



Beach Cities Health District, Healthy Living Campus Strategic Opportunities Report

March 24, 2023

EXECUTIVE SUMMARY

Contemplating demolishing an existing building is not easy. Reuse and being mindful of the embodied energy of the building is always a priority. Over the years, the BCHD invested millions of dollars into the 514 Prospect Avenue building. Nonetheless, the original 1958 design as a hospital has made the 514 building functionally obsolete and would make it difficult to retrofit. Hospital level air filtration and set temperatures throughout the building means that mechanical heating and cooling, fan, and pump energy are far greater than what would otherwise be needed for its current application. The functional obsolescence is evidenced by:

- Exorbitantly high utility bills for electricity, gas and water
- Highly polluting operations for the surrounding community
- Earthquake vulnerability
- Mechanical systems at the point of failure
- The difficulty in attracting and keeping tenants
- The high cost of maintenance for the building

In any scenario, the current conditions above need to be addressed in a way that is amenable to all stakeholders, while making sure the campus is not left unsafe, in disrepair or financially unsustainable going forward.

This building audit prompted a review and comparison of the 514 building and found that it is significantly more expensive to operate and maintain than its counterpart 510 and 520 buildings. This audit also found and highlighted several opportunities for the BCHD to save money and reduce energy, water consumption and localized pollution in its current operations. For example, disentangling the gas meters alone will save the BCHD \$12,895/year, every year going forward (based on 2021 billing). In addition, the BCHD is due compensation from the 510 building for every year of gas consumption since 510 became independent in 1989. Additional opportunities to reduce water consumption and make sure billings are done equitably are currently underway.

Below are strategic opportunities to help make the HLC project more amenable to all stakeholders while better addressing financial sustainability:

- Save money, energy, water and localized pollution by decommissioning the highly energy and water intensive mechanical building (Central Plant) and deploying renewable energy, storage and EV charging as soon as possible
- Fully maximize the unique partnership opportunities available to the BCHD given its mission around preventative health and its commitment to building a Center of Excellence through every part of the development process. These partnerships can open the opportunity to utilize technologies that can cut first and operational costs, while reducing localized pollution, toxicity, noise, traffic and other impacts for the community.

In summary, there is a great opportunity for the Center of Excellence concept along with external partnerships to propel the Healthy Living Campus into a project the community can be proud of by the way it innovates and executes on that innovation related to public health, wellbeing, and financial sustainability. If done well, it can be a beacon for all future construction projects and communities interested in responsible development and preventative healthcare while working within a budget. Hopefully the ideas presented here are helpful in bringing that to fruition.

BACKGROUND

The Beach Cities Health District (BCHD) wishes to design and build a Healthy Living Campus (HLC) on its existing campus on Prospect Avenue in Redondo Beach. The BCHD would like to make it a Center of Excellence demonstration project in its design, construction and operations that lives up to its HLC name and the preventative health care model of the BCHD.

The project is currently in the process of applying for a Conditional Use Permit and engaged a design/build firm to construct and operate the building on a long-term lease.

Because of our unique expertise and experience related to environmental sustainability, building science, economics, innovation and strategy, ForStrategy Consulting was contracted to assist with the project to help the BCHD and the community build a better, healthier and safer campus – and save time, money and aggravation in the process.

To effectively do this, ForStrategy Consulting has been engaged in background research, a series of stakeholder interviews and a series of audits of the existing buildings that documents existing conditions and energy consumption. With that information Forstrategy Consulting is giving guidance on how the BCHD can achieve a project for the community that lives up to the HLC name and the aggressive goals the BCHD is setting for: environmental sustainability, community wellness and cohesion, and financial sustainability. In this draft report we will be covering current conditions of the existing site and strategic opportunities for the project.

STRATEGIC OPPORTUNITIES FOR THE NEW BUILDING PROJECT

The BCHD campus needs to be addressed in a way that is amenable to all stakeholders, while making sure the campus is not left unsafe, in disrepair or financially unsustainable going forward.

Below are strategic opportunities to help make the HLC project more amenable to all stakeholders while better addressing financial sustainability:

- A. Save money, energy, water and localized pollution by decommissioning the highly energy and water intensive mechanical building (Central Plant) and deploying renewable energy, storage and EV charging as soon as possible.
- B. Fully maximize the unique partnership opportunities available to the BCHD given its mission around preventative health and its commitment to building a Center of Excellence through every part of the development process. These partnerships can open the opportunity to utilize technologies that can cut first and operational costs, while reducing localized pollution, toxicity, noise, traffic, and other impacts for the community.

A. Save money, energy, water and localized pollution by decommissioning the highly energy and water intensive mechanical building (Central Plant) and deploying renewable energy, storage and EV charging as soon as possible.

The existing 514 building is putting out tons of pollution and consumes monthly \$26.5k and 168k kWh/month in electricity, \$10k and 12.6k therms of gas and \$9.2k and 887k gallons of water. As described above, we believe the main culprit is the mechanical building which makes and pumps hot water and chilled water for the 514 building. The inefficiencies, localized pollution and point of failure risks originating from the mechanical building are of concern.

The use of natural gas for hot water boilers and cogeneration equipment in the mechanical building is an intense and constant source of localized pollution. Diesel fuel for backup generators adds to the pollution load.

The localized pollution from the mechanical building electricity is exacerbated by the aging Redondo AES power plant. Although our CA grid is becoming more renewable every day, this very high energy intensity use by the 514 building is backed up locally by the older, highly polluting powerplant in Redondo Beach. When activated in high demand times, this power plant blankets the South Bay with its emissions.

Better, healthier, and less costly ways to power buildings are available today – and would fit better with the BCHD’s mission around preventative healthcare.



Because Silverado created its own separate all-electric mechanical systems, it may be possible to stop the bulk of the highly polluting and water-consuming activities from the mechanical building while still operating Silverado, the Gym, and a few select other areas. This, of course, will need to be confirmed with the Maintenance Supervisor and the Senior Project Manager from CBRE before attempting to disconnect those services.

This strategy has two additional advantages:

- Revenue from the 514 building can continue during construction, and tenants can seamlessly transition from the existing to the new building.
- Demolishing the mechanical building allows construction crews to navigate the building site more easily with heavy equipment.

Transformers and Temporary Power - The main transformer for 514 resides with the mechanical building. Therefore, from a staging standpoint, demolishing the mechanical building would require building the transformer for the new building in its permanent position first, and running conduit to the old building temporarily.

There are advantages to this strategy. Given the very high price of temporary power poles and temporary power during construction, this may be a money-saving strategy as well.

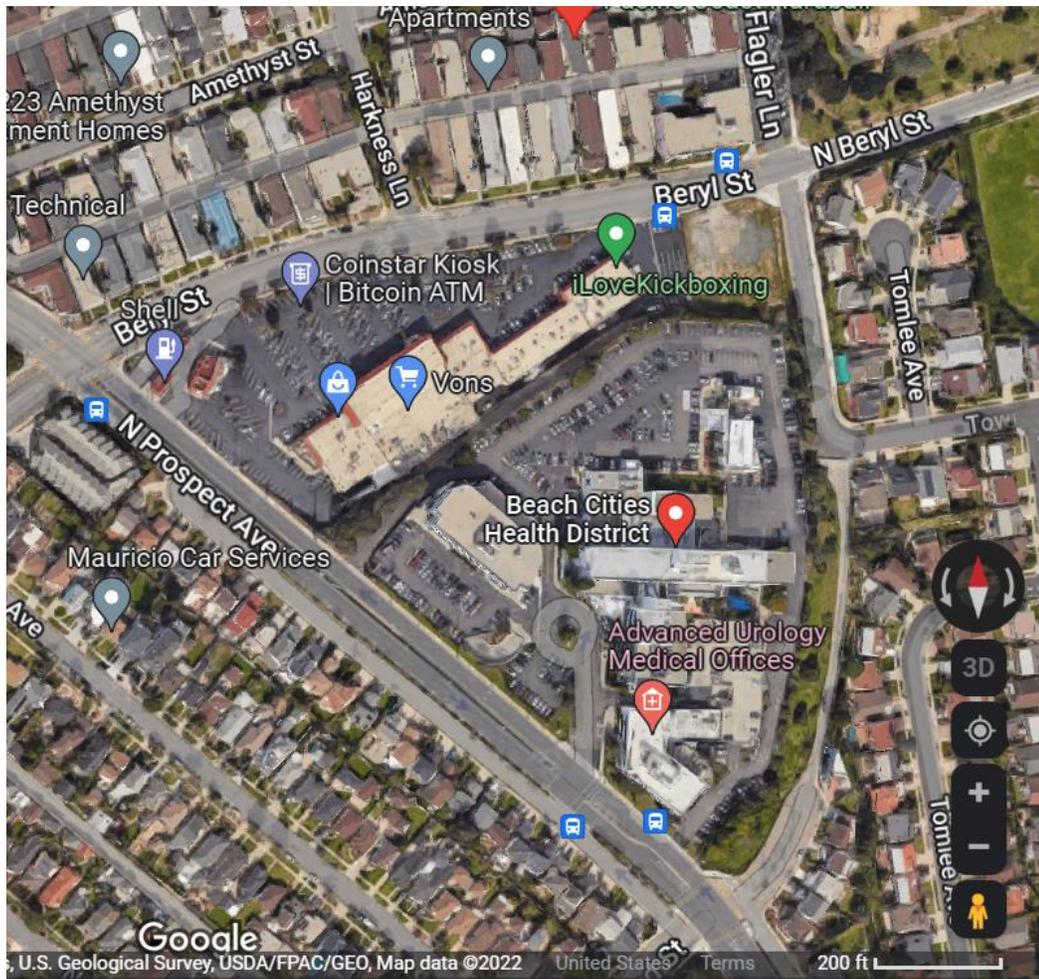
Unfortunately, it appears that temporary power may still be needed on site because of projected long lead times associated with supply chain and other COVID-related impacts in acquiring a transformer and switch gear from Southern California Edison. If possible, the BCHD team should do load calculations as soon as possible to see if that process can be put on a priority status.

In addition, the new vault and equipment enclosure appears to be planned on site near Prospect Avenue. There may be an advantage to building the vault closer to the shopping center complex where industrial power is already available. As a result, a run of large copper cables can be significantly reduced for Phase 1. This would also reduce potential voltage drops between the transformer and the main breaker box. But Phase 2 would have to connect to another power supply near Prospect.

Developing the opportunities for renewable energy, storage and EV Charging - Given the strategies and difficulties above, the BCHD may want to consider drafting a master plan for temporary and permanent solar power generation, energy storage, and EV charging.

This could lessen the load and the costs of temporary and permanent power. It will also significantly reduce the localized pollution load to the community.

Solar Power Generation – Photovoltaic panels produce electricity and could be deployed in various locations on the campus. The BCHD’s large campus and the new building are ideally suited to solar power generation on site because of the campus’s SW orientation at the top of a hill with minimal obstructions (see below).



The Southwest orientation of the site is optimal for solar energy generation.

Active Energy Storage – Battery and potentially other forms of active (like mechanical) energy storage could be sized to replace the diesel backup generators when paired with critical loads panels. Storage could also be used to minimize Demand and Time of Use charges from SCE. Vehicle to Grid technology is fast approaching adoption with the Ford F150 and others having the capability of storing energy during off peak hours and returning it to the grid during peak hours.

Passive Energy Storage – Thermal storage or geothermal can also be deployed to offset peak loads. For example, using tanked heat pump water heaters allows the water to be heated when electricity rates are lowest and can be timed to turn off when rates are the highest. This strategy also minimizes localized pollution.

On a more basic level, passive energy storage starts with designing a building that heats and cools itself throughout the year. By deploying overhangs as part of the buildings design, the building can more effectively repel heat during the summer and harvest heat in the winter. This, obviously, is in combination with other strategy like insulation, air sealing and optimizing the glazing minimizing heat transfer of structural materials in the building.

EV Charging – Charging stations could be strategically located on the site to service the EV construction vehicles on site. In addition to reducing localized pollution, they could:

1. Potentially reduce energy costs through Vehicle to Grid technology described above.
2. Encouraging the mass adoption of EV construction vehicles and also do the same for consumer vehicles.

Excessive Water Consumption – As mentioned above, this study found and highlighted several opportunities for the BCHD to save money and reduce energy, water consumption and localized pollution in its current operations.

Additional opportunities to reduce water consumption and make sure billings are done equitably are currently underway:

All water to the 510 building was redirected to a submeter that is now being billed back to the 510 building.

We are working with the building maintenance supervisor to replace the broken water meter for the cooling tower.

To find any over consumption of water and properly bill back water consumption, temporary ultrasonic water meters were just installed on the water mains coming into the buildings.

The ultrasonic meters are measuring flow rates every 10 seconds and will give us a baseline for water consumption in the new building that could potentially reduce pipe diameters and save first and operational costs on the new build.

If the ultrasonic meters do not find the overconsumption, we will then turn to the possibility that the calibration of the main meter is off or there is an underground leak.

Lastly, the HLC will also need to consider water capture and treatment for reuse. We have seen some technologies that are helpful and they are getting better over time. This project will benefit from those technologies, but most are costly, energy intensive and high maintenance as a function of the job they have to do and the risk to public health. And like solar, there are better and not so great applications of the technology. The design and installation should be monitored carefully.

B. Fully maximize the unique partnership opportunities available to the BCHD given its mission around preventative health and its commitment to building a Center of Excellence through every part of the development process. These partnerships can open the opportunity to utilize technologies that can cut first and operational costs, while reducing localized pollution, toxicity, noise, traffic and other impacts for the community.

The BCHD is in a unique position in that its non-profit mission is around preventative health. By fully leveraging that position and mission, the BCHD could build a mutually beneficial community of public and private entities that are also mission driven to support preventative health in various ways.

For example, Tesla and Volvo are committed to reducing or ending fossil fuel use, which has significant health impacts. Might it be possible to help them tell their story around clean energy generation, storage and all-electric transport and construction vehicles through the HLC project? In return, might they be willing to donate or give a discount to the HLC project?

Finding and partnering with like-minded organizations can help to push down the learning, cost and adoption curves on the important technologies for this Center of Excellence project. Obviously, these organizations would need to be vetted well to avoid the proration of greenwashing. (promoting something as sustainable, even though it is not). But there are many organizations doing great work that could benefit from partnering with the BCHD and vice versa.

In our experience partnering with over 70 public and private entities for our Green Idea House project and helping our clients get millions of dollars in grants for their projects, there are a couple of key elements the BCHD needs to put into place:

1. **Clarify Mission and Communications** – It will be important for the BCHD to emphasize the importance of reducing localized pollution, toxicity... in its preventative health mission and external communications as soon as possible. Potential partners need to get a clear signal that the BCHD is in alignment with their values.
2. **Have Audacious Goals** – Potential partners are hit up for donations on a daily basis. The majority of those requests are denied. To get partner's attention and make the project appealing, the HLC building, and the building process will need to be a case study for a number of things that have not been attempted before –

or not at this scale. The HLC will need to be distinct in specific ways that go beyond code and add real value to the scaling of concepts being put forward.

That is where clear, thoughtful and strategic Owners Project Requirements (OPR) documents are needed. A draft discussion template OPR for this project is included at the end of this report and the core team from BCHD has started a conversation about it.

The draft OPR and discussions around it by the BCHD team have yielded a Draft Developer Discussion Document which makes a number of suggestions about things that may be included in the OPR that would give direction to the design teams in advance of a design charette.

3. **Enhance the public benefit by reducing localized pollution, noise and traffic with alternative construction and building methodologies.**

A large focus of the Healthy Living Campus project is related to the impact on the community. The completed Environmental Impact Report (EIR) detailed and addressed the issues as well as the mitigations taken. Despite this, some concerns remain regarding construction noise, construction duration, traffic and localized pollution.

Much has already been done to address these issues, but there may be alternative strategies to help the project attract partners and achieve Center of Excellence and HLC goals while further reducing the impact on the community:



Operations/Electrification – The BCHD potentially has the land area to design a Zero Carbon, Net Zero Energy campus that eliminates operational polluting fossil fuel burning on the site. That pollution has proven to cause heart disease, lung disease and cancer. This campus has an opportunity to become a model for this type of construction and building design going forward.

California Title 24 requirements are already heavily favoring all electric buildings, but a campus at this scale that achieves it early will draw positive attention for partnership opportunities. In addition, with the right

approach, proactively executed, first costs, operational costs and maintenance costs can be lower in all-electric buildings, saving time money and aggravation for the BCHD and the developer by eliminating one utility and one of the most expensive trades on the site (gas plumbers).

In addition to the cost, time and health benefits, the other inherent benefit of all-electric construction is safety – especially in an earthquake zone like Southern California. Done properly, the HLC can be a resiliency hub for the community in emergency situations, providing a safe haven and emergency power.

Electric construction vehicles - The noise, vibration and pollution from construction vehicles can be reduced using electric construction vehicles vs their noisy and polluting diesel counterparts. This could also include the big rigs used to haul materials and/or building panels or modules to the site. Electric construction vehicles are at the cusp of mass adoption and this Center of Excellence project could significantly spur demand for this important technology.

[Volvo compares their all electric construction vehicles to diesel](#)

[Big rigs going electric](#)

Modular construction - To reduce noise, construction time and traffic for local residents, BCHD may want to consider modular or panelized construction for the new buildings. The residential/office nature of the facility would lend itself well to a combination of modular and panelized construction. While the foundations are being built on site, the rest of the building could be manufactured off site, trucked to the campus and assembled by crane. This methodology could potentially cut construction time in half and significantly reduce noise and traffic from the reduced number of workers on site.

If interested, ForStrategy Consulting has done a round of research on this topic locally for other clients and have recommendations for next steps and potential manufacturers to consider.

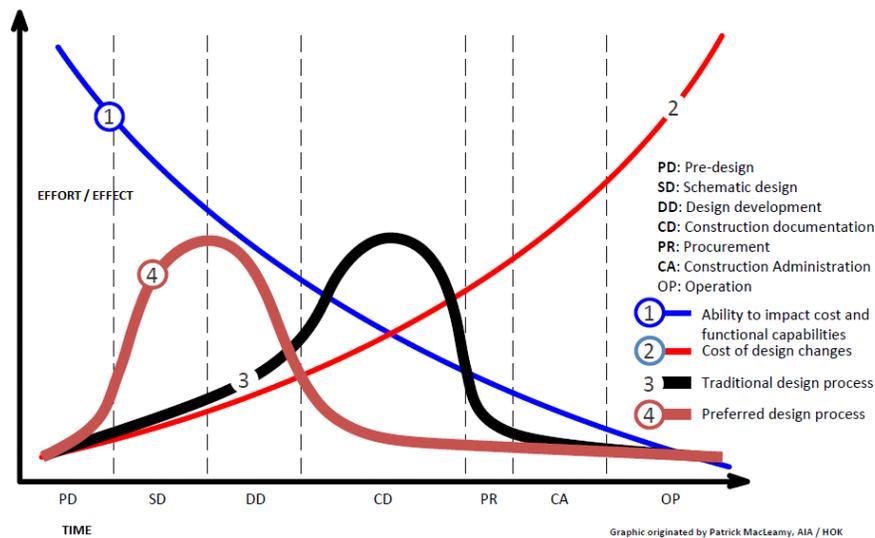
Materials – The demolition of the existing 514 building means a loss of the embodied energy and carbon in the structure as well as the energy needed to demolish and rebuild it. In addition to electrification (above) the HLC project can offset this loss through materials that significantly reduce energy and carbon intensity as well as localized pollution.

Finding substitute lower energy and carbon intense materials is not always easy, but there are a number of new technologies, online databases and some rules of thumb that can help. Cement and steel are generally the two highest energy and carbon intense materials in any

building project. Where possible, substituting lumber, mass timber or bamboo for steel is a move in the right direction. Rethinking the poured paving can go a long way to reducing cement use. Pavers are used instead of poured sidewalks in most European cities because they can be easily moved and replaced if a broken pipe need to be fixed under it. In similar circumstances on poured pavement, the jackhammered concrete can only be downcycled into roadbed and then the pavement needs to be completely repoured. For pathways on the site, decomposed granite (DG) is a good alternative.

4. **Start Early** - The most important strategy for getting partners and creating a Center for Excellence is to, from the start, be clear what that is and how it might benefit all stakeholders. That also reduces everyone’s technical, political and financial risk by calibrating the project correctly from the start.

As depicted in the chart below, the ability to impact the success of a project is inversely correlated with the stage and level of investment in the project. That is, the more money you have spent, the less control you will have of the outcome. That is why it is important to facilitate a series of design charrettes early with all development partners to focus on the partnership opportunities and overcome the technical and innovation challenges early.



If the Center of Excellence concept is done correctly from the start, BCHD will have the ability to:

- Partner with like-minded public and private organizations to learn from and share the experience.
- Potentially apply for grants that will help offset any cost differential.

- Significantly lower first costs and ongoing operations and maintenance costs for buildings proposed to be built.
- Lower the pollution load/toxicity of construction and ongoing operations and be a model and Center for Excellence in preventing toxins in the environment which cause disease.
- Over time, save millions of dollars in cost for new construction as well as existing building operations and maintenance.

To develop the mindset for this kind of project early is helpful to have some background. These are just two ways to accelerate that process:

- Project Tours** - The BCHD may want to consider stakeholder tours of buildings or communities that are on the forefront of this kind of sustainable development. Santa Monica's City Hall East renovation is one of those buildings - and there is a lot more inspiration out there. If the Center of Excellence concept is fully adopted, the Healthy Living Campus should be on those tours in the future!
- Seed Consulting Group** - The Seed Consulting Group helps non-profits with consulting resources at lo-bono rates that are a small fraction of what it would cost to bring in a qualified consulting firm to do the same work. This Center of Excellence project would be advanced significantly with their help in potentially researching:
 - State of the art projects in other parts of the world that are already doing what this project aspires to accomplish
 - Technologies that could significantly advance project objectives
 - Potential partners that would be well suited to assist
 - Other preventative healthcare organizations are approaching preventing cancer and other diseases through similar projects and research.

The BCHD just signed an agreement with the local Seed Consulting Group and they will be getting started next week.

SUMMARY

There is a great opportunity for the Center of Excellence concept along with external partnerships to propel the Healthy Living Campus into a project the community can be proud of by the way it innovates and executes on that innovation related to public health, wellbeing, and financial sustainability. If done well, it can be a beacon for all future construction projects and communities interested in responsible development and preventative healthcare while working within a budget. Hopefully the ideas presented here are helpful in bringing that to fruition.