DETAILED FACILITY STUDY

Replacement of Fire Station 52 & Training Tower and Fire Station 57

VOLUME III

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CITY OF SAN RAFAEL

ESSENTIAL FACILITIES STRATEGIC PLAN

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VOLUME III. DETAILED FACILITY STUDY - REPLACEMENT OF FIRE STATION 52 & TRAINING TOWER AND FIRE STATION 57

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VOLUME III. DETAILED FACILITY STUDY – REPLACEMENT OF FIRE STATION 52 & TRAINING TOWER AND FIRE STATION 57

A. INTRODUCTION

REPLACEMENT OF FIRE STATION 52 AND TRAINING TOWER AT 210 3RD STREET: $13.2M – $14.2M PROJECT BUDGET

Initially, a Space Needs Assessment was developed for a replacement Fire Station 51 that included the Fire Station 52 Engine Company and was combined with the Fire Administration functions and a new Emergency Operations Center (EOC). This replacement headquarters fire station was recommended to be placed on a site near 2nd and D Streets. As the scenario study developed, it became apparent that this stand-alone project combined with a new police station did not develop into a cost-effective solution for improving the seismic safety and operations at Fire Station 52. Combining Fire Station 52 with Fire Station 51 was considered because of the Standards of Cover Report recommendation to combine both units and relocate them closer to the freeway to improve medic response and provide additional truck coverage. It was later determined that locating a fire station near the freeway at 2nd Street would not be feasible because that area of Downtown is designated as a 100-year flood zone by FEMA and not suitable for a fire station location.

The current Fire Station 52 site provides good coverage to the freeway and is one of the larger sites serving the department. In addition, it currently houses the Fire Department's training function. Because of the size and its location, the existing site became the next area of study. A two-company station which could accommodate an engine, medic and a cross-staffed truck company was evaluated for its fit on the existing site. Since Station 52 currently housed the departments training function, a new classroom was added to the station program and a training tower were evaluated at this location as well. This combination of uses proved to fit on the site and meet the following goals:

1. Provided medic coverage closer to the freeway by relocating Medic Company 51 to Fire Station 52.
2. Provided adequate apparatus bay space to house an engine, medic and truck so that the truck company could be cross-staffed by the engine company. This also provided flexibility is adjusting the response capability in the future.
3. Created a South Area medical supply cache to support the companies operating in the south side of the city.
4. Provided adequate space to include a training classroom and a replacement training tower with training grounds.
5. It was determined that this current site was just on the edge of the 100-year floor zone as established by FEMA and could be developed at least 1-foot above the flood level as required for essential facilities.

A two-company prototypical space needs outline was adapted specifically for this site which is the basis for the site layout and project budget which follows. A total of two stations were developed from this prototype to provide this response capacity. One is located in the southern section of the town; Fire Station 52 was designated the South Area "task force" station with medical cache. The other is located in the northern section of the town; Fire Station 57 was designated as the North Area "task force" station which has similar attributes to Fire Station 52 and is described in the second portion of this volume.

Training Center - Prior to including the training function back at the station 52 site, several alternatives for relocating the training classroom, tower, and surrounding grounds were evaluated. A city-owned site on Windward Street was the considered the best candidate for relocation. There was adequate site area and the potential to relocate a fire station to this location as well. However, there were other city functions slated for the site and the total project budget allocated to the replacement of the training function did not provide sufficient funds for a new development at this site. Relocating a fire station to the Windward site also proved infeasible because the site is in a FEMA designated 100-year flood zone.

Replacement Fire Station 52 features include:

- Engine Company 52 and Medic Company 51 will be located at this station with accommodations provided for six firefighters.
- A truck will be housed at this location for cross-staffing by the engine company.
- This station includes a training classroom for 24, seated at tables, and a four- to five-story pre-engineered training tower.
- This location is the South Area central supply and has space for the following elements:
  - Medical cache
  - Airfill room with new Self-Contained Breathing Apparatus (SCBA) Unit.

Items and functions not included which may need to be accommodated at a future time:

- Added site area for improved training scenarios.

Concurrent with evaluating potential Fire Station 52 alternative locations and operational requirements, the Design Team evaluated the existing facilities currently serving the Fire Station 52 site to determine if they could be cost-effectively renovated to serve the established needs and goals of providing operationally efficient and seismically safe facilities. The Design Team evaluated the existing Fire Station 52 and the training tower. In general, it was determined that neither renovating and adding to the existing Fire Station 52, nor renovating the existing training tower proved to be cost effective or operationally efficient solutions to meeting the goals stated above. The detail behind these findings is presented in Part E (Existing Facilities Condition Assessments) of this report.

REPLACEMENT OF FIRE STATIONS 57 AT 3530 CIVIC CENTER DRIVE: $5.5M – $6.0M PROJECT BUDGET (INCLUDING PLACEHOLDER FOR COST SHARING WITH COUNTY)

The San Rafael Fire Department (SRFD) has a contract with Marin Country to provide fire protection services and paramedic coverage to unincorporated areas contiguous to San Rafael, designated County Service Area 19 (CSA 19). CSA 19 includes Santa Venetia, Los Ranchitos, Country Club, California Park, and Bayside Acres. Fire Station 57 is the station that provides first-in coverage to this area and its surrounding City of San Rafael neighborhoods. Both the County and the City of San Rafael agree that this contract serves both agencies well and anticipate that it will be continue for the foreseeable future. In addition, the Standards of Coverage Study recommended that the north area Medic Company 53 be merged with Fire Station Engine Company 57 at this current location.

Relocating Medic Company 53 to this location will provide two benefits. It will provide a permeant location for the medic company that is near the freeway and it will allow this North Area station to serve as a "task force" station (similar to Fire Station 52) by providing a cache for medical and other supplies in the north area of town. Previously, Medic Company 53 was located at Fire Station 56 and was only recently moved to the re-activated Fire Station 53 to improve the Medic 53 response times. With the relocation of Medic Company 53 to Fire Station 57, the older Fire Station 53 will be re-purposed by the City as needs for its use is developed further. In the short term this station will be used as an interim location for the Station 57 engine company during construction of a replacement Fire Station 57.

To address the Standards of Cover Study recommendations to provide flexibility in its response capability, Fire Station 57 was programmed as a two-company station which could accommodate and engine company, medic company, and a cross-staffed truck. It was also programmed to provide an on-site utility vehicle and trailer storage and planned for a future storage building at the rear of the site. This program proved to fit on the site and meet the following goals:

1. Provided a permanent location for medic coverage closer to the freeway by relocating Medic Company 53 to Fire Station 57.
2. Provided adequate apparatus bay space to house an engine, medic, and truck so that the truck company could be cross-staffed by the engine company. This also provided flexibility is adjusting the response capability in the future.
3. Created a North Area medical supply cache to support the companies operating in the north side of the City.

Replacement Fire Station 57 features include:

- Engine Company 57 and Medic Company 53 will be located at this station with accommodations provided for six firefighters.
- Truck 57 will be housed at this location and cross-staffed by the engine company.
- This location is the North Area central supply and has specialty space for the following elements:
  - Central Medical Supply Storage
  - Airfill room with new SCBA unit
  - Site parking area for reserve and ancillary units (planned for a future pre-engineered building).

B. REPLACEMENT OF FIRE STATION 52 AND TRAINING TOWER AT 3RD STREET

SPACE NEEDS OUTLINE

This section identified and itemizes the building spaces into an outline form indicating each space, the required attributes and the required square footage. The space needs of the project have been established through meetings with both the police department and fire department design team, site visits and multiple review meetings. The square footage requirements for each space are derived through the development of "component diagrams" reflecting the operations-based layout of each space and the use of space standards




REPLACEMENT OF FIRE STATION 52 AND TRAINING TOWER AT 3RD ST.
TWO COMPANY PROTOTYPE WITH TRAINING CLASSROOM AND TOWER
EXISTING FIRE STATION 52 SITE
SPACE NEEDS OUTLINE

Two Company Station Company Make-up - CURRENT STAFFING	Total
Fire Engine - Captain, Engineer, Firefighter	3
Fire Truck - Cross Staffed by the Engine Company	0
Ambulance - two medics	2
TOTAL CURRENT STAFFING:	**5**

Finish Legend: A - Simple Finishes; B - Standard Office Finishes; C - Intense Finishes; D - Service Room Finishes

No.	Type of Space	Space Attributes	Square Footage		
SITE OPERATIONS			**Program**	**Size**	**Finish**
	Firefighter Parking	10 firefighter parking spaces, secure and separate from public parking	2,400	10’x20’ ea.	
	Visitor Parking	Two Total - One Accessible with ramp	400	10’ x 20	
	Training Apparatus Staging	Parking for two apparatus used during training exercises	600	10’ x 30 (2)	
	Fire Training Tower	5-story training tower	800	20’ x 40’	
	Drafting Tank	Undergound tank used for hose and pumper testing	100	Above ground Access	
	Apparatus Washing Area	Adjacent to hydrant for refill and testing; locate at rear of App. Bays; provide clarifier for run-off	0	rear apron	
	Hose Maintenance Area	Use rear apron area for cleaning hose; roll wet and store on apparatus	0	rear apron	
	Yard Hydrant	Located at rear yard	0	rear apron	
	Generator Area	Located at rear yard	150	10’x15’	
	Fueling Area	Above grade Con-Vault System	150	10’x15’	
	Trash Enclosure	Exterior access for service; space for dumpster and recycling bins	150	10’x15’	
	Flagpole	Flagpole area with lighting	25	5’x5’	
	Outdoor Patio	Outdoor uses; adjacent to Kitchen	200	10’x20’	

No.	Type of Space	Space Attributes	Square Footage		
	FIRE STATION - APP BAY/APP BAY SUPPORT		**Program**	**Size**	**Finish**
1	Apparatus Bay (3 drive-through bays)	Truck (cross-staffed),Engine, Ambulance - Front line apparatus. Systems include tailpipe exhaust power cord drops to each vehicle; heating system; night lighting; auto-close doors; trench drains	2,900	(2) 20'x 50' (1) 18' x 50'	A
2	Central Medical Supply Storage	Heavy Duty Shelving; medical supplies, gas cylinders, extra backboards;	80	8' x 10'	C
3	Medical Clean Up	Medical clean-up sink, backboard cleaning, shelving	72	8' x 9'	C
4	Yard Storage	Yard equipment, compressor	36	6' x 6'	A
5	Turnout Gear Room	20-turnout gear open metal storage lockers; continuous exhaust fan, floor drain, heavy duty shelving; wildland gear bags	224	14' x 16'	C
6	Janitor room	Service sink, mop rack; janitorial supplies;	48	6' x 8'	C
7	Work Shop Alcove	Work bench/shop area for vise, peg board, tool storage with large flat work surface, solvent tank, tool chest, storage cabinet, shop sink and 6LF for Hose storage.	120	4' x 30'	C
8	Special Project Room	Room for assigned support duty such as turn-out, mask repair, hose repair, allows outsourced projects to be brought in house.	80	8' x 10'	B
9	Restroom	Fire fighter toilet and sink, off of apparatus bay	64	8' x 8'	C
		Station - App Bay/Support Subtotal	**3,624**		
	STATION - FIREFIGHTER OFFICES and TRAINING AREA		**Program**	**Size**	**Finish**
10	Station Public Lobby	Small entry point for public; with seating adjacent to the public restroom. Counter separation between office and lobby	72	6' x 12'	B
11	Station Public Restroom	Male and Female, accessible near Lobby and Training Classroom	128	8'x8' (2)	C
12	Station Office	Workstations for 4-persons; provide space for lateral file cabinets (one cabinet per company) copy machine and office supply storage, book shelving; conference function	196	14' x 14'	B
13	Training Classroom	Training Classroom with classroom seating for 24 and hospitality counter	1,050	30' x 35'	B
14	Training Storage	Table and Chair Storage adjacent to training classroom	80	8' x 10'	B
		Station - Firefighter Offices Subtotal	**1,562**		

No.	Type of Space	Space Attributes	Square Footage		
	STATION - FIREFIGHTER QUARTERS		**Program**	**Size**	**Finish**
15	Kitchen	2-refrigerators; 3-shift pantrie; 1-station pantry; 1-dishwasher; gas range/oven with hood; large microwave; large double-bowl sink with disposer; prep sink at island; open to Dining Area	248	13’ x 16’ 5’ x 8’	C
16	Dining Area	Seating for 6 persons; wall-mounted TV; open to kitchen; open to Day Room	192	12’ x 16’	B
17	Day Room	Seating for 6 with recliner chairs; entertainment center and book shelving; Open to Dining	224	14’ x 16’	B
18	Fitness Room	Dedicated Fitness Room	528	22’ x 24’	B
19	Laundry Room	Service sink; countertop; janitorial supplies; mop rack	96	8’ x 12’	C
20	Firefighter Bedroom	6-separate bedrooms each containing 4-lockers, desk, chair, wall-mounted TV, 1 bed	825	11’ x 12.5’ (6)	B
21	Firefighter Bathroom ADA	1 accessible restroom with shower, sink, toilet	72	8’ x 9’ (1)	C
22	Firefighter Bathroom	2 restrooms with shower, sink, toilet	126	7’ x 9’ (2)	C
		Station - Firefighter Quarters Subtotal	**2,311**		
	UTILITY SUPPORT/VERTICAL CIRCULATION		**Program**	**Size**	**Finish**
23	Mechanical Room	HVAC equipment; hot water heater; fire sprinkler riser	80	8’ x 10’	D
24	Electrical Room	Main service panel, fire alarm panel; sub panels	80	8’ x 10’	D
25	Communications Room	Telephone service racks, alert response system hub, data server hub, radio equipment; security system	80	8’ x 10’	D
26	Stairs	(2x) for each level. Two stairways from the second floor for exiting	576	18’ x 8’	B
27	Station Elevator	Elevator and machine room	240	8’ x 10’ (3)	C
28	Firefighter Pole	One for each level	32	4’x4’	B
		Utility Support/ Vertical Circulation Subtotal	**1,088**		

	TWO COMPANY PROTOTYPE SPACE NEEDS SUMMARY		Program		
		Station - App Bay/Bay Support Subtotal	3,624		
		Station - Firefighter Offices Subtotal	1,526		
		Station - Firefighter Quarters Subtotal	2,311		
		Utility Support/Vertical Circulation Subtotal	1,088		
		BUILDING SUBTOTAL (SF)	**8,549**		
		Circulation at 30%	2,549		B
		TWO COMPANY PROTOTYPE GRAND TOTAL (SF)	**11,114**		

B. REPLACEMENT OF FIRE STATION 52 AND TRAINING TOWER AT 3RD STREET

EQUIPMENT BUDGET LIST

This section provides a count of all equipment to be used or installed in the new facility. Each room is listed followed by its equipment as well as indications of responsibility of provision and estimated costs.




REPLACEMENT OF FIRE STATION 52 AND TRAINING TOWER AT 3RD ST.
TWO COMPANY PROTOTYPE WITH TRAINING CLASSROOM AND TOWER
EXISTING FIRE STATION 52 SITE
EQUIPMENT BUDGET LIST

	Equipment	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
SITE				
	Site Operations			
	A. Generator (100 KVW)	$75,000	$0	$0
	B. Fuel Tank and Con Vaultw	$50,000	$0	$0
	C. Outdoor Patio BBQ	$0	$0	$1,500
	Subtotal	**$125,000**	**$0**	**$1,500**

Contract Specialties:

pole-mounted signage, fire hydrant, water run-off clarifier, flagpole, fencing/gates/ hardware, WP power outlets

Site Operations Subtotal	***$125,000***	***$0***	***$1,500***

APPARATUS BAY/APPARATUS BAY SUPPORT				
1.0	**Apparatus Bay**			
	A. Tailpipe Exhaust System (3@20,000)	$60,000	$0	$0
	Subtotal	**$60,000**	**$0**	**$0**

Contract Specialties:

intercom system, hose bibs, trench drains, App Bay doors and operators, air drops, electrical drops, built-in heavy duty metal shelving

2.0	**Central Medical Supply Storage**			
	NONE	$0	$0	$0
	Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

built-in heavy duty metal shelving

3.0	**Medical Clean-up**			
	NONE	$0	$0	$0
	Subtotal	**$0**	**$0**	**$0**

Equipment			General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
3.0	**Medical Clean-up - Continued**				
	Contract Specialties:				
		hands-free sink with sprayer, built-in shelving			
4.0	**Yard Storage**				
	A.	Compresor	$2,500	$0	$0
		Subtotal	**$2,500**	**$0**	**$0**
	Contract Specialties:				
		heavy duty shelving			
5.0	**Turnout Gear Room**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**
	Contract Specialties:				
		heavy duty metal lockers, floor drain, exhaust fan system			
6.0	**Janitor Room**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**
	Contract Specialties:				
		heavy duty metal shelving, floor drain, exhaust fan system, Mop sink			
7.0	**Work Shop Alcove**				
	A.	Solvent Tank	$0	$0	$500
	B.	Vice	$0	$0	$200
		Subtotal	**$0**	**$0**	**$700**
	Contract Specialties:				
		peg board, tool storage racks, built-in bench and storage cabinets			
8.0	**Special Project Room**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**
	Contract Specialties:				

Equipment	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
APPARATUS BAY/APPARATUS BAY SUPPORT - Continued			
9.0 Restroom			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

fixtures and accessories

App Bay/Support Subtotal	***$62,500***	***$0***	***$700***

STATION - FIREFIGHTER OFFICES			
10.0 Station Public Lobby			
A. 911 Phone	$0	$0	$1,000
Subtotal	**$0**	**$0**	**$1,000**

Contract Specialties:

11.0 Station Public Restroom			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

fixtures and accessories

12.0 Station Office			
A. Computers, Software, Printer (3@3200)	$0	$0	$9,600
B. Fax	$0	$0	$500
C. Copier	$0	$0	$500
D. Phone (3@150)	$0	$0	$450
Subtotal	**$0**	**$0**	**$11,050**

Contract Specialties:

casework and chairs

13.0 Training Classroom			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

casework and chairs

Firefighter Offices Subtotal	***$0***	***$0***	***$12,050***

Equipment			General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
STATION - FIREFIGHTERS QUARTERS					
14.0	**Kitchen**				
	A.	6-burner gas stove w/two electric ovens	$12,000	$0	$0
	B.	Vent Hood	$2,500	$0	$0
	C.	Dishwasher (1@2000)	$2,000	$0	$0
	D.	Refrigerator (2@2000)	$4,000	$0	$0
	E.	Microwave (1@1500)	$1,500	$0	$0
	F.	Coffee (1@500)	$500	$0	$0
		Subtotal	**$22,500**	**$0**	**$0**

Contract Specialties:

built-in cabinets/pantries; garbage disposer at large double sink, prep sink, stainless steel backsplash

15.0	**Dining Area**				
	A.	Phone	$0	$0	$150
		Subtotal	**$0**	**$0**	**$150**

Contract Specialties:

wall mount for TV, built-in casework, marker board

16.0	**Day Room**				
	A.	Phone	$0	$0	$150
		Subtotal	**$0**	**$0**	**$150**

Contract Specialties:

built-in casework, entertainment system provided by firefighters

17.0	**Fitness Room**				
	A.	Allowance - Partial relocation of existing	$0	$0	$7,500
		Subtotal	**$0**	**$0**	**$7,500**

Contract Specialties:

18.0	**Laundry Room**				
	A.	Washer	$1,250	$0	$0
	B.	Dryer	$1,250	$0	$0
		Subtotal	**$1,250**	**$0**	**$0**

	Equipment	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
18.0	**Laundry Room - Continued**			
	Contract Specialties: service sink, shelving			
19.0	**Firefighter Bedroom**			
	NONE	$0	$0	$0
	Subtotal	**$0**	**$0**	**$0**
	Contract Specialties: built-in lockers			
20.0	**Firefighter Bathroom ADA**			
	NONE	$0	$0	$0
	Subtotal	**$0**	**$0**	**$0**
	Contract Specialties: bathroom accessories			
21.0	**Firefighter Bathroom**			
	NONE	$0	$0	$0
	Subtotal	**$0**	**$0**	**$0**
	Contract Specialties: fixtures and accessories			
	Firefighter Quarters Subtotal	***$23,750***	***$0***	***$7,800***
UTILITY SUPPORT /VERTICAL CIRCULATION				
22.0	**Mechanical Room**			
	NONE	$0	$0	$0
	Subtotal	**$0**	**$0**	**$0**
	Contract Specialties: HVAC systems, fire riser systems, plumbing systems, fire extinguisher, access ladder/hatch			
23.0	**Electrical Room**			
	NONE	$0	$0	$0
	Subtotal	**$0**	**$0**	**$0**
	Contract Specialties: electrical panels, fire alarm panels			

Equipment			General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
UTILITY SUPPORT/VERTICAL CIRCULATION - Continued					
24.0	**Communications Room**				
	A.	Computer server	$0	$0	$5,000
	B.	Response System	$0	$0	$100,000
	C.	Phone System	$0	$0	$15,000
	D.	Security System	$0	$0	$10,000
	E.	UPS	$0	$0	$5,000
		Subtotal	**$0**	**$0**	**$135,000**

Contract Specialties:

telephone systems, security systems, alert systems

25.0	**Stairs**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

26.0	**Station Elevator**				
		Hydrolic Elevator	$100,000	$0	$0
		Subtotal	**$100,000**	**$0**	**$0**

Contract Specialties:

27.0	**Firefighters Pole**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

Utility Support Subtotal	***$100,000***	***$0***	***$135,000***

	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
Sub Total	**$311,250**	**$0**	**$157,050**
Grand Total (Equipment)	**$468,300**		
Grand Total (Furnishings)	$44,965		
Overall Total FFE	$513,265		

B. REPLACEMENT OF FIRE STATION 52 AND TRAINING TOWER AT 3RD STREET

FURNISHINGS BUDGET LIST

This section provides a count of all the furnishings to be used or installed in the new facility. Each room is listed followed by its furnishings as well as indications of responsibility of provision and estimated costs.




REPLACEMENT OF FIRE STATION 52 AND TRAINING TOWER AT 3RD ST.
TWO COMPANY PROTOTYPE WITH TRAINING CLASSROOM AND TOWER
EXISTING FIRE STATION 52 SITE
FURNISHINGS BUDGET LIST

		Furnishings	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
SITE					
	Site Operations				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

pole-mounted signage, fire hydrant, water run-off clarifier, flagpole, fencing/gates/ hardware, WP power outlets

		Site Operations Subtotal	***$0***	***$0***	***$0***

APPARATUS BAY/APPARATUS BAY SUPPORT					
1.0	**Apparatus Bay**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

intercom system, hose bibs, trench drains, App Bay doors and operators, air drops, electrical drops, built-in heavy duty metal shelving

2.0	**Central Medical Supply Storage**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

heavy duty metal shelving

3.0	**Medical Clean Up**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

built-in heavy duty metal shelving

Furnishings	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
APPARATUS BAY/APPARATUS BAY SUPPORT - Continued			
4.0 Yard Storage			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

heavy duty shelving

5.0 Turnout Gear Room			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

Heavy duty metal lockers, floor drain, exhaust fan system

6.0 Janitor Room			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

Heavy duty metal shelving, floor drain, exhaust fan system, Mop sink

7.0 Work Shop Alcove			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

peg board, tool storage racks, built-in bench and storage cabinets

8.0 Air Fill Room			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

Air fill equipment

9.0 Special Project Room			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

Furnishings			General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
APPARATUS BAY/APPARATUS BAY SUPPORT - Continued					
10.0	**Restroom**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

fixtures and accessories

App Bay/Support Subtotal	***$0***	***$0***	***$0***

STATION - FIREFIGHTER OFFICES					
11.0	**Station Public Lobby**				
	A	Visitor Chairs (2@500)	$0	$0	$1,000
	B	Side Table	$0	$0	$400
		Subtotal	**$0**	**$0**	**$1,400**

Contract Specialties:

12.0	**Station Public Restroom**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

fixtures and accessories

13.0	**Firefighter Station Office**				
	A	File Cabinets (4@500)	$0	$0	$2,000
	B	Task Chair (3@500)	$0	$0	$1,500
	C	modular Workstations (3@2500)	$0	$0	$7,500
	D	Side Chair (3@500)	$0	$0	$1,500
		Subtotal	**$0**	**$0**	**$12,500**

Contract Specialties:

Casework

Station - Firefighter Offices Subtotal	***$0***	***$0***	***$13,900***

		Furnishings	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
STATION - FIREFIGHTERS QUARTERS					
14.0	**Kitchen**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

built-in cabinets/pantries; garbage disposer at large double sink, prep sink, stainless steel backsplash

15.0	**Dining Area**				
	A	Dining Table - seats 6	$0	$0	$3,000
	B	Chairs (6@300)	$0	$0	$1,800
		Subtotal	**$0**	**$0**	**$4,800**

Contract Specialties:

wall mount for TV, built-in casework, marker board

16.0	**Day Room**				
	A	Recliners (6@1000)	$0	$0	$6,000
	B	Side Tables (6@200)	$0	$0	$1,200
		Subtotal	**$0**	**$0**	**$7,200**

Contract Specialties:

built-in casework, entertainment system provided by firefighters

17.0	**Fitness Room**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

exercise equipment provided by firefighters, drinking fountain, mirrors, built-in casework

18.0	**Laundry Room**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

service sink, shelving

Furnishings			General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
APPARATUS BAY/APPARATUS BAY SUPPORT - Continued					
19.0	**Firefighter Bedroom**				
	A	Beds (6@2000)	$0	$0	$12,000
	B	Nightstands (6@200)	$0	$0	$1,200
		Subtotal	**$0**	**$0**	**$13,200**

Contract Specialties:

built-in lockers

20.0	**Firefighter Bathroom ADA**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

bathroom accessories

21.0	**Firefighter Bathroom**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

fixtures and accessories

Firefighter Quarters Subtotal	***$0***	***$0***	***$25,200***

STATION - UTILITY SUPPORT VERTICAL CIRCULATION					
22.0	**Mechanical Room**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

HVAC systems, fire riser systems, plumbing systems, fire extinguisher, access ladder/ hatch

23.0	**Electrical Room**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

electrical panels, fire alarm panels

Furnishings	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
STATION - UTILITY SUPPORT VERTICAL CIRCULATION - Continued			
24.0 Communications Room			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

telephone systems, security systems, alert systems

25.0 Stairs			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

26.0 Station Elevator			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

27.0 Firefighters Pole			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

Utility Support Subtotal	***$0***	***$0***	***$0***

	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
Sub Total	**$0**	**$0**	**$39,100**
Furnishings Sub Total	**$0**	**$0**	**$39,100**
Taxes, Shipping, Installation (15%)	$0	$0	$5,865
Furnishings Sub Total	$0.00	$0.00	$44,965.00
Grand Total (Furnishings)	**$44,965.00**		
Grand Total (Equipment)	$468,300		
Overall Total FFE	$513,265		

B. REPLACEMENT OF FIRE STATION 52 AND TRAINING TOWER AT 3RD STREET

BUILDING BUDGET

This section identifies an overall construction budget based on the program areas and varying levels of architectural finish. This section does not include equipment, furnishings and other project costs (see following section, Overall Project Budget). The amount is based on a cost per square foot and/or unit cost estimate and is a guideline for the Project Team in the design of the building.




REPLACEMENT OF FIRE STATION 52 AND TRAINING TOWER AT 3RD ST.
TWO COMPANY PROTOTYPE WITH TRAINING CLASSROOM AND TOWER
EXISTING FIRE STATION 52 SITE
BUILDING BUDGET

	QUANT	UNIT	BASE COST	ADD ON	TOTAL
Type A: Simple Finishes					
Apparatus Bays - (3 bays)	2,900	**SF**			
Yard Storage	36	**SF**			
Type A Total Area:	**2,936**	**SF**	**$475**	**($10)**	**$1,365,240**
27%					

	QUANT	UNIT	BASE COST	ADD ON	TOTAL
Type B: Standard Office Type Finishes					
Special Project Room	80	**SF**			
Station Public Lobby	72	**SF**			
Station Office	196	**SF**			
Training Classroom	1,050	**SF**			
Training Storage	80	**SF**			
Dining Area	192	**SF**			
Day Room	224	**SF**			
Fitness Room	528	**SF**			
Firefighter Bedroom	825	**SF**			
Stairs	576	**SF**			
Firefighter Pole	32	**SF**			
Circulation/Structure	2,565	**SF**			
Type B Total Area:	**6,420**	**SF**	**$475**	**$0**	**$3,049,358**
58%					

	QUANT	UNIT	BASE COST	ADD ON	TOTAL
Type C: Intense Finish Systems					
Central Medical Storage	80	**SF**			
Medical Clean Up	72	**SF**			
Turnout Gear Room	224	**SF**			
Janitor room	48	**SF**			
Work Shop Alcove	120	**SF**			
Restroom	64	**SF**			
Station Public Restroom	128	**SF**			
Kitchen	248	**SF**			
Laundry Room	96	**SF**			
Firefighter Bathroom ADA	72	**SF**			
Firefighter Bathroom	126	**SF**			
Station Elevator	240	**SF**			
Type C Total Area:	**1,518**	**SF**	**$475**	**$50**	**$796,950**
13%					
	QUANT	**UNIT**	**BASE COST**	**ADD ON**	**TOTAL**
Type D: Service Room Finishes					
Mechanical Room	80	**SF**			
Electrical Room	80	**SF**			
Communications Room	80	**SF**			
Type D Total Area:	**240**	**SF**	**$475**	**($5)**	**$112,800**
2%					
A. Fire Station 52/51 (medic) Square Footage Total:	**11,114**				**$5,324,348**
adjusted cost per square foot:	**$479**				

B. REPLACEMENT OF FIRE STATION 52 AND TRAINING TOWER AT 3RD STREET

OVERALL PROJECT BUDGET

This section identifies an overall project budget based on the following items:

- Building and Site Construction Costs w/ Equipment and Furnishings,
- Design and other Related Fees,
- Administrative, Permit, Bidding Costs, and
- Project Contingencies.




REPLACEMENT OF FIRE STATION 52 AND TRAINING TOWER AT 3RD ST.
TWO COMPANY PROTOTYPE WITH TRAINING CLASSROOM AND TOWER
EXISTING FIRE STATION 52 SITE
OVERALL PROJECT BUDGET

A. Construction with Contingencies and Escalation

	QUANT	UNIT	Cost per Unit	Total	Notes
Fire Station 52 with 51 Medic, Training Classroom and Central Supply Storage					
Fire Station 52/51	1	LS	$5,324,348	$5,324,348	Refer to construction budget detail
Fire Training Tower	1	LS	$1,000,000	$1,000,000	Allowance
On-Site Improvements (Existing Fire Station 52 Site with Grade lowered)	29,071	SF	$30	$872,130	Utility, Grading and Drainage, Paving, Fences and Gates, Landscaping, lower grade, new retaining walls along School District Property
Haz Mat Demo/Bldg. Demo	5,000	SF	$12	$60,000	Demolition of 2 existing buildings
Off-Site Improvements	1	LS	$150,000	$150,000	Curb and sidewalk from new streets installed - lower allowance
Temporary Facilities	-	LS	$250,000	$0	Stage from 51 and 55 during construction
Specialty Equipment	1	LS	$311,250	$311,250	Contractor Provided Equipment per equipment budget detail
Construction Subtotal:				**$7,717,728**	
Project Design Unknowns	15%	**%**	$7,717,728	$1,157,659	Allowance
Construction with Design Unknowns Subtotal:				**$8,875,387**	Project Allowance
Construction Contingency (10% of Construction)	10%	**%**	$8,875,387	$887,539	Allowance
Construction with Change Order Contingency Subtotal:				**$9,762,925**	Project Allowance
Project Escalation (5% per annum, compounded yearly)	12%	**%**	$9,762,925	$1,171,551	Annual rate to midpoint of Construction = 24 months (14 months design and 20 months construction)
Construction (Building Site, Specialty Equipment, Contingencies, Escalation):				**$10,934,476**	
Construction Cost per SF of Building Area:				**$983.87**	

B. Design and Other Related Fees					
	QUANT	**UNIT**	**Cost Per Unit**	**TOTAL**	**Notes**
Design Fees (A, C, L, S, MEP) - BASIC ON-SITE	10%	%	$10,934,476	$1,093,448	A/E fees including entitlements
Off-site/Street Improvement Drawings	15%	%	$150,000	$22,500	design for off site improvements
Cost Estimating	1	LS	$25,000	$25,000	Estimate for each phase of development
Boundary and Topographic Surveys	1	LS	$25,000	$25,000	Includes two maps, one after site is cut to street level.
Erosion Control Plan	1	LS	$7,500	$7,500	Per Bldg. Department Requirements
Waterproofing Consultant	1	LS	$12,000	$12,000	Consultant to City
Lighting Designer	0	LS	$12,000	$0	Not used
Head In Data, Phone, Response, Security, AV Consultant	1	LS	$75,000	$75,000	Consultant to City or Arch.
LEED Documentation	1	LS	$100,000	$100,000	Energy Modeling, LEED submittal and Tracking
Construction Management (5% of construction value)	5%	%	$10,934,476	$546,724	Day to day management during construction
Geotechnical Investigation	1	LS	$30,000	$30,000	Includes geohazards report
Haz Mat Study (Ground and (E) buildings)	1	LS	$7,500	$7,500	Study only
Environmental (CEQA) Documentation	1	LS	$50,000	$50,000	Assume Neg Dec.
Commissioning	1	LS	$50,000	$50,000	As Required for LEED Gold
Continuous Inspection, Testing During Construction	1	LS	$150,000	$150,000	Allowance
Subtotal Design Fees:				**$2,187,167**	
Fee Contingency (5% of total Fees)	5%	**%**	$2,194,671	$109,734	Allowance
Reimbursables (5% of total Fees)	5%	**%**	$2,194,671	$109,734	Project Allowance
Total Design and Other Related Fees:				**$2,414,139**	

C. Administrative, Permit and Bidding Costs					
	QUANT	**UNIT**	**Cost Per Unit**	**Total**	**Notes**
Administration Costs	-	LS	$200,000	$0	Assume none charged to project
Legal Fees	1	LS	$40,000	$40,000	Allowance
Building Permit Costs	1%	%	$10,934,476	$109,345	Per Building Department
Plan Check Fees	0.5%	%	$10,934,476	$54,672	Per Building Department
SWPP Fees (State Board Compliance)	1	LS	$5,000	$5,000	Allowance
Planning/Environmental Review Fees	1	LS	$40,000	$40,000	Allowance
Temporary Storage Costs	0	LS	$25,000	$0	Assume none required
Public Art	1	LS	$30,000	$30,000	Allowance
Specialty Equipment	1	LS	$157,050	$157,050	Owner provided Equipment
Furnishings	1	LS	$44,965	$44,965	Refer to furnishings budget detail
Bidding/Printing (noticing, blue-prints, etc.)	1	LS	$10,000	$10,000	Allowance
Moving Costs (one move)	1	LS	$15,000	$15,000	Allowance
Utility Fees - (PG&E, sewer, water, telecom, other)	1	LS	$150,000	$150,000	Allowance
Subtotal Administrative Costs:				**$656,032**	
Administrative Cost Contingency (5% of total Fees)	5%	**%**	$656,032	$32,802	Allowance
Total Administrative, Permit and Bidding Costs:				**$688,834**	

Division Totals:		
	Total	**Notes**
A. Construction with Contingencies and Escalation	$10,934,476	
B. Design and Other Related Fees	$2,414,139	
C. Administrative, Permit and Bidding Costs	$688,834	
Overall Project Budget:	**$14,037,449**	
Project Cost Per SF (11,179 + Tower SF) :	**$1,002.67**	

Exclusions:

1. Program Level Bond Management Fees

B. REPLACEMENT OF FIRE STATION 52 AND TRAINING TOWER AT 3RD STREET

SITE ARRANGEMENT DIAGRAMS

These studies graphically illustrate the initial arrangement concepts developed through discussion with the Project Design Team. Considerations in each scheme include:

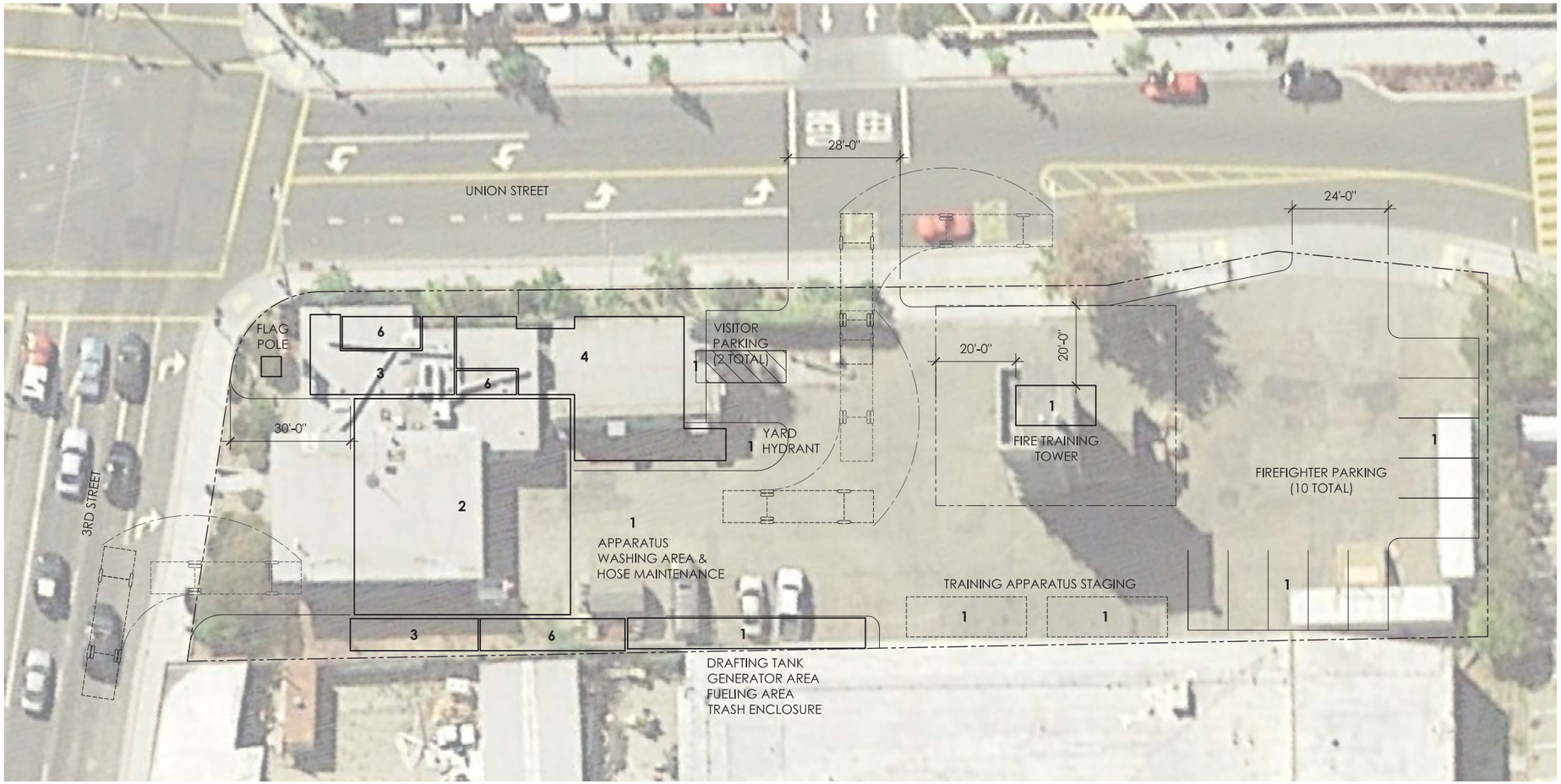
- Circulation to and from site,
- Visitor parking and pedestrian access,
- Site operations adjacencies and activities, and
- City of San Rafael planning ordinances



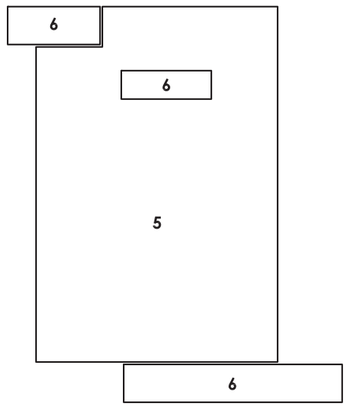

KEYNOTES:

1. SITE OPERATIONS
2. APPARATUS BAY
3. APPARATUS BAY SUPPORT AREA
4. STATION FIREFIGHTER OFFICES AND TRAINING AREA
5. STATION FIREFIGHTER QUARTERS
6. UTILITY SUPPORT/VERTICAL CIRCULATION

LOT AREA	29,071 S.F.
GROUND FLOOR AREA	6,200 S.F.
SECOND FLOOR AREA	4,400 S.F.



SITE/FIRST FLOOR PLAN STUDY
SCALE: 1/32"=1'-0"



SECOND FLOOR PLAN STUDY
SCALE: 1/32"=1'-0"

C. REPLACEMENT OF FIRE STATION 57 AT THE MARIN COUNTY CIVIC CENTER

SPACE NEEDS OUTLINE

This section identified and itemizes the building spaces into an outline form indicating each space, the required attributes and the required square footage. The space needs of the project have been established through meetings with both the police department and fire department design team, site visits and multiple review meetings. The square footage requirements for each space are derived through the development of "component diagrams" reflecting the operations-based layout of each space and the use of space standards




REPLACEMENT OF FIRE STATION 57 AT THE MARIN CIVIC CENTER
TWO COMPANY PROTOTYPE
EXISTING CIVIC CENTER SITE
SPACE NEEDS OUTLINE

Two Company Station Company Make-up - CURRENT STAFFING	Total
Fire Engine - Captain, Engineer, Firefighter	3
Fire Truck - Cross Staffed by the Engine Company	0
Ambulance - two medics	2
TOTAL CURRENT STAFFING:	**5**

Finish Legend: A - Simple Finishes; B - Standard Office Finishes; C - Intense Finishes; D - Service Room Finishes

No.	Type of Space	Space Attributes	Square Footage		
SITE OPERATIONS			**Program**	**Size**	**Finish**
	Firefighter Parking	10 firefighter parking spaces, secure and separate from public parking	2,400	10'x20' ea.	
	Visitor Parking	Two Total - One Accessible with ramp	600	10' x 20	
	Covered Utility Vehicle Storage	ATV, Utility Truck, Hose Tender, OES, Others? Could be a metal building?	800	10' x 20 (4)	
	Un-Covered Trailer Storage	USAR Trailer and EMS Trailer	400	10' x 20 (2)	
	Apparatus Washing Area	Adjacent to hydrant for refill and testing; locate at rear of App. Bays; provide clarifier for run-off	0	rear apron	
	Hose Maintenance Area	Use rear apron area for cleaning hose; roll wet and store on apparatus	0	rear apron	
	Yard Hydrant	Located at rear yard	0	rear apron	
	Generator Area	Located at rear yard	150	10'x15'	
	Fueling Area	Above grade Con-Vault System	150	10'x15'	
	Trash Enclosure	Exterior access for service; space for dumpster and recycling bins	150	10'x15'	
	Flagpole	Flagpole area with lighting	25	5'x5'	
	Outdoor Patio	Outdoor uses; adjacent to Kitchen	200	10'x20'	

No.	Type of Space	Space Attributes	Square Footage		
	STATION - APP BAY/APP BAY SUPPORT		**Program**	**Size**	**Finish**
1	Apparatus Bay (3 drive-through bays)	Truck (cross-staffed),Engine, Ambulance - Front line apparatus. Systems include tailpipe exhaust power cord drops to each vehicle; heating system; night lighting; auto-close doors; trench drains	2,900	(2) 20'x 50' (1) 18' x 50'	A
2	Central Medical Supply Storage	Heavy Duty Shelving; medical supplies, gas cylinders, extra backboards;	80	8' x 10'	C
3	Medical Clean Up	Heavy Duty Shelving; medical supplies, gas cylinders, extra backboards;	72	8' x 9'	C
4	Yard Storage	Yard equipment, compressor	36	6' x 6'	A
5	Turnout Gear Room	20-turnout gear open metal storage lockers; continuous exhaust fan, floor drain, heavy duty shelving; wildland gear bags	224	14' x 16'	C
6	Janitor room	Service sink, mop rack; janitorial supplies;	48	6' x 8'	C
7	Work Shop Alcove	Work bench/shop area for vise, peg board, tool storage with large flat work surface, solvent tank, tool chest, storage cabinet, shop sink and 6LF for Hose storage.	120	4' x 30'	C
8	Air Room	SCBA Unit with separate fill space, oxygen cascade system with bottle storage	240	12' x 20'	B
9	Special Project Room	Room for assigned support duty such as turn-out, mask repair, hose repair, allows outsourced projects to be brought in house.	80	8' x 10'	B
10	Restroom	Fire fighter toilet and sink, off of apparatus bay	64	8' x 8'	C
		Station - App Bay/Support Subtotal	**3,864**		
	STATION - FIREFIGHTER OFFICES		**Program**	**Size**	**Finish**
11	Station Public Lobby	Small entry point for public; with seating adjacent to the public restroom. Counter separation between office and lobby	72	6' x 12'	B
12	Station Public Restroom	unisex, accessible near Lobby	64	8'x8'	C
13	Station Office	Workstations for 4-persons; provide space for lateral file cabinets (one cabinet per company) copy machine and office supply storage, book shelving; conference function	196	14' x 14'	B
		Station - Firefighter Offices Subtotal	**332**		

No.	Type of Space	Space Attributes	Square Footage		
	STATION - FIREFIGHTER QUARTERS		**Program**	**Size**	**Finish**
14	Kitchen	2-refrigerators; 3-shift pantrie; 1-station pantry; 1-dishwasher; gas range/oven with hood; large microwave; large double-bowl sink with disposer; prep sink at island; open to Dining Area	248	13' x 16' 5' x 8'	C
15	Dining Area	Seating for 6 persons; wall-mounted TV; open to kitchen; open to Day Room	192	12' x 16'	B
16	Day Room	Seating for 6 with recliner chairs; entertainment center and book shelving; Open to Dining	224	14' x 16'	B
17	Fitness Room	Dedicated Fitness Room	528	22' x 24'	B
18	Laundry Room	Service sink; countertop; janitorial supplies; mop rack	96	8' x 12'	C
19	Firefighter Bedroom	6-separate bedrooms each containing 4-lockers, desk, chair, wall-mounted TV, 1 bed	825	11' x 12.5' (6)	B
20	Firefighter Bathroom ADA	1 accessible restroom with shower, sink, toilet	72	8' x 9' (1)	C
21	Firefighter Bathroom	2 restrooms with shower, sink, toilet	126	7' x 9' (2)	C
		Station - Firefighter Quarters Subtotal	**2,311**		
	UTILITY SUPPORT/VERTICAL CIRCULATION		**Program**	**Size**	**Finish**
22	Mechanical Room	HVAC equipment; hot water heater; fire sprinkler riser	80	8' x 10'	D
23	Electrical Room	Main service panel, fire alarm panel; sub panels	80	8' x 10'	D
24	Communications Room	Telephone service racks, alert response system hub, data server hub, radio equipment; security system	80	8' x 10'	D
25	Stairs	(2x) for each level. Two stairways from the second floor for exiting	576	18' x 8'	B
26	Station Elevator	Elevator and machine room	240	8' x 10' (3)	C
27	Firefighter Pole	One for each level	32	4'x4'	B
		Utility Support/ Vertical Circulation Subtotal	**1,088**		

	TWO COMPANY PROTOTYPE SPACE NEEDS SUMMARY		Program		
		Station - App Bay/Bay Support Subtotal	3,864		
		Station - Firefighter Offices Subtotal	332		
		Station - Firefighter Quarters Subtotal	2,311		
		Utility Support/Vertical Circulation Subtotal	1,088		
		BUILDING SUBTOTAL (SF)	**7,595**		
		Circulation at 30%	2,279		B
	TWO COMPANY PROTOTYPE GRAND TOTAL (SF)		**9,874**		

C. REPLACEMENT OF FIRE STATION 57 AT THE MARIN COUNTY CIVIC CENTER

EQUIPMENT BUDGET LIST

This section provides a count of all equipment to be used or installed in the new facility. Each room is listed followed by its equipment as well as indications of responsibility of provision and estimated costs.



REPLACEMENT OF FIRE STATION 57 AT THE MARIN COUNTY CIVIC CENTER
TWO COMPANY PROTOTYPE
EXISTING CIVIC CENTER SITE
EQUIPMENT BUDGET LIST

		Equipment	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
SITE					
	Site Operations				
	A.	Generator (100 KVW)	$75,000	$0	$0
	B.	Fuel Tank and Con Vault	$50,000	$0	$0
	C.	Outdoor Patio BBQ	$0	$0	$1,500
		Subtotal	**$125,000**	**$0**	**$1,500**

Contract Specialties:

pole-mounted signage, fire hydrant, water run-off clarifier, flagpole, fencing/gates/ hardware, WP power outlets

	Site Operations Subtotal	***$125,000***	***$0***	***$1,500***

APPARATUS BAY/APPARATUS BAY SUPPORT					
1.0	**Apparatus Bay**				
	A.	Tailpipe Exhaust System (3@20,000)	$60,000	$0	$0
		Subtotal	**$60,000**	**$0**	**$0**

Contract Specialties:

intercom system, hose bibs, trench drains, App Bay doors and operators, air drops, electrical drops, built-in heavy duty metal shelving

2.0	**Central Medical Supply Storage**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

built-in heavy duty metal shelving

3.0	**Medical Clean-up**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

	Equipment	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
3.0	**Medical Clean-up - Continued**			
	Contract Specialties:			
	hands-free sink with sprayer, built-in shelving			
4.0	**Yard Storage**			
	A. Compresor	$2,500	$0	$0
	Subtotal	**$2,500**	**$0**	**$0**
	Contract Specialties:			
	heavy duty shelving			
5.0	**Turnout Gear Room**			
	NONE	$0	$0	$0
	Subtotal	**$0**	**$0**	**$0**
	Contract Specialties:			
	heavy duty metal lockers, floor drain, exhaust fan system			
6.0	**Janitor Room**			
	NONE	$0	$0	$0
	Subtotal	**$0**	**$0**	**$0**
	Contract Specialties:			
	heavy duty metal shelving, floor drain, exhaust fan system, Mop sink			
7.0	**Work Shop Alcove**			
	A. Solvent Tank	$0	$0	$500
	B. Vice	$0	$0	$200
	Subtotal	**$0**	**$0**	**$700**
	Contract Specialties:			
	peg board, tool storage racks, built-in bench and storage cabinets			
8.0	**Air Room**			
	A. SCBA Unit	$80,000	$0	$0
	B. Cascade System	$1,500	$0	$0
	Subtotal	**$1,500**	**$0**	**$0**

		Equipment	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
8.0	**Air Room - Continued**				
	Contract Specialties:				
		oxygen cascade system and bottle storage			
9.0	**Special Project Room**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**
	Contract Specialties:				
10.0	**Restroom**				
		None		$0	$0
		Subtotal	**$0**	**$0**	**$0**
	Contract Specialties:				
		fixtures and accessories			
		App Bay/Support Subtotal	***$64,000***	***$0***	***$700***
STATION - FIREFIGHTER OFFICES					
11.0	**Station Public Lobby**				
	A.	911 Phone	$0	$0	$1,000
		Subtotal	**$0**	**$0**	**$1,000**
	Contract Specialties:				
12.0	**Station Public Restroom**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**
	Contract Specialties:				
		fixtures and accessories			
13.0	**Station Office**				
	A.	Computers, Software, Printer (3@2000)	$0	$0	$6,000
	B.	Fax	$0	$0	$0
	C.	Copier	$0	$0	$250

	Equipment	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
13.0	**Station Office - Continued**			
	D. Phone (3@250)	$0	$0	$750
	Subtotal	**$0**	**$0**	**$7,000**

Contract Specialties:

casework and chairs

Firefighter Offices Subtotal	***$0***	***$0***	***$8,000***

STATION - FIREFIGHTERS QUARTERS				
14.0	**Kitchen**			
	A. 6-burner gas stove w/two electric ovens	$12,000	$0	$0
	B. Vent Hood	$2,500	$0	$0
	C. Dishwasher (1@2000)	$2,000	$0	$0
	D. Refrigerator (2@2000)	$4,000	$0	$0
	E. Microwave (1@1500)	$1,500	$0	$0
	F. Coffee (1@500)	$500	$0	$0
	Subtotal	**$22,500**	**$0**	**$0**

Contract Specialties:

built-in cabinets/pantries; garbage disposer at large double sink, prep sink, stainless steel backsplash

15.0	**Dining Area**			
	A. Phone	$0	$0	$250
	Subtotal	**$0**	**$0**	**$250**

Contract Specialties:

wall mount for TV, built-in casework, marker board

16.0	**Day Room**			
	A. Phone	$0	$0	$250
	Subtotal	**$0**	**$0**	**$250**

Contract Specialties:

built-in casework, entertainment system provided by firefighters

Equipment			General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
STATION - FIREFIGHTERS QUARTERS - Continued					
17.0	**Fitness Room**				
	A.	Allowance - Partial relocation of existing	$0	$0	$7,500
		Subtotal	**$0**	**$0**	**$7,500**
Contract Specialties:					
18.0	**Laundry Room**				
	A.	Washer	$1,250	$0	$0
	B.	Dryer	$1,250	$0	$0
		Subtotal	**$1,250**	**$0**	**$0**
Contract Specialties: service sink, shelving					
19.0	**Firefighter Bedroom**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**
Contract Specialties: built-in lockers					
20.0	**Firefighter Bathroom ADA**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**
Contract Specialties: bathroom accessories					
21.0	**Firefighter Bathroom**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**
Contract Specialties: fixtures and accessories					
		Firefighter Quarters Subtotal	***$23,750***	***$0***	***$8,000***
UTILITY SUPPORT /VERTICAL CIRCULATION					
22.0	**Mechanical Room**				
		NONE	$0	$0	$0

Equipment			General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
22.0	**Mechanical Room - Continued**				
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

HVAC systems, fire riser systems, plumbing systems, fire extinguisher, access ladder/ hatch

23.0	**Electrical Room**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

electrical panels, fire alarm panels

24.0	**Communications Room**				
	A.	Computer server	$0	$0	$5,000
	B.	Response System	$0	$0	$100,000
	C.	Phone System	$0	$0	$15,000
	D.	Security System	$0	$0	$10,000
	E.	UPS	$0	$0	$5,000
		Subtotal	**$0**	**$0**	**$135,000**

Contract Specialties:

telephone systems, security systems, alert systems

25.0	**Stairs**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

26.0	**Station Elevator**				
		Hydrolic Elevator	$100,000	$0	$0
		Subtotal	**$100,000**	**$0**	**$0**

Equipment	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
UTILITY SUPPORT /VERTICAL CIRCULATION - Continued			
Contract Specialties:			
27.0 Firefighters Pole			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**
Contract Specialties:			
Utility Support Subtotal	***$100,000***	***$0***	***$135,000***

	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
Sub Total	**$312,750**	**$0**	**$153,200**
Grand Total (Equipment)	**$465,950**		
Grand Total (Furnishings)	$44,965		
Overall Total FFE	$510,915		

C. REPLACEMENT OF FIRE STATION 57 AT THE MARIN COUNTY CIVIC CENTER

FURNISHINGS BUDGET LIST

This section provides a count of all the furnishings to be used or installed in the new facility. Each room is listed followed by its furnishings as well as indications of responsibility of provision and estimated costs.




REPLACEMENT OF FIRE STATION 57 AT THE MARIN CIVIC CENTER
TWO COMPANY PROTOTYPE
EXISTING CIVIC CENTER SITE
FURNISHINGS BUDGET LIST

Furnishings	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
SITE			
Site Operations			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

pole-mounted signage, fire hydrant, water run-off clarifier, flagpole, fencing/gates/hardware, WP power outlets

Site Operations Subtotal	***$0***	***$0***	***$0***

APPARATUS BAY/APPARATUS BAY SUPPORT			
1.0 Apparatus Bay			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

intercom system, hose bibs, trench drains, App Bay doors and operators, air drops, electrical drops, built-in heavy duty metal shelving

2.0 Central Medical Supply Storage			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

heavy duty metal shelving

3.0 Medical Clean Up			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

built-in heavy duty metal shelving

Furnishings	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
APPARATUS BAY/APPARATUS BAY SUPPORT - Continued			
4.0 Yard Storage			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

heavy duty shelving

5.0 Turnout Gear Room			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

Heavy duty metal lockers, floor drain, exhaust fan system

6.0 Janitor Room			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

Heavy duty metal shelving, floor drain, exhaust fan system, Mop sink

7.0 Work Shop Alcove			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

peg board, tool storage racks, built-in bench and storage cabinets

8.0 Air Fill Room			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

Air fill equipment

9.0 Special Project Room			
NONE	$0	$0	$0
Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

Furnishings			General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
APPARATUS BAY/APPARATUS BAY SUPPORT - Continued					
10.0	**Restroom**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

fixtures and accessories

App Bay/Support Subtotal	***$0***	***$0***	***$0***

STATION - FIREFIGHTER OFFICES					
11.0	**Station Public Lobby**				
	A.	Visitor Chairs (2@500)	$0	$0	$1,000
	B.	Side Table	$0	$0	$400
		Subtotal	**$0**	**$0**	**$1,400**

Contract Specialties:

12.0	**Station Public Restroom**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

fixtures and accessories

13.0	**Firefighter Station Office**				
	A.	File Cabinets (4@500)	$0	$0	$2,000
	B.	Task Chair (3@500)	$0	$0	$1,500
	C.	Modular Workstations (3@2500)	$0	$0	$7,500
	D.	Side Chair (3@500)	$0	$0	$1,500
		Subtotal	**$0**	**$0**	**$12,500**

Contract Specialties:

Casework

Station - Firefighter Offices Subtotal	***$0***	***$0***	***$13,900***

		Furnishings	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
STATION - FIREFIGHTERS QUARTERS					
14.0	**Kitchen**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

built-in cabinets/pantries; garbage disposer at large double sink, prep sink, stainless steel backsplash

15.0	**Dining Area**				
	A.	Dining Table - seats 6	$0	$0	$3,000
	B.	Chairs (6@300)	$0	$0	$1,800
		Subtotal	**$0**	**$0**	**$4,800**

Contract Specialties:

wall mount for TV, built-in casework, marker board

16.0	**Day Room**				
	A.	Recliners (6@1000)	$0	$0	$6,000
	B.	Side Tables (6@200)	$0	$0	$1,200
		Subtotal	**$0**	**$0**	**$7,200**

Contract Specialties:

built-in casework, entertainment system provided by firefighters

17.0	**Fitness Room**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

exercise equipment provided by firefighters, drinking fountain, mirrors, built-in casework

18.0	**Laundry Room**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

service sink, shelving

Furnishings			General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
19.0	**Firefighter Bedroom**				
	A.	Beds (6@2000)	$0	$0	$12,000
	B.	Nightstands (6@200)	$0	$0	$1,200
		Subtotal	**$0**	**$0**	**$13,200**

Contract Specialties:

built-in lockers

20.0	**Firefighter Bathroom ADA**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

bathroom accessories

21.0	**Firefighter Bathroom**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

fixtures and accessories

Firefighter Quarters Subtotal	***$0***	***$0***	***$25,200***

STATION - UTILITY SUPPORT/VERTICAL CIRCULATION					
22.0	**Mechanical Room**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

HVAC systems, fire riser systems, plumbing systems, fire extinguisher, access ladder/ hatch

23.0	**Electrical Room**				
		NONE	$0	$0	$0
		Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

electrical panels, fire alarm panels

	Furnishings	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
24.0	**Communications Room**			
	NONE	$0	$0	$0
	Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

telephone systems, security systems, alert systems

25.0	**Stairs**			
	NONE	$0	$0	$0
	Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

26.0	**Station Elevator**			
	NONE	$0	$0	$0
	Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

27.0	**Firefighters Pole**			
	NONE	$0	$0	$0
	Subtotal	**$0**	**$0**	**$0**

Contract Specialties:

Utility Support Subtotal	***$0***	***$0***	***$0***

	General Contract	Owner Provided, Contractor Installed	Owner Provided, Owner Installed
Sub Total	**$0**	**$0**	**$39,100**
Furnishings Sub Total	**$0**	**$0**	**$39,100**
Taxes, Shipping, Installation (15%)	$0	$0	$5,865
Furnishings Sub Total	$0.00	$0.00	$44,965.00
Grand Total (Furnishings)	**$44,965.00**		
Grand Total (Equipment)	$465,950		
Overall Total FFE	$510,915		

C. REPLACEMENT OF FIRE STATION 57 AT THE MARIN COUNTY CIVIC CENTER

BUILDING BUDGET

This section identifies an overall construction budget based on the program areas and varying levels of architectural finish. This section does not include equipment, furnishings and other project costs (see following section, Overall Project Budget). The amount is based on a cost per square foot and/or unit cost estimate and is a guideline for the Project Team in the design of the building.




REPLACEMENT OF FIRE STATION 57 AT THE MARIN CIVIC CENTER
TWO COMPANY PROTOTYPE
EXISTING CIVIC CENTER SITE
BUILDING BUDGET

	QUANT	UNIT	BASE COST	ADD ON	TOTAL
Type A: Simple Finishes					
Apparatus Bays - (3 bays)	2,900	**SF**			
Yard Storage	36	**SF**			
Type A Total Area:	**2,936**	**SF**	**$475**	**($10)**	**$1,365,240**
30%					

	QUANT	UNIT	BASE COST	ADD ON	TOTAL
Type B: Standard Office Type Finishes					
Turnout Gear Room	224	**SF**			
Janitor Room	48	**SF**			
Station Lobby	72	**SF**			
Station Office	196	**SF**			
Dining Area	192	**SF**			
Day Room	224	**SF**			
Fitness Room	528	**SF**			
Firefighter Bedroom	825	**SF**			
Stairs	576	**SF**			
Firefighter Pole	32	**SF**			
Circulation/Structure	2,279	**SF**			
Type B Total Area:	**5,196**	**SF**	**$475**	**$0**	**$2,467,863**
53%					

	QUANT	UNIT	BASE COST	ADD ON	TOTAL
Type C: Intense Finish Systems					
Central Medical Storage	80	**SF**			
Medical Clean Up	72	**SF**			
Work Shop Alcove	120	**SF**			
Air Room	240	**SF**			
Special Project Room	80	**SF**			
Restroom	64	**SF**			
Station Public Restroom	64	**SF**			
Kitchen	248	**SF**			
Laundry Room	96	**SF**			
Firefighter Bathroom ADA	72	**SF**			
Firefighter Bathroom	126	**SF**			
Station Elevator	240	**SF**			
Type C Total Area:	**1,502**	**SF**	**$475**	**$50**	**$788,550**
15%					
	QUANT	**UNIT**	**BASE COST**	**ADD ON**	**TOTAL**
Type D: Service Room Finishes					
Mechanical Room	80	**SF**			
Electrical Room	80	**SF**			
Communications Room	80	**SF**			
Type D Total Area:	**240**	**SF**	**$475**	**($5)**	**$112,800**
2%					
A. Fire Station 53/57 Square Footage Total:	**9,874**				**$4,734,453**
adjusted cost per square foot:	**$480**				

C. REPLACEMENT OF FIRE STATION 57 AT THE MARIN COUNTY CIVIC CENTER

OVERALL PROJECT BUDGET

This section identifies an overall project budget based on the following items:

- Building and Site Construction Costs w/ Equipment and Furnishings,
- Design and other Related Fees,
- Administrative, Permit, Bidding Costs, and
- Project Contingencies.




REPLACEMENT OF FIRE STATION 57 AT THE MARIN CIVIC CENTER
TWO COMPANY PROTOTYPE
EXISTING CIVIC CENTER SITE
OVERALL PROJECT BUDGET

A. Construction with Contingencies and Escalation

	QUANT	UNIT	Cost per Unit	Total	Notes
Fire Station					
Fire Station No. 53/57	1	LS	$4,734,453	$4,734,453	Refer to construction budget detail
On-Site Improvements (Civic Center Site)	34700	SF	$25	$867,500	Utility, Grading and Drainage, Paving, Fences and Gates, Landscaping.
Storage Building(NIC)	0	SF	$150	$0	Storage Building - Future
Haz Mat Demo/Bldg. Demo	5,000	SF	$12	$60,000	Demolition of existing fire station
Off-Site Improvements	1	LS	$250,000	$250,000	Allowance
Temporary Facilities	-	LS	$250,000	$0	Relocate to Station 53 During construction
Specialty Equipment	1	LS	$312,750	$312,750	Contractor Provided Equipment per equipment budget detail
Construction Subtotal:				**$6,224,703**	Project Allowance
Project Design Unknowns	15%	**%**	$6,224,703	$933,705	Allowance
Construction with Design Unknowns Subtotal:				**$7,158,408**	Project Allowance
Construction Contingency (10% of Construction)	10%	**%**	$7,158,408	$715,841	Allowance
Construction with Change Order Contingency Subtotal:				**$7,874,249**	Project Allowance
Project Escalation (5% per annum, compounded yearly)	12%	**%**	$7,874,249	$944,910	Annual rate to midpoint of Construction = 24 months (14 months design and 20 months construction)
Construction (Building Site, Specialty Equipment, Contingencies, Escalation):				**$8,819,159**	
Constructon Cost per SF of Building Area:				**$418.26**	

B. Design and Other Related Fees					
	QUANT	**UNIT**	**Cost Per Unit**	**TOTAL**	**Notes**
Design Fees (A, C, L, S, MEP) - BASIC ON-SITE	10%	**%**	$8,819,159	$881,916	A/E fees including entitlements
Off-site/Street Improvement Drawings	15%	**%**	$250,000	$37,500	Design for off site improvements
Cost Estimating	1	**LS**	$25,000	$25,000	Estimate for each phase of development
Boundary and Topographic Surveys	1	**LS**	$25,000	$25,000	Includes recording map
Erosion Control Plan	1	**LS**	$7,500	$7,500	Per Bldg Department Requirements
Waterproofing Consultant	1	**LS**	$12,500	$12,500	Consultant to City
Lighting Designer	1	**LS**	$12,500	$12,500	Optional
Head In Data, Phone, Response, Security, AV Consultant	1	**LS**	$75,000	$75,000	Consultant to City or Arch.
LEED Documentation	1	**LS**	$100,000	$100,000	Energy Modeling, LEED submittal and Tracking
Construction Management (5% of construction value)	5%	**%**	$8,819,159	$440,958	Day to day management during construction
Geotechnical Investigation	1	**LS**	$30,000	$30,000	Includes geohazards report
Haz Mat Study (Ground and (E) buildings)	1	**LS**	$15,000	$15,000	Study only
Environmental (CEQA) Documentation	1	**LS**	$50,000	$50,000	Assume Neg Dec.
Commissioning	1	**LS**	$50,000	$50,000	As Required for LEED Gold
Continuous Inspection, Testing During Construction	1	**LS**	$75,000	$75,000	Allowance
			Subtotal Design Fees:	**$1,837,874**	
Fee Contingency (5% of total Fees)	5%	**%**	$1,837,874	$91,894	Allowance
Reimbursables (5% of total Fees)	5%	**%**	$1,837,874	$91,894	Project Allowance
			Total Design and Other Related Fees:	**$2,021,661**	

C. Administrative, Permit and Bidding Costs					
	QUANT	**UNIT**	**Cost Per Unit**	**Total**	**Notes**
Administration Costs	-	**LS**	$200,000	$0	Assume none charged to project
Legal Fees	1	**LS**	$120,000	$120,000	Allowance
Building Permit Costs	1%	**%**	$8,819,159	$88,192	Per Building Department
Plan Check Fees	0.5%	**%**	$8,819,159	$44,096	Per Building Department
SWPP Fees (State Board Compliance)	1	**LS**	$5,000	$5,000	Allowance
Planning/Environmental Review Fees	1	**LS**	$40,000	$40,000	Allowance
Temporary Storage Costs	0	**LS**	$25,000	$0	Assume none required
Public Art	1	**LS**	$30,000	$30,000	Allowance
Specialty Equipment	1	LS	$153,200	$153,200	Owner provided Equipment
Furnishings	1	LS	$44,965	$44,965	Refer to furnishings budget detail
Bidding/Printing (noticing, blueprints, etc.)	1	**LS**	$10,000	$10,000	Allowance
Moving Costs (one move)	1	**LS**	$15,000	$15,000	Allowance
Utility Fees - (PG&E, sewer, water, telecom, other)	1	**LS**	$250,000	$250,000	Allowance
Subtotal Administrative Costs:				**$800,452**	
Administrative Cost Contingency (5% of total Fees)	5%	**%**	$800,452	$40,023	Allowance
Total Administrative, Permit and Bidding Costs:				**$840,475**	

Division Totals:		
	Total	**Notes**
A. Construction with Contingencies and Escalation	$8,819,159	
B. Design and Other Related Fees	$2,021,661	
C. Administrative, Permit and Bidding Costs	$840,475	
Overall Project Budget:	**$11,681,295**	
Project Cost Per SF (9,889 SF) :	**$1,183.10**	

Exclusions:

1. Program Level Bond Management Fees

C. REPLACEMENT OF FIRE STATION 57 AT THE MARIN COUNTY CIVIC CENTER

SITE ARRANGEMENT DIAGRAMS

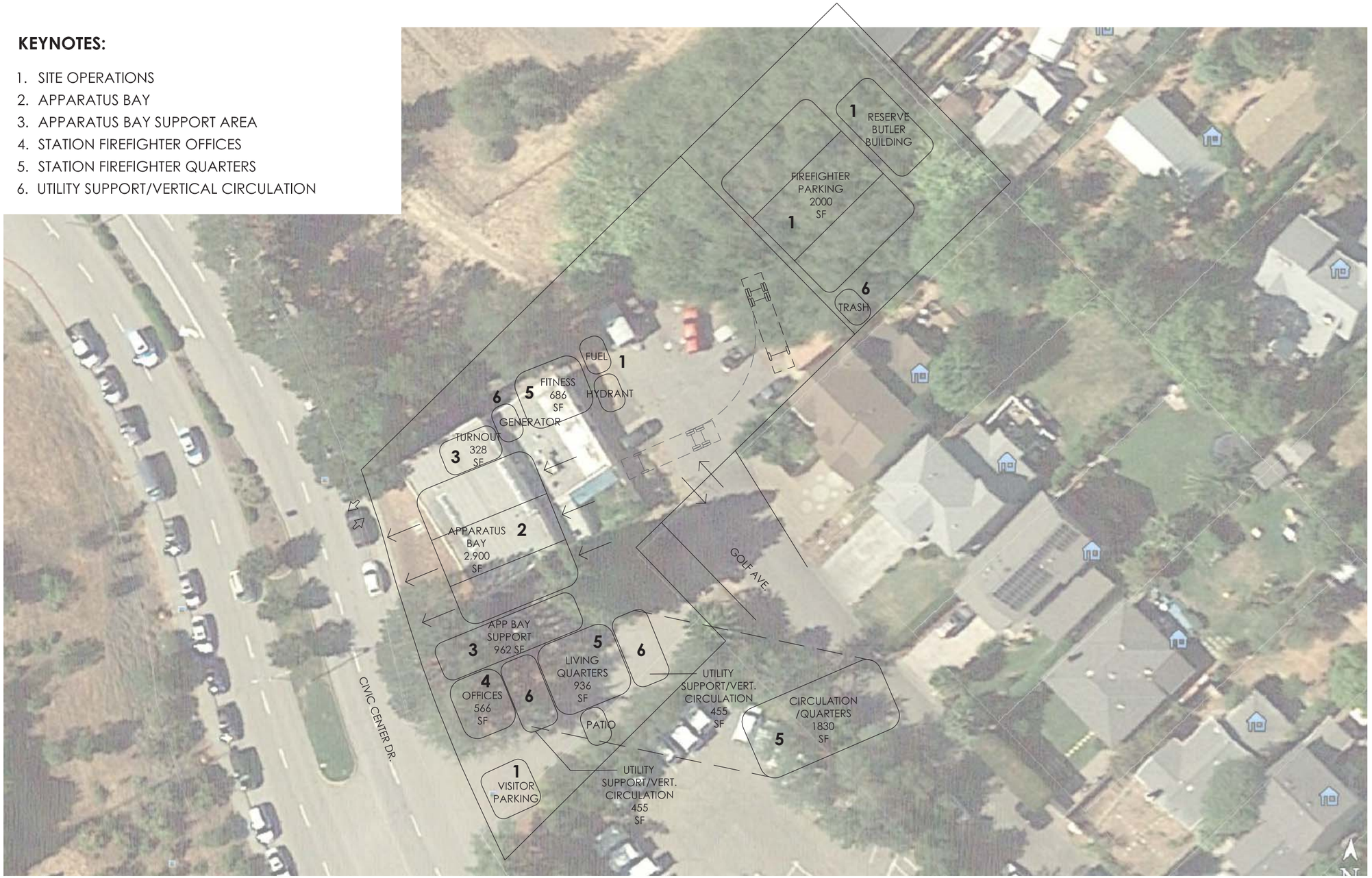
These studies graphically illustrate the initial arrangement concepts developed through discussion with the Project Design Team. Considerations in each scheme include:

- Circulation to and from site,
- Visitor parking and pedestrian access,
- Site operations adjacencies and activities, and
- City of San Rafael planning ordinances




KEYNOTES:

1. SITE OPERATIONS
2. APPARATUS BAY
3. APPARATUS BAY SUPPORT AREA
4. STATION FIREFIGHTER OFFICES
5. STATION FIREFIGHTER QUARTERS
6. UTILITY SUPPORT/VERTICAL CIRCULATION



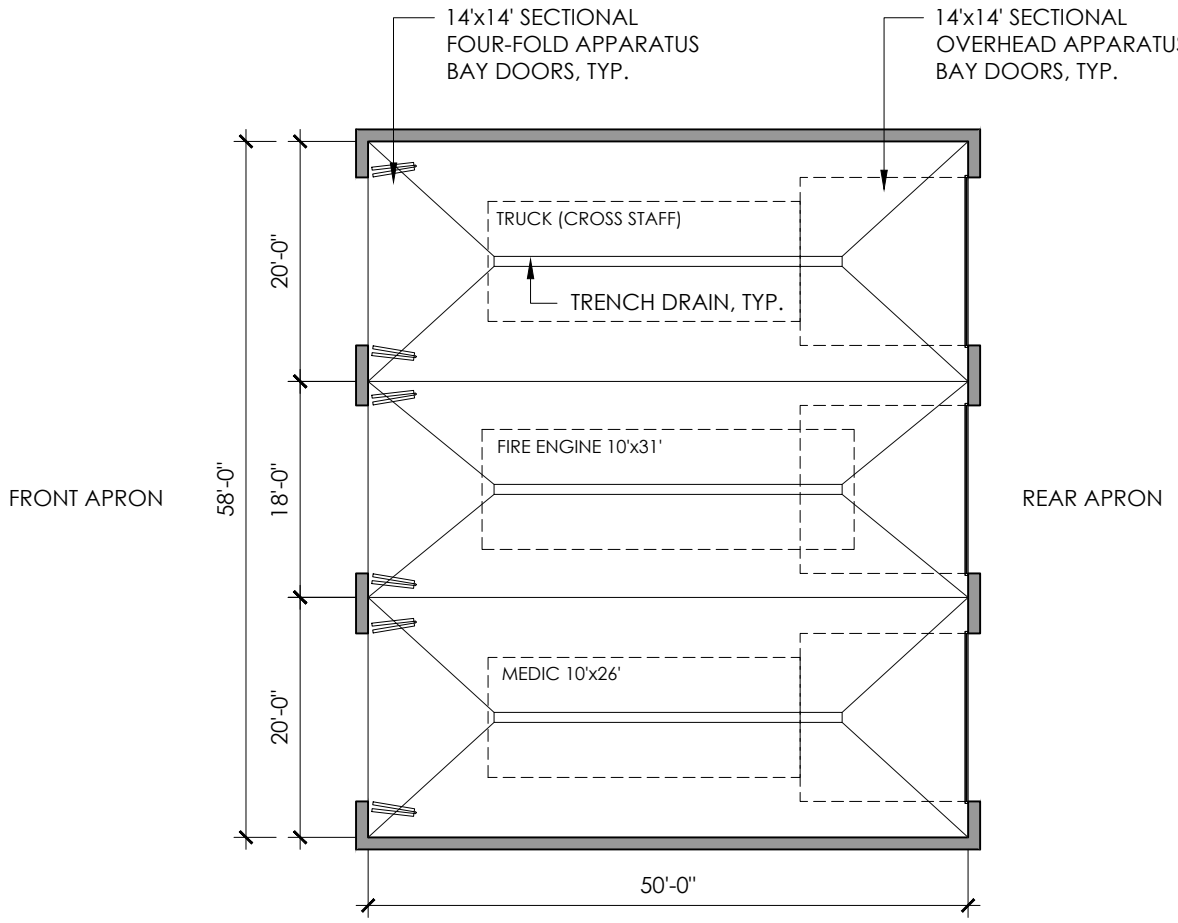
D. TWO COMPANY PROTOTYPICAL COMPONENT DIAGRAMS

Component diagram use space standards and expand them into room diagrams that graphically illustrate the equipment and furniture arrangements in each required space and are used to determine the room area requirements. Considerations include:

- Number of staff to occupy the space at any given time,
- Equipment size and operating clearances,
- Circulation within the space, and
- Furniture layout for efficient space use.



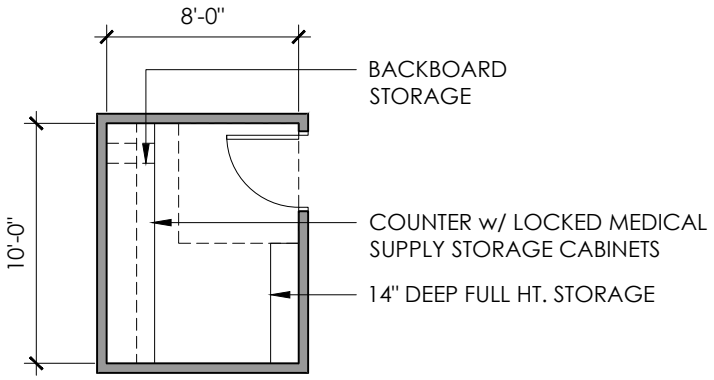

STATION - APPARATUS BAY/APPARATUS BAY SUPPORT



APPARATUS BAY (2,900 S.F.)

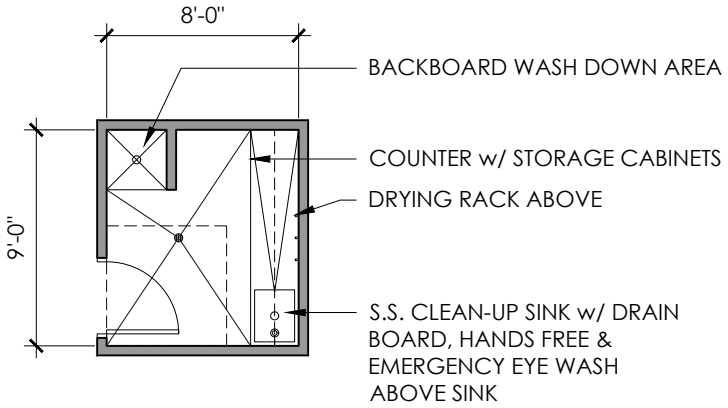
SCALE: 1/16"=1'-0"

STATION - APPARATUS BAY/APPARATUS BAY SUPPORT



CENTRAL MEDICAL SUPPLY STORAGE (80 S.F.)

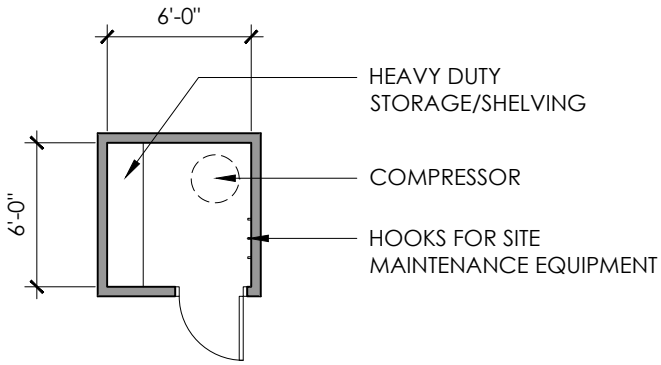
SCALE: 1/8"=1'-0"



MEDICAL CLEAN UP (72 S.F.)

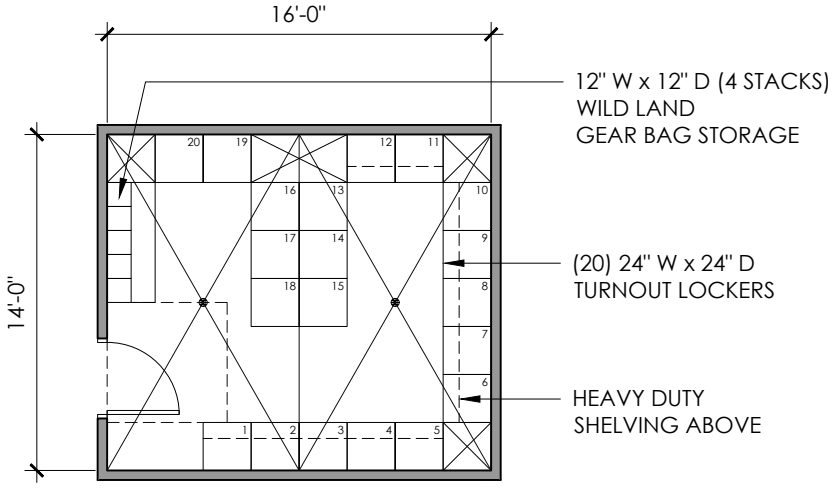
SCALE: 1/8"=1'-0"

STATION - APPARATUS BAY/APPARATUS BAY SUPPORT



YARD STORAGE (36 S.F.)

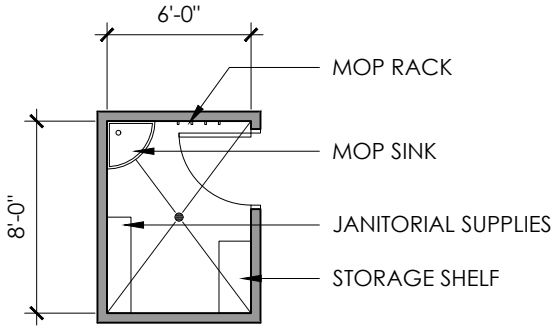
SCALE: 1/8"=1'-0"



TURNOUT GEAR ROOM (224 S.F.)

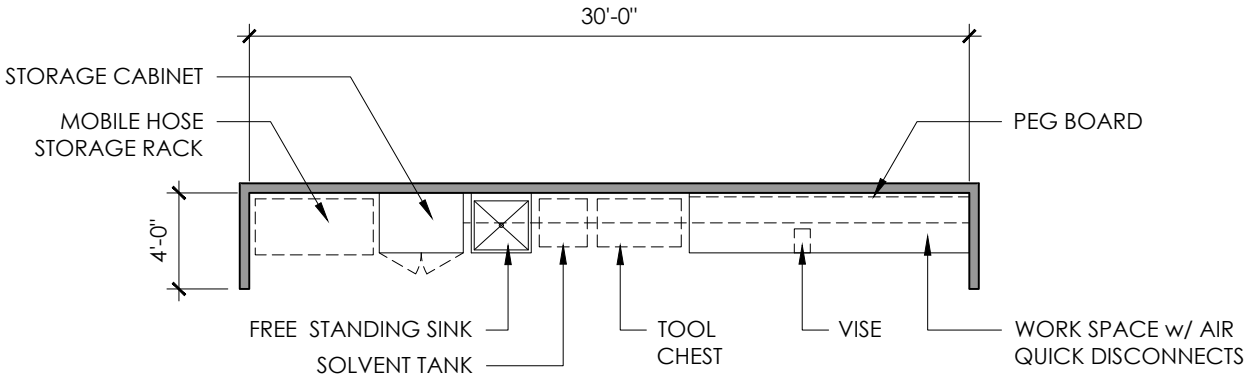
SCALE: 1/8"=1'-0"

STATION - APPARATUS BAY/APPARATUS BAY SUPPORT



JANITOR ROOM (48 S.F.)

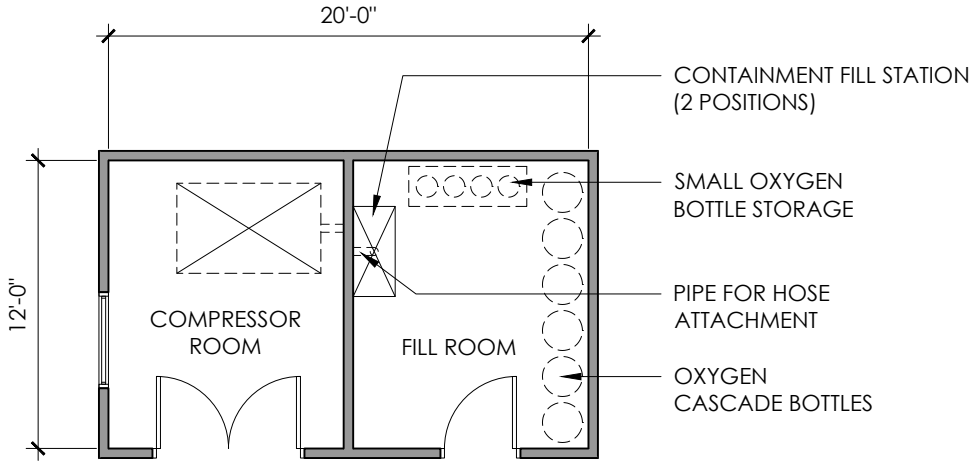
SCALE: 1/8"=1'-0"



WORKSHOP ALCOVE (120 S.F.)

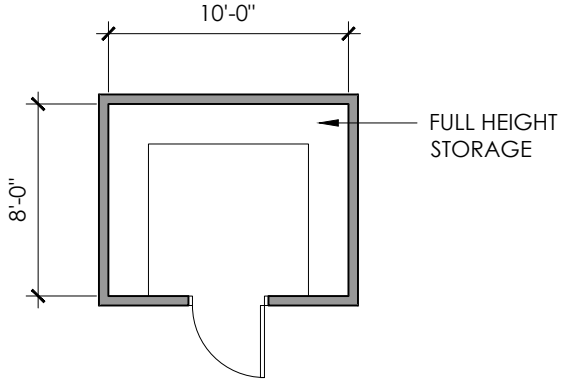
SCALE: 1/8"=1'-0"

STATION - APPARATUS BAY/APPARATUS BAY SUPPORT



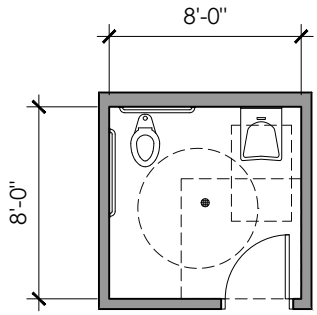
AIR ROOM (240 S.F.)

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



SPECIAL PROJECT ROOM (80 S.F.)

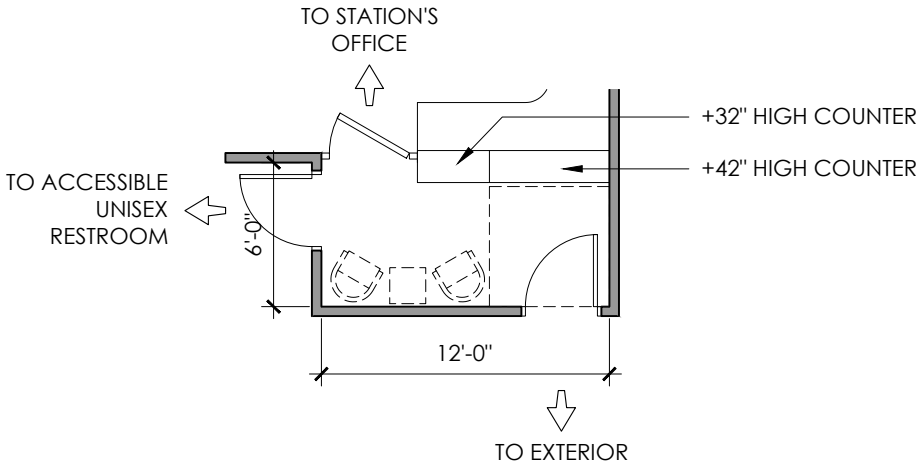
SCALE: 1/8"=1'-0"



RESTROOM (64 S.F.)

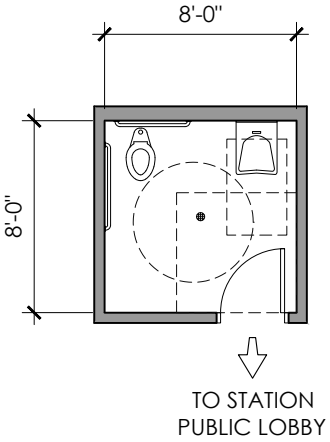
SCALE: 1/8"=1'-0"

STATION - FIREFIGHTER OFFICES



STATION PUBLIC LOBBY (72 S.F.)

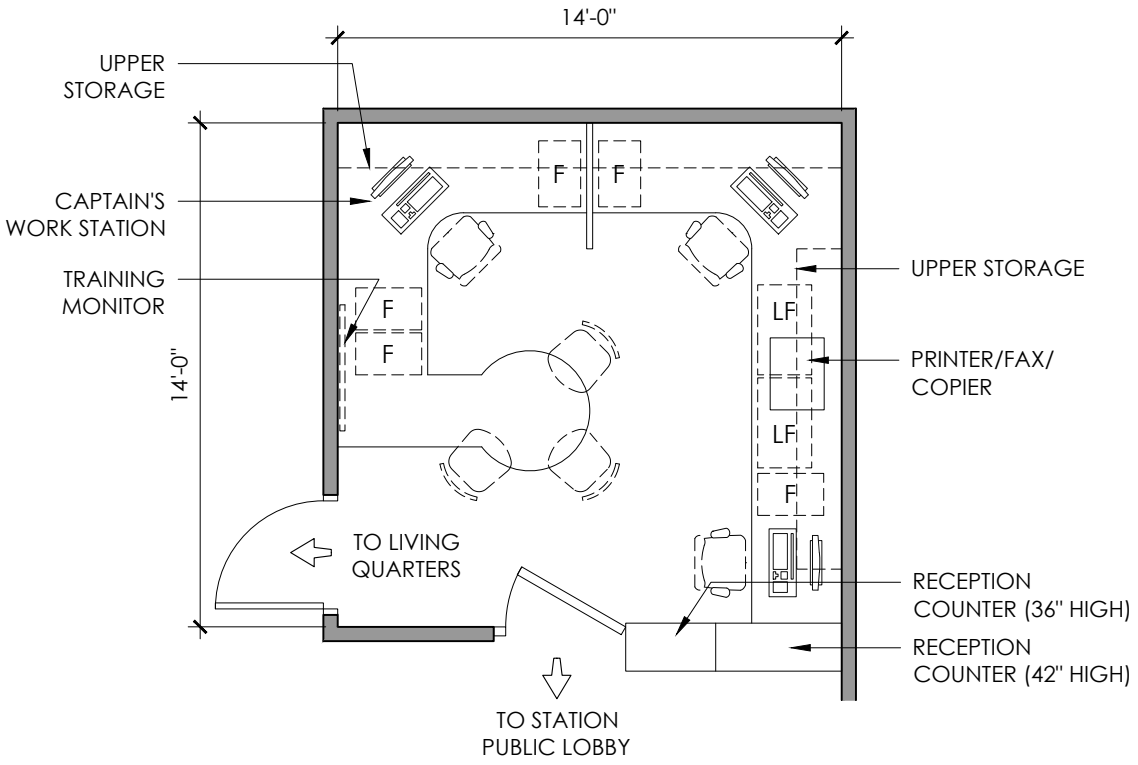
SCALE: 1/8"=1'-0"



STATION PUBLIC RESTROOM (64 S.F.)

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

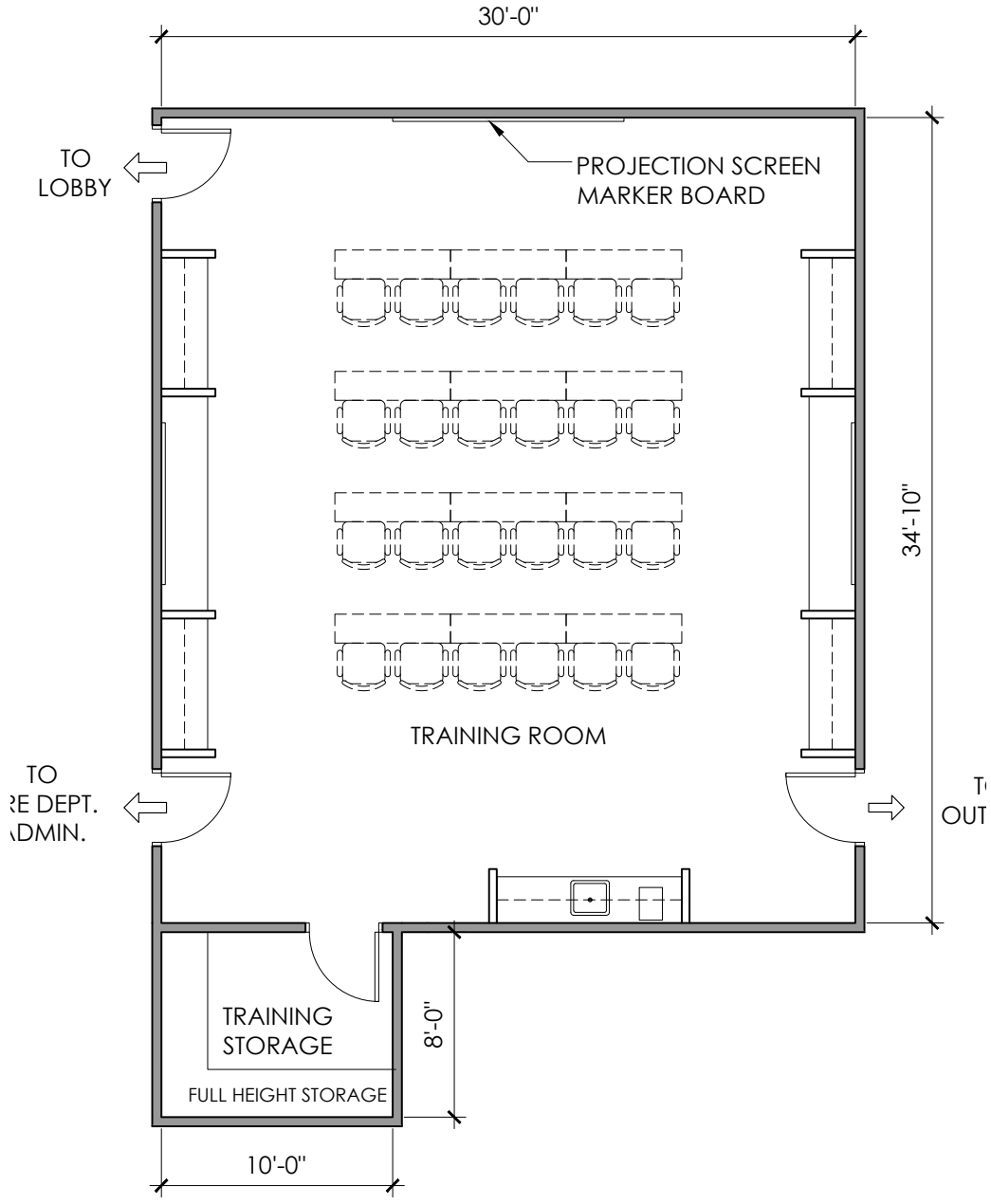
STATION - FIREFIGHTER OFFICES



STATION OFFICE (196 S.F.)

SCALE: 3/16"=1'-0"

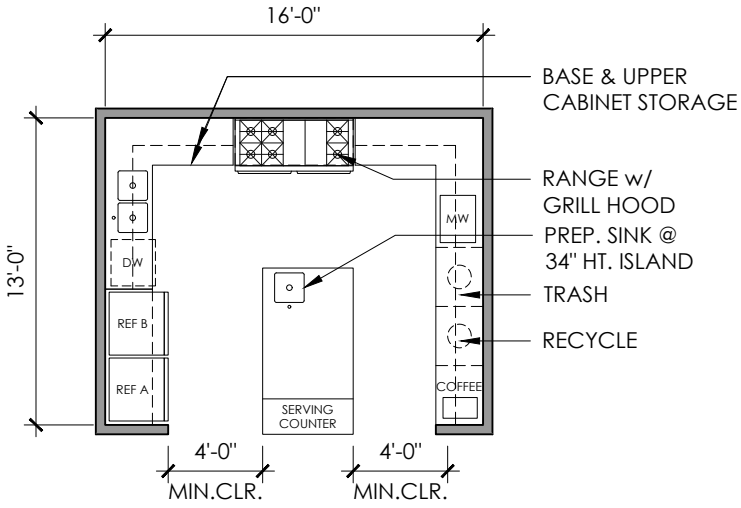
STATION - FIREFIGHTER TRAINING AREA

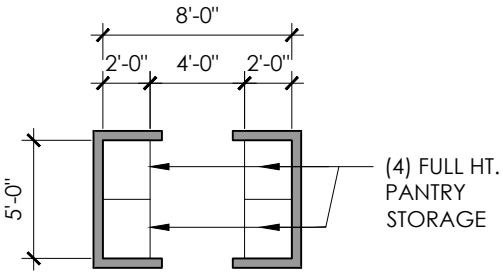


TRAINING CLASSROOM (1,050 S.F.)
TRAINING STORAGE (80 S.F.)

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

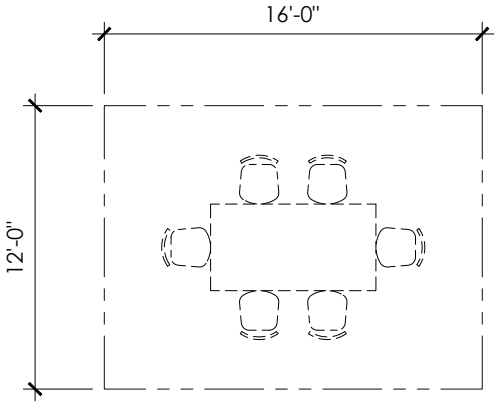
STATION - FIREFIGHTER QUARTERS



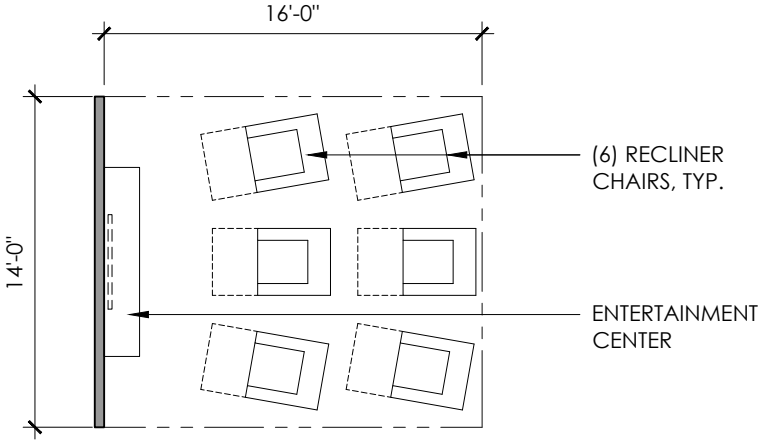


PANTRY (40 S.F.)
SCALE: 1/8"=1'-0"

KITCHEN (208 S.F.)
SCALE: 1/8"=1'-0"

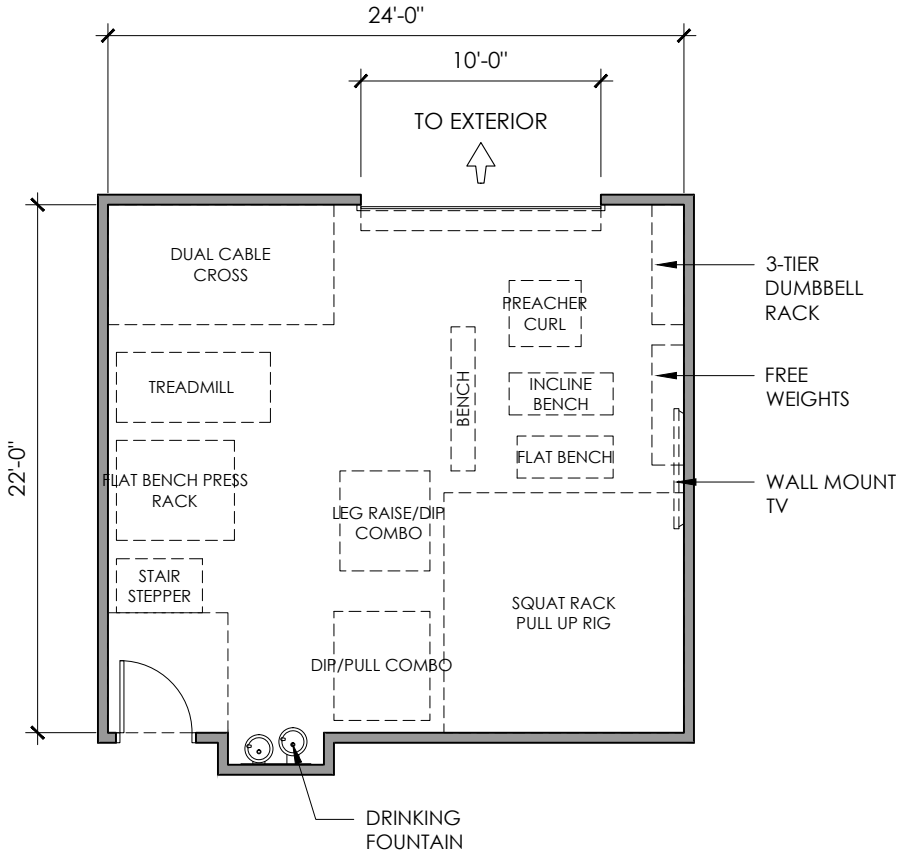


DINING AREA (192 S.F.)
SCALE: 1/8"=1'-0"



DAYROOM (224 S.F.)
SCALE: 1/8"=1'-0"

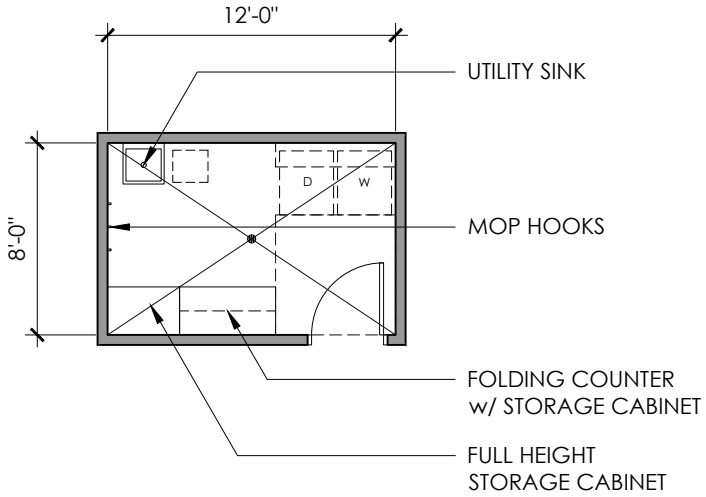
STATION - FIREFIGHTER QUARTERS



FITNESS ROOM (528 S.F.)

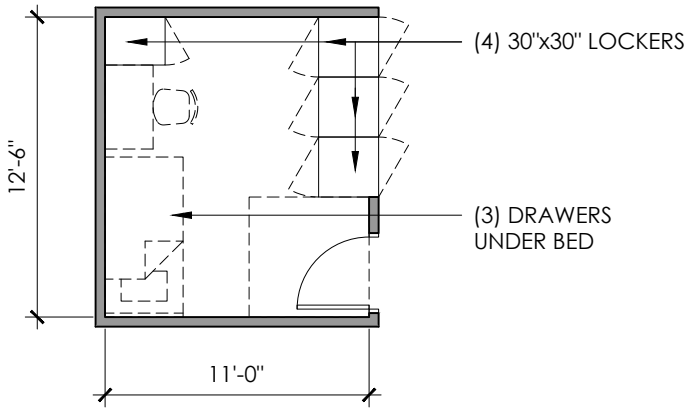
SCALE: 1/8"=1'-0"

STATION - FIREFIGHTER QUARTERS



LAUNDRY ROOM (96 S.F.)

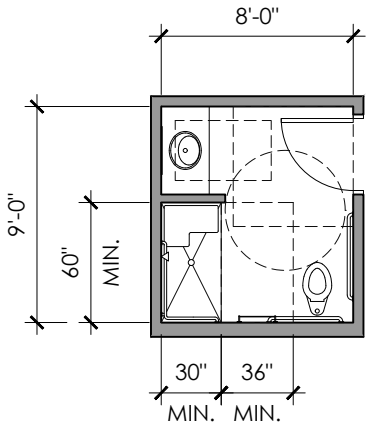
SCALE: 1/8"=1'-0"



FIREFIGHTER BEDROOM - 6 (825 S.F.)

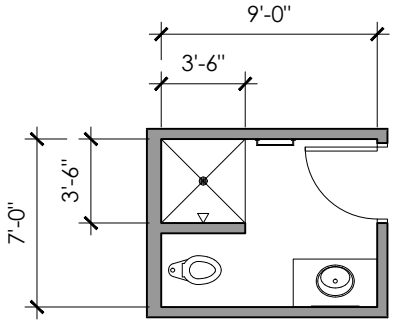
SCALE: 1/8"=1'-0"

STATION - FIREFIGHTER QUARTERS



FIREFIGHTER BATHROOM ADA (72 S.F.)

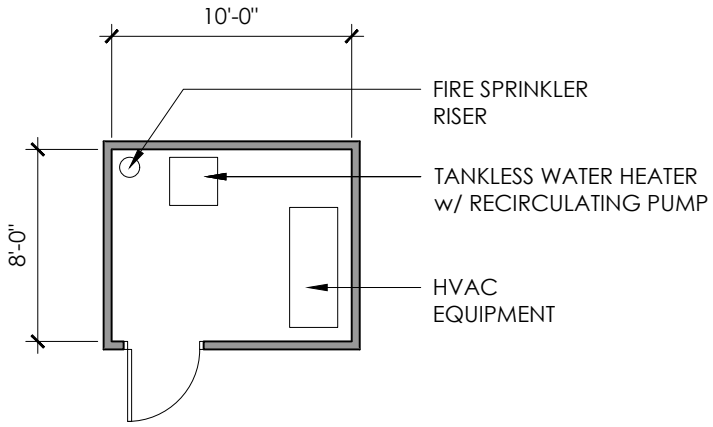
SCALE: 1/8"=1'-0"



FIREFIGHTER BATHROOM (2) (126 S.F.)

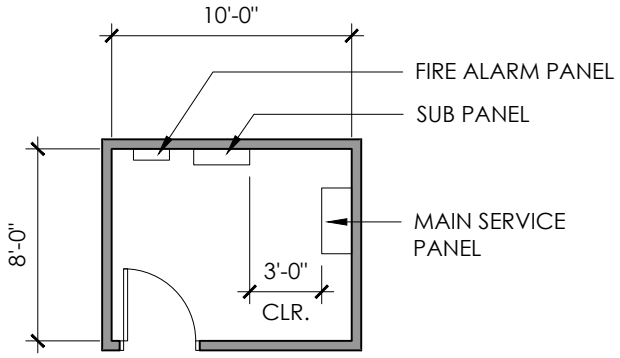
SCALE: 1/8"=1'-0"

STATION - UTILITY SUPPORT SPACE



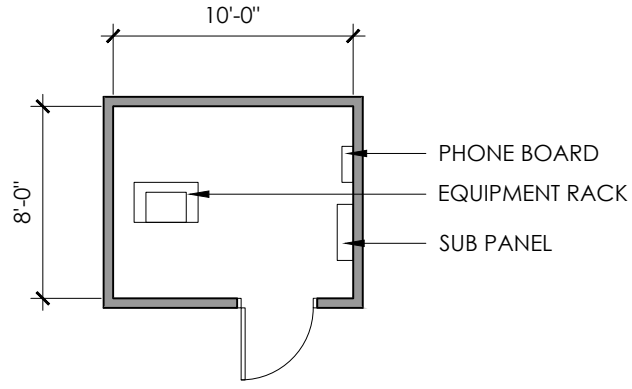
MECHANICAL ROOM (80 S.F.)

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



ELECTRICAL ROOM (80 S.F.)

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

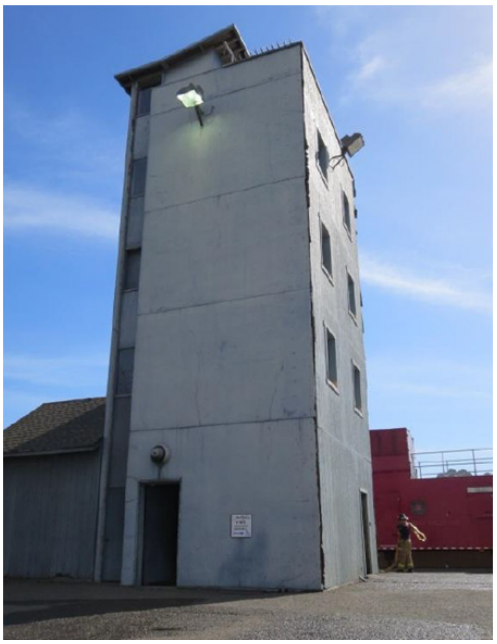


COMMUNICATIONS ROOM (80 S.F.)

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

EXISTING FACILITY CONDITION ASSESSMENTS

FIRE STATION 52 – 210 3RD STREET



Fire Station 52 is located at the corner of 3rd and Union Streets and serves a portion of the city east of Highway 101 and provides backup for Fire Stations 51, 54, 55, and 57. Fire Station 52 was originally built in 1957 and is the smallest of San Rafael's fire stations at approximately 2,982 square feet. In addition to the station building, the site also features training facilities such as a five-story drill tower and an approximately 1,000-square-foot modular classroom.

The station is wood-framed construction and the facility was designed with the apparatus room constructed on the eastern side of the living quarters. The station lacks adequate insulation and has inadequate space, worn finishes, and poor ventilation/air conditioning, especially in the dormitory. The apparatus bay size is inadequate for modern apparatus and equipment. Fire Station 52's life safety issues include the lack of a fire suppression system (e.g., sprinklers), insufficient exhaust from the apparatus bays, and inadequate building access as required by Americans with Disabilities Act (ADA) codes. The station lacks an appropriate area for decontamination as well as space for storage of hazardous materials, such as chemicals used for firefighting or toxic substances cleaned up in the community and waiting proper disposal. In addition to obsolete seismic and building systems, the fire station layout lacks spaces necessary to support a modern work force. Spaces lacking but required for firefighter safety include dedicate turnout storage, medical clean up, medical supply storage, and a dedicated fitness room. The station also lack privacy necessary to support a diverse workforce including private sleeping and bathing facilities for female firefighters.

The department's training tower shows severe dry rot and water damage. Structurally, the drill tower is in a state of disrepair as the floor slab is lower than the level of the surrounding grade, and no floor drains were included in the design to handle the resulting ponding. Water damage to floor and wall panels can be seen throughout the tower. Recommendations include the complete replacement of facilities, including the training tower. Primary deficiencies include:

- The station is seismically unsafe in the event of a major event. Fire Station 52 has significant dry rot damage, differential settlement of perimeter walls, and seismic cracking.
- The fire station layout lacks spaces necessary to support a modern work force.
- Apparatus bay size is inadequate for today's apparatus and equipment.
- Similar to Fire Station 51, much of the plumbing is original, is constantly under repair, and has passed its useful life span.

- This site offers a prime opportunity to bring a medic company closer to the freeway and the facility is proposed to house an engine company, truck and medic company. It is more cost effective to build a new facility rather than adapt this one to accommodate these uses.

Supporting documents used to prepare this recommendation include:

- *Basis of Design Narrative – Fire Station 52.* Prepared by Interface Engineering, June 22, 2015
- *San Rafael Facilities Master Plan – Structural Assessment*. Prepared by Cornerstone Engineering, June 23,2015

FIRE STATION 57 – 3530 CIVIC CENTER DRIVE

Fire Station 57 is located across the street from the Marin County Civic Center and serves the portion of San Rafael north of the hill and east of Highway 101. Fire Station 57 was constructed in 1978 in the shadow of Frank Lloyd Wright's Civic Center and this approximately 3,801-square-foot facility sits on a large parcel of land owned by the County. The building is a wood-framed structure and suffers from outdated electrical and mechanical systems. It lacks adequate insulation and has inadequate space, worn finishes, and poor ventilation/air conditioning, especially in the dormitory. The apparatus bay size is inadequate for modern apparatus and equipment. Fire Station 57's life safety issues include the lack of a fire suppression system (e.g., sprinklers), insufficient exhaust from the apparatus bays, and inadequate building access as required by ADA codes. The fire station layout lacks spaces necessary to support a modern work force. Spaces lacking but required for firefighter safety include dedicate turnout storage, medical clean up and medical supply storage, and a dedicated fitness room. The station also lack privacy necessary to support a diverse workforce including private sleeping and bathing facilities for female firefighters.

Fire Station 57's seismic condition has been rated as "poor" in the City's 2003 assessment, meaning that there is a significant risk of damage or even collapse in the event of a major earthquake. At 37 years old, this is the second-newest fire station in the City; however, the condition and configuration of Fire Station 57 is sufficiently inadequate to require a rebuild rather than retrofit.

- This station as structurally designed (cantilevered wall-framing) has not been allowed by the building code for over 20 years. The entire apparatus bay seismic system is based on this design and would need to be completely replaced at 235 percent greater forces that the original design. In addition the apparatus bay size is inadequate for today's apparatus and equipment.
- Similar to Fire Stations 54 and 55, much of the plumbing is original, constantly under repair, and has passed its useful life span.
- The fire station layout lacks spaces necessary to support a modern work force.
- The building suffers from outdated electrical and mechanical systems which are past their useful lifespan.

Due to the 2003 seismic rating as "poor" and to the severity of the outdated systems this facility was not studied in further detail through this strategic plan. The original study provided sufficient data to develop a recommendation for this station.

APPENDIX

San Rafael Strategic Plan Tier 1 - Fire Station No. 52
Structural Review and Conditional Assessment
Prepared by Cornerstone Structural Engineering Group
Dated: June 23, 2015

Basis of Design Narrative - Fire Station 52
City of San Rafael - Essential Facilities Strategic Plan
MEP Review and Conditional Assessment
Prepared by Interface Engineering
Dated: June 22, 2015



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San Rafael Strategic Plan Tier 1 - Fire Station No. 52

City of San Rafael
San Francisco, CA

Structural Review and Conditional Assessment FINAL DRAFT

June 23, 2015

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June 23, 2015
2015014.11

Mary McGrath Architects
505 17th Street, 2nd Floor
Oakland, CA 94612

Attention: Mary McGrath

Subject: San Rafael Strategic Plan – Fire Station No. 52
Tier 1 Structural Assessment of Public Safety Facilities
San Rafael, CA

Dear Mary

Cornerstone Structural Engineering Group would like to present this initial structural assessment report for the subject project. In accordance with our proposal, we have performed a structural review and seismic risk assessment for the existing Fire Station Building No 52 in San Rafael. This report contains the evaluations of the one-story wood frame building with shear walls originally constructed in 1957.

We completed a site visit in March 2015, and have reviewed the available structural plans. This review includes a Tier 1 ASCE 31 seismic evaluation for Immediate Occupancy in addition to a conditional assessment of the buildings. The Tier 1 assessment includes a general review of the vertical and lateral systems of the structures.

The following report describes the findings of our structural review and seismic risk assessment for the buildings. We have included information on the performance of the buildings in a code-level earthquake.

Sincerely,
CORNERSTONE STRUCTURAL
ENGINEERING GROUP, INC.

Thomas L. Swayze, S.E.
Principal

40 Federal Street
San Francisco, CA 94107
tel (415) 369-9100
fax (415) 369-9101

TABLE OF CONTENTS

PART 1: INTRODUCTION

The following represents a general structural conditional and seismic assessment of the existing Fire Station No. 52 located in San Rafael, California. Fire station 52 is a single story wood framed structure constructed on conventional spread footings on a sloping site in downtown San Rafael constructed on a knoll. There are two apparatus bays within the station. The apparatus bay has been modified from a drive through bay to eliminate the frontage road access on 3rd Street. That access has been blocked with a retaining wall to address the grade differential. The original construction is from 1957.

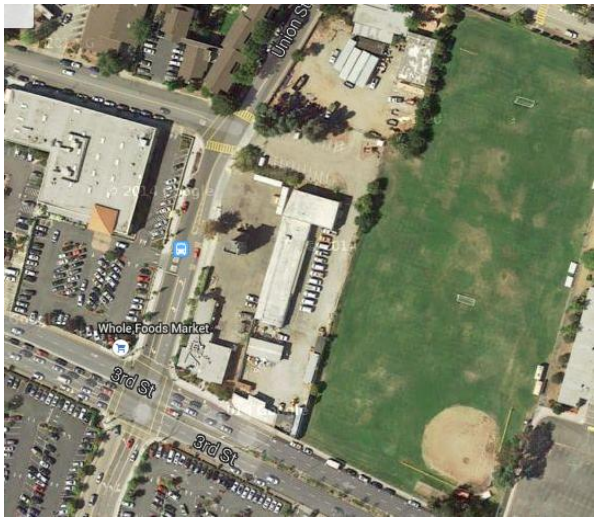

Figure 1: Station 52

A site visit was performed on March 19, 2015 to observe the existing structural conditions of the fire station building.

The report conclusions are limited by the availability of as-built construction documents and by the level of access possible for the observation of the building. This report describes the findings of our structural review, and provides recommendations for seismic upgrade and conditional structural repairs as applicable.

PART 2: SEISMIC PERFORMANCE EVALUATION

2.1 *Methodology*

The potential damage to a structure in an earthquake can be evaluated provided that, (1) seismic hazards which affect the structure and site can be estimated and, (2) the vulnerability of the structure to those hazards are known or can be estimated.

Seismicity of the fire station was determined using the United States Geologic Survey (USGS) web based Seismic Hazard Curves, Response Parameters and Design Parameters program. Seismic short period S_S and one second S_1 response acceleration parameters were obtained using latitude and longitude coordinates of the fire station location.

Seismic evaluations of the buildings were conducted using the ASCE 31-03 – Seismic Evaluation of Existing Buildings. The ASCE 31 provides a three-tiered process for seismic evaluation of existing buildings based on building type and the level of seismicity for the building location. The Tier 1 study is an initial checklist evaluation of structural, non-structural and foundation/geologic hazard elements of a building and site conditions

that is intended to screen for potential seismic deficiencies. Tiers 2 and 3 studies are more in-depth analysis procedures for a building or component that is identified by the Tier 1 screening process as structurally deficient.

This assessment of the fire station buildings utilizes the Tier 1 screening procedure to identify deficiencies as possible with the information available.

2.2 *Performance Level*

ASCE 31 evaluation of a building can be performed for either Life Safety (LS) or Immediate Occupancy (IO) performance level.

ASCE 31 generalizes the two performance levels as follows:

- LS Performance Level: At least some margin against either partial or total collapse remains, and that the overall risk of life-threatening injury as a result of structural damage is expected to be low.
- IO Performance Level: After an earthquake, the basic vertical and lateral force-resisting systems retain nearly all of their pre-earthquake strength, very limited damage to structural and non-structural components has occurred and that critical parts of the building are habitable.

The fire station building was evaluated using the Immediate Occupancy (IO) performance level criteria.

2.3 *Seismic Source*

The general seismicity in the San Francisco Bay Area is influenced by several known faults, their potential faulting length, and relative orientation. The San Andreas Fault system, which separates the North American plate from the Pacific plate, is located approximately 15km west of the fire station. Other known, nearest-site faults with recorded activity, such as the Hayward Fault are listed in Table 1.

Recent earthquakes in Southern and Central California – namely Coalinga, Whittier Narrows, and Northridge – have occurred along blind-thrust faults. These faults do not have readily identifiable surface features and are not extensively mapped. The potential for strong-ground motion to occur due to blind-thrust faulting in Northern California is somewhat in doubt. However, a moderate to large earthquake centered even closer to the site cannot be completely ruled out.

Distance (km)	**San Andreas Fault [Type A]**	**San Gregorio Fault [Type B]**	**Hayward Fault [Type A]**
Estimated MCE (M_W)	**7.1**	**7.2**	**6.4**
Station 52	15.5	16.7	13.0

Table 1: Active Near Source Faults

Based on the 2008 USGS mapping, the 475-year peak ground acceleration (PGA) for the site is 0.500g. The 475-year earthquake is the design basis for a standard structure in the California Building Code (CBC) and is based on a 10 percent probability of exceedance within a 50 year time frame.

The calculated site specific S_{DS} and S_{D1} response acceleration parameters for the fire station are 0.90 and 0.96 respectively and use a site soil classification E per USGS Soil Type and Shaking Hazard in the San Francisco Bay Area Map. Based on S_{DS} and S_{D1} values, ASCE 31 categorizes the seismicity of the fire station as 'High.'

2.4 *Liquefaction, Landslide, and other Geologic Hazard*

Currently published California Geological Survey (CGS) liquefaction hazard zone maps do not include this part of California yet. According to the Association of Bay Area Governments Earthquake Liquefaction Susceptibility maps, the fire station is located within a 'Very High' zone for liquefaction, see Figure 5. Liquefaction is the loss of bearing strength of saturated, cohesionless soils under strong ground motions, which can cause building settlement by consolidation of soils susceptible to liquefaction. Based on the hazard maps and a cursory knowledge of the soils in the area, the potential for liquefaction due to strong ground motions at station 52 is considered to be high.

The building is situated on various kinds of sites within a developed area. The potential for seismically induced landslide is therefore considered to be minimal. Currently published CGS maps for landslide vulnerability do not include this area yet.

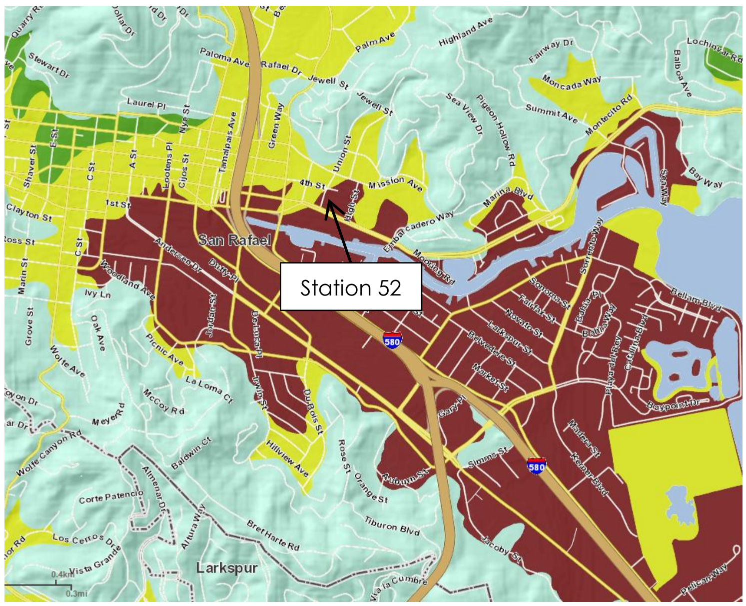

Figure 2: Association of Bay Area Governments Earthquake Liquefaction Susceptibility Map – Very High (Maroon)

The fire station is not located within a Special Study Zone as defined by the Alquist-Priolo Earthquake Fault Zoning Act. The potential for surface fault rupture is considered to be low.

It should be noted that a more thorough explanation of site seismicity, liquefaction and specific faulting hazards should be provided by a geotechnical engineer. The conclusions above rely on general USGS & CGS published data for the San Francisco Bay Area.

PART 3: STRUCTURAL EVALUATION

3.1 *Evaluation*

An ASCE 31 Tier 1 seismic evaluation of the fire station was performed using the Immediate Occupancy performance level. The building was evaluated for Basic Structural (Sec. 3.7), Supplemental Structural (Sec. 3.7S) and Geologic Site Hazard and Foundation (Sec. 3.8) checklists. This report does not evaluate the buildings for the Nonstructural (Sec. 3.9) checklist, which is typically performed by an Architect or other qualified professional.

3.2 *Documentation*

- The architectural, structural and electrical construction drawings for the fire station building by Eugene E. Crawford from San Rafael. Sheets 1-8 of 9. Drawings dated March 4, 1957.

The information provided within this report regarding the buildings is based on field observation and review of available as-built drawings.

3.3 *Vertical Load Systems*

- The apparatus bay high roof is essentially flat and is constructed of 2x (tongue in groove) T&G straight planks spanning between 5 1/8 inch glulam purlins spanning 30 feet at 7.5 feet spacing. The low flat roof over the living quarters consists of 1x diagonal sheathing over 2x wood joists at 16 inches supported in turn by 4x10 girders and interior wood framed bearing walls. The wall construction consists of typical wood framed bearing walls with conventional spread footing foundations. The apparatus bay slab on grade is 5 ½ inches thick and the living quarters slab is 3 ½ inches thick.

3.4 *Lateral Load System*

Lateral loads acting on the fire station building result from either wind pressure or earthquake-induced inertia forces acting on structural and non-structural elements. Lateral loads acting on the structure are transferred through flexible roof and floor diaphragms to the primary lateral-force resisting system of the structure. The primary lateral-force resisting systems consist of the following systems:

- Apparatus bay roof and low roof diaphragms are constructed of straight T&G sheathing and 1x diagonally sheathed diaphragms respectively spanning horizontally to conventional plywood sheathed wood shear walls which transfer lateral loads down to the continuous concrete spread footings through cast-in-place anchor bolts and tie-down rods.

3.5 *Conditional Review*

Based on our review, the fire station building appears to be in general compliance with the codes and standard construction practices in effect at the time of their construction. The exterior, interior, and portions of the roof of the fire station were observed during the site visit on March 19, 2015. Based on our cursory observations, the building appears to be in overall good condition, except for the following specific conditions as noted (see Appendix for photos referenced):

- Station appears to be in good physical condition and has been fairly well maintained
- Although the training tower was not slated for evaluation, it should be noted that dry rot damage is evident at in many locations and failure of the stucco system is evident throughout. (See Photo 4)

3.6 *Seismic Evaluation Findings*

Based on the ASCE 31 Tier 1 review, the following items are of significance for the performance of the building when subjected to strong ground motions during an earthquake.

Positive Features

- Low rise wood framed structures are relatively lightweight and historically perform well in seismic events.

- Building walls are sheathed with plywood and have positive hold-down anchorage in some locations.

Negative Features

- Project site is located within an identified liquefaction zone and there are no special provisions in the foundation system.
- The apparatus bays have inadequate shear walls in the transverse direction.
- Apparatus bay glulams are unbraced laterally at posts within clerestory windows.
- Apparatus bay roof is at higher elevation than the office area and is not tied adequately to the low roof diaphragm.
- The low roof utilizes 1x diagonal sheathing for the roof diaphragm; the apparatus bay roof uses straight 2x T&G sheathing. Neither of these systems is considered a favorable roof diaphragm for essential services facilities.
- There exists a split-level diaphragm between the high roof and the low roof above the offices and other areas. This effectively splits the building in multiple parts and presents vulnerability for separation at this joint where the roof step occurs.
- There is a lack of roof to-wall ties at re-entrant corners.

PART 4: CONCLUSION AND RECOMMENDATIONS

4.1 *Expected Performance*

Findings within this report provide a general structural conditional and seismic assessment of the existing building of the San Rafael Fire Station No. 52 located at 210 3rd Street in San Rafael, CA. Our evaluation concludes that the buildings fail to meet full compliance for ASCE 31 Tier 1 Immediate Occupancy performance criteria.

The following structural relative performance descriptions are based on our professional engineering judgment and experience, and are not part of the ASCE 31 Tier 1 checklist. These descriptions are included to provide a general estimation of seismic performance of the structure, based on component evaluations provided by the Tier 1 evaluation procedure. We expect the building to perform as follows:

- The building is anticipated to perform below average in comparison to buildings of similar construction when subjected to a design level earthquake, due to overstressed shear walls, discontinuous shear walls, and geometric irregularities.

4.2 *General Recommendation for Conditional Issues*

The following recommendations are provided to address issues concerning the condition of the existing fire station building. While none of these represent immediate life safety issues; it is recommended that these issues be addressed in the near future to prevent further deterioration from occurring:

- The station does not have any significant conditional issues
- The training tower should be replaced due to overall condition and configuration.

4.3 *Seismic Recommendations*

The following qualitative recommendations are provided to address our opinion of the potential remediation options for identified seismic deficiencies. These methods are

based on our evaluations described elsewhere in this report and engineering judgment. While the recommendations listed below do not represent any immediate concerns that warrant facility closure, they do describe building components that are non-compliant per the ASCE 31 Tier 1 checklist review for Immediate Occupancy performance or as identified by conditional or systemic deficiencies. We recommend these repairs and seismic upgrades are programmed into a future project:

- Enhance the existing plywood shear walls as necessary to make up for deficient shear capacity. Similarly enhance sill bolting connection as necessary.
- Provide a collector tie and vertical column strong-back at front and back ends of apparatus bay along the roof plane elevation discontinuity to provide continuity across the split-level diaphragms so that seismic load can be delivered to shear walls as they occur.
- Sheathe both high and low roofs with new plywood
- Install new hold-downs and potentially new footing supplements at existing shear walls at the ground floor slab/foundation level
- Provide new stability bracing at unbraced glulam beam to post connections at clerestory windows.
- Obtain geotechnical assessment of liquefaction potential and possible mitigation if necessary.

PART 5: APPENDIX - PHOTOS

Photo 1: Station 52, Front View of the App Bay

Photo 2: Station 52, Front View of the Entrance

Photo 3: Station 52, Interior of App Bay

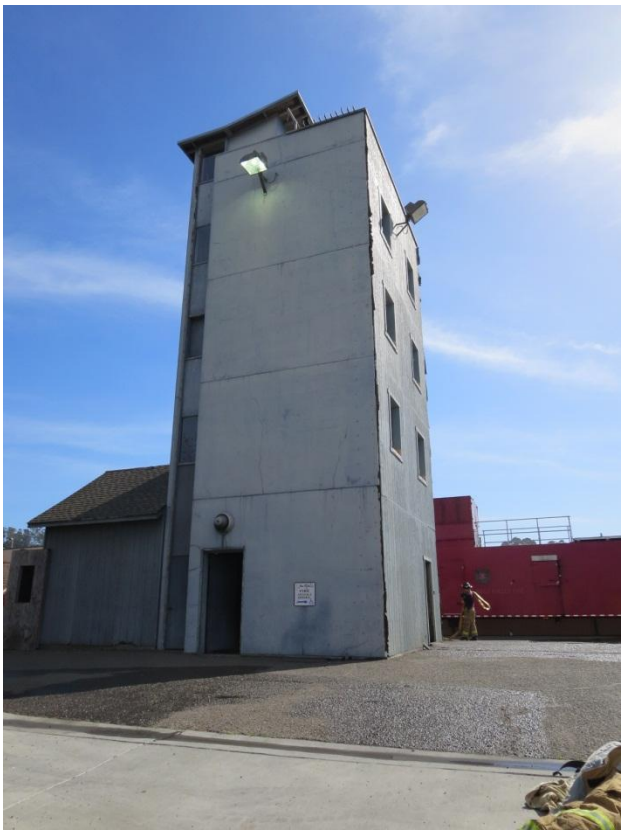

Photo 4: Station 52, Training Tower (Not Covered in Evaluation)

Basis of Design Narrative - Fire Station 52

City of San Rafael - Essential Facilities Strategic Plan
2015-0131

prepared for:
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prepared by:
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Jared Doescher, PE, LEED AP
Jason Lau, PE, LEED AP
Thomas de Senna, PE

June 22, 2015

INTERFACE ENGINEERING

Assessment of Current City of San Rafael Essential Facilities Fire Station #52

- **Mechanical Assessment**

  Fire Station #52 is a single story building with attached apparatus bay built in 1957. The original boiler and base board heating system has been abandoned and upgraded in 1998 to a rooftop air handling unit. A rooftop air handling unit with gas heating and DX cooling is now serving the building. The air handling unit is in fair condition and has approximately 5 years remaining useful life. All distribution ductwork serving the living quarters are on the roof of the building and may be reused. However, the new floorplan layout for Fire station #52 increases the area by 1,500 square foot. The Toilet and Shower room are provided with ceiling mounted exhaust fans on a dial timer switch. The exhaust fans serving these rooms have exceeded its recommended useful life and shall be replaced.

  The Apparatus Bay portion of the building has no cooling system and has gas unit heaters mounted close to the roof. The gas unit heaters seem to be well maintained and have approximately 5 years of useful life. The engine exhaust duct system seems to be working properly and well maintained. The exhaust fan for the engine exhaust system has approximately 5 years of useful life.

- **Plumbing Assessment**

  The existing piping systems in the building are mostly original and are nearing the end of their service life.

  The sewer lateral from the building flows to a city main in Third Street. We were unable to verify the size or assess the condition of the underground and below slab piping. The original design drawings indicate that the lateral may be 4".

Roof drainage is by gutters and downspouts and spills to grade. Several of the downspouts are damaged or corroded.

The building is served by a 1-1/2" water meter located in the landscape area at the south end of the building. A backflow preventer is installed at the point of connection to the building. Above grade piping at the point of connection to the building is galvanized steel. We were unable to assess the condition of the underground piping. Hot water is supplied from a gas fired water heater of unknown age. The domestic hot water system is uncirculated.

The existing bathroom plumbing fixtures appear to have been replaced at some point, but are not water conserving fixtures.

Natural gas service enters at the south east corner of the building. It runs overhead in the truck bay, attached directly to the structure, and above ceiling to serve the apparatus bay heaters, water heater, furnace, laundry dryer, and kitchen range. The piping inside of the building appears to be in functional condition. Piping outside of the building shows signs of corrosion.

An above ground diesel storage tank is located to the east of the truck bay entry. We were unable to assess the operational condition of the tank.

- **Electrical Assessment**

Fire Station #52 is currently served by a single PG&E service. Power is derived from an underground PG&E vault outside the fire station to a meter and main disconnect switch located in the Apparatus Bay. The PG&E meter number is #1009498409. The main service breaker enclosure is rated at 200A, 120/240V, 1-phase, 3-wire. The main disconnect switch feeds to a manual transfer switch, which has a power cord with a receptacle plug to serve a portable emergency generator. The transfer switch appears to have two output feeders that feed the following:

- Load Center (125A, 120/240V, 1-phase, 3-wire with 8 poles). Located in Apparatus Bay. Manufacturer is by General Electric. Appears antiquated and near end of manufacturer's recommended design life.

- Panel "A" (225A, 120/240V, 1-phase, 3-wire with 42 poles). Located in Apparatus Bay. There are (8) single pole spares available within the panelboard. Manufacturer is by Square D. Appears in fair condition and approximately 20 years old.

Emergency power is derived from a portable diesel-engine generator. The generator is a Honda EB10000 rated at 9.0kVA, 120/240V, 1-phase, 3-wire with an 8 hours fuel tank capacity at full load. The generator plugs into the receptacle cord outlet coming from the manual transfer switch.

Existing lighting system appears to be part of the original construction in the building, consisting of fluorescent and incandescent luminaires. Fluorescent luminaires consist of striplights with (2)-32 watt T8 lamps in the Apparatus Bay. Incandescent and fluorescent luminaires were located within the office and living quarters of the building. Luminaires appeared in antiquated condition. Toggle switches controlled the majority of the

luminaires. There does not appear to be automatic lighting shutoff for the building, only contactors for control of outdoor lighting. The outdoor lighting consists of antiquated HID floodlights.

The existing building is not supported by a fire alarm system. There are individual battery-operated smoke detectors located within the living quarters. No smoke detectors were observed in the Apparatus Bay Building. The new building will require an addressable fire alarm system.

- **Telecommunications Assessment**

  Telecommunication service for the fire station terminates to a telephone backboard located next to the incoming distribution service equipment in the Apparatus Bay. Security equipment and other low voltage equipment enclosures are located within the closet and mounted on the plywood backboard.

  There is a communications equipment cabinet located in the Apparatus Bay. It appears to contain equipment serving a public address speaker system. Antenna cables are routed out of the cabinet and up to the exterior roof.

Recommendation for New City of San Rafael Essential Facilities Fire Station #52

- **HVAC System Description**

  <u>Option 1: HVAC system: New VRF/HR with Fan coils to provide space heating & cooling.</u>

  Commercial VRF Condensing Units: Provide 10 ton air-cooled condensing unit to be on a pad located outdoors in close proximity to the building or on the roof. VRF units shall provide heat recovery ability. Basis of Design is Mitsubishi CityMulti R2 units with seacoast coating. Ductless split indoor unit with built-in condensate pump will serve to heat and cool individual bedrooms and operable windows will provide ventilation. Ducted fan coil unit with outdoor air connections and built-in condensate pump will serve to condition the rest of the spaces. Temperature control will be available per each zone. A single 10 port BC controller box will be placed indoor to connect all indoor units to the BC controller. This BC controller will be then connected to the outdoor condensing units. Any unused ports on the BC controller may be utilized in future for extra zoning capabilities. See Appendix _ for sample VRF outdoor unit, indoor units, and the BS controller.

  Apparatus Bay: New gas unit heaters will be provided for heating and roll up doors will provide ventilation to the space.

  Commercial Kitchen: Kitchen hood exhaust duct will rise up thru the roof to new exhaust fan.

  Residential Laundry room: Gas dryer vent duct with maximum 4" diameter up thru the roof. Combustion air intake louvers on laundry closet door/ wall provide required makeup air for dryer operation.

Bathroom Exhaust System: Each Restroom/Shower Room shall be provided with a ceiling mounted exhaust fan ducted through the roof for discharge.

Control System: DDC system to be provided by the VRF system manufacturer for mechanical system control and monitoring capability.

Option 2: HVAC system: Existing rooftop cooling and heating unit with new additional VRF system.

Utilize the existing rooftop unit to provide heating and cooling for the living quarters. Supplement 4 tons of additional heating and cooling needs by providing air cooled condensing units and indoor split system to satisfy the enlarged conditional space. See Appendix _ for sample VRF outdoor unit, indoor units, and the BC controller.

- **Plumbing System Description**

Sanitary Sewer and Vent System: Provide the following:

- Replace all existing below and above grade waste and vent piping to the point of connection to the city sewer in Third Street.

- New waste and vent piping to all plumbing fixtures such as water closet, lavatory, tub/shower, kitchen sinks, washing machine, janitor mop sinks, floor drain and sinks, indirect waste receptors, and other fixtures.

- Pipe condensate from mechanical equipment to indirect receptors.

Storm Drainage System: Replace and relocate gutters and downspouts and correct site grading to properly conduct storm drainage away from the building and toward site storm drains and catch basins.

Domestic Water System:

- Replace all existing above and below ground domestic water piping from the point of connection to the water meter.
- Provide new domestic CW and HW to the following:
    - Bathroom fixtures (water closets, urinals, lavatories, and showers)
    - Kitchen Sinks, refrigerator ice maker, and dishwasher
    - Washing machine box
    - Janitor mop sinks
    - Trap primers(CW only) to serve floor drains
    - Mechanical equipment requiring make-up water with backflow device.
    - Hose bibs

- Provide a reduced-pressure type backflow preventer or acceptable equivalent per Water Department requirement.

- Provide a new gas fired domestic water heater and circulating pump.

- Provide irrigation water to planters as required.

Plumbing Fixtures: Provide the following:

- Provide all new plumbing fixtures as follows:

    - Water closets: Wall-hung with 1.28 gallons per flush, flush valves
    - Urinals: Wall-hung with 1/8 gallon per flush, flush valve
    - Private Lavatories: Wall hung or counter mounted fixture with 1.0 gpm faucet
    - Public lavatories: Wall-hung or counter-mounted fixture with 0.5 gpm faucet
    - Kitchen Sink: Stainless steel or refer to architectural for final fixture selection. Provide with 1.5 gpm max flow faucet.
    - Shower: 1.8 gpm shower head.

- Provide interior and exterior hose bibs with vacuum breakers.

- New floor drains and floor sinks with trap primers. Locate trap primer where accessible or in-wall with access panel.

Natural Gas: Provide the following:

- Replace all natural gas piping from the point of connection to the PG&E gas meter.

- Provide natural gas to all gas fired appliances such as heater, furnaces, water heaters, ranges, and dryers.

Piping materials: Provide all new materials as follows:

- Sanitary sewer (SS) and vent system: Service weight no-hub cast iron soil pipe and fittings with standard couplings above ground and heavy weight cast iron soil pipe and fittings with heavy-duty couplings below ground. Provide corrosion protection for below grade piping as recommended by Geotechnical Engineer.

- Potable domestic cold water (CW) system: Type L hard drawn copper tube above ground; Type K hard drawn copper tube below ground.

- Potable domestic hot water (HW) system: Type L hard drawn copper tube aboveground.

Natural gas system:

- Above ground: Schedule 40, A53 black steel pipe and threaded malleable iron fittings. Galvanized steel for piping exposed to weather.

Below ground: Schedule 40, A53 black steel pipe and threaded malleable fittings 2-1/2 inches and smaller. Welded pipe 3 inches and larger. Pipe below grade wrapped with double thickness Scotchwrap No. 51 applied over Scotchwrap pipe primer. Factory applied epoxy coating to equivalent thickness with field wrapped or epoxied joints approved. Alternately, Polyethylene piping with tracer wire to meet CMC.

Condensate drain system: Type M copper tube with solder joints.

- **Electrical System Description**

Service Capacity:

An upgraded PG&E service is recommended to serve the loads for the new remodel. The electrical service size shall be rated at 400A, 120/208V, 3-phase, 4-wire. This will increase the original electrical service size and allow for additional capacity to serve new and future loads. 3-phase mechanical loads could be accommodated with the service upgrade. The existing PG&E meter, main disconnect switch, manual transfer switch, and load center, and associate electrical equipment enclosures located at the Apparatus Bay would be demolished. A new 400A, 120/208V, 3-phase, 4-wire, main switchboard with PG&E meter would be provided at the same location. The demolished load center would be replaced with a new 100A, 42-pole, 120/208V, 3-phase, 4-wire panelboard at the same wall location. The existing Panel `A' shall be replaced with a new 225A, 42-pole, 120/208V, 3-phase, 4-wire panelboard, and relocated to a new location with Code-minimum 36" working clearance.

New Generator System:

A new permanent emergency generator is recommended to provide emergency power to support the entire fire station, in lieu of the portable generator. The emergency generator will be located outdoors in a sound attenuated, weatherproof enclosure. The emergency generator will be rated at 100kW/125kVA, 120/208V, 3-phase, 4-wire, with a 100 gallon sub-base fuel tank. Based on the size of the fuel tank, the generator can provide approximately 8 hours runtime at 100% full load.

An automatic transfer switch shall be provided, rated at 400A, 208V, 3-phase, and located at the same wall location at the Apparatus Bay. The automatic transfer switch output feeder will terminate into the main switchboard.

Site Lighting:

As part of the new construction, existing exterior lighting shall be replaced with new luminaires utilizing LED lamps. All exterior lighting will be controlled via photocell and lighting control panel.

Interior Lighting:

New lighting shall consist of LED luminaires to comply with Title 24 requirements and achieve energy efficiency and cost savings. Residential occupancy areas such as kitchens, bathrooms, and bedrooms shall be provided with high-efficacy LED luminaires. Non-residential areas shall be controlled via occupancy sensors or lighting control panel. Residential areas shall be controlled via manual controls or vacancy sensors. D. A tap-out

system should be provided to serve the remodeled fire station. Upon activation, the tap-out system shall energize lighting within the bedrooms, hallways, lobby, kitchen, offices/work areas, and apparatus bay and de-energize kitchen equipment.

Power Distribution:

Where receptacles provided for the office areas, a controlled receptacle capable of automatic shutoff shall be provided within 6' of each uncontrolled receptacle. AFCI protection shall be provided for all circuits serving outlets for the kitchen, family room, dining room, living room, bedroom, sunroom, recreation room, closets, hallways, laundry areas, or similar rooms. GFCI receptacles shall be provided for all circuits serving bathrooms, garages (Apparatus Bay), outdoors, kitchen countertops, within 6' of sink edge, and laundry areas.

- **Telecommunication System Description**

Incoming cable terminations shall remain in the same location if the location of the telephone backboard does not change. Otherwise, the cable terminations shall be relocated to a new location such as a new IT room. ¾-inch by 4-foot by 8-foot fire rated plywood backboards will be provided on every wall in the IT room. The IT room will have a telecommunications ground bus bar with a #3/0 copper ground to the main electrical panel and to building steel. Termination blocks will be wall mounted and will cross-connect with the PBX switch and distribute dial tone throughout the facility.

Metallic 2-gang outlet boxes with single gang adapters with 1 inch metallic conduit/raceways to accessible ceiling space will be provided for routing and termination of voice, data and CATV cabling. Telecom locations will be based on Owner input. Raceway installed per ANSI/TIA/EIA-569-B standards.

Electronic card key access will be provided at identified entry doors and any site gates that are secure. All exterior doors will be monitored via door position switches and CCTV. A keypad with and LCD display will be provided at the main entrance for arm/disarm operation as well as determining which doors are operational or not.

Metallic single-gang outlet boxes with ½ -inch metallic conduit/raceways to accessible ceiling space will be provided for routing and termination of the security/access control cabling. Security/access control locations will be based on Owner input. Raceway installed per ANSI/TIA/EIA-569-B standards.

The paging system will be designed to provide program distribution and all-call to speakers throughout and provide local amplification. Coverage will be included for the entire interior of both buildings as well as exterior areas as designated by the Owner. The system will be required to be interfaced to the telephone system for general paging from any telephone instrument.

One inch metallic conduit/raceways will be provided for routing and termination of the Paging System. Speaker and volume control locations will be based on Owner input. Raceway installed per ANSI/TIA/EIA-569-B standards.

The existing communication equipment cabinet shall be coordinated with the Owner to determine whether it should be reused as part of the renovation.

Electrical Appendix

Figure E1: PG&E meter pedestal, main disconnect, and load center

Figure E2: Manual Transfer Switch next to Main Meter Pedestal

Figure E3: Low Voltage Equipment and Telephone Backboard

Figure E4: Telephone Equipment in Closet

Figure E5: Communication Equipment Cabinet in Apparatus Bay

Mechanical Appendix

CITY**MULTI**® **Model: 10-TON PURY-P120YKMU-U (-BS)** MITSUBISHI ELECTRIC

Job Name:

Schedule Reference: | Date:

OUTDOOR VRF HEAT PUMP WITH HEAT RECOVERY SYSTEM FEATURES

- Assembled in USA
- INVERTER-driven compressor
- Air-source, simultaneous cooling and heating
- Long line lengths - for details see Engineering Manual
- Connects to CITY MULTI indoor units
- Controlled via CITY MULTI Controls Network

UNIT OPTION

□ Standard Model……PURY-P120YKMU-U
■ Seacoast (BS) Model……PURY-P120YKMU-U-BS

OPTIONAL PARTS

□ Joint Kit……for details see Pipe Accesories Submittal
■ BC Controller……for details see BC Controller Submittals
□ Low Ambient Kit ……for details see Low Ambient Kit Submittal
□ Snow/Hail Guards Kit……for details see Snow/Hail Guards Kit Submittal

Specifications		Model Name
Unit Type		**PURY-P120YKMU-U (-BS)**
Nominal Cooling Capacity (460V)	**Btu/h**	120,000
Nominal Heating Capacity (460V)	**Btu/h**	135,000
Operating Temperature Range *1	**Cooling (Outdoor) *2**	23~115° F (-5~46° C) DB
	Heating (Outdoor)	-4~60° F (-20~15.5° C) WB
External Dimensions (H x W x D)	**In. (mm)**	64-31/32 x 68-29/32 x 29-5/32 (1,650 x 1,750 x 740)
Net Weight	**Lbs. (kg)**	743 (337)
External Finish		Pre-coated galvanized steel sheet
Electrical Power Requirements	**Voltage, Phase, Hertz**	460V, 3-Phase, 60Hz
Minimum Circuit Ampacity (MCA)	**A**	21
Maximum Fuse Size	**A**	25
Piping Diameter (Brazed) (In. / mm)	**Liquid (High Pressure)**	3/4 (19.05) Brazed
	Gas (Low Pressure)	1-1/8 (28.58) Brazed
Max. Total Refrigerant Line Length	**Ft.**	1,969
Max. Refrigerant Line Length (Between ODU & IDU)	**Ft.**	541
Max. Control Wiring Length	**Ft.**	1,650
Indoor Unit	**Total Capacity**	50~150% of outdoor unit capacity
	Model / Quantity	P06~P96/1~30
Sound Pressure Levels	**dB(A)**	60
Fan		
Type x Quantity		Propeller fan x 2
Airflow Rate	**CFM**	11,300
External Static Pressure	**In. WG**	Selectable; 0, 0.12 or 0.24"WG; factory set to 0"W.G.
Compressor Operating Range		15% to 100%
Compressor Type x Quantity		Inverter scroll hermetic compressor
Refrigerant		R410A x 26 lbs + 1 oz (11.8 kg)
Protection Devices	**High Pressure**	High pressure sensor, High pressure switch at 4.15 MPa (601 psi)
	Inverter Circuit (Comp. / Fan)	Over-current protection
	Fan Motor	Thermal switch
AHRI Ratings (Ducted/Non-Ducted)	**EER**	11.7 / 12.2
	IEER	18.6 / 20.8
	COP	3.45 / 3.61
Simultaneous Rating (Ducted/Non-Ducted)	**SCHE *3**	16.80 / 19.70
Blue Fin Anti-corrosion Protection: Cellulose- and polyurethane-resin coating treatment applied to condenser coil that protects it from air contaminants **Standard:** ≥1µm thick; Salt Spray Test Method - no unusual rust development to 480 hours. **Seacoast (BS):** ≥1µm thick; Salt Spray Test Method - no unusual rust development to 960 hours.		

NOTES:

*1. Harsh weather environments may demand performance enhancing equipment. Ask your Mitsubishi Electric representative for more details about your region.
*2. For details on extended cooling operation range down to -10° F DB, see Low Ambient Kit Submittal.
*3. Simultaneous Cooling and Heating Efficiency

Model: PURY-P120YKMU-U (-BS) – DIMENSIONS

Unit : mm(in.)

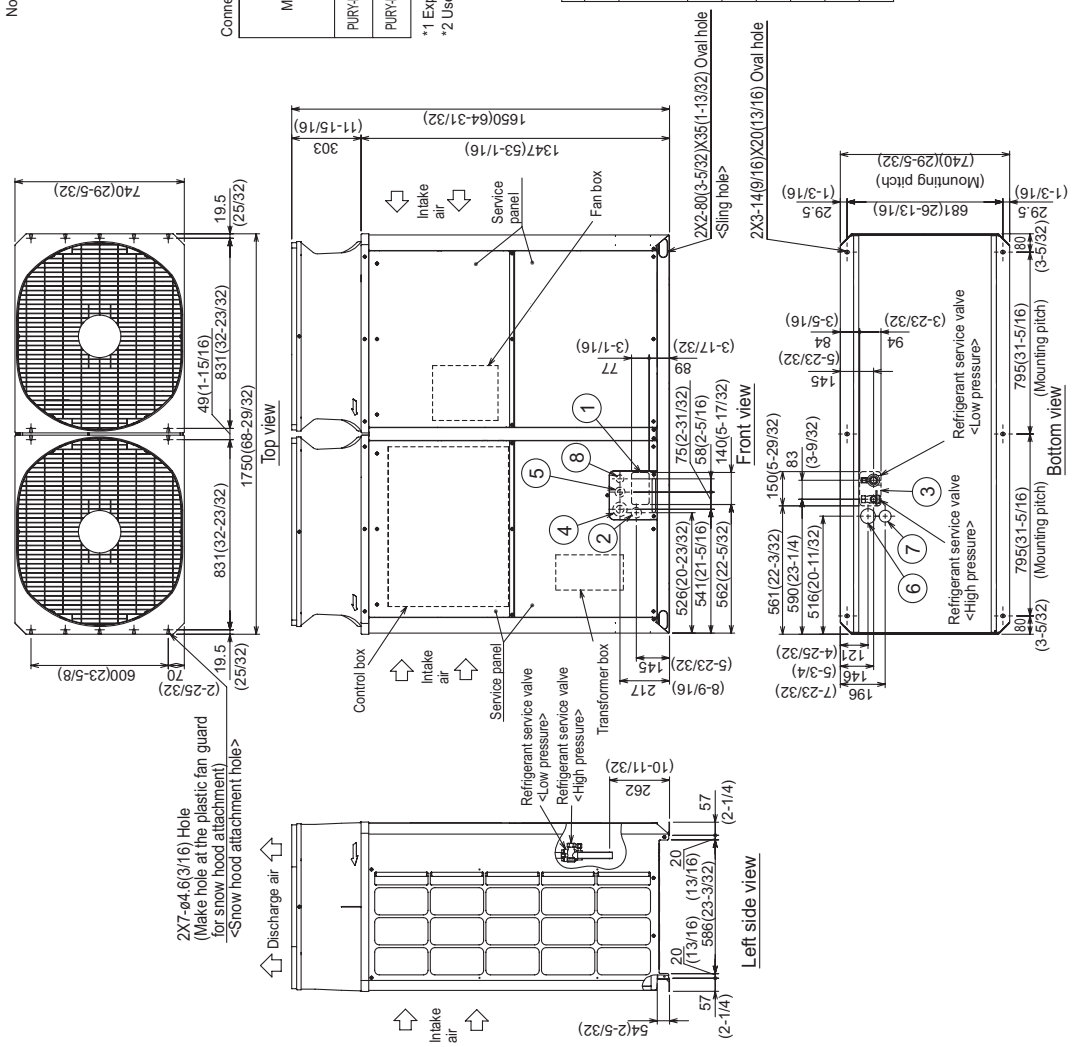
Note 1.Please refer to the engineering manual for information regarding necessary spacing around the unit and foundation work. Outdoor unit must be mounted at least 12" off the ground or 12" above the highest average snow depth, whichever is greater.
2.At brazing of pipes,wrap the refrigerant service valve with wet cloth and keep the temperature of refrigerant service valve under 120°C(248°F).

Connecting pipe specifications

Model	Diameter			
	Refrigerant pipe		Service valve	
	High pressure	Low pressure	High pressure	Low pressure
PURY-P120YKMU	ø19.05 Brazed (3/4) *2	ø28.58 Brazed (1-1/8) *1	ø25.4 (1)	ø28.58 (1-1/8)
PURY-P144YKMU	ø22.2 Brazed (7/8) *2	ø28.58 Brazed (1-1/8) *1	ø25.4 (1)	ø28.58 (1-1/8)

*1 Expand the on-site piping and connect to the refrigerant service valve piping.
*2 Use the pipe joint(field supply) and connect to the refrigerant service valve piping.

NO.	Usage		Specifications
①	For pipes	Front through hole	140 × 77 Knockout hole (5-17/32) (3-1/16)
②		Front through hole (Uses when twinning kit (optional parts) is mounted.)	ø45 Knockout hole (1-25/32)
③		Bottom through hole	150 × 94 Knockout hole (5-29/32) (3-23/32)
④	For wires	Front through hole	ø62.7 or ø34.5 Knockout hole (2-15/32) (1-3/8)
⑤		Front through hole	ø43.7 or ø22.2 Knockout hole (1-3/4) (7/8)
⑥		Bottom through hole	ø65 Knockout hole (2-9/16)
⑦		Bottom through hole	ø52 Knockout hole (2-1/16)
⑧	For transmission cables	Front through hole	ø34 Knockout hole (1-11/32)



MITSUBISHI ELECTRIC
COOLING & HEATING

1340 Satellite Boulevard
Suwanee, GA 30024
Toll Free: 800-433-4822
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FORM# PURY-P120YKMU-U (-BS) - 201407

Specifications are subject to change without notice.

CITYMULTI®

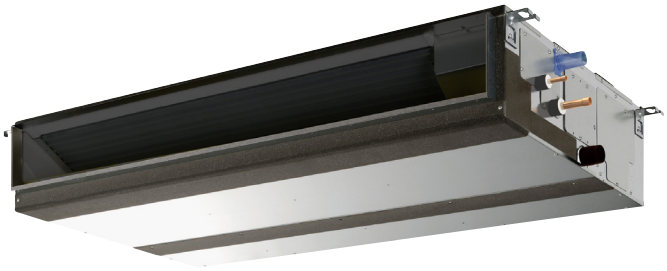
Model: PEFY-P36NMAU-E3

MITSUBISHI ELECTRIC

Job Name:

Schedule Reference: | Date:

INDOOR UNIT OPTION I



GENERAL FEATURES

- Dual set point functionality
- Multiple fan speed settings
- Auto fan mode
- 9-7/8" (250mm) high for low ceiling heights
- Built-in condensate lift; lifts to 27-9/16" (700 mm)
- Ducted fan coil supporting multiple configurations for flexible installation

OPTIONS

□ External Heater Adapter……CN24RELAY-KIT-CM3
□ Filter Box (Includes 2" MERV 13 filter)……FBM2-4

SPECIFICATIONS

Capacity*
Cooling……36,000 Btu/h
Heating……40,000 Btu/h

Power
Power Source……208 / 230V, 1-phase, 60Hz

Power Consumption
Cooling……0.24 kW
Heating……0.22 kW

Current
Cooling……1.50 A
Heating……1.39 A

Minimum Circuit Ampacity (MCA)……3.32 A
Maximum Overcurrent Protection (MOCP) Fuse……15 A

External Finish……Galvanized-steel Sheet

External Dimensions
Inches……9-7/8 H x 55-1/8 W x 28-7/8 D
mm……250H x 1,400W x 732D

Net Weight……86 lbs. / 39 kg

Coil Type……Cross Fin
(Aluminum Plate Fin and Copper Tube)

Fan
Type x Quantity……Sirocco Fan x 2
Airflow Rate (Low-Mid-High)……812 - 989 - 1,165 CFM
External Static Pressure…..0.14 - 0.20 - 0.28 - 0.40 - 0.60"WG
Motor Type……DC Motor

Air Filter……Polypropylene Honeycomb

Refrigerant Piping Dimensions
Liquid (High Pressure)……3/8" / 9.52 mm (Brazed)
Gas (Low Pressure)……5/8" / 15.88 mm (Brazed)

Drainpipe Dimension……O.D. 1-1/4" / 32 mm

Sound Pressure Levels
Low-Mid-High……32 - 37 - 41 dB(A)

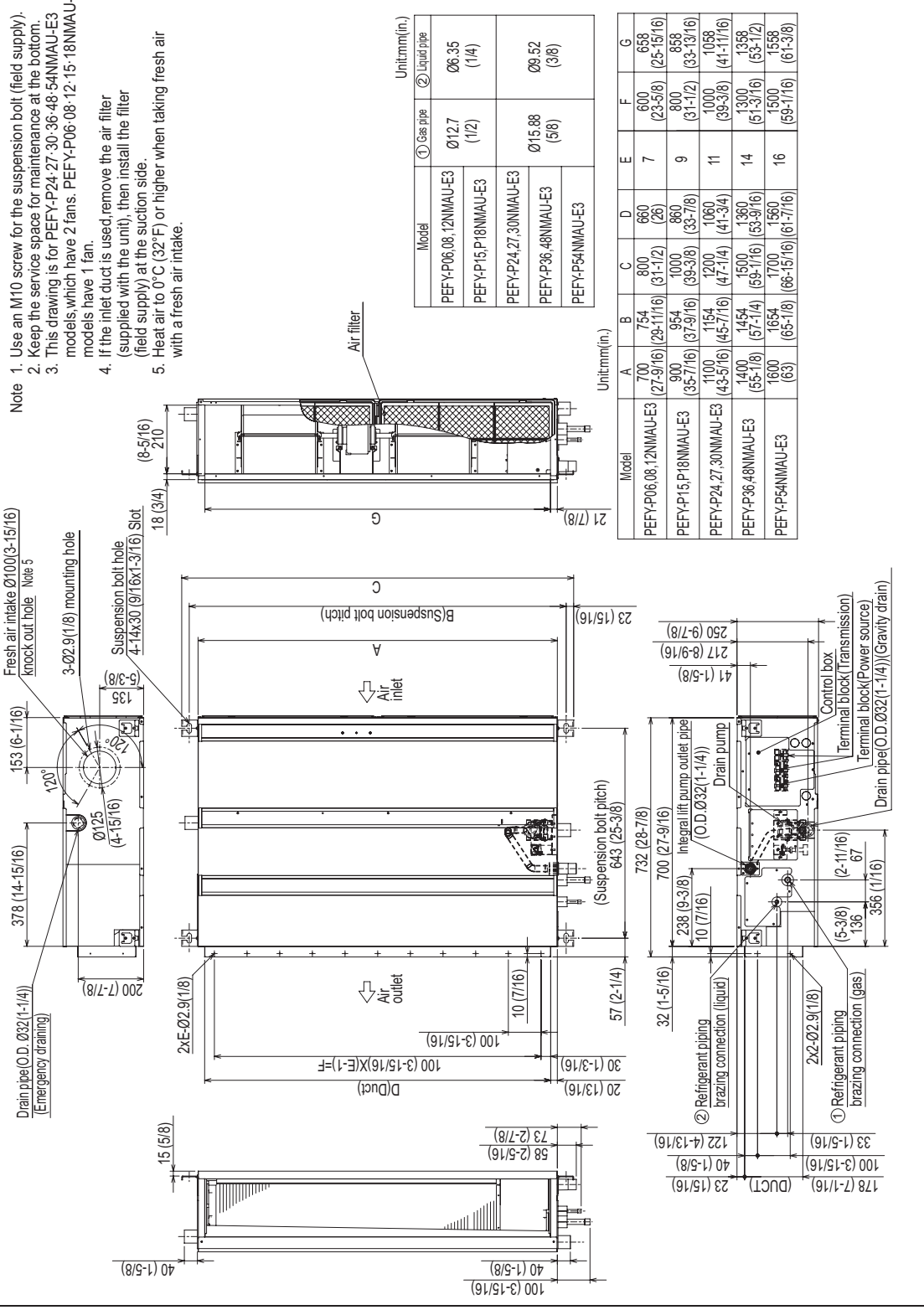
* Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:
Cooling | Indoor: 80° F (27° C) DB / 67° F (19° C) WB,
Cooling | Indoor: Outdoor 95° F (35° C) DB
Heating | Indoor: 70° F (21° C) DB,
Heating | Outdoor 47° F (8° C) DB / 43° F (6° C) WB

Notes:

R410A

Model: PEFY-P36NMAU-E3 – DIMENSIONS

Unit: mm (in)



Intertek

FORM# PEFY-P36NMAU-E3 - 201402

Specifications are subject to change without notice.

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CITY**MULTI**® **Model: PKFY-P30NKMU-E2.TH** MITSUBISHI ELECTRIC

Job Name:	
Schedule Reference:	Date:

INDOOR UNIT OPTION 2

GENERAL FEATURES

- Dual set point functionality
- Compact, lightweight, shiny-white, flat-panel design
- Quiet operation
- Multiple fan-speed settings
- Intake grille filter is easily removed for cleaning
- Wireless receiver on board

OPTIONS

■ Condensate Pump……SI1730-230
□ CN24 Relay Kit……CN24RELAY-KIT-CM3

SPECIFICATIONS

Capacity*
Cooling……30,000 Btu/h
Heating……34,000 Btu/h

Power
Power Source……208 / 230V, 1-phase, 60Hz
Power Consumption
Cooling……0.07 kW
Heating……0.07 kW
Current
Cooling……0.50 A
Heating……0.50 A
Minimum Circuit Ampacity (MCA)……0.63 A
Maximum Overcurrent Protection (MOCP) Fuse……15 A

External Finish……Munsell No. 1.0Y 9.2/0.2

External Dimensions
Inches……14-3/8 H x 46-1/16 W x 11-5/8 D
mm……365 H x 1,170 W x 295 D

Net Weight
Unit……46 lbs. / 21 kg

Coil Type……Cross Fin
(Aluminum Plate Fin and Copper Tube)

Fan
Type x Quantity……Line Flow Fan x 1
Airflow Rate (Low-High)……710 - 920 CFM
Motor Type……Direct-drive DC Motor

Air Filter……Polypropylene Honeycomb

Refrigerant Piping Dimensions
Liquid (High Pressure)……3/8" / 9.52 mm (Flare)
Gas (Low Pressure)……5/8" / 15.88 mm (Flare)

Drainpipe Dimension……I.D. 5/8" / 16 mm

Sound Pressure Levels
Low-High……43 - 49 dB(A)

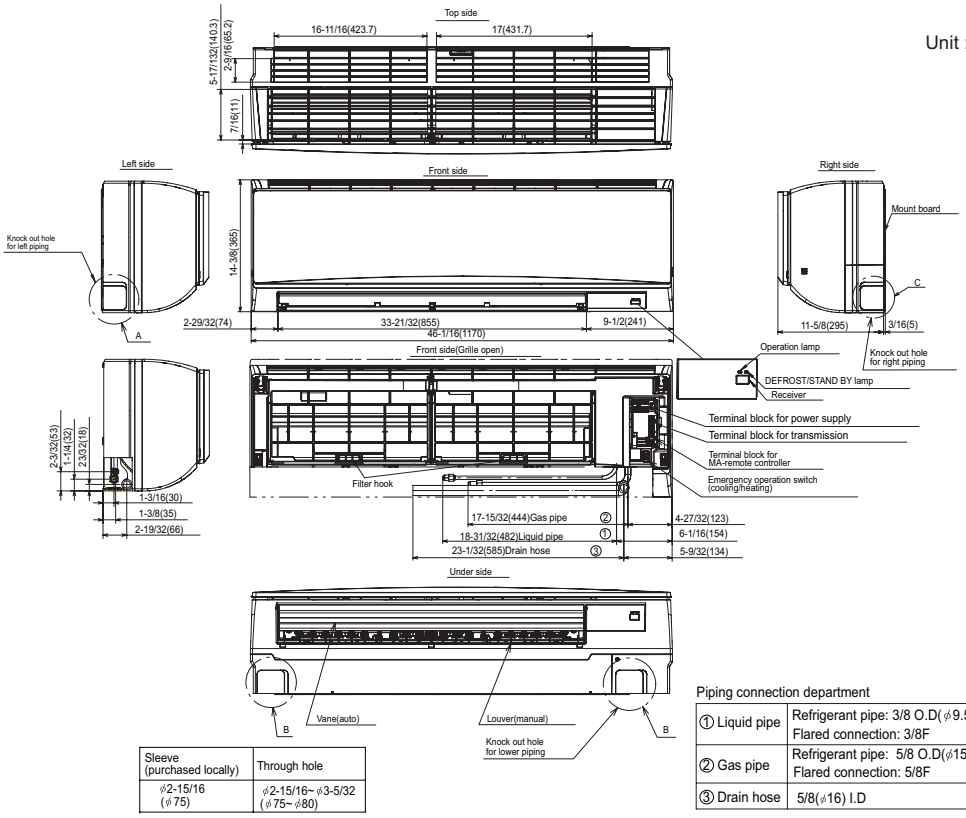
* Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:
Cooling | Indoor: 80° F (27° C) DB / 67° F (19° C) WB, Outdoor 95° F (35° C) DB
Heating | Indoor: 70° F (21° C) DB, Outdoor 47° F (8° C) DB / 43° F (6° C) WB

Notes:

R410A

Model: PKFY-P30NKMU-E2.TH – DIMENSIONS

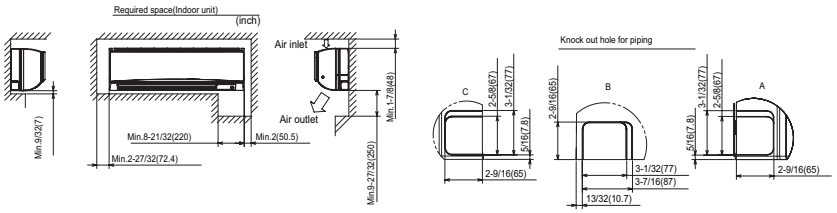
Unit : in(mm)

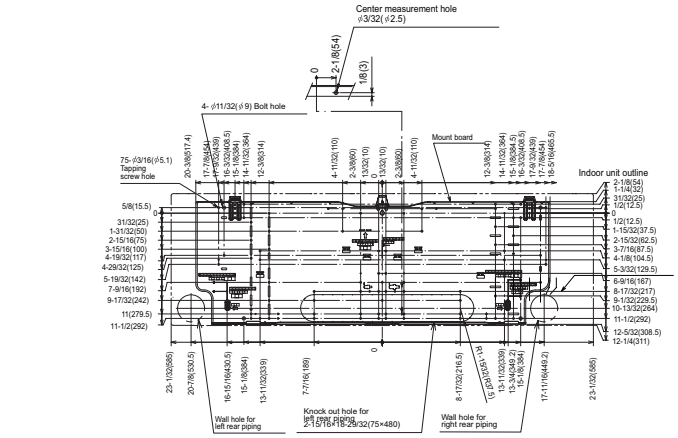


Sleeve (purchased locally)	Through hole
ϕ2-15/16 (ϕ75)	ϕ2-15/16~ϕ3-5/32 (ϕ75~ϕ80)

Piping connection department

① Liquid pipe	Refrigerant pipe: 3/8 O.D(ϕ9.52) Flared connection: 3/8F
② Gas pipe	Refrigerant pipe: 5/8 O.D(ϕ15.88) Flared connection: 5/8F
③ Drain hose	5/8(ϕ16) I.D





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Specifications are subject to change without notice.

PVFY-P54NAMU-E

Job Name:	
System Reference:	Date:

INDOOR UNIT OPTION 3

PVFY-P54NAMU-E

GENERAL FEATURES

- Multi-position design is suitable for any application requires no additional kits, even for downflow configuration
- Dual set point functionality
- Designed specifically for use with CITY MULTI® outdoor units
- Choice of three fan speeds for optimum comfort
- Highly efficient DC motor and a forward curved blower ensures quiet, consistent fan operation
- Optional relay kit provides functionality for two stage auxiliary heat (1 kit per stage), humidifier integration, or other custom applications
- Control board includes a condensate overflow switch connection
- Heavy-gauge steel cabinets with 1” fiberglass-free foam insulation with an R-4.2 insulation value
- Suitable for use in air handling spaces in accordance with Section 18.2 of UL 1995 4th Edition
- Tested in accordance with ANSI/ASHRAE Standard 193; less than 1% air leakage at maximum airflow

ACCESSORIES:

- □ Relay Kit……CN24RELAY-KIT-CM3
- □ Fan Speed Indication Adapter……PAC-735

SPECIFICATIONS:

Capacity*		
Cooling	Btu/h	54,000
Heating	Btu/h	60,000

* Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:
Cooling | Indoor : 80° F (27° C) DB / 67° F (19° C) WB
Cooling | Outdoor : 95° F (35° C) DB
Heating | Indoor : 70° F (21° C) DB
Heating | Outdoor : 47° F (8° C) DB / 43° F (6°C) WB

Electrical		
Electrical Power Requirements	1-phase, 208 / 230V, 60Hz	
Minimum Circuit Ampacity (MCA)	A	5.63 / 5.63
Maximum Fuse Size	A	15

External Dimensions		
Height	In.(mm)	59-1/2 (1,511)
Width	In.(mm)	25 (635)
Depth	In.(mm)	21-5/8 (548)

Net Weight	Lbs.(kg)	172 (78)
External Finish	High-gloss polyester powder coated	
Coil Type	Cross Fin (Aluminum Plate Fin and Copper Tube)	

Fan		
Type x Quanity	Sirocco fan x 1	
Airflow rate (Low - Mid - High)	CFM	1,040 - 1,262 - 1,485
External Static Pressure	In. WG	0.30 / 0.50 / 0.80 (Selectable)
Motor Type	DC motor	

Air Filter	Polypropylene Honeycomb

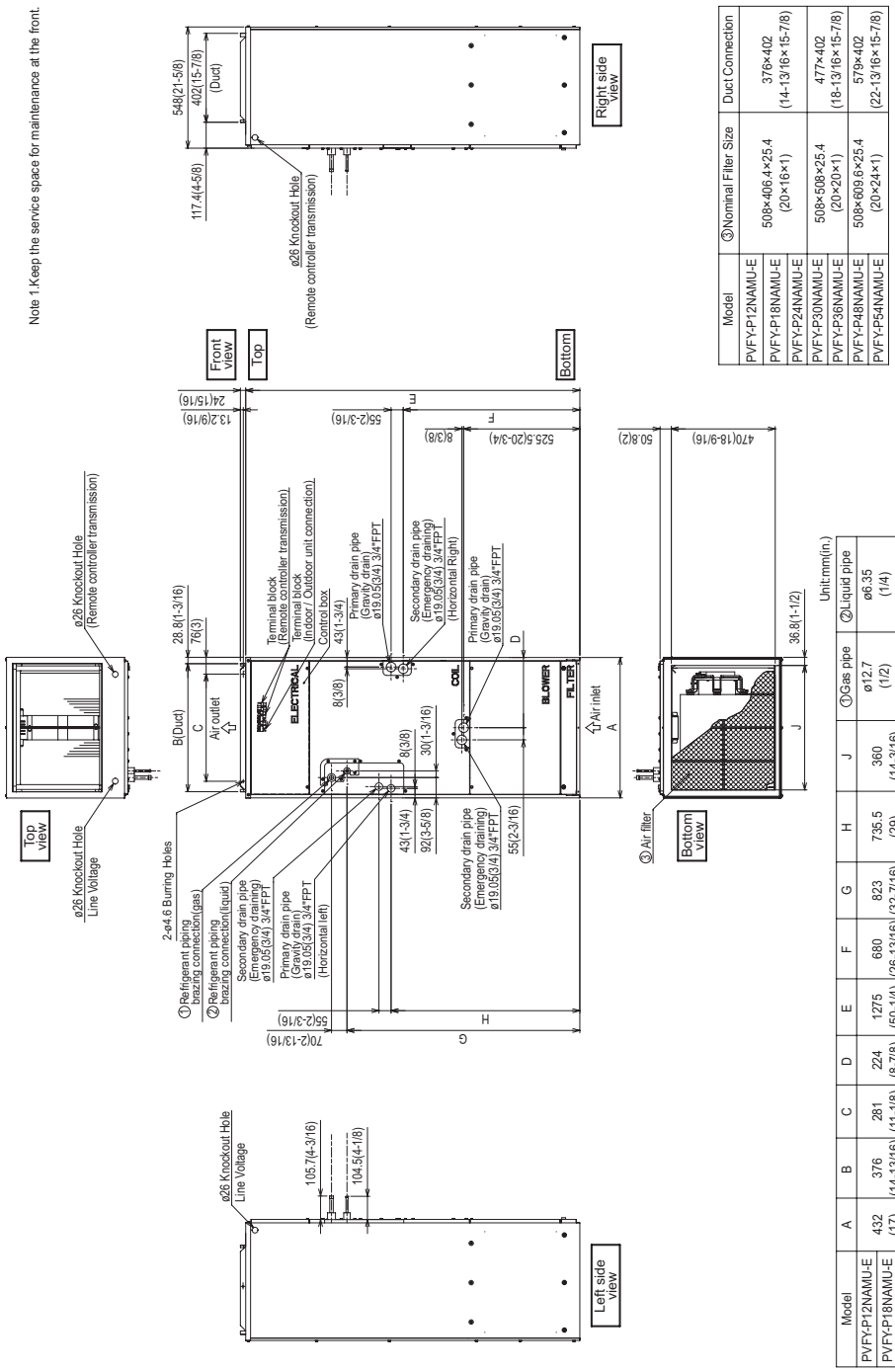
Refrigerant Piping Diameter		
Liquid (High Pressure)	In.(mm)	3/8 (9.52) Brazed
Gas (Low Pressure)	In.(mm)	5/8 (15.88) Brazed

Field Drain Pipe Size	In.(mm)	FPT 3/4 (19.05)

Sound Data (Low - Mid - High) (measured in anechoic room)		
Sound Pressure Level	dB(A)	36 - 40 - 44

Model: PVFY-P54NAMU-E – DIMENSIONS

Units: mm (in.)



Model	③Nominal Filter Size	Duct Connection
PVFY-P12NAMU-E	508×406.4×25.4 (20×16×1)	376×402 (14-13/16×15-7/8)
PVFY-P18NAMU-E		
PVFY-P24NAMU-E		
PVFY-P30NAMU-E	508×508×25.4 (20×20×1)	477×402 (18-13/16×15-7/8)
PVFY-P36NAMU-E		
PVFY-P48NAMU-E	508×609.6×25.4 (20×24×1)	579×402 (22-13/16×15-7/8)
PVFY-P54NAMU-E		

Model	A	B	C	D	E	F	G	H	J	①Gas pipe	②Liquid pipe
PVFY-P12NAMU-E	432 (17)	376 (14-13/16)	281 (11-1/8)	224 (8-7/8)	1275 (50-1/4)	680 (26-13/16)	823 (32-7/16)	735.5 (29)	360 (14-3/16)	ø12.7 (1/2)	ø6.35 (1/4)
PVFY-P18NAMU-E											
PVFY-P24NAMU-E											
PVFY-P30NAMU-E	534 (21)	477 (18-13/16)	382.6 (15-1/8)	266.5 (10-1/2)	1378 (54-1/4)	737 (29-1/16)	953.5 (37-9/16)	792 (31-3/16)	461 (18-3/16)	ø15.88 (5/8)	ø9.52 (3/8)
PVFY-P36NAMU-E											
PVFY-P48NAMU-E	635 (25)	579 (22-13/16)	484.6 (19-1/8)	317.5 (12-1/2)	1511 (59-1/2)	798.5 (31-7/16)	1053 (41-1/2)	853.5 (33-5/8)	563 (22-3/16)		
PVFY-P54NAMU-E											

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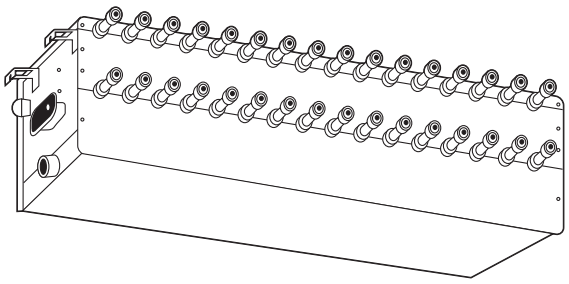
Form# PVFY-P54NAMU-E - 201503

CITY**MULTI**® **Model: CMB-P1016NU-G** MITSUBISHI ELECTRIC

Job Name:

Schedule Reference: | Date:



BC CONTROLLER FEATURES

- Used with R2-Series and WR2-Series outdoor units only
- Each branch supports 54,000 Btu/h or less
- Reducers are included for indoor units 18,000 Btu/h or less

OPTIONS

□ Joint Adapter (Port Connector).....CMY-R160C-J
■ Condensate Pump.....SI30-230

SPECIFICATIONS

Power
Power Source . . . . . 208 / 230V, 1 phase, 60Hz
Power Input
Cooling . . . . . 0.217 kW
Heating . . . . . 0.106 kW
Current
Cooling (208 / 230) . . . . . 1.04 / 0.94 A
Heating (208 / 230) . . . . . 0.51 / 0.46 A
Minimum Circuit Ampacity (MCA) (208 / 230) . . . . . 1.30 / 1.18 A
Maximum Overcurrent Protection (MOCP) . . . . . 15 A

External Finish . . . . . Galvanized Steel Plate

External Dimensions
Inches . . . . . 11-3/16 h x 43-1/4 w x 17 d
mm . . . . . 284 h x 1,098 w x 432 d

Net Weight . . . . . 138 lbs. / 62 kg

Number of Branches 16

Indoor Unit Capacity
Connectable to one Branch
- Model P54 or smaller
- Use optional port connector combining two branches when the total unit capacity exceeds 55,000 Btu/h. Use the reducer (standard accessory) when an indoor unit of 18,000 Btu/h or smaller is connected.

Refrigerant R410A

Refrigerant Piping Diameter
To Outdoor and Water-source Units
P72
High Pressure Pipe . . . . . 5/8" / 15.88 mm Brazed
Low Pressure Pipe . . . . . 3/4" / 19.05 mm Brazed

P96/P108
High Pressure Pipe . . . . . 3/4" / 19.05 mm Brazed
Low Pressure Pipe . . . . . 7/8" / 22.2 mm Brazed

P126
High Pressure Pipe . . . . . 3/4" / 19.05 mm Brazed
Low Pressure Pipe . . . . . 1-1/8" / 28.58 mm Brazed

To Indoor Unit
Liquid Pipe . . . . . 3/8" / 9.52 mm Flare
(1/4" / 6.35 mm with attached reducer used)

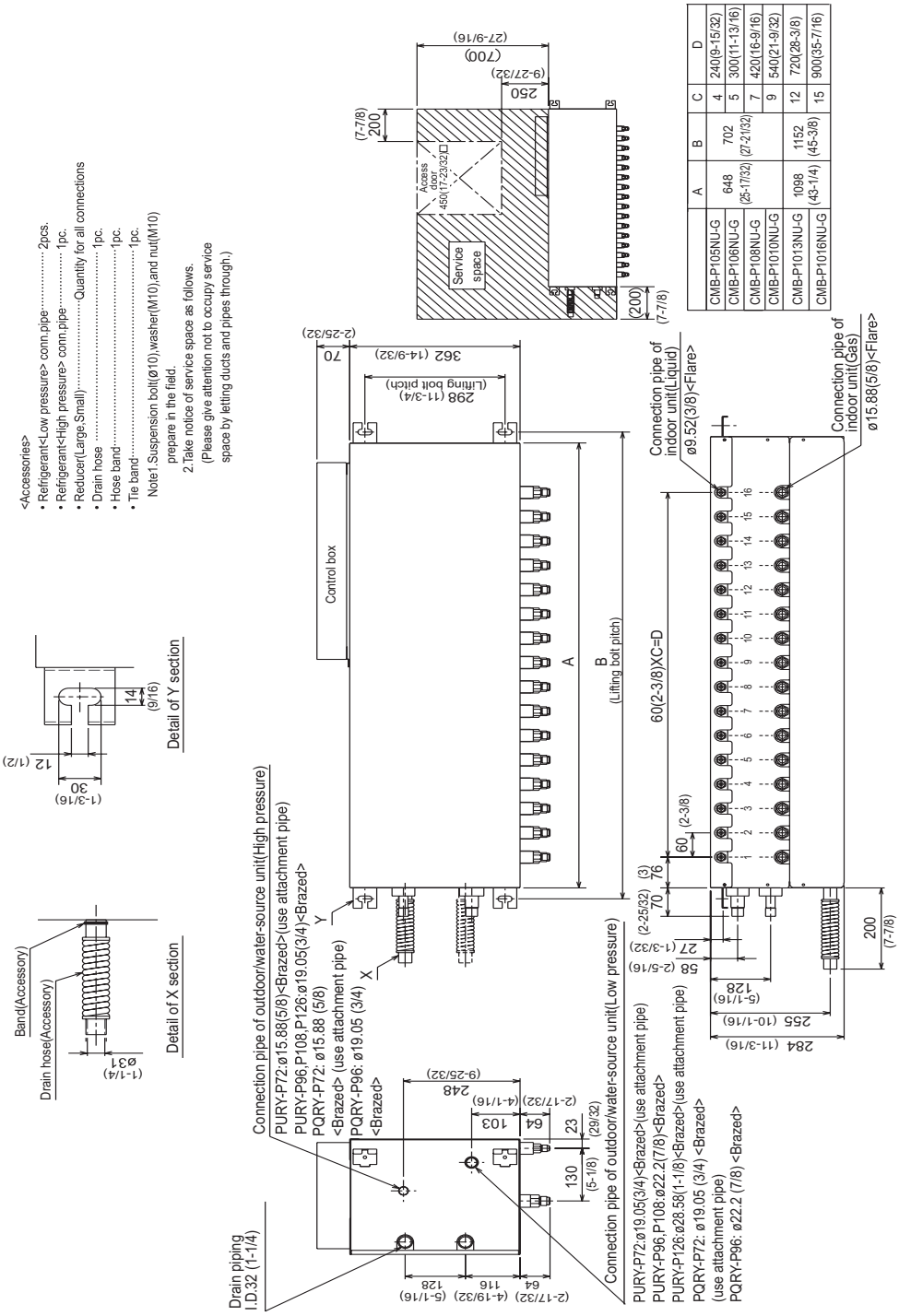
Gas Pipe . . . . . 5/8" / 15.88 mm Flare
(1/2" / 12.7 mm with attached reducer used,
3/4" / 19.05 mm and 7/8" / 22.2 mm
with optional port connector used)

Drainpipe . . . . . O.D. 1-1/4" / 32 mm

Notes:

Model: CMB-P1016NU-G – DIMENSIONS

Drw. : CMB-P-NU-G_W659644
Unit : mm(in)



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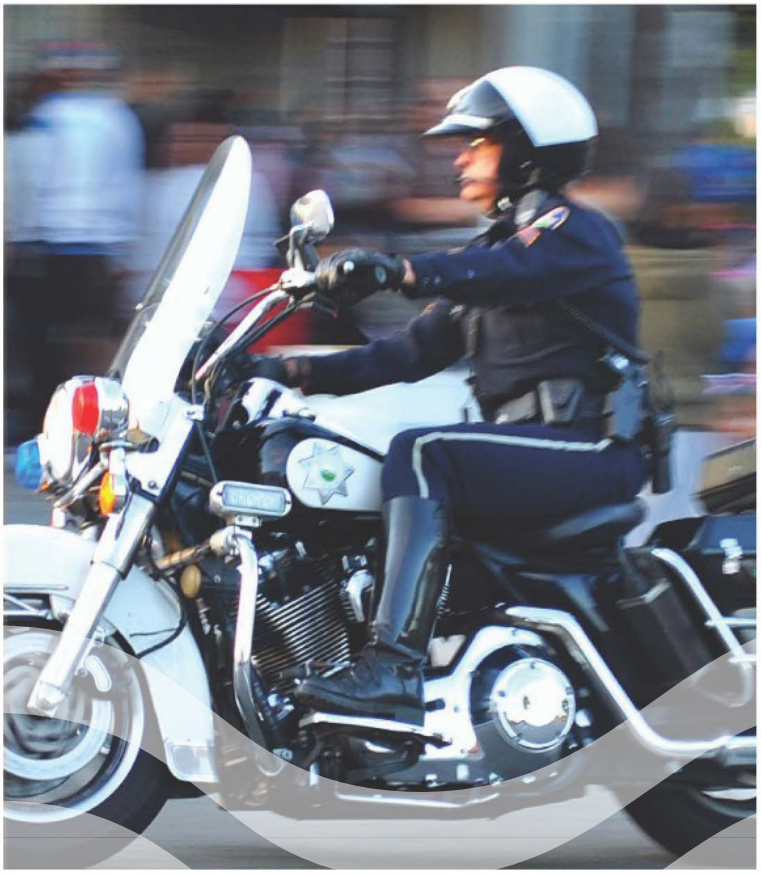

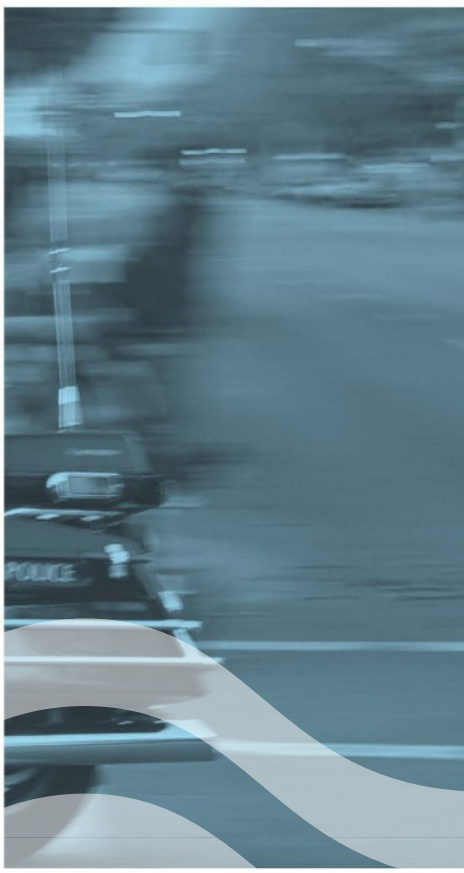

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