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Section 2.0 Project Description

2.1 Overview of Master Plan Development

STACK Infrastructure (STACK) is proposing to develop the SVY03A Data Center Campus (SVY03A Campus) located in the City of Hayward at 26203 Production Avenue. The SVY03A Campus will include a new three-story data center building designated on the plans as ~~“~~Building A~~”~~ ~~(~~SVY03A~~DC1)~~; ~~a one-story smaller data center building (SVY03ADC2), backup generators to support both data centers (SVY03ABGF);~~~~,~~ a security building designated on the plans as “Building SVY03B~~C”;~~~~,~~ backup generators to support the SVY03A data center building (SVY03ABGF); an on-site project substation, and a PG&E switching station and an on-site transmission line. The SVY03A Campus will also include new site and infrastructure improvements consisting of new access driveways located at Eden Landing Road and Production Avenue, internal circulation improvements, parking, a loading dock, stormwater basins, landscaping, utilities, water tank, and a perimeter security fence.

The SVY03ABGF will be an emergency backup generating facility with a generation capacity of up to ~~76.6~~67.2 MW to support the need for the SVY03A ~~ADC1~~ ~~and the SVY03ADC2~~ to provide uninterruptible power supply for tenant’s servers. The SVY03ABGF will consist of a total of twenty-eight (28) emergency generators arranged in two locations ~~generation yards~~. The (27~~6~~) 2..75 MW and the single 1 MW generators will serve the SVY03A data center building and will be located in a generator yard immediately adjacent to the east side of the SVY03A building ~~DC1;~~ and ~~athe single 1,6 MW generator will serve the SVY03ADC2~~; and the single 175 kW generator will serve the security building (SVY03B) and will be located immediately adjacent to the north side of the SVY03B. All of the generators would be dedicated to replacing the electricity needs of the SVY03A Campus in case of a loss of utility power (with redundancy).

The SVY03ABGF will only serve the SVY03A Campus and its components are described in detail in Section 2.2~~0~~. The SVY03A Campus components are~~is~~ described in Section 2.3. For development processing purposes, all of the facilities proposed for the site are included in a Conceptual Development Review (CDR) Application which has been filed with the City of Hayward (City). The City is currently reviewing the CDR Application and STACK will file a formal Application for Major Site Plan Review and any other requirements based on the comments and direction received from the City.

2.2 Generating Facility Description

2.2.1 Site Description

The proposed SVY03A Campus site consists of two contiguous parcels bounded by Eden Landing Road on the north, Production Avenue on the east, and Investment Boulevard on the south, and a developed parcel on the west (APNs 461-0085-016-00; 461-0085-052-01) ("Site"). The Site is approximately 11.3 acres (refer to Figure 2.2-1~~Figure 2.2-1~~, Figure 2.2-2, Figure 2.2-3). The proposed data center use is allowed by the City's General Plan and Zoning Ordinance. The Site's General Plan land use designation is IC (Industrial Technology and Innovation Corridor). . This designation allows a wide range of office, business park, research and development, manufacturing, and information- and technology-based uses, including data centers. The project site is zoned IP (Industrial Park), which allows data center uses. The IP district implements the General Plan designation, and among other uses, expressly allows "data processing centers" and "computer, technical, or informational services."

Figure 2.2-1: Regional Site Plan

Figure 2.2-2: Vicinity Site Plan

Figure 2.2-3: Aerial Site Plan

The site is currently developed as the Eden Landing Business Park and consists of nine existing one-story buildings with a total combined square footage of approximately 167,471 sf.[1] The buildings are multi-tenant warehouse/office/light-industrial buildings. The existing buildings consist of structural, tilt-up, precast concrete wall panels with steel columns with upper wood façade roofs and in some cases wood entrance canopies. None of the existing buildings have basements. The existing improvements were constructed between 1971 and 1973 and have been renovated multiple times throughout the years upon tenant turnover. The site improvements also include paved sidewalks, loading docks, parking and accessways with landscaping in small areas and generally along the site perimeter. The project will demolish all of the existing buildings and site improvements.

Native and non-native trees and ornamental landscaping are located along the frontage of the property, as well as the northern, western, and southern property boundaries. The project proposes to remove all the existing trees, shrubs and groundcovers on the project site.

The project area consists primarily of commercial and industrial land uses surrounding the project site. A PG&E overhead transmission line spans across the southwestern property line, held up by transmission towers, one of which is located within the property line. Highway 92 is located just north of the site. The nearest residential uses are located approximately ½ mile to the east. Buildings surrounding the site are similar in height and scale to the existing building on the project site. Buildings to the east are similar in height and scale to the proposed buildings. The Hayward Executive Airport is located approximately 1-3/4 miles northeast of the site.

2.2.2 General Site Arrangement and Layout

The 28~~98~~ emergency backup generators (27 for the SVY03A~~DC1~~ and one for the SVY03B~~ADC2~~) will be located at the site in two locations. The 26, 2.75 MW generators and the 1 MW single house generator that serve the SVY03A~~DC1~~ will be located in a generator yard on the east~~west~~ side of the SVY03A~~DC1~~. ~~The single 1.6 MW generator that serves the SVY03ADC2 will be located on the south side of the SVY03ADC2.~~ The single 175 kW generator that serves SVY03B will be located on the north side of the building. ~~Figure 2.2-4~~ C200 in the Civil Plan Set in Appendix I shows the General Arrangement and Site Layout of the SVY03A Campus and includes the location of all the proposed generators.

As shown on Figure 2.2-4~~Figure 2.2-5~~, 24 of the 2.75 MW generators will be installed in a stacked configuration. Each stacked pair of generators will be supported by an 11,000-gallon diesel fuel tank at the base of the stacking structure with a 500-gallon diesel fuel tank installed within the upper generator package. Each stacked pair of generators will be supported by a main diesel exhaust fluid (DEF) tank installed below the lower generator. The generators packages and tanks will be enclosed

[1] The square footage of the nine existing buildings are 29,800 sf, 22,927 sf, 13,552 sf, 22,804 sf, 15,400 sf, 16,974 sf, 17,136 sf, 16,908 sf, and 11,970 sf.

in acoustical enclosures. Two of the 2.75 MW generators that support the SVY03ADC1 will not be stacked, will be installed at grade, and will be supported by independent fuel and DEF tanks inside each generator enclosure. These generators will each have fuel tanks with capacities of 5,000 gallons. The 1 MW generator that also supports the SVY03A will be installed at grade and will have an independent fuel tank with a capacity of 1,000 gallons. The single 1.6 MW generator supporting the SVY03ADC2 will include a 5000-gallon diesel fuel tank and a DEF tank inside its acoustical enclosure. The single 175 kW generator that supports SVY03B the security building will have an integrated fuel tank with a capacity of 356 gallons.

The total diesel fuel capacity for the site is 149,356427,000 gallons.

Figure 2.2-4: Project Site Plan Figure C200: Project Site Plan

Figure 2.2-4~~5~~: Emergency Generator Locations and Layout

2.2.3 Generating Capacity

2.2.3.1 *Overview*

In order to determine the generating capacity of the SVY03ABGF, it is important to consider and incorporate the following critical and determinative facts.

1. The SVY03ABGF uses internal combustion engines and not turbines.
2. The SVY03ABGF is controlled exclusively by the SVY03ADC1 and SVY03ADC2 through software technology and electronic devices.
3. The SVY03ABGF has been designed to deliver up to ~~76.6~~67.2 MW during an emergency on the hottest design day.
4. The SVY03ABGF includes two completely redundant generators.
6. The SVY03ABGF will only be operated for maintenance, testing and during emergency utility power outages.
7. The SVY03ABGF will only operate at a load equal to the demand by the SVY03A Campus during an emergency utility outage.
8. The SVY03ABGF is not interconnected to the transmission grid.

2.2.3.2 *Generating Capacity and PUE*

Based on the methodology adopted by the Commission's Final Decisions Granting SPPEs for ~~the last six~~ Data Center Backup Generating Facilities, the maximum generating capacity of the SVY03ABGF is determined by the maximum of capacity of the load being served.

The design demand of the SVY03A Campus, which the SVY03ABGF has been designed to reliably supply with redundant components during an emergency, is based on the maximum critical IT load and maximum mechanical cooling electrical load occurring during the hottest hour in the last 20 years. Such conditions are possible but extremely unlikely to ever occur. The combined SVY03ADC1 and SVY03ADC2 total load on that worst-case day will be ~~76.6~~67.2 MW.

Power Usage Effectiveness, or PUE, is a metric used to compare the efficiency of facilities that house computer servers. PUE is defined as the ratio of total facility energy use to Information Technology (IT) (i.e., server) power draw (e.g., PUE = Total Facility Source Energy/ IT Source Energy). For example, a PUE of two (2), means that the data center or laboratory must draw two (2) watts of electricity for every one (1) watt of power consumed by the IT/server equipment. It is equal to the total energy consumption of a data center (for all fuels) divided by the energy consumption used for the IT equipment. The ideal PUE is one (1) where all power drawn by the facility goes to the IT infrastructure. For a worst case day, where the maximum critical IT load and maximum mechanical cooling electrical load occur during the hottest hour, the peak PUE for the SVY03A Campus would be 1.28. Such conditions to cause this PUE are possible but extremely unlikely to ever occur. The average PUE for the SVY03A Campus would be 1.15. Based on industry surveys, the average PUE for data centers is 1.67, although newly constructed data centers typically have PUEs ranging from 1.1 to 1.4.[2]

2.2.4 Backup Electrical System Design

2.2.4.1 *Overview*

To place the role of the SVY03ABGF into context, the following information about the overall SVY03A Campus design is provided. The design objective of the backup electrical system is to provide sufficient equipment and redundancy to ensure that the servers housed in the SVY03A Campus buildings will never be without electricity to support critical loads. The critical loads include the load to support the building operation in addition to the electricity consumed by the servers themselves. The largest of these non-server serving building loads is to provide cooling for the server rooms.

For backup supply for a Data Center, it is commonplace to build levels of systems and equipment redundancy and concurrent maintainability into the overall electrical and mechanical infrastructure. The base quantity of systems that are required to serve the design load of the facility is referred to as “N”. When reliability requirements dictate that redundant systems are added to the base quantity of systems, it is commonplace in the industry to refer to the number of redundant systems as “X” in the representation “N+X”.

Each electrical system will consist of an Uninterruptible Power Supply (UPS) system that will be supported by batteries and a means for automatic switching between UPS and normal power. The UPS system that will be deployed at the SVY03A Campus to provide backup to the IT loads will consist of two power shelves within each individual rack. Each rack power shelf will consist of 6 N+1 3kW automatic transfer switching power supply units (ATSPSUs) and lithium ion battery backup units (BBUs). The BBUs are designed to deliver 15kW of power.

The UPS systems provided for all non-IT loads will consist of a 100kW rated UPS system provided with the house power service for emergency backup to the fire suppression system and electrical and mechanical controls in office spaces, and 20kW rated UPS systems provided with each electrical lineup for emergency backup to the electrical and mechanical controls for IT, electrical, and mechanical rooms. For the 1 MW house power generator, one 100kW UPS systems is provided. A similar 20kW rated UPS system will be deployed for the Site Security building.

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[2] Uptime Institute. Annual Data Center Survey Results - 2019. Available at: https://datacenter.com/wp-content/uploads/2019/06/data-center-survey-2019.pdf

2.2.4.2 *UPS System and Batteries*

The UPS System and Batteries are part of the SVY03A Campus and are not part of the SVY03ABGF. The load will be automatically transferred to the bypass line without interruption in the event of an internal UPS malfunction. The UPS will operate in the following modes:

- Normal Conditions (Double Conversion, IGBT): Load is supplied with power flowing from the normal power input terminals, through the rectifier-charger and inverter, with the battery connected in parallel with the rectifier-charger output.
- Normal Conditions (Delta conversion): The output inverter and input (Delta) converter shall operate in an on-line manner to continuously regulate power to the critical load. The input power converter and output inverter shall be capable of full battery recharge while simultaneously providing regulated power to the load for all line and load conditions within the range of the UPS specifications.
- Abnormal Supply Conditions: If normal supply deviates from specified and adjustable voltage, voltage waveform, or frequency limits, the battery supplies energy to maintain constant, regulated inverter power output to the load without switching or disturbance.
- Power Failure: If normal power fails, energy supplied by the battery through the inverter continues to supply-regulated power to the load without switching or disturbance.

When power is restored at the normal supply terminals of the system, controls shall automatically synchronize the inverter with the external source before transferring the load. The rectifier-charger shall supply power to the load through the inverter and simultaneously recharge the battery.
If the battery becomes discharged and normal supply is available, the rectifier-charger shall charge the battery. The rectifier-charger shall automatically shift to float-charge mode on reaching full charge.

If any element of the UPS system fails and power is available at the normal supply terminals of the system, the static bypass transfer switch shall switch the load to the normal ac supply circuit without disturbance or interruption.

Should overloads persist past the time limitations, the automatic static transfer switch shall switch the load to the bypass output of the UPS. When the fault has cleared, the static bypass transfer switch shall return the load to the UPS system.

If the battery is disconnected, the UPS shall supply power to the load from the normal supply with no degradation of its regulation of voltage and frequency of the output bus.

2.2.4.3 *Batteries*

Similarly, the batteries are not part of the SVY03ABGF and are described here for informational purposes only. The batteries will be lithium-ion and supplied by Samsung, or Toshiba. The batteries are provided in a one string configuration within a cabinet with each UPS. Batteries will have a minimum design life of approximately 12 years in float applications at 64.4-82.4 degrees F. Lithium ion batteries report cell properties to the UPS, which is monitored by EPMS for statuses and alarming.

The batteries will be configured in banks with matching standalone batteries with the following characteristics:

a. Each battery bank will provide a minimum of 12 minutes of backup at 100% full load UPS current, @ 64-82 deg F, 3 end volts per cell, beginning of life.

b. Internal cabinet temperature sensor to be wired back to the UPS module.

c. Battery type is Lithium Manganese Oxide / Nickel Manganese Cobalt Oxide mix (LMO/NMC)

2.2.5 Generator System Description

Each of the 26, 2.75 MW generators for the SVY03A~~DC1~~ will be Caterpillar Model 3516E (Cat 3516E) standby emergency diesel fired generators equipped with Selective Catalytic Reduction (SCR) equipment and diesel particulate filters (DPF) to comply with Tier 4 emissions standards. The maximum peak generating capacity of each generator is 2.75 MW for standby applications (short duration operation). Under normal operation, due to the block redundant configuration, the maximum load on each generator is designed to be less than 100 percent of the peak capacity.

~~The 1.6 MW generator for the SVY03ADC2 will be Caterpillar Model 3512 (Cat 3512) standby emergency diesel fired generators equipped with Selective Catalytic Reduction (SCR) equipment and diesel particulate filters (DPF) to comply with Tier 4 emissions standards. The maximum peak generating capacity of this generator is 1.75 MW, derated to 1.6 MW for standby applications (short duration operation).~~

The 1 MW generator for the SVY03ADC1 will be Caterpillar Model C32 (Cat C32) standby emergency diesel fired generators equipped with Selective Catalytic Reduction (SCR) equipment and diesel particulate filters (DPF) to comply with Tier 4 emissions standards. The maximum peak generating capacity of this generator is 1 MW for standby applications (short duration operation).

The 175 kW generator for the security building will be Caterpillar Model D175 GC standby emergency diesel fired generator meeting Tier III emission standards.

Each individual generator will be provided with its own packaging system. Within that package, the prime mover and alternator will be automatically turned on and off by a utility-generator PLC transfer controller located in the 480-volt main switchboard located within the SVY03A~~DC1 and the SVY03ADC2~~. Each generator will be controlled by a separate, independent transfer controller. The generator will be turned on if the electrical utility power becomes unavailable and will be turned off after utility power has been restored and the transfer controller has returned the utility to the active source of power serving the computer and mechanical loads within the SVY03A~~DC1 and SVY03ADC2~~.

For the SVY03A~~DC1~~, each stacked pair of Cat 3516E generators will have an integrated dedicated base 11,000 gallon fuel tank and urea tank within the generator enclosure. The upper generator will have a 500 gallon day fuel tank. The upper generators will be supported by a structural steel platform and the lower generators will be supported by concrete pads. The generators enclosures are approximately 13 feet wide, 65-1/2 feet long and the full stacked height is 31-1/2 feet high as shown on Figure 2.2-5~~Figure 2.2-6~~. Each generator will have a stack height of approximately 90 feet above grade. The generators at both levels will have approximately 10 feet of clearance between adjacent generators. Two of the Cat 3516E generators will be at grade as shown on Figures 2.2-5 and 2.2-6.

The SVY03A~~DC1~~ will also be supported by the smaller Cat C32 generator installed at grade and adjacent to the two Cat 3516E unstacked generators. The Cat C32 enclosure will be approximately 5.5 feet wide, 13.7 feet long, and 7.1 feet high. The generator will have a stack height of approximately 90 feet above grade.

~~The SVY03ADC2 will be supported solely by the 1.6 MW Cat 3512 generator and located as shown on Figure 2.2-5 above. The Cat C3512 enclosure will be 14.5 feet wide, 47 feet long, and 20 feet high. The generator will have a stack height of approximately 26 feet above grade.~~

The SVY03B ~~security~~ building will be supported solely by the 175 kW Cat D175 GC and located as shown on Figure 2.2-5 above. The enclosure will be approximately 4 1/2 feet wide, 9 feet long, and 5 feet tall. The generator will have a stack height of approximately 9 feet above grade.

Figure 2.2-56: Emergency Generator Stacked Layout

Each of the 2.75 MW generators for the SVY03AADC1 will be connected to an individual lineup consisting of a Main Switch Board, where two of the generators/lineups are redundant. Each non-redundant lineup feeds a maximum of 1808 kW of critical IT load. All 26 generators and lineups are interconnected at the Main Switch Board level for the SVY03ADC1, therefore should any one lineup fail, either of the two redundant lineups will have enough capacity to completely pick up the dropped load. During a utility outage, all non-redundant generators will start and be connected to their dedicated loads. If no more than 2 of the generator systems fail during the utility outage, the total maximum load of approximately 76.667.268.8 MW will be supported by the generators and will only be running at about 80% of the full capacity of the generators.

2.2.6 Fuel System

The backup generators will use renewable diesel as its primary fuel or ultra-low sulfur diesel as secondary fuel (<15 parts per million sulfur by weight). CARB diesel fuel will only be used when renewable diesel is not available.Approximately 5,200 gallons of fuel are required for 24-hour operation of each generator. The generators would have a combined diesel fuel storage capacity of approximately 237,500 gallons, which is sufficient to provide more than 24 hours of emergency generation at full electrical worst-case demand of the SVY03A Campus.

2.2.7 Hazardous Materials Management

STACK The SVY03ABGF will prepare a Spill Prevention, Control and Countermeasure Plan (SPCC) to address the storage, use and delivery of diesel fuel for the generators.

Each generator unit and its integrated fuel tanks have been designed with double walls. The interstitial space between the walls of each tanks is continuously monitored electronically for the existence of liquids. This monitoring system is electronically linked to an audible and visual alarm system that alerts personnel if a leak is detected. Additionally, the standby generator units and integrated tank are housed within a self-sheltering enclosure that prevents the intrusion of storm water.

Diesel fuel will be delivered on an as-needed basis in a compartmentalized tanker truck. The tanker truck parks at the gated entrances to the generator yard for re-fueling.

There are no loading/unloading racks or containment for re-fueling events; however, a spill catch basin is located at each fill port for the generators. To prevent a release from entering the storm drain system, drains will be blocked off by the truck driver and/or facility staff during fueling events. Rubber pads or similar devices will be kept in the generation yard to allow quick blockage of the storm sewer drains during fueling events.

To further minimize the potential for diesel fuel to come into contact with stormwater, to the extent feasible, fueling operations will be scheduled at times when storm events are improbable. Warning signs and/or wheel chocks will be used in the loading and/or unloading areas to prevent vehicles from departing before complete disconnection of flexible or fixed transfer lines. An emergency pump shut-off will be utilized if a pump hose breaks while fueling the tanks. Tanker truck loading and unloading procedures will be available at the offices.

DEF, which contains urea, is used as part of the diesel engine combustion process to meet the emissions requirements. The DEF will be stored in the tanks located within the generator enclosures. These tanks can be filled in place from other drums, totes, or bulk tanker truck at the tank top.

2.2.8 SVY03ABGF Facility Operation

The backup generators will be run for short periods for testing and maintenance purposes and otherwise will not operate unless there is a disturbance or interruption of the utility supply. BAAQMD's Authority to Construct and the California Air Resources Board's Airborne Toxic Control Measures (ATCM) limits each engine to no more than 50 hours annually for reliability purposes (i.e., testing and maintenance). Please see Table 2.2-1 for a description of the testing and maintenance frequencies and loading proposed for the generators that comprise the SVY03ABGF.

Table 2.2-1: Generator Planned Maintenance and Testing Events

Event	Frequency	Maximum Duration (min)	Maximum Number of Generators Tested Concurrently	Maximum Number of Generators Tested per Day	Typical Load Range
Readiness Testing	Monthly	30	1	10	40%
Generator Maintenance and Testing	Annual	120	1	8	25% for 30 min 50% for 30 min 100% for 1 hour

2.3 SVY03A Campus Facilities Description

2.3.1 Overview

As described in Section 1.2, the Commission SPPE's determination is limited solely to the SVY03ABGF. However, in order for the Commission to inform the decision-makers of the potential environmental effects of the SVY03ABGF, in combination with the SVY03ADC1, the SVY03BADC2 and related facilities, STACK has included a complete description of the SVY03A Campus. A complete description of the SVY03ABGF is included in Section 2.1 Overview of Master Plan Development and Section 2.2 Generating Facility Description. The SVY03A Campus will include the following components:

- SVY03A Data Center 1 Building;
- SVY03A Data Center 2 Building;
- SVY03B Security Building;
- Project Substation, PG&E Switching Station and Transmission Line;
- Site Access and Parking;
- FourThree Water Storage Tanks;
- Stormwater Basin and Stormwater Controls;
- Associated Utility Interconnections (three alternative options); and
- Landscaping

Each component is described in detail below.

2.3.2 SVY03ADC1 Building

2.3.2.1 *Size, Height, and Setbacks*

The SVY03ADC1 building will be a three-story building encompassing approximately 318,700 310.460 square feet. The data center building will house computer servers for private clients in a secure and environmentally controlled structure and would be designed to provide 67.266 megawatts (MW) of power to support the electrical consumption and cooling needs of information technology (Critical IT) equipment. A General Arrangement and Site Layout of the SVY03ADC1 Building is shown on Figure C200 in the Civil Drawing Set in Appendix I. Figure 2.3-1 shows SVY03ADC1 Elevations.

The structure will be architecturally treated to fit the surrounding context of the site. Mechanical equipment for buildings cooling will be housed inside the building along with exhaust baffles for exiting hot-air. Electrical and backup battery equipment rooms will be housed inside the building. The data center is being designed with an average rack power rating of 8 kW.

The data center building is composed of admin, data hall, electrical and mechanical support spaces and loading dock masses. The maximum building height would be approximately 94 feet measured to the top of the main structure, 100 feet measured to the top of the building parapet, and 10816.5 feet measured to the top of the small penthouse.

Floor plans of each level of SVY03ADC1 are shown in Figure 2.3-2, Figure 2.3-3, and Figure 2.3-4. The roof level plan is shown on Figure 2.3-5.

The SVY03ADC1 data center building is located a minimum 20 feet from the property line along Production Avenue and a minimum 10 feet from the property lines along Eden Landing Road and Investment Boulevard. SVY03ADC2 and SCY03ABGF is located southwest and westeast of building SVY03ADC1 and will maintain the minimum setback requirements as the main SCY03AADC1 building.

Figure 2.3-1: SVY03A~~DC1~~ Building Elevations

Figure 2.3-2: SVY03A~~DC1~~ Level One Building Floor Plan

Figure 2.3-3: SVY03A~~DC1~~ Level Two Building Floor Plan

Figure 2.3-4: SVY03A~~DC1~~ Level Three Building Floor Plan

Figure 2.3-5: SVY03A~~DC1~~ Rooftop Building Plan

2.3.2.2 *Building Cooling System*

Data Hall Cooling

Fan wall-style Data hall Air Handling Units (DAHUs) are the sole cooling source for the IT spaces in the building. The DAHUs are installed in dedicated mechanical galleries along opposing sides of the IT space, and they draw in outside air through sidewall louvers at the building's perimeter. These DAHUs are capable of supplying up to 100% outdoor air economization for data center cooling and, when necessary, the DAHUs use direct evaporative media to lower the temperature of the outside air down to the set-point determined by the control system. The mechanical galleries are separated from the IT space by two interstitial "common supply air headers" running the length of the mechanical gallery and IT space.

This SVY03A~~DC1~~ uses a "flooded room" cooling design, meaning that it uses no ductwork or raised flooring systems to direct the cooling air to the IT racks' air intakes. Instead, all the DAHUs in a given mechanical gallery discharge their cooling air into the adjacent common supply air header, and, in turn, the common supply air header allows a "flood" of cooling air into the IT space through a number of supply air dampers in the wall separating the supply air header from the IT space. These supply air dampers include both controlled, modulating sections and fixed, open sections which allows the cooling system to modulate cooling supplied in different areas while still maintaining a certain minimum airflow in all areas.

Data hall pressurization requirements are maintained using rooftop exhaust fans (EFs). These fans modulate in unison to maintain space pressure throughout the control area uniformly. During part load conditions, fans stage off as necessary to maintain minimum fan airflow requirements.

Electrical Room Cooling

The SVY03A~~DC1~~ utilizes multiple ductless split system DX heat pumps in the electrical room. The heat gain in these rooms is minimal compared to the data center load, as there are no large transformers in the electrical rooms. This design requires three heat pumps in typical electrical rooms, and two units in catcher rooms.

Office Cooling

The data center office area utilizes a variable air volume (VAV) system . The VAV system is broken up into two separate systems, each with multiple VAV boxes. This provides cooling redundancy for the house electrical room. The ventilation requirements for the space are met via applicable ventilation codes and is distributed with the central air handling system. The central air handlers have outside air intakes integral with the equipment.

2.3.3 SVY03ADC2 Building

2.3.3.1 *Size, Height, and Setbacks*

The SVY03ADC2 building will be a one-story data center building encompassing approximately 14,564500 square feet. The height of the SVY03ADC2 will be a maximum of 19 feet at the top of building and 26 feet to top of parapet21 feet above grade. The SVY03ADC2 will house computer servers for private clients in a secure and environmentally controlled structure and would be designed to provide 1.6 megawatts (MW) of power to information technology (Critical IT) equipment. A General Arrangement and Site Layout of the SVY03A Building is shown on Figure 2.2-4. Figure 2.3-6 shows SVY03ADC2 Elevations.

The purpose of SVY03ADC2 is a separate data center solution typically located within 1,000 yards of an existing regular data center and is designed to house tape media that provides a long-term data storage solution. The SVY03ADC2 utilizes magnetic tape media which requires environmental conditions such as temperature, humidity and particulate-free (ISO 14644-1 Class B for cleanliness levels) to be maintained in a narrow band (16-25C and 20-50%RH) compared to the values maintained at a typical data center (10-35C, 8-80% RH). The SVY03ADC2 is tied to SVY03ADC1 data center through redundant bulk fibers.

The structure will be architecturally treated to fit the surrounding context of the site. Mechanical equipment for buildings cooling will be housed on the roof of the building. Electrical and backup battery equipment rooms will be housed inside the building. The SVY03ADC2 would be designed with an average rack power rating of 5 kW.

The roofing plan for the SVY03ADC2 is shown on Figure 2.3-7.

Figure 2.3-6: SVY03ADC2 Building Elevations

~~Figure 2.3-7: SVY03ADC2 Rooftop Building Plan~~

2.3.3.2 *Cooling*

Data Hall Cooling

SVY03ADC2is cooled by direct expansion Computer Room Air Conditioning (CRAC) units. The CRAC units are located in a gallery adjacent to the computer room. The system utilizes flooded room airflow design. The CRAC gallery acts as a supply plenum and airflow is discharged to the computer room cold aisles via row supply dampers on the CRAC gallery wall. Server heat is recirculated back to the CRAC units through the hot aisle containment and via return air plenum above the dropped ceiling. Heat is rejected to the ambient air via air cooled condensers located on the roof. When ambient air conditions are below a threshold, the system uses pumped refrigerant economizer feature instead of compressors to reduce energy consumption. Makeup Air Units (MAU) provide ventilation and space pressurization in the computer room.

Electrical Room Cooling

Electrical Room is cooled via two ductless split system DX heat pumps. Heat is rejected to the ambient air via outdoor condensers on the roof.

Admin Area Cooling

Admin area is conditioned via Rooftop Unit. Supply air is ducted to individual spaces. Return air is ducted back to the unit. The unit also has outside air intake for ventilation.

2.3.3 Security Building SVY03B

SVY03B The security building will be located in the northwest corner of the campus and at the location of the security gate. The building will be approximately 1605 square feet and will involve typical concrete masonry unit (CMU) construction. The height of the roof of the building will be approximately 15 feet and 18 feet to the top of masonry.

2.3.4 Project Substation, PG&E Switchyard and Transmission Line

The SVY03A Campus would construct a new 75 MVA (mega volt-ampere) electrical substation along the western boundary of the site (Project Substation). The two-bay gas insulated substation (GIS) (two 75 MVA 115 kV-34.5kV step-down transformers and primary distribution switchgear) will be designed to allow one of the two transformers to be taken out of service, effectively providing 75 MVA of total power (a 2-to-make-1 design).

The project will include a new Pacific Gas & Electric Switchyard (PG&E Switchyard) which will be built in a Breaker and a Half (BAAH) configuration. This will consist of a bundled 2 incoming double-circuit (2-way) 115kV ~~circuits~~ power line connecting to ~~entering~~ a BAAH configuration consisting of approximately 6 115kV circuit breakers, steel structures, 115kV switches, metering devices, and a non-occupied control enclosure. The PG&E Switchyard and the Project Substation will not use Sulfur Hexafluoride (SF_6) unless the short circuit current rating is greater than 63kA to align with CARB requirements.

The Project Substation and PG&E Switchyard will have crushed rock surface with an aggregate base. A mineral~~n~~ oil containment pit surrounding each transformer will capture unintended oil leaks. Access to the PG&E Switchyard will be from Eden Landing Road.

The Project Substation and PG&E Switchyard will be capable of delivering electricity to the SVY03A Campus from the ~~a~~ new PG&E 115 kv transmission line circuit but will not allow any electricity generated from the SVY03ABGF to be delivered to the transmission grid. Availability of substation control systems will be ensured through a redundant DC battery backup system.

To serve the SVY03A Campus, PG&E will be constructing a “looped” (2-way) transmission line from the existing transmission line adjacent to the project. ~~interconnection involving two offsite transmission line extensions. This~~ The Project has identified three optional routes that this looped transmission line could take from PG&E’s existing transmission line to the new PG&E Switchyard. See Figure 2.3-8A. The first option would involve building a new above-ground approximately 300 foot long, double circuit transmission line interconnection (bundled single-circuit each way, looped into and out of the PG&E Switchyard) supported by approximately two new tubular steel poles (TSPs). One new approximately 80-foot-tall TSP would be interset mid-span between two existing steel towers on PG&E’s Grant-Eastshore #1 & #2 115 kV double-circuit transmission line that runs along the west side of the project area. An approximately 70-foot-tall TSP would be installed on the north side of the project area. In addition, one or two approximately 35-foot-tall take-down structures would be installed immediately outside of the PG&E Switchyard. This option is identified as “Alt 1” on Figure 2.3-8A. ~~a line on the south side of the project that comprises a two circuits of 115 kV OH (Overhead) Transmission line (T-Line) from an existing PG&E Eastshore to Grant 115 kV Line which is located on the south side of the project.~~

The second optional route (shown as Design Alternative 1 on Figure 2.3-8A) would involve building a new above-ground, approximately 1,800-foot-long double-circuit transmission line interconnection (single-circuit each way, looped into and out of the PG&E Switchyard). The transmission line would be supported by approximately four to five new TSPs ranging in height from 70 feet to 120 feet. From one new approximately 80-foot-tall TSP to be interset mid-span on PG&E’s Grant-Eastshore #1 & #2 115 kV double-circuit transmission line, the new transmission line would run east on the south side of Eden Landing Road, then south on the west side of Production Avenue, and then west on the north side of Investment Boulevard. One or two approximately 35-foot-tall take-down structures would be installed immediately outside of the new PG&E Switchyard.

The third optional route (shown as Design Alternative 2 on Figure 2.3-8A would involve building a new above-ground, approximately 300-foot-long double-circuit transmission line interconnection (single-circuit each way, looped into and out of the PG&E Switchyard). The transmission line will be supported by approximately two new TSPs ranging in height between 70 feet and 120 feet. From one new approximately 80-foot-tall TSP to be interset mid-span on PG&E's Grant-Eastshore #1 & #2 115 kV double-circuit transmission line, the new transmission line would be run east along the north side of Eden Landing Road, and then to one or two approximately 35-foot-tall take-down structures installed immediately outside of the PG&E Switchyard. The details of the transmission line interconnection are subject to change with final design and conditions on the ground.

A one-line diagram is provided for the Project Substation as Figure 2.3-6~~Figure 2.3-8~~. A one-line diagram for the PG&E Switchyard is not yet available and has been requested.

Figure 2.3-68: One-line Diagram for the Project Substation

Figure 2.3-8A SVY03A Campus PG&E Transmission Line Options

2.3.5 Site Access and Parking

As shown on Figure C200 in the Civil Plan Set in Appendix I ~~Figure 2.4-4~~, the overall project site will include three entrances. The main entrance to the SVY03A Campus will be off of Eden Landing Road near the southwest corner of the site and will be the primary access for vehicles, trucks, bikes, and pedestrians. A secondary access entrance will be off of Production Avenue just south of the proposed substation and will be used for emergency access only. The third access will be off Eden Landing Road east of the main entrance and will be used for PG&E to access its Switching Station.

The site will provide 71~~63~~ vehicle parking spaces, of which 18~~9~~ will be EV and 4~~6~~ will be accessible spaces (2 large enough for vans). The site will also include 10 short-term and 7 long-term bicycle parking spaces.

The SVY03A Campus is anticipated to employ a total of 45 people, including security and maintenance staff. The full-time on-site facility maintenance staff would monitor and maintain the mechanical systems for the data center operation.

2.3.6 Water Storage

The SVY03A Building~~DC1~~ will use potable water for cooling within the DAHU's as described in Section 2.3.2.2 during hotter times of the year. To accommodate the peak demand of water use during those times, the project will include four ~~three~~ (4~~3~~) 62,000 gallon storage tanks Each tank will be constructed with steel bolted panels and will be approximately up to 19 feet in diameter and up to 42 feet high.

The use of the evaporative cooling system in the SVY03A~~DC1~~ building would result in approximately 2.8 AFY (approximately 50,000 gallons per day (GPD) during peak use) of wastewater discharge to the existing City of Hayward wastewater system.

2.3.7 Stormwater Basin and Stormwater Controls

The San Francisco Bay Regional Water Quality Control Board (RWQCB) has issued the Municipal Regional Stormwater NPDES Permit (MRP) to regulate stormwater discharges from municipalities and local agencies. Under Provision C.3 of the MRP, new and redevelopment projects that create or replace 10,000 square feet or more of impervious surface area are required to implement site design, source control, and Low Impact Development (LID)-based stormwater treatment controls to treat post-construction stormwater runoff. LID-based treatment controls are intended to maintain or restore the site's natural hydrologic functions, maximizing opportunities for infiltration and evapotranspiration, and using stormwater as a resource (e.g., rainwater harvesting for non-potable uses). Examples of C.3 LID measures include bioretention areas, flow-through planters, and subsurface infiltration systems.

The design of the SVY03A Campus proposes to construct stormwater treatment areas consisting of LID (Low-Impact Development) bioretention areas totaling approximately 15,000~~18,000~~ square feet, based on preliminary impervious calculations, sized according to the requirements of the MRP. The stormwater treatment areas will be located throughout the site, and adjacent to paved parking areas and buildings. A stormwater control plan is shown in Figure C500~~Figure 2.3-9~~C500 in the Civil Plan Set in Appendix I.

In the existing condition, stormwater flows within the site from north to south and discharges into the public system at two laterals south of the property along Investment Blvd. The project will maintain the existing drainage patterns and will capture flow in catch basins along the drive aisles and will be conveyed through storm drainpipe into the bioretention areas on-site. Downspouts for the roof drainage will be piped under sidewalks and discharged to the bioretention areas. Bioretention areas will include perforated underdrains and overflow structures that connect to the on-site storm drains system which will eventually discharge to the public storm system in Investment Blvd.

According to Appendix I, Hydromodification Susceptibility Map, of the “C.3 Stormwater Technical Guidance” published by the Alameda Countywide Clean Water Program the project site is located in a “solid gray area”, defined as streams or channels that are tidally influenced or depositional in their outfall to San Francisco Bay. According to the MRP, hydromodification controls (HMC) are not required for projects located in solid gray areas of the Hydromodification Susceptibility Map. Therefore, the SVY03A Campus will not incorporate HMC into the project’s development.

As part of the construction of the new buildings, domestic water, fire water, sanitary sewer, fiber, and storm drain connections will be made from the City infrastructure systems located along Eden Landing Road, Production Ave., and Investment Blvd. A utility plan is shown in Figure C400 in the Civil Plan Set in Appendix I ~~Figure 2.3-10~~

Figure ~~2.3~~C500~~-9~~: Preliminary Stormwater Control Plan

Figure C4002.3-10: Utility Plan

2.3.8 Associated Utility Interconnections

As part of the construction of the new buildings, domestic water, fire water, sanitary sewer, and fiber connections will be made from the City infrastructure systems located along Eden Landing Road, Production Avenue, and Investment Boulevard. There is a 12-inch diameter domestic water line located in Eden Landing Road that connects to an 8-inch diameter domestic water line in Production Avenue; both of these water lines are operated by the City of Hayward. The 12-inch domestic water line located in Eden Landing Road will serve as the primary source for potable water, building cooling, and fire supply to the project. The fire supply loop will also connect to the 8-inch domestic water line located in Production Avenue. The project's sanitary connection will tie to an existing 8-inch sanitary sewer that is located in Investment Boulevard along the project frontage.

2.3.9 Landscaping

The SVY03A Campus development proposes to remove 50~~48~~ trees on-site, due to various conflicts with proposed civil and architectural improvements. The replacement of the trees on-site will comply with the mitigation measures described by the City of Hayward. Forty-seven (47)~~All 48~~ on-site trees will be mitigated through a combination of planting new on-site trees per the City's prescribed replacement ratios, as well as paying into the City of Hayward in-lieu fund for new trees at select locations within the city.

New landscaping consisting of trees, large and medium shrubs, and groundcovers will be installed along the property boundaries, building perimeters, stormwater treatment facilities, and landscape beds distributed throughout the parking facilities. Fifty-five (55) ~~T~~trees will be planted a minimum of five feet away from new or existing water mains or utility lines. Please see the Landscape Plan Set included in Appendix I. ~~A site landscaping plan is shown in Figure 2.3-11~~.

Figure 2.3-11: Landscaping Site Plan

2.3.10 Site Demolition, Grading, Excavation, and Construction

Demolition, grading, excavation, and construction is anticipated to begin in summer of 2025~~4~~ with an anticipated completion date in summer of 2027~~6~~; a total of approximately 22 months. The peak construction workforce is approximately 150 workers per month with an average of approximately 100 workers per month. Appendix H contains a table with the anticipated workers per month during construction.

The proposed site grading is relatively balanced but will likely require up to ~~3,~~7,000 cubic yards of imported fill. Per geotechnical considerations, it is recommended that the foundation system be a combination of a matt slab with rammed aggregate piers. The maximum depth of required excavation for the matt slab will be 3-feet and the maximum depth of required excavation for the rammed aggregate piers will be approximately 20-feet (depth pending final geotechnical recommendations). For improvements at-grade that are not supported on a structural slab, the soil subgrade should be kept moist until it is covered by imported fill.

The maximum depth below existing grade for any of the drainage facilities (bioretention areas) is seven feet below existing grade. The drainage facilities for the site are spread evenly throughout the site plan. The total amount of area of drainage facilities provided for the site is approximately 15~~8~~,000 square feet. The maximum extent of excavation for the drainage facilities on-site is 8~~9~~0,000 cubic-feet or approximately 3,0~~5~~00 cubic-yards. A site grading and drainage plan is shown in Figure C300 in the Civil Plan Set in Appendix I ~~Figure 2.312~~.

Figure C3002.3-12: Site Grading and Drainage Plan

2.3.11 Site Water Supply and Use

2.3.11.1 *Site Grading and Construction*

Grading and construction of the SVY03A Campus is estimated to utilize approximately 1.75-acre feet of water over the 22-month construction period.

2.3.11.2 *Campus Operations*

Operation of the SVY03A Campus will require the approximate amounts of potable water as shown by use in Table 2.3-1~~Table 2.3-1~~ below.

Table 2.3-1: Potable Water and Wasteewater Demand

~~Use~~	~~Projected Demand Volume~~
~~Domestic:~~	~~0.5 AFY~~
~~Landscape:~~	~~3.75 AFY~~
~~Evaporative Cooling:~~	~~5.2 AFY~~
~~**Total Water Use:**~~	~~**9.5 AFY**~~

SVY03A Campus- Water Use				
	Peak 24-hour Period (gallons)	**Yearly Total (gallons)**	**Yearly Total (AFY)**	**Daily Average (gallons)**
Industrial Water (IW)	168,400	1,467,200	4.50	4,020
Potable Water	975	355,875	1.09	975
Landscape	3,340	1,182,648	3.63	3,240
TOTAL	**172,615**	**3,005,723**	**9.22**	**8,235**

SVY03A~~DC1~~ IW Storage Tank Capacity (total, 4 tanks)	172,000	gallons
SVY03A~~DC1~~ IW Storage Tank Capacity (per tank)	43,000	gallons

WASTEWATER SUMMARY

SVY03A - Wastewater

	Peak 24-hour Period (gallons)	Yearly Total (gallons)	Yearly Total (AFY)	Daily Average (gallons)
Industrial Wastewater (IWW)	56,800	580,200	1.78	1,590
Sewer	975	355,875	1.09	975
Landscape	0	0	0	0
TOTAL	**57,775**	**936,075**	**2.87**	**2,565**

It should be noted that the estimate for landscaping water will decrease with time as the plants become established adapt to the site environment.

STACK investigated the use of recycled water to be used at the site for evaporative cooling and rejected because Hayward's recycled water is not sufficient and would require expensive treatment and the infrastructure is not close to the site.

APPENDIX I

Revised Project Description Figures

PERSPECTIVE VIEW

PERSPECTIVE VIEW

PROJECT ADDRESS

26062 EDEN LANDING ROAD
HAYWARD, CA 94545

PROJECT DELIVERY PACKAGE

SEAL/SIGNATURE

THE LICENSED PROFESSIONAL SEAL AFFIXED TO THIS SHEET APPLIES ONLY TO THE MATERIAL AND ITEMS SHOWN ON THIS SHEET. ALL DRAWINGS, INSTRUMENTS OR OTHER DOCUMENTS NOT EXHIBITING THIS SEAL SHALL NOT BE CONSIDERED PREPARED BY THIS PROFESSIONAL, AND THIS PROFESSIONAL EXPRESSLY DISCLAIMS ANY AND ALL RESPONSIBILITY FOR SUCH PLAN, DRAWINGS OR DOCUMENTS NOT EXHIBITING THIS SEAL.

ISSUE DATE:	PROJECT NO: 25691.000
DESIGNED: HKS	ARCHITECT: HKS

MARK	DATE	DESCRIPTION

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SECURITY ENGINEER
GUIDEPOST
JON JOLIBOIS
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10th Floor
San Francisco, California 94104

PROJECT: BUILDING A SHELL

TITLE: ARCHITECTURAL ELEVATION

DRAWING: A608

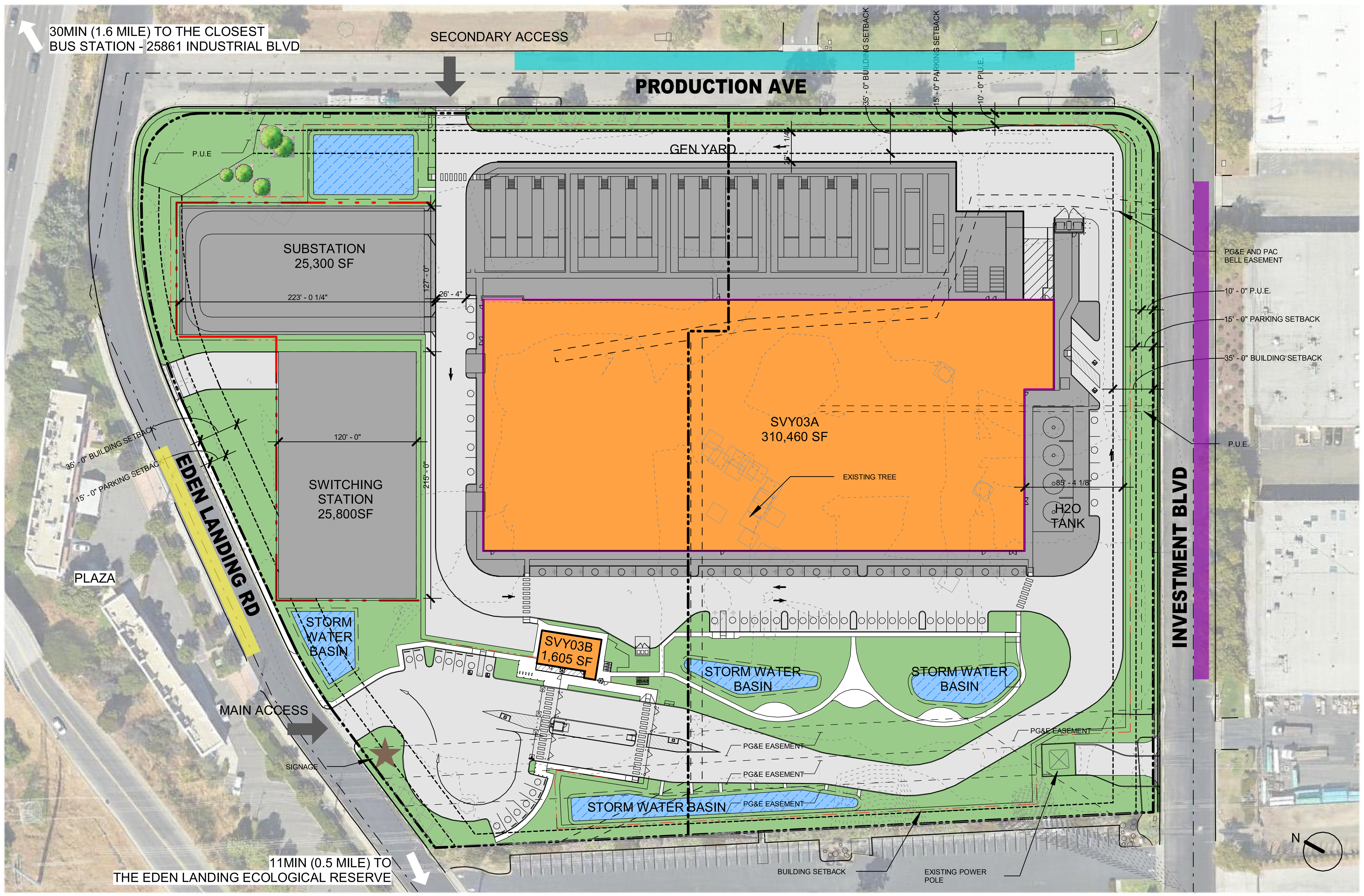
E1 SCALE: AGILE No: REV:

BOD VERSION: OPTDCv2.1
PDF PRINT DATE: 2/1/2024 4:36:37 PM 58

SITE PLAN

PRODUCTION AVE

EDEN LANDING RD



INVESTMENT BLVD

FAR: 0.62
REQUIRED PARKING: 182 Spaces
PARKING PROVIDED: 68 Spaces
% LANDSCAPE: 27%

STACK INFRASTRUCTURE

SVY03 STACK HAYWARD DATA CENTER

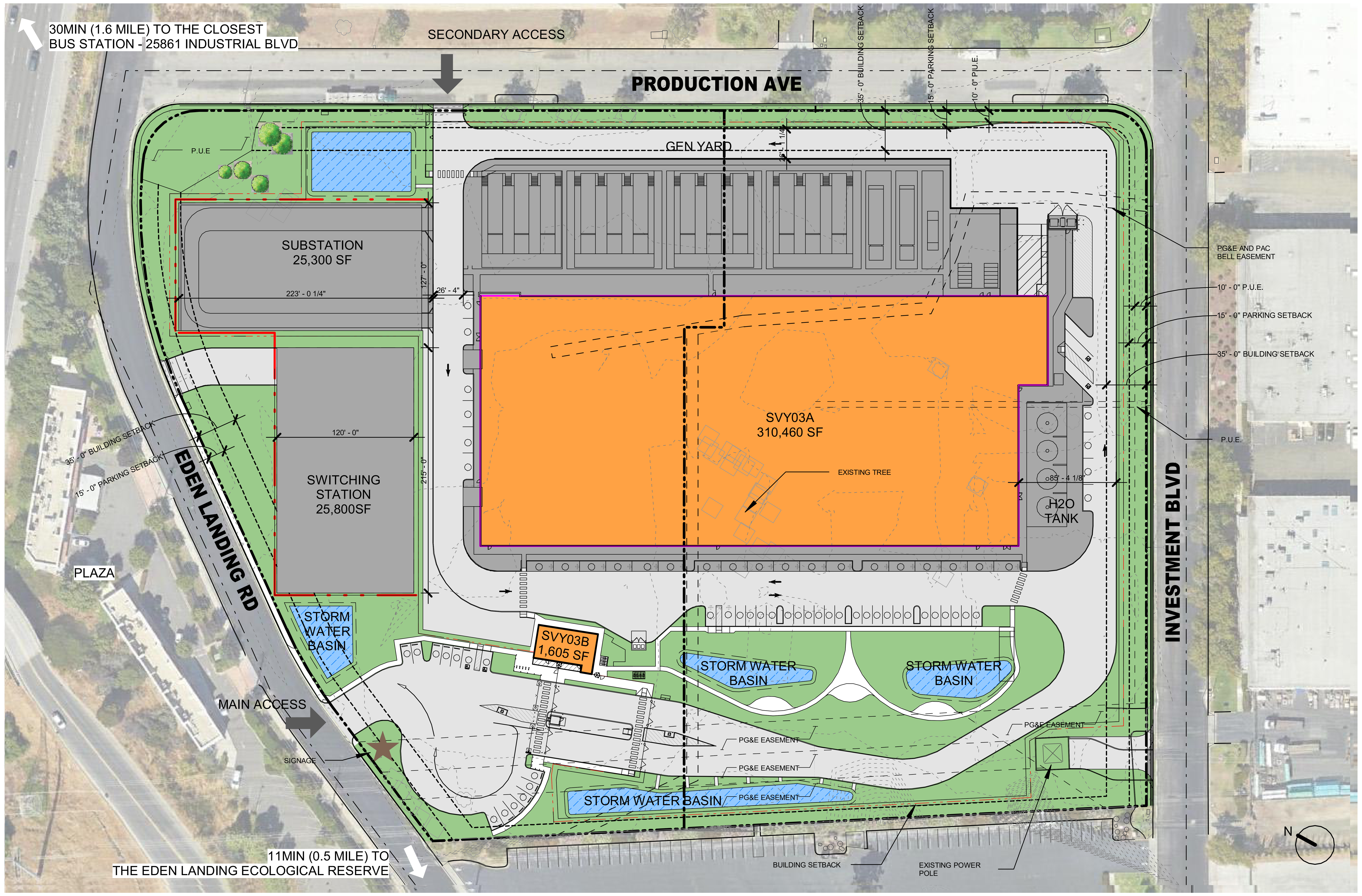
HKS

06/08/2023

SITE PLAN - WB67 TURNING

PRODUCTION AVE


EDEN LANDING RD



INVESTMENT BLVD

STACK INFRASTRUCTURE

SVY03 STACK HAYWARD DATA CENTER

HKS

06/08/2023

PRECEDENCE - STACK PROJECTS

MATERIALS: METAL PANELS
GLAZING: TINTED
COLORS: LIGHT GREY, WHITE

MATERIALS: METAL PANELS, CONC PANELS
GLAZING: SPANDREL, TINTED
COLORS: SILVER, WHITE, DARK ACCENTS

MATERIALS: METAL PANELS
GLAZING: SPANDREL, TINTED
COLORS: GREY, BLUE, DARK ACCENTS

MATERIALS: METAL PANELS, CONC PANELS
GLAZING: SPANDREL, TINTED
COLORS: SILVER, BEIGE, BROWN ACCENTS

MATERIALS: METAL PANELS
GLAZING: TINTED
COLORS: GROWN, LIGHT GREY, WHITE

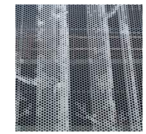
MATERIALS: METAL PANELS
GLAZING: SPANDREL, TINTED
COLORS: GOLD, SILVER

CONCEPT STUDY - ENTRANCE VIEW

COLOR CONSIDERATIONS

LIGHT BLUE | LIGHT GREY | LIGHT GREY

MATERIAL CONSIDERATIONS


PERFORATED SCREEN

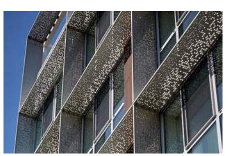

ARCHITECTURAL LOUVERS


CONCRETE PANEL


METAL PANEL

HAYWARD DESIGN GUIDELINES:

1. Incorporate architectural features such as awnings, canopies, trellises, and/or other treatments such as vertical architectural features or unique building colors or materials to clearly identify primary building entries.



2. Place windows on building elevations, such as clerestory windows, to allow for natural daylighting to occur within interior work areas and to break up massing and add articulation to a building.

3. Provide articulation and detailing on all elevations of a building and include elements such as recesses, columns, score lines, reveals, trellises, windows, lighting,etc.