SUSTAINABILITY PLAN

Hines
25800 Clawiter Road
Hayward, CA

Hines

City of Hayward

Prepared By:

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1. INTRODUCTION

Hines will manage a property at 25800 Clawiter Road in Hayward, California, consisting of four buildings. As part of the Major Site Plan Review and Conditional Use Permit application for the property, Hines is including this sustainability plan to describe proposed sustainability measures, in particular highlighting those which go above and beyond local and state requirements. The property and structures have been designed to incorporate many sustainability interventions which will reduce energy and water use. Hines will pursue LEED for Building Design and Construction for Core and Shell (v4). The property will align with CALGreen requirements including stringent Title 24 Energy Code compliance. A sustainable features map is included in Appendix A.

One of the buildings, Building 4, will house a data center. As this building is the only building with a known use and tenant at the time of report preparation, this sustainability plan focuses on two key sustainability categories, water management and energy management, which reflect the primary environmental impact categories related to data center operations.

In addition to measures reducing the water and energy impacts, Hines is implementing multiple additional sustainability features across all four buildings, including the following:

- An area to collect recyclables and green waste to promote recycling and composting;
- Electric vehicle charging at all property buildings to promote the use of electric vehicles;
- Preferred parking for carpool vehicles to encourage carpooling among commuters;
- Bicycle parking provided at all buildings and shower facilities provided at Building 4 to promote bicycle commuting;
- Low emitting paint and materials to reduce volatile and toxic emissions into the atmosphere;
- Construction and demolition waste recycling to reduce waste during these processes;
- Facilitating onsite meal preparation and sales by providing turnout space for food trucks and ample outdoor seating areas, thus reducing lunchtime vehicle miles traveled; and
- The site location is adjacent to public transit to promote the use of public transit for commuters.

Furthermore, as part of the development, Hines is providing enhanced bicycle infrastructure to encourage cycling to work. Hines is financially supporting the cost of striping detail, pavement marking, and roadside signage for bike lanes on Clawiter Road between Industrial Boulevard and Middle Lane in Hayward, California. This effort will establish 2,750 square feet of bicycle infrastructure with the goal of mitigating emissions from commuter vehicles and reducing traffic. This infrastructure contribution far exceeds the 25800 Clawiter Road project frontage of approximately 500 feet.

1.1 Building 4 Tenant Sustainability Commitment

The Building 4 tenant is committed to running its business in the most environmentally friendly way possible and has ensured accountability by establishing challenging targets relating to various sustainability metrics. Two key goals the Building 4 tenant is committed to achieving are reaching 100% renewable energy usage

by 2025 and having a net-zero carbon footprint by 2040, 10 years ahead of the Paris Agreement goal of 2050.[1]

The Building 4 tenant's corporate culture focuses on efficiency and continuous innovation to improve operational success and reduce the environmental impact using holistic and data-driven approaches. These principles are applied in many aspects of the design of the Building 4 data center. For example, the Building 4 data center cooling system will utilize real-time weather data to optimize the system parameters for current conditions, reducing both the energy and water demand.

Employees of the data center in Building 4 will have the opportunity to join a company-wide sustainability network with the goal of raising awareness of environmental impacts and reduction opportunities as well as leading pilot projects and sustainability initiatives in their workplaces. Examples of initiatives include: organizing employee carpool opportunities; diverting useable products from waste into community donations; organizing local cleanup events; increasing recycling opportunities; conducting energy audits; and continually implementing new energy efficiency programs.

The Building 4 tenant strives to not only achieve optimal performance with minimal adverse environmental impacts but to assist other companies and organizations in doing the same. The Building 4 tenant participates in an initiative supporting innovators and researchers to accelerate sustainability research and innovation by reducing the cost and time required to develop and analyze large datasets necessary for their work.

The water and energy-related sustainability considerations for the Building 4 data center are discussed in detail in the subsequent sections of this plan.

[1] The Paris Agreement is a legally binding global climate change agreement which was adopted at the Paris Climate Conference (COP21) in December 2015 and signed by close to 190 parties. The Paris Agreement sets a framework to limit global warming and strengthen countries' ability to deal with cllimate change impacts. While the United States gave a formal notice of intention to withdraw from the Paris Agreement in November 2019, many states and local governments have stated their commitment to continue to advance the Paris Agreement objectives.

2. ENERGY MANAGEMENT

The following sections outline energy-saving processes, features, and equipment which will be incorporated into the building design. Hines will be able to further evaluate sustainability measures and metrics once all building tenants are in place.

Key energy management features include:

- High server utilization in Building 4;
- Evaporating cooling use in Building 4;
- Adaptive equipment use in Building 4;
- Efficient lighting and controls installed in all buildings;
- Electronic Power Management System implementation in Building 4;
- Environmentally Conscious Roof Design;
- Low Power Usage Effectiveness rating for the Building 4 data center;
- Renewable energy usage for the Building 4 power demand; and
- Additional energy conservation measures.

Many of these features go above and beyond local and state requirements, for example use of evaporative cooling, adaptive equipment, and an electronic power management system for energy optimization in Building 4. These features and other features later discussed contribute to the Building 4 data center power usage effectiveness rating which is well below global and national averages. Additionally, the Building 4 tenant is committed to powering the data center with 100% renewable energy by 2025.

The Building 4 tenant estimates an annual energy usage of approximately 96,500,000 kWh assuming an average installed load of 13 MW, continuous annual operation, a load factor of 0.85, and implementation of the energy-saving measures discussed in this section. By implementing these energy-saving measures, the Building 4 tenant estimates a corresponding reduction in the annual energy demand of approximately 6% or 5,790,000 kWh.

2.1 Server Utilization

The Building 4 tenant will be operating a hyperscale data center. Hyperscale data centers are much more efficient and produce a carbon footprint that is a fraction of what enterprises' on-premise or collocated data centers or servers produce. Having the large centralized process allows for the operation to attain high infrastructure efficiency by design, while the cloud model with a shared and monetized infrastructure leads to high server utilization which can far exceed what is possible for individual enterprises which are frequently un- or under-utilized. This is often necessary because individual enterprises cannot afford to run out of server capacity. The average data center server utilization is 12-18% while hyperscale cloud providers can realize higher utilization rates ranging from 40 to 70 percent.[2] While un-utilized equipment simply wastes energy while not in use, under-utilized equipment does not operate as efficiently as equipment operating at a high load. Due to more energy-efficient, modern equipment and a higher server utilization, the Building 4 tenant's operation will be more than 3.5 times more energy-efficient than the median of enterprise data centers in the United States.

[2] Natural Resources Defense Council (August 2014). Data Center Efficiency Assessment. Retrieved from https://www.nrdc.org/sites/default/files/data-center-efficiency-assessment-IP.pdf.

2.2 Evaporative Cooling

In addition to increased server utilization, the hyperscale data center design allows for scalable improvements in other features like temperature controls. For enterprise data center facilities, cooling remains a major source of inefficiency due to tight temperature controls required to mitigate the potential for hardware failure. This energy-intensive practice relies on mechanical refrigeration to keep the air in the data center room cool year-round. In contrast, the Building 4 data center servers will be specifically designed to accommodate a wider temperature range and to utilize an advanced evaporative cooling technique in place of compressors or cooling towers. The Building 4 data center's cooling system will simply bring in cool air directly from outdoors to provide for its cooling needs during 97.7% of each year. During these months, no water will be needed for the direct evaporative cooling process. During the 2.3% of the year when outdoor temperatures are too high for outdoor air to be used for cooling as-is, the proposed cooling system will lower the temperature of the incoming outdoor air by passing it across wetted media. Real-time sensor data will be utilized to allow the cooling system to immediately adapt to changing weather conditions.

This process, direct evaporative cooling, requires approximately 0.11 kW per ton of water cooled while the ASHRAE HVAC standard (water cooled chiller plant with waterside economizer) requires approximately 0.6 to 0.8 kW per ton of water cooled.

2.3 Adaptive Equipment

The Building 4 tenant will install variable speed drives and variable frequency drives on fans and motors to enable the equipment to run at lower speeds when possible reducing energy consumption.

2.4 Efficient Lighting and Controls

All of the buildings at 25800 Clawiter Road will have LED lighting which is 6-7 times more efficient as compared to conventional light bulbs and will reduce the energy demand by over 80%.[3] In addition, LED lights can last 25 times longer than traditional light bulbs.[4] The buildings will also utilize motion sensors to eliminate unnecessary lighting electricity usage.

2.5 Electronic Power Management System

The Building 4 tenant will install an electronic power management system (EPMS) which is an electronic system that provides detailed information about the flow of power to the data center. The EPMS will manage the operational environment and optimize the HVAC and electrical system settings for the lowest functional energy usage.

2.6 Environmentally Conscious Roof Design

All of the buildings at 25800 Clawiter Road are designed to have white roofs with solar-ready features. White roofs reflect sunlight reducing heat-absorption which in turn reduces both the cooling demand for the buildings and the contribution to the urban heat island effect. Providing tenants with solar-ready roofs

[3] U.S. Department of Energy (2013). Top 8 Things You Didn't Know About LEDs. Retrieved from https://www.energy.gov/articles/top-8-things-you-didn-t-know-about-leds.

[4] Ibid.

promotes the opportunity for increased renewable energy usage. In addition, the buildings will have up to 2.5% skylights to reduce the lighting demand and associated electricity usage.

2.7 Power Usage Effectiveness

All of the features listed in the previous sections contribute to a low power usage effectiveness (PUE) for Building 4. PUE is a ratio that describes how efficiently a data center uses energy. It is the ratio of the total amount of energy used by the data center facility to the energy delivered specifically to computing equipment, thus the ideal PUE would be 1.0. The data center in Building 4 will have an extremely competitive PUE rating of 1.18. In comparison, Uptime's 2020 global data center survey indicated that the global average PUE is currently 1.59 while the United States and Canada average PUE is currently 1.53, which is approximately 30% higher than the Building 4 data center's projected PUE.[5,6]

2.8 Renewable Energy Usage

The Building 4 tenant is committed to working with the local utility to procure a 100% renewable energy mix by 2025. In addition, the Building 4 tenant is committed to achieving net-zero carbon by 2040. The local utility, Pacific Gas & Electric (PG&E), offers a diverse energy mix including 39% from eligible renewable resources (such as wind, geothermal, and solar) and a combined total of 85% from renewable or greenhouse gas-free sources.[7] PG&E currently offers various renewable programs to customers, including the Solar Choice program. Considering the carbon intensity of the electricity demand and renewable energy portfolio, the Building 4 data center will be able to perform tasks with an 88% lower carbon footprint than a standard data center.

2.9 Additional Energy Conservation Measures

The Building 4 tenant will engage PG&E to stay apprised of all energy efficiency programs that could be implemented, will leverage PG&E incentives to fund energy conservation measures, and will incorporate energy conservation measures into building design where appropriate.

[5] Uptime Institute (July 2020). 2020 Data Center Industry Survey Results. Retrieved from https://uptimeinstitute.com/2020-data-center-industry-survey-results.

[6] Data Center Dynamics (August 2020). Which regions have the most energy efficient data centers?. Retrieved from https://www.datacenterdynamics.com/en/opinions/which-regions-have-most-energy-efficient-data-centers/.

[7] PG&E (2020). Exploring Clean Energy Solutions. Retrieved from https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/clean-energy-solutions/clean-energy-solutions.page?WT.mc_id=Vanity_cleanenergy.

3. WATER MANAGEMENT

The following sections outline water-saving processes, features, and equipment which are incorporated into the building design. Hines will be able to further evaluate sustainability measures and metrics once all building tenants are in place.

Key energy management features include:

- Low-flow appliances installed in all buildings;
- Recycled water infrastructure design in Building 4;
- Evaporative cooling use and adaptive systems in Building 4;
- Water reuse in Building 4; and
- Water conscious landscaping.

Many of these features go above and beyond local and state requirements, for example use of evaporative cooling, adaptive systems, and water reuse in Building 4. Additionally, the Building 4 tenant has proposed to utilize recycled water from the City of Hayward and is currently in discussions with the City regarding the feasibility of this measure. Taken together, all of these measures will mitigate all four buildings' water-related impacts.

3.1 Low-Flow Appliances

The 25800 Clawiter Road buildings will utilize low flow appliances in restrooms (toilets, sinks, and showers) to reduce the water footprint of the property.

3.2 Recycled Water Infrastructure

The Building 4 tenant has communicated a strong desire to work with the City of Hayward to bring recycled water infrastructure to Building 4 and has implemented a site plan and design that will allow for the use of recycled water for cooling and plumbing when the service can be made available. Discussions with the City around recycled water quality are ongoing and under evaluation to determine if pre-treatment will be required for use in the cooling system.

Recycled water refers to residential and industrial wastewater which has been treated at a local wastewater treatment plant. It is "highly-treated wastewater that has undergone multiple levels of treatment to meet stringent quality and safety standards set by the California State Water Resources Control Board."[8] The process for utilizing recycled water would conserve precious drinking water resources by diverting a portion of treated water that would otherwise be released back into the bay or local water bodies.

3.3 Evaporative Cooling

As mentioned in Section 2.2, the Building 4 tenant will use evaporative cooling technology which will eliminate the need for cooling towers and supply the most efficient use of water and energy to power and provide cooling for the facility infrastructure. The Building 4 data center's cooling system will utilize only cool

[8] San Francisco Public Utilities Comission (2018). Recycled Water. Retrieved from https://sfwater.org/index.aspx?page=141#:~:text=What%20is%20Recycled%20Water%3F,State%20Water%20Resources%20Control%20Board.&text=Recycled%20water%20is%20safe%20and,variety%20of%20non%2Ddrinking%20uses.

air for its cooling needs during 97.7% of each year. Whereas standard cooling methods require a continuous water supply throughout the year, this advanced system will only have a water demand during 2.3% of the year when outdoor temperatures are too high for outdoor air to be used for cooling as-is.

The data center in Building 4 is expected to use less than 1 million gallons of water annually for cooling purposes, most of which will occur during the hottest months of the year. During cooler months, outside air will be directly utilized to cool the server room without the need for any water. During the hottest month, the Building 4 tenant expects to use no more than 600,000 gallons.

The cooling technology was selected in part by evaluating regional climate patterns, local water availability, local water management, and drinking water source conservation opportunities. Both energy and water impacts were considered during the method selection process as the Building 4 tenant seeks to take holistic approaches when evaluating environmental impacts.

3.4 Adaptive Systems

As noted in Section 2.2, real-time sensor data will be utilized to allow the cooling system to immediately adapt to changing temperatures. A data-driven approach will also be taken for water usage, the Building 4 tenant plans to partner with the local water utility to access utility water meter readings. In addition, the Building 4 tenant will install independent meters to track real-time water usage metrics which will provide continuous data for the operations and sustainability departments to analyze with the goal of identifying water reduction opportunities which can be immediately implemented in the direct evaporative cooling system and other water uses at the site.

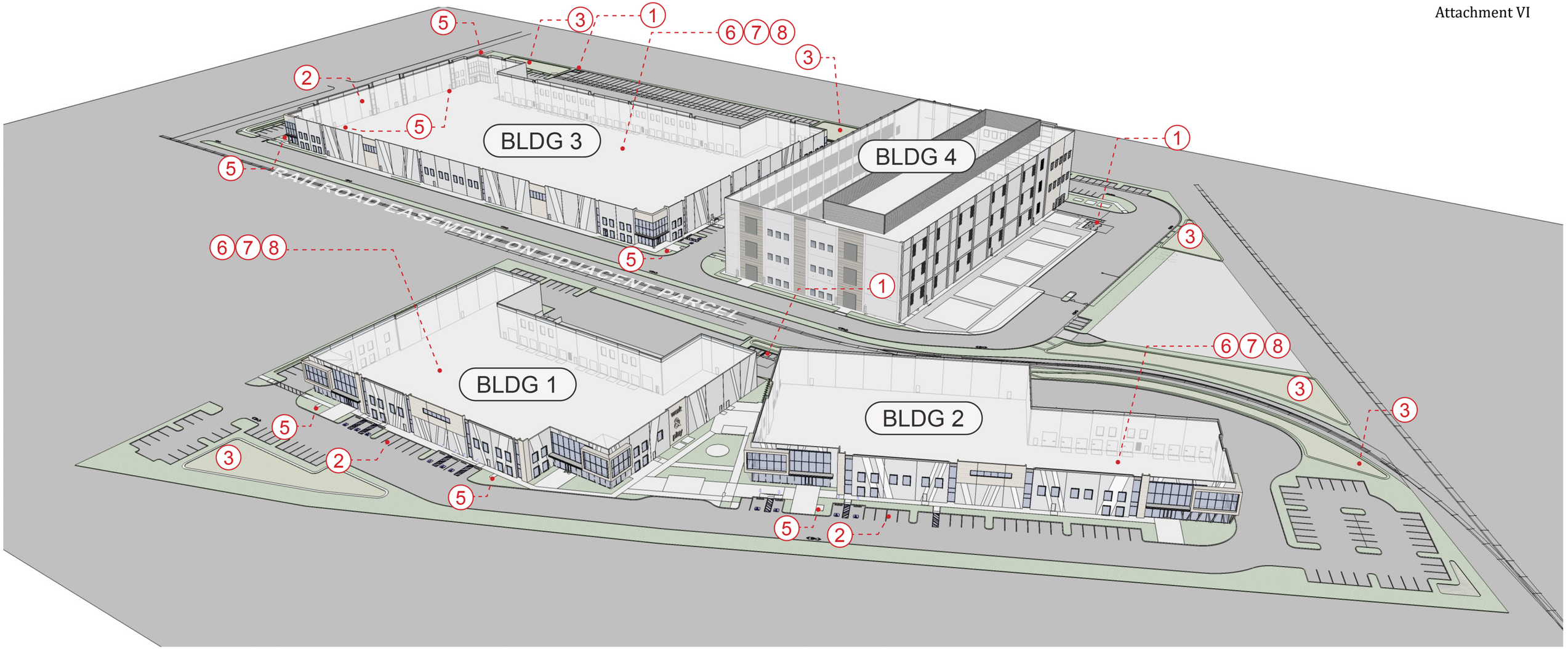
3.5 Water Reuse

As the recycled water infrastructure may not be immediately available for use when the Building 4 data center begins operation, the evaporative cooling system will be designed to reuse the potable water a minimum of 3 times before it must be discharged to the sewer system without the need for any treatment.

3.6 Water Conscious Landscaping

The 25800 Clawiter Road property will have drought-tolerant landscaping as well as efficient drip irrigation systems. In addition, the landscaping will be conducted in excess of the city required landscape percentage and will leave in place many existing trees.

APPENDIX A. SUSTAINABLE FEATURES MAP



1. Area to collect recycleables and green waste
2. Electric vehicle charging: Building 1 and 2 provided with (2) chargers each; Building 3 charger ready; Building 4 provided with (4) chargers
3. Drought tolerant plants and efficient drip irrigation
4. Landscaping provided in excess of city required landscape percentage and many of the existing trees to remain reducing heat island effect
5. Bicycle parking provided at all buildings and shower facilities provided at building 4
6. Cool roof reduces heat island effect and reduces air conditioning demands
7. Solar ready roof design
8. 2% skylights reduces lighting demand
9. LED lighting
10. Low emitting paint and materials
11. Site located adjacent to public transportation
12. Construction and demolition waste recycling to reduce waste

25800 CLAWITER ROAD

CITY OF HAYWARD, COUNTY OF ALAMEDA, CA

HPA architecture

Hines