Attachment C

Civil Engineering Schematic Design Narrative and MEPF Concept Narrative

ESA

C-1 Civil Engineering Schematic Design Narrative

700 South Flower Street, Suite 2100 Los Angeles, CA 90017 213.418.0201 kpff.com

CIVIL ENGINEERING SCHEMATIC DESIGN NARRATIVE

5600 Hollywood Boulevard, Los Angeles

July 10, 2020

The purpose of this narrative is to evaluate project challenges and design intent as is related to Civil Engineering scope of work for the Saint Andrews Dwellings Project.

The site improvement area is approximately 0.86 acres, consisting predominately of concrete, asphalt pavement, vacant buildings, and undeveloped area. The project improvements consist of the demolition of the existing buildings and hardscape and constructing an 18-stories high residential tower with one level of subterranean basement. The proposed development is fronted by Hollywood Boulevard to the north, Saint Andrews Place to the east, Carlton Way to the south, with existing commercial and residential establishments to the west.

1. Topographic Site Survey

A topographic site survey was conducted on October 12 and 14, 2019 by the KPFF survey team and was provided to the KPFF design team on October 30, 2019.

2. Geotechnical Recommendations

We are awaiting the revised geotechnical report to be completed. It will inform us on the following areas:

- Shoring design criteria.
- Maximum temporary vertical cut without shoring.
- Temporary slope criteria
- Suitability of existing on-site materials for backfill
- Definition of suitable import materials
- Earthwork preparation including over-excavation and re-compaction requirements for support of pavements and site structures.
- Exterior flatwork/concrete walk thickness including rebar recommendations.
- Paving/hardscape design recommendations
- Utility trench backfill.
- Recommendations for storm water management. Confirm whether infiltration is possible. Perform percolation testing (2 locations) at least 10 feet below basement level and provide design infiltration rates at a depth between 10 feet below bottom of footing and 10 feet above historic groundwater. Provide horizontal and vertical setback requirements from existing and proposed structures
- Historic high and current ground water levels.

- Soil Corrosivity. Concrete type recommendation based on soil corrosivity if applicable. Ferrous pipe protection recommendations if applicable.

We expect that the structural engineer will provide additional requirements related to their scope of work.

3. Erosion and Sediment Control

The area of land surface disturbance is expected to be less than 1 acre therefore the project does not require the development of a storm water pollution prevention plan (SWPPP) or an application with the State Water Resources Control Board. An erosion and sediment control plan will be provided as a part of the Construction Documents to provide guidance on storm water pollution prevention during construction through the use of various Best Management Practices (BMPs) such as gravel bags, drainage inlet protection and rumble plates at construction entrances.

4. Grading and Drainage

Based on our site observations and review of the provided site topographic survey the existing site topography is relatively flat along the northern and southern frontages and slopes to the south along St. Andrews Place. There is approximately a 10-foot elevation difference along the St. Andrews Place property frontage. This difference in elevation along St. Andrews Place may cause a difference in finished floor elevations for any doors proposed along this frontage. We anticipate the project site drainage to be either directed to the curb and gutter in St. Andrews Place, or Carlton Way by the way of curb drains.

The proposed site grading design will slope grades away from the buildings. The grades of all accessible areas will be designed to comply with the requirements of the Americans with Disabilities Act (ADA):

- The grades at the building entry / drop-off area will range from 0.5% to 1.9%. They will not exceed 2% in any direction.
- Grades on sloped walkways will not exceed 5% in the direction of travel.
- Accessible ramps steeper than 5% will be equipped with handrails and have a maximum slope of 8.3% (1Vertical to12 Horizontal) between landings.

Due to the change in elevations, special attention will be placed on the retaining wall condition on the eastern property line.

5. Excavation – Earthwork Quantities

We understand that the current design concept incorporates in 2 levels of proposed subterranean parking with a total depth of 23 feet based on the conceptual plan. It is estimated that 31,500 cubic yards of soil will be cut.

Note that this amount is based on preliminary information and should be understood as a rough order of magnitude estimate. It doesn't include export of unsuitable or contaminated soils, or additional local excavation for footings, sump pits, elevator pits etc.

6. Low Impact Development (LID) Storm Water Management

The project storm water management design will be required to comply with the City of Los Angeles Low Impact Development (LID) requirements. The first flush (85^{th} percentile annual rainstorm) of storm run-off will need to be either:

- Infiltrated in the soils, by mean of deep infiltration wells or shallow infiltration trenches
- Captured in a cistern and treated for on-site re-use (irrigation)
- Filtered through bio-retention planters and released.

LID design will be reviewed by the City Bureau of Sanitation Watershed Protection Division. In the City of Los Angeles, infiltration is the first tier of stormwater management design that should be considered to satisfy LID. If infiltration is deemed infeasible by the geotechnical engineer, the second tier of capture and re-use may need to be considered. If capture and re-use is deemed infeasible, perhaps due to the amount of landscaping provided on site being less than the required amount of landscaping needed to utilize the stormwater captured in the cistern, then the next tier of biofiltration/bioretention can be explored to satisfy LID requirements.

The type of storm water management system selected will primarily depend on whether the soils are suitable for infiltration. We anticipate the geotechnical engineer to provide this assessment and provide design criteria for the storm water management system. Please see below for a breakdown of possible storm water management systems based on the Tier selected.

Tier 1 Design (Infiltration)

LID System components include:

a. Pre-treatment: CDS unit or downspout filters
b. Temporary stormwater detention system: Tank (masonry or prefabricated) located in the basement. The capacity of the tank will equate approximately to the stormwater mitigation volume (see below for value).
c. Drywell(s): Passive vertical wells located below basement to inject storm runoff into the soils
d. Overflow to street

Roof downspouts are routed to the pretreatment device and then to the detention system and drywell (s).

Tier 2 Design (Capture and Re-use - Basic)

Please note that the project needs to include sufficient landscaped areas to justify this design. We estimate that the amount of landscaping required for the estimated amount of captured storm water volume will be approximately 4,000 sf based off a planting factor of 0.4 for moderate water use plants.

LID System components include:

a. Pre-Treatment: CDS unit or downspout filters

b. Permanent storage cistern: Masonry or prefabricated cistern located in the basement. The capacity of the tank will equate approximately to the stormwater mitigation volume (see below for value). Prefabricated cisterns need to have a third-party rating (UL or other).
c. Pump and treatment skid (if required)
d. Connection to irrigation system
e. Overflow to street

Roof downspouts and area drains are routed to the pretreatment device through storm drain piping and then routed to the permanent storage in the basement, where it can then be used for irrigation on site. Note that Tier 2 designs require review and approval by the County Health Department, in addition to the City Department of Building and Safety and the City Bureau of Sanitation.

Tier 2 Design (Capture and Re-use - "EPIC" Alternative)

An alternative design consists of providing the irrigation storage volume integrated within the landscape planters. Proprietary products such as "EPIC" planters are pre-engineered and can provide a space saving solution meeting the requirements of the City of Los Angeles.

Tier 3 Design (Biofiltration "Flow Through Planters")

Please note that this tier requires the project to capture 1.5 times the amount of storm water required for the previous two tiers.

LID System Components include: -

a. All roof downspouts to be routed to planters
b. Engineered media to treat the stormwater
c. Perforated underdrain to collect the treated stormwater
d. Connection to a storm drain system on site
e. Overflow to public storm drain or street

The amount of storm water to be mitigated will depend on the amount of hardscape or roof areas that is constructed. Permeable pavement, landscape areas or green roofs can help reduce the amount of storm run-off that requires mitigation.

7. Domestic & Fire Protection Water

Based on available substructure maps from NavigateLA, the City Department of Public Works GIS website, it appears that there is a 10" water line in Hollywood Boulevard, an 8" water line in Carlton Way, and a 4" water line in St. Andrews Place. Both water lines are owned and operated by the Los Angeles Department of Water and Power (LADWP). Existing public fire hydrants are located at the intersection of Hollywood Boulevard and St. Andrews Place and the intersection of St. Andrews Place and Carlton Way adjacent to the project site.

The project will require the following new water services:

- Domestic water service for the residential program (check if individual sub-metering required for all units, based on SB-7 legislation)
- Fire protection water service for the entire building.

- Optional: separate irrigation water service

Per the entitlement documents, the new building water service will require a 6-inch water service, 6-inch meter, and reduced pressure backflow preventer with a required service demand of 450 gpm. A 6-inch domestic water and fire water connection, meter and backflow [preventor is proposed along Carlton Way. On Hollywood blvd. a 6-inch fire water connection and meter will also be proposed to service the proposed development. Based on the proposed location of the project site along Hollywood Blvd, we do not expect encountering water capacity issues for the project. However, we will file a Fire Service Pressure Flow Report (SAR) to verify that the existing public water infrastructure has the capacity to serve the proposed facility.

8. Sanitary Sewer

Based on available substructure maps from NavigateLA, the City Department of Public Works GIS website, it appears that there is an 8" sewer line in Hollywood Boulevard, an 8" sewer line in Carlton Way, and a 15" sewer line in St. Andrews Place. Based on the available information, the pipes are estimated to be approximately 10 feet to 16 feet below surface.

Two 8-inch sewer connections are proposed along Saint Andrews Place. Based on the proposed location of the project site along Hollywood Boulevard, we do not anticipate encountering capacity issues for the project. However, we will file prior to finalizing plans a Sewer Capacity Availability Request (SCAR) to obtain confirmation of the existing infrastructure capacity to accept the new sewage flow from the proposed building.

9. Offsite Improvements

It is anticipated that all offsite improvements will be encompassed in a separate B-permit through the City of Los Angeles. Right-of-Way dedication and road widening will also be required for the frontages along Hollywood Blvd. and St. Andrews Place.

Hollywood Boulevard has been designated an Avenue 1 which requires 100' of way with a 70' roadway. This would require 5' road widening and 5' dedication along the Hollywood Boulevard frontage. St. Andrews Place is designated a local street which requires a 60' right of way and 36' roadway. Our project is required to dedicate 5' to the right of way and a 3' road widening. A 15' x 15' corner cut will also be required on the corner of Hollywood and St. Andrews. Carlton Way is also designated a local street and has the same requirements as St. Andrews Place. A road widening on Carlton Way is not necessary and it is possible to achieve a 5' vacation of the right of way through a tract map or street vacation process. A 15'x15' corner cut will be necessary between Carlton Way and St Andrews Place.

The rest of offsite improvements will consist of:

- The closure of old driveways and construction of new driveways
- Repair or replacement of section of the existing concrete sidewalk

City of Los Angeles

Los Angeles Department of Water and Power - Water System

SAR NUMBER **86554**

Fire Service Pressure Flow Report

SERVICE NUMBER **634702**

For: **5600 HOLLYWOOD BLVD** Approved Date: **7-9-2020**

Proposed Service **6 INCH** off of the

8 inch main in **CARLTON WAY** on the **NORTH** side approximately

35 feet **WEST** of **WEST** of **ST ANDREWS PL** The System maximum pressure is

91 psi based on street curb elevation of **380** feet above sea level at this location.

The distance from the DWP street main to the property line is **19** feet

System maximum pressure should be used only for determining class of piping and fittings.

Residual Flow/Pressure Table for water system street main at this location

Flow (gpm)	Press. (psi)	Flow (gpm)	Press. (psi)	Flow (gpm)	Press. (psi)
0	63				
350	62				
510	61				
635	60				
740	59				
835	58				
920	57				
1000	56				
1075	55				
1150	54				
1215	53				
1280	52				
1340	51				
1400	50				

These values are subject to change due to changes in system facilities or demands.

Notes: With 700 gpm simultaneous flow from 6" domestic service

Meter Assembly Capacities

Domestic Meters	
1 inch =	56 gpm
1-1/2 inch =	96 gpm
2 inch =	160 gpm
3 inch =	220 gpm
4 inch =	400 gpm
6 inch =	700 gpm
8 inch =	1500 gpm
10 inch =	2500 gpm

Fire Service	
2 inch =	250 gpm
4 inch =	600 gpm
6 inch =	1400 gpm
8 inch =	2500 gpm
10 inch =	5000 gpm

FM Services	
8 inch =	2500 gpm
10 inch =	5000 gpm

This information will be sent to the Department of Building and Safety for plan checking.

This SAR is valid for one year from 07-09-20. Once the SAR expires, the applicant needs to re-apply and pay applicable processing fee.

For additional information contact the Water Distribution Services Section **WESTERN (213) 367-1225**

ELIA SUN	**ELIA SUN**	**148-192**
Prepared by	**Approved by**	**Water Service Map**

City of Los Angeles

Los Angeles Department of Water and Power - Water System

SAR NUMBER **86649**

Fire Service Pressure Flow Report

SERVICE NUMBER **634732**

For: **5600 HOLLYWOOD BLVD** Approved Date: **7-13-2020**

Proposed Service **6 INCH** off of the

10 inch main in **HOLLYWOOD BLVD** on the **SOUTH** side approximately

35 feet **WEST** of **WEST** of **ST ANDREWS PL** The System maximum pressure is

86 psi based on street curb elevation of **392** feet above sea level at this location.

The distance from the DWP street main to the property line is **25** feet

System maximum pressure should be used only for determining class of piping and fittings.

Residual Flow/Pressure Table for water system street main at this location

Flow (gpm)	Press. (psi)	Flow (gpm)	Press. (psi)	Flow (gpm)	Press. (psi)
0	61				
530	60				
775	59				
965	58				
1125	57				
1270	56				
1400	55				

Meter Assembly Capacities

Domestic Meters	
1 inch =	56 gpm
1-1/2 inch =	96 gpm
2 inch =	160 gpm
3 inch =	220 gpm
4 inch =	400 gpm
6 inch =	700 gpm
8 inch =	1500 gpm
10 inch =	2500 gpm

Fire Service	
2 inch =	250 gpm
4 inch =	600 gpm
6 inch =	1400 gpm
8 inch =	2500 gpm
10 inch =	5000 gpm

FM Services	
8 inch =	2500 gpm
10 inch =	5000 gpm

These values are subject to change due to changes in system facilities or demands.

Notes: With 220 gpm simultaneous flow from 3" EQ domestic service

This information will be sent to the Department of Building and Safety for plan checking.

This SAR is valid for one year from 07-13-20. Once the SAR expires, the applicant needs to re-apply and pay applicable processing fee.

For additional information contact the Water Distribution Services Section **WESTERN (213) 367-1225**

ELIA SUN	ELIA SUN	148-192
Prepared by	**Approved by**	**Water Service Map**

C-2 MEPF Concept Narrative

5600 HOLLYWOOD
MEPF CONCEPT NARRATIVE

LOS ANGELES, CA

November 11, 2019

HENDERSON ENGINEERS

TABLE OF CONTENTS

APPENDIX

1. ENERGY MODEL PRELIMINARY RESULTS

GENERAL

1. INTRODUCTION

A. This report outlines the proposed new MEPF systems based on conceptual floor plans and space programming.

B. All recommendations and proposed systems are based of rule-of thumb calculations and will need to be further evaluated when the final design direction for the remodel/new addition is established.

C. Given that this building shall be a Transit Priority Project (TPP) as defined in PRC Section 21155, the TPP buildings are 15% more energy efficient than Title 24. Thus, mechanical systems must exceed baseline efficiencies in order to achieve compliance. A Concept Design level energy analysis was undertaken to examine the energy performance and paths for the project to reach the energy saving goal. Please refer to Appendix #1.

2. CODES, REGULATIONS, AND STANDARDS

A. The following codes and standards are in effect as of the date of this report. Adoption of future codes may occur after the report that would require design changes to meet adopted codes. A code consultant should be engaged during the design development phase to ensure an efficient approach to code requirements. For phasing and construction, a Construction Manager should be engaged.

1. 2020 Los Angeles City Building Code
2. 2020 Los Angeles City Mechanical Code
3. 2020 Los Angeles City Electrical Code
4. 2020 Los Angeles City Plumbing Code
5. 2020 Los Angeles City Fire Code
6. 2019 California Building Code (CBC), Part 2, Title 24 CCR
7. 2019 California T24 Electrical Code
8. 2019 California T24 Plumbing Code
9. 2019 California T24 Mechanical Code
10. 2019 California T24 Fire Code
11. 2019 California T24, Part VI, Energy Code
12. City of Los Angeles Adaptive Reuse, Water Conservation, and Green Code Ordinance
13. Any applicable OSHA Guides and Standards
14. Any additional applicable Los Angeles City Codes
15. LACF Requirement No. 10 – Emergency Helicopter Landing Facilities (EHLF) Requirements (See Fire Sprinkler Section)

PROPOSED MEPF REQUIREMENTS:

1. MECHANICAL

A. Global Design Criteria

1. Outdoor design temperature
   a) The ASHRAE outside winter and summer design conditions for Los Angeles USC Campus will be used for design purposes and are outlined below:
      (1) Winter (99.0%): 44.9 F
      (2) Summer (0.4%): 91.4 F (DB) / 65.6 F ((MCWB)
      (3) Dehumidification (0.4%): 67.1 F (DP) / 77.1 F (MCDB)
2. Indoor design conditions (Winter/Summer)
   a) Apartments: 70 F/ 75 F, 50% RH
   b) Fitness: 70 F/ 75 F, 50% RH
   c) Residential Tower Common Areas: 72 F/ 75 F, 50% RH
   d) Electrical/Mechanical rooms: No heating / 80 F
   e) Generator Room: No heating / 105 F during unit operation
   f) Corridors and Support Spaces: 70 F/ 78 F
3. Given that this building must be a Transit Priority Project (TPP) as defined in PRC Section 21155, the TPP buildings are 15% more energy efficient than Title 24. The preliminary results of the energy analysis (refer to Appendix #1) found that the best way to achieve the energy saving goal is to have a high efficient water source VRF mechanical system.

B. Enclosed Underground Parking Garage

1. The parking garage exhaust system will consist of (2) exhaust fans totaling 45,000 CFM (based on .75 CFM/SF exhaust rate) and (2) makeup air fans totaling 40,000 CFM. Exhaust fans must be variable speed and capable of turn-down to meet California Energy Code requirements for minimum exhaust rate of 0.15 CFM/SF during non-peak conditions. The ramp into the garage will serve as an additional makeup air path. The system will utilize a 'push-pull' design to minimize horizontal ductwork in the garage.
2. Smoke control for the parking garage will be provided by the garage exhaust system. Garage exhaust fans will be rated for smoke exhaust and will provide at least 6 ACH of the garage area. Garage exhaust system will discharge a minimum of 10' above grade, 20' from openings into the building, and 30' from mechanical air intakes per code for Class I product conveying ducts. The fans will be on emergency power and connected to the Building Automation System for control in the event of a fire. All garage intake, exhaust ductwork and fans (outside the underground garage) to be located in 2-hour fire rated enclosure/room per code.

C. Above Grade Parking Garage

1. The above grade portions of the parking garage are considered 'Enclosed' per Building Code, a mechanical exhaust system will be required to exhaust total of 40,000 CFM exhaust (based on 0.75 CFM/SF) over levels 2, 3 and 4. Exhaust air from above grade parking garage could be connected to the underground parking garage exhaust air ducts passing through the above grade parking levels. Makeup air may be drawn in through intake louvers on each parking level above grade. Exhaust fans must be variable speed and capable of turn-down to meet California Energy Code requirements for minimum exhaust rate of 0.15 CFM/SF during non-peak conditions.
2. Smoke control for the parking garage will be provided by the garage exhaust system. Garage exhaust fans will be rated for smoke exhaust and will provide at least 6 ACH of the garage area. Garage exhaust system will discharge a minimum of 10' above grade, 20' from openings into the building, and 30' from mechanical air intakes per code for Class I product conveying ducts. The fans will be on emergency power and connected to the Building Automation System for control in the event of a fire.

D. Base Building Systems

1. The building will be served by (2) independent cell roof-mounted closed-circuit fluid coolers (with total dimensions ~40'x20'x20', and total weight ~130,000 lbs) providing ~700 tons of cooling located on the roof of the high amenity level. Condenser water pumps will be located at the tower roof MEP room. Condenser water will be piped to all levels of the residential tower to provide a heat sink/source for the cooling and heating of apartment units and common areas. Per LA City water conservation requirements, 100% of makeup water for the fluid cooler must be non-potable.

   Heat will be provided to the condenser water loop by (3) ~1,750 MBH exterior rated, natural gas fired boilers located at the tower roof MEP room.

   Condenser water piping will be schedule 40 carbon steel with welded fittings for pipes 3" and larger and will be of Type L copper construction for pipes 2-1/2" and smaller.

2. Dedicated outside air system (DOAS) units sized at ~10,000 CFM will be located on the roof of the high amenity level. DOAS units will be water source heat pump type. Fresh air will be ducted vertically to each floor in 40"x40" shaft and discharged into the corridors and elevator vestibules at room neutral temperature. Units will be on emergency power and fans will have 1.5 times the number of belts required for operation due to secondary use for smoke control.

3. Exhaust/relief fans sized at ~10,000 CFM will be located on the roof of the high amenity level. Exhaust air will be ducted vertically from each floor in 40"x40" shaft with exhaust grilles located on each floor. Units must be rated for smoke control, be on emergency power, and have 1.5 times the number of belts required for operation.

E. Apartment units

1. Exhaust
   a) Kitchen range: Each range hood will be ducted directly to the exterior of the building with a 10" round duct and terminate with a 24" x 12" louver a minimum of 3' from all operable windows and doors (dimensions assume 400 CFM exhaust hood). A soffit will be required to conceal the exhaust ductwork where it passes through any areas with full height ceiling.
   b) Bathroom: A ceiling mounted exhaust fan in each bathroom will be ducted directly to the exterior of the building with a 6" round duct and terminate with a louver on the building façade. Exhaust outlets shall terminate no less than 3' from property line, 3' from openings into building, 10' from a forced air inlet, and shall not discharge onto a public walkway. The fan will be controlled by a wall switch.
   c) Dryer: a dryer vent will be ducted directly to the exterior of the building with a 4" round duct and terminate with a louver on the building façade. Exhaust outlets shall terminate no less than 3' from property line, 3' from openings into building, 10' from a forced air inlet, and shall not discharge onto a public walkway.

2. Outside air
   a) Outside air will be ducted from a 12"x8" louver on the building façade to a dedicated Energy Recovery Ventilator (ERV) located at the ceiling space of each dwelling unit. ERV to provide pre-conditioned outside air into the dwelling unit while exhausting an equal amount of stale air to a 12"x8" louver on the building façade. ERV will be ducted to a single supply grille and to a single exhaust grille. Additional soffits or dropped ceiling may be required to run supply and exhaust ductwork. Access to unit will require a 24"x24" access panel. ERV will run continuously to maintain code required ventilation to the space. Exhaust outlets shall terminate no less than 3' from property line, 3' from openings into building, 10' from a forced air inlet, and shall not discharge onto a public walkway.

3. Heating and Cooling Water Cooled VRF (Heat Recovery)
   a) Each apartment will have a horizontal ducted VRF fan coil (from 1-3 tons) mounted in a dropped ceiling above the bathroom with refrigerant piping to the closest VRF branch circuit controller. Unit will be ducted to supply grilles mounted on the high sidewall in each room and to a single large return grill mounted on the sidewall outside the bathroom. Additional soffits or dropped ceiling may be required to run supply ductwork to some rooms. Access to unit will require a 24"x24" access panel in bathroom ceiling.

Each floor will require 2-3 water cooled VRF condensing units connected to the condenser water loop. Each unit will require a footprint of ~36”x24” with a clear service space of 36”x36” in front and 36”x20” in the back of the unit (some manufacturers allow units to be stacked vertically). Each unit will distribute refrigerant piping out to apartment units via a branch circuit controller located in an accessible location (requires access of ~60”x36” and clear height of 18”).

F. Fitness

1. The fitness spaces in the residential tower will be conditioned with water cooled VRF fan coil units sized at 250 SF/ton and mounted above the ceiling. A 24”x30” access panel will be required for access to fan coil.
2. Outside air will be ducted from a louver on the building façade to a dedicated Energy Recovery Ventilator (ERV) located at the ceiling space. ERV to provide pre-conditioned outside air into the space while exhausting an equal amount of stale air to a louver on the building façade. Outside air will be provided at a rate of 6 air changes an hour (ACH).

G. Common Areas

1. The residential tower common areas will be conditioned with VRF fan coil units located above the ceiling and ducted to ceiling supply and return grilles. 24”x30” Access panels will be required for access to fan coil.
2. Outside air will be ducted from a louver on the building façade to a dedicated Energy Recovery Ventilator (ERV) located at the ceiling space. ERV to provide pre-conditioned outside air into the space while exhausting an equal amount of stale air to a louver on the building façade.

H. Stairwell Pressurization System

1. A stairwell pressurization mechanical ventilation system will be required for each stairwell in the residential tower. Each system will consist of one supply fan located the roof of the high amenity level with total of ~40,000 CFM per system, with vertical ductwork run in a shaft with a clear area of 36”x84” directly adjacent to stairwell. The system will inject air at every other floor and relief vents at the top of the stairwell will provide the code required relief air path. fans will be on emergency power and connected to the Building Automation System for control in the event of a fire.

I. Smoke Control System

1. A smoke control system will be required to maintain a tenable environment on the floors surrounding the fire floor via the pressurization method outlined in CBC section 909. The smoke control system will utilize the DOAS units and ductwork serving the building core and operate zone fire/smoke rated dampers to pressurize the floors directly above and below the fire floor. Use of the DOAS for smoke control will require the DOAS units to be on emergency power and connected to the Building Automation System for control in the event of a fire. Zone dampers will be installed at the duct stub from the outside air riser to each floor.
2. The building general exhaust/relief fans will be rated for smoke control to exhaust the fire floor. Fans will be on emergency power and connected to the Building Automation System for control in the event of a fire. Zone dampers will be installed at the duct stub from the outside air riser to each floor.

J. Elevator Hoistway Pressurization

1. Elevator hoistway pressurization mechanical system would only be required in the event no elevator lobby is provided. Current concept plans show elevator lobbies throughout the building, and as such, elevator hoistway pressurization is excluded.

K. Elevator Machine Room

1. The elevator machine room will be conditioned to maintain a minimum of 60 degrees F and a maximum of 80 degrees F at all times. Conditioning will be provided by a dedicated air-to-air split system on emergency power.

L. LADWP Vault

1. Dedicated exhaust and makeup air fans of ~ 10,000 CFM each (final sizing in conjunction with LADWP) will be ducted directly to the exterior of the building high on the second level. A ~50 SF intake and ~40 SF exhaust louver will be required. The exhaust must terminate a minimum of 10’ above grade and from the property line.

M. Generator Room

1. The building generator room located on level 3 will be provided with combustion air/ventilation, general exhaust, and generator exhaust. The combustion air/ventilation will require ~25,000 CFM of outside air ducted through an ~120 SF louver located along the east wall of the generator room at level 3. The general exhaust fan will be integral to the generator and will be ducted to an ~120 SF louver located along the south wall of the generator room on level 3. The generator flue exhaust duct must terminate a minimum of 10’ from the property line, 3’ from exterior wall/roof, 10’ from openings into building, and 10’ above grade. Flue exhaust must be of double-wall metal construction tested according to UL 103 and 959 and rated for 1400 deg F continuously, or 1800 deg F for 10 minutes.

N. Electrical/Mechanical Rooms

1. Electrical/Mechanical rooms will be provided with ventilation and/or cooling with dedicated air-cooled DX split systems as necessary to maintain the space at design temperatures.

O. Fire/Life safety Rooms

1. Independent mechanical exhaust and makeup air fans on emergency power will be required in the fire control room.

P. Trash Rooms

1. An independent mechanical exhaust fan ducted to an exterior louver and makeup air transfer grille to the adjacent space will be required in the trash room to provide a minimum of 6 ACH.

Q. HVAC Utility Metering

1. Fan coil will be connected to electrical panel in each apartment. The electrical consumption of the fan coil unit will be billed via the tenant electricity meter.
2. Tenant billing software available from VRF manufacturer will allocate condenser power use based on actual use, so tenants can be billed back for their share of condenser power.
3. Central equipment (fluid coolers, boilers, pumps, DOAS, fans) and the common area expenses will be allocated to tenants on a pro-rata basis.

R. Building Automation System

1. Building Automation System (BAS) Will be a direct digital control system using electronic signals. The Building Automation System will be capable of:
   a) Monitoring all space conditions, equipment, and energy usage.
   b) Resetting system set points and record system operational parameters and alarm history.
   c) Starting and stopping equipment on a set schedule and resetting the space temperature during unoccupied periods.
2. Individual equipment will include packaged controls to allow for standalone operation while communicating with the BAS.
3. Local computer station with color graphic display screens will be located in the building engineer/supervisor room.

2. ELECTRICAL

A. Design Criteria

1. The following power requirements in volt-amps (VA) are the basis of design of the new electrical system for the building:
   a) Apartment (200units)
      (1) Lighting and general receptacles – 3VA/SF
      (2) Laundry – 1,500VA for each unit
      (3) (2) Small Appliances – 3,000VA for each unit
      (4) Range – 25,000VA + (750VA for each units)
      (5) Dryer – 5,000VA for each unit
      (6) Equipment or miscellaneous loads – 2VA/SF
      (7) Motors / Fans – 2VA/SF
      (8) Cooling – 2.5VA/SF
   b) Indoor Common Spaces
      (1) Lighting – 1.5VA/SF
      (2) Equipment or miscellaneous loads – 1VA/SF
      (3) Motors / Fans – 1VA/SF
      (4) Cooling – 3VA/SF
   c) Amenities
      (1) Overall load – 19VA/SF
   d) Pool
      (1) Overall load – 26VA/SF
   e) Outdoor Common Spaces/Decks
      (1) Overall load – 11.5VA/SF
   f) Specific Equipment
      (1) Elevators – (3) 40HP
      (2) Smoke Control and Pressurization Fans – 75HP total
      (3) Fire Pump – 100HP
      (4) Domestic Water Pumps – 20HP total
      (5) Hot Water Pumps – 4x5HP total
      (6) Sewage Ejector Pumps – 4x5 HP total
2. The following power requirements in volt-amps (VA) are the basis of design of the new emergency generator for the building:
   a) Emergency lighting, exit signs and fire alarm – 0.25VA/SF
   b) Includes all life safety and legally required standby equipment loads such as elevators, smoke control and pressurization fans, fire pump, fuel pump, domestic water and sewage ejector pumps. Refer to equipment loads above. It is estimated that 1 horsepower is equal to 1KVA.

B. Electrical System

1. Utility Service
   a) This building shall be served by 1 service from a utility vault located on Level 1. Services will be as follows:
      (1) (1)3000A -480Y/277V, 3-phase, 4-wire
   b) Provide new utility vault on Level 1 with minimum dimension of 50’x25’ -18’ head height with (2) 14’x12’ equipment doors and (2)3’x7’ man doors. The vault shall meet LADWP’s vault requirements.
2. Electrical Distribution

a) Power shall be distributed from 480Y/277V service equipment to all common areas for equipment and lighting. A 1500kVA dry type transformer in main electrical room shall step down 480V power to distribute 208Y/120V system to all residential floors and to common areas requiring 120 or 208 voltage.

b) The new electrical power distribution system shall meet the latest Title 24 requirements. Disaggregation of different load types is required between the receptacles, lighting, HVAC, and other loads.

c) Main switchboard MS1, 3000 Amps, 480Y/277 volt, 3-phase, 4-wire system, shall distribute power as follows:

(1) A new 4000-Amp bus duct 208Y/120V system shall be provided to serve ALL residential floors to feed an 800A distribution board with digital private metering capabilities. The distribution panel shall feed each residential load center rated at 125A each. Each distribution board feeds all the unit on that floor and the floor below it.

d) Main switchboard MS1, 3000 Amps, 480Y/277 volt, 3-phase, 4-wire system, shall distribute power to common spaces with utility meters as follows:

(1) New 1000A meter, house power distribution to power following loads:

(a) (2)100A circuit breakers for (2)40hp elevators

(b) (1)100A circuit breakers for Amenities, pool equipment, and common spaces

(c) (1)400A panel for parking levels power and lighting & car chargers

(d) (2)225A circuit breaker for common areas

(e) (1)225A circuit breaker for miscellaneous house power

(f) (1)600A circuit breaker feeding roof mechanical equipment

3. Emergency Power

a) New emergency diesel generator rated at 500KW/625KVA, 480Y/277 volt, 3-phase, 4-wire system, indoor housing, exhaust muffler, and sound attenuation to be below the noise level limitation.

b) The generator shall be located on Level 3. A fuel truck shall be capable of fueling the generator from inside parking. Provide an annunciator panel located near fire alarm panel to indicate generator status and fuel level.

c) New emergency distribution board, 800 Amp, 480Y/277 volt, 3-phase, 4-wire system, with indoor enclosure.

d) New ATS and distribution equipment for each type of loads:

(1) 225 Amp ATS for emergency loads, 4-pole with panel, 100 amp, 480Y/277 volt, 3-phase, 4-wire system, located on the roof to serve the emergency lighting. This panel shall provide power to the 15KVA transformer and panel, 60 amp, 208Y/120 volt, 3-phase, 4-wire system, on the basement main electrical room serving the fire alarm panels.
An emergency panel will be located on floors 2,6,10,14, for residential tower emergency egress lighting.

(2) 200 Amp ATS for legally required stand by loads, 4-pole with panel, 400 amp, 480Y/277 volt, 3-phase, 4-wire system, located on the roof to serve the elevators, smoke control and stair pressurization fans.

(3) 150 Amp ATS for emergency loads, 4-pole, 480Y/277 volt, 3-phase, 4-wire system with controls designed specifically to serve the fire pump.

(4) 100 Amp ATS for legally required and optional stand by loads, 4-pole, with panel, 100 amp, 480Y/277 volt, 3-phase, 4-wire system, located on the basement main electrical room serving domestic water pumps and sewage ejector pumps.

4. Space Requirements

a) The main electrical room in Level 1shall be a minimum of 1100 SF, approximately 17’ x 15’. The main electrical room shall be provided with two entrances with double doors swinging out equipped with panic bar hardware. The main electrical room shall be adjacent to utility vault with a door in between them.

b) Provide stacked electrical room from ground floor to roof with a minimum of 10'-2" x 9'-3" which provides space for (1)4000A bus duct residential power risers, (1)200A emergency power (1)600A normal house power (4)panels, digital meter cabinet, and fire alarm panels.
IDF rooms alternate where electrical rooms are located.

c) Plumbing chase for PRV equipment is not stacked with electrical rooms and uses different room.

d) The generator room on level 2 floor shall be 25'L x 14'W (or larger).

e) The room immediately next to generator room on level 3 shall be dedicated to emergency equipment room per code. Minimum dimension for this room shall be 10' x 12'.

f) Provide a main distribution frame (MDF) room to be allocated by telecom consultant, this room may be on ground level or B1 level. Provide a stacked intermediate distribution frame (IDF) rooms, starting in ground level and located on every other residential floors to be allocated by telecom consultant.

g) All room measurements are inside dimensions.

C. Lighting System

1. Provide new LED lighting throughout the building, served at 277 volt, single phase.
2. The emergency generator will power the emergency egress lighting throughout the building.
3. Lighting and lighting controls shall meet the latest Title 24 requirements.
4. Provide new lighting control systems. It shall be a networked digital system with demand response and automatic shut-off features, utilizing dimmable room controllers, occupancy sensors, daylight sensors, and plug-load controllers. The lighting control software shall provide a graphical floor plan of the entire building's lighting system and enable the facility manager to remotely monitor and control the system from a computer with web connectivity.

3. PLUMBING

A. Storm Water System

1. Storm drainage system will consist of roof drains, deck drains, emergency drains and planter drains. All drain locations will be provided by the architect, landscape architect or others. Drains, storm drain stacks, and pipe sizes shall be sized to meet the 2 inches per hour rainfall rate and the total exposed roof area as required by the City of Los Angeles Plumbing Code. All primary drains will be routed to a LID/SUSMP system as determined by the Civil Engineer and Department of Public Works (Water Shed Division). Secondary drainage system will be provided via secondary overflow drains and/or roof scuppers and discharge to a visible location. Size of overflow drains and/or scuppers will be based on the total exposed roof area and rainfall rate of 2 inches per hour as required per the Los Angeles Plumbing Code.

B. Sanitary System

1. Residential Tower/3 Townhouses - The new sanitary for the residential building, and back of house portion of the building will be provided by (2) 8 inch sanitary building drains with new connections by civil to the existing 15 inch city sewer located in N St Andrews Place. The new building program residential load is approximately 3,600 drainage fixture units. Dependent upon the final square footage of landscape provided, up to at least 50 percent of all residential lavatories, bathtub and clothes washer will require to be collected independently of the sanitary system and connect into each of the (2) 8 inch sanitary lines right at the point the sanitary building drain leaves the building. All sanitary drainage located below the invert of the laterals will be collected and discharge into a sump basin with sewage ejector and interlock alarms.

C. Domestic Water System

1. Residential Tower/3 Townhouses - The new building domestic water service will require a single 6 inch water service with 6 inch LADWP meter and reduced pressure backflow preventer off of N St Andrews Place . Water service demand required for the project is 450 gpm. The service will connect to a triplex booster pump system capable of supplying minimum of 450 gpm and 290 TDH. Each pump will supply 33% of the total system demand and will be located within the basement level and express up to a central water heating system located on the roof mechanical equipment room. A 185 gallon hydropneumatic tank will be located on roof next to water heating equipment to maintain system pressure.

   a) The building will require 3 water pressure zones providing between 75-40 psi at each floor. The first zone will serve the 1st to 5th floors, including the back of house and common areas. The second zone will serve 6th to11th floors. The third zone will service 12th to 18th floors. Automatic pressure reducing valve type stations will be provided to maintain and regulate pressures within each of the pressure zones.

   b) Hot and cold water supply will connect into mains located in the corridor ceiling of each of the zone distribution floors and route to the water risers located within each of the units. Unit water distribution will be provided with hot and cold water isolation valve and ¾” disc type sub-meters and connect to the main riser within the unit.

   c) Size cold water distribution piping for a maximum velocity of 8 fps and hot water distribution piping for a maximum velocity of 5 fps unless indicated otherwise by the acoustical consultant. Whichever is more stringent.

D. Domestic Hot Water

1. Apartment/Townhouses:
   a) Domestic hot water will be provided by (4) 1,750,000 btu/hr gas fired water heaters with a single vertical glass lined 1,200 gallon hot water storage tank located on the roof level. Water heating system shall be capable to provide 200 gpm hot water at a temperature rise of 80 degrees Fahrenheit for all residential units. Hot water return pumps, 30 gallon electric ASME rated re-heat heaters with 15kw heating element, and flow control valves shall be provided at each pressure zone to maintain heat loss within the hot water system.
   b) Townhouse Option – Provide 40 gallon 35,000 btu/hr gas fired high efficiency water heaters in each townhouse.

2. Back of House/Common Areas:
   a) Hot water will be supplied by the central system in the mechanical room on the roof. Hot water will be delivered to each public fixture. Each fixture will be supply with a thermostatic mixing valve, each set at 120 degree maximum outlet temperature.
3. Domestic hot water shall be stored and distributed at 140 degrees with a minimum hot water return temperature of 132 degrees. Thermostatic mixing valves shall be installed for all common area public lavatories. Thermostatic mixing valves shall be in accordance with ASSE 1070.

E. Plumbing Fixtures

1. Provide high efficiency type plumbing fixtures and maintain the following water consumption values to meet the local plumbing code requirements.
   a) Water Closets: 1.28 gpf
   b) Urinals: 0.125 gpf
   c) Public Lavatories: 0.40 gpm/0.20 gallons per cycle (metering)
   d) Private Lavatories: 1.0 gpm
   e) Kitchen Sinks: 1.5 gpm
   f) Shower Heads: 1.5 gpm

   Appropriate 'barrier free' fixtures shall be provided in accordance with the "Americans with Disabilities Act" (ADA) where required. Mounting heights of plumbing fixtures shall be as indicated on the Architectural floor plans, and in compliance with the "Americans with Disabilities Act" (ADA) where required.
2. Fixtures shall be provided with chromium plated brass trim and individual stop valves.
3. Water closets shall be floor mounted vitreous china with flush valves. Manual or sensor operated flush valve requirements shall be determined during the design phase. Acceptable manufacturers include American Standard, Kohler, Sloan or Zurn.
4. Urinals shall be wall hung vitreous china with sensor operated flush valves. Acceptable manufacturers include American Standard, Kohler, Sloan or Zurn.
5. Public Lavatories shall be vitreous china wall mounted type, faucets with 0.4 gpm (max) flow restrictors, grid drains, and ADA insulation kits (where required). Manual metering or sensor operated faucet requirements shall be determined during the design phase. Acceptable manufacturers include American Standard, Kohler, Sloan or Zurn.
6. Private Lavatories shall be vitreous china counter/undercounter mounted type, faucets with 1.0 gpm (max) flow restrictors, pop-up drains and ADA insulation kits (where required). Counter installation type and single or double handle faucet requirements shall be determined during the design phase. Acceptable manufacturers include American Standard, Kohler, Sloan or Zurn.
7. Kitchen Sinks shall be stainless steel single or double compartment, self-rimming/undercounter mounted type, faucets with 1.5 gpm flow restrictors, and ADA insulation kits (where required). Counter installation type shall be determined during the design phase. Acceptable manufacturers include Elkay, American Standard and Kohler.
8. Food waste disposers shall be equal to In-Sink-Erator “Badger 5XP” with 3/4 horsepower motor with power cord, plastic grind chamber, galvanized steel cutting element, permanently lubricated upper and lower bearings and sound deadening enclosure.
9. Showers shall be ASSE 1016P pressure balance type with 1.5 gpm showerheads. Shower valves in ADA stalls shall have hand held shower, glide bar, hose and vacuum breakers. Acceptable manufacturers include Acorn, Symmons, American Standard, Kohler, Powers, Leonard or Lawler.
10. Electric water coolers shall be dual height, wall hung, push button operated and stainless steel construction with integral chiller units. One fountain shall be mounted at ADA Accessible elevation. Acceptable manufacturers include Elkay, Halsey Taylor or Haws.
11. Janitor’s mop sinks shall be 24” x 24” x 12” terrazzo floor mounted type with stainless steel wall surrounds, reinforced hose with wall hook and stainless steel mop hanger Service sink faucet shall be wall mounted

with wall brace, integral vacuum breaker, pail hook and threaded hose outlet. Acceptable manufacturers include Fiat, Acorn and Stern-Williams.

12. Wall hydrants shall be non-freeze type with nickel bronze box and cover. Wall hydrants will have a vacuum breaker and shall be loose key operated. At least one wall hydrant shall be provided on each side of the building exterior at a maximum of every 200 feet, and within the Trash & Recycling Room. There shall be a minimum of two wall hydrants placed on the roof deck area for maintenance. Acceptable manufacturers include Prier, Jay R. Smith, Zurn, Chicago and T&S Brass.
13. Hose bibbs shall be rough brass with vacuum breaker, chrome plated loose key in public areas with wheel handle in all other areas. In public toilet rooms, hose bibbs shall be of the recessed type with locking box and cover. One hose bibb shall be installed within the men's and women's public restrooms on the first floor for wash down. The central mechanical room located on the mezzanine level shall have a hose bibb for maintenance. Acceptable manufacturers include Prier, Jay R. Smith, Zurn, Chicago, Woodford and T&S Brass.
14. Roof and Overflow Roof Drains: Cast iron body, flashing clamp, gravel stop, sump receiver, underdeck clamp, cast iron dome, and no-hub outlet. Overflow roof drains shall be provided with 2" high water dam. Acceptable manufacturers include Jay R. Smith, Josam, Wade, and Zurn.
15. Planter drains shall be provided at each planter area and shall be heavy duty adjustable perforated standpipe with dome and stainless steel mesh screen. Acceptable manufacturers include Jay R. Smith, Josam, Wade, and Zurn.
16. Mechanical rooms, kitchen and bar area drains shall be provided with cast iron body, clamping collar, 8" round medium duty grates with sediment buckets and trap primer connections. Acceptable manufacturers include Jay R. Smith, Josam, Wade, Mifab and Zurn.
17. General-purpose floor drains with cast iron body, clamping collar, removable adjustable 6" light duty nickel bronze strainer and trap primer connections shall be installed each toilet room, including toilet rooms with one water closet and lavatory. Each public toilet shall have approximately one floor drain for every four water closets. Acceptable manufacturers include Jay R. Smith, Josam, Wade, Mifab and Zurn.
18. Trash and Recycling Room area drain shall be provided with cast iron body, 12" round heavy duty grate with sediment bucket and trap primer connection. Acceptable manufacturers include Jay R. Smith, Josam, Wade, Mifab and Zurn.
19. Fire Pump Room and Domestic Pump Room shall be provided with floor drains with cast iron body, 12" round medium duty grates, 13" deep cast iron body, sediment bucket and trap primer connection. Acceptable manufacturers include Jay R. Smith, Josam, Wade, Mifab and Zurn.
20. Backflow Preventer: Reduced pressure zone type, stainless steel body and sleeve, quarter turn test cocks, resilient seated non-rising stem gate valves, epoxy coated cast iron strainer, and suitable air gap fitting. Acceptable manufacturers include Conbraco, Febco, Watts, Wilkins and Zurn.
21. Automatic Flow Control Valves: For installation in hot water recirculation line, shall be Flow Design, Inc. #ICSS or equal by Victaulic with stainless steel body and flow cartridge and sweat connections. Provide ball valve, strainer and check valve upstream and union and ball valve downstream of each flow control valve.
22. Floor Cleanouts: Cast iron body, flashing flange with clamping collar, ABS plug, and adjustable, round, secured light duty, nickel bronze top, with carpet marker where installed in carpeted floor areas. Acceptable manufacturers include Jay R. Smith, Josam, Wade, and Zurn.
23. Wall Cleanouts: Cast iron cleanout tee, countersunk plug, stainless steel round cover and screw, and iron plug with gasket seal. Acceptable manufacturers include Jay R. Smith, Josam, Wade, and Zurn.
24. Exterior Cleanouts: Cast iron body, double flanged housing, ABS plug, and heavy duty, secured, scoriated, cast iron cover with lifting device installed in concrete pad where located in grassy areas. Acceptable manufacturers include Jay R. Smith, Josam, Wade, and Zurn.
25. Water Hammer Arresters: Piston type, with casing of Type "L" copper tube and spun copper ends, nylon piston with "O"rings, pressure rated, tested, and certified in accordance with PDI Standards. Acceptable

manufacturers include Amtrol, Josam, Precision Plumbing Products, PROFLO, Sioux Chief, Wade, Watts, and Zurn.

26. Pressure Drop Activated Trap Primer Valves: Brass body and integral vacuum breaker. Acceptable manufacturers include Precision Plumbing Products “Prime Rite”, Mifab, or Sioux Chief. Where more than one trap is to be primed by same trap primer valve, provide with distribution unit.

27. Electronic Trap Primer Valves: Used at remote mechanical rooms and at truck vendor area floor drains. Brass body and integral air gap and corded solenoid valve. Acceptable manufacturers include Precision Plumbing Products “Mini-Prime”, Mifab, or Sioux Chief. Where more than one trap is to be primed by same trap primer valve, provide with distribution unit.

F. Natural Gas System

1. Natural gas will be provided by So Cal Gas Company. One gas meter shall be provided for the back of house and central domestic and space heating systems and located on the ground floor parking structure in a dedicated room as outlined by the gas company rules and regulations. Building gas meter and service will be medium pressure (5 psi.) and will supply water heaters and space heating boilers on the roof and pool heaters. Each connection to water heating equipment will be provided with a gas pressure regulator with a minimum inlet pressure of 1.5 psi and reducing to a maximum outlet of 11 inches of water column. If it is determined that there will be restaurant spaces, future tenant gas meters and service will be determined during Design Development phase and coordinated with So Cal Gas Company. Final determination of gas pressure will be applied for and approve by So Cal Gas Company. Earthquake valves shall be installed downstream of each gas meter and securely mounted to structure.

G. Plumbing Piping Materials

1. Domestic Water Service (Below ground to 5' from building): Cement-lined ductile-iron pipe with rubber gasketed joints.

2. Domestic Water Piping (above ground and downstream of pressure regulators): Type L, drawn copper tube with wrought copper fittings and sweat solder joints with 95-5 lead free solder.

3. Domestic Water Piping (downstream of booster pump): Schedule 10 316L stainless steel, with schedule 40 stainless steel welded fittings.

4. Soil, Waste, Vent and Storm Piping (below ground): Service weight, hub-and-spigot cast iron pipe and fittings with gasketed joints.

5. Soil, Waste, Vent and Storm Piping (above ground): Hubless cast-iron soil pipe and fittings with hubless couplings NSF certified to comply with CISPI 310 on waste piping 3” and smaller and on all vent piping, and heavy duty couplings on soil and waste piping 4” and larger and on all storm piping.

6. Indirect and Condensate Drains: Type "M" hard copper with wrought copper fittings for 1” and smaller and “DWV” copper with wrought copper drainage pattern fittings for 1-1/4” and larger hard temper copper tube and soldered connections made with 95/5 solder.

H. Plumbing Valves

1. Valves 2” and smaller: Ball Valves, 2” And Smaller: Class 150, 600-psi CWP, with stem extension, NSF 61 Annex G lead free cast bronze.

2. Valves 2-1/2” and larger: Class 125 200-psi CWP cast iron gate valves with non-rising stems and flanged ends.

3. Gas Cocks 4” and smaller: Brass full port ball valves.

4. Gas Cocks 5” and larger: Iron lubricated plug type with full area port and flanged ends.

5. Gas Pressure Regulating Valves: Double diaphragm with integral vent limiter and Over Pressure Device (OPD). Inlet pressure range 7 inches water column to 5 psi and 500 to 1 turn down ratio.

6. Automatic Control Valves: Ductile iron epoxy coated, stainless steel spring, nuts and bolts, 25 – 75 psi reduced pressure range, provide with lead-free strainer. Pressure reducing valves shall be by Watts, or equal by CLA Valve or Wilkins.

I. Insulation for Plumbing Systems

1. All insulating materials, adhesives, coatings, etc., shall have a flame spread of 25 or less and smoke developed rating not higher than 50. All containers for mastics and adhesives shall have U.L. Label.
2. Domestic hot water, and hot water recirculation piping: Fiberglass: 1-1/2" thick for pipe sizes up to and including 1-1/2" and smaller, 2" thick for pipe sizes 2" and larger.
3. Roof drain bodies and all interior above-ground horizontal storm drain piping: 1" fiberglass with all service jacket and vapor barrier.
4. Plumbing vents within six lineal feet of the roof outlet shall be insulated with 1-inch thick fiberglass insulation with “all service jacket”.
5. Condensate drain piping: 1" fiberglass with all service jacket and vapor barrier.

J. Plumbing Equipment

1. Copper Silver Ionization: Copper Silver Ionization system sized based on the flow demand of the facility. System shall be securely mounted on a unistut system and anchored to the floor.
2. Domestic Booster Pump: Packaged, variable speed type with triplex vertical multi-stage pumps, control panel, variable speed drive on each motor, accumulator tank all factory assembled mounted on rooftop in mechanical equipment room. Manufacturers by Bell & Gossett, Canarris, Grundfos, and QuantumFlo. Domestic water booster pump shall be located within the Domestic Pump Room.
3. Domestic Water Heaters: Domestic water heaters shall be as follows: Water heater shall be sealed combustion gas-fired copper fin type, fully condensing, high efficiency, with 150-psig-rated tank, fan assisted combustion with exhaust fan, integral thermostats and controls, temperature & pressure relief valve, automatic gas shutoff device, and vent and intake kits. Estimated size of water heating system is (4) 1,750,000 btu/hr heaters and ASME rated 1,200 gallon storage tank. Water heater shall be capable of providing 200 gpm of hot water at 80 degrees F. temperature rise. Final sizing and location shall be determined during design phase. Acceptable manufacturers include Raypak, RB&I, Lochinvar, and Laars.
4. Thermal Expansion Tank: Diaphragm type, welded carbon steel, ASME labeled, butyl rubber diaphragm with air charging fitting and drain. Acceptable manufacturers include Armstrong, Amtrol, Bell & Gosset, and Taco.
5. Hot Water Recirculation Pump: Horizontal inline, centrifugal, separately coupled, single-stage, all-bronze, radially split case design with mechanical seals and permanently lubricated ball bearings and rated for 125 psig working pressure and 225 deg F continuous water temperature. Acceptable manufacturers include Amtrol, Armstrong, Bell & Gossett, and Taco.
6. Sewage Ejector: Duplex submersible explosion proof sewage ejector with NEMA 3R rated control panel with moisture sensor alarm for each pump, high water audible and visual alarms. Sump basin shall be poured in place concrete construction with H20 loading manhole frame and gas tight cover. Coordinate interlock alarms with the Building Management System (BMS).
7. Digital Mixing Valve: Master mixing valve to be sized based on the flow demand of the facility to accurately control hot water distribution temperatures. Set outlet temperature at 120 degree maximum outlet temperature. Acceptable manufacturers include Leonard, Powers and Acorn.
8. Alarm Interlock with the BMS: Coordinate interlock of the following alarms with the Building Management System. Alarm wiring and alarm interlock with the Building Management System are provided by Mechanical.

PLUMBING ALARM SCHEDULE

SPECIFICATION SECTION	ALARM SYSTEM DESCRIPTION	ALARM DESCRIPTION
221100	Domestic Water Meter	Instantaneous flow rate, (gpm over time), Flow total per day
	Flood Control Valve (FCV)	Alarm - domestic water service shutdown alarm
221123	Booster Pump	High flow shutdown, low flow shutdown, high pressure shutdown
221329	Sewage Ejector Alarms	High level alarm, moisture sensor alarm (optional), second pump running alarm (optional)
221489	Sump Pump Alarms	High level alarm, moisture sensor alarm (optional), second pump running alarm (optional)
227000	Gas Meter	Instantaneous flow rate,(CFH over time), Flow total per day CFH

APPENDIX #1

ENERGY MODELING

K. ENERGY MODEL PRELIMINARY RESULTS – SUMMARY

1. A Concept Design level energy analysis for 5600 Hollywood was undertaken to examine the energy performance and paths for the project to be 15% more efficient than a Title 24 2019 Compliance Building. Using the new 2019 version of the California Compliance software, CBECC com, multiple modeling iterations were compared. The comparison started with understanding the components of the T24 2019 Standard Compliance Building. The compliance building has prescriptive wall, roof, and glazing performance values with a four-pipe fan coil heating and cooling system. The mechanical system utilizes prescriptive efficiency water-cooled chillers and natural gas boilers.

   To better understand how design elements can improve the energy efficiency of the building, a single factor was changed in the model and the impact on energy use was documented. Factors are evaluated based on annual energy cost, time-dependent valued (TDV) energy, and annual CO2 emissions. Changes in the model stem from six categories; envelope, glazing shading, lighting, mechanical equipment, and domestic hot water. After testing a variety of factors, optimized models were ran to see how a combination of changes can improve the model. The optimized models help to show the path to reach the building efficiency goals.

   The results of the analysis (seen below in Table 1) found that the best way to achieve the 15% goal is to have a high-performance envelope, efficient water source VRF mechanical system, a performance based domestic hot water system design, and non-residential space lighting savings. The main energy component of the building is the cooling load. In order to achieve the energy goal, it will be important to reduce the cooling load and have equipment that can be more efficient than the chillers in the compliance building.

   a) Energy Model Details
      (1) Los Angeles, CA weather file
      (2) Building schedules based on typical retail and multifamily use
      (3) eQuest 3.65 used for analysis, CBECC-com used to validate results
      (4) California Title 24 2019 used as baseline energy code
      (5) Utility rates structure based on a blended EIA state-wide average
      (6) TDV values are based on California Energy Commission 2019 published values
      (7) CO2 emission values are based on US eGRID database

TABLE 1

COMPLIANCE TESTING	
Modeling Inputs	**Percentage Compared to Title 24 2019 Compliance Building**
Title 24 2019 Compliance Building *Prescriptive Envelope and Four Pipe Fan Coils	-
Modeling Starting Point *Mandatory Minimum Envelope and Water Source Heat Pump with Electric Boiler on loop with prescriptive efficiency	-10.8%
ENVELOPE	
Mass Wall U-0.069	-0.1%
Metal Framed R15 Continuous Insulation U-0.046	0.8%
Roof R30 Continuous Insulation U-0.032	3.1%
SHADING	
Max Horizontal Shading (continuous shelf balcony) floors 8 and up	1.7%
Max Horizontal Shading (continuous shelf balcony) plus opaque rail floors 8 and up	4.8%
50% Horizontal Shading floors 8 and up	0.3%
50% Horizontal Shading plus opaque rail floors 8 and up	1.8%
GLAZING	
SHGC - 0.1	9.9%
SHGC - 0.17	5.9%
SHGC – 0.2	2.0%
LIGHTING	
5% Non-Residential Space Lighting Savings	0.7%
MECHANICAL SYSTEMS	
13 EER Water Source Heat Pump & Electric Boiler	-10.8%
14.3 EER Water Source Heat Pump & Electric Boiler	-3.7%
15.6 EER Water Source Heat Pump & Electric Boiler	0.4%
11 EER Air Cooled VRF & Electric Boiler	-7.9%
13.2 EER Air Cooled VRF & Electric Boiler	2.5%
17 EER Water Source VRF & Electric Boiler	4.2%
18 EER Water Source VRF & Electric Boiler	6.5%
13 EER Water Source Heat Pump & Gas Boiler	-10.3%
DOMESTIC HOT WATER SYSTEM	
Central Gas DHW system 95% efficiency water heater	1.2%
Segmented Gas DHW system 95% efficiency water heater	1.0%
Solar Water Heating Ratio 0.2 *needs to be evaluated further	2.5%
Solar Water Heating Ratio 0.8 *needs to be evaluated further	7.0%

ENERGY MODEL PRELIMINARY RESULTS – SUMMARY CONTINUED

OPTIMIZED MODELS	
Modeling Inputs	**Percentage Compared to Title 24 2019 Compliance Building**
1. Water Source VRF EER 18.5, Mass Wall U-0.069, 5% lighting savings, Prescriptive DHW, Prescriptive Glazing U-0.36 SHGC-0.25	9.0%
2. Air Source VRF EER 13.2, Mass Wall U-0.069, 5% lighting savings, Prescriptive DHW, Roof R30 continuous insulation U-0.041, Prescriptive Glazing U-0.36 SHGC-0.25	9.6%
3. Water Source VRF EER 18.5, Mass Wall U-0.069, Roof R30 Continuous Insulation U-0.041 Prescriptive DHW, Prescriptive Glazing U-0.36 SHGC-0.25	9.6%
4. Water Source VRF EER 18.5, Mass Wall U-0.069, Roof R30 Continuous Insulation U-0.041 Prescriptive DHW, SHGC 0.2	10.8%
5. Water Source VRF EER 18.5, Max Horizontal Shading, Mass Wall U-0.069, 5% lighting savings, Prescriptive DHW, Prescriptive Glazing U-0.36 SHGC-0.25	11.6%
6. Water Source VRF EER 18.5, Mass Wall U-0.069, Roof R30 Continuous Insulation U-0.041 Prescriptive DHW, SHGC 0.17	15.2%
7. Water Source VRF EER 18.5, Mass Wall U-0.069, Roof R30 Continuous Insulation U-0.041 Prescriptive DHW, Glazing U-0.27 and SHGC 0.19, 5% Lighting Savings	15.4%

Disclaimer
There are many assumptions required to be made in energy modeling. The model cannot be necessarily predictive of future energy consumption and should not be used for budgeting and utility service sizing. Henderson Engineers Inc. is not liable if projected estimated savings or economics are not actually achieved as there are many factors outside of Henderson's control which impact building performance.

This approach does not guarantee compliance with code. It will be a collaborative effort to ensure that the project as a whole achieves its energy related goals. All savings and cost estimates in the report are for informational purposes and are not to be construed as a design document or as guarantees