

# *SILVER OAK*

ALEXANDER VALLEY  
LIVING BUILDING CHALLENGE



CERTIFICATION BINDER

March 2020

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## OUR STORY

Silver Oak began over a handshake between two friends with a bold vision: focus on one varietal, Cabernet Sauvignon, aged exclusively in American oak and worthy of cellaring for decades to come. Raymond Twomey Duncan, a Colorado entrepreneur who began investing in California vineyards in the late 1960s, and Justin Meyer, a winemaker and former Christian Brother, began in a Napa Valley dairy barn in 1972, producing only 1,100 cases of their inaugural vintage. Over the next two decades, Silver Oak grew in popularity. Our Napa Valley and Alexander Valley Cabernets sold quickly upon their release from the winery and became a sought-after staple on restaurant wine lists around the country. After selecting Daniel Baron to succeed him as winemaker in 1994, Justin retired, selling his share of Silver Oak to the Duncan family in 2001.

With David R. Duncan serving as CEO and Tim Duncan as Chief Revenue Officer, the Duncan family continues to operate the winery to this day. In 2006, a fire destroyed our historic Oakville winery. It was a difficult and emotional event; but in hindsight, a blessing in disguise. When we regrouped on the morning of the fire, we knew we had to rebuild, and it wasn't long before the excitement of a new, state-of-the-art winery overcame our sense of loss.

In 2016, we achieved LEED Platinum certification and became the first production winery worldwide to achieve this level of certification. We applied lessons learned toward a new winery in the Alexander Valley. Set amidst our 73 acres estate along the rolling foothills of the Mayacamas Mountains, our new Alexander Valley winery has pushed industry design and innovation standards with alternative energy sources, an innovative water reuse system and reclaimed building materials.

## THE LIVING BUILDING CHALLENGE

The following is an excerpt from the Living Building Challenge 3.1 Standard. Please visit [www.living-future.org](http://www.living-future.org) to download the entire standard.

The Living Building Challenge™ is an attempt to dramatically raise the bar from a paradigm of doing less harm to one in which we view our role as a steward and co-creator of a true Living Future. The Challenge defines the most advanced measure of sustainability in the built environment today and acts to rapidly diminish the gap between current limits and the end-game positive solutions we seek.

The Challenge aims to transform how we think about every single act of design and construction as an opportunity to positively impact the greater community of life and the cultural fabric of our human communities. The program has always been a bit of a Trojan horse—a philosophical worldview cloaked within the frame of a certification program. The Challenge is 1 The Living Building Challenge was the 2012 winner of the Buckminster Fuller Prize, the world’s top award for socially responsible design, successful because it satisfies our left-brain craving for order and thresholds, and our right-brain intuition that the focus needs to be on our relationship with and understanding of the whole of life.

As such the program is a philosophy first, an advocacy tool second, and a certification program third. Within the larger Living Future Challenge framework that covers the creation of all human artifacts and edifices, the Living Building Challenge focuses on humanity’s most abundant creations—its buildings. It is in essence a unified tool for transformative thought, allowing us to envision a future that is Socially Just, Culturally Rich and Ecologically Restorative.

Regardless of the size or location of the project, the Living Building Challenge provides a framework for design, construction and the symbiotic relationship between people and all aspects of community. Indeed, “Living Building Challenge” is not a merely a noun that defines the character of a particular solution for development, but is more relevant if classified as a series of verbs—calls for action that describe not only the building of all of humanity’s longest-lasting artifacts, but also the relationships and broader sense of community and connectivity that they engender. It is a challenge to immerse ourselves in such a pursuit—and many refer to the ability to do so as a paradigm shift.

PLACE PETAL



IMPERATIVE 1

**Limits to Growth**

The Silver Oak Alexander Valley estate is located on 113 acres of prime farmland, zoned exclusively for agriculture. The majority of the site is planted to Cabernet grapevines, which are CSWA certified sustainable. The site has been planted to grapevines since the 1820's.

Situated at the base of Alexander Valley foothills, the site also includes a 2.5 acre pond that provides a valuable ecological resource and main water source for the vineyard. The pond is ringed with riparian species such as cattail, native sycamore, and willows.

To the North, the property is bound by Sausal Creek, a seasonal stream which feeds the nearby Russian River. Sausal creek is lined with native scrub species, grasses and oaks. The inherited topography and watershed remains largely the same with the primary re-grading occurring at the future building locations in the center of the property.

In addition to regular vineyard management and landscape maintenance, natural ecologies on the site are preserved and enhanced through natural selection and succession. Sausal Creek and the pond are prime candidates for promoting biodiversity on the site. It is the intent for Silver Oak to be a leader in sustainable viticulture and demonstrate a transparent and educational experience for its visitors, and production facility and tasting room employees.

The planting at Silver Oak incorporates native, drought tolerant and/or naturalized species exclusively. All species listed are described as non-invasive and low-maintenance, requiring little to no fertilizer or insecticides to maintain health.

Several existing *Quercus agrifolia* on the property were retained and preserved, and one large specimen was relocated adjacent to the Tour Path Plaza. *Laurus nobilis*, a low-water evergreen hedge adapted to Mediterranean climates create outdoor rooms and frame views to the surrounding landscape. At the entry road, bioswales are planted with *Muhlenbergia dubia*, a low-water species well suited to summer dry climates. At the Tasting Room and Production Building, *Carex barbarae* and *Carex praegracilis*, *Juncus effusus*—all California natives—will line the bioswales.

As part of a working winery and visitor destination, the planting at the property performs as a multi-functional element in the design. The planting design calms traffic and helps navigate the visitor through the winery with hedge baffles and bioswale planting recurring at strategic moments along the entry road, and important vehicular junctions. The design is also kept simple to allow the vineyards to take center stage.





**HARDSCAPE MATERIALS**

1. PRODUCTION ROAD & PARKING:  
Asphalt
2. PRODUCTION & MBR COURTYARDS:  
Concrete paving with integral color
3. ADMINISTRATION PARKING:  
Wood wheel stops
4. PRODUCTION BUILDING PLANTING:  
1/4" steel edge at planting
5. ADMINISTRATION ENTRY SPINE:  
Specialty Paving: Basalt stone  
Color: charcoal gray - black
6. ADMINISTRATION TERRACE:  
stone gravel  
Size: 3/8" x 1/4"  
Color: Lodi' or 'CA Gold'
7. WINERY TOUR PATH:  
"Park Tread" stabilized accessible surface
8. TOUR PATH GATHERING AREA:  
Basalt stone pavers & seating

**PLANTING MATERIALS**

- A. HEDGE Baffles (4' wide)  
Laurus Nobilis  
"Sweet Bay"
- B. PARKING SPINES  
Carpinus betulus v. fastigiata  
"European Hornbeam"
- C. PARKING LOT HEDGES  
Rhamnus californica
- D. BOSQUES  
Sidastris triacanthos  
"Honey Locust"
- E. BIOSWALES  
Native grasses and insectary planting
- F. VINEYARDS
- G. (N) SPECIMEN OAK TREE
- H. UNDERSTORY PLANTING  
Selection of insectary planting



**HARDSCAPE MATERIALS**

1. PARKING COURT + ENTRY ROAD:  
Chip and Seal Asphalt Base  
with Lodi' stone gravel
2. TASTING ROOM ENTRY COURT +  
SERVICE ROAD:  
Basalt stone pavers  
Color: charcoal gray - black
3. ENTRY LIGHT BOLLARDS
4. ENTRY ALLEE SURFACE:  
Stone gravel  
Size: 3/8" x 1/4"  
Color: Lodi' or 'CA Gold'
5. ENTRY ALLEE PAVING STITCH:  
Basalt stone pavers & concrete
6. TASTING ROOM WATER FEATURE
7. VEGETABLE GARDEN PATHWAYS:  
Stone gravel  
Size: 3/8" x 1/4"  
Color: Lodi' or 'CA Gold'
8. VEGETABLE BEDS:  
1/2" steel plate
9. WINERY TOUR PATH:  
"Park Tread" stabilized accessible surface
10. BUILDING TERRACES  
Architectural concrete
11. ENTRY COURT:  
Basalt stone pavers  
Color: charcoal gray - black
12. ENTRY DRIVE:  
Asphalt
13. ENTRY BOLLARDS:  
Automatic steel bollards
14. AGRICULTURAL ROADS:  
Compacted blue shale
15. ENTRY INTERSECTION:  
Basalt stone pavers  
Color: charcoal gray - black
16. WOOD PIER:  
Recycled local redwood
17. TASTING ROOM SERVICE COURT  
Concrete Paving



IMPERATIVE 2

**Urban Agriculture**

The Silver Oak Alexander Valley winery and tasting room meets the intent of the imperative with our vineyards. 64% of the property is dedicated to cultivating grapes for wine, exceeding the 50% requirement. We also have an impressive herb and vegetable garden which is used by our tasting room culinary team for food and wine pairings and lunches.

All 73 acres of vineyard are certified to the California Sustainable Winegrowing Alliance (CSWA) certification program. Additionally, all other estate vineyards and wineries are certified to CSWA. To become certified, we conducted a thorough self-assessment in key areas such as water efficiency, pest management, neighbors & community, and employee benefits. Each chapter has several criteria with a minimum score requirement of 2 based on a 1-4 scale. The minimum overall score threshold is 85%.

As a part of the certification, we have formally adopted an Integrated Pest Management approach. We also comply with CSWA's red and yellow lists of banned chemicals in the vineyard. We track water and energy use, as well as greenhouse gas emissions and nitrogen applied in vineyards. Certified properties are audited every year to ensure standards are continually met.



IMPERATIVE 3

**Habitat Exchange**

This imperative requires projects to donate an equal amount of land away from the project site to be set aside in perpetuity for conservation. We have chosen to donate to the Napa Land Trust to help protect land in our immediate community. The Napa Land Trust is accredited through the Land Trust Accreditation Commission.

The conservation easement project is called Running Deer Ranch, which is a 1,400-acre project near Lake Berryessa. We have contributed funds to purchase 106 acres. The land will continue to operate as an active cattle ranch but will adhere to specific farming requirements to ensure the future health of the land.

IMPERATIVE 4

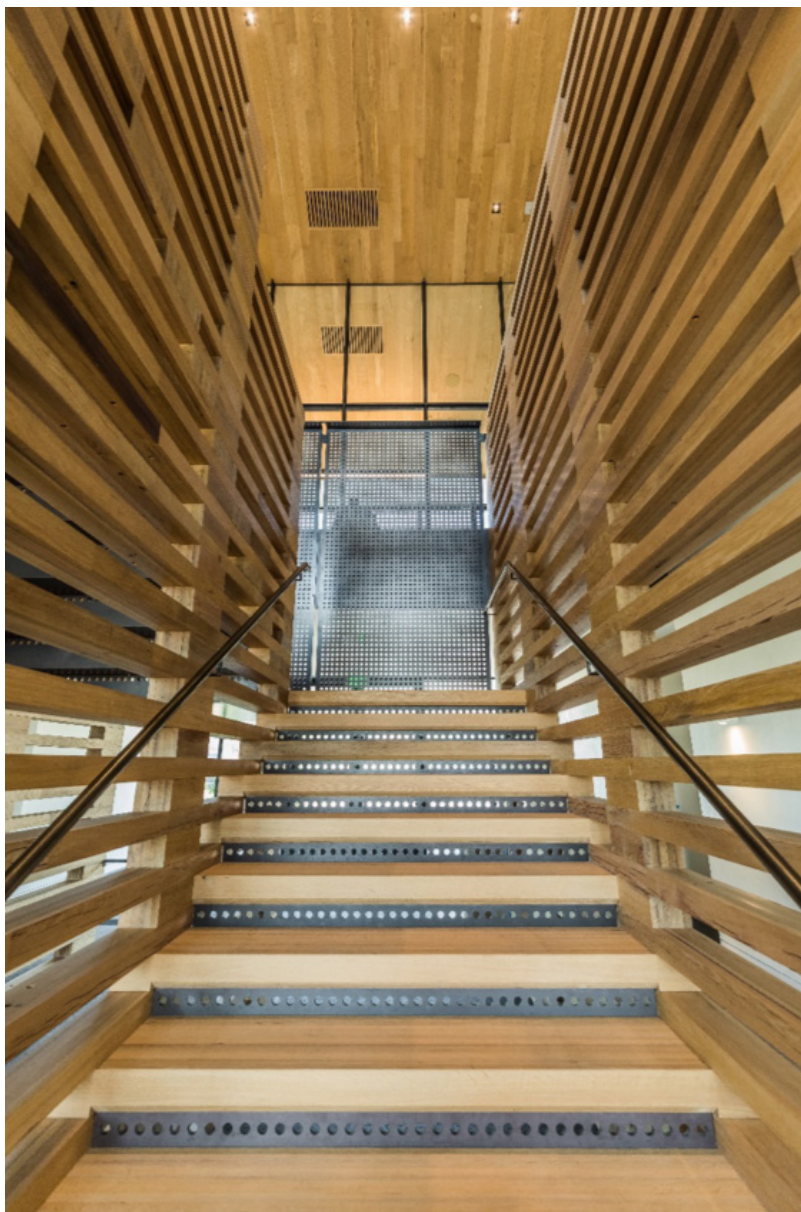
**Human-Powered Living**

Our project was designed with the intent that tasting room guests and employees can safely walk the property and access both buildings. There is a walking path that connects to the back of the winery, through a vineyard block, and leads into the back patio of the tasting room. Both guests and employees may use the path. There is a semi-paved road on the Northern portion of the property, adjacent to Sausal Creek, that employees often use as a walking path during the Summer.

Both parking lots include secure bicycle storage as well as EV charging stations. In order to encourage bicycling, we also have locker and shower facilities for employee use. The winery has 5 individual EV chargers and the tasting room has 6. All of them are free to use and are located closest to the building's entrance. We also have preferred parking for carpools at both lots. Most of the winery and tasting room are one level, except for the offices. To promote the use of the stairs, we designed the main staircase to be directly in front of the main entrance. The staircase is an architectural beauty made from reclaimed oak barrels which came from the property. Although the offices are only two stories, the vast majority of people use the stairs over the elevator.

Recently, CalTrans agreed with our position and committed to converting this section of road to a non-passing lane. The work is estimated to begin in April 2020.

We selected to advocate to the California Highway Patrol that they consider multiple traffic calming strategies to the public right-of-way where visitors enter our property. Currently, the section of Hwy 128 in front of our entrance serves as a passing lane with little to no shoulder. Because it is a state highway, the speed limit is 55 mph. This does not promote the safest driving conditions and can also be dangerous for bicyclists. We recommended reducing the speed limit, double striping the road, or improving the shoulders to encourage better conditions for human-powered transportation.



## WATER PETAL



IMPERATIVE 5

**Net Positive Water**

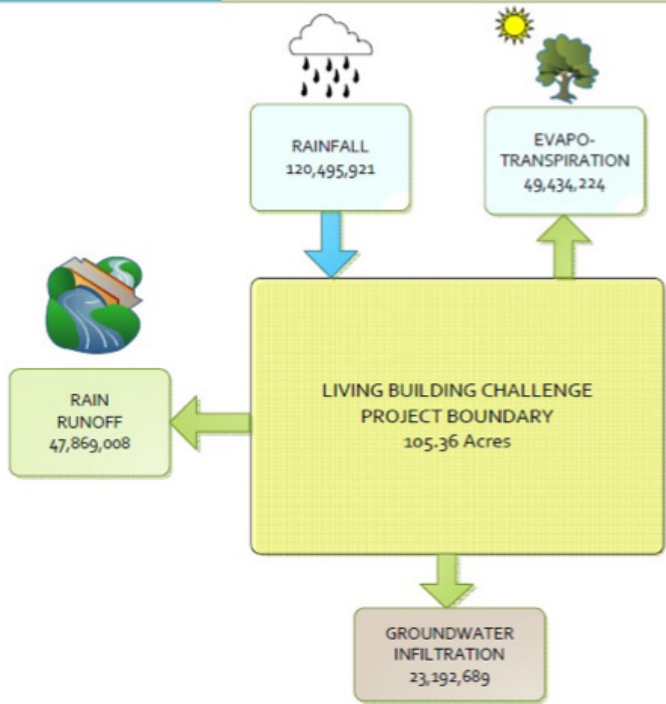
The building's water is supplied by an onsite domestic well and from treated process wastewater. Landscaping is irrigated with treated process wastewater. The vineyard is served by agricultural wells.

Water from the domestic well is pumped to a 100,000 gallon shared storage tank located behind the Membrane Bioreactor (MBR) building, with 30,000 gallons for domestic usage and 70,000 gallons reserved for fire protection. The water is treated with an ultra violet system housed in the MBR building and then distributed throughout the facility. Process wastewater (PW) generated during winemaking is treated by a membrane bioreactor (MBR) and stored in a 100,000 gallon tank. Prior to distribution, the water is disinfected with an ultra violet system and then conveyed to the buildings where it will be used for toilet flushing, tank washing, process equipment wash down and landscape irrigation.

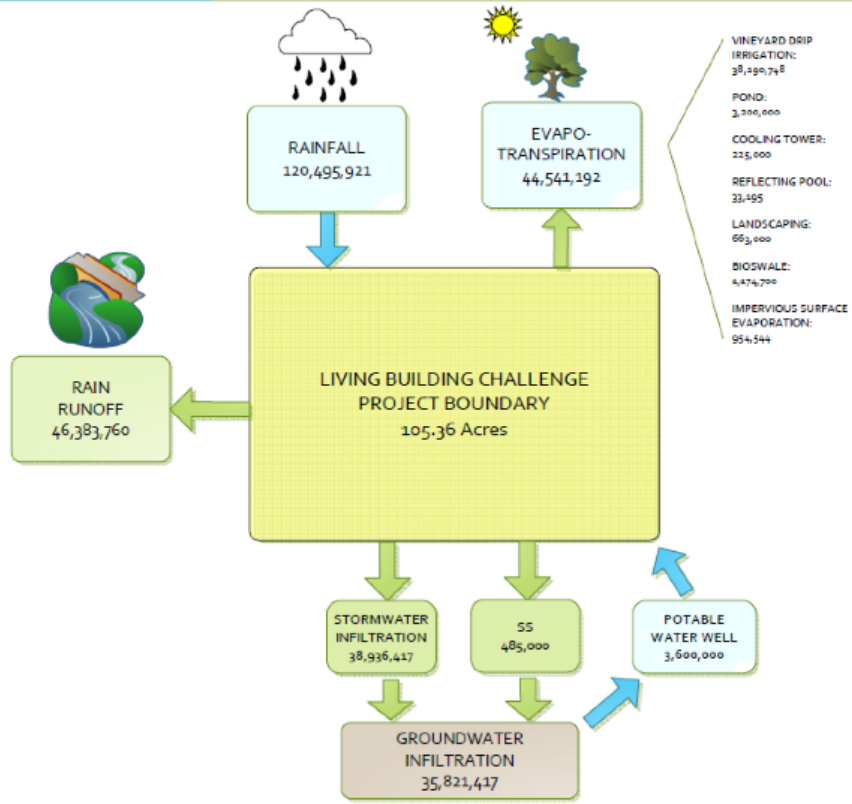
Sanitary sewage (SS) is collected in septic tanks, treated, and infiltrated through subsurface drip irrigation. Biosolids generated through winemaking (stems and pomace) are hauled offsite to be composted.

Per the Water Petal Imperative requirements, the hydrology of the historical site was analyzed and used as a baseline for the modern site, with every attempt made to mimic the natural hydrologic processes of the historic site. The 113-acre parcel on which the LBC Project is located has an average slope of 4% to 5%, generally sloping from southeast to northwest, with Sausal Creek creating the northern boundary of the site. This general grade was assumed for the historic condition, as there is no known topographic mapping of the specific site prior to development in the early 1900's. Historical conditions are assumed to be predominantly woodland consisting of oak and fir mixed with native grassland. As no historical aerial photographs predate the development of the area, the density of foliage before human interference was assumed to match the foliage density of the surrounding areas left untouched by human hands. Using modern and historical aerials, this natural tree density is approximately 50–60 percent. It is estimated that the pre-human site experienced a large amount of sheet flow due to the characteristics of the native soil, the sloping elevations of the site, and its location at the foothills of mountainous terrain.

August 10, 2018 **Silver Oak Cellars AV128 ~ Historical Site (gal/yr)**



August 10, 2018 **Silver Oak Cellars AV128 ~ Developed Site (gal/yr)**



## ENERGY PETAL



**IMPERATIVE 6****Net Positive Energy**

The goal of the solar photovoltaic (PV) system is to offset 105% of annual energy usage for the entire facility. According to Gilleran Energy Management's energy modeling dated 02/05/15, the SOC facility will use an estimated 1,026,789 kWh annually. This equates to a target of 1,078,130 kWh for a 105% offset of annual usage.

We installed 2,595 300-watt SolarWorld panels. These panels are made locally in Hillsboro, Oregon. Because the property is zoned for exclusive farm use, we were unable to increase solar production on-site using additional ground mount systems. In order to meet the 105% threshold, we opted to "scale-jump" and installed an additional 404 SolarWorld panels on our nearby warehouse and shipping facility. After gathering 12 months of energy data, both sites together produced 121% of the winery's energy demand.

To meet the energy storage requirement, we opted for a 330 kWh battery made by Powin Energy. The batteries are made from lithium iron phosphate, which is thought to be a safer alternative to lithium cobalt. The batteries are controlled by a Battery Management System (BMS) by PXiSE Energy Solutions. The Active Control Technology (ACT) tracks energy use, solar production and grid costs to determine the most efficient time to charge and discharge the battery. This allows the facility to reduce operating costs by using the battery more frequently instead of functioning as emergency backup only.

All hot water equipment and cooking appliances are electric. During most of the year, hot water is supplied by solar thermal panels and CO2 heat pumps. The solar panels act as a pre-heat system for the winery. The water is then sent to two CO2 heat pumps. The heat pumps use ambient CO2 in the air to slowly bring the water tanks to 180-190 degrees F. The tasting room uses an electric water heater.

Both the winery and tasting room are monitored using a Building Management System. One of the key benefits of having a BMS is being able to monitor sub-metered energy use data. For example, the system monitors lighting, HVAC, bottling line, barrel room refrigeration and well pumps separately. In the tasting room, the BMS monitors lighting, HVAC, commercial kitchen plug loads, and EV chargers separately. By separating these major energy end uses, building management staff monitor consumption and can set goals for reducing consumption in the future.



## HEALTH & HAPPINESS PETAL



IMPERATIVE 7

**Civilized Environment**

Each office is designed to maximize access to fresh air and quality views. Each private office has operable windows and vineyard views and open office cubicles also have access to a patio with operable doors and views of the vineyard and seasonal creek. For those cubicles that do not quite meet the 30 ft minimum, a switch was added to increase outside air into the vents directly above them. In the tasting room, offices have either operable skylights or doors leading directly to the outdoors. Each private office and cubicle have a height adjustable desk.

IMPERATIVE 8

**Healthy Interior Environment**

A number of strategies have been implemented to ensure high indoor air quality. To ensure the implemented strategies were effective, an air quality testing firm performed multiple rounds of indoor and outdoor air testing. Pre- and Post-Occupancy air quality tests gathered data for TVOC's, formaldehyde, ozone, and particulate matter, among other chemicals. Most areas in the winery, offices and tasting room passed all limits. A few areas exceeded limits and were likely due to poor outdoor air quality and/or the winemaking/aging process.

Smoking is prohibited on-site. Every frequently used entrance into the winery, offices and tasting room have exterior and interior walk-off systems to catch dirt and other small debris from entering the buildings. All interior finishes like carpet, paint, furniture, and casework comply with CDPH Standard Method v1.1-2010. The CDPH standard sets strict limits for emissions that are released over the life of a product. To pass the standard, each installed material has gone through rigorous and voluntary testing with a qualified lab. All cleaning products used in the operation of the offices and tasting room comply with EPA's Safer Choice program. In addition to standard carbon monoxide monitoring devices, carbon dioxide sensors are located in small meeting rooms that tend to experience higher occupancy.

IMPERATIVE 9

**Biophilic Environment**

Approaching the Tasting Room presents visitors with a striking reflecting water feature that runs along the edge of one side of the building and then seemingly through it as you find it returning again on the other side. The sky and trees reflect heavily on the water, as does the vertical reclaimed wood siding that stretches your perspective as you pass over the bridge. The building itself acts as a type of inhabited bridge over the water, positioning itself in a relationship of respect for the lifeline that is integral to the making of wine—the water.





The ceilings of the Open Offices in the Admin Wing and the Wine Library of the Tasting Room entice occupants to “look up” and feel closer to the outside world by mimicking shapes and patterns found in nature. The sloped ceiling and skylight of the Open Offices space is eclipsed by a purposefully randomized continuation of the wood ceiling material that creates a feeling of being under a flurry of branches—under cover, but still with the feeling of being outside in dappled light. Breaking up the skylight attenuates the intensity of the light coming in for a more comfortable working environment as well.

The curved walls of the Wine Library surround a centrally—framed domed ceiling that hovers like the moon above a massive and rugged basalt boulder. This space feels infinite and grandiose, yet sparse and simple, much like the inside of a cave. The wine bottles themselves face the center of the room, creating artistic patterns that help to amplify the grain of the space.



The Tasting Room has a variety of opportunities to experience nature in relation to the built environment. Natural metals that age and rust are present in the planter boxes that hold native plants and herbs grown for the kitchen. There are many long paths that invite visitors to follow while walking along the water or breaking out to meander through the series of benches where one can take pause and enjoy the landscaped views. Along these paths, people can move freely to engage with nature and the constructed environment, linked by transitions of material that define and hold the space together, but without hard barriers. Hedges and tree lines do as much to guide you as actual walls, expanding the footprint of the building to include the natural environment just as much as the interior environment. This back and forth relationship create a tension that is both aesthetically pleasing, dynamic, and diverse.



The Fermentation Space in the Production Facility is the heart of the winery, and to celebrate this fact, the large and expansive space was flooded with light from a series of continuous skylights to create a warm glow that permeates what would otherwise be a sterile environment. The stainless steel reflects this glow and cavernous heights dilute it as light makes its way down to the concrete floor. The large curtain wall on the end is covered with a shade screen, echoing the Open Offices with a randomized pattern akin to branches or tree trunks framing a central view to the landscape beyond.

All around the winery and tasting room are elements of design meant to engage with the landscape and with Silver Oak's respect for the land—their canvas for winemaking. The landscape itself is brought close to the building in staggered strips and bars that echo the building form itself, creating an interplay between landscape and building that appears as if stitched together, both pulling on each other and eventually ending woven together. Therein, many of the plantings are water tolerant and also provide habitat for insects and birds, supporting a mutually respectful relationship between building and nature. A statue of St. Francis of Assisi sits just outside of the Admin building to the south, reminding passersby to be good stewards to the environment, while the emblem of Silver Oak—the water tower—stands as a marker of the timelessness that winemaking represents; a sharp contrast to the contemporary design of the adjacent buildings.



The Outdoor Patio of the Tasting Room is a truly unique space. Both expansive and intimate, one is pulled to the distant views, but also drawn to the proximity of the water by your toes, or the vineyard just feet away. The clean lines of the wood siding suggest a level of refinement that is both warm, rustic, and familiar while the 18' height of the ceiling pulls your gaze up and outward, creating the feeling of being on a precipice.



Both from afar and up close, the material craftsmanship and refined expression of materiality is apparent in this building, which only adds to the narratives that can be found in between the paths and the walls. In time, the wood may silver-out, showing signs of age, as the reclaimed siding is already doing on the southern side due to being heavily washed in sun. This interplay between building and nature, material and landscape, inside and outside, reveals the future of the built environment as one of complex and sustainable respect.

MATERIALS PETAL





## IMPERATIVE 10

### Red List

The red list was the most challenging imperative for the design team. The team learned that very few design and construction professionals had any experience with its requirements, and that we needed some guidance on how to set up a properly robust material vetting system. The design team began planning for the red list vetting process in early design and included red list requirements in their respective drawings. The core material vetting team, which included a team member from the owner, contractor and sustainability consultant met with Joe David for a 2-day training in Seattle. Joe performed the material vetting for the Bullitt Center and was instrumental in the development of a material vetting process and decision-making structure.

After the training, the team continued to develop the vetting process. First, materials vetting procedures were incorporated into project specifications with the help of a sustainability consultant. It was also incorporated into the contracts between the subcontractors and general contractor to ensure they understood the extra work required of them. Once all the subcontractors were selected, the general contractor held meetings with each one to review expectations and material submittal requirements. All sub-contractors were required to submit a spreadsheet of materials to be used for an early review, as well as a cut sheet, model number, manufacturer information and Safety Data Sheet (SDS) if available on each product. Regular meetings were held throughout the project to ensure consistency and to refresh them on the requirements.

The owner's representative performed the material vetting, and frequent meetings took place between the representative and the contractor. Each week, a small team would review what materials were coming up in the next 3 weeks. The representative was given 3 weeks to approve or deny a material, and efforts were made to begin vetting longer lead time items as soon as possible.

The project team used Prolog Converge software for material vetting. The software is geared towards Requests for Information (RFI's) however it had enough flexibility to set it up for red list material tracking. The contractor would upload a set of materials for review, mark as "priority" and the representative would receive a notice of materials requiring review. Each material was separated into different "records" and follow up communications were conducted through each online record. Each record also held material ingredient documentation.

When a material arrived on-site, a member of the contractor's team would inspect each item and confirm it matched with an approved material record on Converge. If a material could not be matched up with a record on Converge, the material was rejected or stored on-site until an approval was granted. Photographs were taken of each material, with special attention to those that are no longer visible.

Every month, the contractor would send out a list of materials that had been approved or denied on the project. Subcontractors were then responsible for providing alternates if necessary. Alternates were then uploaded to Converge and marked as “priority” again to alert the owner’s rep that a review was necessary. Daily email alerts were sent as a reminder. The owner’s rep was responsible for reaching out to manufacturers to obtain more documentation and would either approve or deny a material. This helped the owner’s control the material selection process.

Materials that had larger budget implications required a review during the weekly Owner Architect Contractor (OAC) meetings. The team focused on sourcing red list free wiring, insulation, fixtures/fittings and finishing items like carpet and furniture. Once that limit was reached, each item was reviewed on a case-by-case basis. No products were installed that contained red list ingredients without a proper exception.

At the end of 3½ years of material vetting, the team had researched over 3,000 individual products. We installed approximately 1,600. The team gathered thousands of pieces of documentation including letters, safety data sheets, cut sheets, email correspondence and certification statements. Hundreds of customer service representatives and others were educated on the red list and the team was successful in convincing a few manufacturers to list their products on the Declare database. The Declare program offers product certification to manufacturers who wish to publicly disclose 100% of a products ingredients.

There were some products that simply did not have suitable alternatives, like PVC piping, conduit and wire insulation. In this example, there was a complex relationship between product safety and testing standards, building codes and manufacturers. PVC is called out as the only acceptable material for electric wire conduit seeking UL approval, and UL approval is required by the local building code. Because there is little demand for non-PVC conduit, there is no incentive for manufacturers to spend money testing new materials. In fact, UL would not agree to test a non-PVC alternative because the first requirement is that it must be made of PVC. The process to change the law and the subsequent testing was estimated to take several years. As frustrating and lengthy as this process was, the hope is that it sheds some light on the complexity of the building materials industry and how difficult it can be to make even a small change.

Please visit <https://living-future.org/lbc/> to learn more about the Red List and the specific chemicals that are banned.

IMPERATIVE 11

## Embodied Carbon Footprint

A quantification analysis of the building materials demonstrated that the building structure (including sub and super structure, building enclosure, internal partitions and other nonstructural elements i.e. catwalks) contains 4,373 tons CO<sub>2</sub>e. The project includes the installation of 2,999 Monocrystalline PV panels which contain 1,010 tons CO<sub>2</sub>e.

The project utilized the following design stage strategies to reduce the total embodied carbon footprint of the project. The team specified concrete must contain 40% fly ash replacement which equates to a 20% reduction in the embodied carbon quantity in the foundations and a 5% reduction in total project embodied carbon footprint. Salvaged redwood siding was used for the building façade which reduced total project embodied carbon by 3%. The project utilized a lightweight steel frame construction. This form of construction can be erected significantly quicker than other material choices such as concrete. This reduces on-site construction time, which has a positive impact on reducing construction energy use. Steel also has reduced construction waste with no site timber or plastic required for formwork and it is more flexible for future change with the simple removal of a structural steel member.

IMPERATIVE 12

## Responsible Industry

The project team spent considerable time sourcing salvaged materials for various components of the project. All of the interior and exterior wood siding was sourced from salvaged lumber. The exterior siding came from old redwood tanks once owned by Cherokee Winery in the 1920's, and later purchased by Robert Mondavi. They were used to age their "vin ordinaire" or red table wine for a short time, until it was discovered that redwood was unsuitable for aging wine.

When new wood was required for construction, all products held FSC certification. It was difficult to locate subcontractors that were willing to become FSC chain-of-custody certified that met the contractor's quality standards. Therefore, several wood shops were not certified. However, they took steps to ensure the FSC material purchased for the project were not mixed with other non-certified material. The tasting room floors and the entry area of the administration wing are basalt tiles (approximately 11,000 square feet.) The team selected material that was extracted within the U.S. versus material mined in China. The team selected solar panels that were manufactured in Hillsboro, Oregon over panels made in China. The main staircase in the administration wing is made of old oak barrels left from the previous winery. The entrance to the winery features salvaged limestone bricks leftover from the construction of our Oakville facility.

**IMPERATIVE 13**

**Living Economy Sourcing**

The project sourced many products within 500 km of the project site. Approximately 42% (more than double the minimum requirement) of building materials used to construct the winery and tasting room were assembled and/or extracted within 500 km the winery's location in Healdsburg, California. 21% of building materials were assembled between 500 km to 1000 km, and 13% between 1000 km and 5000 km.

**IMPERATIVE 14**

**Net Positive Waste**

Cello & Maudru, the general contractor, created a detailed waste management plan prior to the start of construction. They selected a waste hauling company that could recycle most construction materials, as well as provide detailed, project specific tracking data every month. At the end of 3 years, the project diverted 2,356 tons of material from the landfill. All metal, wood, concrete, cardboard and gypsum waste were recycled.

One of the best ways to ensure a high diversion rate is to source separate materials on-site. The contractor separated metal, wood, concrete, cardboard, and gypsum into separate dumpsters on-site. Some construction waste could not be source separated. These materials were combined into a mixed container and were separated at the local recycling center. Unfortunately, mixing materials results in a lower diversion rate that varies month-to-month. All excess soil was donated to other local projects. Some excess materials were donated directly to the contractor's staff. The project maintained a 94% diversion threshold over the course of construction.

EQUITY PETAL



IMPERATIVE 15

**Human Scale & Humane Places**

This imperative helped guide several design elements in the project. It focused on limiting parking lot size, increasing the number of planted medians, signage sizing and improving walkability. The walking path between the winery and tasting room was designed to encourage walking over driving and is used by both employees and guests. The walking path runs through a vineyard block and is made of park tread, which is a natural path material. The design team also incorporated several gathering spaces throughout the tasting room and winery. Each gathering space has large shared patios with picnic tables that promote a sense of gathering with plenty of viewpoints of the vineyards and hillsides.

IMPERATIVE 16

**Universal Access to Nature & Place**

This section deals primarily with providing fresh air, sunlight and access to natural waterways. It also makes recommendations for bathroom access and existing landscape guidelines. Due to the project's rural location, complying with these requirements was relatively straight forward. There is an abundant supply of fresh air on the 113-acre property, and the project's buildings are not close enough to neighbors to shade their homes. California State Law requires the same level of bathroom access that the Equity Petal recommends. Although the property is adjacent to a seasonal creek, public access is not possible due to safety and liability concerns.

IMPERATIVE 17

**Equitable Investment**

Silver Oak donates substantial funds to 501(c)3 non-profit organizations every year. Funds are donated to organizations whose focus is primarily education, healthcare and the arts.

IMPERATIVE 18

**JUST Organizations**

The JUST label is a program designed for businesses to declare their workplace practices in a transparent manner. Criteria include diversity, work benefits, safety and stewardship. The JUST label displays scores for each criterion and is publicly available on their website. The firm that provided commissioning services is JUST certified; therefore, meeting the imperative. The project team also sent JUST information to at least 10 other individuals on the design team, including the general contractor, civil and mechanical electrical plumbing (MEP) engineers.

## BEAUTY PETAL



IMPERATIVE 19

**Beauty & Spirit**

The following is a narrative from Piechota Architecture. The goal of the Beauty imperative is to implement elements of design that are solely for human delight.

There is a moment at Silver Oak winery where, if you look, the hill behind the main tasting room area becomes the central focus. Looking through a sweeping open space, whose shape is reflective of the idealized and almost-Platonic barn, you see a gentle rolling landscape, dotted with trees. The hillock is more than a natural “design” feature; it is a reminder of how everything changes—how nature develops and shifts and participates in its own ecological sense. The hill wasn’t always there; neither was the complex of buildings that together make up the winery. But the sense that the hill could always have been there; that the trees are standing sentinel watch over the human intervention that has been so carefully considered into this landscape: that is beauty.

*Celebration of Culture, Spirit, and Place*

The Alexander Valley has its own spirit; long the little sibling to the more heavily-built-up Napa to the east, the Valley has been recognized for its smaller wineries; its more intimate orientation to the production of wine; its status as an almost-secret (that is just now beginning to be told). We at architecture firm Sagan Piechota recognized the central importance of water not only to the region but also to wine production and worked to produce a net-zero water winery. We also thought deeply about the beauty-related role of water; to that end, a central feature of the tasting room is a reflective pool that appears to cut its way through the building. On sunny days, the pool reflects a window which in turn reflects the pool again; layers of articulation begin to unfold, inviting the visitor to think evocatively about the role of water, the way in which rivers and waterways begin to articulate and, yes, reflect so much of human experience. We celebrated the waterways of the Alexander Valley while also keeping the inherent function—of providing a place for visitors to experience and learn about this remarkable small local winery—at the forefront.

We framed the views; every space has a view to the vineyard, and the local landscape becomes art. The clarity of the rows contrasts with the winding texture of the vines that begins to shape their own lifespans, aided by human intervention but even more so by the sun, the soil, the water. Because of the clarity of the framing, moments that could have been overlooked become central: the entryway to the tasting room is approached via a tree-lined outdoor walkway, the paving stones articulating a rhythm between crisp and more textured gravel, that water feature running alongside the building and offering yet another opportunity for reflection on the materiality of nature’s most fundamental elements: stone, wood, water, gravel, plant.



The shape of the exterior references the dominant barn form in the area; here, though, we reduced it to its simplest clarity. A traction-style water tower serves two purposes: relating to the Silver Oak brand through a reference to the winery's existing water tower, and a landmark that celebrates the farmed landscape—that draws attention to the way in which the labor and work and cultivation and farming that has happened here is a part of the natural development of the land. The production of wine can itself be both beautiful and reflective of all that this area has to offer.

The winery's exterior is clad in wood siding repurposed from 100-year-old wine tanks from Robert Mondavi, one of the Napa Valley's pioneers of winemaking. We left holes from the bolt connection in the original planks to remind visitors of their original use; to draw an explicit visual and architectural thread between what the wood's function is now, and what it was then. We leave room, forever, for the wood to become something else again; understanding, deeply, that we are making a mark right now—and that everything changes. The entry stair in the production department is another celebration of the craft of wine barrels, built from repurposed wood from oak wine barrels with red wine stains purposefully left to, again, tie the recent to the threads of history. The material palette, dominantly steel and wood, reference the construction of a wine barrel, while wood slats at the end of the fermentation room shape light and shadow, reminding us of the quality of light inside old barns—the way in which the sun, no matter how guarded, will still find a way in.

### *Human Delight*

The space was designed to work at all scales; driving up, the visitor sees the forms of the barn-like tasting room and production spaces emerge almost effortlessly from the hillside. Inside, we cared for the tiniest details in the window mullions in the hallway that runs from the open tasting room, past an observation window, and into the clearly-articulated kitchen whose openness and relationship to the garden is an explicit expression of the deep relationship between farm and table here. Next, the event pavilion whose massive glass walls slide open, creating the sense of an outdoor patio while still being sheltered by the crisp architecture, and opening visitors up to the calming breeze of the valley winds. There is a sense of immersion in the vineyard and also orientation towards the site's natural features: a smaller hill that rests at the entry of the built area and then a larger hill into whose slope the winery begins to nestle. The building acts as both a foil and focus for the natural features—the rhythms of the surrounding valley and mountains; articulating itself through the highly-textured facade whose rhythmic pattern both echoes vineyard rows and provides a sense of human delight at capturing that moment in which—aha!, there's a rhythm!

The experience of the winery is one of constant discovery and unfolding. A careful bridge offers a link between the actual working vines and the barrel aging room, itself a secret kept by the combination of almost-utter darkness and the opacity of seemingly-endless stacks of barrels. The scent of wine permeates the space, which is cool and restorative in contrast to the brightness of the outside California sun. It is a moment of pause and reorientation, of slippage between the sophisticated nature of the tasting room up the hill and the light-filled and light-industry-oriented production center in the dip. The soaring scale of that fermentation room, the way the abundance of natural light streams in and is only brightened by the constant presence of polished chrome and textured fermentation barrel exteriors, is a remarkable counterpoint to the richly-textured tasting room. Tripping down the hillside from the wide-open vistas provided by the tasting room and into the orchestrated views of the way wine is made offers a sense of being let behind the curtain, through the darkness and mystery of the barrel room and into the illuminated mystery of the secret blending and wine production process.

In the main tasting room, the landscaped promenade offers a constantly shifting relationship between shadows and shading, sound, and movement. Board-formed concrete gives subtle impressions of natural patterns imprinted onto architectural walls, a textural and tactile quality that hints at a sense of the history of their production. Inside, the circular space of the restrained wine library embraces the way in which humans want to gather together around something, in this case a monolithic stone plinth derived from nature, its basalt materiality reiterating the basalt floor. The walls in the library are shou sugi ban vertical wood siding, yet another reference to the process of winemaking.

Near the pavilion-like entry patio, a series of raised vegetable gardens are a contrast to the unfurling and untamed landscape beyond the winery's borders, the intimacy and delicacy of their herbs drawing the mind and heart into remembering how cultivation is its own mode of participation with the natural world. The beauty here of the ridges on a leaf of mint, the velvety feel of a sage plant, the way in which a tiny bud will push its way through the rich soil—these are all parts of a larger narrative, punctuative notes that are played to change the feeling of the whole symphony. The smells, colors, movements of the garden connect to a larger cycle, the observation of seasonal changes, the way in which we can be shown through the cycle of plant life that we are constituted in cycles, that part of the way in which we, as humans, can find delight in our lives is by knowing that they are always changing.

IMPERATIVE 20

**Inspiration & Education**

**All projects must provide:**

- A Living Building Challenge Case Study.
- An annual open day for the public.
- A copy of the Operations and Maintenance Manual.

**All projects, except single family residential, must provide:**

- A simple brochure describing the design and environmental features of the project.
- Interpretive signage that teaches visitors and occupants about the project.
- An educational website.

A detailed case study will be featured on ILFI's website under certified projects. Please visit [www.living-future.org](http://www.living-future.org) for more information. The tasting room is open to the public 7 days a week and non-tasting fees are low enough to not unreasonably exclude any members of the community. A copy of the Operations and Maintenance manual will be provided to the LBC auditor.

This binder will fulfill the brochure requirement. The interpretative signage requirement is met through our Eco Screen, which teaches guests about our facilities operations and sustainability objectives. Our website has a detailed section on sustainability.