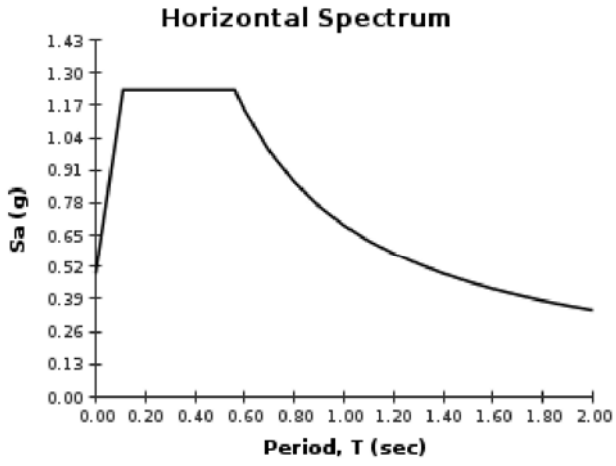
User–Specified Input

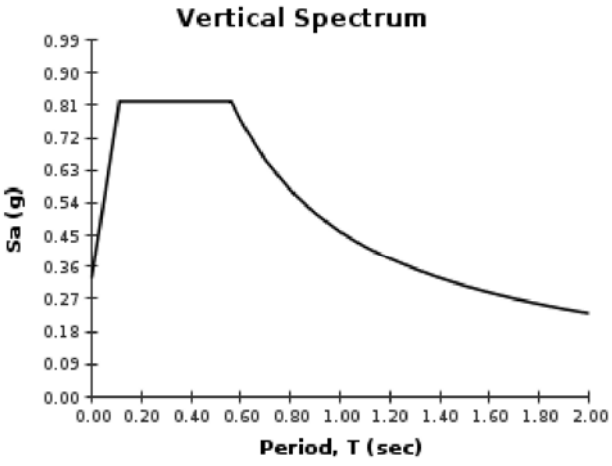
Report Title	Kensington Firestation Mon November 14, 2016 19:32:11 UTC
Building Code Reference Document	ASCE 41-13 Retrofit Standard, BSE-1E (which utilizes USGS hazard data available in 2008)
Site Coordinates	37.90616°N, 122.2789°W
Site Soil Classification	Site Class D – "Stiff Soil"



USGS–Provided Output

$S_{S,20/50}$	1.213 g	$S_{XS,BSE\text{-}1E}$	1.231 g
$S_{1,20/50}$	0.443 g	$S_{X1,BSE\text{-}1E}$	0.690 g

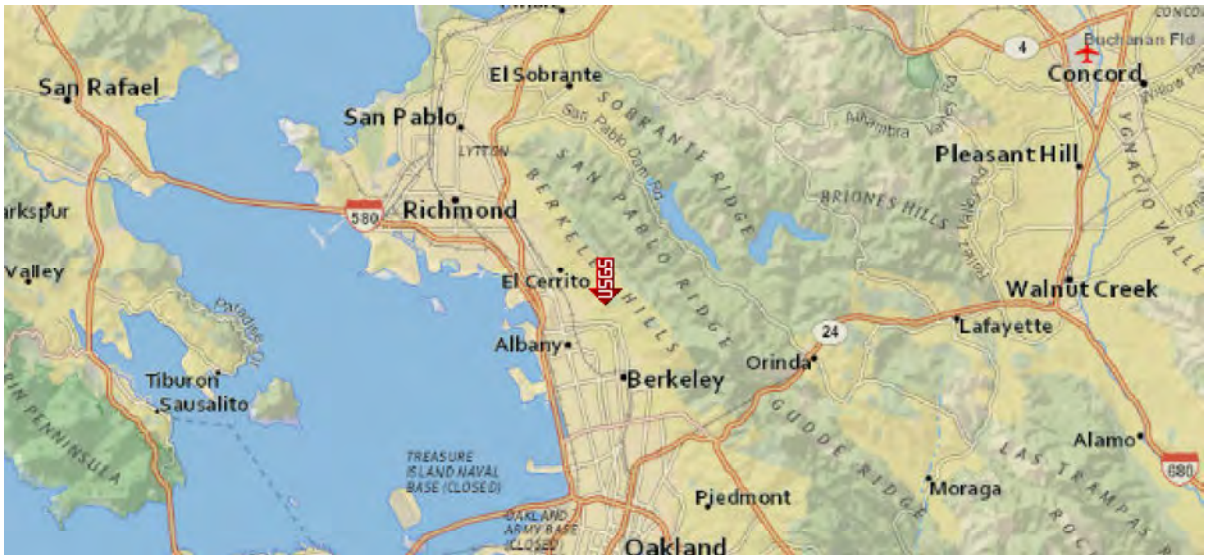




USGS Design Maps Summary Report

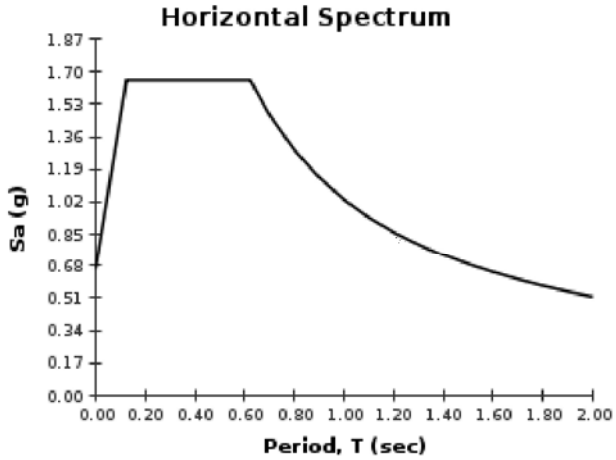
User–Specified Input

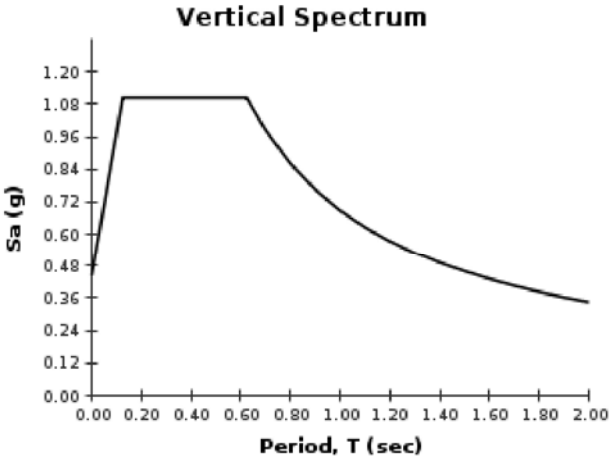
Building Code Reference Document	ASCE 41-13 Retrofit Standard, BSE-1N (which utilizes USGS hazard data available in 2008)
Site Coordinates	37.90656°N, 122.27925°W
Site Soil Classification	Site Class D – "Stiff Soil"



USGS–Provided Output

$S_{XS,BSE-1N}$	1.656 g
$S_{X1,BSE-1N}$	1.032 g





ASCE 41 Shear Stress in Shear Walls

Determine V, the pseudo lateral force from Equation 4-1. V is a function of

- C
- S_a, the response spectral acceleration at the fundamentla period of the building in the diretion under consideration. S_a shall be calculated in accordance with Section 4.5.2.3
- W, the total dead load

Building type — W1 Wood Light Frames

the modification factor to relate expected maximum inelastic displacements to displacements calculated for linear elastic response, taken from Table 4-8

$C := 1.1$ Number of stories=2

Determine S_a

1 second period spectral acceleration of the BSE-1E

$S_{X1} := 0.69$

Short period spectral acceleration of the BSE-1E Design

$S_{XS} := 1.231$

Factor per table 4-9

$M_s := 2.0$ Immediate Occupancy Level of Performance

Determine T

Coefficient to determine building period, from Section 4.5.2.4

$C_t := 0.020$

Height in feet above the base to the roof level

$h_n := 22.5\ \mathbf{ft}$

$\beta := 0.75$

Fundamental period of vibration of the building, calculated in accordance with Section 4.5.2.4

$$T := C_t \cdot \left(\frac{h_n}{1\ \mathbf{ft}} \right)^{\beta} = 0.207$$

Minimum base dimension $base := 40.66\ ft$

$$S_a := min\left(\frac{S_{X1}}{T}, S_{XS}\right) = 1.231$$

$$0.6 \cdot S_a = 0.74 \qquad \frac{base}{h_n} = 1.81$$

Minimum base dimension

$$Overturning := \mathbf{if}\left(\frac{base}{h_n} > 0.6 \cdot S_a, \text{“Compliant”}, \text{“Non compliant”}\right)$$

$$Overturning = \text{“Compliant”}$$

Arrays are second floor and roof

$$Floors := 2.0$$

Floor heights from base

$$h := \begin{bmatrix} 11.75 \\ 22.5 \end{bmatrix} ft$$

Length of the wall in North South Direction

$L_{NS\_1stFlr} := 105\ ft$

$L_{NS\_2ndFlr} := 51.4\ ft$

Length of the wall in East West Direction

$L_{EW\_1stFlr} := 84.63\ ft$

$L_{EW\_2ndFlr} := 75.3\ ft$

For wood-framed walls, the length shall be used rather than wall per 4.5.3.3

Area of walls in north south direction in

$$A_{wNS} := \begin{bmatrix} L_{NS\_1stFlr} \cdot \frac{1}{ft} \\ L_{NS\_2ndFlr} \cdot \frac{1}{ft} \end{bmatrix} ft^2$$

$$A_{wNS} = \begin{bmatrix} 105 \\ 51.4 \end{bmatrix} ft^2$$

Area of walls in east west direction

$$A_{wEW} := \begin{bmatrix} L_{EW\_1stFlr} \cdot \frac{1}{ft} \\ L_{EW\_2ndFlr} \cdot \frac{1}{ft} \end{bmatrix} ft^2$$

$$A_{wEW} = \begin{bmatrix} 84.63 \\ 75.3 \end{bmatrix} ft^2$$

$FloorArea_{2ndFlr} := 79\ ft \cdot 41\ ft = 3239\ ft^2$

$FloorArea_{Roof} := 79\ ft \cdot 41\ ft = 3239\ ft^2$

$FloorWeight_{2ndFlr} := 24\ psf$

$FloorWeight_{Roof} := 19\ psf$

$WallWeights := 10\ psf$

$WallTrib_{2ndFlr} := \frac{11.75}{2} ft + \frac{10.75}{2} ft = 11.25\ ft$

$WallTrib_{Roof} := \frac{11.75}{2} ft = 5.88\ ft$

Sesimic Weight of Walls :

$w_{wall\_2ndfFlr} := 61.5\ kip$

$w_{wall\_Roof} := 9.5\ kip$

See effective seismic weight calculations for walls and moment frame

$SeismicWeight_{2ndFlr} := FloorArea_{2ndFlr} \cdot FloorWeight_{2ndFlr} + w_{wall\_2ndfFlr}$

$SeismicWeight_{2ndFlr} = 139.24\ \textbf{kip}$

$SeismicWeight_{Roof} := FloorArea_{Roof} \cdot FloorWeight_{Roof} + w_{wall\_Roof}$

$SeismicWeight_{Roof} = 71.04\ \textbf{kip}$

Portion of total seismic weight on each floor, the first element in the array is for first floor and so on

$$w := \begin{bmatrix} 140 \\ 71 \end{bmatrix}\ \textbf{kip}$$

Total seismic weight of structure

$$W := \sum_{i=1}^{\text{length}(w)} w_i = 211\ \textbf{kip}$$

Psuedo seismic force per 4.5.2.1 Eq. 4-1

$$V := C \cdot S_a \cdot W = 286\ \textbf{kip}$$

Factor per 4.5.2.2

$$k := \text{if}\left(T > 2.5, 2, \text{if}\left(T \le 0.5, 1, 0.5 \cdot T + 0.75\right)\right)$$

$$k = 1$$

$$x := 1 .. Floors$$
$$j := 1 .. Floors$$

Vertical distribution of psuedo seismic force per 4.5.2.2 Eq 4-3a

$$F_x := \frac{w_x \cdot h_x^{\,k}}{\sum_{i=1}^{Floors} w_i \cdot h_i^{\,k}} \cdot V = \begin{bmatrix} 145 \\ 141 \end{bmatrix}\ \textbf{kip}$$

Story shear at story level j

$$V_j := \sum_{x=j}^{Floors} F_x = \begin{bmatrix} 286 \\ 141 \end{bmatrix} \textbf{kip}$$

Shear stress in shear walls in north sourth direction

$$v_{NS_j} := \frac{1}{M_s} \cdot \frac{V_j}{A_{wNS_j} \cdot \frac{1}{\textbf{ft}}} = \begin{bmatrix} 1360.55 \\ 1369.31 \end{bmatrix} \textbf{plf}$$

Shear stress in shear walls in east west direction

$$v_{EW_j} := \frac{1}{M_s} \cdot \frac{V_j}{A_{wEW_j} \cdot \frac{1}{\textbf{ft}}} = \begin{bmatrix} 1688.02 \\ 934.69 \end{bmatrix} \textbf{plf}$$

ASCE 41 Quick check limit:

$ShearstressAllowable := 1000$ **plf**

The shear stress in the shear walls,calculated using the Quick Check procedure of Section 4.5.3.3 is less than than allowable value of 1000plf

DATE: PAGE:

BY: JOB No.

PROJECT:

Effective Seismic weight calculations of walls and moment frame

LENGTH CONC. WALL ALONG GRID A IN 1ST FLOOR.

$L_{CONCWALL} = 45.75' + 5.75' + 5.75' + 5.6' + 3.75' = 66.6'$

WGT OF CONC WALL TRIB TO 2ND FLOOR

$W_{concwall} = 150pcf \times \left(\frac{6}{12}\right)' \times 66.6' \times \frac{11.75'}{2}$

$= 30^{K}$

WGT OF OMF COLUMNS. TRIB TO. 2ND FLOOR.

$W_{COL\_OMF} = (4\,NOS)\left(\frac{11.75'}{2}\right) \times (58\,\#)$

W12X58 $= 1.4^{K}$.

WGT. OF OMF BEAMS

$W_{BM\_OMF} = \left((13.5') + (13.25') + (13.25')\right) \times (40\,\#)$

$= 1.6^{K}$

LENGTH OF WALL ALONG GRID 1 IN FIRST FLOOR.

$L_{GRID1\_1STFLR} = 36.75'$

LENGTH OF WALL ALONG GRID. E 1ST FLOOR.

$L_{GRIDE\_1STFLR} = 2.75' + 1.75' + 5.75' + 5.75' + 5.75' + 2.6'$

$= 25'$

LENGTH OF WALL ALONG GRID 7 1ST FLOOR

$L_{GRID7\_1STFLR} = 41'$ (NO OPENINGS DEDUCTED)

DATE: PAGE:

BY: JOB No.

PROJECT:

LENGTH OF WALL ALONG. GRID A 2ND FLOOR

$L_{GRIDA-2ND\,FLR} = 2' + 1.5' + 7.5' + 8' + 5.5' + 5.75' + 8.5' + 2.75' + 10.25'$

$= 52'$

LENGTH OF WALL ALONG. GRID E 2ND FLOOR

$L_{GRIDE-2ND\,FLOOR} = 15.75' + 3.5' + 2' + 4.75' + 1.25' + 5.5' + 5' + 5.75' + 5.75' + 10.25'$

$= 60'$

LENGTH OF WALL ALONG. GRID 1 2ND FLOOR.

$L_{GRID1-2ND\,FLOOR} = 24'$

LENGTH OF WALL ALONG. GRID 7 2ND FLOOR

$L_{GRID7-2ND\,FLOOR} = 41'$

SEISMIC WGT. OF WALLS TRIB TO 2ND FLOOR

$= 30^K + 1.4^K + 1.6^K + (36.75' + 24')\left(\frac{11.75'}{2} + \frac{10.75'}{2}\right) \times (10\,psf)$

$+ (52')\left(\frac{10.75'}{2}\right) \times (10\,psf)$

$+ (25' + 60')\left(\frac{11.75'}{2} + \frac{10.75'}{2}\right) \times (10\,psf)$

$+ (41' + 41')\left(\frac{11.75'}{2} + \frac{10.75'}{2}\right) \times (10\,psf)$

$= 61.5^K.$

Tier 2 analysis of shear wall

Total seismic weight of the building $W = 211$ ***kip***

C_1 Modification factor to relate expected maximum inelastic displacements to displacements calculated for linear elastic response

C_2 Modification factor to represent the effect of pinched hysteresis shape, cyclic stiffness degradation, and strength deterioation on maximum displacement response.

Cm Effective mass factor to account for higher modal mass participation effects

$C_1C_2 := 1.1$ Table 7-3

$C_m := 1.0$ Table 7-4

$S_a = 1.23$

The Pseudo lateral force in a given horizontal direction of a building is determined using Eq. (7-21) :

$$V := C_1C_2 \cdot C_m \cdot S_a \cdot W$$

$V = 285.72$ ***kip***

Vertical distribution of psuedo seismic force per 7.4.1.3.2 Eq (7-24)

$$F_x := \frac{w_x \cdot h_x^{k}}{\sum_{i=1}^{Floors} w_i \cdot h_i^{k}} \cdot V = \begin{bmatrix} 145 \\ 141 \end{bmatrix} \text{ kip}$$

Story shear at story level j

$$V_j := \sum_{x=j}^{Floors} F_x = \begin{bmatrix} 286 \\ 141 \end{bmatrix} \text{ kip}$$

Diaphragm inertial force

$$F_{p_x} := \frac{\sum_{i=1}^{Floors} F_i}{\sum_{i=1}^{Floors} w_i} \cdot w_x = \begin{bmatrix} 190 \\ 96 \end{bmatrix} \textit{kip}$$

DATE: PAGE:

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PROJECT: KENSINGTON FIRE STATION

EXPECTED STRENGTH OF WOOD STRUCTURAL PANEL SHEATHING DIAPHRAGM PER C12.5-3-6.2.2

DIAPHRAGM INERTIAL FORCE - ROOF = F_{px} = 96 kips.

FOR NORTH-SOUTH DIRECTION EQ.

$$Q_{ud\ DIAPHRAMS.} = \frac{F_{px}/2}{D} = \frac{96^{k}/2}{79'} = 0.60\ klf$$

(E) ROOF SHEATHING: 1/2" PLYWOOD
CDX GRADE.
8d @ 4" O.C BOUNDARY NAILING.
8d @ 10" O.C. FIELD NAILING.

LRFD SHEAR CAPACITY = 2x320plf (ϕ = 1.0)
= 640plf

$$\Rightarrow Q_{CEDIAPHRAGMS} = 640\ plf = 0.64\ klf.$$

$$\frac{Q_{udDIAPHRAGMS}}{Q_{CEDIAPHRAGMS}} = \frac{0.60\ klf}{0.64\ klf} = 0.94\ \underline{OK}$$

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PROJECT:

STORY FORCE @ SECOND FLOOR FOR N-S. DIRECTION EQ. = 190^k.

$$Q_{ud} = \frac{\frac{190^k}{2}}{79'} = \frac{95^k}{79'} = 1.20\ klf.$$

(E) FLOOR SHEATHING : 3/4" PW.

10d @ 4" O.C BOUNDARY NAILING

10d @ 4" O.C EDGE NAILING.

10d @ 10" O.C FIELD NAILING.

LRFD SHEAR CAPACITY = 2X425 plf
(ϕ=1.0) = 850 plf.
= 0.85 klf.

$$\frac{Q_{ud}}{Q_{CE}} = \frac{1.20^{klf}}{0.85\ klf} = 1.41\ klf.$$ NG

Calculation of available Shear Wall Length

Length of shear wall in N-S
Direction in Ground Floor:

$L_{Ground\_GridA} := 45.75\ ft + 5.66\ ft + 5.75\ ft + 5.5\ ft = 62.66\ ft$

Length of shear wall in E-W
Direction in Ground Floor :

$L_{Ground\_Grid1} := 36.75\ ft$

$L_{Ground\_Grid4} := 12\ ft + 8\ ft = 20\ ft$

$L_{Ground\_Grid7} := 6.83\ ft + 14\ ft + 8.5\ ft = 29.33\ ft$

Length of shear wall in N-S
Direction in Second Floor :

$L_{Second\_GridA} := 7.5\ ft + 8\ ft + 5.5\ ft + 5.75\ ft + 8.6\ ft + 10.25\ ft = 45.6\ ft$

$L_{Second\_GridE} := 4.9\ ft + 5.5\ ft + 5\ ft + 5.66\ ft + 5.66\ ft + 10.25\ ft = 36.97\ ft$

Length of shear wall in E-W
Direction in Second Floor :

$L_{Second\_Grid1} := 24\ ft$

$L_{Second\_Grid4} := 17\ ft + 5.66\ ft = 22.66\ ft$

$L_{Second\_Grid7} := 24.25\ ft + 4.42\ ft + 8.42\ ft = 37.09\ ft$

Calculation of Shear Loads to the Shear Walls

Roof

North South Direction

$V_x := 141\ kip$ Input Story Shear

Shear to Walls along grid A :

$$R_{A\_Roof} := \frac{V_x}{2} = 70.5\ kip$$

$$v_{A\_Roof} := \frac{R_{A\_Roof}}{L_{Second\_GridA}} = 1546.05\ plf \quad L_{Second\_GridA} = 45.6\ ft$$

Shear to Walls along grid E:

$$R_{E\_Roof} := \frac{V_x}{2} = 70.5\ kip$$

$$v_{E\_Roof} := \frac{R_{E\_Roof}}{L_{Second\_GridE}} = 1906.95\ plf \quad L_{Second\_GridE} = 36.97\ ft$$

East West Direction

Shear to Walls along grid 1 :

$$R_{1\_Roof} := \frac{21\ ft}{79\ ft} \cdot V_x = 37.48\ kip$$

$$v_{1\_Roof} := \frac{R_{1\_Roof}}{L_{Second\_Grid1}} = 1561.71\ plf$$

Shear to Walls along grid 4 :

$$R_{4\_Roof} := \frac{(45\ ft + 37\ ft) \cdot 0.5}{79\ ft} \cdot V_x = 73.18\ kip$$

$$v_{4\_Roof} := \frac{R_{4\_Roof}}{L_{Second\_Grid4}} = 3229.36\ plf \quad L_{Second\_Grid4} = 22.66\ ft$$

Shear to Walls along grid 7 :

$$R_{7\_Roof} := \frac{37\ ft \cdot 0.5}{79\ ft} \cdot V_x = 33.02\ kip$$

$$v_{7\_Roof} := \frac{R_{7\_Roof}}{L_{Second\_Grid7}} = 890.24\ plf \qquad L_{Second\_Grid7} = 37.09\ ft$$

Second Floor

North South Direction

$V_x := 286\ kip$ Input Story Shear

Shear to Walls along grid A :

$$R_{A\_2ndFlr} := \frac{V_x}{2} = 143\ kip$$

$$v_{A\_2ndFloor} := \frac{R_{A\_2ndFlr}}{L_{Ground\_GridA}} = 2282.16\ plf \qquad L_{Ground\_GridA} = 62.66\ ft$$

Shear to Walls along grid E:

$$R_{E\_2ndFlr} := \frac{V_x}{2} = 143\ kip$$ Moment Frame

East West Direction

Shear to Walls along grid 1 :

$$R_{1\_2ndFlr} := \frac{21\ ft}{79\ ft} \cdot V_x = 76.03\ kip$$

$$v_{1\_2ndFlr} := \frac{R_{1\_2ndFlr}}{L_{Ground\_Grid1}} = 2068.72\ plf$$

Shear to Walls along grid 4 :

$$R_{4\_2ndFlr} := \frac{(45\ ft + 37\ ft) \cdot 0.5}{79\ ft} \cdot V_x = 148.43\ kip$$

$$v_{4\_2ndFlr} := \frac{R_{4\_2ndFlr}}{L_{Ground\_Grid4}} = 7421.52\ \textbf{plf} \quad L_{Ground\_Grid4} = 20\ \textbf{ft}$$

Shear to Walls along grid 7 :

$$R_{7\_2ndFlr} := \frac{37\ \textbf{ft} \cdot 0.5}{79\ \textbf{ft}} \cdot V_x = 66.97\ \textbf{kip}$$

$$v_{7\_2ndFlr} := \frac{R_{7\_2ndFlr}}{L_{Ground\_Grid7}} = 2283.49\ \textbf{plf} \quad L_{Ground\_Grid7} = 29.33\ \textbf{ft}$$

Existing Allowable Shear Wall Capacity

Acceptance Criteria for Deformation Controlled Actions for LSP,Section 7.5.2.2

$m := 1.7$ Component modification factor to account for expected ductility. For linear procedures,m-factors for use with deformation-controlled actions shall be taken from Table 12-3.

$k := 0.9$ Knowledge factor defined per section 6.2.4/Table 6-1

Q_{CE} Expected strength of wood structural panel sheathing per Section 12.4.4.6.2. Expected strengths of wood structural panel shear walls shall be permitted to based on 1.5 times yield strengths. Yield strength shall be determined using LRFD procedure contained in AWC SDPWS, except the resistance factor, ϕ, shall be taken as 1.0

Roof

North South Direction

Shear wall capacity along Grid A

$Q_{CE\_AWall} := 1.5 \cdot 255\ plf \cdot 2 \cdot 1 = 765\ plf$

(10d nails @ 6" oc edge nailing)

$m \cdot k \cdot Q_{CE\_AWall} = 1170.45\ plf$

$m \cdot k \cdot Q_{CE\_AWall} \cdot L_{Second\_GridA} = 53.37\ kip$

$Q_{ad} := R_{A\_Roof} = 70.5\ kip$

$$\frac{Q_{ad}}{m \cdot k \cdot Q_{CE\_AWall} \cdot L_{Second\_GridA}} = 1.32$$ NG

Shear wall capacity along Grid E

$Q_{CE\_AWall} := 1.5 \cdot 255\ plf \cdot 2 \cdot 1 = 765\ plf$

$m \cdot k \cdot Q_{CE\_AWall} = 1170.45\ plf$

$m \cdot k \cdot Q_{CE\_AWall} \cdot L_{Second\_GridE} = 43.27\ kip$

$Q_{ad} := R_{E\_Roof} = 70.5\ kip$

$$\frac{Q_{ad}}{m \cdot k \cdot Q_{CE\_AWall} \cdot L_{Second\_GridE}} = 1.63$$ NG

East West Direction

Shear wall capacity along Grid 1

$Q_{CE\_AWall} := 1.5 \cdot 255\ plf \cdot 2 \cdot 1 = 765\ plf$

$m \cdot k \cdot Q_{CE\_AWall} = 1170.45\ plf$

$m \cdot k \cdot Q_{CE\_AWall} \cdot L_{Second\_Grid1} = 28.09\ kip$

$Q_{ad} := R_{1\_Roof} = 37.48\ kip$

$$\frac{Q_{ad}}{m \cdot k \cdot Q_{CE\_AWall} \cdot L_{Second\_Grid1}} = 1.33$$ NG

Shear wall capacity along Grid 4:

$Q_{CE\_AWall} := 1.5 \cdot 255\ plf \cdot 2 \cdot 1 = 765\ plf$ Added in 1998

$Q_{CE\_CWall} := 1.5 \cdot 310\ plf \cdot 2 \cdot 1 = 930\ plf$ Added in 2004

$m \cdot k \cdot \left(Q_{CE\_AWall} + Q_{CE\_CWall}\right) \cdot 17\ ft + m \cdot k \cdot Q_{CE\_AWall} \cdot 5.66\ ft = 50.71\ kip$

$Q_{ad} := R_{4\_Roof} = 73.18\ kip$

$$\frac{Q_{ad}}{m \cdot k \cdot \left(Q_{CE\_AWall} + Q_{CE\_CWall}\right) \cdot 17\ ft + m \cdot k \cdot Q_{CE\_AWall} \cdot 5.66\ ft} = 1.44$$ NG

Shear wall capacity along Grid 7:

$Q_{CE\_AWall} := 1.5 \cdot 255\ \textbf{plf} \cdot 2 \cdot 1 = 765\ \textbf{plf}$

$m \cdot k \cdot Q_{CE\_AWall} \cdot L_{Second\_Grid7} = 43.41\ \textbf{kip}$

$Q_{ad} := R_{7\_Roof} = 33.02\ \textbf{kip}$

$$\frac{Q_{ad}}{m \cdot k \cdot Q_{CE\_AWall} \cdot L_{Second\_Grid7}} = 0.76$$

OK

Second Floor

North South Direction

Shear wall capacity along Grid A

$Q_{ad} := R_{A\_2ndFlr} = 143\ \textbf{kip}$

Shear to concrete shear wall

Shear wall capacity along Grid E

$Q_{ad} := R_{E\_2ndFlr} = 143\ \textbf{kip}$

Loads to Moment Frame

East West Direction

Shear wall capacity along Grid 1

$Q_{CE\_AWall} := 1.5 \cdot 255\ \textbf{plf} \cdot 2 \cdot 1 = 765\ \textbf{plf}$

$m \cdot k \cdot Q_{CE\_AWall} = 1170.45\ \textbf{plf}$

$m \cdot k \cdot Q_{CE\_AWall} \cdot L_{Ground\_Grid1} = 43.01\ \textbf{kip}$

$Q_{ad} := R_{1\_2ndFlr} = 76.03\ \textbf{kip}$

$$\frac{Q_{ad}}{m \cdot k \cdot Q_{CE\_AWall} \cdot L_{Ground\_Grid1}} = 1.77$$ NG

Shear wall capacity along Grid 4:

$Q_{CE\_DWall} := 1.5 \cdot 600\ \textbf{plf} \cdot 2 \cdot 1 = 1800\ \textbf{plf}$

$Q_{CE\_BWall} := 1.5 \cdot 460\ \textbf{plf} \cdot 2 \cdot 1 = 1380\ \textbf{plf}$

$m \cdot k \cdot \left(Q_{CE\_BWall} + Q_{CE\_DWall}\right) \cdot 8\ \textbf{ft} + m \cdot k \cdot \left(Q_{CE\_DWall} \cdot 12\ \textbf{ft} + Q_{CE\_BWall} \cdot 18\ \textbf{ft}\right) = 109.98\ \textbf{kip}$

$Q_{ad} := R_{4\_2ndFlr} = 148.43\ \textbf{kip}$

$$\frac{Q_{ad}}{m \cdot k \cdot \left(Q_{CE\_BWall} + Q_{CE\_DWall}\right) \cdot 8\ \textbf{ft} + m \cdot k \cdot \left(Q_{CE\_DWall} \cdot 12\ \textbf{ft} + Q_{CE\_BWall} \cdot 18\ \textbf{ft}\right)} = 1.35$$ NG

Shear wall capacity along Grid 7:

$Q_{CE\_AWall} := 1.5 \cdot 255\ \textbf{plf} \cdot 2 \cdot 1 = 765\ \textbf{plf}$

$m \cdot k \cdot Q_{CE\_AWall} \cdot L_{Ground\_Grid7} = 34.33\ \textbf{kip}$

$Q_{ad} := R_{7\_2ndFlr} = 66.97\ \textbf{kip}$

$$\frac{Q_{ad}}{m \cdot k \cdot Q_{CE\_AWall} \cdot L_{Ground\_Grid7}} = 1.95$$ NG

Conclusion : The existing shear walls are not adeqaute to resist the seismic forces

Immediate Occupancy Structural Checklist for Building Types S1A: Steel Moment Frames with Flexible Diaphragms

Section 4.5.3.1 Story Drift for Moment Frames ,
Quick Check Procedure

$h := 13.5\ \textbf{ft}$	Story Height (in)
$I_b := 307\ \textbf{in}^4$	Moment of Inertia of beam (in^4)
$I_c := 475\ \textbf{in}^4$	Moment of Inertia of beam (in^4)
$L := 161\ \textbf{in}$	Beam Length from center-to-center of adjacent columns (in)
$E := 29000\ \textbf{ksi}$	Modulus of elasticity (kip/in^2)
$V_c := \frac{286}{2}\ \textbf{kip}$	Shear in the column (kip). The column shear forces are calculated using the story forces in accordance with Section 4.5.2.2
$V_c = 143\ \textbf{kip}$	
$k_b := \frac{I_b}{L}$	for the representative beam
$k_c := \frac{I_c}{h}$	for the representative column

Drift Ratio: $D_r := \frac{(k_b + k_c)}{k_b \cdot k_c} \cdot \frac{h}{12 \cdot E} \cdot V_c = 0.0576$

$\textbf{if}\left(D_r < 0.015, \text{“OK”}, \text{“NG”}\right) = \text{“NG”}$

Tier 2 evaluation of Drift :

Demands : $Q_{ud\_col} := 396\ kip \cdot ft$ Based on RISA 3d analysis of frame

$Q_{ud\_beam} := 396\ kip \cdot ft$

Expected Strength of Beams :

$M_{CE} := 114\ in^3 \cdot 36\ ksi = 4104\ kip \cdot in$ W12x40 beam with 5/8"x4.5" wide stiff plate

$Q_{CE\_beam} := M_{CE} = 4104\ kip \cdot in$

$m := 2.0$ Table 9-4, Beams-Flexure, IO

$Q_{CE\_beam} \cdot m \cdot k = 7387.2\ kip \cdot in$

$\frac{Q_{ud\_beam}}{Q_{CE\_beam} \cdot m \cdot k} = 0.64$ Comply

Expected Strength of Columns:

Note: Assuming negligible axial load on the columns

$M_{CE} := 167\ in^3 \cdot 36\ ksi = 6012\ kip \cdot in$ W12x58 columns with 3/4"x5.5" flange stiff plate

$Q_{CE\_col} := M_{CE} = 6012\ kip \cdot in$

$Q_{ud\_col} = 4752\ kip \cdot in$

$m := 2.0$ Table 9-4, Columns-Flexure, IO

$\frac{Q_{ud\_col}}{m \cdot Q_{CE\_col}} = 0.4$ Comply

Conclusion:
The anlaysis of frame was performed in accordance with Section 5.2.4.
Adequacy of the beams and columns was checked per Tier 2: Section 5.5.2.1.2 .
The strength of the beams and columns is adequate. The moment frame comply the drift check.

COLUMN AXIAL STRESS CHECK USING QUICK CHECK PROCEDURE

$f_y := 36\ \textbf{ksi}$ A36 steel

$0.30\ f_y = 10.8\ \textbf{ksi}$

Column Axial stress Caused by Overturning calculated using quick check procedure of Section 4.5.3.6

$n_f := 3$ Total number of frames in the direction of loading

$V := 143\ \textbf{kip}$ Pseudo Seismic force

$h_n := 13.5\ \textbf{ft}$ Height above the base to the roof level

$L := 39.832\ \textbf{ft}$ Total length of the frame

$M_s := 1.3$ System Modification Factor Immediate Occupancy Performace Level

$A_{col} := 17\ \textbf{in}^2$ Area of the end column of the frame

$$p_{ot} := \frac{1}{M_s} \cdot \left(\frac{2}{3}\right) \cdot \left(\frac{V \cdot h_n}{L \cdot n_f}\right) \cdot \left(\frac{1}{A_{col}}\right) = 0.49\ \textbf{ksi}$$

$p_{ot} < 0.30\ f_y$ *ok*

FLEXURAL STRESS CHECK USING QUICK CHECK PROCEDURE OF SECTION 4.5.3.9:

$n_c := 4$ Total number of frame columns at the level, j, under consideration

$n_f := 3$ Total number of frames in the direction of loading at the level ,j, under consideration

$V_j := 143\ \textbf{kip}$ Story shear computed in accordance with Section 4.5.2.2

$h := 13.5\ \textbf{ft}$ Story Height

$Z_c := 4 \cdot 167\ \textbf{in}^3 = 668\ \textbf{in}^3$ The sum of the plastic section moduli of all the frame columns at the level under consideration

$Z_b := 6 \cdot 114\ \textbf{in}^3 = 684\ \textbf{in}^3$ The sum of the plastic section moduli of all the frame beams with moment resisting connections at the level under consideration

$M_s := 3.0$ Immediate Occupancy System Modification Factor

$f_{j\_col} := V_j \cdot \frac{1}{M_s} \cdot \frac{n_c}{n_c - n_f} \cdot \frac{h}{2} \cdot \frac{1}{Z_c} = 23.12\ \textbf{ksi}$ < Fy=36ksi OK

$f_{j\_beam} := V_j \cdot \frac{1}{M_s} \cdot \frac{n_c}{n_c - n_f} \cdot \frac{h}{2} \cdot \frac{1}{Z_b} = 22.58\ \textbf{ksi}$ < Fy=36ksi OK

PANEL ZONES (MODERATE SEISMICITY) Ref: 9.4.2.3 Strength of FR Moment Frames

$d_c := 12.2\ in$ Column depth W12x58

$d_b := 12\ in$ Depth of W12x40 beam

$t_{fb} := 0.515\ in$ Thickness of W12x40 flange beam

$E := 29000\ ksi$ Modulus of elasticity

$F_{ye} := 36\ ksi$ Expected Yield strength of the material, A36 steel

$t_p := \frac{1}{2}\ in \cdot 2 + 0.36\ in$ Total thickness of panel zone including doubler, 1/2" thk dblr plate both sides

The expected plastic shear capacity of the panel zone :

$V_{CE} := 0.55\ F_{ye} \cdot d_c \cdot t_p$ Equation 9-5

$V_{CE} = 328.52\ kip$

$m := 1.5$ Column panel zone shear, Immediate Occupancy, Table 9-4,deformation controlled

$m \cdot k \cdot V_{CE} = 443.5\ kip$

The plastic moment capacity of beam:

$Z := 57\ in^3$ Plastic section modulus of W12x40 beam

$M_{CE} := Z \cdot F_{ye} = 2052\ kip \cdot in$

$\Sigma M_{CE} := 2 \cdot M_{CE} = 4104\ kip \cdot in$

Shear Demand :

$d_z := d_b - t_{fb} = 11.49$ ***in*** Depth of panel zone

$V_{ud} := \frac{\Sigma M_{CE}}{d_z} = 357.34$ ***kip***

Demand Capacity Ratio
Panel Zone Strength :

$\frac{V_{ud}}{m \cdot k \cdot V_{CE}} = 0.81$ OK

MOMENT RESISTING CONNECTION CHECK (MODERATE SEISMICITY AND HIGH SEISMICITY):

The expected shear strength of beam :

$t_w := 0.295\ in$ $d := 12\ in$ $t_f := 0.515\ in$ $d - 2 \cdot t_f = 10.97\ in$

$A_w := t_w \cdot (d - 2 \cdot t_f) = 3.24\ in^2$

$V := 0.6 \cdot F_{ye} \cdot A_w = 69.9\ kip$ Equation 9-7

$V_{ud} := V = 69.9\ kip$

Strength of beam web-to-column connection weld :

$V_{CE} := 1.39\ \frac{kip}{in} \cdot 5 \cdot 2 \cdot (d - 2\ t_f) = 152.48\ kip$

(5/16" fillet weld provided at both side of shear plate to column connection)

$m := 1.0$

$m \cdot k \cdot V_{CE} = 137.23\ kip$

Demand Capacity Ratio

$\frac{V_{ud}}{m \cdot k \cdot V_{CE}} = 0.51$ OK for moderate seismicity

$1.1 \cdot \frac{V_{ud}}{m \cdot k \cdot V_{CE}} = 0.56$ OK for high seismicity

STRONG COLUMN WEAK BEAM (MODERATE SEISMICITY)

STRONG COLUMN-WEAK BEAM (MODERATE SEISMICITY)

$m := 2.5$ Tier2: Section 5.5.2.1.5

$Z_c = 668\ in^3$ Plastic section modulus of Columns

$Z_b = 684\ in^3$ Plastic section modulus of Beams

$2 \cdot Z_b = 1368\ in^3$

$p_{ot} = 0.49\ ksi$ Axial stress in the column due to overturning using quick check procedure

$f_a := p_{ot} = 0.49\ ksi$

$$\frac{Z_c \cdot (F_{ye} - f_a)}{2 \cdot Z_b \cdot F_{ye}} = 0.482$$

$$m \cdot \frac{Z_c \cdot (F_{ye} - f_a)}{2 \cdot Z_b \cdot F_{ye}} = 1.2 \quad >1.0 \quad \text{Comply}$$

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COMPACT MEMBER CHECK

W 12X58

$\frac{bf}{2tf} = 7.82$ ok

$\frac{h}{tw} = 27$ ok

$0.30 \times \sqrt{\frac{29000 ksi}{36 ksi}} = 8.51$

$2.45 \sqrt{\frac{29000 ksi}{36 ksi}} = 69.56$

W 12X40 $\frac{bf}{2tf} = 7.77$ ok

$\frac{h}{tw} = 33.6$ ok

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January 10, 2017

Mark Zall, AIA, Associate
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18294 Sonoma Highway
Sonoma, CA 95476

Re: Kensington Fire Station Facility Evaluation Report

Mark,

The attached is the Facility Evaluation Report for Kensington Fire Station. The following document is based upon a review of the available as-built drawings and our site visit conducted on July 13th, 2016. If you should have any questions, please don't hesitate to call. Thank you.

Sincerely,

Jay Takacs LEED AP, Principal

Kensington Fire Station Facility Evaluation Report - Summary

Heating, Ventilating and Air Conditioning (HVAC) Systems

The following is based upon review of the existing as-built documents and our site visit conducted on July 13th, 2016.

The primary HVAC systems consist of three gas-fired furnaces located within a closet with associated roof mounted air-cooled condensing units. In general the equipment is at the end of its useful lifespan and the insulation on the refrigerant piping is deteriorating. The furnace closet is also too small for the amount of equipment located within it. Equipment is approximately twenty-five years old.

Outdoor air ventilation is being provided by a common outdoor air intake located within the exterior furnace closet and extending up through the roof to a common gravity air intake. Each furnace is provided with a built-up two-position economizer. Dampers are not accessible for maintenance due to original construction constraints.

In addition to the three furnaces, there are four separate ductless split-systems throughout the building which have been added after the original design. Each one serves an independent office with associated thermostat and condensate drainage piping. While the interior units are in good shape, the exterior mounted condensing units are showing wear and tear and are likely to require ongoing maintenance.

Lastly, there is a gas-fired unit heater within the apparatus bay. When the trucks are parked in the apparatus bay under normal conditions, the back end of the truck directly contacts the unit heater, causing the heater to have limited capability to distribute tempered air within the apparatus bay.

HVAC Controls

The HVAC controls throughout the building are antiquated and there is no consistency throughout the control system. Each furnace unit is provided with a separate stand-alone manufacturer's thermostat all from various manufactures. Only one of the furnaces is provided with a programmable thermostat (minimum code requirement). The other two are provided with mercury driven thermostats which do not provide any programming and are 100% manual and not in compliance with current Title 24 requirements.

Plumbing Systems

The domestic water plumbing systems throughout the building consist of a single 2" main domestic water line. In general, the fixtures are not ADA compliant and should be replaced as part of any upgrade for the facility. Hot water systems are gas-fired and near the end of their expected lifespan. The water heater is located in the same closet as the furnaces and is not properly strapped for seismic restraint as required by code. The water heater is a minimum 80% efficient. While this is the minimum efficiency allowed by Title 24, it is very common to provide condensing water heaters which provide 94% efficient burners.

The restrooms throughout the building are not ADA compliant and are in need of new fixtures and clearances.

The sanitary sewer system is served by a single 4" line entering the building through the front (south) elevation. The apparatus bay is not provided with any oil and/or sand protection (sand/oil separator).

Option #1 – Remodel & Addition

The option of adding on additional square footage to the building and remodeling the existing building proves to be problematic from an HVAC perspective. The existing furnace closet houses three furnaces and a gas-fired water heater that is approximately 50 square feet in size. In addition, the furnace closet is located on the exterior at the rear of the facility. This space would be compromised by the addition of new square footage towards the rear.

Adequate code clearance is not provided for any of the pieces of equipment and the water heater is strapped to a vertical section of exhaust ductwork which is not code compliant. The water heater is required to be strapped at one-third intervals against a wall with properly sized blocking.

Recommendations would be to provide a much larger closet, approximately 100 square feet in order to accommodate new furnaces, economizers and water heater. This would correspond with new air-cooled condensing units located on the roof.

Additional HVAC requirements for the smaller offices would include a variable refrigerant system throughout the building, allowing the system to be sourced from a single heat pump located on the roof distributing to several separate zones. The addition of a multi-zone system would require the addition of a dedicated outside air unit to provide for minimum Title 24 requirements for outdoor air ventilation.

It is recommended that the furnace closet be located on an exterior wall in order to take advantage of outdoor air intakes and flue discharge. Presently, there are two-position economizers for each unit. The recommended solution would be to provide fully modulating economizers to take advantage of "free-cooling" allowing the economizer to operate on temperate days without energizing the electrically powered condensing units. This is especially important given the mild Kensington climate.

The apparatus bay should have the unit heater removed and replaced with a gas-fired infrared heater above the trucks allowing for more space for parking and access.

The plumbing systems are largely non-ADA compliant and restrooms and sinks should be renovated to provide larger rooms to accommodate current ADA requirements.

It is also recommended to replace all existing controls with new direct digital controls matching the City of Kensington's standards.

Option #2 – New Building at Existing Site

The option of a new building on the existing site presents many of the space constraints detailed in Option #1.

The benefit of a new building on the existing site is the flexibility for the HVAC systems. Given the nature of the building and its several zones, we would recommend a variable refrigerant flow (VRF) system for the entire building with the exception of the apparatus bay in addition to a dedicated outside air system to provide minimum Title 24 required outdoor air ventilation.

It was noted on site that the electrical services was 120/240, single phase. With this voltage and phase, a VRF is not feasible as the equipment is not available in that voltage. This would require an electrical service upgrade to a minimum of 208v, three-phase equipment.

Without the change in electrical service, we would recommend the HVAC options noted in Option #1 if the intended goal was to remain at the existing site.

Option #3 – New Building at New Site

The benefit of a new building on a new site is the flexibility for the HVAC systems. Given the nature of the building and its several zones, we would recommend a variable refrigerant flow (VRF) system for the entire building with the exception of the apparatus bay.

This would also require a dedicated outside air unit for minimum Title 24 outdoor air ventilation. The system could be integrated with the standard control system for the Town allowing for remote monitoring and control of the new system.

Largely the benefit of a new building on a new site is the factor of ground-up construction allowing for maximum flexibility and planning through the design phase.

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Section 04
Site Analysis Diagrams

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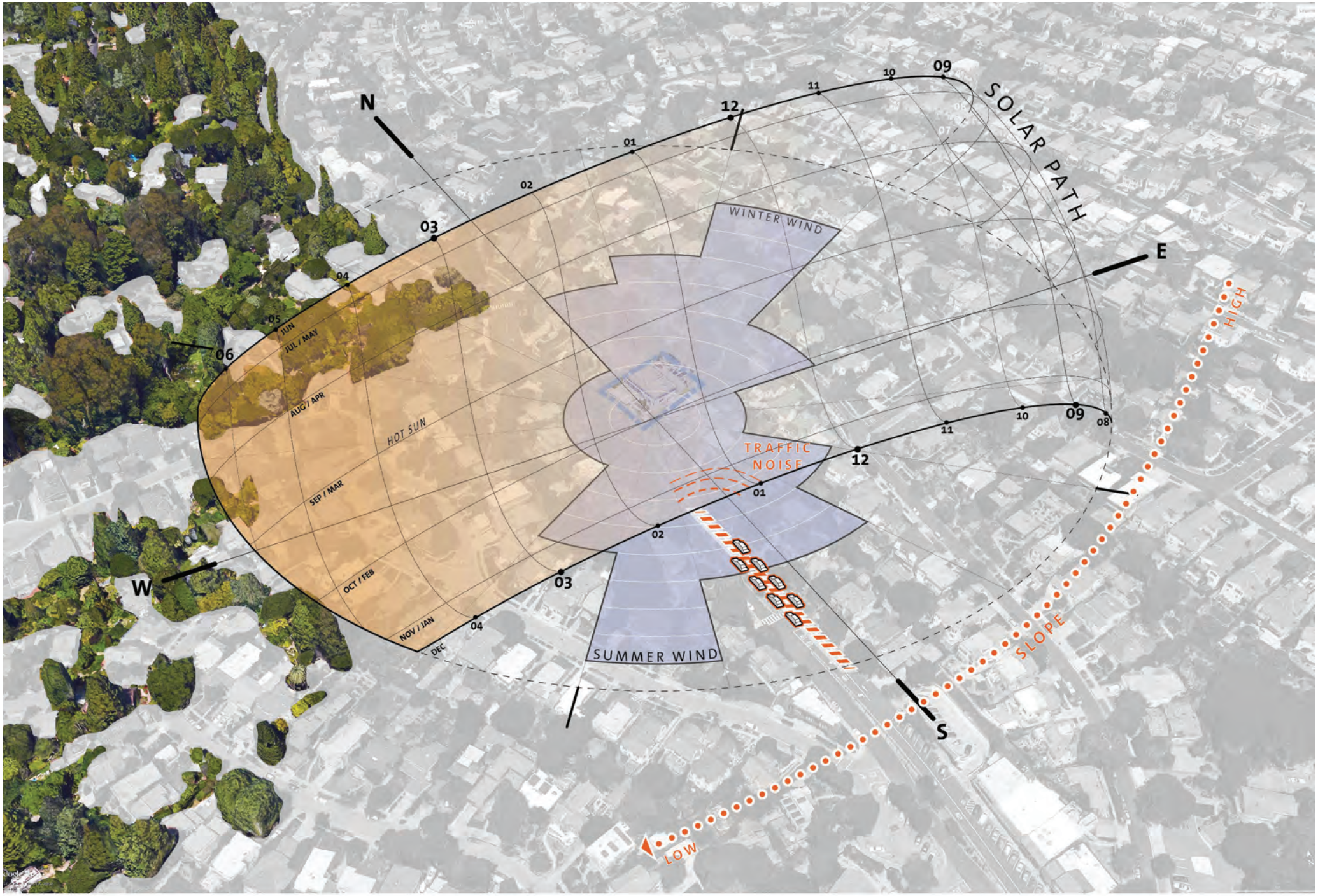
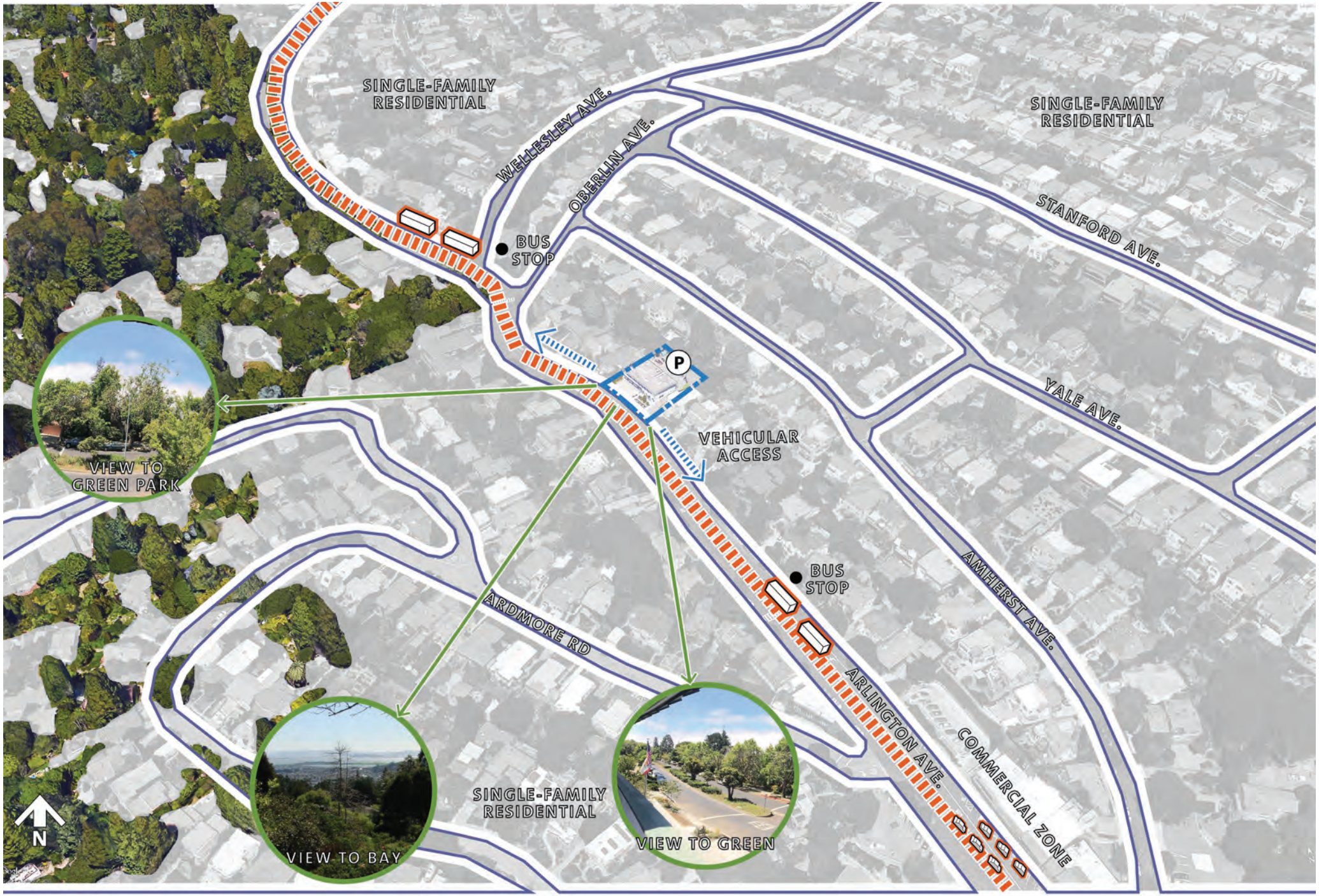


RossDrulisCusenbery ARCHITECTURE

ENVIRONMENTAL CONTEXT - EXISTING SITE

KENSINGTON FIRE STATION

08/10/16

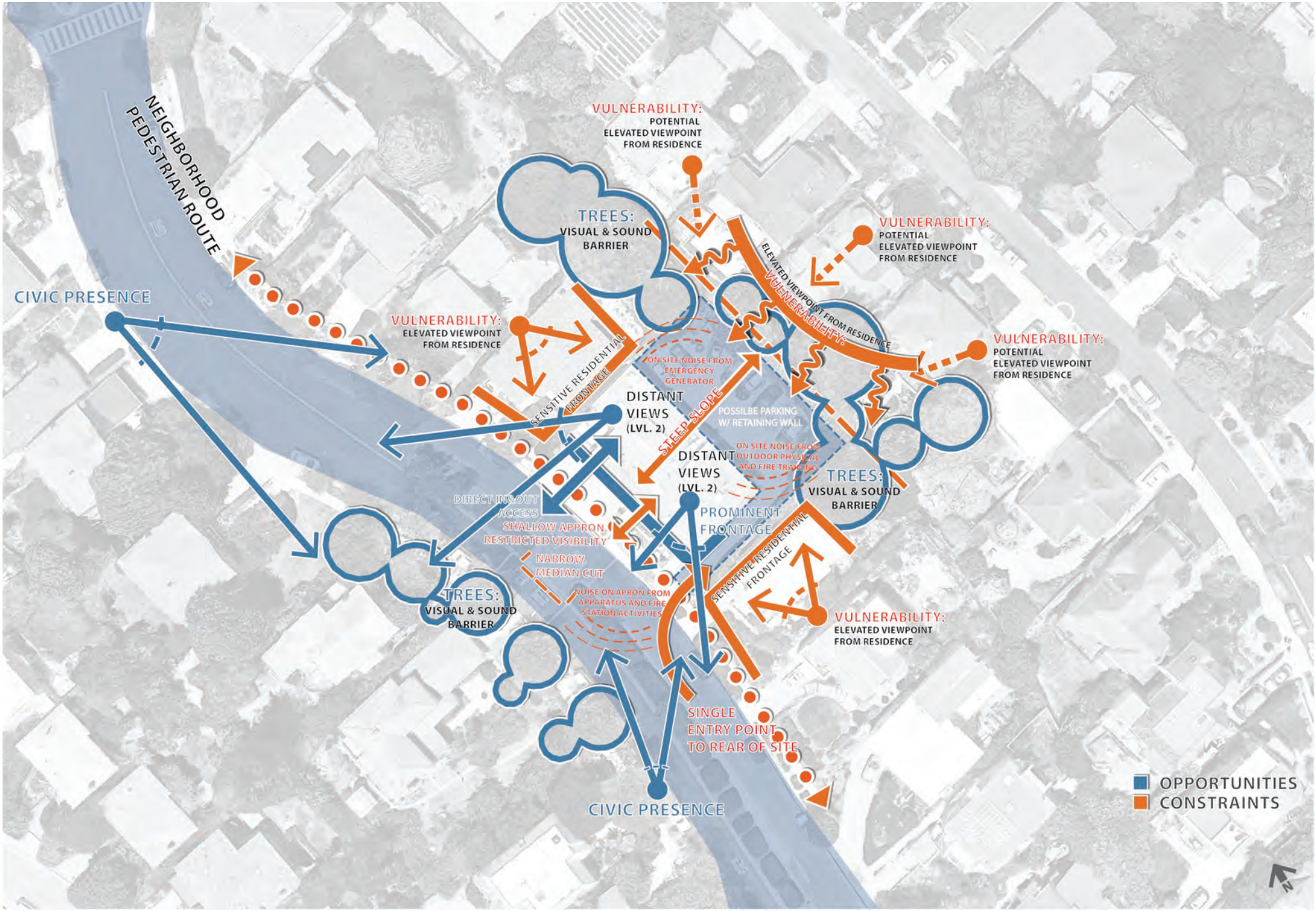


RossDrulisCusenbery ARCHITECTURE

PHYSICAL CONTEXT - EXISTING SITE

KENSINGTON FIRE STATION

08/10/16

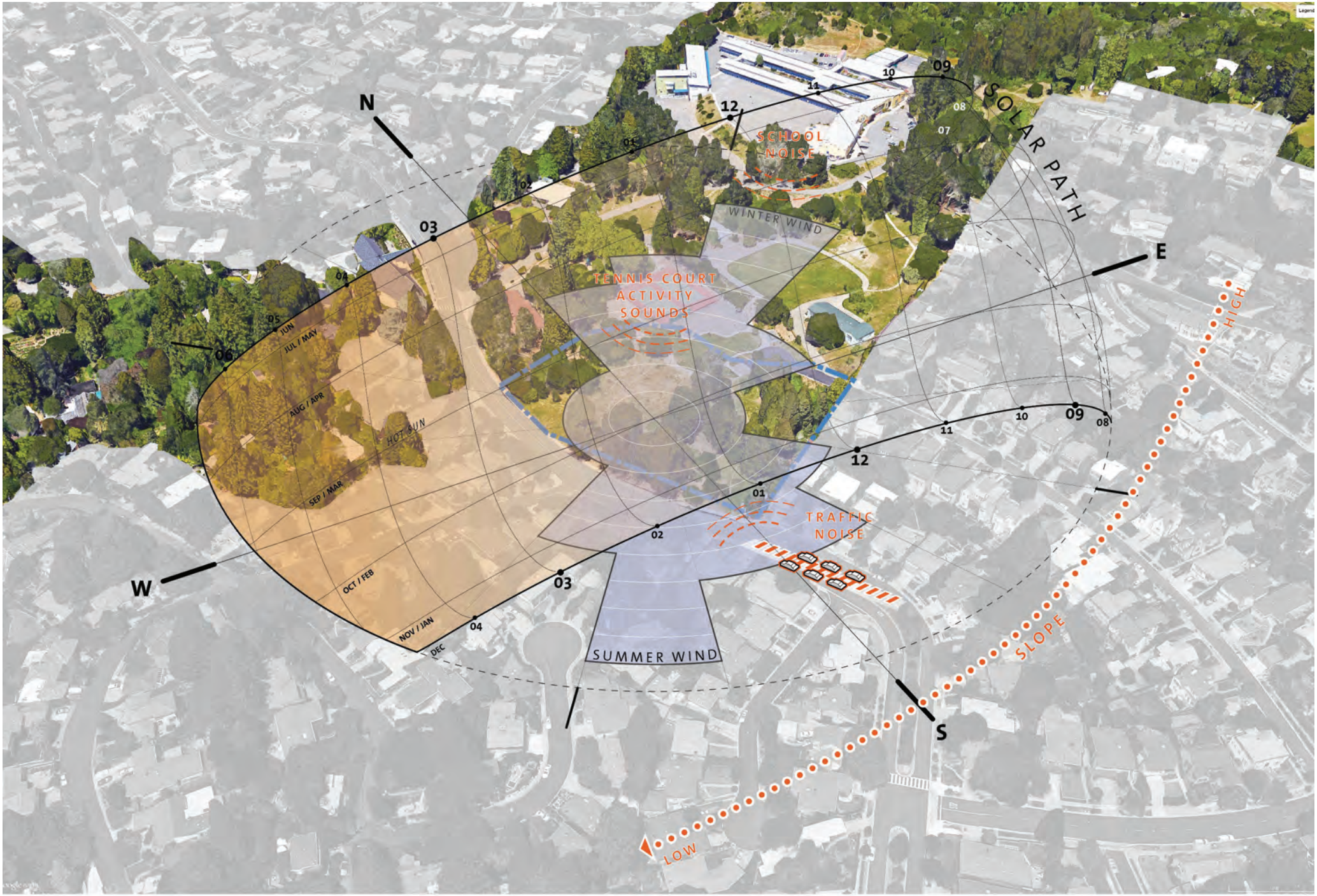


RossDrulisCusenbery ARCHITECTURE

OPPORTUNITIES AND CONSTRAINTS - EXISTING SITE

KENSINGTON FIRE STATION

08/10/16

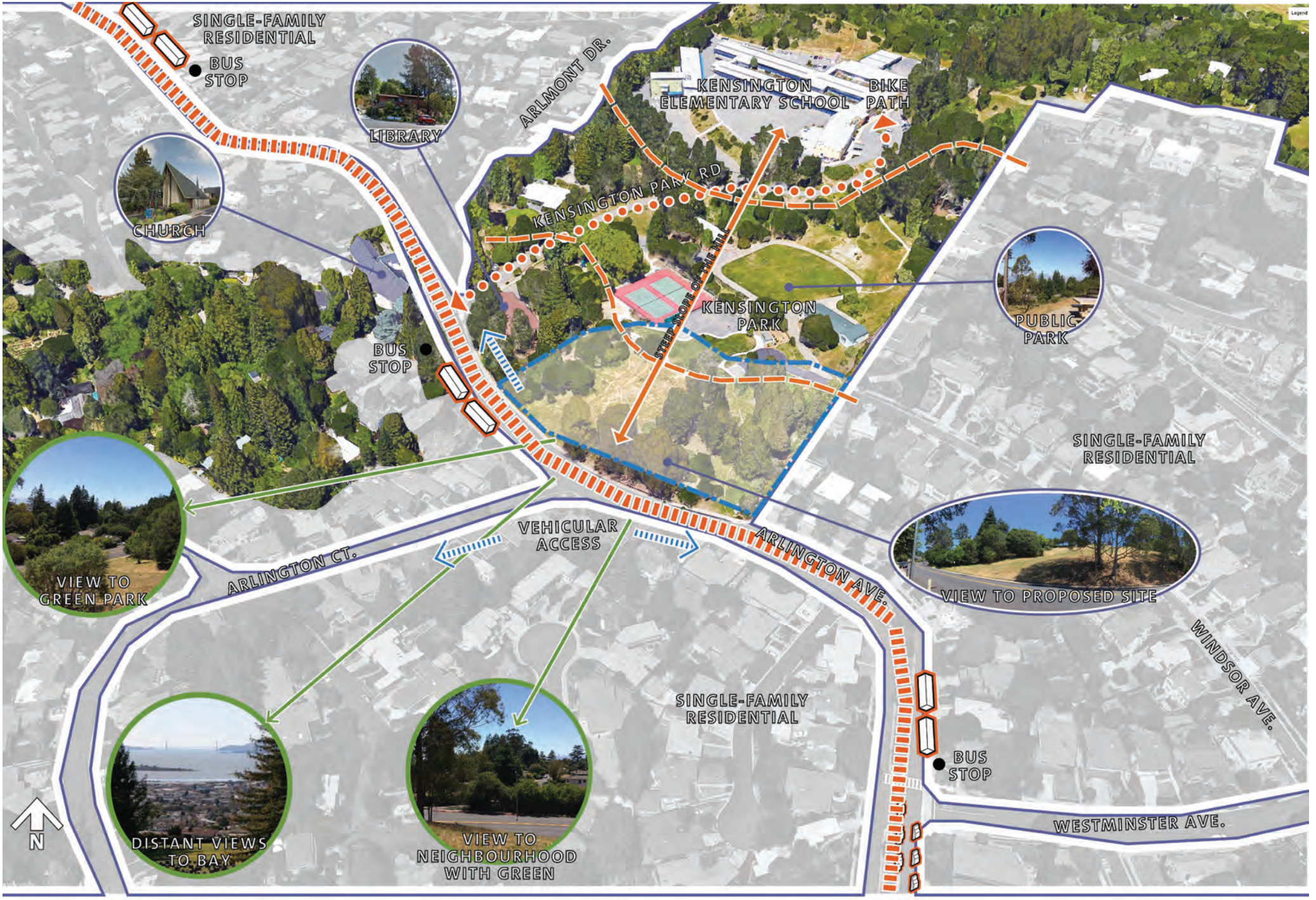


RossDrulisCusenbery ARCHITECTURE

ENVIRONMENTAL CONTEXT - ALTERNATE SITE

KENSINGTON FIRE STATION

08/10/16



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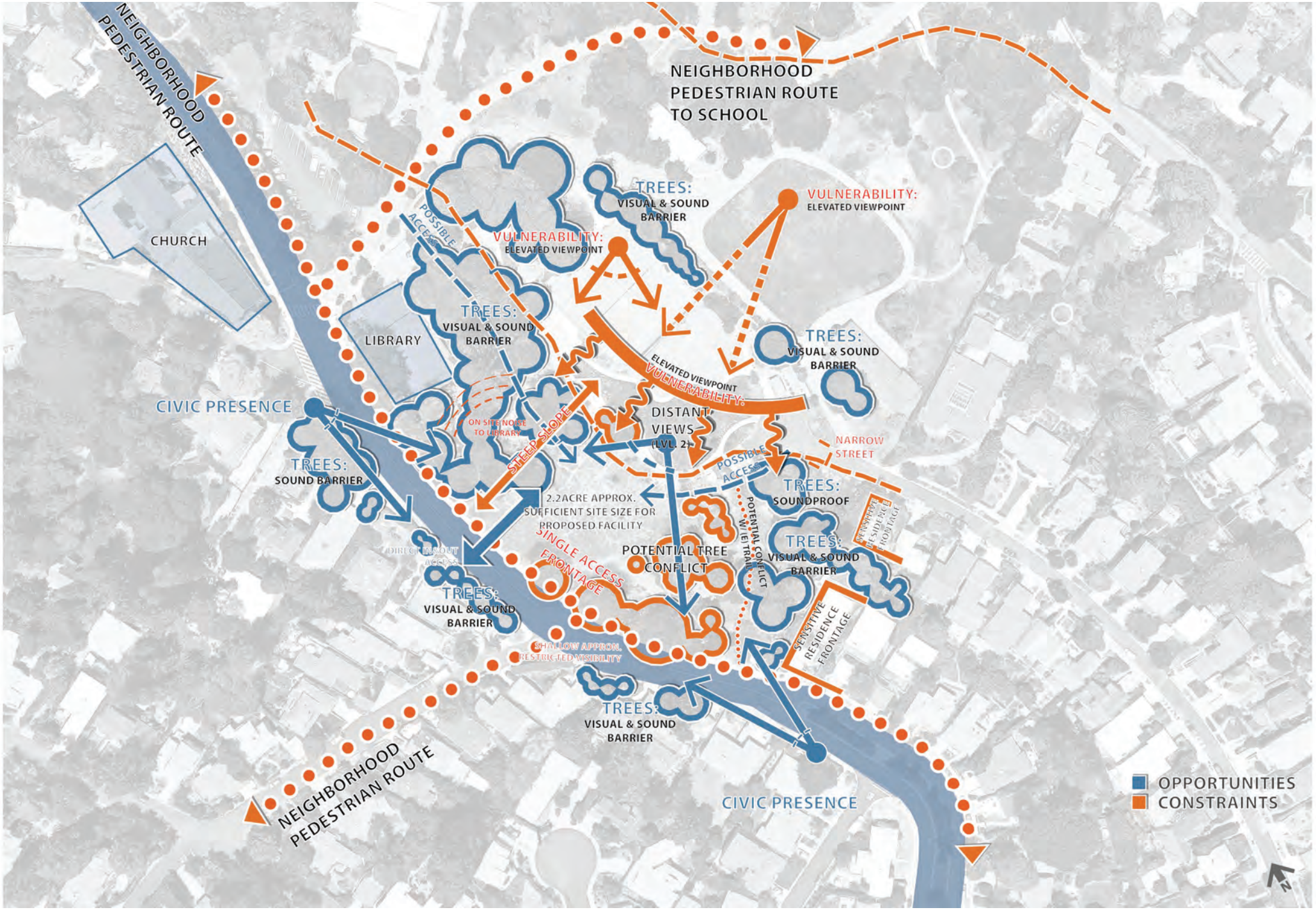
PHYSICAL CONTEXT - ALTERNATE SITE

KENSINGTON FIRE STATION

08/10/16



RossDrulisCusenbery ARCHITECTURE

OPPORTUNITIES AND CONSTRAINTS - ALTERNATE SITE

KENSINGTON FIRE STATION

08/10/16

SECTION 05
ARCHITECTURAL PROGRAM

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KENSINGTON FIRE STATION
Preliminary Space Requirements (PSR)
December 12, 2016
RossDrulisCusenbery Architecture, Inc.

Series	Department	Existing Staff	Existing NSF	Reduced Program Staff	Reduced Program NSF	Optimal Program Staff	Optimal Program NSF
100	Fire Department	3	3,202	5	5,700	5	5,955
200	Police Department	5	1,269	7	2,880	8	2,488
300	Shared Support	0	892	0	338	0	500
400	Building Support	0	585	0	990	0	990
Total Personnel/NSF		8	5,948	12	9,908	13	9,933
Building Spaces/Circulation		22%	0		2,180		2,185
Total Building Gross SF (BGSF)			5,948		12,088		12,118

Parking Requirements	Existing Units					
Personal Vehicles	2		5		7	
Department Vehicles	7		7		7	
Visitor Vehicles	0		0		2	
Total Parking	**9**		**12**	**0**	**16**	**0**

Site Requirements	Existing Units					
Fire Department						
Storage Shed	1	0				
Outdoor BBQ Area	1	301	1	300		
Training	0	0	0	0		
Vehicles Staging / Apron	0	0	3	1680	3	1890
Shared Support						
Trash Enclosure	1	0				
Building Support						
Yard Storage			1	80	1	80
Emergency Generator	1	62	1	80	1	80
Total Site		**363**		**2140**		**2050**

100	FIRE DEPARTMENT			Existing				Reduced Program				Optimal Program				
Ref. #	Plan Ref. #		Type	Existing NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Remarks
		Personnel														
		Offices														
101		Captain's Office	PO	0		1	0	100	1	1	100	100	1	1	100	Adjacent to sleeping Room. Existing: Included in sleep room
102	216B	Business Manager Office	PO	92	1	1	92	100	1	1	100	100	1	1	100	At Lobby, Watch Office
103	216C	Paramedic EMT Office	PO	63	1	1	63	100	1	1	100			1	0	
		Subtotal				3	155			3	300			3	200	
		Subtotal Private Office					155				300				200	
		Workstations														
104		Firefighter	WS	0			0	0		1	0	0		1	0	Included in Watch Office area. New workstation
105		Engineer	WS	0			0	0		1	0			1	0	Included in Watch Office area
		Subtotal				0	0			2	0			2	0	
		Subtotal Workstations					0				0				0	
		Total Personnel Spaces				3				5				5		
		Departmental Spaces														
106		Lobby - F.D.					0	60	1		60	60	1		60	May be combined with Ref. #208
		General Department Area														
107		Watch Office Area		0			0	150	1		150	200	1		200	w/Firefighter and Engineer workstations
108		Radio Response/Map Alcove		0			0	40	1		40	20	1		20	Existing: In Day Room. Adjacent to App. Bay
109		Training Storage		0			0	80	1		80	80	1		80	
110		Training/Community Room					0	240	1		240	400	1		400	Adjacent to Public Lobby
		Living Area														
111	214C	Day Room		305	1		305	250	1		250	275	1		275	
112	215	Kitchen		201	1		201	250	1		250	275	1		275	
113	214B	Dining		191	1		191	200	1		200	250	1		250	Seating at Table for 6
114	210	Dorm A, Captain		214	1		214	170	1		170	175	1		175	Existing combines sleep and work areas. Renovation: 2 bed, New: 3 bed
115	209	Dorm B, Firefighters		180	1		180	170	1		170	175	1		175	Renovation: 2 bed, New: 3 Bed
116	206	Dorm C, Firefighters		95	1		95	170	1		170	175	1		175	Renovation: 2 bed, New: 3 Bed
117	208	Bathroom A		50	1		50	105	1		105	105	1		105	At hallway for Firefighter early arrival
118	207	Bathroom B		66	1		66	105	1		105	70	3		210	For new, one attached to each dorm room.

100	FIRE DEPARTMENT			Existing				Reduced Program				Optimal Program				
Ref. #	Plan Ref. #		Type	Existing NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Remarks
119	218	Laundry		83	1		83	100	1		100	100	1		100	
120	211	Storage		10	1		10	100	1		100	100	1		100	
121	219	Radio Room / RACES	WS	62	1		62	48	1		48	65	1		65	
122	205	Hall		111	1		111	0			0	0			0	Included in building gross
123		Staff Restroom					0	88	1		88				0	At Watch Office
		Apparatus Area														
124	114	Apparatus Bay		484	3		1452	800	3		2400	864	3		2592	Bay Size Renovation = 16' x 50' Bay Size New = 18' x 48' Recommended width for apparatus bay is 18 feet, reduced to 16 feet wide due to restricted site size Engine 65: 115" tall and 29' long Engine 365: 115" tall and 29' long
125		Turn out Alcove or Room		0			0	180	1		180	125	1		125	Existing: In App Bay
126		EMS Clean up Alcove		0			0	20	1		20	25	1		25	Existing: In App Bay
127		EMS Supply Storage		0			0	80	1		80	25	1		25	
128		App Bay Refrigeration Alcove		0			0	0			0				0	
129		Workshop Area		0			0	100	1		100	125	1		125	
130		Workshop Area					0	100	1		100				0	
131		Cascade Room		0			0	0			0	90	1		90	Air compressor
132		Hose Storage		0			0	100	1		100	25	1		25	Discuss: Hose Dryer
133	113	Air Compressor		21	1		21	40	1		40	35	1		35	Combined with Ref. #134, Mop Sink Closet
134	114a	Mop Sink Closet		6	1		6	6	1		6				0	Combined with Ref. #133, Air Compressor
135		App Bay Generator Storage					0	0			0				0	Outside
136		Fire Pole					0	48	1		48	48	1		48	24 NSF on two levels
		Subtotal					3047				5400				5755	
		Subtotal Departmental Spaces					3047				5400				5755	
		Total NSF				**3**	**3202**			**5**	**5700**			**5**	**5955**	
		Parking Requirements														Employee private vehicle per shift = 4 Employee vehicles at overlap shift changes = 6 + 3
		Personal Vehicles			2				4				6			2 or 1 1/2 for FD due to the generator encroachment
																An additional 2 for FD park against the north end of the lot
		Department Vehicles			1				1				1			Chief/Battalion Chief or staff - either a large SUV or a pick-up truck
		Total Parking			**3**				**5**				**7**			

100	FIRE DEPARTMENT			Existing				Reduced Program				Optimal Program				
Ref. #	Plan Ref. #		Type	Existing NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Remarks
		Site Requirements														Fire Department: Indicate need for exterior training and staging areas.
		Storage Shed			1											
		Outdoor BBQ Area		301	1		301	300	1		300					Existing on deck, okay as alt.
		Training														Discuss. Dual purpose w/parking
		Vehicles Staging / Apron						560	3		1680	630	3		1890	Discuss
		Total Site Requirements					`				**1980**				**1890**	

200	POLICE DEPARTMENT			Existing				Reduced Program				Optimal Program				
Ref. #	Rm #		Type	Existing NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Remarks
		Personnel														
		Offices														
201	102	Police Chief Office	PO	119	1	1	119	160	1	1	160	125	1	1	125	
202		Detective	PO				0	100	1	1	100	100	1	1	100	Existing shared with Police Aid. Locate with Police Aid
203	103	Supervisor 1 Office	PO	92	1	1	92	100	1	1	100	100	1	1	100	Discuss: Single Shared Office?
204	108	Supervisor 2 Office	PO	73	1	1	73	100	1	1	100	100	1	1	100	
		Subtotal				3	284			4	460			4	425	
		Subtotal Private Office					284				460				425	
		Workstations														
205	101	Clerical / Reception	WS	59	1	1	59	80	1	1	80	80	1	1	80	Adjacent to Public Lobby. Provide security glazing. Access to Staff Restroom
206	109	Police Aid	WS	75	1	1	75	64	1	1	64	64	1	1	64	Existing shared with Detective, Near Property & Evidence Locate with Ref. #202, Detective
207		Officer Workstation	WS				0	36	1	1	36			2	0	Verify: May be redundant to "Report Writing"
		Subtotal				2	134			3	180			4	144	
		Subtotal Workstations					134				180				144	
		Total Personnel Spaces				5				7				8		
		Departmental Spaces														
208	101A	Lobby - P.D.		47	1		47	60	1		60	60	1		60	May be combined with Ref. #106 w/restroom. Adj to Ref. #205, Clerical/Reception
209		Interview Rooms		0			0	100	1		100	100	1		100	Discuss: Number of Secure Interview Rooms
210		Conference / Briefing		0			0	240	1		240	200	1		200	
211		Juvenile Interview Room					0	100	1		100				0	
212		Witness Interview Room					0	100	1		100				0	Adjacent to Lobby / Reception
213	201	Lockers / Dressing Men / Shower		66	1		66	150	1		150	200	1		200	Includes shower
214	204	Lockers/Dressing Women / Shower		51	1		51	100	1		100	100	1		100	Includes shower
215	106	Copy / File Storage		101	1		101	100	1		100	100	1		100	
216		Reception Active Files					0	36	1		36	25	1		25	
217	107	Storage		44	1		44	100	1		100	100	1		100	
218		Evidence Processing		0			0	75	1		75	75	1		75	Bag & Tag adjacent to Ref. #219, Transfer Lockers
219		Transfer Lockers		0			0	64	1		64	64	1		64	Adjacent to Ref. #218, Evidence Processing

200	POLICE DEPARTMENT			Existing				Reduced Program				Optimal Program				
Ref. #	Rm #		Type	Existing NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Remarks
220	112	Property & Evidence Storage		101	1		101	280	1		280	200	1		200	Adjacent to Ref. #219, Transfer Lockers
221	200	Prisoner Processing		206	1		206	100	1		100	100	1		100	Existing shares with Report Writing
222	200	Report Writing					0	75	1		75	75	1		75	Included in Ref. #221, Prisoner Processing
223	200A	Armory		98	1		98	100	1		100	100	1		100	
224	200A	Radio Room					0	80	1		80	10	1		10	Included in Ref. #223, Armory
225	202	Staff Restrooms		22	1		22	88	2		176	50	2		100	Adjacent to m/f Locker Rooms
226		Secure Restroom					0	88	1		88	50	1		50	At Prisoner Processing
227		Officer Sleep Room / Quiet Room					0	0			0	80	1		80	
228	115	PD Hallway Level 1		115	1		115				0				0	
229		Quiet Room		0			0	80	1		80				0	
230		Break/Kitchenette		0			0	36	1		36	100	1		100	
231		Secure Storage (Bikes, T.V., etc.)		0			0	0			0	80	1		80	
		Subtotal					851				2240				1919	
		Subtotal Departmental Spaces					851				2240				1919	
		Total NSF				**5**	**1269**			**7**	**2880**			**8**	**2488**	
		Parking Requirements														
		Personal Vehicles							1				1			Chief No overlap shift parking. Employee vehicles park on the street
		Department Vehicles			6				6				6			squad cars / SUVS
		Total Parking			**6**				**7**				**7**			
		Site Requirements														
		Total Site Requirements														

300	SHARED SUPPORT			Existing				Reduced Program				Optimal Program				
Ref. #	Rm #		Type	Existing NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Remarks
		Personnel														
		Offices														
		Subtotal				0	0			0	0			0	0	
		Subtotal Private Office					0				0				0	
		Workstations														
		Subtotal				0	0			0	0			0	0	
		Subtotal Workstations					0				0				0	
		Total Personnel Spaces				0				0				0		
		Departmental Spaces														
301	217	Exercise Room		189	1		189	250	1		250	450	1		450	FD will share w/PD
302	100	Hall 1st Floor		283	1		283				0				0	Included in circulation factor
303	111	Training		285	1		285				0				0	In FD and PD Conference Rooms
304	110	HC Toilet Public Restroom		57	1		57	88	1		88	50	1		50	Adjacent to Public Lobby
305	203	Restroom A		23	1		23				0				0	
306	220	Hall 2nd Floor		55	1		55				0				0	Included in circulation factor
		Subtotal					892				338				500	
		Subtotal Departmental Spaces					892				338				500	
		Total NSF				**0**	**892**			**0**	**338**			**0**	**500**	
		Parking Requirements														
		Visitor Vehicles			0				0				2			
		Total Parking			**0**				**0**				**2**			
		Site Requirements														
		Trash Enclosure			1							60	1		60	
		Total Site Requirements														

400	BUILDING SUPPORT			Existing				Reduced Program				Optimal Program				
Ref. #	Rm #		Type	Existing NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Remarks
		Personnel														
		Offices														
		Subtotal					0		0	0	0		0	0	0	
		Subtotal Private Office					0				0				0	
		Workstations														
		Subtotal				0	0			0	0			0	0	
		Subtotal Workstations					0				0				0	
		Total Personnel Spaces				0				0				0		
		Departmental Spaces														
401	212	Janitor		11	1		11	40	1		40	40	1		40	
402	213	Mechanical		71	1		71	150	1		150	150	1		150	
404		Electrical		0			0	80	1		80	80	1		80	
405		Communications/IT Room		0			0	80	1		80	80	1		80	
406		Stairs		200	1		200	220	2		440	220	2		440	Accurately charge -needs - not enough
407		Water Heater		0			0	20	1		20	20	1		20	Accurately assess needs - not enough
408		Elevator		0			0	100	1		100	100	1		100	
409		Elevator Equipment Room		0			0	80	1		80	80	1		80	
410	101B	Hallway Level 1		169	1		169				0				0	
411	205A	Hallway Level 2		72	1		72				0				0	
		Subtotal					585				990				990	
		Subtotal Departmental Spaces					585				990				990	
		Total NSF				**0**	**585**			**0**	**990**			**0**	**990**	
		Parking Requirements														
		Total Parking			**0**				**0**				**0**			
		Site Requirements														
		Yard Storage						80	1		80	80	1		80	
		Emergency Generator		62	1		62	80	1		80	80	1		80	
		Total Site Requirements					**62**				**160**				**160**	

SECTION 06
MASTER PLAN OPTIONS

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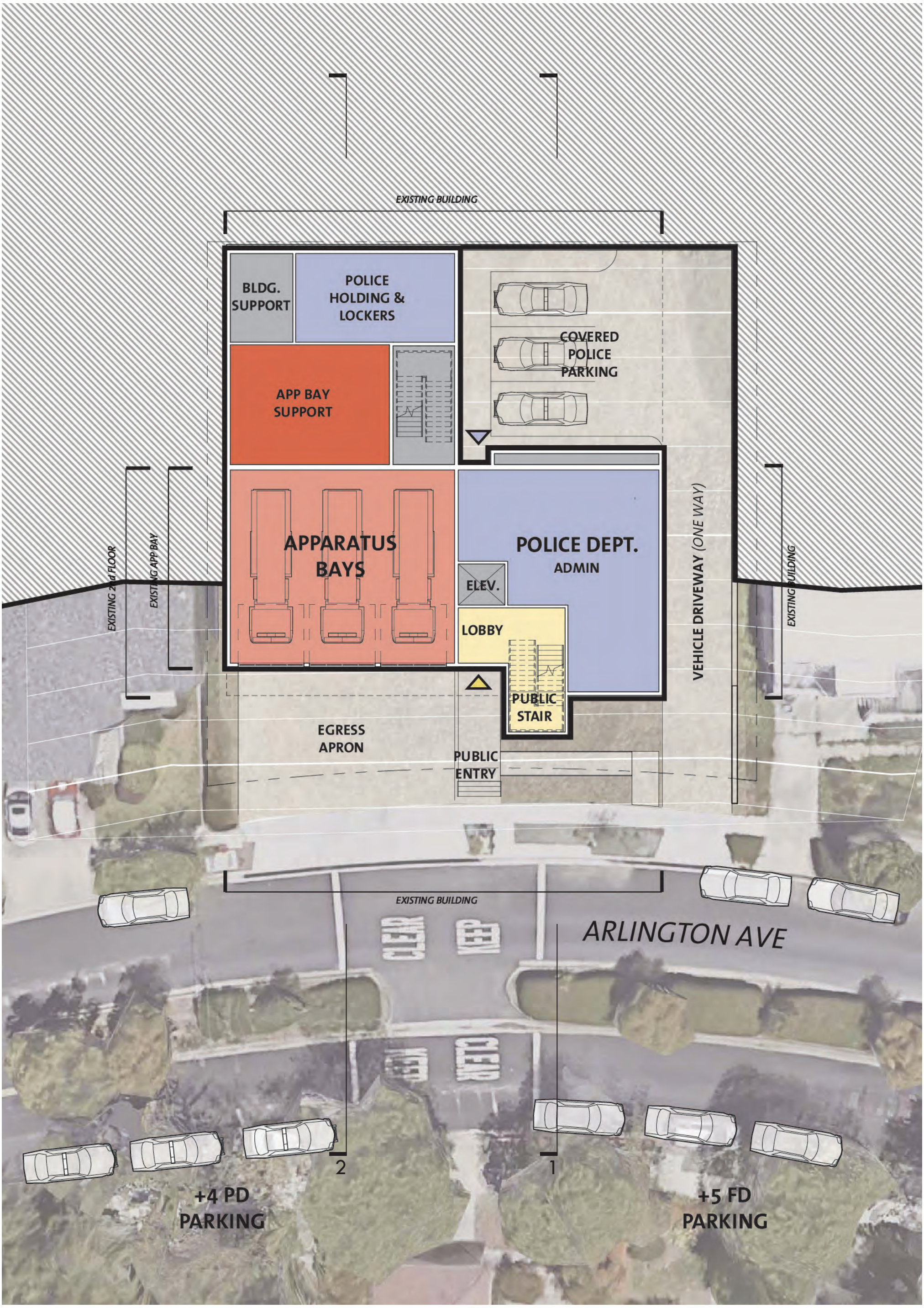
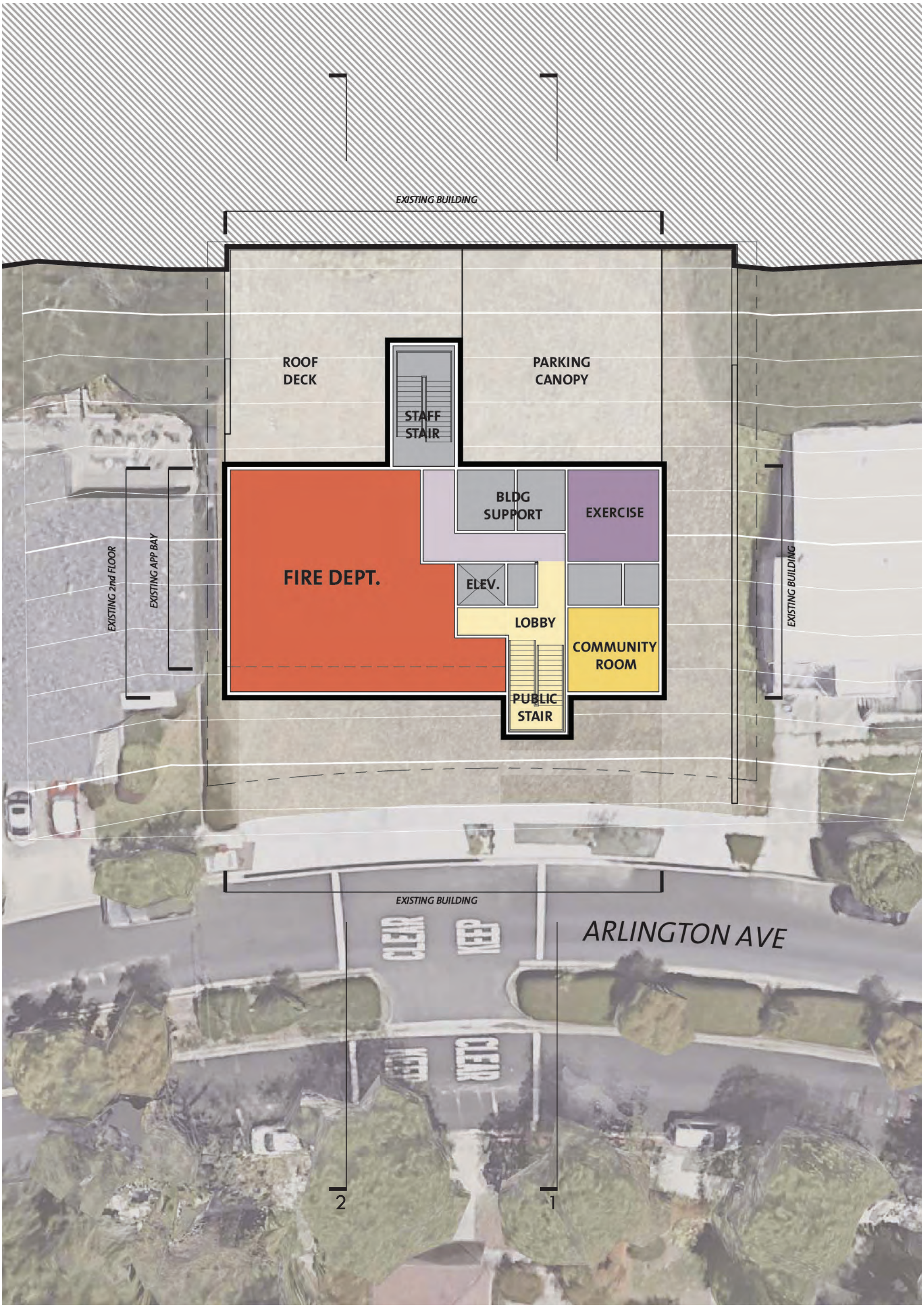


CONCEPTUAL PROGRAM PLAN- GROUND FLOOR



CONCEPTUAL PROGRAM PLAN- SECOND FLOOR

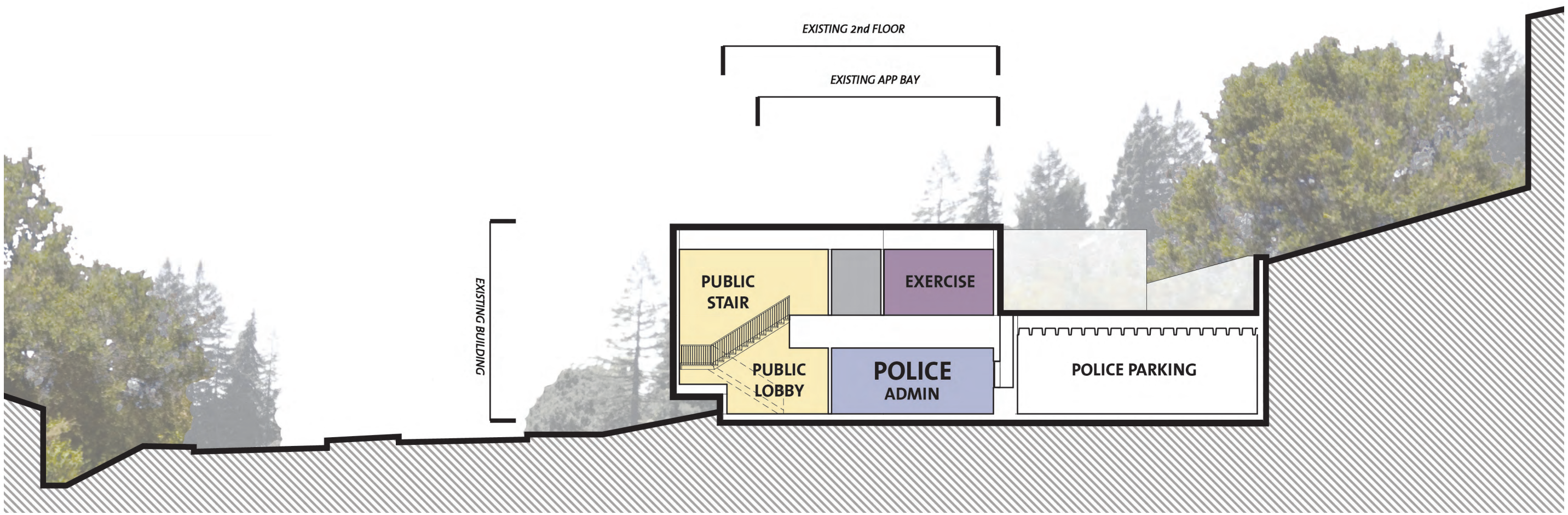
Ross Drulis Cusenbery
ARCHITECTURE

1/16" = 1'-0"

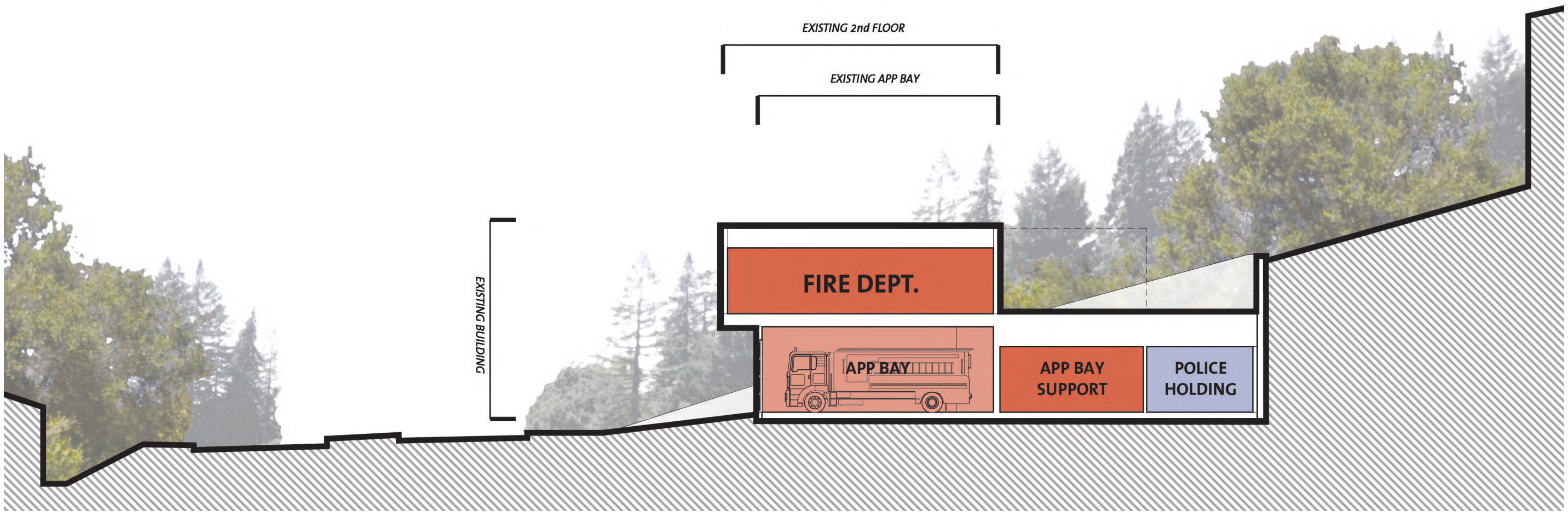
RENOVATION

KENSINGTON FIRE STATION

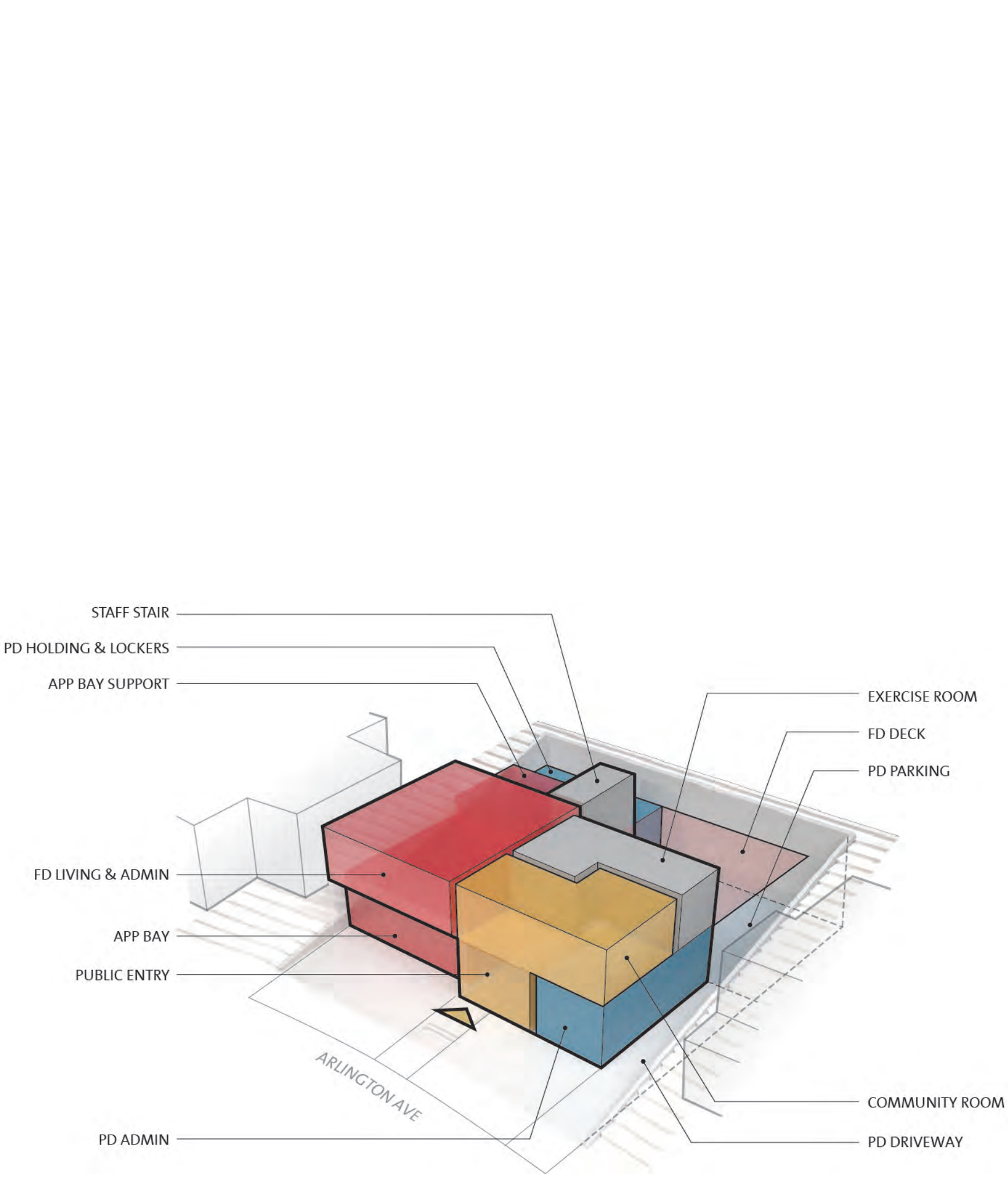
B



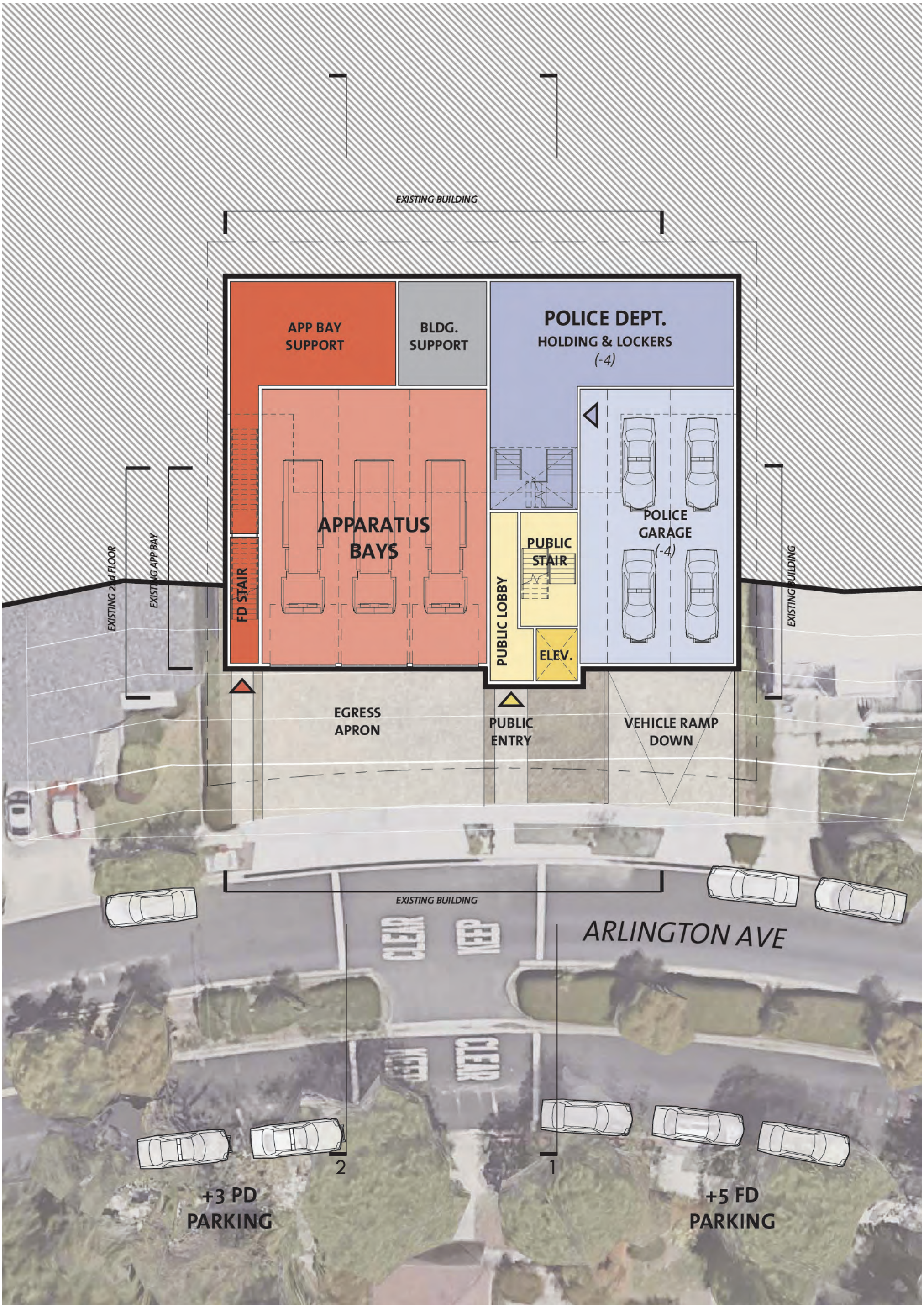
CONCEPTUAL PROGRAM SECTION 1



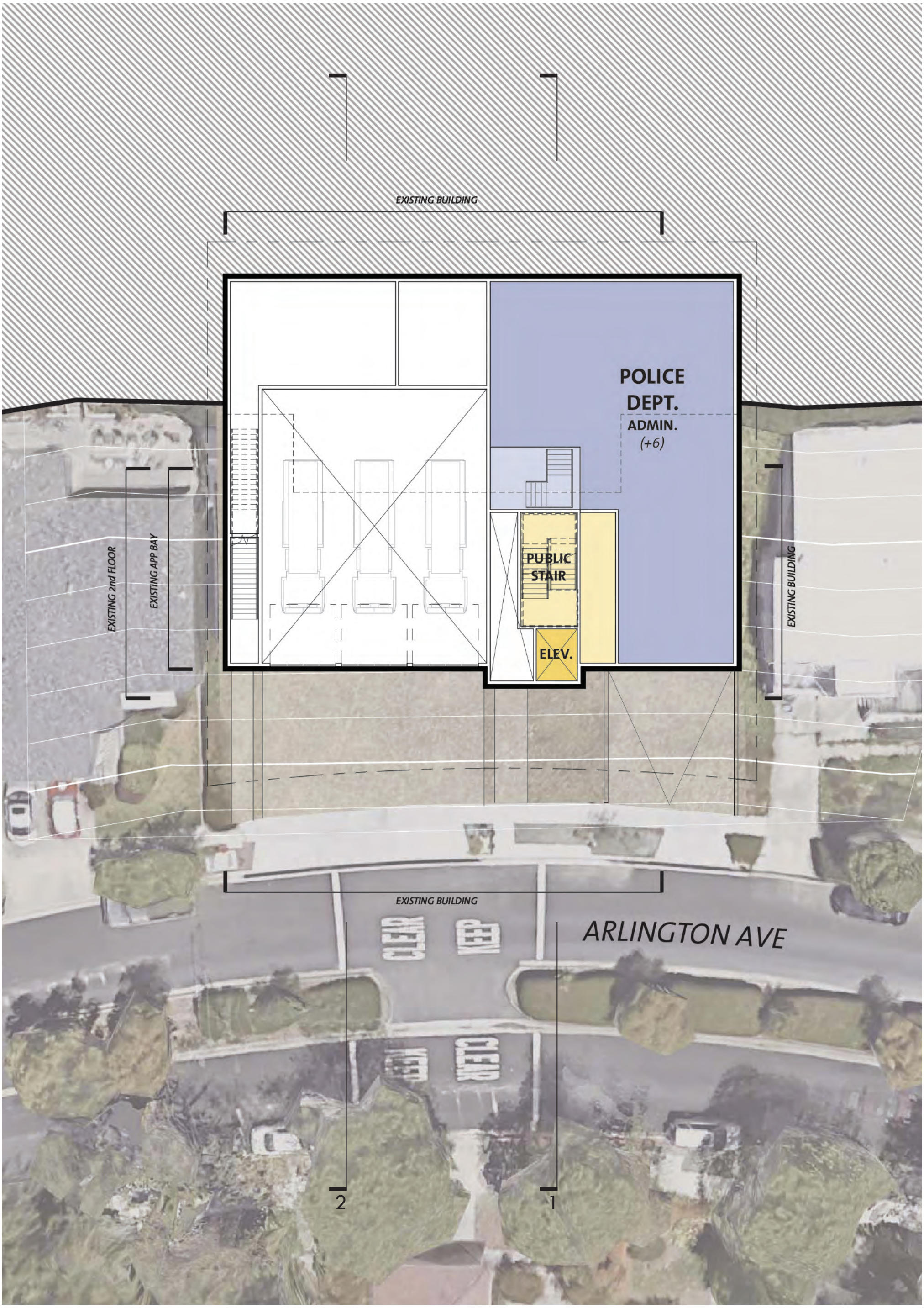
CONCEPTUAL PROGRAM SECTION 2



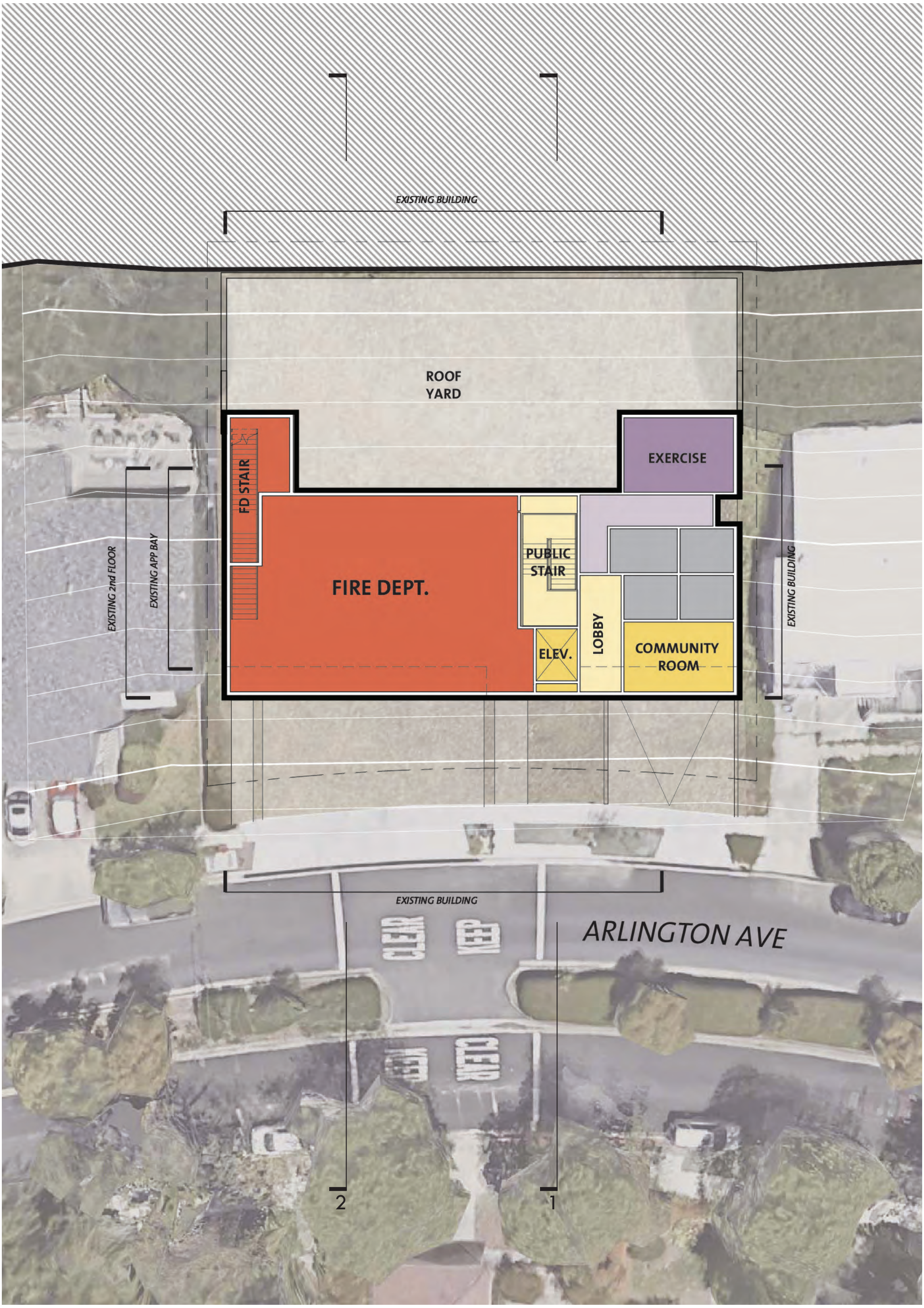
CONCEPTUAL PROGRAM DIAGRAM



CONCEPTUAL PROGRAM PLAN- GROUND FLOOR



CONCEPTUAL PROGRAM PLAN- “MEZZANINE” LEVEL



CONCEPTUAL PROGRAM PLAN- SECOND FLOOR

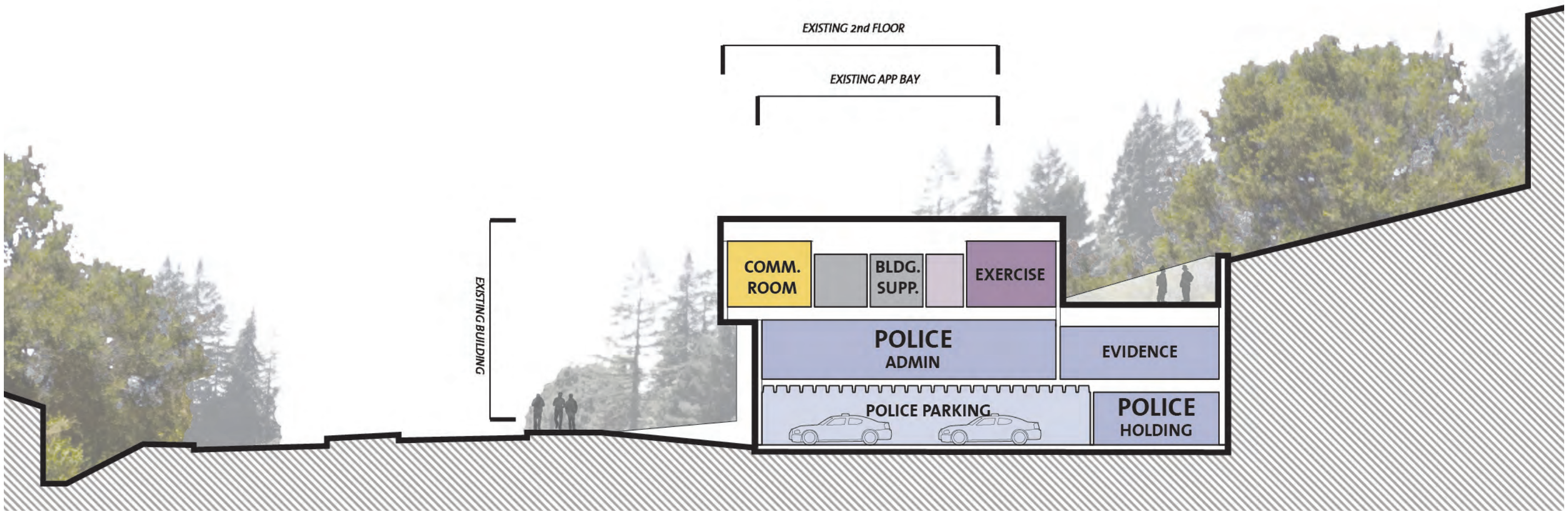
RossDrulisCusenbery
ARCHITECTURE

1/16" = 1'-0"

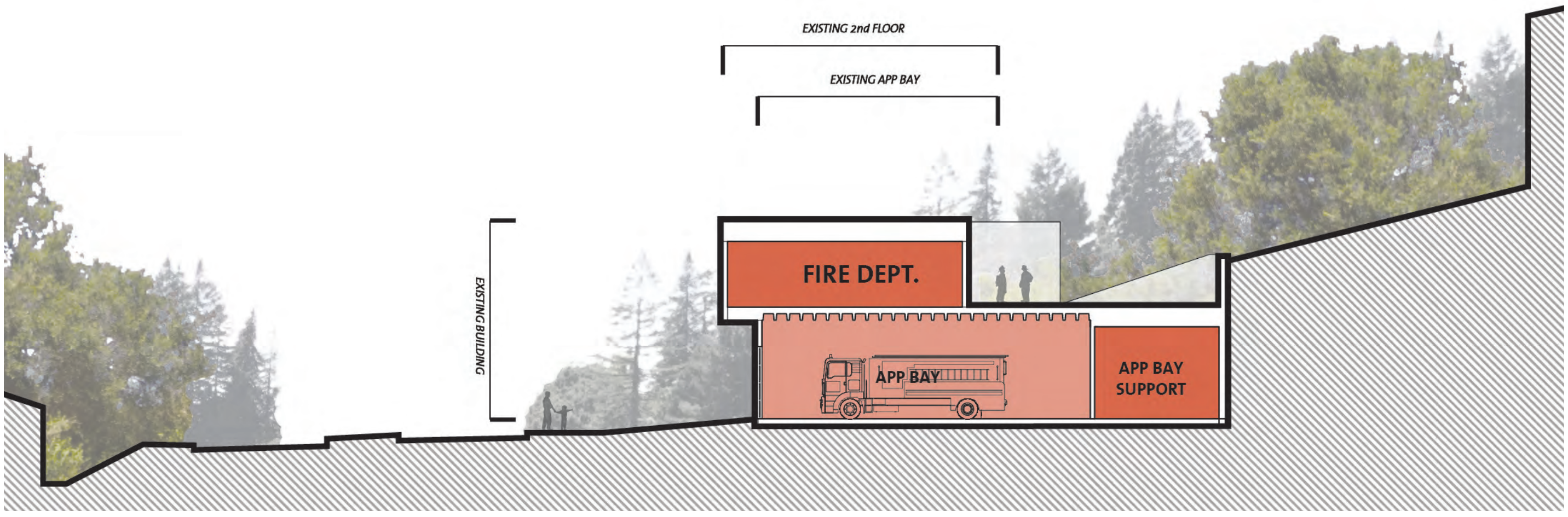
REBUILD

KENSINGTON FIRE STATION

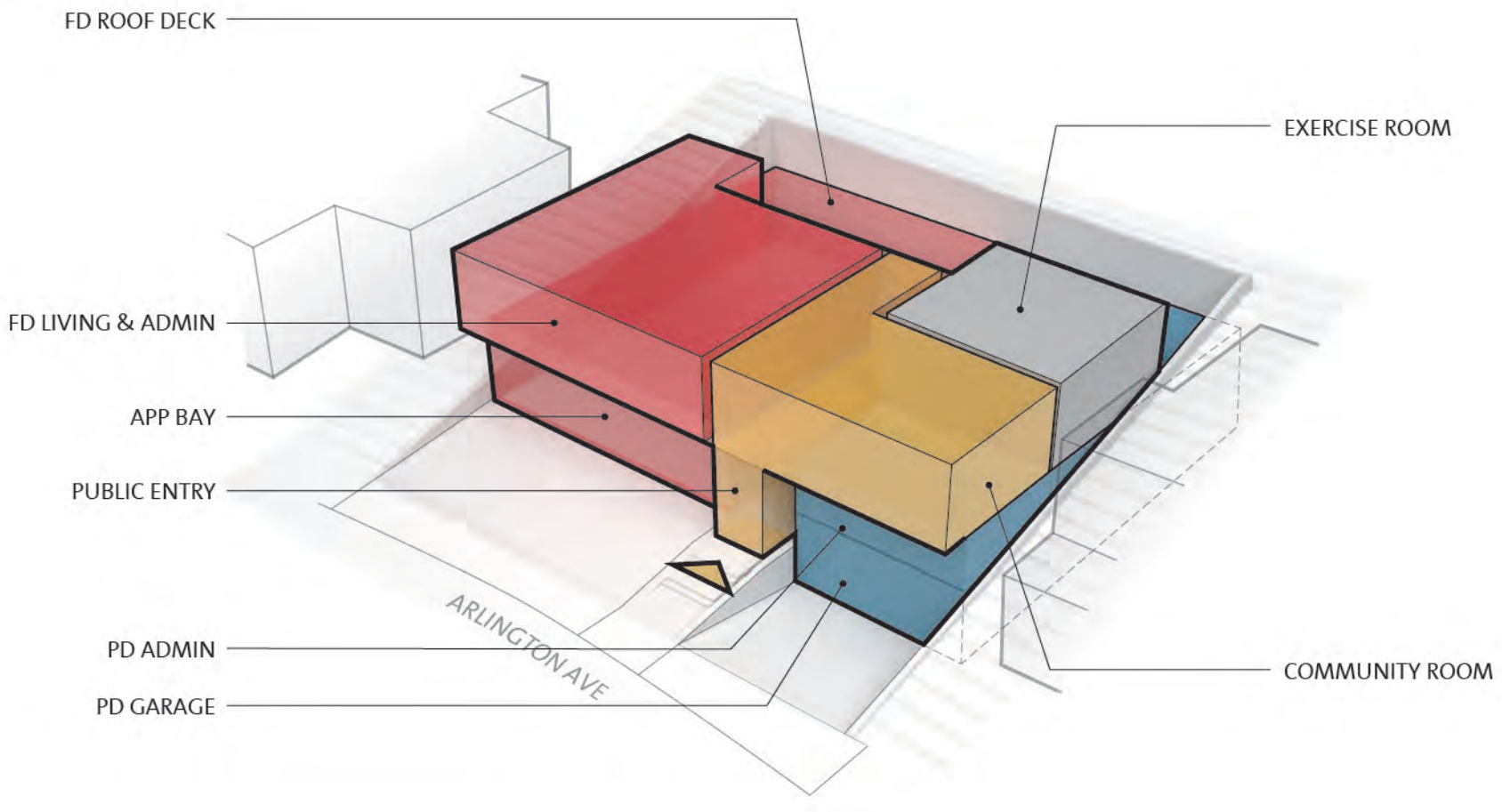
D



CONCEPTUAL PROGRAM SECTION 1



CONCEPTUAL PROGRAM SECTION 2



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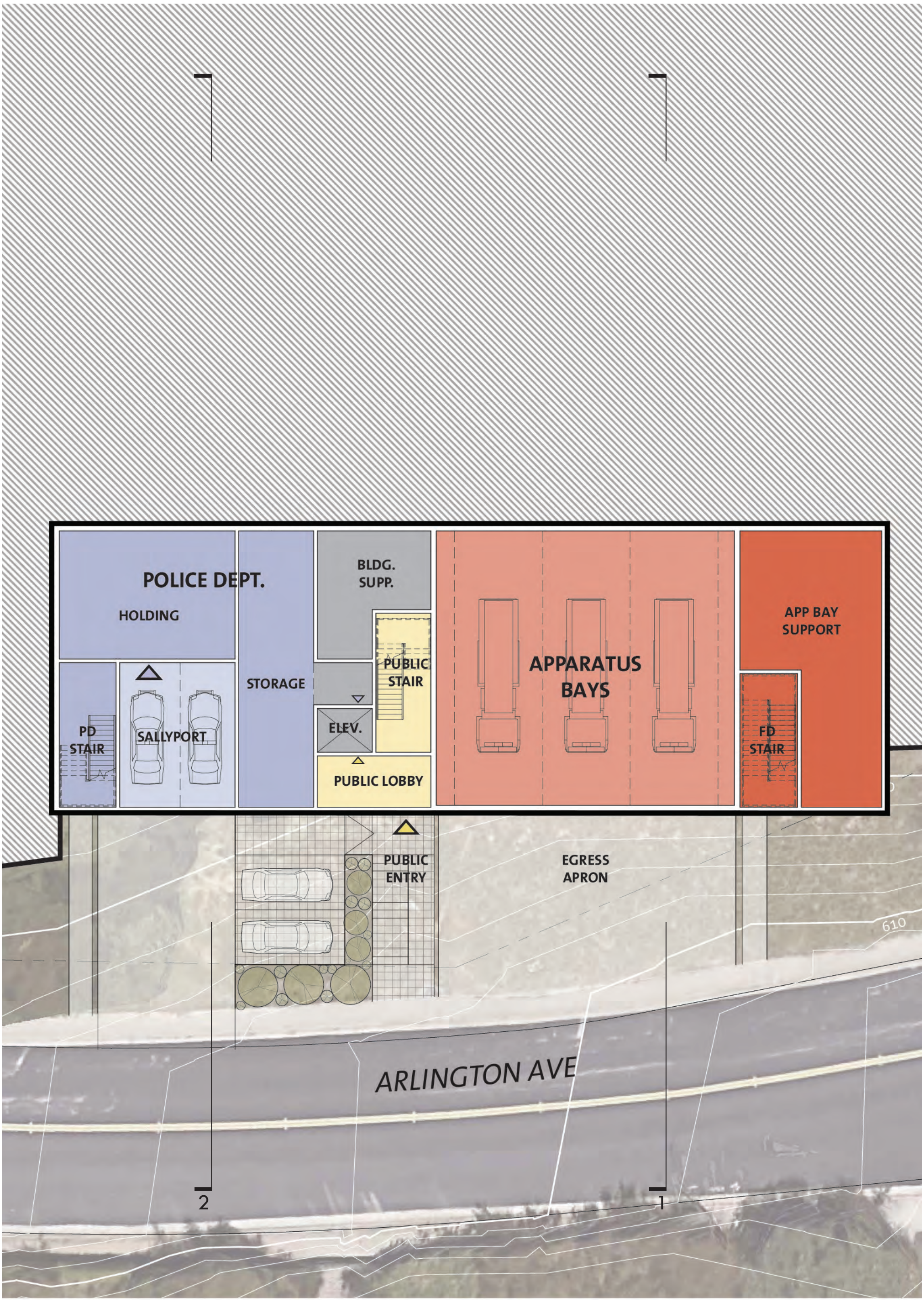


CONCEPTUAL PROGRAM PLAN- GROUND FLOOR

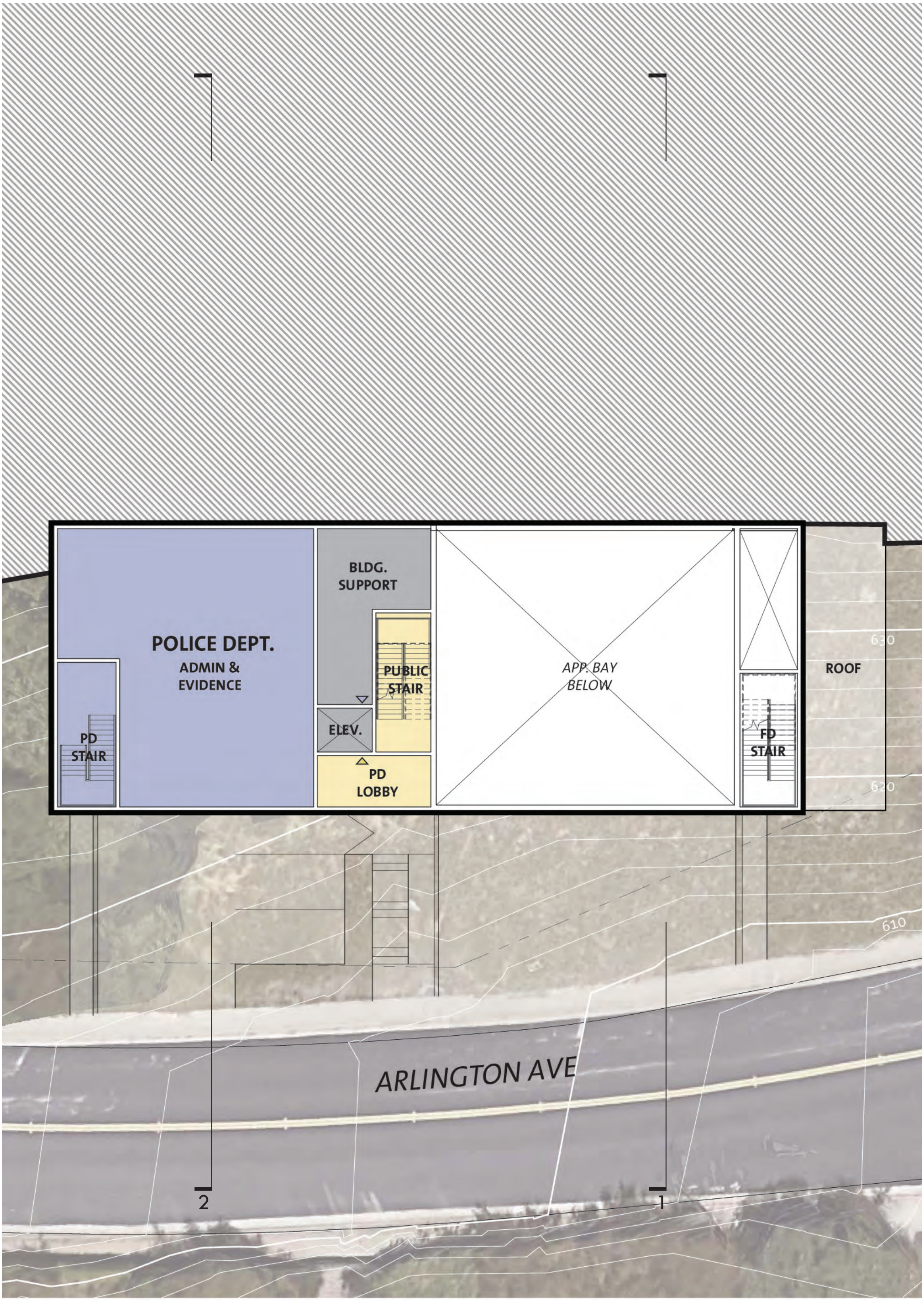
RossDrulisCusenbery ARCHITECTURE

1/16” = 1’-0”

ALTERNATE SITE

KENSINGTON FIRE STATION

CC



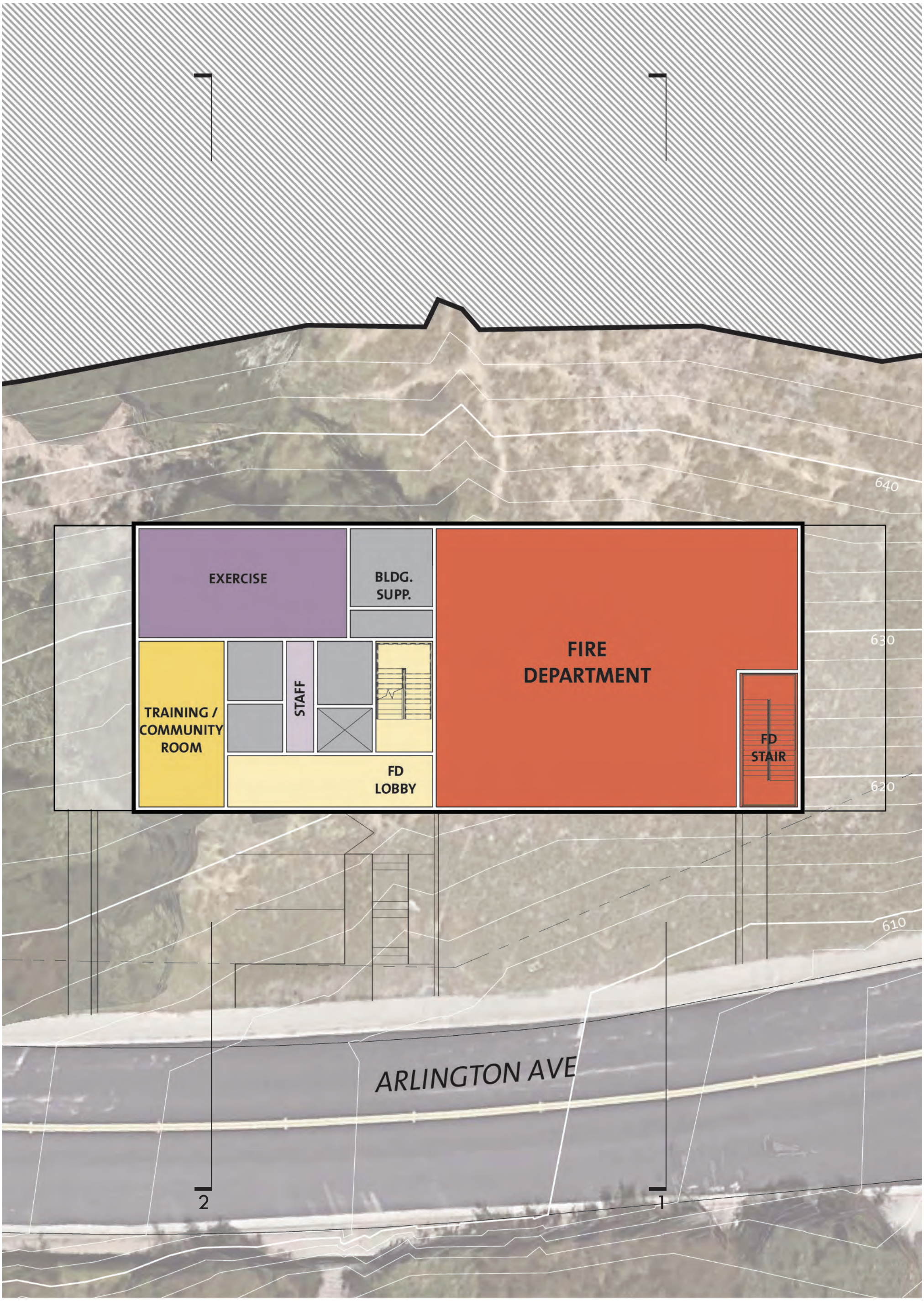
CONCEPTUAL PROGRAM PLAN- “MEZZANINE” LEVEL

RossDrulisCusenbery
ARCHITECTURE

1/16” = 1’-0”

ALTERNATE SITE
KENSINGTON FIRE STATION

CC



CONCEPTUAL PROGRAM PLAN- SECOND FLOOR

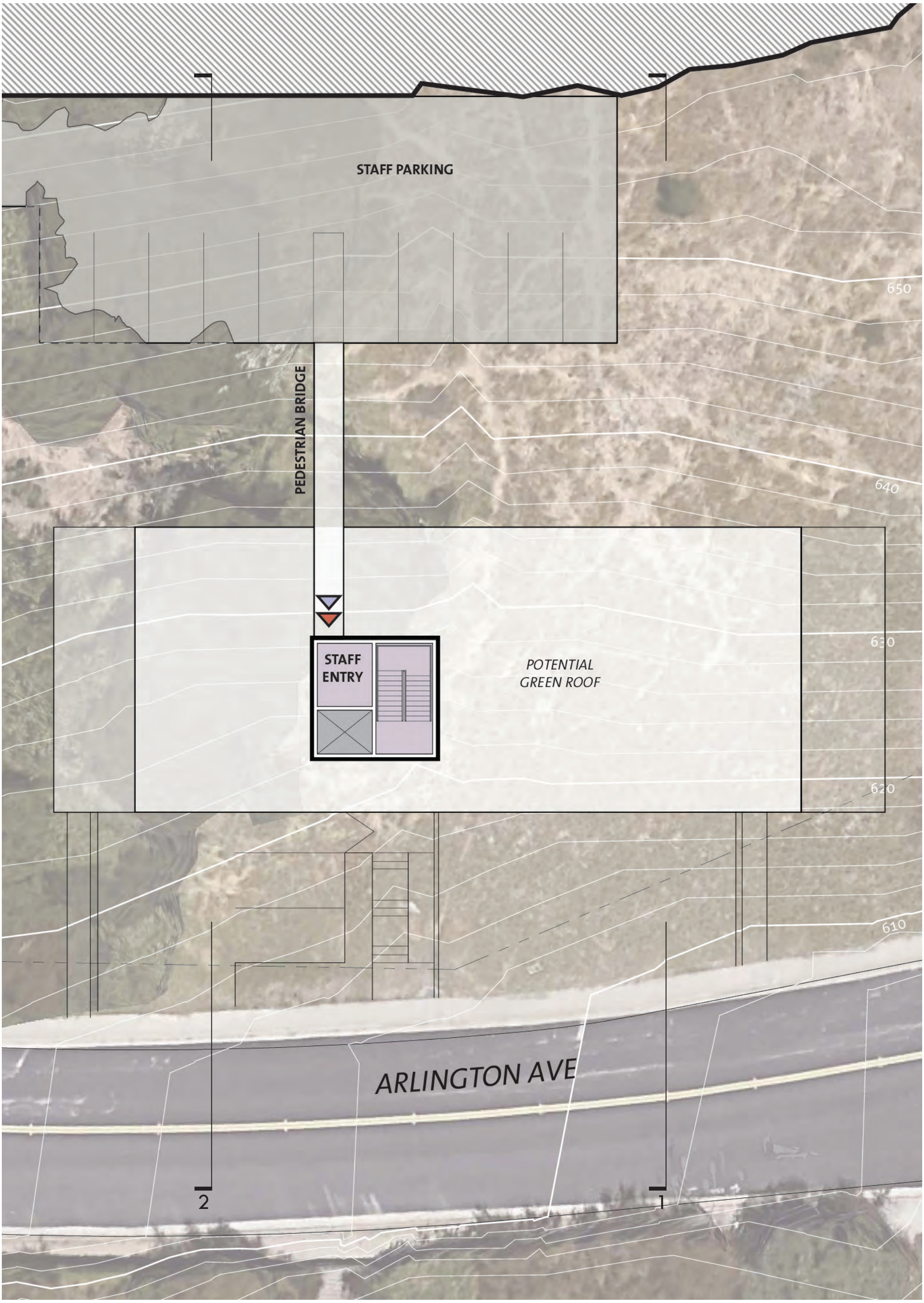
RossDrulisCusenbery ARCHITECTURE

1/16” = 1’-0”

ALTERNATE SITE

KENSINGTON FIRE STATION

CC



CONCEPTUAL PROGRAM PLAN- ROOF LEVEL

RossDrulisCusenbery ARCHITECTURE

1/16" = 1'-0"

ALTERNATE SITE

KENSINGTON FIRE STATION

CC

CONCEPTUAL PROGRAM PLAN- SITE PLAN

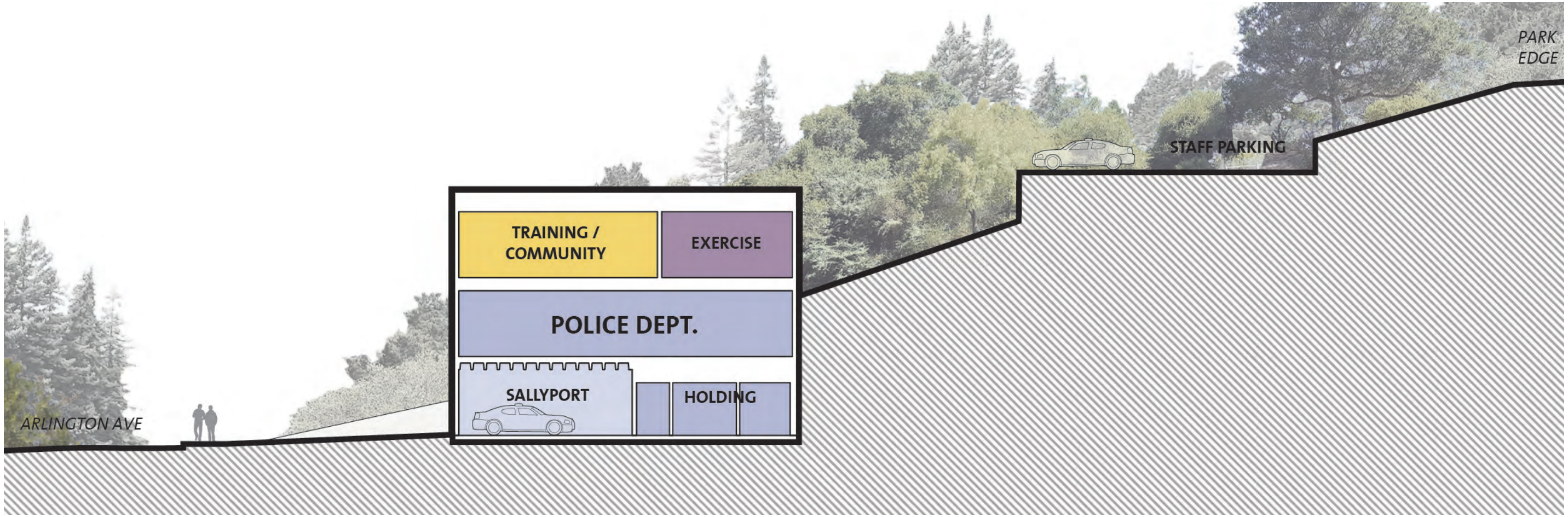
Ross Drulis Cusenbery ARCHITECTURE

1/16” = 1’-0”

ALTERNATE SITE

KENSINGTON FIRE STATION

CC



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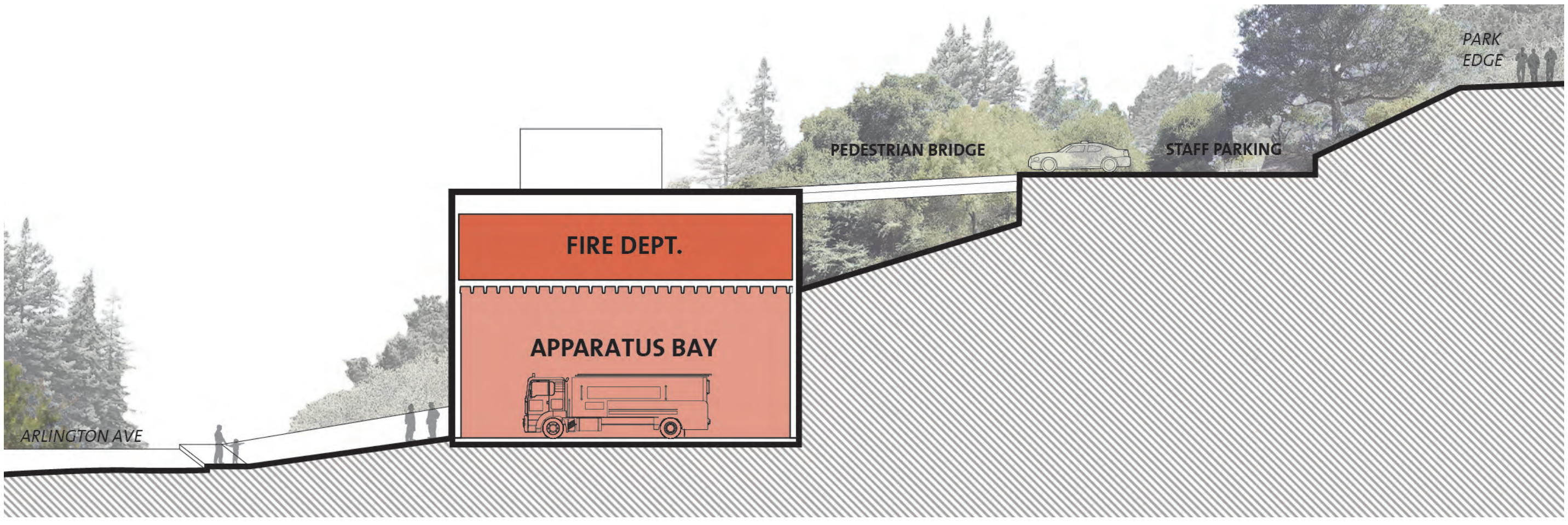

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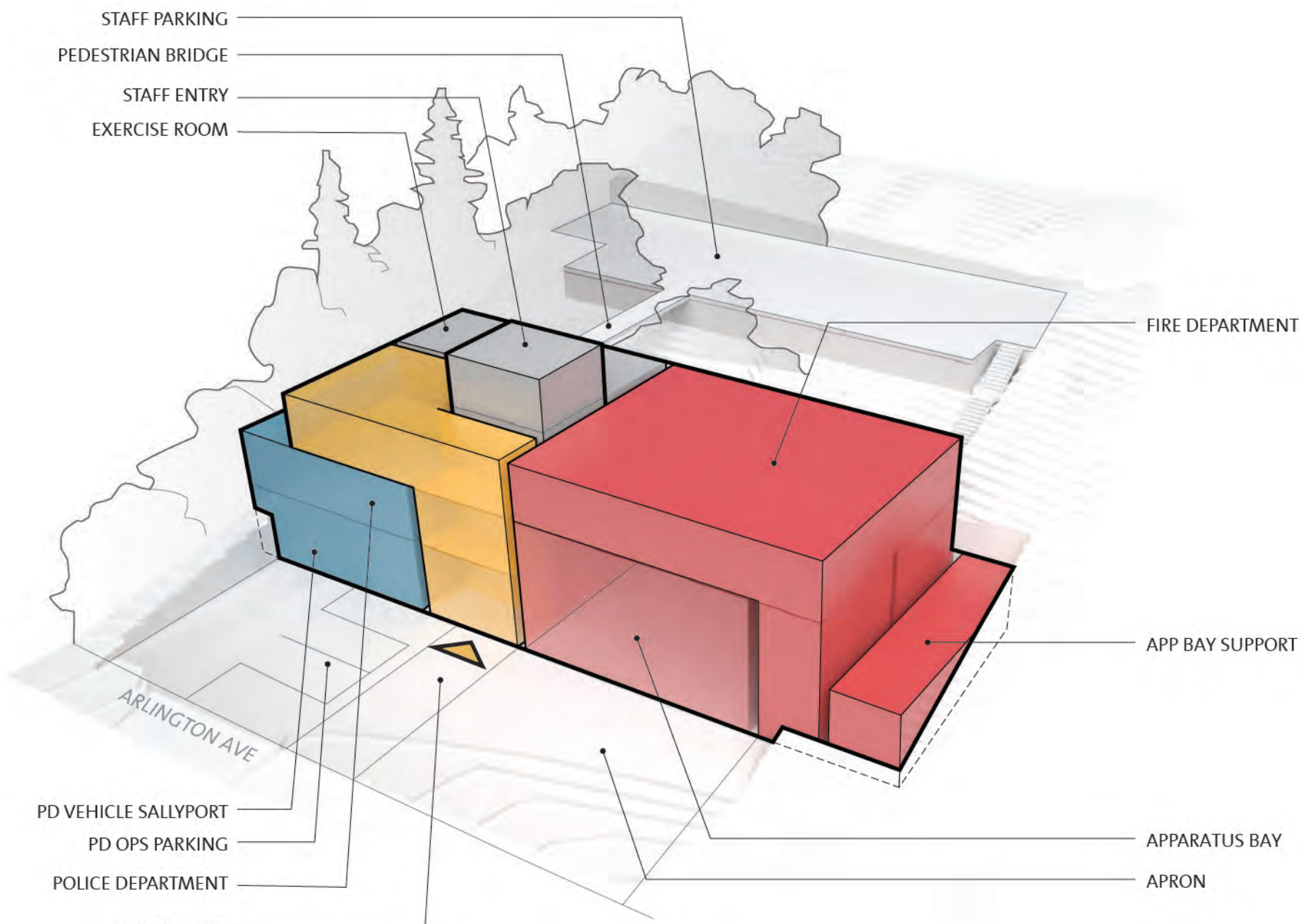

CONCEPTUAL PROGRAM DIAGRAM

KENSINGTON FIRE STATION

PERCENTAGES OF PROGRAM AREA by OPTION

	A	B	C	D	E	AA	BB	CC
	RENO *"INCREMENTAL EXPANSIONS"*	RENO *"1 STORY EXCAVATION"*	REBUILD *"2 STORY EXCAVATION"*	REBUILD *"MEZZANINE"*	REBUILD *"MEZZANINE W/ LOT"*	NEW *"STACKED DEPTS"*	NEW *"SIDE BY SIDE DEPTS"*	NEW *"NEW MEZZANINE"*
APP BAY	76%	74%	75%	85%	79%	100%	100%	100%
APP BAY SUPP.	27%	84%	94%	93%	100%	100%	100%	100%
FIRE DEPT	100%	100%	100%	100%	100%	100%	100%	100%
POLICE DEPT	57%	47%	99%	100%	62%	100%	100%	100%
SHARED / SUPPORT	79%	77%	100%	77%	80%	100%	100%	100%
BLDG GROSS	**68%**	**68%**	**91%**	**95%**	**88%**	**100%**	**100%**	**100%**
PD PARKING	6	3	7	4	4	7	7	7
FD PARKING	0	0	0	0	5	7	7	7

DECISION PLANNING MATRIX

NO.	DESCRIPTION	SITE DESIGN OPTIONS		
		B One Story Expansion	**D** Mezzanine PD Level	**CC** New Mezzanine
1	Meets Fire Department Architectural Program			
2	Meets Fire Department App Bay Program Area	74%	85%	100%
3	Meets Fire Department App Bay Support Program Area	84%	93%	100%
4	Meets Fire Department Office/Living Program Area	100%	100%	100%
5	Meets Police Department Architectural Program	47%	77%	100%
6	Meets Program Total Building Gross Area	68%	95%	100%
7	Segregation of FD and PD program areas			
8	Opportunity for Independent Civic Identity for FD & PD			
9	Functional Fire Apparatus Apron Provided			
10	Outdoor Areas Available for Training			
11	Adequate Opportunity for Natural Daylight to All Occupied Spaces			
12	Optimizes Response Time (Distance from Bedroom to Apparatus)			
13	In-Custody Transfer Screened From Public View			
14	Apparatus Bays: Optimum Width			
15	Apparatus Bays: Optimum Length			
16	Apparatus Bays: Optimum Height			
17	Convenient Vehicular Access			
18	Clear Egress Line of Sight Visibility			
19	Accommodates Fire Department Operational Parking			
20	Accommodates Fire Department Staff Parking On Site			
21	Accommodates Police Department Operational Parking			
22	Accommodates Police Department Staff Parking On Site			
23	FD Parking and PD Parking Separated			
24	Operational Parking Hidden from Public View			
25	Provides Visitor Parking On Site			
26	Adequate Overflow Public Parking Opportunity			
27	Building is Within the Planning Envelope & Setbacks			
28	Minimal Impact on Immediate Neighbors			
29	Adequate Acoustic Isolation			
30	Public Use is Compatible with Nearby Neighbors			
31	Does Not Require Acquisition of Public Open Space			
32	Does Not Impact Surrounding Views			
33	Adequate Area for On-Site Storm water Management			
34	Minimizes Excavation			
35	Does Not Excavate Full Basement			

Section 07
Cost Estimate

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Conceptual Cost Plan

for

Kensington Fire Station

November 7, 2016

DRAFT for REVIEW and COMMENT

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Emeryville, CA 94608
ph: 510.595.3020
www.mack5.com

CONTENTS ***Page***

Conceptual Cost Plan

Commentary

Kensington Fire Station

Introduction
Basis of Cost
Assumptions
Exclusions
Risk Register

November 7, 2016

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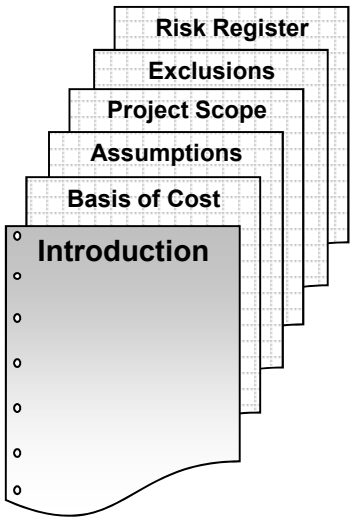
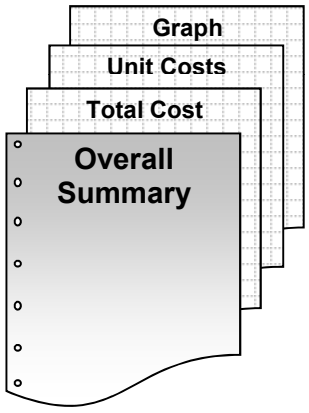
introduction



mack5 was requested to carry out a Conceptual/Feasibility Cost Plan for the proposed Kensington Fire Station located at City of Kensington, CA.

The first part of the Report contains the basis of the report, the assumptions made, description of the project scope, the exclusions to the costs and a risk register which contain items that have potential to impact cost at some point in the future.

The Overall Summary section contains a Summary of Gross Floor Areas, an Overall Project Summary, and Component and Trade Cost Summaries with Graphs.



Each section contains Control Quantities, a Cost Summary and Graph, and a Detailed Breakdown of Costs.

project introduction

The City of Kensington proposes to renovate or rebuild the existing fire station.

The fire station includes 3-drive through apparatus bays, apparatus suppot spaces including a workshop, medical storage and clean-up room, turnout storage and related janitor facilities, ADA restroom and station office, kitchen, dining, dayroom and laundry room, private sleeping quarters with unisex restrooms and mechanical/electrical/communications rooms.

items used for cost estimate

architectural	Site Fit Options prepared by RDC, dated 09/19/2016 Option B - Renovation Of Existing (4-pages) Option D - Rebuild (5-pages) Option CC - Alternate Site (7-pages)
narrative	Basis Of Design prepared by RDC, dated 10/07/2016 (9-pages)
	Space Requirement prepared by RDC, dated09/09/2016

assumptions

(a) Construction will start in April, 2017

(b) A construction period of 12 months

(c) The general contract will be competitively bid by a minimum of five (5) qualified contractors

(d) The general contractor will have full access to the site during normal business hours

(e) There are no phasing requirements

(f) The contractor will be required to pay prevailing wages

exclusions

(a) Cost escalation beyond a start of April, 2017

(b) Loose furniture and equipment except as specifically identified

(c) Hazardous materials handling, disposal and abatement

(d) Compression of schedule, premium or shift work, and restrictions on the contractor's working hours

(e) Soft Cost such as testing and inspection fees, architectural design and construction management fees, assessments, taxes, finance, legal and development charges

(f) Scope change and post contract contingencies

(g) Environmental impact mitigation

Conceptual Cost Plan

Overall Summary

Kensington Fire Station

Gross Floor Areas
Overall Summary
Component Summary
Trade Summary

November 7, 2016

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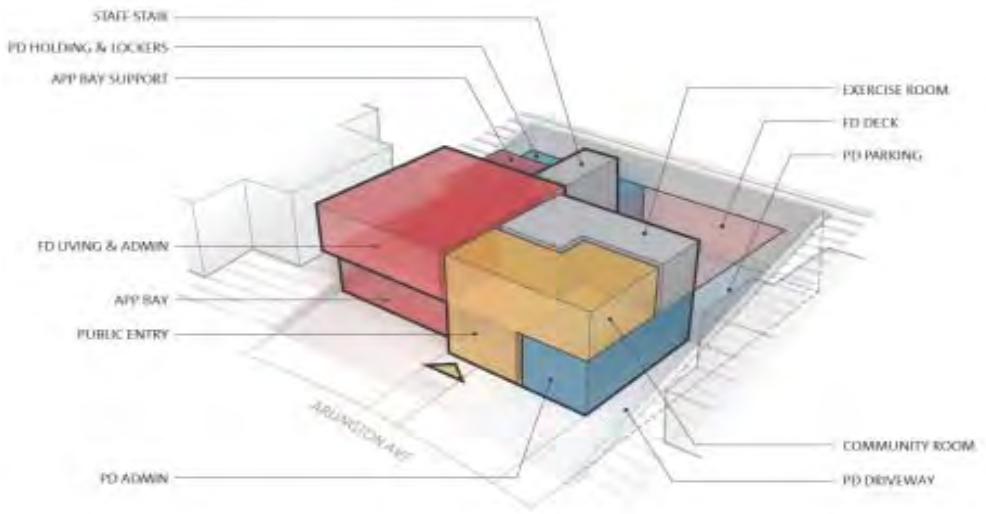
Kensington Fire Station	***GFA***	***%***	***$/SF***	***$,000***
Option B - Renovation	9,334	24%	$652.61	$6,091
Option D - Rebuild	14,175	32%	$578.91	$8,206
Option CC - Alternate Site	19,402	45%	$595.41	$11,552



Conceptual Cost Plan

Option B - Renovation

Kensington Fire Station

Control Quantities
Option B - Renovation Summary
Detailed Cost Breakdown

November 7, 2016

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Enclosed Areas	
First Floor	4,904
Second Floor	3,694
Subtotal of Enclosed Area	8,598
Covered Area	
Parking Canopy	1,471
Roof Overhang	260
Subtotal of Covered Area at half value	736
Total of Gross Floor Area	9,334

CONTROL QUANTITIES

				Ratio to Gross Area
Number of stories (x1,000)		2	EA	0.214
Gross Area		9,334	SF	1.000
Enclosed Area		8,598	SF	0.921
Covered Area		1,471	SF	0.158
Footprint Area		4,904	SF	0.525
Volume		133,842	CF	14.340
Gross Wall Area		10,077	SF	1.080
Finished Wall Area		7,244	SF	0.776
Windows or Glazing Area	28%	2,833	SF	0.304
Roof Area - Flat		6,635	SF	0.711
Roof Area - Sloping		0	SF	0.000
Roof Area - Total		6,635	SF	0.711
Roof Glazing Area		-	SF	0.000
Interior Partition Length		495	LF	0.053
Elevators (x10,000)		1	EA	1.071
Plumbing Fixtures (x1,000)		27	EA	2.893

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CSI UniFormat Summary	9,334 SF	%	$/SF	$,000
Foundations		4%	$28.78	$269
Basement Construction		9%	$58.86	$549
Superstructure		4%	$23.60	$220
Enclosure		12%	$78.05	$728
Roofing		4%	$23.84	$223
Interior Construction		4%	$28.60	$267
Stairs		1%	$6.75	$63
Interior Finishes		2%	$15.00	$140
Conveying		2%	$10.71	$100
Plumbing		2%	$15.49	$145
Heating, Ventilation, & Air Conditioning		9%	$61.83	$577
Fire Protection		1%	$6.54	$61
Electrical		10%	$63.46	$592
Equipment		2%	$11.04	$103
Furnishings		0%	$1.66	$16
Special Construction		0%	$0.54	$5
Selective Building Demolition		4%	$24.23	$226
Subtotal - Building Construction		*70%*	*$458.97*	*$4,284*
Site Preparation		0%	$3.11	$29
Site Improvement		2%	$16.23	$151
Site Mechanical Utilities		1%	$5.89	$55
Site Electrical Utilities		1%	$6.16	$58
Subtotal - Sitework		*5%*	*$31.39*	*$293*
Total - Building and Sitework Construction		*75%*	*$490.36*	*$4,577*
Bonds & Insurance	2.25%	2%	$11.03	$103
General Conditions	11.03%	8%	$55.28	$516
Contractor's Overhead & Profit	4.50%	4%	$25.05	$234
Subtotal		*89%*	*$581.72*	*$5,430*
Contingency for Design Development	10.00%	9%	$58.17	$543
Cost Escalation (to start of construction)	1.99%	2%	$12.71	$119
TOTAL CONSTRUCTION BUDGET	***April 2017***	***100%***	***$652.61***	***$6,091***

NOTE: Inclusions and Exclusions listed in the Commentary Section.

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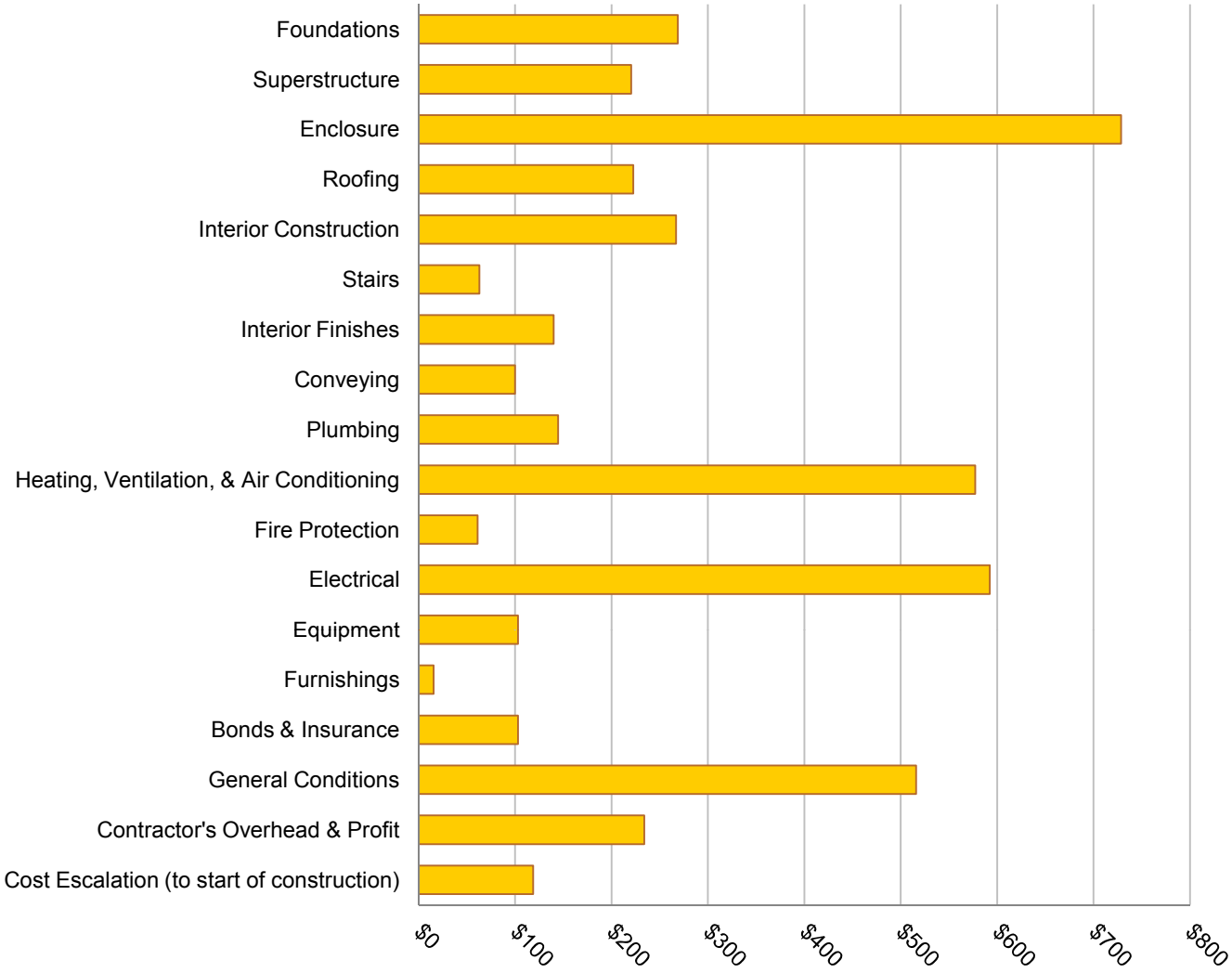
CSI UniFormat Summary



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FOUNDATIONS	Quantity	Unit	Rate	Total ($)
Standard Foundations				
Drilled Piers				
Mobilization and demobilization	1	LS	$15,000.00	$15,000
Testing	1	LS	$10,000.00	$10,000
Allowance for drilled piers	12	EA	$4,000.00	$48,000
Allowance for grade beams/ footings / foundation walls	47	CY	$500.00	$23,704
Footing at basement/ retaining wall	222	CY	$400.00	$88,889
Elevator pit	1	EA	$15,000.00	$15,000
Slab On Grade				
Slab on grade, reinforced, 6" thick, typical	2,004	SF	$10.00	$20,040
New slab on grade, reinforced, 12" thick at Apparatus bay	1,500	SF	$16.00	$24,000
Allowance to patch/repair existing slab on grade	1,400	SF	$10.00	$14,000
Allowance for equipment pads	1	LS	$10,000.00	$10,000
			Subtotal For Foundations:	**$268,633**

BASEMENT CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Basement Excavation - allowance				
Excavate & haul away basement material (assume partial cut)	2,326	CY	$30.00	$69,780
Sheeting/Shoring allowance	4,200	SF	$45.00	$189,000
Basement Walls				
Basement wall , 18" thick including along Vehicle driveway	4,200	SF	$60.00	$252,000
Waterproofing membrane	4,200	SF	$8.00	$33,600
Perforated drain pipe	200	LF	$25.00	$5,000
				$549,380

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SUPERSTRUCTURE	Quantity	Unit	Rate	Total ($)
Upper Floor Structure				
2" thick light weight concrete over plywood and wood framing	885	SF	$30.00	$26,550
12" Concrete curbs in Apparatus bay	150	LF	$25.00	$3,750
Allowance for reconfiguration of existing upper floor structure	2,809	SF	$20.00	$56,180
Roof Structure				
Plywood over wood framing	3,140	SF	$25.00	$78,500
Allowance for reconfiguration of existing roof structure/ cutting and patching for new work	3,660	SF	$10.00	$36,600
Miscellaneous				
Miscellaneous metal	9,334	GSF	$1.50	$14,000
Miscellaneous rough carpentry	9,334	GSF	$0.50	$4,667
			Subtotal For Superstructure:	**$220,247**

ENCLOSURE	Quantity	Unit	Rate	Total ($)
Exterior Wall Framing, Furring and Insulating				
Exterior wall system; composite wall panel or fiber cement cladding including sealants, blocking, flashings etc	5,288	SF	$35.00	$185,073
Backup system; 6" Metal stud, insulation, air/vapor barrier (assume backup at ETR walls will remain)	2,540	SF	$16.00	$40,640
CMU backup including insulation and air barrier at Ground level Apparatus bay	134	SF	$28.00	$3,763
Drywall to interior face of exterior wall	5,288	SF	$4.00	$21,151
Aluminum Windows	2,266	SF	$85.00	$192,627
Premium for ballistic glazing at lower level glazing	567	SF	$115.00	$65,153
Premium for sunshades	1,133	SF	$20.00	$22,662
Cement plaster system at covered parking & overhang	1,760	SF	$20.00	$35,200

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ENCLOSURE	Quantity	Unit	Rate	Total ($)
Exterior Doors, Frames and Hardware				
Apparatus bay doors; 14'x13'	3	EA	$40,000.00	$120,000
Aluminum entry doors, double leaf, ballistic proof	2	PR	$10,000.00	$20,000
Hollow metal door, frame and hardware, exterior	4	EA	$2,000.00	$8,000
Allowance for specialty hardware at entrance doors	1	LS	$2,500.00	$2,500
Soffits				
Exterior soffit to roof overhangs	260	SF	$45.00	$11,700
			Subtotal For Enclosure:	**$728,470**

ROOFING	Quantity	Unit	Rate	Total ($)
Roof Coverings				
Membrane roofing	6,800	SF	$18.00	$122,400
Roof Parapet/Coping	388	LF	$30.00	$11,640
Miscellaneous work				
Safety rail at main roof	80	LF	$250.00	$20,000
Skylights; allow per narrative	340	SF	$150.00	$51,000
Pedestrian paving at roof level	500	SF	$25.00	$12,500
Roof ladder/ hatches/ accessories	1	LS	$5,000.00	$5,000
			Subtotal For Roofing:	**$222,540**

INTERIOR CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Interior Partitions				
Partitions - core and fit out	8,598	GSF	$15.00	$128,970
Interior glazed windows/partitions (per narrative)	150	SF	$75.00	$11,250
Interior Doors				
Interior Doors including coiling doors and	8,598	SF	$5.00	$42,990
Fittings				
Protective guards, barriers and bumpers - allowance	8,598	GSF	$0.25	$2,150

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INTERIOR CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Prefabricated compartments and accessories				
Mirrors in Fitness	60	SF	$30.00	$1,800
Toilet Accessories, single stall	8,598	GSF	$0.50	$4,299
Shower stall and accessories	2	EA	$2,500.00	$5,000
Shelving and Millwork				
Janitor's shelf and mop rack	1	EA	$500.00	$500
Cabinets and Countertops				
Allowance for casework throughout	8,598	SF	$5.00	$42,990
Allowance for Display cases in Lobby	1	LS	$3,000.00	$3,000
Chalkboards and Graphics				
Directional/wayfinding signs	8,598	GSF	$1.50	$12,897
Door signage	24	EA	$150.00	$3,600
Building signage - exterior	1	LS	$5,000.00	$5,000
Chalkboards/tack boards and mapping wall	1	LS	$2,500.00	$2,500
Subtotal For Interior Construction:				**$266,946**

STAIRS	Quantity	Unit	Rate	Total ($)
Stair Construction				
Egress stair; metal pan with concrete fill	2	FLT	$25,000.00	$50,000
Rubber finish to treads and landings	2	FLT	$1,500.00	$3,000
Fire pole	1	EA	$10,000.00	$10,000
Subtotal For Stairs:				**$63,000**

INTERIOR FINISHES	Quantity	Unit	Rate	Total ($)
Floor Finishes				
Carpet tile in sleep rooms	489	SF	$5.50	$2,690
Resilient sheet flooring in Offices, Living, Storage, Kitchen & Training room	4,248	SF	$8.00	$33,986
Stained concrete in Apparatus bays, support area & Sally port	2,117	SF	$8.00	$16,936
Athletic flooring tiles in Fitness room	189	SF	$10.00	$1,890
Tile or similar in Lobbies	47	SF	$20.00	$940
Ceramic floor tile and base in bathrooms	218	SF	$16.00	$3,488

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INTERIOR FINISHES	Quantity	Unit	Rate	Total ($)
Wall finishes				
Paint to interior walls	8,598	GSF	$1.50	$12,897
Tile in bathrooms & showers; wainscot typical, full height in showers	225	SF	$20.00	$4,500
Painted plywood, 8' high in Apparatus bays	880	SF	$5.00	$4,400
Allowance for upgraded finishes in Public areas; plam wainscot in corridors	8,598	GSF	$0.50	$4,299
Ceiling Finishes				
Gypsum board ceilings, painted; 30%	1,557	SF	$18.00	$28,033
ACT; 70%	3,634	SF	$5.00	$18,170
Paint exposed ceiling in Apparatus bay & support space	2,117	SF	$2.00	$4,234
Allowance for soffits	100	LF	$35.00	$3,500
Subtotal For Interior Finishes:				**$139,962**

CONVEYING	Quantity	Unit	Rate	Total ($)
Elevators and Lifts				
Traction elevator, 2-stops	1	EA	$100,000.00	$100,000
Subtotal For Conveying:				**$100,000**

PLUMBING	Quantity	Unit	Rate	Total ($)
Plumbing Fixtures				
Water closet, floor, manual flush	5	EA	$1,650.00	$8,250
Lavatory, wall hung, lever faucet	5	EA	$1,850.00	$9,250
Kitchen sink, dbl, SS faucet, disposer	1	EA	$1,900.00	$1,900
Mop sink, floor type, trim	2	EA	$1,950.00	$3,900
Service sink, wall type, ECI, faucet	1	EA	$1,675.00	$1,675
Shower receptor, drain, valve & head	4	EA	$2,900.00	$11,600
Laundry box, recessed w/ WHA	2	EA	$800.00	$1,600
Hose bibb - interior type	2	EA	$240.00	$480
Hose bibb - exterior type	4	EA	$560.00	$2,240
Dishwasher (connections only)	1	EA	$300.00	$300
Miscellaneous fixtures	0	SF	$2.25	

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PLUMBING	Quantity	Unit	Rate	Total ($)
Plumbing Equipment				
Gas water heater w/ flue	1	EA	$12,500.00	$12,500
Recirculation pump w/ aqua stat	1	EA	$2,100.00	$2,100
Expansion tank	1	EA	$420.00	$420
Miscellaneous equipment	0	SF	$1.50	
Domestic Water Distribution				
Domestic water system	0	SF	$2.50	
Cold water rough-in for fixture	27	EA	$550.00	$14,850
Hot water rough-in for fixture	16	EA	$350.00	$5,600
Sanitary Waste				
Sanitary waste & vent systems	0	SF	$2.25	
Rain Water Drainage				
Rain water drainage system	0	SF	$1.35	
Gutters & downspouts (by others)				
Compressed Air Systems				
Air compressor, 120 gallon, 10 HP	1	EA	$10,000.00	$10,000
Air dryer, filters, etc.	2	EA	$750.00	$1,500
CA piping, drops - complete	5	LS	$5,000.00	$25,000
Natural Gas System				
Gas service & meter (by Utility Co.)			NIC, Not required	
Natural gas system			NIC, Not required	
Condensate Drainage				
Condensate drain system	8,598	SF	$0.75	$6,449
Trade Specialties				
Demolition	1	LS	$7,000.00	$7,000
Testing & sterilization	1	LS	$3,000.00	$3,000
Pipe sleeves, fire stopping, etc.	1	LS	$5,000.00	$5,000
Miscellaneous	1	LS	$10,000.00	$10,000
Subtotal For Plumbing:				**$144,614**

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HEATING, VENTILATION, & AIR-	Quantity	Unit	Rate	Total ($)
Energy Supply				
Boiler Plant	1	EA	$14,850.00	$14,850
Heat Generating Systems				
Radiant heat panels	4	EA	$2,200.00	$8,800
Electric infrared heaters (Bay doors)	3	EA	$1,500.00	$4,500
Boiler flue through roof	1	EA	$500.00	$500
Cooling Systems				
Air Handling Equipment				
RTU with heat recovery option	1	EA	$50,000.00	$50,000
Distribution Systems				
Galvanized sheet metal ductwork	4,500	LB	$12.50	$56,250
Duct insulation	2,925	SF	$3.25	$9,506
Miscellaneous duct accessories	1	LS	$10,000.00	$10,000
Sound Attenuator	1	LS	$14,850.00	$14,850
Registers, grilles and diffusers	65	EA	$425.00	$27,625
Dryer vent	1	EA	$300.00	$300
Terminal and Package Units				
VRF system	22	TON	$2,560.00	$56,320
VRF HR branch selectors	3	EA	$4,800.00	$14,400
VRF fan coil unit, ducted	22	EA	$2,500.00	$55,000
RS/RL/HR lines - (CU>BS)	900	LF	$32.50	$29,250
Outdoor condensing unit, 1 1/2 ton	2	EA	$2,950.00	$5,900
Indoor fan coil unit, wall, 1 1/2 ton	2	EA	$1,550.00	$3,100
RS/RL lines - complete	110	LF	$25.00	$2,750
Controls and Instrumentation				
Controls & instrumentation	9,334	SF	$5.85	$54,601
Systems Testing and Balancing				
Systems start-up & testing	1	LS	$5,000.00	$5,000
Air systems balancing	9,334	SF	$0.50	$4,667
Other HVAC Systems and Equipment				
Apparatus bay exhaust fan	2	EA	$5,000.00	$10,000
Decon room exhaust fan	1	EA	$3,000.00	$3,000
Turnout room exhaust fan	1	EA	$2,500.00	$2,500
Work shop area exhaust fan	1	EA	$3,000.00	$3,000
Vehicle exhaust system - complete	1	LS	$50,000.00	$50,000

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HEATING, VENTILATION, & AIR-	Quantity	Unit	Rate	Total ($)
Trade Specialties				
Demolition	1	LS	$10,000.00	$10,000
Rigging & hoisting	1	LS	$10,000.00	$10,000
Pipe sleeves, fire stopping, etc.	1	LS	$3,500.00	$3,500
Miscellaneous	1	LS	$10,000.00	$10,000
Commissioning og the systems based upon Calgreen, including Contractor efforts and commissioning effort - allow 1% of the Construction Cost	1	LS	$46,900.00	$46,900
Subtotal For Heating, Ventilation, & Air-Conditioning:				**$577,069**

FIRE PROTECTION	Quantity	Unit	Rate	Total ($)
Sprinklers				
Wet sprinkler system - complete including pump	9,334	GSF	$6.00	$56,001
Demolition	1	LS	$5,000.00	$5,000
Subtotal For Fire Protection:				**$61,001**

ELECTRICAL	Quantity	Unit	Rate	Total ($)
Electrical Service and Distribution				
Electrical service & distribution equipment, feeders & grounding	9,334	SF	$15.50	$144,669
80KW generator w/200 gal belly tank, complete with ATS and feeder to electrical distribution system	9,334	SF	$8.50	$79,335
Equipment wiring				
Apparatus bay door	3	EA	$1,500.00	$4,500
Elevator	1	EA	$3,500.00	$3,500
Mechoshade	1	LS	$1,500.00	$1,500
Vehicle exhaust	1	LS	$2,500.00	$2,500
CRAC	1	EA	$3,000.00	$3,000
Air compressor	1	EA	$1,500.00	$1,500
Kitchenette:				
Garbage disposal	1	EA	$500.00	$500
Range/Oven	1	EA	$650.00	$650
Hood	1	EA	$350.00	$350
Dishwasher	1	EA	$500.00	$500
Equipment wiring not yet detailed	9,334	SF	$3.00	$28,001

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ELECTRICAL	Quantity	Unit	Rate	Total ($)
Lighting and Branch Wiring				
Lighting				
LED lighting fixtures with installation labor	8,034	SF	$6.65	$53,423
Lighting to covered parking canopy	1,300	SF	$3.00	$3,900
Lighting controls				
Lighting controls	9,334	SF	$1.00	$9,334
Lighting and Branch Wiring				
Branch receptacles	9,334	SF	$0.75	$7,000
Lighting & branch circuitry	9,334	SF	$6.00	$56,001
Communications and Security				
Fire Alarm System				
Fire alarm control panel	1	LS	$5,500.00	$5,500
Initiating devices	9,334	SF	$0.75	$7,000
Circuitry	9,334	SF	$1.25	$11,667
Telecommunications				
Telecom devices & cabling	9,334	SF	$1.50	$14,000
Rough-in	9,334	SF	$1.00	$9,334
Public Announcement System				
Public announcement system	9,334	SF	$2.00	$18,667
Security System				
Security system allowance	9,334	SF	$3.00	$28,001
Door Cell/Holding Lock System				
Door cell lock system (Rough-in only)	7	LOC	$2,500.00	$17,500
Sally port Control				
Overhead door control feed and connection	2	EA	$2,500.00	$5,000
E-911 (Server)				
UPS unit, disconnect switch and feeder, assumes required.	1	LS	$25,000.00	$25,000
E-911 rough-in	1	LS	$5,000.00	$5,000
Dispatch Room				
Dispatch room rough-in (allow)	1	LS	$7,000.00	$7,000

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ELECTRICAL	Quantity	Unit	Rate	Total ($)
Other Electrical Systems				
Demolition	1	LS	$7,500.00	$7,500
Antenna System / Satellite Dish				
Rough-in only	1	LS	$2,500.00	$2,500
Training/Large Meeting Room				
Sound system	1	LS	$5,000.00	$5,000
A/V rough-in only	1	LS	$2,500.00	$2,500
Temp power & lights	1	LS	$4,000.00	$4,000
Seismic restraints	1	LS	$2,000.00	$2,000
Fees & Permits	1	LS	$6,000.00	$6,000
Testing and studies	1	LS	$4,000.00	$4,000
Lightning protection	1	LS	$5,000.00	$5,000
			Subtotal For Electrical:	**$592,330**

EQUIPMENT	Quantity	Unit	Rate	Total ($)
Shelving				
High density mobile storage systems in Property & Evidence room; allowance	1	LS	$10,000.00	$10,000
Public Safety Equipment	1	LS	$25,000.00	$25,000
Metal detector in prisoner processing area			included in allowance	
Blast resistant storage container in mail processing center			included in allowance	
Weapon discharge unit			included in allowance	
Refrigerators & Freezers in Property Evidence department			included in allowance	
Drying cabinet in Property Evidence department			included in allowance	
Detention furniture in Holding areas			included in allowance	
Lockers; weapon, personnel etc			included in allowance	
Secure storage lockers			included in allowance	
Fire Department Equipment				
Allowance for Turn-out gear lockers, rappelling anchors	1	LS	$20,000.00	$20,000

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EQUIPMENT	Quantity	Unit	Rate	Total ($)
Kitchen & Laundry Equipment				
Commercial grade kitchen equipments, including (3) refrigerators, (1) freezer, range/oven, hood exhaust, dishwasher, garbage disposal, microwave oven	1	LS	$40,000.00	$40,000
Residential grade Laundry equipment; Washer & Dryer	1	LS	$5,000.00	$5,000
Fitness Equipments				NIC, FF&E
Projection screen in Training room	1	LS	$3,000.00	$3,000
Subtotal For Equipment:				**$103,000**

FURNISHINGS	Quantity	Unit	Rate	Total ($)
Fixed Furnishings				
Roller shades, manual, mecho shades	2,266	SF		
Staff mailboxes	1	LS		
Entrance mats and frames	50	LS	$40.00	$2,000
Fire Extinguisher cabinets	1	LS	$1,500.00	$1,500
Amenities and Convenience Items				
Bike storage	1	LS	$2,000.00	$2,000
Wire mesh lockers at turnout room	1	LS	$10,000.00	$10,000
Moveable Furnishings				
Dayroom/Bedroom/sleep room furnishings				NIC, FF&E
Office desk and chairs				NIC, FF&E
Classroom tables and chairs				NIC, FF&E
Subtotal For Furnishings:				**$15,500**

SPECIAL CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Special Controls and Instrumentation				
Safe in Property/Evidence room	1	EA	$5,000.00	$5,000
Subtotal For Special Construction:				**$5,000**

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SELECTIVE BUILDING DEMOLITION	Quantity	Unit	Rate	Total ($)
Interior Building Demolition				
Allowance for gut demolition of interiors	5,948	SF	$8.00	$47,584
Remove cut and capped MEP systems	5,948	SF	$2.00	$11,896
Allowance for structural demolition to tie into new addition	5,948	SF	$10.00	$59,480
Allowance to remove existing roof membrane down to deck	3,660	SF	$3.00	$10,980
Demo existing exterior wall for new Addition	1,200	SF	$20.00	$24,000
Allowance to remove existing closure veneer	7,220	SF	$10.00	$72,200
Hazardous Materials Abatement				Excluded
Subtotal For Selective Building Demolition:				**$226,140**

SITE PREPARATION	Quantity	Unit	Rate	Total ($)
Site Clearing and Demolition				
Allowance for site preparation/ protection	3,000	SF	$3.00	$9,000
Allowance for erosion control	1	LS	$5,000.00	$5,000
Earthwork				
Allowance for site grading/ cut & fill	3,000	SF	$5.00	$15,000
Hazardous Materials Abatement				Excluded
Subtotal For Site Preparation:				**$29,000**

SITE IMPROVEMENT	Quantity	Unit	Rate	Total ($)
Vehicular Paving				
Vehicular driveway & Covered Police parking area, 6"~8" thick	2,650	SF	$12.00	$31,800
Egress Apparatus apron, 12" thick	1,130	SF	$15.00	$16,950
Curbs	150	LF	$30.00	$4,500
Pedestrian Paving				
Concrete sidewalks	550	SF	$15.00	$8,250
Paving at entry	160	SF	$20.00	$3,200
Allowance for work to existing sidewalks	1	LS	$10,000.00	$10,000

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SITE IMPROVEMENT	Quantity	Unit	Rate	Total ($)
Site Structures				
Site walls at entrance	25	LF	$350.00	$8,750
Steps @ entrance	1	LS	$5,000.00	$5,000
Retaining wall at driveway	40	LF	$675.00	$27,000
Site Development				
Flag poles	2	EA	$8,000.00	$16,000
Site furnishings; bike racks, bollards, trash receptacles etc	1	LS	$15,000.00	$15,000
Landscaping				
Allowance for landscaping and irrigation	1	LS	$5,000.00	$5,000
Subtotal For Site Improvement:				**$151,450**

SITE MECHANICAL UTILITIES	Quantity	Unit	Rate	Total ($)
Domestic Water				
Connect to existing domestic water	1	LS	$20,000.00	$20,000
Sanitary Sewer				
Connect to existing sanitary sewer	1	LS	$10,000.00	$10,000
Storm Drainage				
Allowance for storm drainage	1	LS	$25,000.00	$25,000
Fuel Distribution				
Allowance for fuel distribution				NIC
Subtotal For Site Mechanical Utilities:				**$55,000**

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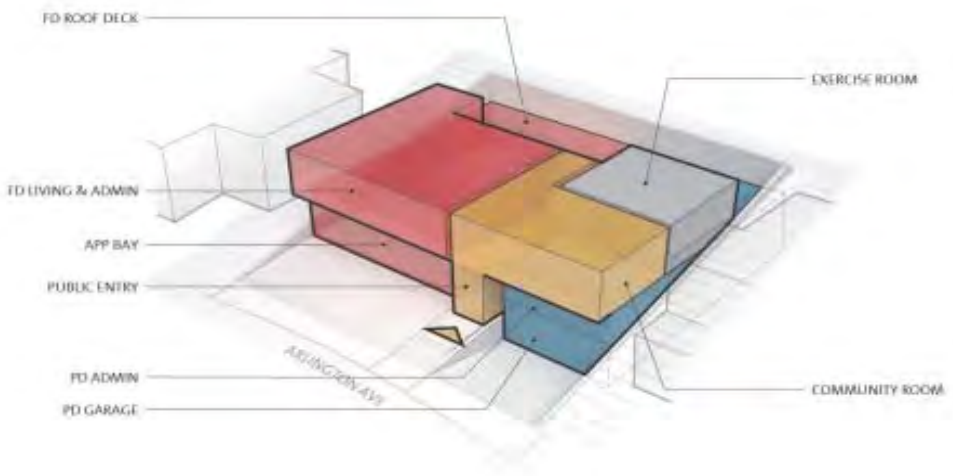
SITE ELECTRICAL UTILITIES	Quantity	Unit	Rate	Total ($)
Electrical Service and Distribution				
Primary electrical duct bank, allow 2-4" empty	100	LF	$80.00	$8,000
Pad mounted transformer				Utility company
Transformer pad	1	LS	$2,500.00	$2,500
Secondary duct bank, allow	60	LF	$150.00	$9,000
Generator duct bank, allow	60	LF	$100.00	$6,000
Site Lighting				
Site lighting & circuitry, allow	1	LS	$20,000.00	$20,000
Site Communications and Security				
Communication duct bank, allow 2-4" empty	150	LF	$80.00	$12,000
Subtotal For Site Electrical Utilities:				**$57,500**



Conceptual Cost Plan

Option D - Rebuild

Kensington Fire Station

Control Quantities
Option D - Rebuild Summary
Detailed Cost Breakdown

November 7, 2016

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Enclosed Areas	
Ground Floor	6,692
Mezzanine Floor	3,364
Second Floor	3,906
Subtotal of Enclosed Area	13,962
Covered Area	
Roof Overhang	426
Subtotal of Covered Area at half value	213
Total of Gross Floor Area	14,175

CONTROL QUANTITIES

				Ratio to Gross Area
Number of stories (x1,000)		3	EA	0.212
Gross Area		14,175	SF	1.000
Enclosed Area		13,962	SF	0.985
Covered Area		426	SF	0.030
Footprint Area		6,692	SF	0.472
Volume		164,758	CF	11.623
Gross Wall Area		12,149	SF	0.857
Finished Wall Area		9,791	SF	0.691
Windows or Glazing Area	24%	2,358	SF	0.166
Roof Area - Flat		7,118	SF	0.502
Roof Area - Sloping		-	SF	0.000
Roof Area - Total		7,118	SF	0.502
Roof Glazing Area		-	SF	0.000
Interior Partition Length		904	LF	0.064
Elevators (x10,000)		1	EA	0.705
Plumbing Fixtures (x1,000)		29	EA	2.046

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CSI UniFormat Summary	*14,175 SF*	*%*	*$/SF*	*$,000*
Foundations		4%	$23.44	$332
Basement Construction		8%	$44.40	$629
Superstructure		5%	$29.82	$423
Enclosure		8%	$48.52	$688
Roofing		4%	$21.85	$310
Interior Construction		7%	$39.82	$564
Stairs		1%	$8.08	$115
Interior Finishes		3%	$16.53	$234
Conveying		2%	$9.88	$140
Plumbing		4%	$20.82	$295
Heating, Ventilation, & Air Conditioning		10%	$59.96	$850
Fire Protection		1%	$8.00	$113
Electrical		10%	$60.08	$852
Equipment		2%	$10.09	$143
Furnishings		1%	$3.08	$44
Special Construction		0%	$0.35	$5
Selective Building Demolition		1%	$6.29	$89
Subtotal - Building Construction		*71%*	*$411.01*	*$5,826*
Site Preparation		1%	$7.05	$100
Site Improvement		1%	$6.22	$88
Site Mechanical Utilities		1%	$5.29	$75
Site Electrical Utilities		1%	$5.41	$77
Other Site Construction		0%	$0.00	$0
Subtotal - Sitework		*4%*	*$23.98*	*$340*
Total - Building and Sitework Construction		*75%*	*$434.99*	*$6,166*
Bonds & Insurance	2.25%	2%	$9.79	$139
General Conditions	11.03%	8%	$49.04	$695
Contractor's Overhead & Profit	4.50%	4%	$22.22	$315
Subtotal		*89%*	*$516.04*	*$7,315*
Contingency for Design Development	10.00%	9%	$51.60	$731
Cost Escalation (to start of construction)	1.99%	2%	$11.28	$160
TOTAL CONSTRUCTION BUDGET	***April 2017***	***100%***	***$578.91***	***$8,206***

NOTE: Inclusions and Exclusions listed in the Commentary Section.

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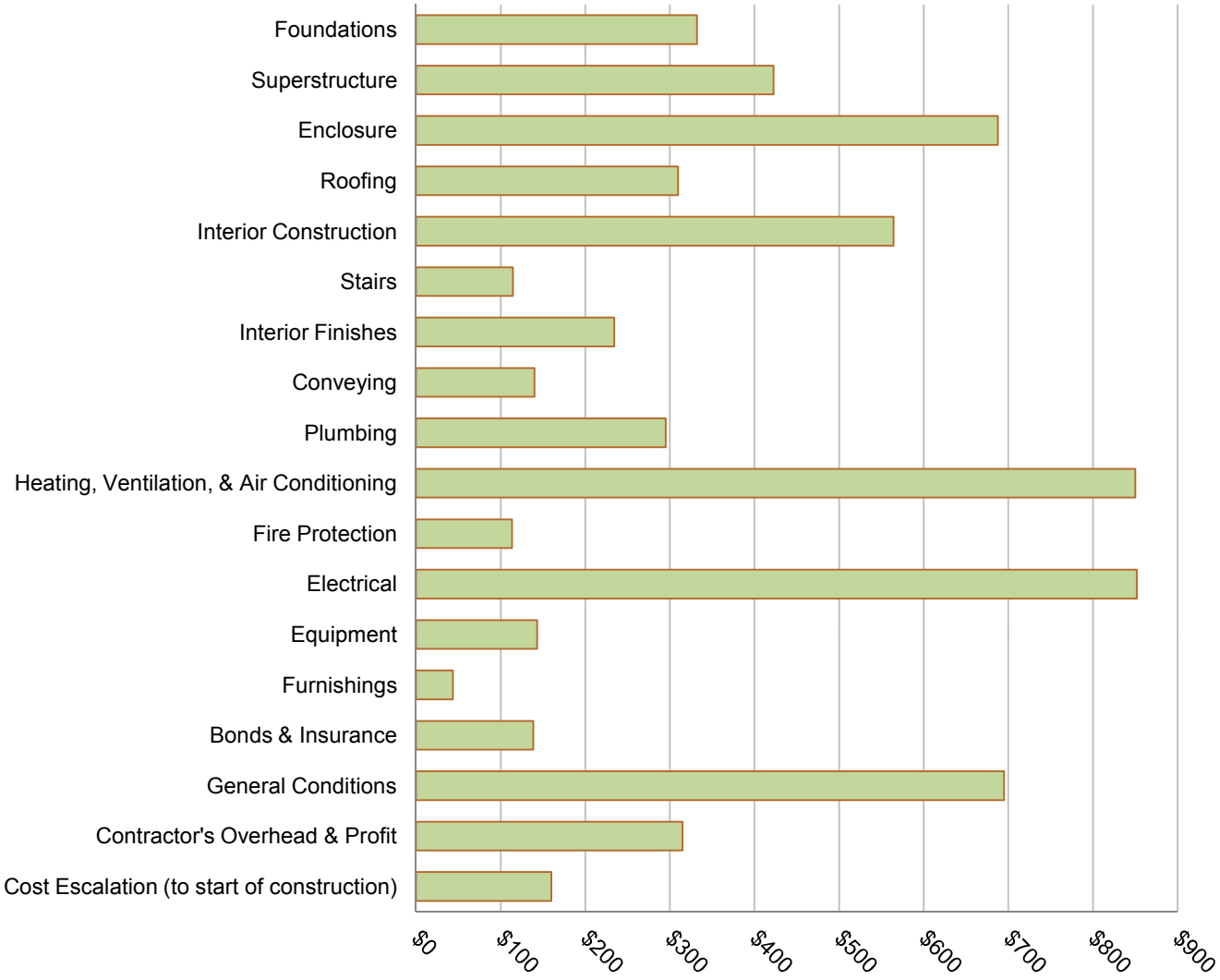
CSI UniFormat Summary



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FOUNDATIONS	Quantity	Unit	Rate	Total ($)
Standard Foundations				
Drilled Piers				
Mobilization and demobilization	1	LS	$15,000.00	$15,000
Testing	1	LS	$10,000.00	$10,000
Allowance for drilled piers	20	EA	$4,000.00	$80,000
Allowance for grade beams/ footings / foundation walls	123	CY	$500.00	$61,481
Footing at basement/ retaining wall	150	CY	$400.00	$60,000
Elevator pit	1	EA	$15,000.00	$15,000
Slab On Grade				
Reinforced concrete slab on grade				
6"~8" thick at police garage	1,496	SF	$12.00	$17,952
12" thick at Apparatus bay	2,170	SF	$15.00	$32,550
6" thick, typical	3,026	SF	$10.00	$30,260
Allowance for equipment pads	1	LS	$10,000.00	$10,000
Subtotal For Foundations:				**$332,243**

BASEMENT CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Basement Excavation - allowance				
Excavate & haul away basement material (assume partial cut)	3,500	CY	$30.00	$105,000
Sheeting/Shoring allowance	4,497	SF	$45.00	$202,365
Basement Walls				
Basement wall , 18" thick	4,497	SF	$60.00	$269,820
Waterproofing membrane	4,497	SF	$8.00	$35,976
Perforated drain pipe	250	LF	$25.00	$6,250
Dewatering	1	LS	$10,000.00	$10,000
Subtotal For Basement Construction:				**$629,411**

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SUPERSTRUCTURE	Quantity	Unit	Rate	Total ($)
Upper Floor Structure				
2" thick light weight concrete over plywood and wood framing	7,270	SF	$30.00	$218,100
12" Concrete curbs in Apparatus bay, Turn-out room and Workshop	250	LF	$25.00	$6,250
Roof Structure				
Plywood over wood framing	6,800	SF	$25.00	$170,000
Miscellaneous				
Miscellaneous metal	14,175	GSF	$1.50	$21,263
Miscellaneous rough carpentry	14,175	GSF	$0.50	$7,088
			Subtotal For Superstructure:	**$422,700**

ENCLOSURE	Quantity	Unit	Rate	Total ($)
Exterior Wall Framing, Furring and Insulating				
Exterior wall system; composite wall panel or fiber cement cladding including sealants, blocking, flashings etc	4,876	SF	$35.00	$170,657
Backup system; 6" Metal stud, insulation, air/vapor barrier	4,530	SF	$16.00	$72,482
CMU backup including insulation and air barrier at First floor (ground level)	346	SF	$28.00	$9,682
Drywall to interior face of exterior wall	4,530	SF	$4.00	$18,120
Aluminum Windows	2,021	SF	$85.00	$171,794
Premium for ballistic glazing at lower level glazing	337	SF	$115.00	$38,738
Premium for sunshades	606	SF	$20.00	$12,127
Exterior Doors, Frames and Hardware				
Apparatus bay doors; 14'x13'	3	EA	$40,000.00	$120,000
Police Garage doors; assume 10'x10'	2	EA	$10,000.00	$20,000
Aluminum entry doors, double leaf, ballistic proof	2	PR	$10,000.00	$20,000
Hollow metal door, frame and hardware, exterior	5	EA	$2,000.00	$10,000
Allowance for specialty hardware at entrance doors	1	LS	$5,000.00	$5,000

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ENCLOSURE	Quantity	Unit	Rate	Total ($)
Soffits				
Exterior soffit to roof overhangs	426	SF	$45.00	$19,170
			Subtotal For Enclosure:	**$687,769**

ROOFING	Quantity	Unit	Rate	Total ($)
Roof or deck traffic surfaces				
Membrane roofing, typical	6,800	SF	$18.00	$122,400
Roof Parapet/Coping	460	LF	$30.00	$13,800
Miscellaneous work				
Safety rail at roof yard	150	LF	$250.00	$37,500
Skylights; allow per narrative	340	SF	$150.00	$51,000
Pedestrian paving at roof yard	3,000	SF	$25.00	$75,000
Roof ladder/ hatches/ accessories	1	LS	$10,000.00	$10,000
			Subtotal For Roofing:	**$309,700**

INTERIOR CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Interior Partitions				
Core area; elevator shafts, stair shafts, apparatus bay etc	11,700	SF	$18.00	$210,600
Partitions in fit out areas	13,962	GSF	$8.00	$111,696
Interior glazed windows/partitions (per narrative)	150	SF	$75.00	$11,250
2-Way mirror in Interview room	3	EA	$2,500.00	$7,500
Allowance for transaction counter window; bullet proof @ Reception	1	EA	$4,000.00	$4,000
Allowance for wire mesh partitions & doors in Property/Evidence room	40	LF	$240.00	$9,600
Interior Doors				
Interior Doors including coiling doors and Detention room specialty doors	13,962	SF	$5.00	$69,810
Fittings				
Protective guards, barriers and bumpers - allowance	13,962	GSF	$0.25	$3,491

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INTERIOR CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Prefabricated compartments and accessories				
Mirrors in Fitness	60	SF	$30.00	$1,800
Toilet Accessories, single stall	13,962	GSF	$0.50	$6,981
Shower stall and accessories	2	EA	$2,500.00	$5,000
Shelving and Millwork				
Janitor's shelf and mop rack	1	EA	$500.00	$500
Cabinets and Countertops				
Counter tops at transaction counters	15	LF	$300.00	$4,500
Allowance for casework throughout	13,962	SF	$5.00	$69,810
Allowance for Display cases in Lobby	1	LS	$7,500.00	$7,500
Chalkboards and Graphics				
Directional/wayfinding signs	13,962	GSF	$1.50	$20,943
Door signage	30	EA	$150.00	$4,500
Building signage - exterior	1	LS	$10,000.00	$10,000
Chalkboards/tackboards and mapping wall	1	LS	$5,000.00	$5,000
			Subtotal For Interior Construction:	**$564,481**

STAIRS	Quantity	Unit	Rate	Total ($)
Stair Construction				
Egress stair; metal pan with concrete fill	2	FLT	$25,000.00	$50,000
Communicating stair in Police Department	1	FLT	$20,000.00	$20,000
Rubber finish to treads and landings	3	FLT	$1,500.00	$4,500
Fire department training stair; 1st to 3rd floor	1	LS	$30,000.00	$30,000
Fire Pole	1	LS	$10,000.00	$10,000
			Subtotal For Stairs:	**$114,500**

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INTERIOR FINISHES	Quantity	Unit	Rate	Total ($)
Floor Finishes				
Carpet tile in sleep rooms	510	SF	$5.50	$2,805
Resilient sheet flooring in Offices, Living, Storage, Kitchen & Training room	5,788	SF	$8.00	$46,302
Stained concrete in Apparatus bays, Support area & Police garage	4,250	SF	$8.00	$34,000
Athletic flooring tiles in Fitness room	250	SF	$10.00	$2,500
Tile or similar in Lobbies	120	SF	$20.00	$2,400
Ceramic floor tile and base in bathrooms	950	SF	$16.00	$15,200
Wall finishes				
Paint to interior walls	13,962	GSF	$1.50	$20,943
Tile in bathrooms & showers; wainscot typical, full height in showers	538	SF	$20.00	$10,760
Painted plywood, 8' high in Apparatus bays	1,120	SF	$5.00	$5,600
Allowance for upgraded finishes in Public areas; plam wainscot in corridors	13,962	GSF	$0.75	$10,472
Ceiling Finishes				
Gypsum board ceilings, painted; 30%	2,285	SF	$18.00	$41,136
ACT; 70%	5,332	SF	$5.00	$26,662
Paint exposed ceiling in Apparatus bay & Police Garage	4,250	SF	$2.00	$8,500
Allowance for soffits	200	LF	$35.00	$7,000
Subtotal For Interior Finishes:				**$234,279**

CONVEYING	Quantity	Unit	Rate	Total ($)
Elevators and Lifts				
Traction elevator, 3 stop	1	EA	$140,000.00	$140,000
Subtotal For Conveying:				**$140,000**

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PLUMBING	Quantity	Unit	Rate	Total ($)
Plumbing Fixtures				
Water closet, floor, manual flush	6	EA	$1,650.00	$9,900
Lavatory, wall hung, lever faucet	6	EA	$1,850.00	$11,100
Kitchen sink, dbl, SS faucet, disposer	1	EA	$1,900.00	$1,900
Mop sink, floor type, trim	2	EA	$1,950.00	$3,900
Service sink, wall type, ECI, faucet	1	EA	$1,675.00	$1,675
Shower receptor, drain, valve & head	4	EA	$2,900.00	$11,600
Laundry box, recessed w/ WHA	2	EA	$800.00	$1,600
Hose bibb - interior type	2	EA	$240.00	$480
Hose bibb - exterior type	4	EA	$560.00	$2,240
Dishwasher (connections only)	1	EA	$300.00	$300
Miscellaneous fixtures	13,962	SF	$2.00	$27,924
Plumbing Equipment				
Gas water heater w/ flue	1	EA	$12,500.00	$12,500
Recirculation pump w/ aqua stat	1	EA	$2,100.00	$2,100
Expansion tank	1	EA	$420.00	$420
Miscellaneous equipment	13,962	SF	$1.50	$20,943
Domestic Water Distribution				
Domestic water system	13,962	SF	$2.50	$34,905
Cold water rough-in for fixture	29	EA	$550.00	$15,950
Hot water rough-in for fixture	17	EA	$350.00	$5,950
Sanitary Waste				
Sanitary waste & vent systems	13,962	SF	$2.25	$31,415
Rain Water Drainage				
Rain water drainage system	13,962	SF	$1.35	$18,849
Gutters & downspouts (by others)				
Other Plumbing Systems				
Compressed Air Systems				
Air compressor, 120 gallon, 10 HP	1	EA	$10,000.00	$10,000
Air dryer, filters, etc.	2	EA	$750.00	$1,500
CA piping, drops - complete	6	LS	$5,000.00	$30,000
Natural Gas System				
Gas service & meter (by Utility Co.)				NIC, Not required
Natural gas system				NIC, Not required
Condensate Drainage				
Condensate drain system	13,962	SF	$0.75	$10,472

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PLUMBING	Quantity	Unit	Rate	Total ($)
Trade Specialties				
Testing & sterilization	1	LS	$5,000.00	$5,000
Pipe sleeves, fire stopping, etc.	1	LS	$7,500.00	$7,500
Miscellaneous	1	LS	$15,000.00	$15,000
Subtotal For Plumbing:				**$295,122**

HEATING, VENTILATION, & AIR-	Quantity	Unit	Rate	Total ($)
Energy Supply				
Boiler Plant	2	EA	$17,500.00	$35,000
Heat Generating Systems				
Radiant heat panels	8	EA	$2,200.00	$17,600
Electric infrared heaters (Bay doors)	5	EA	$1,500.00	$7,500
Boiler flue through roof	2	EA	$500.00	$1,000
Cooling Systems:				
Air Handling Equipment				
RTU with heat recovery option	1	EA	$100,000.00	$100,000
Distribution Systems				
Galvanized sheet metal ductwork	11,500	LB	$12.50	$143,750
Duct insulation	7,475	SF	$3.25	$24,294
Miscellaneous duct accessories	1	LS	$12,000.00	$12,000
Sound Attenuator	1	LS	$15,000.00	$15,000
Registers, grilles and diffusers	65	EA	$425.00	$27,625
Dryer vent	1	EA	$300.00	$300
Terminal and Package Units				
VRF system	40	TON	$2,560.00	$102,400
VRF HR branch selectors	2	EA	$4,800.00	$9,600
VRF fan coil unit, ducted	40	EA	$2,500.00	$100,000
RS/RL/HR lines - (CU>BS)	1,400	LF	$32.50	$45,500
Outdoor condensing unit, 1 1/2 ton	2	EA	$2,950.00	$5,900
Indoor fan coil unit, wall, 1 1/2 ton	2	EA	$1,550.00	$3,100
RS/RL lines - complete	110	LF	$25.00	$2,750
Controls and Instrumentation				
Controls & instrumentation	13,962	SF	$5.85	$81,678

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HEATING, VENTILATION, & AIR-	Quantity	Unit	Rate	Total ($)
Systems Testing and Balancing				
Systems start-up & testing	1	LS	$7,500.00	$7,500
Air systems balancing	13,962	SF	$0.50	$6,981
Other HVAC Systems and Equipment				
Apparatus bay exhaust fan	2	EA	$5,000.00	$10,000
Decon room exhaust fan	1	EA	$3,000.00	$3,000
Turnout room exhaust fan	1	EA	$2,500.00	$2,500
Work shop area exhaust fan	1	EA	$3,000.00	$3,000
Vehicle exhaust system - complete	1	LS	$50,000.00	$50,000
Trade Specialties				
Rigging & hoisting	1	LS	$12,000.00	$12,000
Pipe sleeves, firestopping, etc.	1	LS	$5,000.00	$5,000
Miscellaneous	1	LS	$14,900.00	$14,900
Subtotal For Heating, Ventilation, & Air-Conditioning:				**$849,877**

FIRE PROTECTION	Quantity	Unit	Rate	Total ($)
Sprinklers				
Wet sprinkler system - complete including pump	14,175	GSF	$8.00	$113,400
Subtotal For Fire Protection:				**$113,400**

ELECTRICAL	Quantity	Unit	Rate	Total ($)
Electrical Service and Distribution				
Electrical service & distribution equipment, feeders & grounding	13,962	SF	$15.50	$216,411
150KW generator w/250 gal belly tank, ATS and feeder to electrical distribution system	13,962	SF	$8.50	$118,677
Apparatus bay door	3	EA	$1,500.00	$4,500
Elevator	1	EA	$3,500.00	$3,500
Mechoshade	1	LS	$1,500.00	$1,500
Vehicle exhaust	1	LS	$2,500.00	$2,500
CRAC	1	EA	$3,000.00	$3,000
Air compressor	1	EA	$1,500.00	$1,500
Kitchenette:				
Garbage disposal	1	EA	$500.00	$500

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ELECTRICAL	Quantity	Unit	Rate	Total ($)
Electrical Service and Distribution				
Range/Oven	1	EA	$650.00	$650
Hood	1	EA	$350.00	$350
Dishwasher	1	EA	$500.00	$500
Equipment wiring not yet detailed	13,962	SF	$3.00	$41,886
Lighting and Branch Wiring				
Lighting				
LED lighting fixtures with installation labor	13,962	SF	$6.65	$92,847
Lighting controls				
Lighting controls	13,962	SF	$1.00	$13,962
Lighting and Branch Wiring				
Branch receptacles	13,962	SF	$0.75	$10,472
Lighting & branch circuitry	13,962	SF	$6.00	$83,772
Communications and Security				
Fire Alarm System				
Fire alarm control panel	1	LS	$8,500.00	$8,500
Initiating devices	13,962	SF	$0.75	$10,472
Circuitry	13,962	SF	$1.25	$17,453
Telecommunications				
Telecom devices & cabling	13,962	SF	$1.50	$20,943
Rough-in	13,962	SF	$1.00	$13,962
Public Announcement System				
Public announcement system	13,962	SF	$2.00	$27,924
Security System				
Security system allowance	13,962	SF	$3.00	$41,886
Door Cell/Holding Lock System				
Door cell lock system (Rough-in only)	7	LOC	$2,500.00	$17,500
Sallyport Control				
Overhead door control feed and connection	3	EA	$2,500.00	$7,500
E-911 (Server)				
UPS unit, disconnect switch and feeder, assumes required.	1	LS	$25,000.00	$25,000
E-911 rough-in	1	LS	$5,000.00	$5,000
Dispatch Room				
Dispatch room rough-in (allow)	1	LS	$7,000.00	$7,000

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ELECTRICAL	Quantity	Unit	Rate	Total ($)
Other Electrical Systems				
Antenna System / Satellite Dish				
Rough-in only	1	LS	$2,500.00	$2,500
Training/Large Meeting Room				
Sound system	1	LS	$10,000.00	$10,000
A/V rough-in only	1	LS	$5,000.00	$5,000
Temp power & lights	1	LS	$10,000.00	$10,000
Seismic restraints	1	LS	$4,500.00	$4,500
Fees & Permits	1	LS	$8,500.00	$8,500
Testing and studies	1	LS	$4,000.00	$4,000
Lightning protection	1	LS	$7,500.00	$7,500
			Subtotal For Electrical:	**$851,666**

EQUIPMENT	Quantity	Unit	Rate	Total ($)
Shelving				
High density mobile storage systems in Property & Evidence room; allowance	1	ls	$15,000.00	$15,000
Public Safety Equipment	1	ls	$60,000.00	$60,000
Metal detector in prisoner processing area			included in allowance	
Blast resistant storage container in mail processing center			included in allowance	
Weapon discharge unit			included in allowance	
Refrigerators & Freezers in Property Evidence department			included in allowance	
Drying cabinet in Property Evidence department			included in allowance	
Detention furniture in Holding areas			included in allowance	
Lockers; weapon, personnel etc			included in allowance	
Secure storage lockers			included in allowance	
Fire Department Equipment				
Allowance for Turn-out gear lockers, rappelling anchors	1	LS	$20,000.00	$20,000

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EQUIPMENT	Quantity	Unit	Rate	Total ($)
Kitchen & Laundry Equipment				
Commercial grade kitchen equipments, including (3) refrigerators, (1) freezer, range/oven, hood exhaust, dishwasher, garbage disposal, microwave oven	1	LS	$40,000.00	$40,000
Residential grade Laundry equipment; Washer & Dryer	1	LS	$5,000.00	$5,000
Fitness Equipments				NIC, FF&E
Projection screen in Training room	1	LS	$3,000.00	$3,000
Subtotal For Equipment:				**$143,000**

FURNISHINGS	Quantity	Unit	Rate	Total ($)
Fixed Furnishings				
Roller shades, manual, mecho shades	2,021	SF	$10.00	$20,211
Staff mailboxes	1	LS	$5,000.00	$5,000
Entrance mats and frames	100	SF	$40.00	$4,000
Fire Extinguisher cabinets	1	LS	$2,500.00	$2,500
Amenities and Convenience Items				
Bike storage	1	LS	$2,000.00	$2,000
Wire mesh lockers at turnout room	1	LS	$10,000.00	$10,000
Moveable Furnishings				
Dayroom/Bedroom/sleep room furnishings				NIC, FF&E
Office desk and chairs				NIC, FF&E
Classroom tables and chairs				NIC, FF&E
Subtotal For Furnishings:				**$43,711**

SPECIAL CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Special Controls and Instrumentation				
Safe in Property/Evidence room	1	EA	$5,000.00	$5,000
Subtotal For Special Construction:				**$5,000**

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SELECTIVE BUILDING DEMOLITION	Quantity	Unit	Rate	Total ($)
Building Demolition				
Demolish existing building in its entirety	5,948	SF	$15.00	$89,220
Hazardous Materials Abatement				
No work in this section				Excluded
Subtotal For Selective Building Demolition:				**$89,220**

SITE PREPARATION	Quantity	Unit	Rate	Total ($)
Site Clearing and Demolition				
Allowance for site preparation/ protection	10,000	SF	$3.00	$30,000
Allowance for erosion control	1	LS	$20,000.00	$20,000
Earthwork				
Allowance for site grading/cut & fill	10,000	SF	$5.00	$50,000
Hazardous Materials Abatement				Excluded
Subtotal For Site Preparation:				**$100,000**

SITE IMPROVEMENT	Quantity	Unit	Rate	Total ($)
Vehicular Paving				
12" Concrete apron at Apparatus bay	1,000	SF	$15.00	$15,000
12" Concrete apron at Vehicle ramp down	620	SF	$15.00	$9,300
Curbs	100	LF	$30.00	$3,000
Pedestrian Paving				
Concrete sidewalks	100	SF	$15.00	$1,500
Paving at entry	120	SF	$20.00	$2,400
Allowance for work to existing sidewalks	1	LS	$10,000.00	$10,000
Site Structures				
Site walls/rail at Vehicle ramp	30	LF	$300.00	$9,000
Site Development				
Flag poles	2	EA	$8,000.00	$16,000
Site furnishings; bike racks, bollards, trash receptacles etc	1	LS	$15,000.00	$15,000

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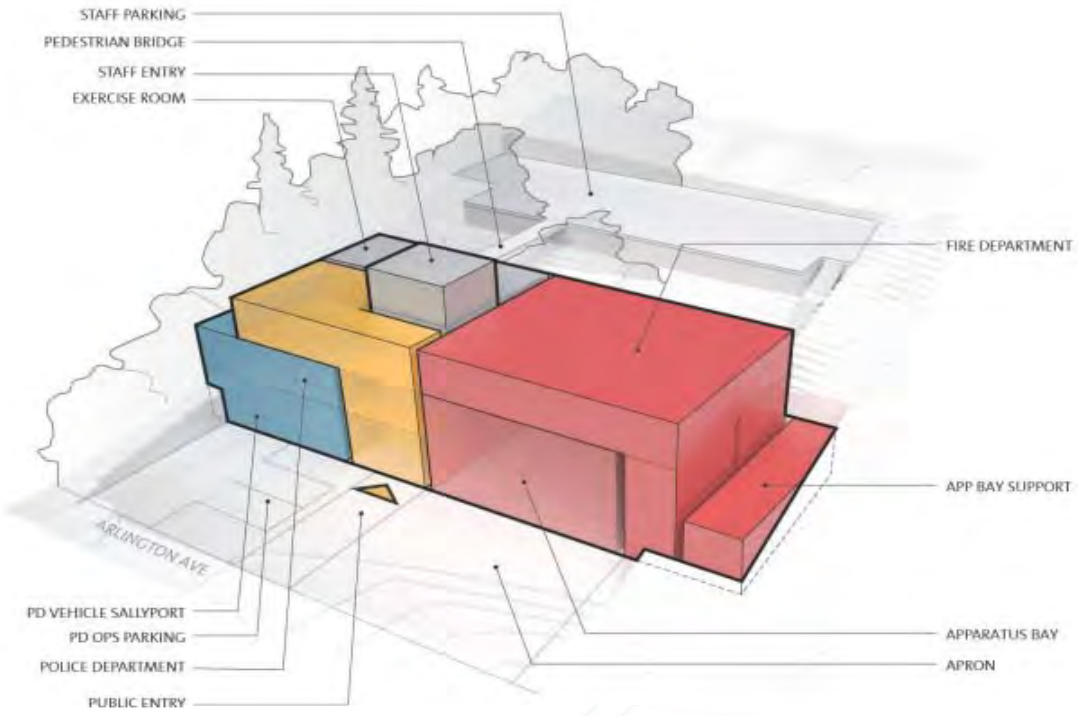
SITE IMPROVEMENT	Quantity	Unit	Rate	Total ($)
Landscaping				
Allowance for landscaping and irrigation	1,000	SF	$7.00	$7,000
Subtotal For Site Improvement:				**$88,200**

SITE MECHANICAL UTILITIES	Quantity	Unit	Rate	Total ($)
Domestic Water				
Allowance for domestic water	1	LS	$25,000.00	$25,000
Sanitary Sewer				
Allowance for sanitary sewer	1	LS	$15,000.00	$15,000
Storm Drainage				
Allowance for storm drainage	1	LS	$35,000.00	$35,000
Fuel Distribution				
Allowance for fuel distribution				NIC
Subtotal For Site Mechanical Utilities:				**$75,000**

SITE ELECTRICAL UTILITIES	Quantity	Unit	Rate	Total ($)
Electrical Service and Distribution				
Primary electrical ductbank, allow 2-4" empty	100	LF	$80.00	$8,000
Pad mounted transformer				Utility company
Transformer pad	1	LS	$2,500.00	$2,500
Secondary ductbank, allow	60	LF	$200.00	$12,000
Generator duct bank, allow	60	LF	$120.00	$7,200
Site Lighting				
Site lighting & circuitry, allow	1	LS	$35,000.00	$35,000
Site Communications and Security				
Communication ductbank, allow 2-4" empty	150	LF	$80.00	$12,000
Subtotal For Site Electrical Utilities:				**$76,700**



Conceptual Cost Plan

Option CC - Alternate Site

Kensington Fire Station

Control Quantities
Option CC - Alternate Site Summary
Detailed Cost Breakdown

November 7, 2016

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Enclosed Areas	
Ground Floor	7,878
Mezzanine Floor	4,424
Second Floor	6,562
Roof Penthouse	538
Subtotal of Enclosed Area	19,402

CONTROL QUANTITIES				Ratio to Gross Area
Number of stories (x1,000)		3	EA	0.155
Gross Area		19,402	SF	1.000
Enclosed Area		19,402	SF	1.000
Covered Area		-	SF	0.000
Footprint Area		7,878	SF	0.406
Volume		253,826	CF	13.082
Gross Wall Area		15,997	SF	0.825
Finished Wall Area		12,798	SF	0.660
Windows or Glazing Area	20%	3,199	SF	0.165
Roof Area - Flat		7,878	SF	0.406
Roof Area - Sloping		-	SF	0.000
Roof Area - Total		7,878	SF	0.406
Roof Glazing Area		-	SF	0.000
Interior Partition Length		983	LF	0.051
Elevators (x10,000)		1.00	EA	0.515
Plumbing Fixtures (x1,000)		29	EA	1.495

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CSI UniFormat Summary	*19,402 SF*	*%*	*$/SF*	*$,000*
Foundations		4%	$20.90	$406
Basement Construction		5%	$32.40	$629
Superstructure		10%	$56.80	$1,102
Enclosure		8%	$47.19	$916
Roofing		3%	$19.73	$383
Interior Construction		6%	$35.15	$682
Stairs		1%	$8.71	$169
Interior Finishes		3%	$17.05	$331
Conveying		2%	$9.28	$180
Plumbing		4%	$21.18	$411
Heating, Ventilation, & Air Conditioning		9%	$54.87	$1,065
Fire Protection		1%	$7.50	$146
Electrical		10%	$59.33	$1,151
Equipment		1%	$6.60	$128
Furnishings		0%	$2.74	$53
Special Construction		0%	$0.26	$5
Selective Building Demolition		0%	$0.00	$0
Subtotal - Building Construction		*67%*	*$399.67*	*$7,754*
Site Preparation		2%	$12.24	$238
Site Improvement		4%	$25.51	$495
Site Mechanical Utilities		1%	$4.90	$95
Site Electrical Utilities		1%	$5.07	$98
Other Site Construction		0%	$0.00	$0
Subtotal - Sitework		*8%*	*$47.71*	*$926*
Total - Building and Sitework Construction		*75%*	*$447.38*	*$8,680*
Bonds & Insurance	2.25%	2%	$10.07	$195
General Conditions	11.03%	8%	$50.43	$979
Contractor's Overhead & Profit	4.50%	4%	$22.85	$443
Subtotal		*89%*	*$530.74*	*$10,297*
Contingency for Design Development	10.00%	9%	$53.07	$1,030
Cost Escalation (to start of construction)	1.99%	2%	$11.60	$225
TOTAL CONSTRUCTION BUDGET	***April 2017***	***100%***	***$595.41***	***$11,552***

NOTE: Inclusions and Exclusions listed in the Commentary Section.

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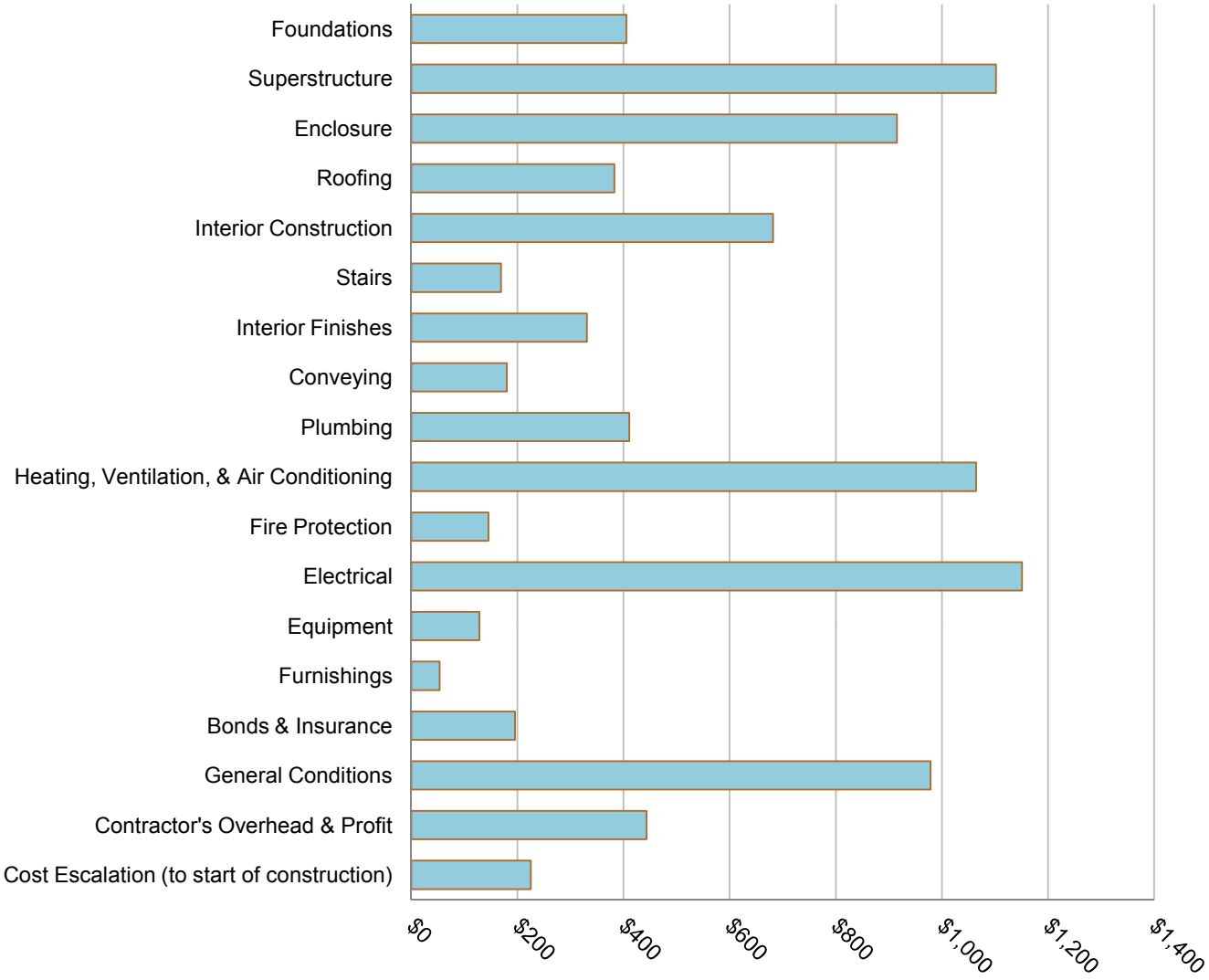
CSI UniFormat Summary



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FOUNDATIONS	Quantity	Unit	Rate	Total ($)
Standard Foundations				
Drilled Piers				
Mobilization and demobilization	1	LS	$15,000.00	$15,000
Testing	1	LS	$10,000.00	$10,000
Allowance for drilled piers	21	EA	$4,000.00	$84,000
Allowance for grade beams/ footings / foundation walls	121	CY	$500.00	$60,741
Footing at basement/ retaining wall	278	CY	$400.00	$111,111
Elevator pit	1	EA	$15,000.00	$15,000
Slab On Grade				
Reinforced concrete slab on grade				
6"~8" thick at police vehicle	575	SF	$12.00	$6,900
12" thick at Apparatus bay	2,810	SF	$15.00	$42,150
6" thick, typical	5,068	SF	$10.00	$50,680
Allowance for equipment pads	1	LS	$10,000.00	$10,000
			Subtotal For Foundations:	**$405,582**

BASEMENT CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Basement Excavation - allowance				
Excavate & haul away basement material (assume partial cut)	2,334	CY	$30.00	$70,027
Sheeting/Shoring allowance	4,800	SF	$45.00	$216,000
Basement Walls				
Basement wall , 18" thick	4,800	SF	$60.00	$288,000
Waterproofing membrane	4,800	SF	$8.00	$38,400
Perforated drain pipe	250	LF	$25.00	$6,250
Dewatering	1	LS	$10,000.00	$10,000
			Subtotal For Basement Construction:	**$628,677**

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SUPERSTRUCTURE	Quantity	Unit	Rate	Total ($)
Upper Floor Structure				
Structural floor system including braced frames, assume 16psf	92	T	$5,200.00	$479,398
Metal decking with concrete infill	11,524	SF	$12.00	$138,288
12" Concrete curbs in Apparatus bay, Turn-out room and Workshop	350	LF	$25.00	$8,750
Roof Structure				
Structural roof system, assume 13psf	51	TNS	$5,200.00	$266,276
Metal roof decking (no infill)	538	SF	$4.00	$2,152
Metal decking with concrete infill	7,340	SF	$15.00	$110,100
Fire protection of structural steel	19,402	SF	$3.00	$58,206
Miscellaneous				
Miscellaneous metal	19,402	GSF	$1.50	$29,103
Miscellaneous rough carpentry	19,402	GSF	$0.50	$9,701
			Subtotal For Superstructure:	**$1,101,975**

ENCLOSURE	Quantity	Unit	Rate	Total ($)
Exterior Wall Framing, Furring and Insulating				
Exterior wall system; composite wall panel or fiber cement cladding including sealants, blocking, flashings etc	7,094	SF	$35.00	$248,304
Backup system; 6" Metal stud, insulation, air/vapor barrier	6,050	SF	$16.00	$96,800
CMU backup including insulation and air barrier at First floor (ground level)	1,044	SF	$28.00	$29,243
Drywall to interior face of exterior wall	6,050	SF	$4.00	$24,200
Aluminum Windows	2,908	SF	$85.00	$247,146
Premium for ballistic glazing at lower level glazing	485	SF	$115.00	$55,729
Premium for sunshades	2,181	SF	$20.00	$43,614

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ENCLOSURE	Quantity	Unit	Rate	Total ($)
Exterior Doors, Frames and Hardware				
Apparatus bay doors; 14'x14'	3	EA	$40,000.00	$120,000
Sally port doors; assume 10'x10'	2	EA	$6,000.00	$12,000
Aluminum entry doors, double leaf, ballistic proof	2	PR	$10,000.00	$20,000
Aluminum entry doors, single leaf @ roof level Vestibule, ballistic proof	1	EA	$7,500.00	$7,500
Hollow metal door, frame and hardware, exterior	3	EA	$2,000.00	$6,000
Allowance for specialty hardware at entrance doors	1	LS	$5,000.00	$5,000
			Subtotal For Enclosure:	**$915,536**

ROOFING	Quantity	Unit	Rate	Total ($)
Roof or deck traffic surfaces				
Membrane roof at Mezzanine level, 2nd floor & Penthouse	2,000	SF	$20.00	$40,000
Membrane roofing, typical	5,878	SF	$20.00	$117,560
Roof Parapet/Coping	570	LF	$30.00	$17,100
Miscellaneous work				
Safety rail at lower level roofs	160	LF	$150.00	$24,000
Safety rail at Pedestrian bridge	70	LF	$250.00	$17,500
Safety rail at main roof	340	LF	$250.00	$85,000
Skylights; allow per narrative	394	SF	$150.00	$59,085
Pedestrian paving at roof level	500	SF	$25.00	$12,500
Roof ladder/ hatches/ accessories	1	LS	$10,000.00	$10,000
			Subtotal For Roofing:	**$382,745**

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INTERIOR CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Interior Partitions				
Core area; elevator shafts, stair shafts, apparatus bay etc	13,000	SF	$18.00	$234,000
Partitions in fit out areas	19,402	GSF	$8.00	$155,216
Interior glazed windows/partitions (per narrative)	150	SF	$75.00	$11,250
2-Way mirror in Interview room	3	EA	$2,500.00	$7,500
Allowance for transaction counter window; bullet proof @ Reception	1	EA	$4,000.00	$4,000
Allowance for wire mesh partitions & doors in Property/Evidence room	40	LF	$240.00	$9,600
Interior Doors				
Interior Doors including coiling doors and Detention room specialty doors	19,402	SF	$5.00	$97,010
Fittings				
Protective guards, barriers and bumpers - allowance	19,402	GSF	$0.25	$4,851
Prefabricated compartments and accessories				
Mirrors in Fitness	120	SF	$30.00	$3,600
Toilet Accessories, single stall	19,402	GSF	$0.50	$9,701
Shower stall and accessories	2	EA	$2,500.00	$5,000
Shelving and Millwork				
Janitor's shelf and mop rack	1	EA	$500.00	$500
Cabinets and Countertops				
Counter tops at transaction counters	15	LF	$300.00	$4,500
Allowance for casework throughout	19,402	SF	$4.00	$77,608
Allowance for Display cases in Lobby	1	LS	$7,500.00	$7,500
Chalkboards and Graphics				
Directional/wayfinding signs	19,402	GSF	$1.50	$29,103
Door signage	40	EA	$150.00	$6,000
Building signage - exterior	1	LS	$10,000.00	$10,000
Chalkboards/tackboards and mapping wall	1	LS	$5,000.00	$5,000
Subtotal For Interior Construction:				**$681,939**

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STAIRS	Quantity	Unit	Rate	Total ($)
Stair Construction				
Egress stair; metal pan with concrete fill	6	FLT	$25,000.00	$150,000
Rubber finish to treads and landings	6	FLT	$1,500.00	$9,000
Fire Pole	1	LS	$10,000.00	$10,000
			Subtotal For Stairs:	**$169,000**

INTERIOR FINISHES	Quantity	Unit	Rate	Total ($)
Floor Finishes				
Carpet tile in sleep rooms	820	SF	$5.50	$4,510
Resilient sheet flooring in Offices, Living, Storage, Kitchen & Training room	7,805	SF	$8.00	$62,438
Stained concrete in Apparatus bays, Support area & Sally port	5,000	SF	$8.00	$40,000
Athletic flooring tiles in Fitness room	780	SF	$10.00	$7,800
Tile or similar in Lobbies	940	SF	$20.00	$18,800
Ceramic floor tile and base in bathrooms	1,147	SF	$16.00	$18,352
Wall finishes				
Paint to interior walls	19,402	GSF	$1.50	$29,103
Tile in bathrooms & showers; wainscot typical, full height in showers	538	SF	$20.00	$10,760
Painted plywood, 8' high in Apparatus bays	1,240	SF	$5.00	$6,200
Allowance for upgraded finishes in Public areas; plam wainscot in corridors	19,402	GSF	$0.75	$14,552
Ceiling Finishes				
Gypsum board ceilings, painted; 30%	3,448	SF	$18.00	$62,055
ACT; 70%	8,044	SF	$5.00	$40,221
Paint exposed ceiling in Apparatus bay & Sally port areas	5,000	SF	$2.00	$10,000
Allowance for soffits	200	LF	$30.00	$6,000
			Subtotal For Interior Finishes:	**$330,790**

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CONVEYING	Quantity	Unit	Rate	Total ($)
Elevators and Lifts				
Traction elevator, 4 stop	1	EA	$180,000.00	$180,000
			Subtotal For Conveying:	**$180,000**

PLUMBING	Quantity	Unit	Rate	Total ($)
Plumbing Fixtures				
Water closet, floor, manual flush	6	EA	$1,650.00	$9,900
Lavatory, wall hung, lever faucet	6	EA	$1,850.00	$11,100
Kitchen sink, dbl, SS faucet, disposer	1	EA	$1,900.00	$1,900
Mop sink, floor type, trim	2	EA	$1,950.00	$3,900
Service sink, wall type, ECI, faucet	1	EA	$1,675.00	$1,675
Shower receptor, drain, valve & head	4	EA	$2,900.00	$11,600
Laundry box, recessed w/ WHA	2	EA	$800.00	$1,600
Hose bibb - interior type	2	EA	$240.00	$480
Hose bibb - exterior type	4	EA	$560.00	$2,240
Dishwasher (connections only)	1	EA	$300.00	$300
Miscellaneous fixtures	19,402	SF	$2.00	$38,804
Plumbing Equipment				
Gas water heater w/ flue	1	EA	$15,000.00	$15,000
Recirculation pump w/ aqua stat	1	EA	$2,100.00	$2,100
Expansion tank	1	EA	$420.00	$420
Miscellaneous equipment	19,402	SF	$1.50	$29,103
Domestic Water Distribution				
Domestic water system	19,402	SF	$2.50	$48,505
Cold water rough-in for fixture	29	EA	$550.00	$15,950
Hot water rough-in for fixture	17	EA	$350.00	$5,950
Sanitary Waste				
Sanitary waste & vent systems	19,402	SF	$2.25	$43,655
Rain Water Drainage				
Rain water drainage system	19,402	SF	$1.35	$26,193
Gutters & downspouts (by others)				

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PLUMBING	Quantity	Unit	Rate	Total ($)
Other Plumbing Systems				
Compressed Air Systems				
Air compressor, 120 gallon, 10 HP	1	EA	$10,000.00	$10,000
Air dryer, filters, etc.	2	EA	$750.00	$1,500
CA piping, drops - complete	6	LS	$5,000.00	$30,000
Natural Gas System				
Gas service & meter (by Utility Co.)				Nic, By Utility Co.
Natural gas system	19,402	SF	$2.50	$48,505
Condensate Drainage				
Condensate drain system	19,402	SF	$0.75	$14,552
Trade Specialties				
Testing & sterilization	1	LS	$6,000.00	$6,000
Pipe sleeves, fire stopping, etc.	1	LS	$10,000.00	$10,000
Miscellaneous	1	LS	$20,000.00	$20,000
			Subtotal For Plumbing:	**$410,931**

HEATING, VENTILATION, & AIR-	Quantity	Unit	Rate	Total ($)
Energy Supply				
Boiler Plant	2	EA	$19,000.00	$38,000
Heat Generating Systems				
Radiant heat panels	12	EA	$2,200.00	$26,400
Electric infrared heaters (Bay doors)	6	EA	$1,500.00	$9,000
Boiler flue through roof	2	EA	$500.00	$1,000
Cooling Systems				
Air Handling Equipment				
RTU with heat recovery option	1	EA	$115,000.00	$115,000
Distribution Systems				
Galvanized sheet metal ductwork	14,000	LB	$12.50	$175,000
Duct insulation	9,100	SF	$3.25	$29,575
Miscellaneous duct accessories	1	LS	$15,000.00	$15,000
Sound Attenuator	1	LS	$15,000.00	$15,000
Registers, grilles and diffusers	70	EA	$425.00	$29,750
Dryer vent	1	EA	$300.00	$300

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HEATING, VENTILATION, & AIR-	Quantity	Unit	Rate	Total ($)
Terminal and Package Units				
VRF system	55	TON	$2,560.00	$140,800
VRF HR branch selectors	3	EA	$4,800.00	$14,400
VRF fan coil unit, ducted	50	EA	$2,500.00	$125,000
RS/RL/HR lines - (CU>BS)	1,750	LF	$32.50	$56,875
Outdoor condensing unit, 1 1/2 ton	2	EA	$2,950.00	$5,900
Indoor fan coil unit, wall, 1 1/2 ton	2	EA	$1,550.00	$3,100
RS/RL lines - complete	110	LF	$25.00	$2,750
Controls and Instrumentation				
Controls & instrumentation	19,402	SF	$5.85	$113,502
Systems Testing and Balancing				
Systems start-up & testing	1	LS	$10,000.00	$10,000
Air systems balancing	19,402	SF	$0.50	$9,701
Other HVAC Systems and Equipment				
Apparatus bay exhaust fan	3	EA	$5,000.00	$15,000
Decon room exhaust fan	1	EA	$3,000.00	$3,000
Turnout room exhaust fan	1	EA	$2,500.00	$2,500
Work shop area exhaust fan	1	EA	$3,000.00	$3,000
Vehicle exhaust system - complete	1	LS	$50,000.00	$50,000
Trade Specialties				
Rigging & hoisting	1	LS	$30,000.00	$30,000
Pipe sleeves, fire stopping, etc.	1	LS	$5,000.00	$5,000
Miscellaneous	1	LS	$20,000.00	$20,000
Subtotal For Heating, Ventilation, & Air-Conditioning:				**$1,064,553**

FIRE PROTECTION	Quantity	Unit	Rate	Total ($)
Sprinklers				
Wet sprinkler system - complete including pump	19,402	GSF	$7.50	$145,515
Subtotal For Fire Protection:				**$145,515**

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ELECTRICAL	Quantity	Unit	Rate	Total ($)
Electrical Service and Distribution				
Electrical service & distribution equipment, feeders & grounding	19,402	SF	$15.50	$300,731
200KW generator w/300 gal belly tank, ATS and feeder to electrical distribution system	19,402	SF	$8.50	$164,917
Apparatus bay door	3	EA	$1,500.00	$4,500
Elevator	1	EA	$3,500.00	$3,500
Mechoshade	1	LS	$1,500.00	$1,500
Vehicle exhaust	1	LS	$2,500.00	$2,500
CRAC	1	EA	$3,000.00	$3,000
Air compressor	1	EA	$1,500.00	$1,500
Sally port	2	EA	$5,000.00	$10,000
Kitchenette:				
Garbage disposal	1	EA	$500.00	$500
Range/Oven	1	EA	$650.00	$650
Hood	1	EA	$350.00	$350
Dishwasher	1	EA	$500.00	$500
Equipment wiring not yet detailed	19,402	SF	$3.00	$58,206
Lighting and Branch Wiring				
Lighting				
LED lighting fixtures with installation labor	19,402	SF	$6.65	$129,023
Lighting controls				
Lighting controls	19,402	SF	$1.00	$19,402
Branch receptacles	19,402	SF	$0.75	$14,552
Lighting & branch circuitry	19,402	SF	$6.00	$116,412
Communications and Security				
Fire Alarm System				
Fire alarm control panel	1	LS	$15,000.00	$15,000
Initiating devices	19,402	SF	$0.75	$14,552
Circuitry	19,402	SF	$1.25	$24,253
Telecommunications				
Telecom devices & cabling	19,402	SF	$1.50	$29,103
Rough-in	19,402	SF	$1.00	$19,402
Public Announcement System				
Public announcement system	19,402	SF	$2.00	$38,804

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ELECTRICAL	Quantity	Unit	Rate	Total ($)
Security System				
Security system allowance	19,402	SF	$3.00	$58,206
Door Cell/Holding Lock System				
Door cell lock system (Rough-in only)	7	LOC	$2,500.00	$17,500
Sally port Control				
Overhead door control feed and connection	2	EA	$2,500.00	$5,000
E-911 (Server)				
UPS unit, disconnect switch and feeder, assumes required.	1	LS	$25,000.00	$25,000
E-911 rough-in	1	LS	$5,000.00	$5,000
Dispatch Room				
Dispatch room rough-in (allow)	1	LS	$7,000.00	$7,000
Other Electrical Systems				
Antenna System / Satellite Dish				
Rough-in only	1	LS	$2,500.00	$2,500
Training/Large Meeting Room				
Sound system	1	LS	$15,000.00	$15,000
A/V rough-in only	1	LS	$6,000.00	$6,000
Temp power & lights	1	LS	$10,000.00	$10,000
Seismic restraints	1	LS	$4,500.00	$4,500
Fees & Permits	1	LS	$8,500.00	$8,500
Testing and studies	1	LS	$4,000.00	$4,000
Lightning protection	1	LS	$10,000.00	$10,000
			Subtotal For :	**$1,151,062**

EQUIPMENT	Quantity	Unit	Rate	Total ($)
Shelving				
High density mobile storage systems in Property & Evidence room; allowance	1	less	$25,000.00	$25,000
Public Safety Equipment	1	ls	$75,000.00	$75,000
Metal detector in prisoner processing area			included in allowance	
Blast resistant storage container in mail processing center			included in allowance	
Weapon discharge unit			included in allowance	
Refrigerators & Freezers in Property Evidence department			included in allowance	

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EQUIPMENT	Quantity	Unit	Rate	Total ($)
Public Safety Equipment				
Drying cabinet in Property Evidence department				included in allowance
Detention furniture in Holding areas				included in allowance
Lockers; weapon, personnel etc				included in allowance
Secure storage lockers				included in allowance
Fire Department Equipment				
Allowance for Turn-out gear lockers, rappelling anchors	1	LS	$20,000.00	$20,000
Kitchen & Laundry Equipment				
Commercial grade kitchen equipments, including (3) refrigerators, (1) freezer, range/oven, hood exhaust, dishwasher, garbage disposal, microwave oven	1	LS		
Residential grade Laundry equipment; Washer & Dryer	1	LS	$5,000.00	$5,000
Fitness Equipments				NIC, FF&E
Projection screen in Training room	1	ls	$3,000.00	$3,000
			Subtotal For Equipment:	**$128,000**

FURNISHINGS	Quantity	Unit	Rate	Total ($)
Fixed Furnishings				
Roller shades, manual, mecho shades	2,908	SF	$10.00	$29,076
Staff mailboxes	1	LS	$5,000.00	$5,000
Entrance mats and frames	100	SF	$40.00	$4,000
Fire Extinguisher cabinets	1	LS	$3,000.00	$3,000
Amenities and Convenience Items				
Bike storage	1	LS	$2,000.00	$2,000
Wire mesh lockers at turnout room	1	LS	$10,000.00	$10,000
Moveable Furnishings				
Dayroom/Bedroom/sleep room furnishings				NIC, FF&E
Office desk and chairs				NIC, FF&E
Classroom tables and chairs				NIC, FF&E
			Subtotal For Furnishings:	**$53,076**

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SPECIAL CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Special Structures				
Safe in Property/Evidence room	1	EA	$5,000.00	$5,000
Subtotal For Special Construction:				**$5,000**

SELECTIVE BUILDING DEMOLITION	Quantity	Unit	Rate	Total ($)
No work in this section				
Subtotal For Selective Building Demolition:				

SITE PREPARATION	Quantity	Unit	Rate	Total ($)
Site Clearing and Demolition				
Allowance for site preparation/ protection	25,000	SF	$3.00	$75,000
Allowance for erosion control	1	LS	$37,500.00	$37,500
Earthwork				
Allowance for site grading/ cut & fill	25,000	SF	$5.00	$125,000
Hazardous Materials Abatement				Excluded
Subtotal For Site Preparation:				**$237,500**

SITE IMPROVEMENT	Quantity	Unit	Rate	Total ($)
Vehicular Paving				
12" Concrete apron at Apparatus bay	1,700	SF	$15.00	$25,500
Parking at entrance including curbs	1,000	SF	$7.00	$7,000
Staff parking including curbs	5,000	SF	$7.00	$35,000
Pedestrian Paving				
Concrete sidewalks	300	SF	$15.00	$4,500
Paving at entry	420	SF	$20.00	$8,400
Site Structures				
Site walls/ steps at entrance	100	LF	$350.00	$35,000
Site walls/rail/fence at Staff parking lot	300	LF	$300.00	$90,000
Steps/ stair at Staff parking lot	1	LS	$20,000.00	$20,000

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SITE IMPROVEMENT	Quantity	Unit	Rate	Total ($)
Connecting bridge to Staff parking				
Pedestrian bridge construction - allowance (approx. 35' long x 6' wide)	210	SF	$850.00	$178,500
Site Development				
Flag poles	2	EA	$8,000.00	$16,000
Site furnishings; bike racks, bollards, trash receptacles etc	1	LS	$15,000.00	$15,000
Landscaping				
Allowance for landscaping and irrigation	8,580	SF	$7.00	$60,060
Subtotal For Site Improvement:				**$494,960**

SITE MECHANICAL UTILITIES	Quantity	Unit	Rate	Total ($)
Domestic Water				
Allowance for domestic water	1	LS	$35,000.00	$35,000
Sanitary Sewer				
Allowance for sanitary sewer	1	LS	$20,000.00	$20,000
Storm Drainage				
Allowance for storm drainage	1	LS	$40,000.00	$40,000
Fuel Distribution				
Allowance for fuel distribution				NIC
Subtotal For Site Mechanical Utilities:				**$95,000**

SITE ELECTRICAL UTILITIES	Quantity	Unit	Rate	Total ($)
Electrical Service and Distribution				
Primary electrical ductbank, allow 2-4" empty	130	LF	$80.00	$10,400
Pad mounted transformer				Utility company
Transformer pad	1	LS	$2,500.00	$2,500
Secondary ductbank, allow	60	LF	$230.00	$13,800
Generator duct bank, allow	60	LF	$120.00	$7,200
Site Lighting				
Site lighting & circuitry, allow	1	LS	$50,000.00	$50,000

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SITE ELECTRICAL UTILITIES	Quantity	Unit	Rate	Total ($)
Site Communications and Security				
Communication ductbank, allow 2-4" empty	180	LF	$80.00	$14,400
Subtotal For Site Electrical Utilities:				**$98,300**

Architectural Basis of Design Criteria				
	Option B	**Option D**	**Option CC**	**Comments**
The following system descriptions are for determining the range of costs. Actual design & systems selection to occur during the schematic design phase.				
FOUNDATIONS				
Seismic Design	Seismic design for essential services facility.	Same as Option B	Same as Option B	
Foundations and Retaining Walls	Cast in place reinforced concrete over drilled piers.	Same as Option B	Same as Option B	
Slab On Grade	Cast in place reinforced concrete. High strength 12" thick reinforced concrete in apparatus bays and exterior fire apparatus apron.	Same as Option B	Same as Option B	
Concrete Curbs	Provide a 12" high concrete curb base at all walls surrounding the apparatus bays, turnout room, and workshop.	Same as Option B	Same as Option B	
SUPERSTRUCTURE				
Seismic Design	Seismic design for essential services facility.	Same as Option B	Same as Option B	
Vertical Structure	Light gauge metal or wood platform framing	Same as Option B	Steel braced frame system.	Note: A steel bracerd frame system is tentatively proposed for Option CC based on the building height and complexity. However, if Type V stick framed construction is significantly less expensive then it should be used as the basis of design.
Floor & Roof Construction	Floors: 2" of light weight concrete over plywood over metal or wood framing. Roof: Plywood over over metal or wood framing.	Same as Option B	Floors: Reinforced concrete over structural steel decking over steel framing. Roof: Structural steel decking over steel framing.	

Architectural Basis of Design Criteria				
	Option B	**Option D**	**Option CC**	**Comments**
EXTERIOR ENCLOSURE				
Exterior Walls	Exterior Wall framing is to be steel or wood stud framing. Thermal insulation is to achieve R28 or better value. Assume a medium grade cladding assembly with self adhering sheet waterproofing over dense glass panels. For exterior cladding materials, assume medium-cost cladding systems such as: • Through-color fiber cement panels, • Composite metal siding system. • Fiber cement board siding. For attachment systems assume concealed fasteners.	Same as Option B	Exterior Wall framing is to be **steel** stud framing. Thermal insulation is to achieve R28 or better value. Assume a medium grade cladding assembly with self adhering sheet waterproofing over dense glass panels. For exterior cladding materials, assume medium-cost cladding systems such as: • Through-color fiber cement panels, • Composite metal siding system. • Fiber cement board siding. For attachment systems assume concealed fasteners.	
Exterior Openings: Windows	Windows shall be commercial grade aluminum frames. Assume thirty percent of the exterior walls are glazed surfaces. Approximately 30% of the window area is to be open able. The doors and windows are to have HVAC Shut-off sensors. Glazing , except ballistic resistant, is to be dual-glazed low-e glass to meet energy code criteria. Bullet resistant glazing is to be provided in portions of the building envelope that are identified as a being in security threat. The PD secure areas and the PD chief's office is to have bullet resistant glazing.	Same as Option B	Same as Option B	
Exterior Openings: Doors	The apparatus bay doors will be 14' wide by 13' high aluminum sectional door these door will have glass lites in all sections with the exception of the bottom sections. AppBay doors will be equiped with rapid electric motor operators. Exterior doors shall be hollow metal with hollow metal frames. The public lobby door will be a glazed aluminum storefront system. Door hardware is to be accessible-rated and are to utilize card key locks. HVAC Shut-off Sensors for all Windows and Doors.	Same as Option B	The apparatus bay doors will be 14' wide by 14' high aluminum sectional door these door will have glass lites in all sections with the exception of the bottom sections. AppBay doors will be equiped with rapid electric motor operators. Exterior doors shall be hollow metal with hollow metal frames. The public lobby door will be a glazed aluminum storefront system. Door hardware is to be accessible-rated and are to utilize card key locks. HVAC Shut-off Sensors for all Windows and Doors.	

Architectural Basis of Design Criteria				
	Option B	**Option D**	**Option CC**	**Comments**
Exterior Openings: Sunshades	Assume exterior aluminum sunshade screens on the west and south elevations.	Assume exterior aluminum sunshade screens on the west elevations.	Assume exterior aluminum sunshade screens on the east, south and west elevations.	
Exterior Roofing -	Assume: 100% of the roof area Tapered roof deck insulation (polyisocyanurate) with a thickness	Same as Option B	Same as Option B	
Exterior Roofing - "SOLAR"	Assume 80% of the "FLAT" membrane roof area to be designed to accommodate solar panels. Driver: To provide an economical system that develops renewable energy to comply with pending California energy code requirements for buildings to consume net zero energy (NZE).	Same as Option B	Same as Option B	
Exterior Roofing CLERESTORY	Assume 5% of the roof area to have a dual glazed clerestory windows and/or skylights to provide natural day lighting.	Same as Option B	Same as Option B	
Exterior Soffits and Overhangs	Assume a medium grade soffit cladding such as: • Fiber cement panel. • Cement plaster.	Same as Option B	Same as Option B	
Exterior Deck Traffic Toppings	Pedestrian membrane traffic toppings on exterior decks over occupied space.	Same as Option B	Same as Option B	
Exterior Storefront / Curtain Wall Systems	Doors and windows at the main public entry are to be a reinforced storefront system with ballistic resistant glazing to resist forced entry.	Same as Option B	Same as Option B	
INTERIOR CONSTRUCTION				
Partitions	Provide for steel light gauge or wood framing with acoustic treatments to achieve the STC rating stated in the Sound Isolation Requirement Table (below).	Provide for steel light gauge or wood framing with acoustic treatments to achieve the STC rating stated in the Sound Isolation Requirement Table (below).	Provide for **steel** light gauge framing with acoustic treatments to achieve the STC rating stated in the Sound Isolation Requirement Table (below).	
	Partitions at all private offices, conference rooms, interview rooms and sleeping rooms to be to underside of deck above.	Same as Option B	Same as Option B	
	Partitions and ceilings in the detention interview rooms area shall have abuse resistant gypsum board over security mesh. For the Armory and Evidence Storage provide Full height CMU walls.	Same as Option B	Same as Option B	
Interior Doors	The doors are to be solid core wood doors with transparent finish in hollow metal frames. Hollow metal doors in secure interview rooms, evidence storage and armory.	Same as Option B	Same as Option B	

Architectural Basis of Design Criteria				
	Option B	**Option D**	**Option CC**	**Comments**
Door Hardware	Door hardware is to be accessible rated and have card key locking systems where required. Sound seals are to be provided for all conference rooms, interview rooms, private offices and sleeping rooms. Doors at public entries are to have automatic openers where required.	Same as Option B	Same as Option B	
Interior Windows	Windows shall be hollow metal frame with hollow metal windows. Transaction windows at property evidence and central supply shall be stainless steel coiling doors. Transaction window at public lobby is to be bullet resistant rated glazing. Assume 150 SF of interior windows.	Same as Option B	Same as Option B	
Interior Storefront Windows	None	Same as Option B	Aluminum storefront system at public entries to PD and FD.	
Stairs	Stairs shall be steel framed stairs with concrete treads. The riser face is to be steel. The railings are to be a durable metal system.	Same as Option B	Same as Option B	
Wall Finishes	Interior Finished Walls shall be painted gypsum board with level 4 plaster finish. Painted wall surfaces.	Same as Option B	Same as Option B	
Wall Finishes Wainscot in Wet Locations	In wet locations provide mid range cost ceramic tile wainscot. The ceramic tile is to be installed on only the wet walls. The height of the ceramic tile wainscot will be as required by code.	Same as Option B	Same as Option B	
Wainscot in Apparatus Bays.	Apparatus Bays shall have 8'-0" high painted plywood wainscot.	Same as Option B	Same as Option B	

Architectural Basis of Design Criteria				
	Option B	**Option D**	**Option CC**	**Comments**
Wainscot in corridors.	Primary operational circulation areas are to have protective wainscot to minimum 48" high cement board , or plastic laminate.	Same as Option B	Same as Option B	
Floor Finishes	Durable quality carpet tiles in the sleep rooms. Resilient linoleum sheet flooring in the offices, living areas, storage rooms, kitchen and training room. Stained & sealed concrete in theApparatus Bays Atheletic flooring tiles in the Fitness Room Apparatus Bays walls will have a 12" high exposed concrete curb base.	Same as Option B	Same as Option B	
Ceiling Finishes	Ceilings assume 30% of the surfaces to be painted gypsum board with level 4 finish and 70% of the areas are to be medium-grade regular lay in acoustic tile.	Same as Option B	Same as Option B	
Interior Casework	Architectural wood casework • Premium grade quality casework with premium level plastic laminate. In selected areas there may be areas of solid wood, stained and sealed casework. • Countertops to be premium level plastic laminate. In high use areas the counter tops be a stainless steel. (Kitchen)	Same as Option B	Same as Option B	
Interior Casework Public Lobby Counter.	The Lobby Entry Counter is to be: • Premium grade quality casework with wood Veneer with transparent finish. Provide layer of bullet resistant material on vertical surfaces. • Counter tops to be high density epoxy resin or quartz composite solid surface material. At the bullet resistant glazing provide stainless steel transaction trays.	Same as Option B	Same as Option B	
Interior Casework For In-Custody Areas	The casework in the in custody areas are to be Institutional grade Stainless Steel facings and countertops. Note: Casework and accessories are to be certified for use in holding areas.	Same as Option B	Same as Option B	
SPECIALTIES				
Fittings	Toilet compartments shall be stainless steel or monolithic plastic floor supported systems. The design layout of the fixture compartments are to be such as there are not direct sight lines for privacy.	Same as Option B	Same as Option B	
	Lockers 24” x 24” full height wardrobe lockers with top shelf with quad power receptacles for charging flashlights and radios. Lockers shall have sloped tops in the staff locker rooms or closed soffits to the ceiling above.			

Architectural Basis of Design Criteria				
	Option B	**Option D**	**Option CC**	**Comments**
	Custom storage shelving in the armory Storage shelving and wire mesh partitions in property & evidence			
Shelving	High density mobile storage systems are to be provided in the property and evidence storage	Same as Option B	Same as Option B	
Elevator	For conveying elevator assume machine roomless electric traction elevator.	Same as Option B	Same as Option B	
Communications & Security	In conference rooms and the training room provide a 60" Flat Screen Monitor, adjustable bracket and concealed cable pathways and power from the center of the conference room table to the wall monitor.	Same as Option B	Same as Option B	
Public Safety Equipment	Metal Detector in the prisoner processing area Blast resistant Storage Container in the mail processing area. Gun lockers in the prisoner processing area Weapon discharge unit Refrigerator(s) & freezers in the Property Evidence Department Drying Cabinet in the Property/Evidence Department Detention Furniture is to be provide in the in-custody holding areas. Secure storage lockers are to be provided for fire arms, narcotics and large evidence storage. Provide a safe.	Same as Option B	Same as Option B	
Institutional	IT racks shall be provided in the IT servicer room	Same as Option B	Same as Option B	
HVAC	Computer Room Air Conditioners (CRAC) mechanical units(s) are to be provided in the IT server room	Same as Option B	Same as Option B	
Vehicular Equipment	Apparatus vehicle exhaust system in FD apparatus bays. Compressor and air distribution system with ceiling mounted hose racks in the vehicle repair areas and apparatus bays.	Same as Option B	Same as Option B	
	Parts cleaning equipment in the vehicle repair shop.			
Kitchen Equipment	Commercial Grade: Three Refrigerators, One Freezer, Range/Oven, Hood Exhaust, Dishwasher, Garbage Disposal, Microwave Oven	Same as Option B	Same as Option B	
Laundry Equipment	Residential Grade: Washer, Dryer, Laundry Sink. Decontamination Room:	Same as Option B	Same as Option B	

Architectural Basis of Design Criteria				
	Option B	**Option D**	**Option CC**	**Comments**
Fixed Furnishings	Staff mailboxes	Same as Option B	Same as Option B	
Window Coverings	Window roller shades (MechoShade) shall be provided at exterior windows and at interior windows of private offices.	Same as Option B	Same as Option B	
Fixed Furnishings	Countertops at the public transition windows are to be either stainless steel or epoxy resin. Entrance walk-off mats and frames are to be provided at exterior entries.	Same as Option B	Same as Option B	
Movable Furnishings	Recycle /composting bins throughout the facility.	Same as Option B	Same as Option B	
Fitness Equipment	Not in contract (NIC)	Same as Option B	Same as Option B	
Special Construction	A safe is to be provided in the property and evidence storage room.	Same as Option B	Same as Option B	
Site Furnishings	Bicycle Racks ground mounted for the staff and visitor use.	Same as Option B	Bicycle Racks ground mounted for the staff and visitor use. Bicycle Racks in bicycle evidence storage room	
MISCELLANEOUS				
Walk-Off Mats	Provide a system of exterior and interior walk-off mats flush with the floor surface directly in front of the main entry doors and immediately after entering the public lobby.	Same as Option B	Same as Option B	
Flagpoles	Provide two flagpoles, to accommodate a State of California flag and a United States flag, near the public entrance.	Same as Option B	Same as Option B	
Roof Access	Provide an interior permanent dedicated industrial stair or ladder and access hatches to the roof with roof slope of less than 1:4.	Same as Option B	Same as Option B	

Architectural Basis of Design Criteria				
	Option B	**Option D**	**Option CC**	**Comments**
SIGNAGE				
	All signage must meet the requirements of the Americans with Disabilities Act (ADA) and the most recently adopted provisions of the California Building Code and CCR, title 24, regarding accessibility. Braille lettering and audio signals shall be provided at elevators and where required by codes. Provide prominent multilingual posting of public notices and informational material. Signage shall include interior and exterior building identification, way finding, room identification and code related signage.			
SOUND ISOLATION REQUIREMENTS TABLE				
STC Value Of Partition	**Spaces /Uses**			
40	General Office Space to General Office Space Orientation to adjoining areas Telecom AV rooms to adjoining areas			
45	Office Equipment to adjoining areas Workroom to adjoining areas Computer Room Spaces to adjoining areas Conference, Meeting, and Training Spaces to adjoining spaces			
50-55	Toilet room to adjoining spaces, Sleep Rooms			
65	Electrical Transformer to NC 30 space or less Elevator Shaft to NC 30 space or less Hydraulic Elevator Equip. to NC 30 space or less			
TYPICAL CEILING HEIGHT TABLE				
Ceiling Height	**Spaces /Uses**			
9'	Corridors			
9'	Private Offices, Sl;eep Rooms			
9’-10’	Open Plan Offices, Kitchen, Dining, Dayroom			
9’-10’	Ancillary Spaces			
9’-10’	Public Corridors			
9’-10’	Public Lobby - This may be expanded to be a two story high space.			
10'-13'	Shop and Equipment Repair Spaces			
10'-13'	Training / Community Room			
per BSCC stds..	Secure Corridors			
per BSCC stds..	Holding Cells			

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Prepared for:

KENSINGTON
FIRE PROTECTION DISTRICT

ADDENDUM A

Prepared by:

RossDrulisCusenbery

ARCHITECTURE

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SECTION A1
ARCHITECTURAL PROGRAM

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DRAFT

KENSINGTON FIRE STATION
Preliminary Space Requirements (PSR)
December 14, 2016
RossDrulisCusenbery Architecture, Inc.

Series	Department	Existing Staff	Existing NSF	Reduced Program Staff	Reduced Program NSF	Optimal Program Staff	Optimal Program NSF	Optimal with Possible Cuts Staff	Optimal with Possible Cuts NSF
100	Fire Department	3	3,202	5	5,700	5	7,287	5	**5,955**
200	Police Department	5	1,269	7	2,880	8	3,668	8	**2,488**
300	Shared Support	0	892	0	338	0	838	0	**500**
400	Building Support	0	585	0	990	0	1,100	0	**990**
	Total Personnel/NSF	8	5,948	12	9,908	13	12,893	13	**9,933**
	Building Spaces/Circulation	22%	0		2,180		2,836		**2,185**
	Total Building Gross SF (BGSF)		5,948		12,088		15,729		**12,118**

Parking Requirements	Existing Units							
Personal Vehicles	2		5		7		7	
Department Vehicles	7		7		7		7	
Visitor Vehicles	0		0		2		2	
Total Parking	**9**		**12**	**0**	**16**	**0**	**16**	**0**

Site Requirements	Existing Units							
Fire Department								
Storage Shed	1	0						
Outdoor BBQ Area	1	301	1	300				
Training	0	0	0	0				
Vehicles Staging / Apron	0	0	3	1680	3	1890	3	1890
Shared Support								
Trash Enclosure	1	0						
Building Support								
Yard Storage			1	80	1	80	1	80
Emergency Generator	1	62	1	80	1	200	1	**80**
Total Site		**363**		**2140**		**2170**	**5**	**2050**

100	FIRE DEPARTMENT			Existing				Reduced Program				Optimal Program				Optimal with Possible Cuts				
Ref. #	Plan Ref. #		Type	Existing NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total AP NSF	Remarks
		Personnel																		
		Offices																		
101		Captain's Office	PO	0		1	0	100	1	1	100	125	1	1	125	100	1	1	100	Adjacent to sleeping Room. Existing: Included in sleep room
102	216B	Business Manager Office	PO	92	1	1	92	100	1	1	100	125	1	1	125	100	1	1	100	At Lobby, Watch Office
103	216C	Paramedic EMT Office	PO	63	1	1	63	100	1	1	100	100	1	1	100			1	0	
		Subtotal				3	155			3	300			3	350			3	200	
		Subtotal Private Office					155				300				350				200	
		Workstations																		
104		Firefighter	WS	0			0	0		1	0	0		1	0	0		1	0	Included in Watch Office area. New workstation
105		Engineer	WS	0			0	0		1	0			1	0			1	0	Included in Watch Office area
		Subtotal				0	0			2	0			2	0			2	0	
		Subtotal Workstations					0				0				0				0	
		Total Personnel Spaces				3				5				5				5		
		Departmental Spaces																		
106		Lobby - F.D.					0	60	1		60	60	1		60	60	1		60	May be combined with Ref. #208
		General Department Area																		
107		Watch Office Area		0			0	150	1		150	200	1		200	200	1		200	w/Firefighter and Engineer workstations
108		Radio Response/Map Alcove		0			0	40	1		40	40	1		40	20	1		20	Existing: In Day Room. Adjacent to App. Bay
109		Training Storage		0			0	80	1		80	80	1		80	80	1		80	
110		Training/Community Room					0	240	1		240	450	1		450	400	1		400	Adjacent to Public Lobby
		Living Area																		
111	214C	Day Room		305	1		305	250	1		250	300	1		300	275	1		275	
112	215	Kitchen		201	1		201	250	1		250	300	1		300	275	1		275	
113	214B	Dining		191	1		191	200	1		200	300	1		300	250	1		250	Seating at Table for 6
114	210	Dorm A, Captain		214	1		214	170	1		170	220	1		220	175	1		175	Existing combines sleep and work areas. Renovation: 2 bed, New: 3 bed
115	209	Dorm B, Firefighters		180	1		180	170	1		170	220	1		220	175	1		175	Renovation: 2 bed, New: 3 Bed
116	206	Dorm C, Firefighters		95	1		95	170	1		170	220	1		220	175	1		175	Renovation: 2 bed, New: 3 Bed
117	208	Bathroom A		50	1		50	105	1		105	105	1		105	105	1		105	At hallway for Firefighter early arrival
118	207	Bathroom B		66	1		66	105	1		105	70	3		210	70	3		210	For new, one attached to each dorm room.
119	218	Laundry		83	1		83	100	1		100	150	1		150	100	1		100	
120	211	Storage		10	1		10	100	1		100	100	1		100	100	1		100	
121	219	Radio Room / RACES	WS	62	1		62	48	1		48	80	1		80	65	1		65	
122	205	Hall		111	1		111	0			0	0			0	0			0	Included in building gross
123		Staff Restroom					0	88	1		88	88	1		88				0	At Watch Office

100	FIRE DEPARTMENT			Existing				Reduced Program				Optimal Program				Optimal with Possible Cuts				
Ref. #	Plan Ref. #		Type	Existing NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total AP NSF	Remarks
		Apparatus Area																		
124	114	Apparatus Bay		484	3		1452	800	3		2400	900	3		2700	864	3		2592	Bay Size Renovation = 16' x 50' Bay Size New = 18' x 48' Recommended width for apparatus bay is 18 feet, reduced to 16 feet wide due to restricted site size Engine 65: 115" tall and 29' long Engine 365: 115" tall and 29' long
125		Turn out Alcove or Room		0			0	180	1		180	280	1		280	125	1		125	Existing: In App Bay
126		EMS Clean up Alcove		0			0	20	1		20	40	1		40	25	1		25	Existing: In App Bay
127		EMS Supply Storage		0			0	80	1		80	80	1		80	25	1		25	
128		App Bay Refrigeration Alcove		0			0	0			0	10	1		10				0	
129		Workshop Area		0			0	100	1		100	150	1		150	125	1		125	
130		Workshop Area					0	100	1		100	150	1		150				0	
131		Cascade Room		0			0	0			0	90	1		90	90	1		90	Air compressor
132		Hose Storage		0			0	100	1		100	120	1		120	25	1		25	Discuss: Hose Dryer
133	113	Air Compressor		21	1		21	40	1		40	40	1		40	35	1		35	Combined with Ref. #134, Mop Sink Closet
134	114a	Mop Sink Closet		6	1		6	6	1		6	6	1		6				0	Combined with Ref. #133, Air Compressor
135		App Bay Generator Storage					0	0			0	100	1		100				0	
136		Fire Pole					0	48	1		48	48	1		48	48	1		48	24 NSF on two levels
		Subtotal					3047				5400				6937				5755	
		Subtotal Departmental Spaces					3047				5400				6937				5755	
		Total NSF				**3**	**3202**			**5**	**5700**			**5**	**7287**			**5**	**5955**	
		Parking Requirements																		Employee private vehicle per shift = 4 Employee vehicles at overlap shift changes = 6 + 3
		Personal Vehicles			2				4				6				6			2 or 1 1/2 for FD due to the generator encroachment
																				An additional 2 for FD park against the north end of the lot
		Department Vehicles			1				1				1				1			Chief/Battalion Chief or staff - either a large SUV or a pick-up truck
		Total Parking			**3**				**5**				**7**				**7**			
		Site Requirements																		Fire Department: Indicate need for exterior training and staging areas.
		Storage Shed			1															
		Outdoor BBQ Area		301	1		301	300	1		300									Existing on deck, okay as alt.
		Training																		Discuss. Dual purpose w/parking
		Vehicles Staging / Apron						560	3		1680	630	3		1890	630	3		1890	Discuss
		Total Site Requirements					`				**1980**				**1890**				**1890**	

200	POLICE DEPARTMENT			Existing				Reduced Program				Optimal Program				Optimal with Possible Cuts				
Ref. #	Rm #		Type	Existing NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total AP NSF	Remarks
		Personnel																		
		Offices																		
201	102	Police Chief Office	PO	119	1	1	119	160	1	1	160	200	1	1	200	125	1	1	125	
202		Detective	PO				0	100	1	1	100	100	1	1	100	100	1	1	100	Existing shared with Police Aid. Locate with Police Aid
203	103	Supervisor 1 Office	PO	92	1	1	92	100	1	1	100	100	1	1	100	100	1	1	100	Discuss: Single Shared Office?
204	108	Supervisor 2 Office	PO	73	1	1	73	100	1	1	100	100	1	1	100	100	1	1	100	
		Subtotal				3	284			4	460			4	500			4	425	
		Subtotal Private Office					284				460				500				425	
		Workstations																		
205	101	Clerical / Reception	WS	59	1	1	59	80	1	1	80	80	1	1	80	80	1	1	80	Adjacent to Public Lobby. Provide security glazing. Access to Staff Restroom
206	109	Police Aid	WS	75	1	1	75	64	1	1	64	64	1	1	64	64	1	1	64	Existing shared with Detective, Near Property & Evidence Locate with Ref. #202, Detective
207		Officer Workstation	WS				0	36	1	1	36	64	2	2	128			2	0	Verify: May be redundant to "Report Writing"
		Subtotal				2	134			3	180			4	272			4	144	
		Subtotal Workstations					134				180				272				144	
		Total Personnel Spaces				5				7				8				8		
		Departmental Spaces																		
208	101A	Lobby - P.D.		47	1		47	60	1		60	60	1		60	60	1		60	May be combined with Ref. #106 w/restroom. Adj to Ref. #205, Clerical/Reception
209		Interview Rooms		0			0	100	1		100	100	1		100	100	1		100	Discuss: Number of Secure Interview Rooms
210		Conference / Briefing		0			0	240	1		240	240	1		240	200	1		200	
211		Juvenile Interview Room					0	100	1		100	100	1		100				0	
212		Witness Interview Room					0	100	1		100	100	1		100				0	Adjacent to Lobby / Reception
213	201	Lockers / Dressing Men / Shower		66	1		66	150	1		150	236	1		236	200	1		200	Includes shower
214	204	Lockers/Dressing Women / Shower		51	1		51	100	1		100	156	1		156	100	1		100	Includes shower
215	106	Copy / File Storage		101	1		101	100	1		100	100	1		100	100	1		100	
216		Reception Active Files					0	36	1		36	36	1		36	25	1		25	
217	107	Storage		44	1		44	100	1		100	150	1		150	100	1		100	
218		Evidence Processing		0			0	75	1		75	75	1		75	75	1		75	Bag & Tag adjacent to Ref. #219, Transfer Lockers
219		Transfer Lockers		0			0	64	1		64	64	1		64	64	1		64	Adjacent to Ref. #218, Evidence Processing
220	112	Property & Evidence Storage		101	1		101	280	1		280	400	1		400	200	1		200	Adjacent to Ref. #219, Transfer Lockers
221	200	Prisoner Processing		206	1		206	100	1		100	100	1		100	100	1		100	Existing shares with Report Writing
222	200	Report Writing					0	75	1		75	75	1		75	75	1		75	Included in Ref. #221, Prisoner Processing
223	200A	Armory		98	1		98	100	1		100	100	1		100	100	1		100	

200	POLICE DEPARTMENT			Existing				Reduced Program				Optimal Program				Optimal with Possible Cuts				
Ref. #	Rm #		Type	Existing NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total AP NSF	Remarks
224	200A	Radio Room					0	80	1		80	80	1		80	10	1		**10**	Included in Ref. #223, Armory
225	202	Staff Restrooms		22	1		22	88	2		176	88	2		176	50	2		**100**	Adjacent to m/f Locker Rooms
226		Secure Restroom					0	88	1		88	88	1		88	50	1		**50**	At Prisoner Processing
227		Officer Sleep Room / Quiet Room					0	0			0	80	1		80	80	1		80	
228	115	PD Hallway Level 1		115	1		115				0				0				0	
229		Quiet Room		0			0	80	1		80	80	1		80				**0**	
230		Break/Kitchenette		0			0	36	1		36	100	1		100	100	1		100	
231		Secure Storage (Bikes, T.V., etc.)		0			0	0			0	200	1		200	80	1		**80**	
		Subtotal					851				2240				2896				1919	
		Subtotal Departmental Spaces					851				2240				2896				1919	
		Total NSF				**5**	**1269**			**7**	**2880**			**8**	**3668**			**8**	**2488**	
		Parking Requirements																		
		Personal Vehicles							1				1				1			Chief No overlap shift parking. Employee vehicles park on the street
		Department Vehicles			6				6				6				6			squad cars / SUVS
		Total Parking			**6**				**7**				**7**				**7**			
		Site Requirements																		
		Total Site Requirements																		

300	SHARED SUPPORT			Existing				Reduced Program				Optimal Program				Optimal with Possible Cuts				
Ref. #	Rm #		Type	Existing NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total AP NSF	Remarks
		Personnel																		
		Offices																		
		Subtotal				0	0			0	0			0	0			0	0	
		Subtotal Private Office					0				0				0				0	
		Workstations																		
		Subtotal				0	0			0	0			0	0			0	0	
		Subtotal Workstations					0				0				0				0	
		Total Personnel Spaces				0				0				0				0		
		Departmental Spaces																		
301	217	Exercise Room		189	1		189	250	1		250	750	1		750	450	1		450	FD will share w/PD
302	100	Hall 1st Floor		283	1		283				0				0				0	Included in circulation factor
303	111	Training		285	1		285				0				0				0	In FD and PD Conference Rooms
304	110	HC Toilet Public Restroom		57	1		57	88	1		88	88	1		88	50	1		50	Adjacent to Public Lobby
305	203	Restroom A		23	1		23				0				0				0	
306	220	Hall 2nd Floor		55	1		55				0				0				0	Included in circulation factor
		Subtotal					892				338				838				500	
		Subtotal Departmental Spaces					892				338				838				500	
		Total NSF				**0**	**892**			**0**	**338**			**0**	**838**			**0**	**500**	
		Parking Requirements																		
		Visitor Vehicles			0				0				2				2			
		Total Parking			**0**				**0**				**2**				**2**			
		Site Requirements																		
		Trash Enclosure			1							60	1		60	60	1			
		Total Site Requirements																		

400	BUILDING SUPPORT			Existing				Reduced Program				Optimal Program				Optimal with Possible Cuts				
Ref. #	Rm #		Type	Existing NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total NSF	Rec NSF	Unit	Staff	Total AP NSF	Remarks
		Personnel																		
		Offices																		
		Subtotal					0		0	0	0		0	0	0		0	0	0	
		Subtotal Private Office					0				0				0				0	
		Workstations																		
		Subtotal				0	0			0	0			0	0			0	0	
		Subtotal Workstations					0				0				0				0	
		Total Personnel Spaces				0				0				0				0		
		Departmental Spaces																		
401	212	Janitor		11	1		11	40	1		40	80	1		80	40	1		40	
402	213	Mechanical		71	1		71	150	1		150	200	1		200	150	1		150	
404		Electrical		0			0	80	1		80	80	1		80	80	1		80	
405		Communications/IT Room		0			0	80	1		80	100	1		100	80	1		80	
406		Stairs		200	1		200	220	2		440	220	2		440	220	2		440	Accurately charge -needs - not enough
407		Water Heater		0			0	20	1		20	20	1		20	20	1		20	Accurately assess needs - not enough
408		Elevator		0			0	100	1		100	100	1		100	100	1		100	
409		Elevator Equipment Room		0			0	80	1		80	80	1		80	80	1		80	
410	101B	Hallway Level 1		169	1		169				0				0				0	
411	205A	Hallway Level 2		72	1		72				0				0				0	
		Subtotal					585				990				1100				990	
		Subtotal Departmental Spaces					585				990				1100				990	
		Total NSF				**0**	**585**			**0**	**990**			**0**	**1100**			**0**	**990**	
		Parking Requirements																		
		Total Parking			**0**				**0**				**0**				**0**			
		Site Requirements																		
		Yard Storage						80	1		80	80	1		80	80	1			
		Emergency Generator		62	1		62	80	1		80	200	1		200	80	1			
		Total Site Requirements					**62**				**160**				**280**					

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SECTION A2
SEISMIC RETROFIT OPTION

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STRUCTURAL ENGINEERS

Conceptual Retrofit Design based on ASCE 41-13 Tier 1 and 2 Seismic Evaluation

Kensington Public Safety Building
217 Arlington Avenue
Kensington, CA 94707

Prepared for: Ross Drulis Cusenbery Architecture, Inc. May 4, 2017
IDA Project Number 16066

1629 Telegraph Avenue, Ste 300 | Oakland, CA 94612 | t: 510.834.1629
ida-se.com

Executive Summary

IDA has completed a Seismic Evaluation of the Kensington Fire Station. Attached is our Supplemental Structural Report which provides

IDA utilized ASCE 41-13, Seismic Evaluation and Retrofit of Existing Buildings, to perform the analysis. IDA evaluated the structure against Immediate Occupancy requirements. The building structure does not meet ASCE 41-13 requirements for Immediate Occupancy. In order to meet Immediate Occupancy performance, structural upgrades would be required.

IDA developed schematic upgrade plans based on the findings of our evaluation. Mack5 used these plans to develop a cost estimate. The cost to implement these upgrades would be $497,000.

The requirement of Immediate Occupancy seismic performance for this building is a much greater seismic demand on the building where the existing capacity is based on 1960 code levels. 1960 code levels were much lower than what is required to meet Immediate Occupancy in accordance with ASCE 41-13. The building would require the addition of shear transfer elements to develop a complete lateral force resisting system to achieve the Immediate Occupancy requirement. It should be evaluated if the economic investment required to achieve an Immediate Occupancy performance level, by retrofitting the building, is worth the expense to the City of Berkeley.

List of Appendices

Appendix A: Structural Narrative Plans for Seismic Retrofit
Appendix B: ASCE 41-13 Tier 2 Evaluation Report

April 25, 2017 Project No. 16066

Mallory Cusenbery
Principal
Ross Drulis Cusenbery Architecture Inc.
18294 Sonoma Highway
Sonoma California 95476

SUBJECT: Conceptual Structural Narrative for Seismic Retrofit
Kensington Public Safety Building
2170 Arlington Avenue
Kensington, CA 94707
Pre-Design Services
Option 01- Seismic Only

1 Introduction

The Kensington Public Safety Building is an existing two-story wood framed building constructed in the early 1960's. The building is built into a sloped site and the total building area is approximately 5,700 square feet. IDA performed an ASCE 41-13 Tier 2 assessment for Immediate Occupancy Structural Performance. The evaluation identified a number of deficiencies in the lateral resisting system which must be addressed in order to meet the desired Immediate Occupancy System. For this phase of pre-design work, three options are under consideration:

1. **Option 01- Seismic only**- This option focuses on seismic retrofit only.
2. **Option 02- Existing site-** This option evaluates options for on-site renovation, expansion, or rebuild.
3. **Option 03- Park site-** This option evaluates a new building on a separate site.

This Structural Narrative on Option 01- Seismic Only focuses on the seismic mitigation measures required to address the deficiencies identified in the ASCE 41-13 assessment. The drawings in Appendix A identify the locations of the mitigation measures. The numbers in the Structural Narrative Drawings correspond to the mitigation numbers below. The ASCE 41-13 assessment report is included in Appendix B.

2 Option 01- Seismic Only

The Option 01-Seismic Only option focuses on a seismic retrofit of the building only. The objective of the proposed retrofit measures will be to satisfy the requirements of ASCE 41-13 requirements for Immediate Occupancy Structural Performance (S-1). No building remodel will be performed on the building except as required for seismic upgrades. Under this option, there will be no operational changes for the building.

3 ASCE 41-03 Deficiencies

Previously, IDA Structural Engineers performed an ASCE 41-13 Tier 2 evaluation on the Kensington Public Safety Building. A more detailed discussion of the deficiencies is provided in the full ASCE 41-13 report attached in Appendix B. A brief summary of the deficiencies identified in the ASCE 41-13 evaluation are as follows:

3.1 Vertical Irregularities

A vertical discontinuity occurs at the second floor shear walls at the West Elevation at line E where the walls are discontinuous for seismic overturning forces to the ground floor.

3.2 Slope Failure

1997 Geotechnical Evaluation by Geomatrix determined that there was risk of slope failure due to a seismic event. The 1998 Renovation added piers in front of the apparatus bay between lines 1 and 4 to resist sliding of the building down slope. However, no mitigation measures were provided between lines 4 and 7.

3.3 Shear Stress in Wood Shear Walls

The ASCE 41 assessment identified existing walls throughout the building as insufficient to resist seismic shears. In determining the shear capacity of the existing walls conservative assumptions were made where information on the construction of the walls was not known. The shear walls at line 4 that were strengthened as part of the 1998 and 2004 renovations were also identified as deficient in the ASCE 41 assessment.

3.4 Diaphragm Continuity

The diaphragm at the second floor has a split level discontinuity near line C between lines 1 and 4. The diaphragm does not appear to have been properly strengthened to transfer seismic loads across the discontinuity.

3.5 Steel Moment Frames with Flexible Diaphragms: Steel Column Connections

The moment frame column connections to the foundation are identified as insufficient to support the seismic demand from the frames.

3.6 Steel Moment Frames with Flexible Diaphragms: Transfer to steel frames

The strap connection connecting the 2nd floor diaphragm to the moment frame collector between lines 4 to 7 is not shown in the 1998 renovation details and is not clearly defined in the plans.

3.7 Steel Moment Frames with Flexible Diaphragms: Bottom Flange Bracing

The moment frame was installed as part of the 1998 renovation and as part of the renovation bottom flange bracing was installed. However, the flange bracing connections to the diaphragm are insufficient.

4 Proposed Seismic Retrofit Measures

4.1 Vertical Irregularities Mitigation

At second floor shear walls along line E between lines 4 and 7, provide direct bearing posts and holdowns below the ends of the second floor shear wall to transfer overturning forces directly to the foundation. Straps will tie to 2nd floor wall to post below.

4.2 Slope Failure Mitigation

Between gridlines 4 and 7 at the exterior front of the building west of line E install drilled piers to resist westward down slope building movement. For the purposes of pricing assume that there will be 3- 18” diameter piers by 10 feet deep, and assume 150 lb of reinforcing steel per pier.

It should be noted that the 1997 Geomatrix Geotechnical evaluation recommends tying the drilled piers to the existing foundation system with grade beams. The drilled piers installed as part of the 1998 renovation to resist sliding did not have grade beams tying the piers to the footing. Tying the new and existing drilled piers to the existing wall with grade beams is desirable; however this would require significant excavation of existing site ramps and concrete slabs. As the objective is to match the slope mitigation measure provided between grid lines 1 and 4, grade beams are not noted between 4 and 7 for the new drilled piers.

4.3 Wood Shear Walls Shear Stress Mitigation

Install additional plywood shear walls from the interior side of the building for sufficient strength to resist lateral loads. See the attached proposed renovation plan for proposed shear wall locations.

4.4 Diaphragm Continuity Mitigation

Provide additional nailing and blocking at diaphragm edges at diaphragm between lines 1 and 4 and between lines C and E to increase diaphragm strength. Provide vertical plywood near line C to ensure diaphragm continuity between the split levels at the second floor.

4.5 Steel Moment Frame Column Connection Mitigation

In order to reinforce the column to foundation connection, it is recommended to shore the moment frame and chip out the concrete at the base of the connection down 4 feet while preserving the rebar and provide a new base plate with new and additional anchor bolts which are longer. The new baseplate can be welded to the existing baseplates. The anchor bolts would be re-cast into new concrete. The use of additional post-installed anchors such as epoxy-installed anchor bolts is not sufficient to strengthen this connection.

4.6 Steel Moment Frame Collector Mitigation

The strap and blocking for the entire length of the collector between grid lines 4 to 7 should be field verified. For the purposes of pricing, assume that a continuous strap is required between grid lines 4 to 7 on 6x8 minimum blocking. See sketch NS-1 in Structural Narrative Plan in Appendix A.

4.7 Steel Moment Frame Beam Flange Bracing Connection Mitigation

The strengthening of diagonal braces to brace the bottom flange of the existing moment frame beams. The connections of these diagonal braces are not sufficient and should be strengthened by adding a new plate to the end of the brace to add more bolts to the connection. The existing floor framing can be strengthened by adding a beam at the braces to resist vertical loading. Blocks and straps are added to the floor to transfer the brace loads into the floor diaphragm.

5 Design Criteria

5.1 Seismic Dead Loads

Roof Seismic Dead Load:	19 PSF
Second Floor Seismic Dead Load:	23 PSF

5.2 Seismic Criteria

Importance Factor:	1.5
S_s=	2.48
S_1=	1.03
Seismic Design Category	F
Risk Category	IV, Buildings and other structures designated as essential facilities
Basic Performance Objective for Existing Buildings (BPOE)	1-B Immediate Occupancy Structural Performance (S-1)
Seismic Hazard Level	BSE-1E 20% in 50 years, 225 year return period
Site Class	C
Building Type	Wood framed building, sheathed with wood structural shear panels.

5.3 Materials

Concrete:

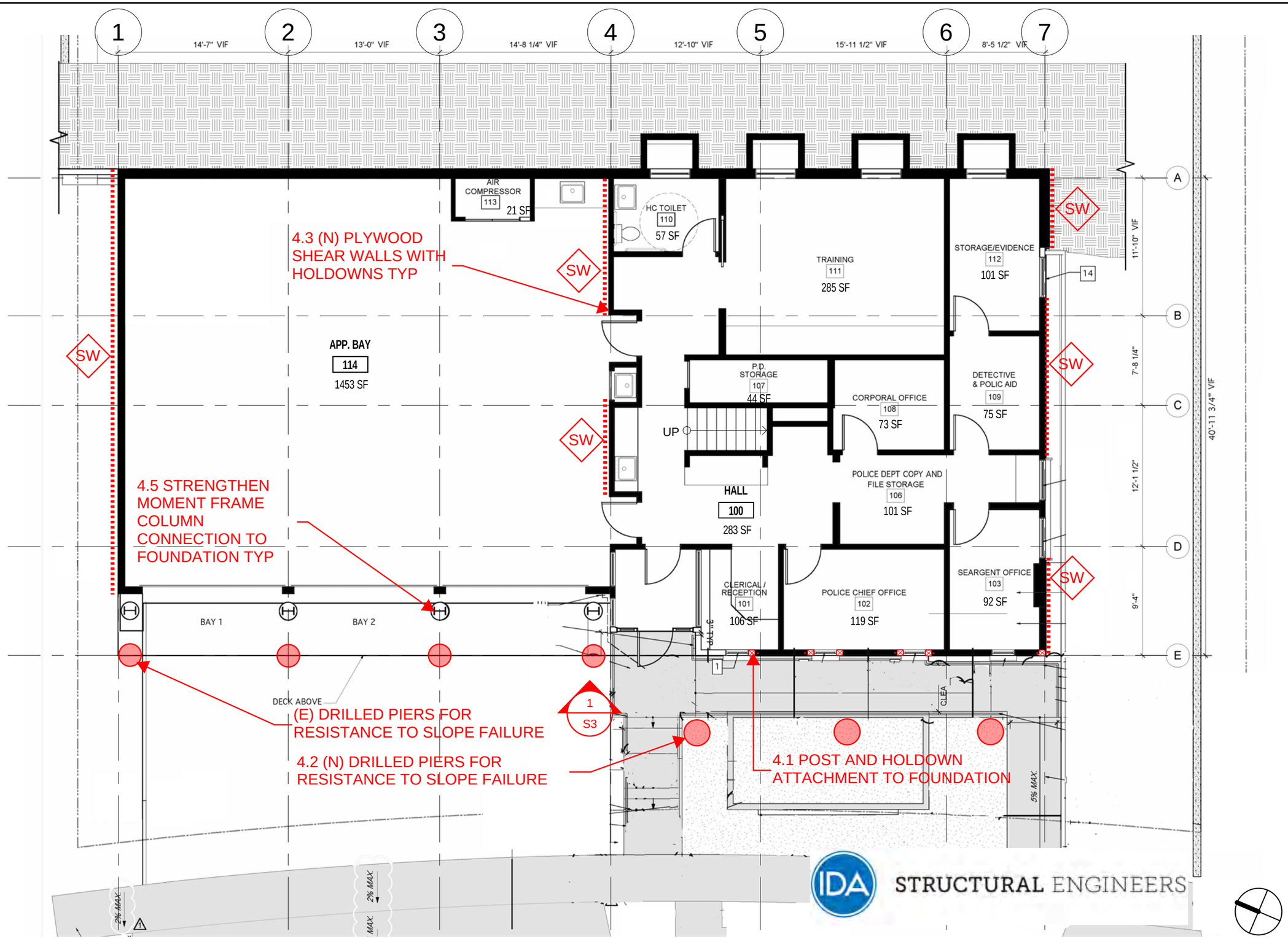
Footings	3,000 psi	Normal Weight
Slab on Grade	3,000 psi	Normal Weight

Concrete Reinforcing Steel:

ASTM A-615 Gr 60	fy = 60 ksi (Shop Bend)
ASTM A-706 Gr 60	fy = 60 ksi (Shop Bend)

Steel:

Structural Bolts	ASTM A307 or ASTM A325	
Anchor Rods	ASTM F1554	36 ksi
Wide Flange Shapes	ASTM A992	50 ksi
Plates, Shapes, Angles	ASTM A36	36 ksi
Structural Pipe	ASTM A53 – Grade B	35 ksi
Structural Tubing (Square or Rectangular)	ASTM A500 – Grade B	46 ksi



1 FIRST FLOOR PLAN
1/8" = 1'-0"

Preliminary design. Not for bidding or construction purposes.

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KENSINGTON FIRE STATION
KENSINGTON, CA

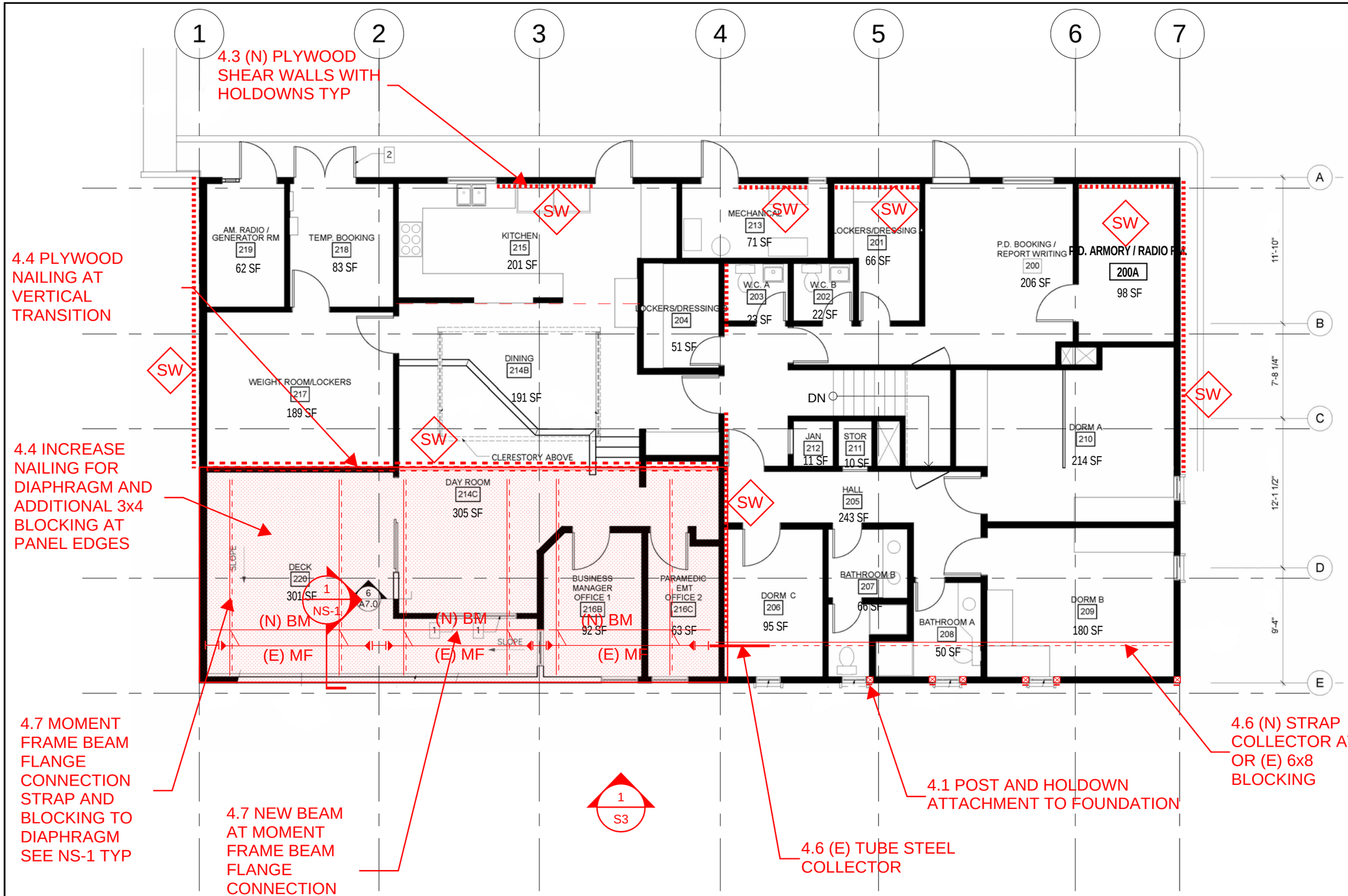
APPENDIX A: STRUCTURAL NARRATIVE

Sheet Title
EXISTING FLOOR PLAN - LEVEL 1
STRUCTURAL MITIGATION NARRATIVE

Scale: 1/8" = 1'-0"

Date: 2016/07/07

S1
Drawing No.



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KENSINGTON FIRE STATION

KENSINGTON, CA

APPENDIX A: STRUCTURAL NARRATIVE

Sheet Title

EXISTING FLOOR PLAN - LEVEL 2

STRUCTURAL MITIGATION NARRATIVE

Scale: 1/8" = 1'-0"

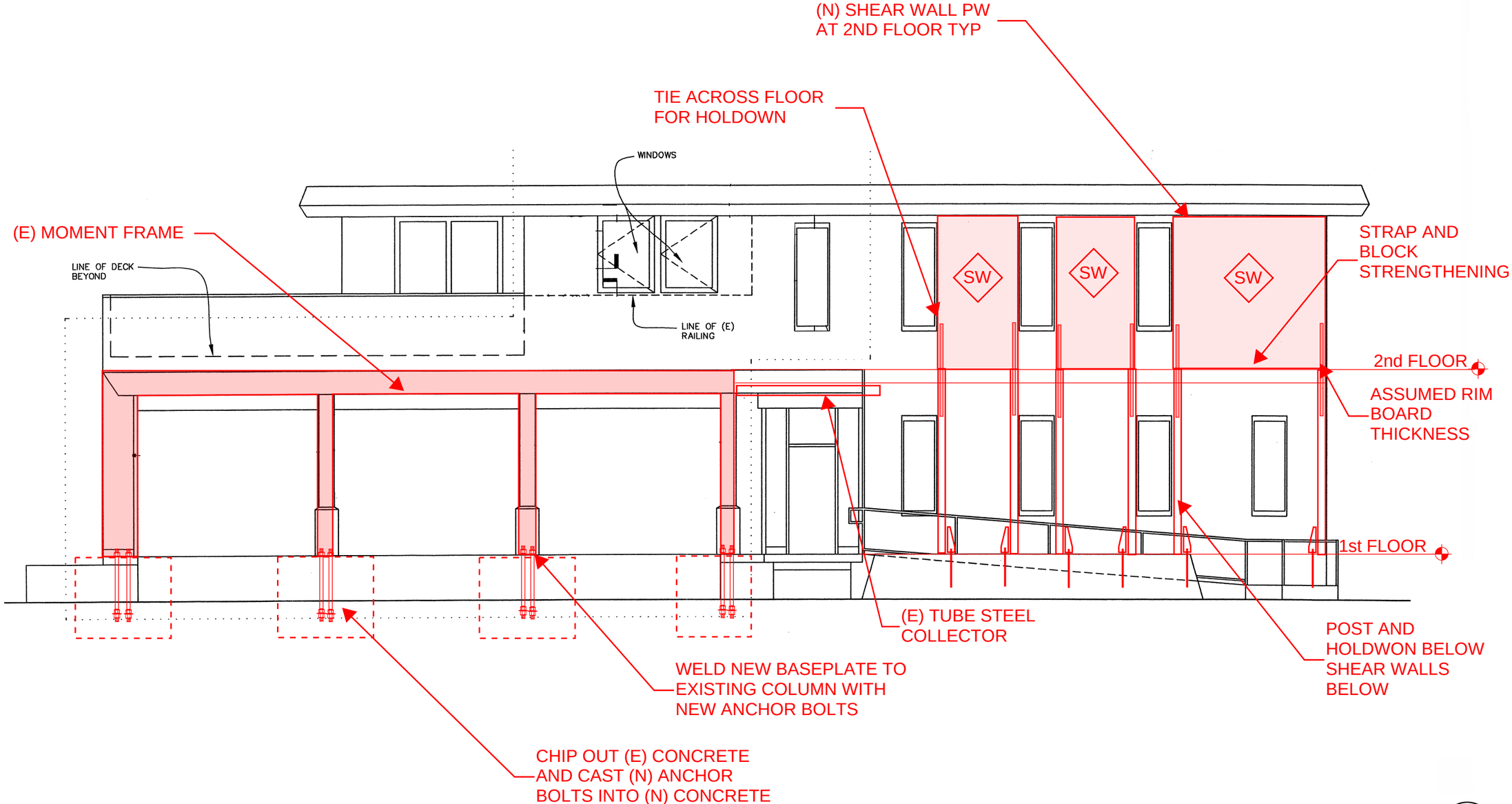
Date: 2016/07/07

S2

Drawing No.

IDA STRUCTURAL ENGINEERS

1 EXISTING SECOND FLOOR PLAN
1/8" = 1'-0"



1 WEST ELEVATION

NTS

Preliminary design. Not for bidding or construction purposes.

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KENSINGTON FIRE STATION

KENSINGTON, CA

APPENDIX A: STRUCTURAL NARRATIVE

Sheet Title

EXISTING FLOOR PLAN - LEVEL 1

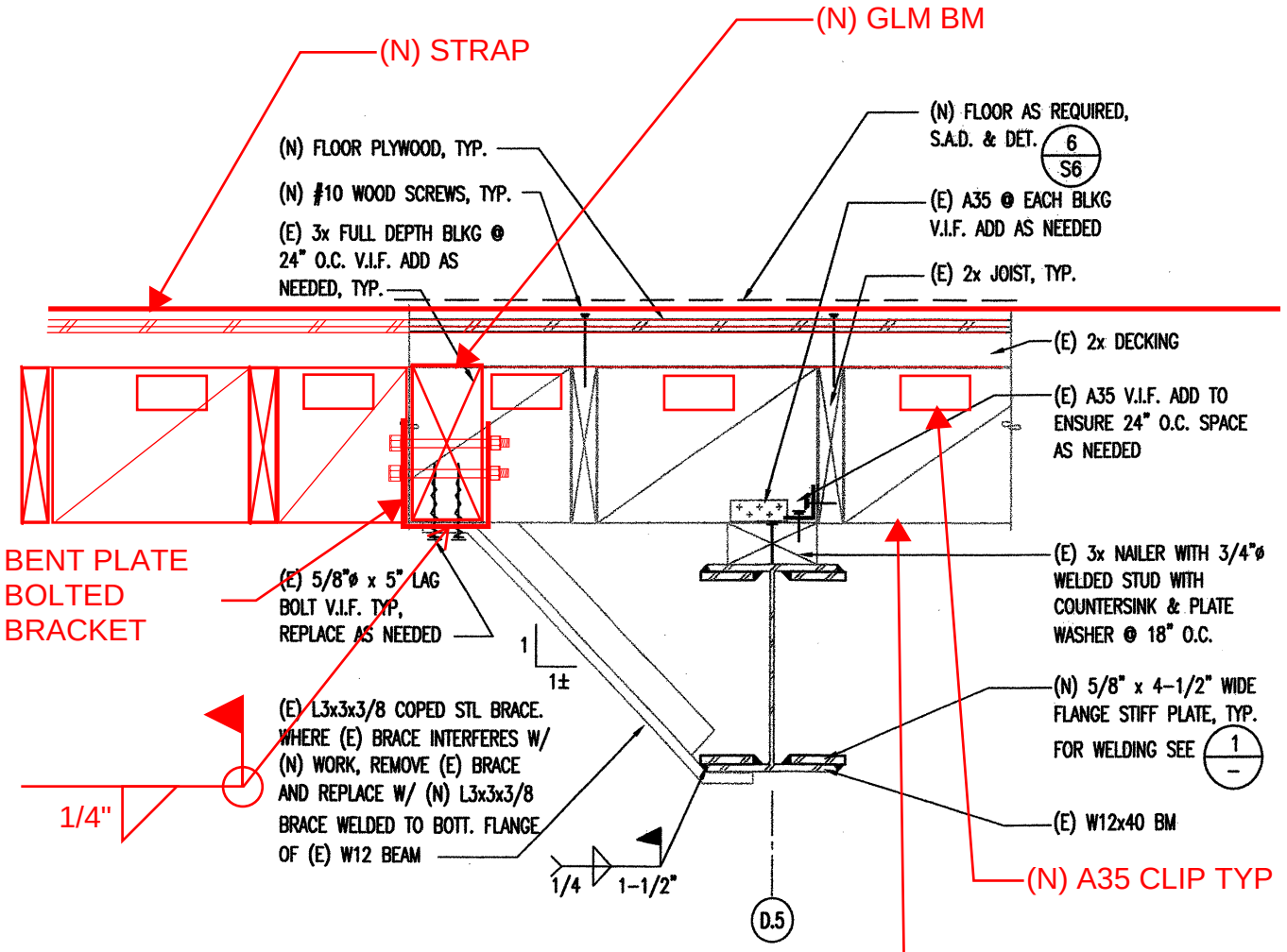
STRUCTURAL MITIGATION NARRATIVE

Scale: 1/8" = 1'-0"

Date: 2016/07/07

S3

Drawing No.



2/- DETAIL

1-1/2" = 1'-0"

REF.: 2/S5 BASELINE ENGINEERING DRAWINGS DATED 06/21/2004

APPENDIX A: STRUCTURAL NARRATIVE

IDA STRUCTURAL ENGINEERS
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Kensington Public Safety Building
217 Arlington Avenue
Kensington, CA

RFI No. NA			Date 05.03.2017
Bulletin No. NA	IDA Project No. 16066		Scale AS INDICATED
Addendum No. NA	ASI No.		
Ref. dwg. No. NA	NS-1		

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SECTION A3
NEW BUILDING OPTIONS

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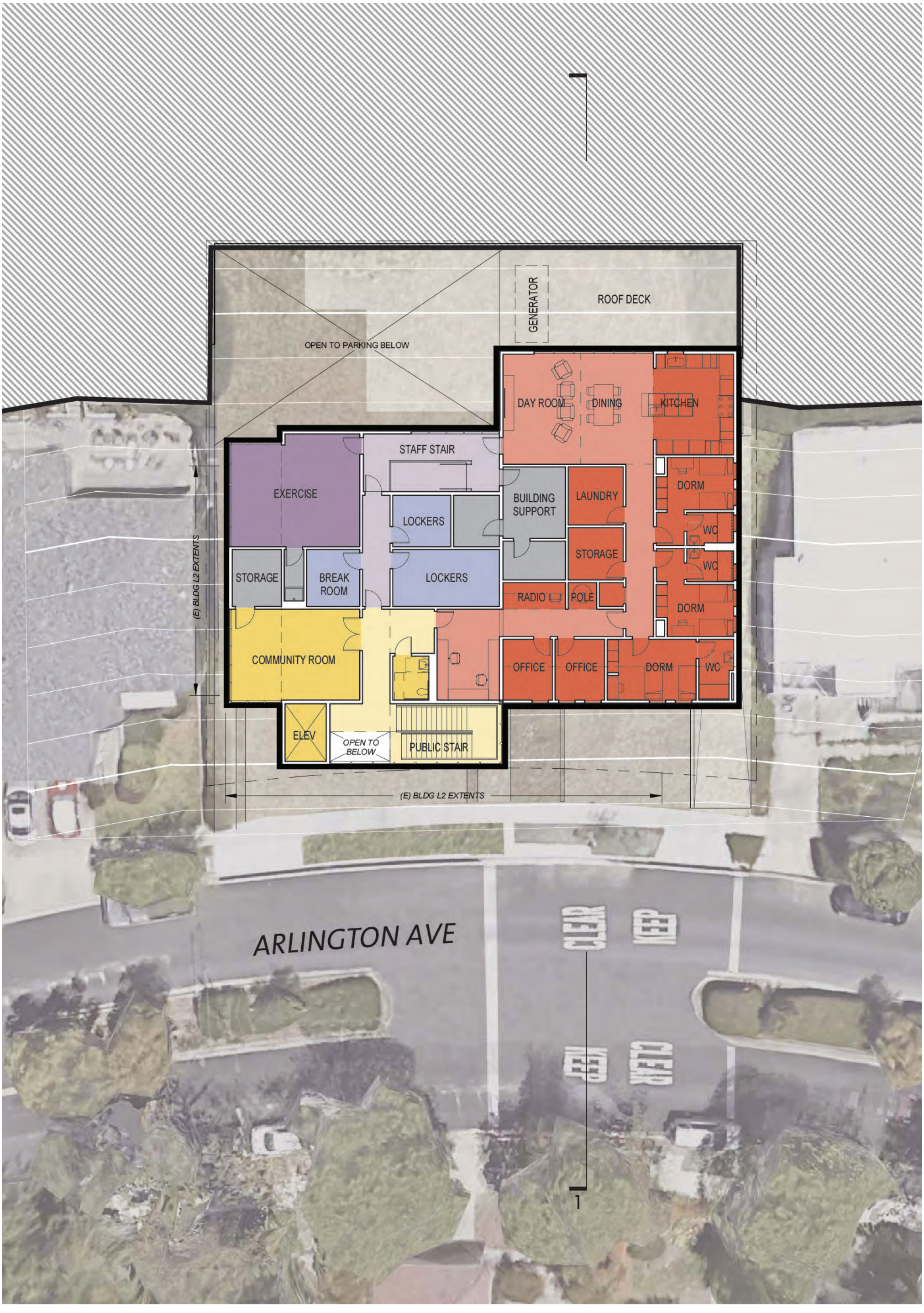
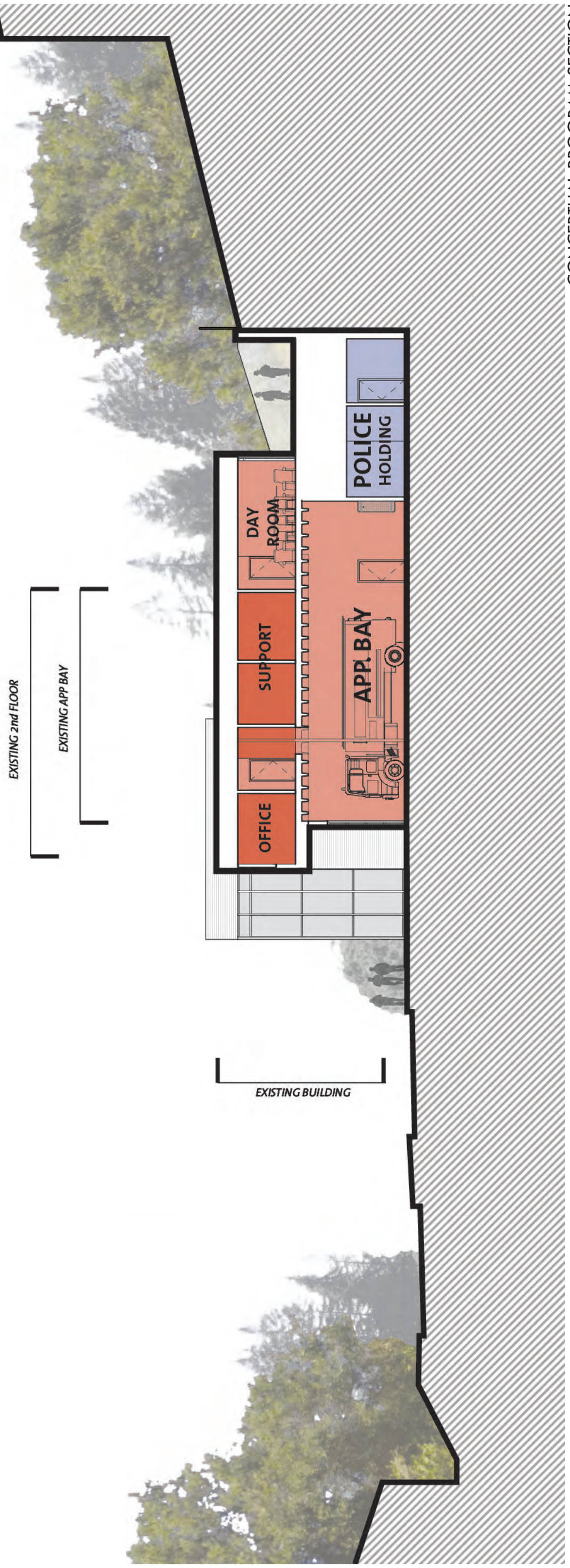
CONCEPTUAL PROGRAM PLAN- GROUND FLOOR

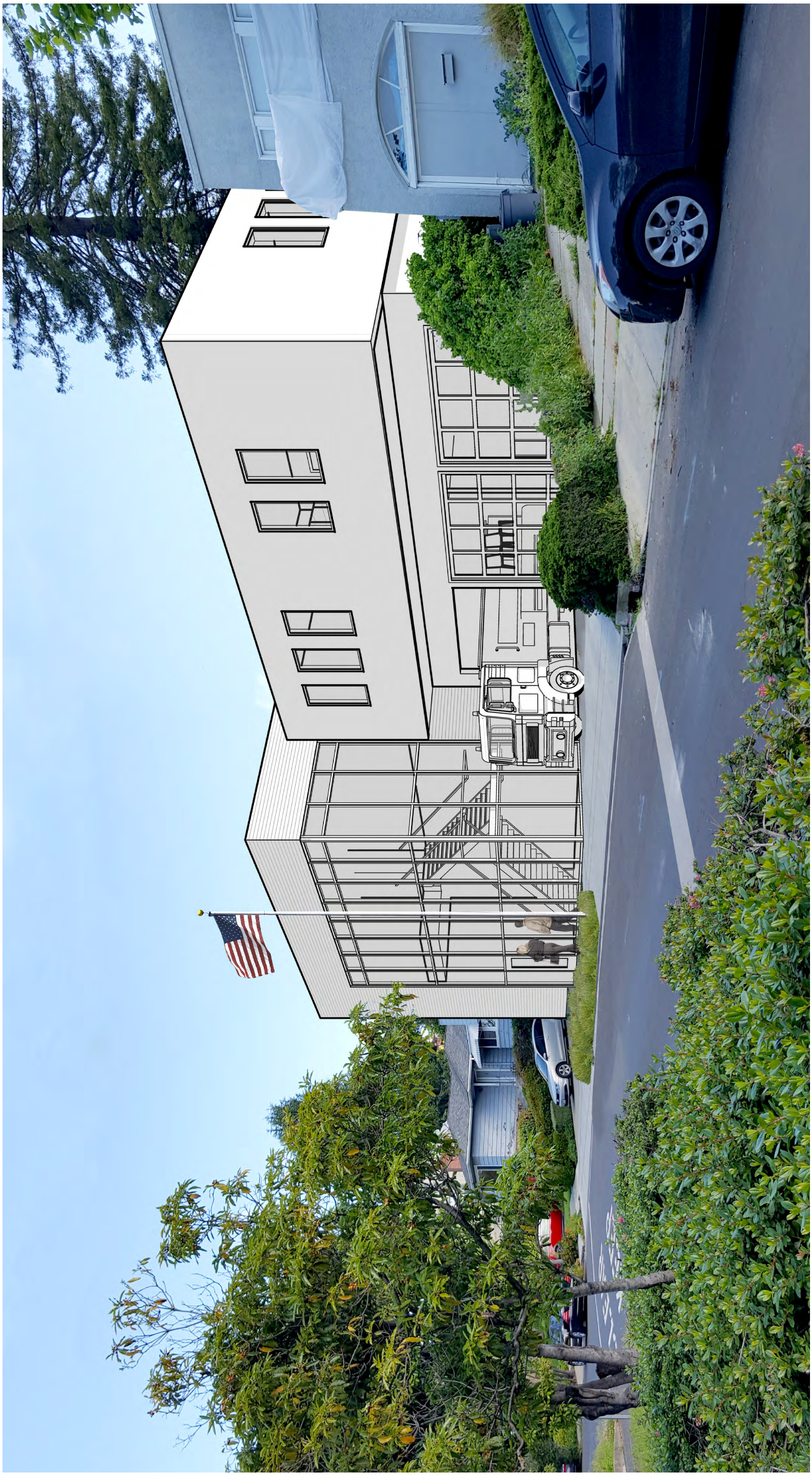


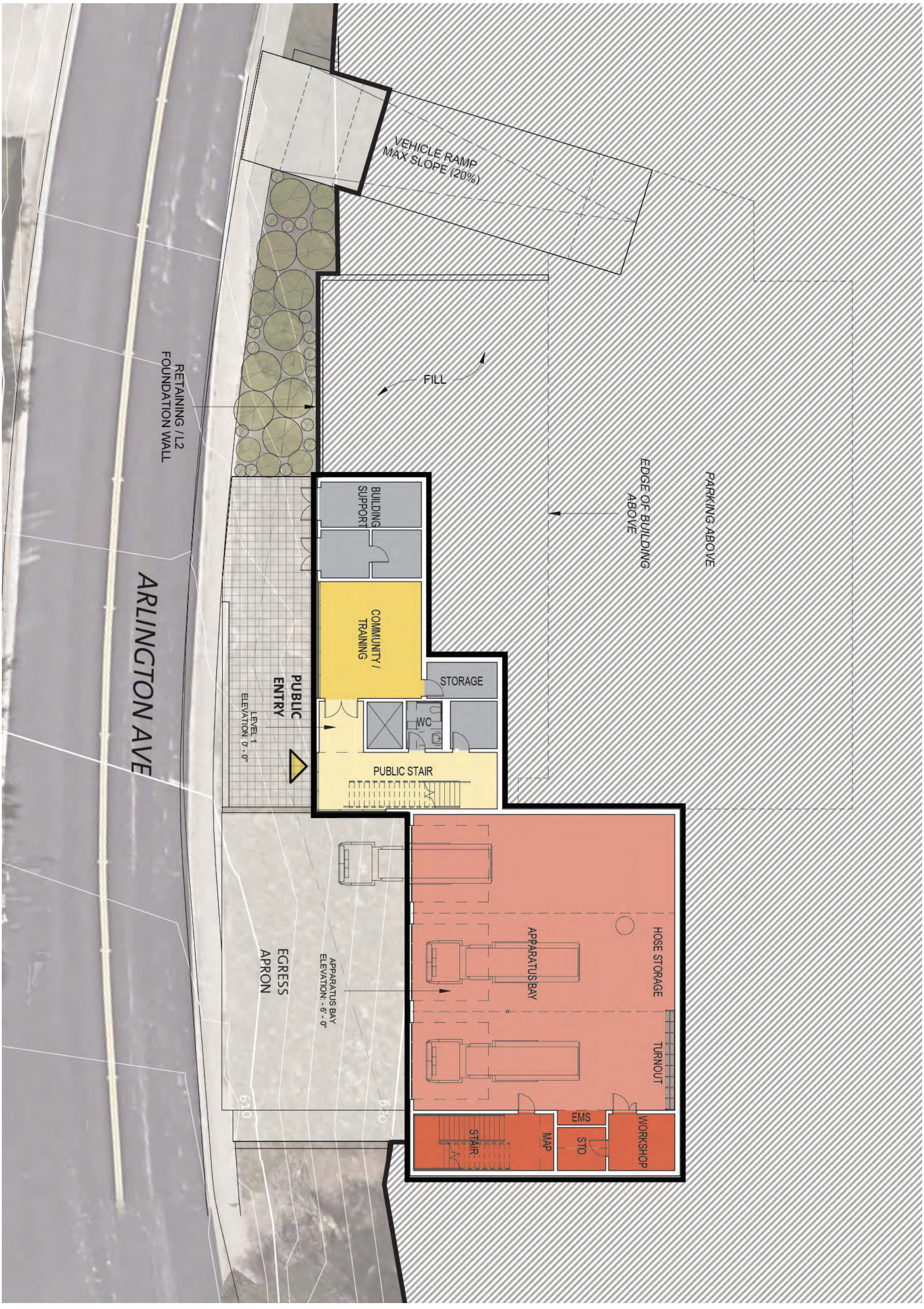
CONCEPTUAL PROGRAM PLAN- SECOND FLOOR

CONCEPTUAL PROGRAM SECTION



CONCEPTUAL PERSPECTIVE





CONCEPTUAL PROGRAM PLAN- GROUND FLOOR

RossDrulisCusenbery ARCHITECTURE

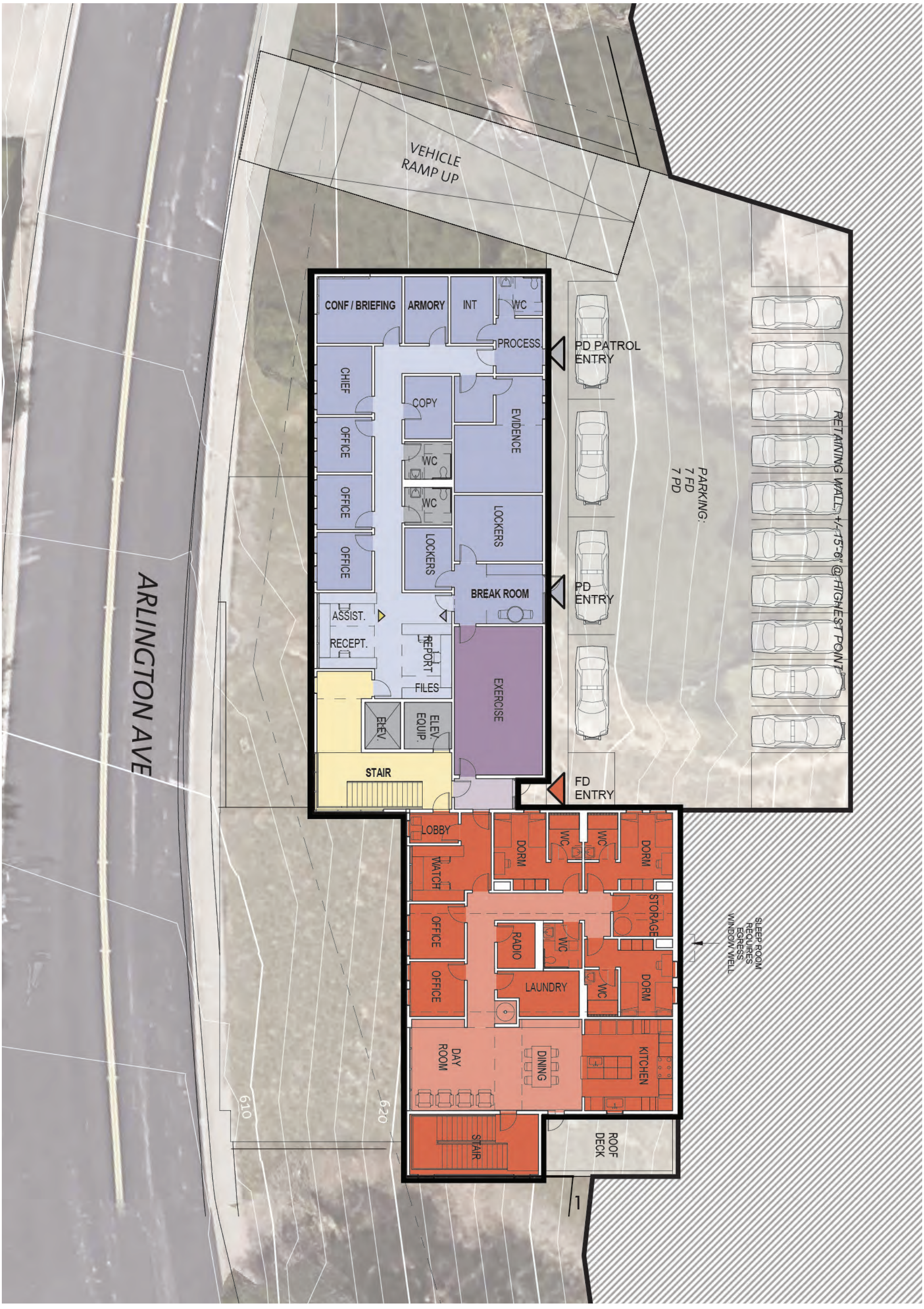
1/16" = 1'-0"

N

ALTERNATE SITE

KENSINGTON FIRE STATION

EE



CONCEPTUAL PROGRAM PLAN- SECOND FLOOR

RossDrulisCusenbery ARCHITECTURE

1/16” = 1’-0”

N

ALTERNATE SITE

KENSINGTON FIRE STATION

EE

Section A4
Cost Estimate

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Conceptual Cost Plan

for

Kensington Fire Station

May 24, 2017

DRAFT for REVIEW and COMMENT

1900 Powell Street, Suite 470
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CONTENTS ***Page***

Conceptual Cost Plan

Commentary

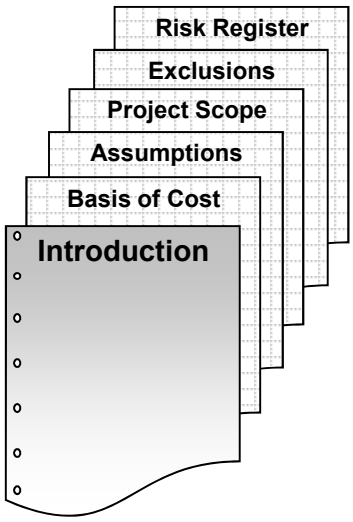
Kensington Fire Station

Introduction
Basis of Cost
Assumptions
Exclusions
Risk Register

May 24, 2017

DRAFT for REVIEW and COMMENT

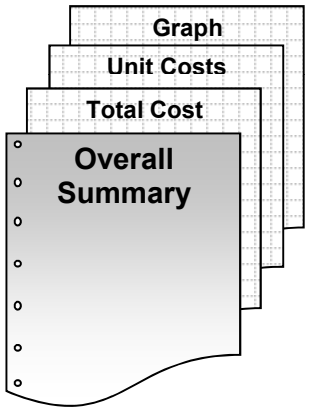
introduction



mack5 was requested to carry out a Conceptual/Feasibility Cost Plan for the proposed Kensington Fire Station located at City of Kensington, CA.

The first part of the Report contains the basis of the report, the assumptions made, description of the project scope, the exclusions to the costs and a risk register which contain items that have potential to impact cost at some point in the future.

The Overall Summary section contains a Summary of Gross Floor Areas, an Overall Project Summary, and Component and Trade Cost Summaries with Graphs.



Each section contains Control Quantities, a Cost Summary and Graph, and a Detailed Breakdown of Costs.

project introduction

The Kensington Fire Protection District proposes to renovate or rebuild the existing fire station.

The fire station includes 3-apparatus bays, apparatus support spaces including a workshop, medical storage and clean-up room, turnout storage and related janitor facilities, ADA restroom and station office, kitchen, dining, dayroom and laundry room, private sleeping quarters with unisex restrooms and mechanical/electrical/communications rooms. Two (2) Options are under consideration:

- Option 1 - Seismic Retrofit Only
- Option F - Demo & Rebuild at existing site

The Project is expected to be bid at a time when the Bay Area construction market appears to be saturated, with both contractors and subcontractos at or near capacity - often resulting in higher bids than estimated. Based on the current bid environment, if fewer than 4-5 bids are received, bids have high likelihood of coming in over estimated cost - potentially up to 25%, and more if only 1 bid is received.

items used for cost estimate

architectural	Floor plans prepared by RDC, received on 4/25/2017 Option F
structural	Floor plans prepared by RDC & IDA Structural Engineer, received on 05/04/2017 S1, S2, S3, NS-1
narrative	Basis Of Design Matrix prepared by RDC, received on 4/25/2017 (7-pages) Conceptual Retrofit Design based on ASCE 41-13 Tier 1 & 2 Seismic Evaluation

assumptions

(a) Construction will start in July, 2018

(b) A construction period of 12 months

(c) The general contract will be competitively bid by a minimum of five (5) qualified contractors

(d) The general contractor will have full access to the site during normal business hours

(e) There are no phasing requirements

(f) The contractor will be required to pay prevailing wages

exclusions

(a) Cost escalation beyond a start of July, 2018

(b) Loose furniture and equipment except as specifically identified

(c) Hazardous materials handling, disposal and abatement

(d) Compression of schedule, premium or shift work, and restrictions on the contractor's working hours

(e) Soft Cost such as testing and inspection fees, architectural design and construction management fees, assessments, taxes, finance, legal and development charges

(f) Scope change and post contract contingencies

(g) Environmental impact mitigation

Conceptual Cost Plan

Overall Summary

Kensington Fire Station

Gross Floor Areas
Overall Summary
Component Summary
Trade Summary

May 24, 2017

DRAFT for REVIEW and COMMENT

Kensington Fire Station	*GFA*	*$/SF*	*$,000*
Option 1 - Seismic Retrofit Only	6,172	$121.10	$747
Option F - Rebuild	11,827	$768.15	$9,085

Conceptual Cost Plan

Option 1 - Seismic Retrofit Only

Kensington Fire Station

Control Quantities
Option 1 - Seismic Retrofit Only Summary
Detailed Cost Breakdown

May 24, 2017

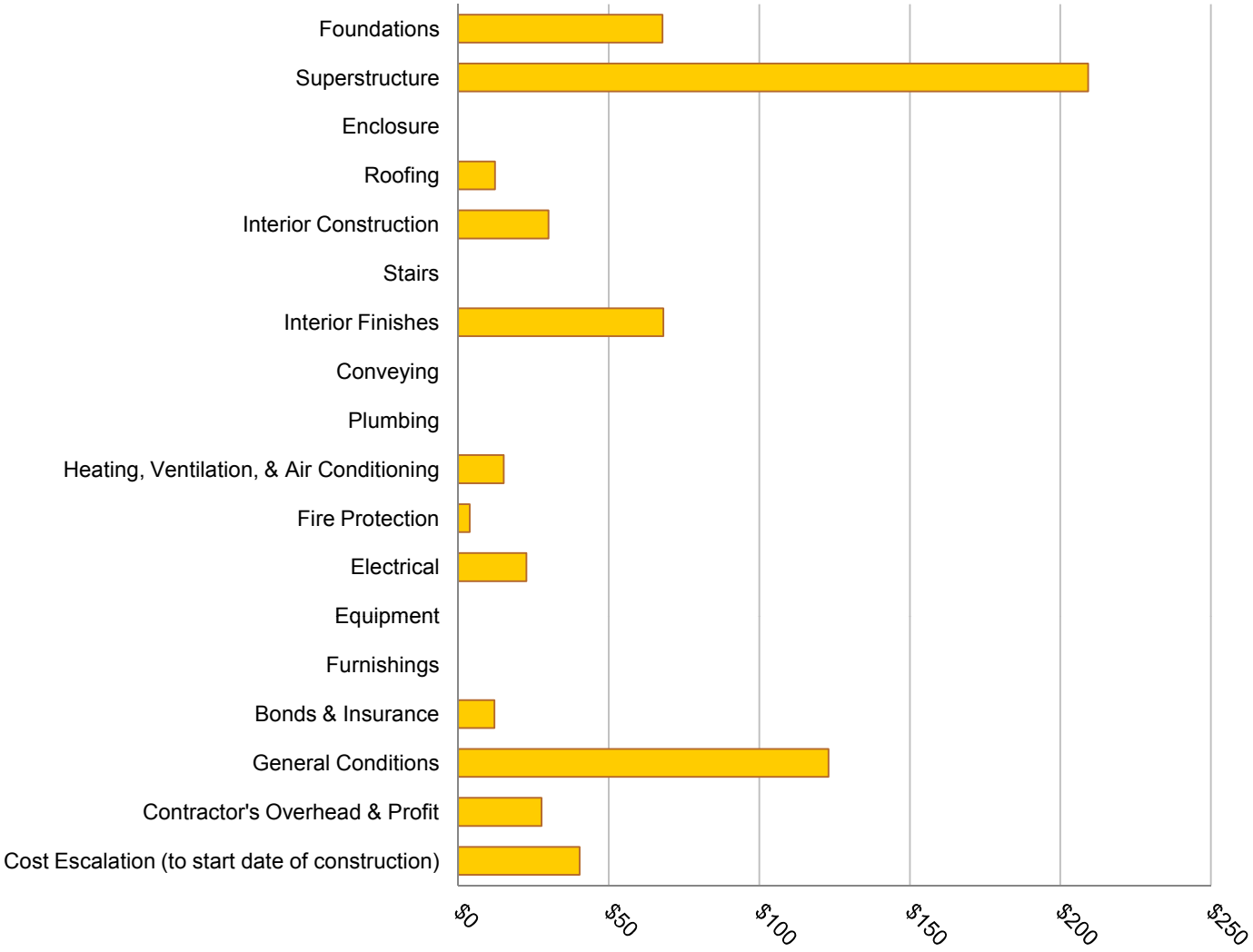
DRAFT for REVIEW and COMMENT

Enclosed Areas	
First Floor	3,252
Second Floor	2,920
Subtotal of Enclosed Area	6,172

CSI UniFormat Summary	*6,172 SF*	*%*	*$/SF*	*$,000*
Foundations		9%	$10.99	$68
Basement Construction		0%	$0.00	$0
Superstructure		28%	$33.90	$209
Enclosure		0%	$0.00	$0
Roofing		2%	$1.98	$12
Interior Construction		4%	$4.86	$30
Stairs		0%	$0.00	$0
Interior Finishes		9%	$11.04	$68
Conveying		0%	$0.00	$0
Plumbing		0%	$0.00	$0
Heating, Ventilation, & Air Conditioning		2%	$2.45	$15
Fire Protection		1%	$0.61	$4
Electrical		3%	$3.67	$23
Equipment		0%	$0.00	$0
Furnishings		0%	$0.00	$0
Special Construction		0%	$0.00	$0
Selective Building Demolition		4%	$5.04	$31
Subtotal - Building Construction		*62%*	*$74.55*	*$460*
Site Preparation		1%	$1.62	$10
Site Improvement		1%	$1.62	$10
Site Mechanical Utilities		0%	$0.00	$0
Site Electrical Utilities		0%	$0.00	$0
Subtotal - Sitework		*3%*	*$3.24*	*$20*
Total - Building and Sitework Construction		*64%*	*$77.79*	*$480*
Bonds & Insurance	2.50%	2%	$1.94	$12
General Conditions	25.00%	16%	$19.93	$123
Contractor's Overhead & Profit	4.50%	4%	$4.49	$28
Subtotal		*86%*	*$104.16*	*$643*
Contingency for Design Development	10.00%	9%	$10.42	$64
Cost Escalation (to start date of construction)	5.70%	5%	$6.53	$40
TOTAL CONSTRUCTION BUDGET	***July 2018***	***100%***	***$121.10***	***$747***

NOTE: Inclusions and Exclusions listed in the Commentary Section.

CSI UniFormat Summary



FOUNDATIONS	Quantity	Unit	Rate	Total ($)
Standard Foundations				
Drilled Piers				
Mobilization and demobilization	1	LS	$15,000.00	$15,000
Testing	1	LS	$10,000.00	$10,000
18" diameter pier x 10' deep	3	EA	$4,000.00	$12,000
Allowance for grade beams/ footings / foundation walls				NIC, Not required
Slab On Grade				
Allowance to patch/repair existing slab on grade, affected by the seismic retrofit	6,172	SF	$5.00	$30,860
			Subtotal For Foundations:	**$67,860**

BASEMENT CONSTRUCTION	Quantity	Unit	Rate	Total ($)
No work anticipated in this section				

SUPERSTRUCTURE	Quantity	Unit	Rate	Total ($)
Vertical Structure				
Post and holdown attachment to foundation	72	LF	$250.00	$18,000
(N) plywood shearwalls at the interior side of the building	3,000	SF	$20.00	$60,000
Holdowns - allow at 24" o.c.	120	EA	$150.00	$18,000
Strengthen moment frame column connection to foundation; shore the moment frame and chip out the concrete at the base of the connection down 4 feet while preserving the rebar and provide a new base plate with new anchor bolts	4	EA	$15,000.00	$60,000

SUPERSTRUCTURE	Quantity	Unit	Rate	Total ($)
Horizontal Structure - Level2				
Plywood nailing at vertical transition	42	LF	$100.00	$4,200
Diaphragm continuity mitigation (4.4)				
(N) structural floor plywood	755	SF	$10.00	$7,550
Additional 3x4 blocking at panel edges	122	LF	$50.00	$6,100
(N) strap collector at (E) 6x8 blocking	19	EA	$75.00	$1,425
(N) Moment frame beam flange connection strap and blocking to diaphragm (ref. NS-1)	51	EA	$75.00	$3,825
(N) GLM beam	42	LF	$150.00	$6,300
(N) 5/8" x 4 1/2" wide flange stiffener plate to (E) W12 beam	168	LF	$50.00	$8,400
Roof Structure			NIC, No work required	
Miscellaneous				
Miscellaneous metal	6,172	GSF	$1.50	$9,258
Miscellaneous rough carpentry	6,172	GSF	$1.00	$6,172
Subtotal For Superstructure:				**$209,230**

ENCLOSURE	Quantity	Unit	Rate	Total ($)
No work anticipated in this section				
Subtotal For Enclosure:				

ROOFING	Quantity	Unit	Rate	Total ($)
Roofing System				
Patch/repair/replace (E) roof deck paving	350	SF	$35.00	$12,250
Subtotal For Roofing:				**$12,250**

INTERIOR CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Interior Partitions				
(N) gypwall over new shearwall	3,000	SF	$10.00	$30,000
Subtotal For Interior Construction:				**$30,000**

STAIRS	Quantity	Unit	Rate	Total ($)
No work anticipated in this section				
Subtotal For Stairs:				

INTERIOR FINISHES	Quantity	Unit	Rate	Total ($)
Floor Finishes				
(N) floor finish over new plywood diaphragm	405	SF	$20.00	$8,100
Patch and repair (E) floor finishes affected by the structural retrofit	1,180	SF	$10.00	$11,800
Wall finishes				
Paint to (N) gypwall	3,000	SF	$3.00	$9,000
Patch and repair (E) wall finishes affected by the structural retrofit	6,172	GSF	$2.00	$12,344
Ceiling Finishes				
(N) ceiling finishes under the diaphragm mitigation	755	SF	$20.00	$15,100
Patch and repair (E) floor ceiling affected by the structural retrofit	1,180	SF	$10.00	$11,800
Subtotal For Interior Finishes:				**$68,144**

CONVEYING	Quantity	Unit	Rate	Total ($)
No work anticipated in this section				
Subtotal For Conveying:				

PLUMBING	Quantity	Unit	Rate	Total ($)
No work anticipated in this section				
Subtotal For Plumbing:				

HEATING, VENTILATION, & AIR-CONDITIONING	Quantity	Unit	Rate	Total ($)
Trade Specialties				
Miscellaneous ductwork modification	755	SF	$20.00	$15,100
Subtotal For Heating, Ventilation, & Air-Conditioning:				**$15,100**

FIRE PROTECTION	Quantity	Unit	Rate	Total ($)
Sprinklers				
Miscellaneous fire sprinkler modification	755	SF	$5.00	$3,775
Subtotal For Fire Protection:				**$3,775**

ELECTRICAL	Quantity	Unit	Rate	Total ($)
Lighting and Branch Wiring				
Lighting fixtures modification/replacement	755	SF	$30.00	$22,650
Subtotal For Electrical:				**$22,650**

EQUIPMENT	Quantity	Unit	Rate	Total ($)
No work anticipated in this section				
Subtotal For Equipment:				

FURNISHINGS	Quantity	Unit	Rate	Total ($)
No work anticipated in this section				
Subtotal For Furnishings:				

SPECIAL CONSTRUCTION	Quantity	Unit	Rate	Total ($)
No work anticipated in this section				
Subtotal For Special Construction:				

SELECTIVE BUILDING DEMOLITION	Quantity	Unit	Rate	Total ($)
Interior Building Demolition				
Demo and remove (E) gypwall	3,000	SF	$5.00	$15,000
Demo and remove (E) plywood floor	755	SF	$5.00	$3,775
Miscellaneous structural demolition	6,172	GSF	$2.00	$12,344
Hazardous Materials Abatement				Excluded
Subtotal For Selective Building Demolition:				**$31,119**

SITE PREPARATION	Quantity	Unit	Rate	Total ($)
Site Clearing and Demolition				
Allowance for site preparation/ protection	1	LS	$5,000.00	$5,000
Allowance for erosion control	1	LS	$5,000.00	$5,000
Hazardous Materials Abatement				Excluded
Subtotal For Site Preparation:				**$10,000**

SITE IMPROVEMENT	Quantity	Unit	Rate	Total ($)
Vehicular Paving				
Patch/repair (E) entry affected by the (N) drilled pier	1	LS	$10,000.00	$10,000
Subtotal For Site Improvement:				**$10,000**

SITE MECHANICAL UTILITIES	Quantity	Unit	Rate	Total ($)
No work anticipated in this section				
Subtotal For Site Mechanical Utilities:				

SITE ELECTRICAL UTILITIES	Quantity	Unit	Rate	Total ($)
No work anticipated in this section				
Subtotal For Site Electrical Utilities:				

Level 1

Level 2

Conceptual Cost Plan

Option F - Rebuild

Kensington Fire Station

Control Quantities
Option F - Rebuild Summary
Detailed Cost Breakdown

May 24, 2017

DRAFT for REVIEW and COMMENT

Enclosed Areas	
Level 1	5,750
Level 2	5,697
Subtotal of Enclosed Area	11,447
Covered Area	
Roof Overhang	760
Subtotal of Covered Area at half value	380
Total of Gross Floor Area	11,827

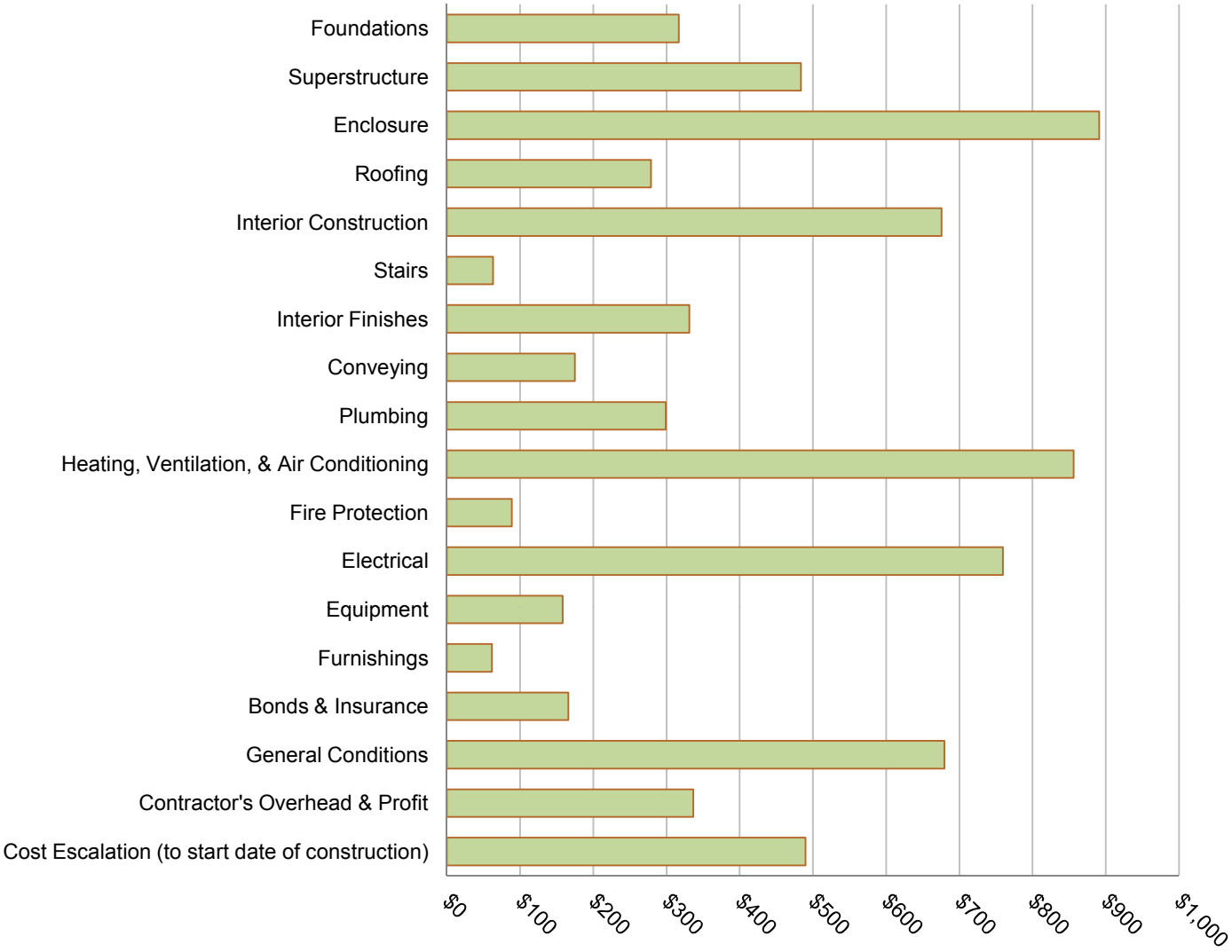
CONTROL QUANTITIES

				Ratio to Gross Area
Number of stories (x1,000)		2	EA	0.169
Gross Area		11,827	SF	1.000
Enclosed Area		11,447	SF	0.968
Covered Area		760	SF	0.064
Footprint Area		5,750	SF	0.486
Volume		166,114	CF	14.045
Gross Wall Area		10,096	SF	0.854
Finished Wall Area		7,468	SF	0.631
Retaining Wall Area (including Driveway/Parking)		2,308	SF	0.195
Windows or Glazing Area	26%	2,628	SF	0.222
Roof Area - Flat		6,510	SF	0.550
Roof Area - Sloping		-	SF	0.000
Roof Area - Total		6,510	SF	0.550
Roof Glazing Area		-	SF	0.000
Interior Partition Length		1,200	LF	0.101
Elevators (x10,000)		1	EA	0.846
Plumbing Fixtures (x1,000)		29	EA	2.452

CSI UniFormat Summary	*11,827 SF*	*%*	*$/SF*	*$,000*
Foundations		3%	$26.80	$317
Basement Construction		4%	$31.76	$376
Superstructure		5%	$40.91	$484
Enclosure		10%	$75.36	$891
Roofing		3%	$23.57	$279
Interior Construction		7%	$57.14	$676
Stairs		1%	$5.33	$63
Interior Finishes		4%	$27.99	$331
Conveying		2%	$14.80	$175
Plumbing		3%	$25.28	$299
Heating, Ventilation, & Air Conditioning		9%	$72.39	$856
Fire Protection		1%	$7.50	$89
Electrical		8%	$64.22	$759
Equipment		2%	$13.36	$158
Furnishings		1%	$5.21	$62
Special Construction		0%	$0.00	$0
Selective Building Demolition		1%	$7.83	$93
Subtotal - Building Construction		*65%*	*$499.42*	*$5,907*
Site Preparation		1%	$9.26	$109
Site Improvement		5%	$39.23	$464
Site Mechanical Utilities		1%	$6.34	$75
Site Electrical Utilities		1%	$6.49	$77
Other Site Construction		0%	$0.00	$0
Subtotal - Sitework		*8%*	*$61.31*	*$725*
Total - Building and Sitework Construction		*73%*	*$560.74*	*$6,632*
Bonds & Insurance	2.50%	2%	$14.02	$166
General Conditions	10.00%	7%	$57.48	$680
Contractor's Overhead & Profit	4.50%	4%	$28.45	$336
Subtotal		*86%*	*$660.68*	*$7,814*
Contingency for Design Development	10.00%	9%	$66.07	$781
Cost Escalation (to start date of construction)	5.70%	5%	$41.40	$490
TOTAL CONSTRUCTION BUDGET	***July 2018***	***100%***	***$768.15***	***$9,085***

NOTE: Inclusions and Exclusions listed in the Commentary Section.

CSI UniFormat Summary



FOUNDATIONS	Quantity	Unit	Rate	Total ($)
Standard Foundations				
Cast in place reinforced concrete grade beams/footings/pile caps	11,827	GSF	$8.00	$94,616
Special Foundations				
Drilled pier	11,827	GSF	$8.00	$94,616
Mobilization and demobilization	1	LS	$15,000.00	$15,000
Testing	1	LS	$10,000.00	$10,000
Reinforced concrete slab on grade				
6" thick, typical	3,580	SF	$12.00	$42,960
12" thick at Apparatus bay	2,170	SF	$16.00	$34,720
Miscellaneous				
Allowance for equipment pads	1	LS	$10,000.00	$10,000
Elevator pit	1	EA	$15,000.00	$15,000
			Subtotal For Foundations:	**$316,912**

BASEMENT CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Basement Excavation				
Excavate & haul away basement material to elev 514'	2,484	CY	$35.00	$86,935
Sheeting/Shoring allowance	2,308	SF	$45.00	$103,860
Basement Walls				
Basement & retaining wall , 18" thick	2,308	SF	$60.00	$138,480
Reinforced continuous wall footing	124	LF	$200.00	$24,800
Waterproofing membrane	2,308	SF	$8.00	$18,464
Perforated drain pipe	124	LF	$25.00	$3,100
			Subtotal For Basement Construction:	**$375,639**

SUPERSTRUCTURE	Quantity	Unit	Rate	Total ($)
Vertical Structure				
Columns/post	11,827	GSF	$5.00	$59,135
Floor Structure (level 2)				
2" thick light weight concrete over plywood and wood framing	5,697	SF	$35.00	$199,395
Reinforced concrete curb at walls surrounding the apparatus bays, turnout room and workshop, 12" high	180	LF	$35.00	$6,300
Roof Structure				
Plywood over wood framing	6,510	SF	$30.00	$195,300
Miscellaneous				
Miscellaneous metal	11,827	GSF	$1.50	$17,741
Miscellaneous rough carpentry	11,827	GSF	$0.50	$5,914
		Subtotal For Superstructure:		**$483,784**

ENCLOSURE	Quantity	Unit	Rate	Total ($)
Exterior Wall Framing, Furring and Insulating				
Exterior wall system; medium grade cladding assembly with self-adhering waterproofing over dense glass panels, including sealants, blocking, flashings etc	5,099	SF	$35.00	$178,465
Backup system; 6" Metal stud, insulation, air/vapor barrier	4,215	SF	$18.00	$75,870
Full height CMU wall at armory and evidence storage	884	SF	$36.00	$31,824
Drywall to interior face of exterior wall	5,099	SF	$5.00	$25,495
Exterior Windows				
Aluminum framed storefront system	2,328	SF	$115.00	$267,720
Aluminum framed punched windows	300	SF	$95.00	$28,500
Premium for operable window	10	EA	$500.00	$5,000
Premium for ballistic glazing at PD secure areas and PD Chief office	120	SF	$150.00	$18,000
Aluminum sunshade screens over areas of glazing on West & South elevation	1,173	SF	$20.00	$23,460

ENCLOSURE	Quantity	Unit	Rate	Total ($)
Exterior Doors, Frames and Hardware				
Apparatus bay sectional doors; 14' x 14'	3	EA	$45,000.00	$135,000
Police garage doors/gate	1	LS	$20,000.00	$20,000
Aluminum entry doors, double leaf, ballistic proof @ PD entry	2	PR	$10,000.00	$20,000
FD Entry & Roof deck	2	PR	$6,000.00	$12,000
Hollow metal door, frame and hardware, exterior	2	EA	$2,200.00	$4,400
Allowance for specialty hardware at entrance doors	1	LS	$5,000.00	$5,000
Balustrades, Parapets & Roof Screens				
Guardrail/handrail at roof deck	18	LF	$350.00	$6,300
Soffits				
Exterior soffit to roof overhangs	760	SF	$45.00	$34,200
			Subtotal For Enclosure:	**$891,234**

ROOFING	Quantity	Unit	Rate	Total ($)
Roof or deck traffic surfaces				
Membrane roofing over tapered insulation, typical	5,697	SF	$18.00	$102,546
Pedestrian membrane traffic coating on exterior deck over occupied space	796	SF	$14.00	$11,144
Pedestrian paving at roof deck - allowance	796	SF	$25.00	$19,900
Roof Parapet/Coping	336	LF	$30.00	$10,080
Roof Openings				
Skylight, allow 3% of roof area	171	SF	$200.00	$34,182
Miscellaneous work				
Mechanical roof screen - allowance	340	LF	$250.00	$85,000
Caulking and sealants	11,827	GSF	$0.50	$5,914
Roof ladder/ hatches/ accessories	1	LS	$10,000.00	$10,000
			Subtotal For Roofing:	**$278,766**

INTERIOR CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Interior Partitions				
Steel light gauge or wood framing with acoustic treatments to achieve STC rating				
At general office space, STC40	3,700	SF	$18.00	$66,600
At office equipment/workroom/computer room spaces/meeting/conference/training rooms to adjoining areas, STC45	2,388	SF	$18.00	$42,984
At sleep rooms and toilet room to adjoining spaces, STC 50-55	3,216	SF	$22.00	$70,752
At electrical transformer, stairwall, elevator shaft, adjacent wall to apparatus, STC65	3,573	SF	$26.00	$92,898
Abuse resistant gypsum board over security mesh for detention interview rooms	561	SF	$42.00	$23,562
Full height CMU wall at armory and evidence storage	1,972	SF	$36.00	$70,992
Backing and blocking	11,827	GSF	$1.00	$11,827
Interior glazed windows/partitions at conference; allow 8'-0"high	184	SF	$85.00	$15,640
2-Way mirror in Interview room - allowance	2	EA	$2,500.00	$5,000
Interior Doors				
Solid core wood doors in hollow metal frames				
Single leaf	38	EA	$2,000.00	$76,000
Double leaf	2	PR	$3,600.00	$7,200
Hollow metal doors in secure interview rooms, evidence storage and armory	5	EA	$2,400.00	$12,000
Premium for specialty door hardwares; card key locking system and automatic openers where required	1	LS	$10,000.00	$10,000
Fittings				
Protective guards, barriers and bumpers - allowance	11,827	GSF	$0.25	$2,957
Prefabricated compartments and accessories				
Mirrors in exercise/fitness	60	SF	$30.00	$1,800
Toilet Accessories, single stall	7	RM	$750.00	$5,250
Shower stall and accessories	7	EA	$2,500.00	$17,500
Shelving and Millwork				
Janitor's shelf and mop rack	1	EA	$500.00	$500

INTERIOR CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Cabinets and Countertops				
Counter tops/desk at reception and radio workstation; level1 & 2	82	LF	$250.00	$20,500
Casework at kitchen, with stainless steel countertop	60	LF	$750.00	$45,000
Bullet resistant transaction window 48"wide x 48"high; complete with stainless steel countertop 48" x 18" x 1-1/2" and stainless steel recessed tray with bullet trap	2	EA	$7,500.00	$15,000
Allowance for miscellaneous casework	11,447	SF	$2.00	$22,894
Chalkboards and Graphics				
Directional/wayfinding signs	11,447	GSF	$1.50	$17,171
Door signage	45	EA	$150.00	$6,750
Building signage - exterior	1	LS	$10,000.00	$10,000
Chalkboards/tackboards and mapping wall	1	LS	$5,000.00	$5,000
Subtotal For Interior Construction:				**$675,776**

STAIRS	Quantity	Unit	Rate	Total ($)
Stair Construction				
Public & Staff stair; steel framed stairs with concrete treads	2	FLT	$25,000.00	$50,000
Rubber finish to treads and landings	2	FLT	$1,500.00	$3,000
Fire Pole	1	LS	$10,000.00	$10,000
Subtotal For Stairs:				**$63,000**

INTERIOR FINISHES	Quantity	Unit	Rate	Total ($)
Floor Finishes				
Durable quality carpet tile in sleep rooms	540	SF	$6.50	$3,510
Resilient sheet flooring in offices, living areas, storage, kitchen & training room	5,568	SF	$8.00	$44,544
Sealed concrete on apparatus bay	2,192	SF	$2.50	$5,480
Athletic flooring tiles in exercise/fitness room	500	SF	$10.00	$5,000
Tile or similar in lobbies/public stair	1,076	SF	$20.00	$21,520
Ceramic floor tile and base in bathrooms & locker room	781	SF	$18.00	$14,058
Elevator shaft/staff stair	790	SF		*No Finish, NIC*
Water vapor emission control - allowance	6,608	SF	$3.50	$23,128

INTERIOR FINISHES	Quantity	Unit	Rate	Total ($)
Wall finishes				
Paint to interior walls	26,664	GSF	$2.00	$53,328
Ceramic tile in bathrooms & showers; wainscot at wet walls only, full height in showers	1,932	SF	$20.00	$38,640
Painted plywood wainscot at apparatus bays, 8' high	1,056	SF	$5.00	$5,280
Protective wainscot at primary operational circulation, 48"high	1,168	SF	$15.00	$17,520
Ceiling Finishes				
Gypsum board ceilings, painted; 30%	2,679	SF	$18.00	$48,217
Lay-in ACT; 70%	6,250	SF	$5.00	$31,252
Abuse resistant gypsum board over security mesh for detention interview rooms	326	SF	$25.00	$8,150
Paint exposed ceiling in apparatus bay	2,192	SF	$2.00	$4,384
Allowance for soffits	200	LF	$35.00	$7,000
Subtotal For Interior Finishes:				**$331,010**

CONVEYING	Quantity	Unit	Rate	Total ($)
Elevators and Lifts				
Machine roomless traction elevator, 2 stop	1	EA	$175,000.00	$175,000
Subtotal For Conveying:				**$175,000**

PLUMBING	Quantity	Unit	Rate	Total ($)
Plumbing Fixtures				
Water closet, floor, manual flush	4	EA	$1,700.00	$6,800
Lavatory, wall hung, lever faucet	7	EA	$1,900.00	$13,300
Kitchen sink, dbl, SS faucet, disposer	2	EA	$2,000.00	$4,000
Mop sink, floor type, trim	2	EA	$2,100.00	$4,200
Service sink, wall type, ECI, faucet	1	EA	$1,750.00	$1,750
Shower receptor, drain, valve & head	4	EA	$3,000.00	$12,000
Laundry box, recessed w/ WHA	2	EA	$850.00	$1,700
Hose bibb - interior type	2	EA	$250.00	$500
Hose bibb - exterior type	4	EA	$590.00	$2,360
Dishwasher (connections only)	1	EA	$325.00	$325
Miscellaneous fixtures	11,447	GSF	$2.00	$22,894

PLUMBING	Quantity	Unit	Rate	Total ($)
Plumbing Equipment				
Gas water heater w/ flue	1	EA	$13,000.00	$13,000
Recirculation pump w/ aqua stat	1	EA	$2,200.00	$2,200
Expansion tank	1	EA	$450.00	$450
Miscellaneous equipment	11,447	SF	$1.60	$18,315
Domestic Water Distribution				
Domestic water system	11,447	SF	$2.60	$29,762
Cold water rough-in for fixture	29	EA	$575.00	$16,675
Hot water rough-in for fixture	18	EA	$360.00	$6,480
Sanitary Waste				
Sanitary waste & vent systems	11,447	SF	$2.50	$28,618
Rain Water Drainage				
Rain water drainage system	11,447	SF	$1.50	$17,171
Gutters & downspouts	418	LF	$36.00	$15,048
Other Plumbing Systems				
Compressed Air Systems				
Air compressor, 120 gallon, 10 HP	1	EA	$10,500.00	$10,500
Air dryer, filters, etc.	2	EA	$780.00	$1,560
CA piping, drops - complete	6	LS	$5,250.00	$31,500
Natural Gas System				
Gas service & meter (by Utility Co.)				NIC, Not required
Natural gas system				NIC, Not required
Condensate Drainage				
Condensate drain system	11,447	SF	$0.80	$9,158
Trade Specialties				
Testing & sterilization	1	LS	$5,500.00	$5,500
Pipe sleeves, fire stopping, etc.	1	LS	$7,500.00	$7,500
Miscellaneous	1	LS	$15,750.00	$15,750
			Subtotal For Plumbing:	**$299,015**

HEATING, VENTILATION, & AIR-CONDITIONING	Quantity	Unit	Rate	Total ($)
Energy Supply				
Boiler Plant	2	EA	$17,500.00	$35,000
Heat Generating Systems				
Radiant heat panels	8	EA	$2,200.00	$17,600
Electric infrared heaters (Bay doors)	3	EA	$1,500.00	$4,500
Boiler flue through roof	2	EA	$500.00	$1,000
Cooling Systems:				
Air Handling Equipment				
RTU with heat recovery option	1	EA	$100,000.00	$100,000
Distribution Systems				
Galvanized sheet metal ductwork	11,500	LB	$12.50	$143,750
Duct insulation	7,475	SF	$3.50	$26,163
Miscellaneous duct accessories	1	LS	$12,000.00	$12,000
Sound Attenuator	1	LS	$15,000.00	$15,000
Registers, grilles and diffusers	65	EA	$450.00	$29,250
Dryer vent	1	EA	$300.00	$300
Terminal and Package Units				
VRF system	40	TON	$2,560.00	$102,400
VRF HR branch selectors	2	EA	$4,800.00	$9,600
VRF fan coil unit, ducted	40	EA	$2,500.00	$100,000
RS/RL/HR lines - (CU>BS)	1,400	LF	$32.50	$45,500
Outdoor condensing unit, 1 1/2 ton	2	EA	$2,950.00	$5,900
Indoor fan coil unit, wall, 1 1/2 ton	2	EA	$1,550.00	$3,100
RS/RL lines - complete	110	LF	$25.00	$2,750
Controls and Instrumentation				
Controls & instrumentation	11,447	SF	$6.00	$68,682
Systems Testing and Balancing				
Systems start-up & testing	1	LS	$7,500.00	$7,500
Air systems balancing	11,447	SF	$0.50	$5,724
Other HVAC Systems and Equipment				
Apparatus bay exhaust fan	3	EA	$5,000.00	$15,000
Decon room exhaust fan	1	EA	$3,000.00	$3,000
Turnout room exhaust fan	1	EA	$2,500.00	$2,500
Work shop area exhaust fan	1	EA	$3,000.00	$3,000
Vehicle exhaust system - complete	1	LS	$50,000.00	$50,000

HEATING, VENTILATION, & AIR-CONDITIONING	Quantity	Unit	Rate	Total ($)
Trade Specialties				
HVAC shutoff sensors for all windows and doors	10	EA	$1,500.00	$15,000
Rigging & hoisting	1	LS	$12,000.00	$12,000
Pipe sleeves, firestopping, etc.	1	LS	$5,000.00	$5,000
Miscellaneous	1	LS	$14,900.00	$14,900
Subtotal For Heating, Ventilation, & Air-Conditioning:				**$856,118**

FIRE PROTECTION	Quantity	Unit	Rate	Total ($)
Sprinklers				
Wet sprinkler system - complete including pump	11,827	GSF	$7.50	$88,703
Subtotal For Fire Protection:				**$88,703**

ELECTRICAL	Quantity	Unit	Rate	Total ($)
Electrical Service and Distribution				
Electrical service & distribution equipment, feeders & grounding	11,447	SF	$15.50	$177,429
150KW generator w/250 gal belly tank, ATS and feeder to electrical distribution system	11,447	SF	$8.50	$97,300
Apparatus bay door	3	EA	$1,500.00	$4,500
Elevator	1	EA	$3,500.00	$3,500
Mechoshade	1	LS	$1,500.00	$1,500
Vehicle exhaust	1	LS	$2,500.00	$2,500
CRAC	1	EA	$3,000.00	$3,000
Air compressor	1	EA	$1,500.00	$1,500
Garbage disposal @ kitchen	1	EA	$500.00	$500
Range/Oven	1	EA	$650.00	$650
Hood	1	EA	$350.00	$350
Dishwasher	1	EA	$500.00	$500
Equipment wiring not yet detailed	11,447	SF	$3.00	$34,341

ELECTRICAL	Quantity	Unit	Rate	Total ($)
Lighting and Branch Wiring				
Lighting				
LED lighting fixtures with installation labor	11,447	SF	$10.00	$114,470
Lighting controls				
Lighting controls	11,447	SF	$1.00	$11,447
Branch receptacles	11,447	SF	$0.75	$8,585
Lighting & branch circuitry	11,447	SF	$6.00	$68,682
Communications and Security				
Fire Alarm System				
Fire alarm control panel	1	LS	$8,500.00	$8,500
Initiating devices	11,447	SF	$0.75	$8,585
Circuitry	11,447	SF	$1.25	$14,309
Telecommunications				
Telecom devices & cabling	11,447	SF	$1.50	$17,171
Rough-in	11,447	SF	$1.00	$11,447
Public Announcement System				
Public announcement system	11,447	SF	$2.00	$22,894
Security System				
Security system allowance	11,447	SF	$3.00	$34,341
Door Cell/Holding Lock System				
Door cell lock system (Rough-in only)	7	LOC	$2,500.00	$17,500
Sallyport Control				
Overhead door control feed and connection	2	EA	$2,500.00	$5,000
E-911 (Server)				
UPS unit, disconnect switch and feeder, assumes required.	1	LS	$25,000.00	$25,000
E-911 rough-in	1	LS	$5,000.00	$5,000
Dispatch Room				
Dispatch room rough-in (allow)	1	LS	$7,000.00	$7,000

ELECTRICAL	Quantity	Unit	Rate	Total ($)
Other Electrical Systems				
Antenna System / Satellite Dish				
Rough-in only	1	LS	$2,500.00	$2,500
Training/Large Meeting Room				
Sound system	1	LS	$10,000.00	$10,000
A/V rough-in only	1	LS	$5,000.00	$5,000
Temp power & lights	1	LS	$10,000.00	$10,000
Seismic restraints	1	LS	$4,500.00	$4,500
Fees & Permits	1	LS	$8,500.00	$8,500
Testing and studies	1	LS	$4,000.00	$4,000
Lightning protection	1	LS	$7,500.00	$7,500
			Subtotal For Electrical:	**$759,500**

EQUIPMENT	Quantity	Unit	Rate	Total ($)
Shelving				
High density mobile storage systems in Property & Evidence room; allowance	1	LS	$15,000.00	$15,000
Public Safety Equipment; including gun lockers in prisoner processing areas, detention furniture, secure storage lockers for fire arms, narcotics and large evidence storage	1	LS	$75,000.00	$75,000
Metal detector in prisoner processing area				NIC
Blast resistant storage container in mail processing center				NIC
Weapon discharge unit				NIC
Refrigerators & Freezers in Property Evidence department				NIC
Drying cabinet in Property Evidence department				NIC
Fire Department Equipment				
Allowance for Turn-out gear lockers, rappelling anchors	1	LS	$20,000.00	$20,000

EQUIPMENT	Quantity	Unit	Rate	Total ($)
Kitchen & Laundry Equipment				
Commercial grade kitchen equipments, including (3) refrigerators, (1) freezer, range/oven, hood exhaust, dishwasher, garbage disposal, microwave oven	1	LS	$40,000.00	$40,000
Residential grade Laundry equipment; Washer & Dryer	1	LS	$5,000.00	$5,000
Fitness Equipments				NIC, FF&E
Projection screen in Training room	1	LS	$3,000.00	$3,000
Subtotal For Equipment:				**$158,000**

FURNISHINGS	Quantity	Unit	Rate	Total ($)
Fixed Furnishings				
Roller shades, manual, mecho shades				
Exterior window/storefront	2,628	SF	$12.00	$31,536
Interior window	184	SF	$12.00	$2,208
Staff mailboxes	1	LS	$5,000.00	$5,000
Entrance mats and frames	100	SF	$40.00	$4,000
Fire Extinguisher cabinets	1	LS	$2,500.00	$2,500
Amenities and Convenience Items				
Lockers	32	LF	$450.00	$14,400
Bike storage	1	LS	$2,000.00	$2,000
Moveable Furnishings				
Dayroom/Bedroom/sleep room furnishings				NIC, FF&E
Office desk and chairs				NIC, FF&E
Classroom tables and chairs				NIC, FF&E
Subtotal For Furnishings:				**$61,644**

SPECIAL CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Special Controls and Instrumentation				
Safe in Property/Evidence room	1	EA		NIC, FF&E
Subtotal For Special Construction:				

SELECTIVE BUILDING DEMOLITION	Quantity	Unit	Rate	Total ($)
Building Demolition				
Demolish (E) building in its entirety	6,172	SF	$15.00	$92,580
Hazardous Materials Abatement				
No work in this section				Excluded
Subtotal For Selective Building Demolition:				**$92,580**

SITE PREPARATION	Quantity	Unit	Rate	Total ($)
Site Demolition				
Demolish (E) retaining wall down to foundation	1,392	SF	$10.00	$13,920
Site Clearing and Demolition				
Allowance for site preparation/ protection	10,000	SF	$3.00	$30,000
Allowance for erosion control	10,000	SF	$1.50	$15,000
Earthwork				
Site grading/cut & fill at driveway	1,445	CY	$35.00	$50,571
Hazardous Materials Abatement				Excluded
Subtotal For Site Preparation:				**$109,491**

SITE IMPROVEMENT	Quantity	Unit	Rate	Total ($)
Vehicular Paving				
12" Concrete apron at Apparatus bay	820	SF	$16.00	$13,120
12" Concrete at Vehicle ramp down	790	SF	$16.00	$12,640
PD/Staff parking including curbs	1,880	SF	$10.00	$18,800
Curbs - allowance	130	LF	$30.00	$3,900
Striping and pavement marking	3,490	SF	$0.35	$1,222
Pedestrian Paving				
Concrete sidewalks	100	SF	$15.00	$1,500
Paving at entry	120	SF	$20.00	$2,400
Allowance for work to existing sidewalks	1	LS	$10,000.00	$10,000

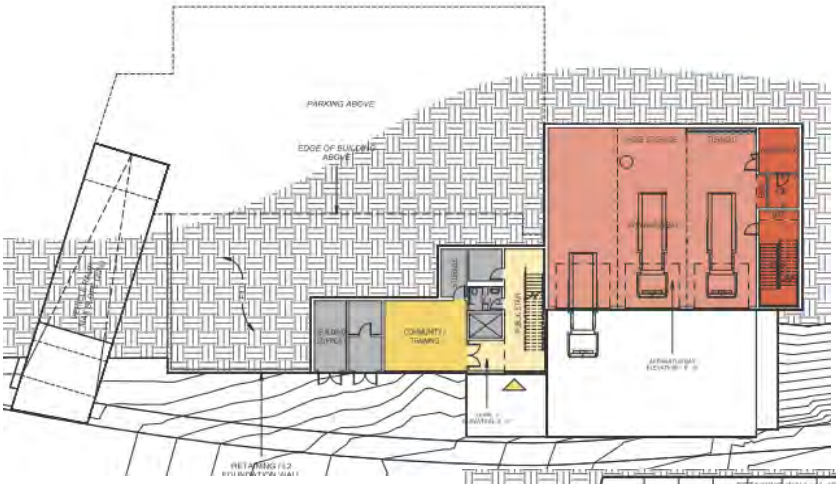
SITE IMPROVEMENT	Quantity	Unit	Rate	Total ($)
Site Structures				
Reinforced concrete retaining wall				
Along driveway, from elev.0' to +/- 25'	50	LF	$840.00	$42,000
Along parking, +/- 25'-0"	86	LF	$1,560.00	$134,160
Reinforced continuous wall footing	136	LF	$200.00	$27,200
Sheeting/Shoring allowance	2,936	SF	$45.00	$132,120
Waterproofing membrane	2,936	SF	$8.00	$23,488
Perforated drain pipe	136	LF	$25.00	$3,400
Site Development				
Flag poles	2	EA	$8,000.00	$16,000
Site furnishings; bollards, trash receptacles	1	LS	$15,000.00	$15,000
Landscaping				
Allowance for landscaping and irrigation	1,000	SF	$7.00	$7,000
Subtotal For Site Improvement:				**$463,950**

SITE MECHANICAL UTILITIES	Quantity	Unit	Rate	Total ($)
Domestic Water				
Allowance for domestic water	1	LS	$25,000.00	$25,000
Sanitary Sewer				
Allowance for sanitary sewer	1	LS	$15,000.00	$15,000
Storm Drainage				
Allowance for storm drainage	1	LS	$35,000.00	$35,000
Fuel Distribution				
Allowance for fuel distribution				NIC
Subtotal For Site Mechanical Utilities:				**$75,000**

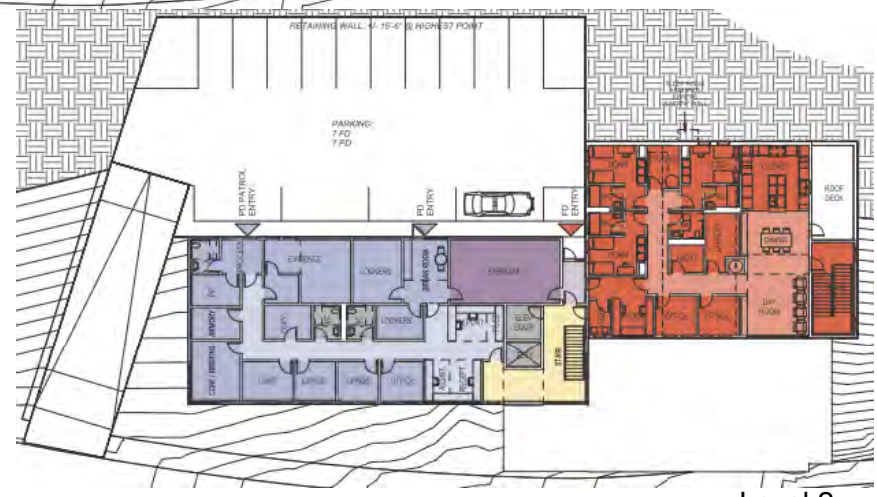
SITE ELECTRICAL UTILITIES	Quantity	Unit	Rate	Total ($)
Electrical Service and Distribution				
Primary electrical ductbank, allow 2-4" empty	100	LF	$80.00	$8,000
Pad mounted transformer				Utility company
Transformer pad	1	LS	$2,500.00	$2,500
Secondary ductbank, allow	60	LF	$200.00	$12,000
Generator duct bank, allow	60	LF	$120.00	$7,200
Site Lighting				
Site lighting & circuitry, allow	1	LS	$35,000.00	$35,000
Site Communications and Security				
Communication ductbank, allow 2-4" empty	150	LF	$80.00	$12,000
Subtotal For Site Electrical Utilities:				**$76,700**

	DELTA	REBUILD OPTION F 5/10/2017			REBUILD OPTION D 1/10/2017		
CSI UniFormat Summary		%	$/SF	$,000	%	$/SF	$,000
Foundations	($8)	3%	$26.80	$317	4%	$26.20	$325
Basement Construction	($254)	4%	$31.76	$376	8%	$50.76	$629
Superstructure	$106	5%	$40.91	$484	5%	$30.45	$378
Enclosure	$203	10%	$75.36	$891	9%	$55.47	$688
Roofing	($20)	3%	$23.57	$279	4%	$24.12	$299
Interior Construction	$147	7%	$57.14	$676	7%	$42.62	$529
Stairs	($52)	1%	$5.33	$63	1%	$9.23	$115
Interior Finishes	$126	4%	$27.99	$331	3%	$16.51	$205
Conveying	$35	2%	$14.80	$175	2%	$11.29	$140
Plumbing	$22	3%	$25.28	$299	4%	$22.32	$277
Heating, Ventilation, & Air Conditioning	$18	9%	$72.39	$856	11%	$67.63	$839
Fire Protection	($10)	1%	$7.50	$89	1%	$8.00	$99
Electrical	($2)	8%	$64.22	$759	10%	$61.40	$761
Equipment	$15	2%	$13.36	$158	2%	$11.53	$143
Furnishings	$18	1%	$5.21	$62	1%	$3.53	$44
Special Construction	($5)	0%	$0.00	$0	0%	$0.40	$5
Selective Building Demolition	$3	1%	$7.83	$93	1%	$7.20	$89
Subtotal - Building Construction	*$343*	*65%*	*$499.42*	*$5,907*	*71%*	*$448.65*	*$5,563*
Site Preparation	$9	1%	$9.26	$109	1%	$8.06	$100
Site Improvement	$376	5%	$39.23	$464	1%	$7.11	$88
Site Mechanical Utilities		1%	$6.34	$75	1%	$6.05	$75
Site Electrical Utilities		1%	$6.49	$77	1%	$6.19	$77
Subtotal - Sitework	*$385*	*8%*	*$61.31*	*$725*	*4%*	*$27.41*	*$340*
Total - Building and Sitework Construction	*$729*	*73%*	*$560.74*	*$6,632*	*75%*	*$476.06*	*$5,903*
Bonds & Insurance	$33	2%	$14.02	$166	2%	$10.71	$133
General Conditions	($15)	7%	$57.48	$680	9%	$56.06	$695
Contractor's Overhead & Profit	$34	4%	$28.45	$336	4%	$24.43	$303
Contingency for Design Development	$78	9%	$66.07	$781	9%	$56.73	$703
Cost Escalation (to start date of construction)	$344	5%	$41.40	$490	2%	$11.78	$146
TOTAL CONSTRUCTION BUDGET	***$1,201***	***100%***	***$768.15***	***$9,085***	***100%***	***$635.76***	***$7,883***
GROSS FLOOR AREA	***(573 SF)***			***11,827 SF***			***12,400 SF***

CSI UniFormat Summary



Level 1



Level 2

Conceptual Cost Plan

Option EE - Alternate Site

Kensington Fire Station

Control Quantities
Option EE - Alternate Site Summary
Detailed Cost Breakdown

May 11, 2017

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Enclosed Areas	
Level 1	4,900
Level 2	7,241
Subtotal of Enclosed Area	12,141
Covered Area	
Roof Overhang	-
Subtotal of Covered Area at half value	-
Total of Gross Floor Area	12,141

CONTROL QUANTITIES				Ratio to Gross Area
Number of stories (x1,000)		2	EA	0.165
Gross Area		12,141	SF	1.000
Enclosed Area		12,141	SF	1.000
Covered Area		-	SF	0.000
Footprint Area		4,900	SF	0.404
Volume		179,992	CF	14.825
Gross Wall Area		13,017	SF	1.072
Finished Wall Area		11,265	SF	0.928
Retaining Wall Area		6,050	SF	0.498
Windows or Glazing Area	13%	1,752	SF	0.144
Roof Area - Flat		7,241	SF	0.596
Roof Area - Sloping		-	SF	0.000
Roof Area - Total		7,241	SF	0.596
Roof Glazing Area		-	SF	0.000
Interior Partition Length		1,115	LF	0.092
Elevators (x10,000)		1	EA	0.824
Plumbing Fixtures (x1,000)		33	EA	2.718

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CSI UniFormat Summary	*12,141 SF*	*%*	*$/SF*	*$,000*
Foundations		3%	$28.18	$342
Basement Construction		8%	$68.94	$837
Superstructure		5%	$39.54	$480
Enclosure		7%	$61.92	$752
Roofing		3%	$24.75	$300
Interior Construction		6%	$48.92	$594
Stairs		1%	$5.19	$63
Interior Finishes		3%	$28.91	$351
Conveying		2%	$14.41	$175
Plumbing		3%	$27.92	$339
Heating, Ventilation, & Air Conditioning		9%	$75.27	$914
Fire Protection		1%	$7.50	$91
Electrical		8%	$65.66	$797
Equipment		2%	$13.84	$168
Furnishings		1%	$5.04	$61
Special Construction		0%	$0.00	$0
Selective Building Demolition		0%	$0.00	$0
Subtotal - Building Construction		*60%*	*$515.98*	*$6,264*
Site Preparation		2%	$16.13	$196
Site Improvement		9%	$74.88	$909
Site Mechanical Utilities		1%	$7.82	$95
Site Electrical Utilities		1%	$8.10	$98
Other Site Construction		0%	$0.00	$0
Subtotal - Sitework		*13%*	*$106.93*	*$1,298*
Total - Building and Sitework Construction		*73%*	*$622.91*	*$7,563*
Bonds & Insurance	2.50%	2%	$15.57	$189
General Conditions	10.00%	7%	$63.85	$775
Contractor's Overhead & Profit	4.50%	4%	$31.60	$384
Subtotal		*86%*	*$733.94*	*$8,911*
Contingency for Design Development	10.00%	9%	$73.39	$891
Cost Escalation (to start date of construction)	5.70%	5%	$46.01	$559
TOTAL CONSTRUCTION BUDGET	***July 2018***	***100%***	***$853.34***	***$10,360***

NOTE: Inclusions and Exclusions listed in the Commentary Section.

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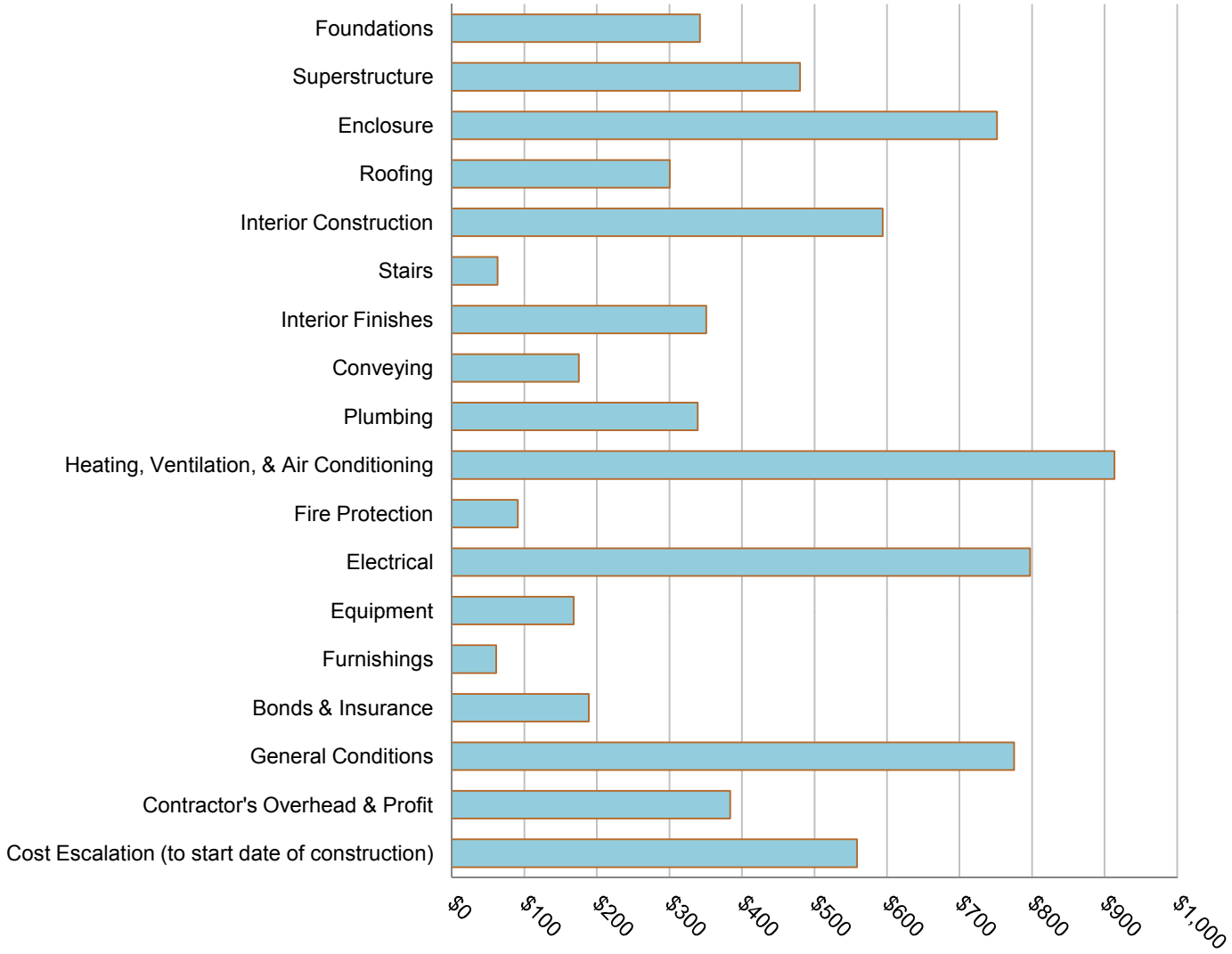
CSI UniFormat Summary



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FOUNDATIONS	Quantity	Unit	Rate	Total ($)
Standard Foundations				
Cast in place reinforced concrete grade beams/footings/pile caps	12,141	GSF	$8.00	$97,128
Special Foundations				
Drilled pier	12,141	GSF	$8.00	$97,128
Mobilization and demobilization	1	LS	$15,000.00	$15,000
Testing	1	LS	$10,000.00	$10,000
Reinforced concrete slab on grade				
6" thick, typical	4,501	SF	$12.00	$54,012
12" thick at Apparatus bay	2,740	SF	$16.00	$43,840
Miscellaneous				
Allowance for equipment pads	1	LS	$10,000.00	$10,000
Elevator pit	1	EA	$15,000.00	$15,000
			Subtotal For Foundations:	**$342,108**

BASEMENT CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Basement Excavation - allowance				
Excavate & haul away basement material (assume partial cut)	2,490	CY	$35.00	$87,151
Sheeting/Shoring allowance	6,050	SF	$45.00	$272,250
Basement Walls				
Basement wall , 18" thick	6,050	SF	$60.00	$363,000
Reinforced continuous wall footing	250	LF	$200.00	$50,000
Waterproofing membrane	6,050	SF	$8.00	$48,400
Perforated drain pipe	250	LF	$25.00	$6,250
Dewatering	1	LS	$10,000.00	$10,000
			Subtotal For Basement Construction:	**$837,051**

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SUPERSTRUCTURE	Quantity	Unit	Rate	Total ($)
Vertical Structure				
Columns/post	12,141	GSF	$5.00	$60,705
Floor Structure (level 2)				
2" thick light weight concrete over plywood and wood framing	4,900	SF	$35.00	$171,500
Reinforced concrete curb at walls surrounding the apparatus bays, turnout room and workshop, 12" high	180	LF	$35.00	$6,300
Roof Structure				
Plywood over wood framing	7,241	SF	$30.00	$217,230
Miscellaneous				
Miscellaneous metal	12,141	GSF	$1.50	$18,212
Miscellaneous rough carpentry	12,141	GSF	$0.50	$6,071
			Subtotal For Superstructure:	**$480,017**

ENCLOSURE	Quantity	Unit	Rate	Total ($)
Exterior Wall Framing, Furring and Insulating				
Exterior wall system; composite wall panel or fiber cement cladding including sealants, blocking, flashings etc	4,627	SF	$35.00	$161,945
Backup system; 6" Metal stud, insulation, air/vapor barrier	3,583	SF	$16.00	$57,322
Full height CMU wall at armory and evidence storage	1,044	SF	$30.00	$31,332
Drywall to interior face of exterior wall	4,627	SF	$4.00	$18,508
Exterior Windows				
Aluminum framed storefront system	1,392	SF	$115.00	$160,080
Aluminum framed punched windows	360	SF	$95.00	$34,200
Premium for operable window	12	EA	$500.00	$6,000
Premium for ballistic glazing at PD secure areas and PD Chief office	180	SF	$150.00	$27,000
Aluminum sunshade screens over areas of glazing on West & South elevation	1,752	SF	$25.00	$43,800

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ENCLOSURE	Quantity	Unit	Rate	Total ($)
Exterior Doors, Frames and Hardware				
Apparatus bay sectional doors; 14' x 14'	3	EA	$45,000.00	$135,000
Police garage doors/gate	1	LS	$20,000.00	$20,000
Aluminum entry doors, double leaf, ballistic proof @ PD entry	2	PR	$10,000.00	$20,000
FD Entry & Roof deck	2	EA	$6,000.00	$12,000
Double leaf door at building support	2	PR	$3,500.00	$7,000
Allowance for specialty hardware at entrance doors	1	LS	$5,000.00	$5,000
Balustrades, Parapets & Roof Screens				
Guardrail/handrail at roof deck	36	LF	$350.00	$12,600
Soffits				
Exterior soffit to roof overhangs				NIC, None
			Subtotal For Enclosure:	**$751,787**

ROOFING	Quantity	Unit	Rate	Total ($)
Roof or deck traffic surfaces				
Membrane roofing over tapered insulation, typical	7,241	SF	$18.00	$130,338
Pedestrian membrane traffic coating on exterior deck over occupied space	294	SF	$14.00	$4,116
Pedestrian paving at roof deck - allowance	294	SF	$25.00	$7,350
Roof Parapet/Coping	472	LF	$30.00	$14,160
Roof Openings				
Skylight, allow 3% of roof area	217	SF	$200.00	$43,446
Miscellaneous work				
Mechanical roof screen - allowance	340	LF	$250.00	$85,000
Caulking and sealants	12,141	GSF	$0.50	$6,071
Roof ladder/ hatches/ accessories	1	LS	$10,000.00	$10,000
			Subtotal For Roofing:	**$300,481**

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INTERIOR CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Interior Partitions				
Steel light gauge or wood framing with acoustic treatments to achieve STC rating				
At general office space, STC40	4,440	SF	$18.00	$79,920
At office equipment/workroom/computer room spaces/meeting/conference/training rooms to adjoining areas, STC45	2,508	SF	$18.00	$45,144
At sleep rooms and toilet room to adjoining spaces, STC 50-55	2,400	SF	$22.00	$52,800
At electrical transformer, stairwall, elevator shaft, adjacent wall to apparatus, STC65	1,653	SF	$26.00	$42,978
Abuse resistant gypsum board over security mesh for detention interview rooms	612	SF	$42.00	$25,704
Full height CMU wall at armory and evidence storage	876	SF	$36.00	$31,536
Backing and blocking	12,141	GSF	$1.00	$12,141
Interior glazed windows/partitions at conference; allow 8'-0"high	184	SF	$85.00	$15,640
2-Way mirror in Interview room - allowance	2	EA	$2,500.00	$5,000
Interior Doors				
Solid core wood doors in hollow metal frames				
Single leaf	40	EA	$2,000.00	$80,000
Double leaf	2	PR	$3,600.00	$7,200
Hollow metal doors in secure interview rooms, evidence storage and armory	5	EA	$2,400.00	$12,000
Premium for specialty door hardwares; card key locking system and automatic openers where required	1	LS	$10,000.00	$10,000
Fittings				
Protective guards, barriers and bumpers - allowance	12,141	GSF	$0.25	$3,035
Prefabricated compartments and accessories				
Mirrors in exercise/fitness	60	SF	$30.00	$1,800
Toilet Accessories, single stall	8	RM	$750.00	$6,000
Shower stall and accessories	7	EA	$2,500.00	$17,500
Shelving and Millwork				
Janitor's shelf and mop rack	1	EA	$500.00	$500

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INTERIOR CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Cabinets and Countertops				
Counter tops/desk at reception and radio workstation; level1 & 2	82	LF	$250.00	$20,500
Casework at kitchen, with stainless steel countertop	60	LF	$750.00	$45,000
Bullet resistant transaction window 48"wide x 48"high; complete with stainless steel countertop 48" x 18" x 1-1/2" and stainless steel recessed tray with bullet trap	2	EA	$7,500.00	$15,000
Allowance for miscellaneous casework	12,141	GSF	$2.00	$24,282
Chalkboards and Graphics				
Directional/wayfinding signs	12,141	GSF	$1.50	$18,212
Door signage	47	EA	$150.00	$7,050
Building signage - exterior	1	LS	$10,000.00	$10,000
Chalkboards/tackboards and mapping wall	1	LS	$5,000.00	$5,000
Subtotal For Interior Construction:				**$593,942**

STAIRS	Quantity	Unit	Rate	Total ($)
Stair Construction				
Egress stair; metal pan with concrete fill	2	FLT	$25,000.00	$50,000
Rubber finish to treads and landings	2	FLT	$1,500.00	$3,000
Fire Pole	1	LS	$10,000.00	$10,000
Subtotal For Stairs:				**$63,000**

INTERIOR FINISHES	Quantity	Unit	Rate	Total ($)
Floor Finishes				
Durable quality carpet tile in sleep rooms	540	SF	$6.50	$3,510
Resilient sheet flooring in Offices, Living, Storage, Kitchen & Training room	6,207	SF	$8.00	$49,656
Stained concrete in Apparatus bays	2,767	SF	$2.50	$6,918
Athletic flooring tiles in exercise/fitness room	500	SF	$10.00	$5,000
Tile or similar in Lobbies	1,294	SF	$20.00	$25,880
Ceramic floor tile and base in bathrooms & locker room	833	SF	$18.00	$14,994
Water vapor emission control - allowance	7,247	SF	$3.50	$25,365

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INTERIOR FINISHES	Quantity	Unit	Rate	Total ($)
Wall finishes				
Paint to interior walls	19,670	SF	$2.00	$39,340
Ceramic tile in bathrooms & showers; wainscot at wet walls only, full height in showers	2,460	SF	$20.00	$49,200
Painted plywood wainscot at apparatus bays, 8' high	1,280	SF	$5.00	$6,400
Protective wainscot at primary operational circulation, 48"high	1,568	SF	$15.00	$23,520
Ceiling Finishes				
Gypsum board ceilings, painted; 30%	2,714	SF	$18.00	$48,859
Lay-in ACT; 70%	6,334	SF	$5.00	$31,668
Abuse resistant gypsum board over security mesh for detention interview rooms	326	SF	$25.00	$8,150
Paint exposed ceiling in apparatus bay	2,767	SF	$2.00	$5,534
Allowance for soffits	200	LF	$35.00	$7,000
Subtotal For Interior Finishes:				**$350,993**

CONVEYING	Quantity	Unit	Rate	Total ($)
Elevators and Lifts				
Machine roomless traction elevator, 2 stop	1	EA	$175,000.00	$175,000
Subtotal For Conveying:				**$175,000**

PLUMBING	Quantity	Unit	Rate	Total ($)
Plumbing Fixtures				
Water closet, floor, manual flush	8	EA	$1,700.00	$13,600
Lavatory, wall hung, lever faucet	8	EA	$1,900.00	$15,200
Kitchen sink, dbl, SS faucet, disposer	2	EA	$2,000.00	$4,000
Mop sink, floor type, trim	2	EA	$2,100.00	$4,200
Service sink, wall type, ECI, faucet	1	EA	$1,750.00	$1,750
Shower receptor, drain, valve & head	4	EA	$3,000.00	$12,000
Laundry box, recessed w/ WHA	2	EA	$850.00	$1,700
Hose bibb - interior type	2	EA	$250.00	$500
Hose bibb - exterior type	4	EA	$590.00	$2,360
Dishwasher (connections only)	1	EA	$325.00	$325
Miscellaneous fixtures	12,141	GSF	$2.00	$24,282

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PLUMBING	Quantity	Unit	Rate	Total ($)
Plumbing Equipment				
Gas water heater w/ flue	1	EA	$15,750.00	$15,750
Recirculation pump w/ aqua stat	1	EA	$2,200.00	$2,200
Expansion tank	1	EA	$450.00	$450
Miscellaneous equipment	12,141	SF	$2.00	$24,282
Domestic Water Distribution				
Domestic water system	12,141	SF	$2.60	$31,567
Cold water rough-in for fixture	33	EA	$575.00	$18,975
Hot water rough-in for fixture	25	EA	$360.00	$9,000
Sanitary Waste				
Sanitary waste & vent systems	12,141	SF	$2.50	$30,353
Rain Water Drainage				
Rain water drainage system	12,141	SF	$1.50	$18,212
Gutters & downspouts (by others)	728	LF	$36.00	$26,208
Other Plumbing Systems				
Compressed Air Systems				
Air compressor, 120 gallon, 10 HP	1	EA	$10,500.00	$10,500
Air dryer, filters, etc.	2	EA	$780.00	$1,560
CA piping, drops - complete	6	LS	$5,250.00	$31,500
Natural Gas System				
Gas service & meter (by Utility Co.)				NIC, Not required
Natural gas system				NIC, Not required
Condensate Drainage				
Condensate drain system	12,141	SF	$0.80	$9,713
Trade Specialties				
Testing & sterilization	1	LS	$5,500.00	$5,500
Pipe sleeves, fire stopping, etc.	1	LS	$7,500.00	$7,500
Miscellaneous	1	LS	$15,750.00	$15,750
			Subtotal For Plumbing:	**$338,935**

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HEATING, VENTILATION, & AIR-CONDITIONING	Quantity	Unit	Rate	Total ($)
Energy Supply				
Boiler Plant	2	EA	$17,500.00	$35,000
Heat Generating Systems				
Radiant heat panels	8	EA	$2,200.00	$17,600
Electric infrared heaters (Bay doors)	3	EA	$1,500.00	$4,500
Boiler flue through roof	2	EA	$500.00	$1,000
Cooling Systems				
Air Handling Equipment				
RTU with heat recovery option	1	EA	$100,000.00	$100,000
Distribution Systems				
Galvanized sheet metal ductwork	12,197	LB	$12.50	$152,465
Duct insulation	7,928	SF	$3.50	$27,749
Miscellaneous duct accessories	1	LS	$12,000.00	$12,000
Sound Attenuator	1	LS	$15,000.00	$15,000
Registers, grilles and diffusers	69	EA	$450.00	$31,023
Dryer vent	1	EA	$300.00	$300
Terminal and Package Units				
VRF system	42	TON	$2,560.00	$108,608
VRF HR branch selectors	2	EA	$4,800.00	$9,600
VRF fan coil unit, ducted	42	EA	$2,500.00	$106,063
RS/RL/HR lines - (CU>BS)	1,485	LF	$32.50	$48,259
Outdoor condensing unit, 1 1/2 ton	2	EA	$2,950.00	$5,900
Indoor fan coil unit, wall, 1 1/2 ton	2	EA	$1,550.00	$3,100
RS/RL lines - complete	110	LF	$25.00	$2,750
Controls and Instrumentation				
Controls & instrumentation	12,141	SF	$6.00	$72,846
Systems Testing and Balancing				
Systems start-up & testing	1	LS	$7,500.00	$7,500
Air systems balancing	12,141	SF	$0.50	$6,071
Other HVAC Systems and Equipment				
Apparatus bay exhaust fan	3	EA	$5,000.00	$15,000
Decon room exhaust fan	1	EA	$3,000.00	$3,000
Turnout room exhaust fan	1	EA	$2,500.00	$2,500
Work shop area exhaust fan	1	EA	$3,000.00	$3,000
Vehicle exhaust system - complete	1	LS	$50,000.00	$50,000

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HEATING, VENTILATION, & AIR-	Quantity	Unit	Rate	Total ($)
Trade Specialties				
HVAC shutoff sensors for all windows and doors	12	EA	$1,500.00	$18,000
Rigging & hoisting	1	LS	$30,000.00	$30,000
Pipe sleeves, fire stopping, etc.	1	LS	$5,000.00	$5,000
Miscellaneous	1	LS	$20,000.00	$20,000
Subtotal For Heating, Ventilation, & Air-Conditioning:				**$913,833**

FIRE PROTECTION	Quantity	Unit	Rate	Total ($)
Sprinklers				
Wet sprinkler system - complete including pump	12,141	GSF	$7.50	$91,058
Subtotal For Fire Protection:				**$91,058**

ELECTRICAL	Quantity	Unit	Rate	Total ($)
Electrical Service and Distribution				
Electrical service & distribution equipment, feeders & grounding	12,141	SF	$15.50	$188,186
150KW generator w/250 gal belly tank, ATS and feeder to electrical distribution system	12,141	SF	$8.50	$103,199
Apparatus bay door	3	EA	$1,500.00	$4,500
Elevator	1	EA	$3,500.00	$3,500
Mechoshade	1	LS	$1,500.00	$1,500
Vehicle exhaust	1	LS	$2,500.00	$2,500
CRAC	1	EA	$3,000.00	$3,000
Air compressor	1	EA	$1,500.00	$1,500
Garbage disposal @ kitchen	1	EA	$500.00	$500
Range/Oven	1	EA	$650.00	$650
Hood	1	EA	$350.00	$350
Dishwasher	1	EA	$500.00	$500
Equipment wiring not yet detailed	12,141	SF	$3.00	$36,423

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ELECTRICAL	Quantity	Unit	Rate	Total ($)
Lighting and Branch Wiring				
Lighting				
LED lighting fixtures with installation labor	12,141	SF	$10.00	$121,410
Lighting controls				
Lighting controls	12,141	SF	$1.00	$12,141
Branch receptacles	12,141	SF	$0.75	$9,106
Lighting & branch circuitry	12,141	SF	$6.00	$72,846
Communications and Security				
Fire Alarm System				
Fire alarm control panel	1	LS	$8,500.00	$8,500
Initiating devices	12,141	SF	$0.75	$9,106
Circuitry	12,141	SF	$1.25	$15,176
Telecommunications				
Telecom devices & cabling	12,141	SF	$1.50	$18,212
Rough-in	12,141	SF	$1.00	$12,141
Public Announcement System				
Public announcement system	12,141	SF	$2.00	$24,282
Security System				
Security system allowance	12,141	SF	$3.00	$36,423
Door Cell/Holding Lock System				
Door cell lock system (Rough-in only)	7	LOC	$2,500.00	$17,500
Sally port Control				
Overhead door control feed and connection	2	EA	$2,500.00	$5,000
E-911 (Server)				
UPS unit, disconnect switch and feeder, assumes required.	1	LS	$25,000.00	$25,000
E-911 rough-in	1	LS	$5,000.00	$5,000
Dispatch Room				
Dispatch room rough-in (allow)	1	LS	$7,000.00	$7,000
Other Electrical Systems				
Antenna System / Satellite Dish				
Rough-in only	1	LS	$2,500.00	$2,500
Training/Large Meeting Room				
Sound system	1	LS	$10,000.00	$10,000
A/V rough-in only	1	LS	$5,000.00	$5,000
Temp power & lights	1	LS	$10,000.00	$10,000
Seismic restraints	1	LS	$4,500.00	$4,500
Fees & Permits	1	LS	$8,500.00	$8,500
Testing and studies	1	LS	$4,000.00	$4,000
Lightning protection	1	LS	$7,500.00	$7,500
			Subtotal For :	**$797,149**

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EQUIPMENT	Quantity	Unit	Rate	Total ($)
Shelving				
High density mobile storage systems in Property & Evidence room; allowance	1	LS	$25,000.00	$25,000
Public Safety Equipment; including gun lockers in prisoner processing areas, detention furniture, secure storage lockers for fire arms, narcotics and large evidence storage	1	LS	$75,000.00	$75,000
Metal detector in prisoner processing area				NIC
Blast resistant storage container in mail processing center				NIC
Weapon discharge unit				NIC
Refrigerators & Freezers in Property Evidence department				NIC
Drying cabinet in Property Evidence department				NIC
Fire Department Equipment				
Allowance for Turn-out gear lockers, rappelling anchors	1	LS	$20,000.00	$20,000
Kitchen & Laundry Equipment				
Commercial grade kitchen equipments, including (3) refrigerators, (1) freezer, range/oven, hood exhaust, dishwasher, garbage disposal, microwave oven	1	LS	$40,000.00	$40,000
Residential grade Laundry equipment; Washer & Dryer	1	LS	$5,000.00	$5,000
Fitness Equipments				NIC, FF&E
Projection screen in Training room	1	ls	$3,000.00	$3,000
			Subtotal For Equipment:	**$168,000**

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FURNISHINGS	Quantity	Unit	Rate	Total ($)
Fixed Furnishings				
Roller shades, manual, mecho shades				
Exterior window/storefront	1,752	SF	$12.00	$21,024
Interior window	184	SF	$12.00	$2,208
Staff mailboxes	1	LS	$5,000.00	$5,000
Entrance mats and frames	100	SF	$40.00	$4,000
Fire Extinguisher cabinets	1	LS	$2,500.00	$2,500
Amenities and Convenience Items				
Lockers	32	LF	$450.00	$14,400
Bike storage	1	LS	$2,000.00	$2,000
Wire mesh lockers at turnout room	1	LS	$10,000.00	$10,000
Moveable Furnishings				
Dayroom/Bedroom/sleep room furnishings				NIC, FF&E
Office desk and chairs				NIC, FF&E
Classroom tables and chairs				NIC, FF&E
Subtotal For Furnishings:				**$61,132**

SPECIAL CONSTRUCTION	Quantity	Unit	Rate	Total ($)
Special Structures				
Safe in Property/Evidence room	1	EA		NIC, FF&E
Subtotal For Special Construction:				

SELECTIVE BUILDING DEMOLITION	Quantity	Unit	Rate	Total ($)
No work in this section				
Subtotal For Selective Building Demolition:				

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SITE PREPARATION	Quantity	Unit	Rate	Total ($)
Site Clearing and Demolition				
Allowance for site preparation/ protection	17,300	SF	$3.00	$51,900
Allowance for erosion control	17,300	SF	$1.50	$25,950
Earthwork				
Site grading/cut at PD driveway/parking	3,066	CY	$35.00	$107,327
Site grading/fill at App Bay egress apron and building entry	305	CY	$35.00	$10,669
Hazardous Materials Abatement				Excluded
			Subtotal For Site Preparation:	**$195,845**

SITE IMPROVEMENT	Quantity	Unit	Rate	Total ($)
Vehicular Paving				
12" Concrete apron at Apparatus bay	2,025	SF	$16.00	$32,400
12" Concrete at Vehicle ramp down	1,465	SF	$16.00	$23,440
PD/Staff parking including curbs	5,600	SF	$10.00	$56,000
Curbs - allowance	130	LF	$30.00	$3,900
Striping and pavement marking	9,090	SF	$30.00	$272,700
Pedestrian Paving				
Building entry area	1,045	SF	$20.00	$20,900
Site Structures				
Reinforced concrete retaining wall				
Along driveway, at both edge +/- 3'-0"	148	LF	$180.00	$26,640
Along parking, +/- 14'-0"	174	LF	$840.00	$146,160
Along Apparatus Bay egress apron, elev -2' to 10'	32	LF	$360.00	$11,520
Reinforced continuous wall footing	354	LF	$200.00	$70,800
Sheeting/Shoring allowance	3,072	SF	$45.00	$138,240
Waterproofing membrane	3,072	SF	$8.00	$24,576
Perforated drain pipe	354	LF	$25.00	$8,850
Site walls/ steps at entrance	100	LF	$350.00	$35,000

Architectural Basis of Design Criteria		
	Description	**Comments**
The following system descriptions are for determining the range of costs. Actual design & systems selection to occur during the schematic design phase.		
FOUNDATIONS		
Seismic Design	Seismic design for essential services facility.	
Foundations and Retaining Walls	Cast in place reinforced concrete over drilled piers.	Option EE: Terraced retaining wall along parking East edge should be used as B.O.D. if it will be siginificantly less expensive than single 16' height retaining wall.
Slab On Grade	Cast in place reinforced concrete. High strength 12" thick reinforced concrete in apparatus bays and exterior fire apparatus apron.	
Concrete Curbs	Provide a 12" high concrete curb base at all walls surrounding the apparatus bays, turnout room, and workshop.	
SUPERSTRUCTURE		
Seismic Design	Seismic design for essential services facility.	
Vertical Structure	Light gauge metal or wood platform framing	
Floor & Roof Construction	Floors: 2" of light weight concrete over plywood over wood framing. Roof: Plywood over over wood framing.	
EXTERIOR ENCLOSURE		
Exterior Walls	Exterior Wall framing is to be steel or wood stud framing. Thermal insulation is to achieve R28 or better value. Assume a medium grade cladding assembly with self adhering sheet waterproofing over dense glass panels. For exterior cladding materials, assume medium-cost cladding systems such as: • Through-color fiber cement panels, • Composite metal siding system. • Fiber cement board siding. For attachment systems assume concealed fasteners.	
Exterior Openings: Windows	Windows shall be commercial grade aluminum frames. Assume thirty percent of the exterior walls are glazed surfaces. Approximately 30% of the window area is to be open able. The doors and windows are to have HVAC Shut-off sensors. Glazing , except ballistic resistant, is to be dual-glazed low-e glass to meet energy code criteria. Bullet resistant glazing is to be provided in portions of the building envelope that are identified as a being in security threat. The PD secure areas and the PD chief's office is to have bullet resistant glazing.	

Architectural Basis of Design Criteria		
	Description	**Comments**
Exterior Openings: Doors	The apparatus bay doors will be 14' wide by 14' high aluminum sectional door these door will have glass lites in all sections with the exception of the bottom sections. AppBay doors will be equiped with rapid electric motor operators. Exterior doors shall be hollow metal with hollow metal frames. The public lobby door will be a glazed aluminum storefront system. Door hardware is to be accessible-rated and are to utilize card key locks. HVAC Shut-off Sensors for all Windows and Doors.	
Exterior Openings: Sunshades	Assume exterior aluminum sunshade screens over areas of glazing on the west and south elevations.	
Exterior Roofing -	Assume: 100% of the roof area Tapered roof deck insulation (polyisocyanurate) with a thickness achieving a thermal rating of R25	
Exterior Roofing - "SOLAR"	Assume 80% of the "FLAT" membrane roof area to be designed to accommodate solar panels. Driver: To provide an economical system that develops renewable energy to comply with pending California energy code requirements for buildings to consume net zero energy (NZE).	
Exterior Roofing CLERESTORY	Assume 3% of the roof area to have a dual glazed clerestory windows and/or skylights to provide natural day lighting.	
Exterior Soffits and Overhangs	Assume a medium grade soffit cladding such as: • Fiber cement panel. • Cement plaster.	
Exterior Deck Traffic Toppings	Pedestrian membrane traffic toppings on exterior decks over occupied space.	
Exterior Storefront / Curtain Wall Systems	Doors and windows at the main public entry are to be a reinforced storefront system with ballistic resistant glazing to resist forced entry.	

Architectural Basis of Design Criteria		
	Description	**Comments**
INTERIOR CONSTRUCTION		
Partitions	Provide for steel light gauge or wood framing with acoustic treatments to achieve the STC rating stated in the Sound Isolation Requirement Table (below).	
	Partitions at all private offices, conference rooms, interview rooms and sleeping rooms to be to underside of deck above.	
	Partitions and ceilings in the detention interview rooms area shall have abuse resistant gypsum board over security mesh. For the Armory and Evidence Storage provide Full height CMU walls.	
Interior Doors	The doors are to be solid core wood doors with transparent finish in hollow metal frames. Hollow metal doors in secure interview rooms, evidence storage and armory.	
Door Hardware	Door hardware is to be accessible rated and have card key locking systems where required. Sound seals are to be provided for all conference rooms, interview rooms, private offices and sleeping rooms.	
	Doors at public entries are to have automatic openers where required.	
Interior Windows	Windows shall be hollow metal frame with hollow metal windows. Transaction window at public lobby is to be bullet resistant rated glazing. Assume 150 SF of interior windows.	
Interior Storefront Windows	Glazing at PD Conference Room.	
Stairs	Stairs shall be steel framed stairs with concrete treads. The riser face is to be steel. The railings are to be a durable metal system.	
Wall Finishes	Interior Finished Walls shall be painted gypsum board with level 4 plaster finish. Painted wall surfaces.	
Wall Finishes Wainscot in Wet Locations	In wet locations provide mid range cost ceramic tile wainscot. The ceramic tile is to be installed on only the wet walls. The height of the ceramic tile wainscot will be as required by code.	
Wainscot in Apparatus Bays.	Apparatus Bays shall have 8'-0" high painted plywood wainscot.	
Wainscot in corridors.	Primary operational circulation areas are to have protective wainscot to minimum 48" high abuse resistant gypsum board.	

Architectural Basis of Design Criteria		
	Description	**Comments**
Floor Finishes	Durable quality carpet tiles in the sleep rooms. Resilient rubber sheet flooring in the offices, living areas, storage rooms, kitchen and training room. Sealed concrete in the Apparatus Bays Atheletic flooring tiles in the Fitness Room Apparatus Bays walls will have a 12" high exposed concrete curb base.	
Ceiling Finishes	Ceilings assume 30% of the surfaces to be painted gypsum board with level 4 finish and 70% of the areas are to be medium-grade regular lay in acoustic tile.	App Bay & Support Spaces shall have exposed structure, painted.
Interior Casework	Architectural wood casework • Premium grade quality casework with premium level plastic laminate. In selected areas there may be areas of solid wood, stained and sealed casework. • Countertops to be premium level plastic laminate. In high use areas the counter tops be a stainless steel. (Kitchen)	
Interior Casework Public Lobby Counter.	The Lobby Entry Counter is to be: • Premium grade quality casework with wood Veneer with transparent finish. Provide layer of bullet resistant material on vertical surfaces. • Counter tops to be high density epoxy resin or quartz composite solid surface material. At the bullet resistant glazing provide stainless steel transaction trays.	
Interior Casework For In-Custody Areas	The casework in the in custody areas are to be Institutional grade Stainless Steel facings and countertops. Note: Casework and accessories are to be certified for use in holding areas.	
SPECIALTIES		
Fittings	Toilet compartments shall be stainless steel or monolithic plastic floor supported systems. The design layout of the fixture compartments are to be such as there are not direct sight lines for privacy.	
	Lockers 24” x 24” full height wardrobe lockers with top shelf with quad power receptacles for charging flashlights and radios. Lockers shall have sloped tops in the staff locker rooms or closed soffits to the ceiling above.	
	Custom storage shelving in the armory	
	Storage shelving and wire mesh partitions in property & evidence	

Architectural Basis of Design Criteria		
	Description	**Comments**
Shelving	High density mobile storage systems are to be provided in the property and evidence storage room	
Elevator	For conveying elevator assume machine roomless electric traction elevator.	
Communications & Security	In conference rooms and the training room provide a 60" Flat Screen Monitor, adjustable bracket and concealed cable pathways and power from the center of the conference room table to the wall monitor.	
Public Safety Equipment	*Metal Detector in the prisoner processing area*	*N.I.C.*
	Blast resistant Storage Container in the mail processing area.	*N.I.C.*
	Gun lockers in the prisoner processing area	
	Weapon discharge unit	*N.I.C.*
	Refrigerator(s) & freezers in the Property Evidence Department	*N.I.C.*
	Drying Cabinet in the Property/Evidence Department	*N.I.C.*
	Detention Furniture is to be provide in the in-custody holding areas.	
	Secure storage lockers are to be provided for fire arms, narcotics and large evidence storage. Provide a safe.	
Institutional	IT racks shall be provided in the IT servicer room	
HVAC	Computer Room Air Conditioners (CRAC) mechanical units(s) are to be provided in the IT server room	
Vehicular Equipment	Apparatus vehicle exhaust system in FD apparatus bays.	
	Compressor and air distribution system with ceiling mounted hose racks in the vehicle repair areas and apparatus bays.	
	Parts cleaning equipment in the vehicle repair shop.	*N.I.C.*
Kitchen Equipment	Commercial Grade: Three Refrigerators, One Freezer, Range/Oven, Hood Exhaust, Dishwasher, Garbage Disposal, Microwave Oven	

Architectural Basis of Design Criteria		
	Description	**Comments**
Laundry Equipment	Residential Grade: Washer, Dryer, Laundry Sink.	
Fixed Furnishings	Staff mailboxes	
Window Coverings	Window roller shades (MechoShade) shall be provided at exterior windows and at interior windows of private offices.	
Fixed Furnishings	Countertops at the public transition windows are to be either stainless steel or epoxy resin.	
	Entrance walk-off mats and frames are to be provided at exterior entries.	
Movable Furnishings	*Recycle /composting bins throughout the facility.*	*N.I.C.*
Fitness Equipment	*Not in contract (NIC)*	*N.I.C.*
Special Construction	*A safe is to be provided in the property and evidence storage room.*	*N.I.C.*
Site Furnishings	Bicycle Racks ground mounted for the staff and visitor use.	
MISCELLANEOUS		
Walk-Off Mats	Provide a system of exterior and interior walk-off mats flush with the floor surface directly in front of the main entry doors and immediately after entering the public lobby.	
Flagpoles	Provide two flagpoles, to accommodate a State of California flag and a United States flag, near the public entrance.	
Roof Access	Provide an interior permanent dedicated industrial stair or ladder and access hatches to the roof with roof slope of less than 1:4.	
SIGNAGE		
	All signage must meet the requirements of the Americans with Disabilities Act (ADA) and the most recently adopted provisions of the California Building Code and CCR, title 24, regarding accessibility. Braille lettering and audio signals shall be provided at elevators and where required by codes. Provide prominent multilingual posting of public notices and informational material.	
	Signage shall include interior and exterior building identification, way finding, room identification and code related signage.	

Architectural Basis of Design Criteria		
	Description	**Comments**
SOUND ISOLATION REQUIREMENTS TABLE		
STC Value Of Partition	**Spaces /Uses**	
40	General Office Space to General Office Space Orientation to adjoining areas Telecom AV rooms to adjoining areas	
45	Office Equipment to adjoining areas Workroom to adjoining areas Computer Room Spaces to adjoining areas Conference, Meeting, and Training Spaces to adjoining spaces	
50-55	Toilet room to adjoining spaces, Sleep Rooms	
65	Electrical Transformer to NC 30 space or less Elevator Shaft to NC 30 space or less Hydraulic Elevator Equip. to NC 30 space or less	
TYPICAL CEILING HEIGHT TABLE		
Ceiling Height	**Spaces /Uses**	
8'-6"	Corridors	
8'-6"	Private Offices, Sl;eep Rooms	
9’-10’	Open Plan Offices, Kitchen, Dining, Dayroom	
8'-6" - 9'-0"	Ancillary Spaces	
8'-6" - 9'-0"	Public Corridors	
9’-10’	Public Lobby - This may be expanded to be a two story high space.	
10'-13'	Shop and Equipment Repair Spaces	
10'-13'	Training / Community Room	
per BSCC stds..	Secure Corridors	
per BSCC stds..	Holding Cells	