



casa ala blanca



































design for integration

casa ala blanca is a site-responsive, small footprint, net-zero energy residence that integrates architecture, ecology, and environmental performance.

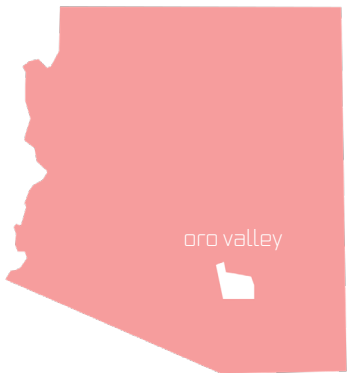
its single-form structure shelters both home and workshop beneath a butterfly roof that captures rainfall, channels breezes, and creates generous overhangs for seasonal microclimates.

passive and active systems, including rainwater harvesting, greywater reuse, and solar PV, are seamlessly embedded within the architecture, supporting net-zero goals through formal and aesthetic integration.

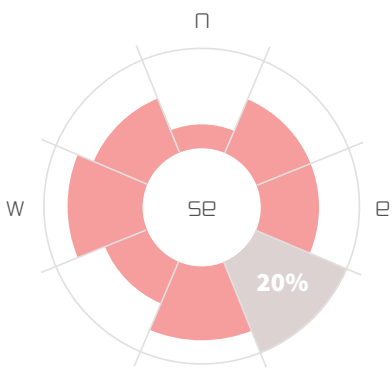
the spatial organization of the home reinforces this integration: a concealed courtyard draws daylight into the open plan, while a hidden roof terrace offers 360° views without disrupting the figural silhouette.

low maintenance material choices reduce embodied carbon while recalling the region’s vernacular forms.

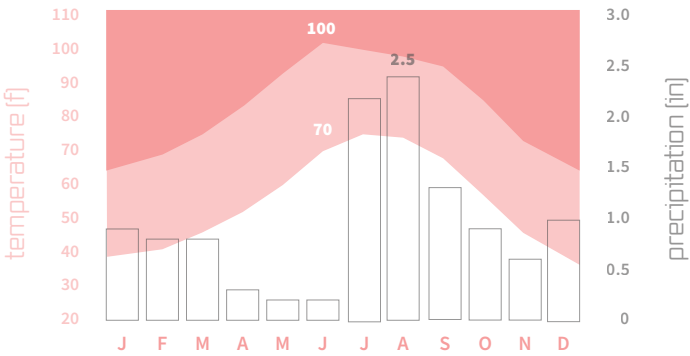
each architectural element, from the protective wing of the roof, to the rain garden catchment at the entry to the home, is part of an integrated response to site, climate, and daily life.



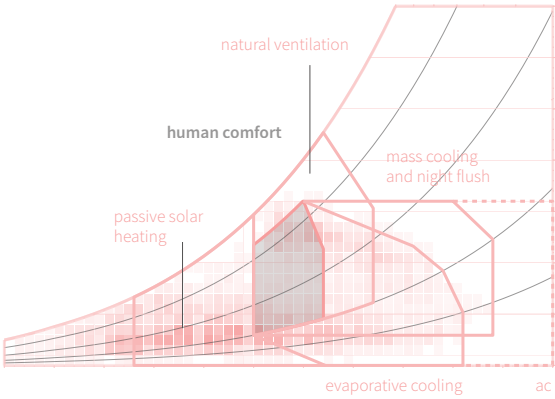
location



wind

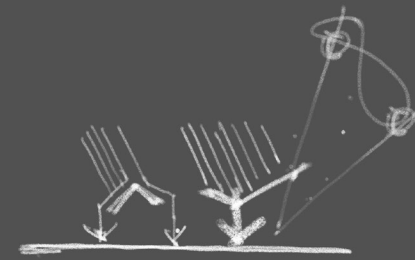


climate chart



psychrometric chart

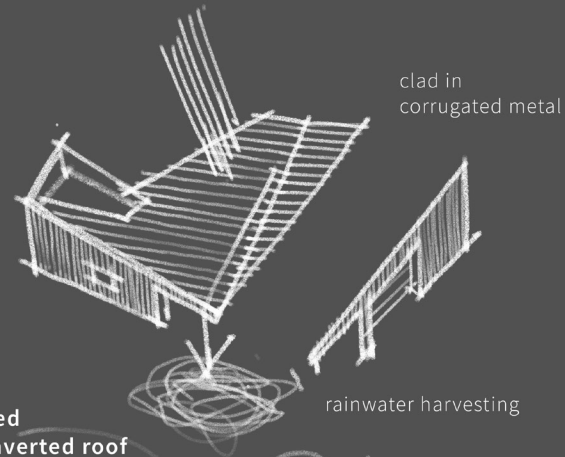




sun + rain

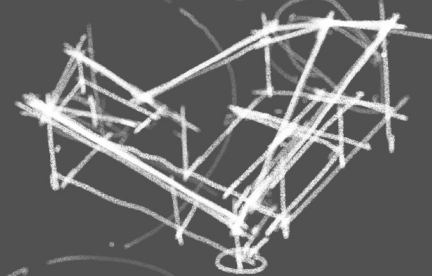


program collected
under a single inverted roof

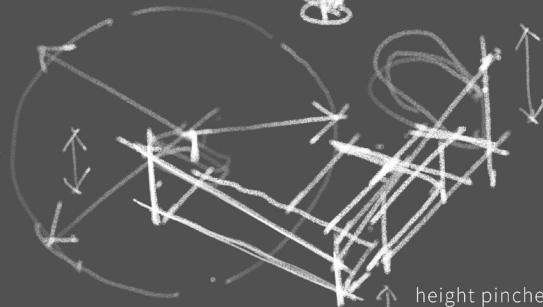


rainwater harvesting

clad in
corrugated metal



height expanded
to accomodate
workshop



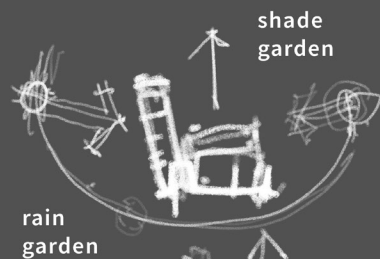
height expanded
to envelope roof
terrace with 360 views

height pinched
to define entry

house

garage

workshop



rain
garden

shade
garden



house

garage

workshop

parti

exurban outbuilding translation

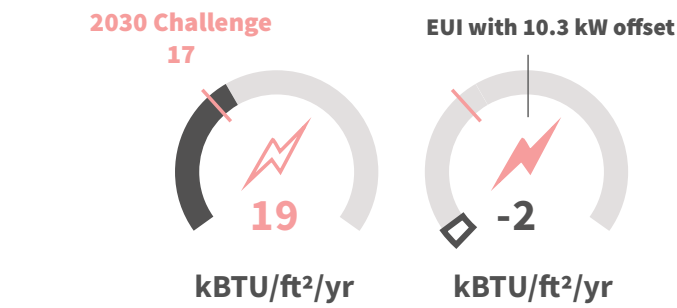


1. living
2. dining
3. kitchen
4. pantry
5. laundry
6. studio
7. office
8. bedroom
9. bedroom
10. closet
11. garage
12. workshop
13. mechanical
14. outdoor kitchen

0 5 10

norte

design for energy

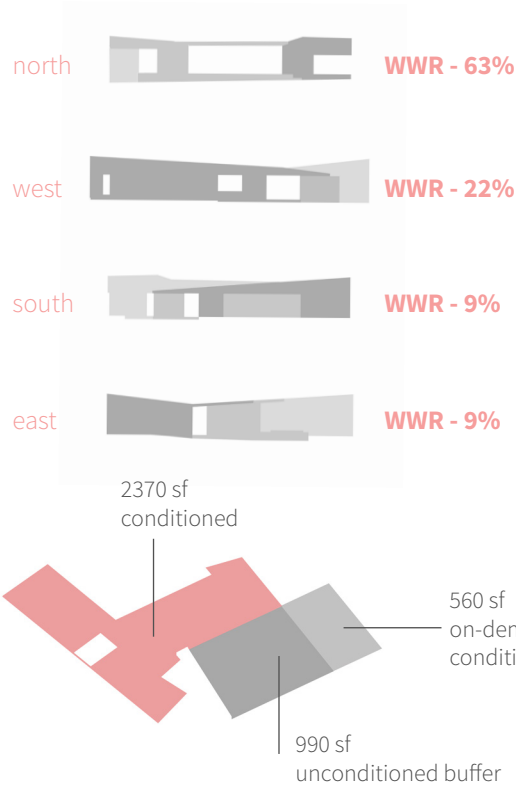
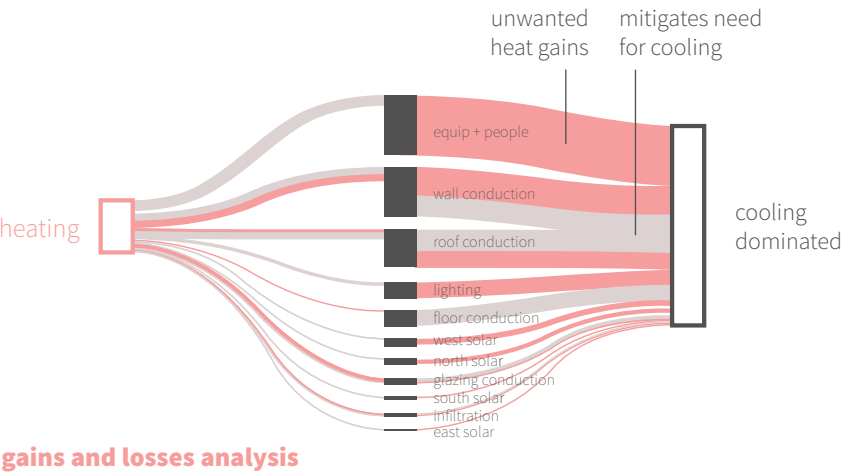


energy use intensity

casa ala blanca achieves **net-zero energy** performance through an integrated and climate-responsive design that prioritizes small footprint living, passive strategies, efficient systems, and onsite renewable generation.

a modeled, low EUI of 19.2 kBTU/sf/year is offset by a 10.3 kW rooftop solar array that is paired with two-day battery storage, radiant ceilings, energy recovery ventilation, and on-demand conditioning, reduce operational loads while enhancing comfort.

solar reflective roof and wall assemblies prioritize low air-infiltration while being ventilated on the exterior to minimize solar heat gain. the design maintains an overall window-to-wall ratio of 27.2%, below typical new construction averages, reducing envelope-related energy loss while preserving access to daylight and visual connection to the environment.

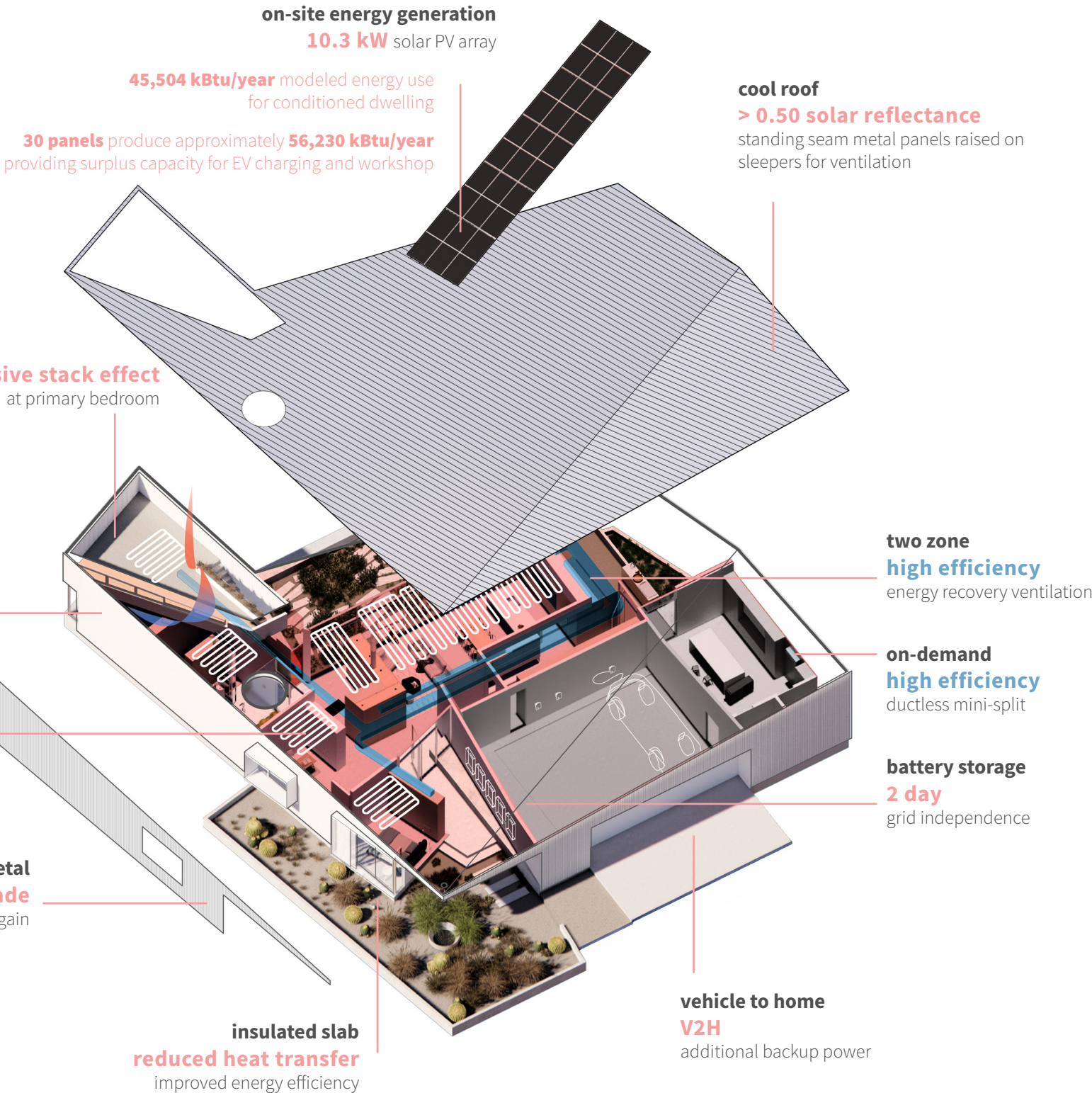


airtight barrier
reduced energy loss
improved envelope resilience

zoned hydronic radiant ceiling
high efficiency cooling + heating
silent, efficient thermal comfort

white corrugated metal
ventilated facade
to minimize and dissipate heat gain

conservation before production
the gains and losses analysis reveals how different building elements contribute to heating and cooling loads, validating the design strategy to prioritize equipment efficiency, enhance envelope performance, optimize daylighting, and carefully manage necessary west-facing exposure, all in service of occupant comfort and energy savings

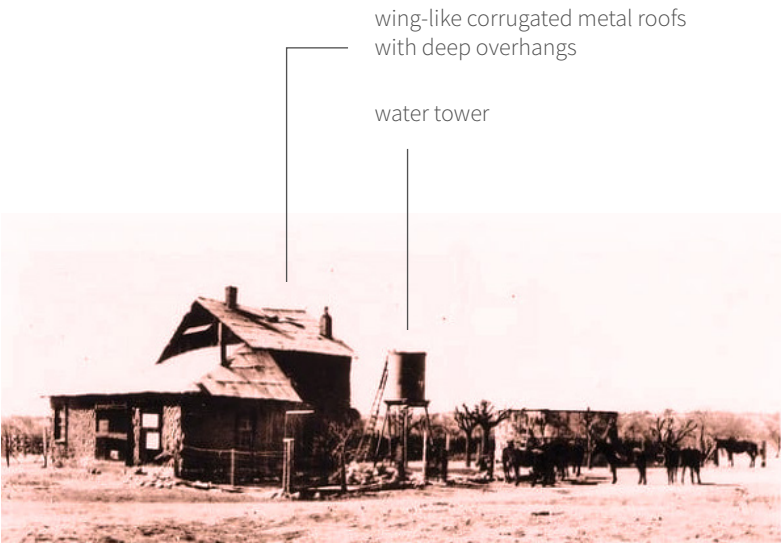


design for equitable communities

casa ala blanca embraces the cultural and ecological context of Oro Valley’s exurban fabric, drawing on regional building traditions of modest, practical structures that combine home, outbuildings, and land stewardship.

by consolidating the living and workshop space under one roof, the project supports a small footprint lifestyle while reducing material and energy intensity. utilizing conventional wood framing and familiar construction methods, the project engages local trades and craftspeople, contributing to community resilience and economic prosperity.

with rainwater harvesting sized to offset 100% of landscape irrigation and greywater reuse that further reduces well-water demand, the project supports Oro Valley’s community goals of groundwater conservation, resource security, and long-term sustainability.



historic Steam Pump Ranch in Oro Valley

design for economy

casa ala blanca demonstrates that considered, resource-efficient choices can yield both elegance and long-term value.

with a modest 2,370 sf of habitable floor area, the design optimizes spatial efficiency by integrating living and workshop functions under one roof, minimizing the construction footprint and material use.

the utilization of conventional wood framing simplifies labor, reduces cost, and supports local building practices, while the exposed concrete slab eliminates the need for additional flooring materials. paired with other durable materials, including corrugated metal siding and standing seam metal roofing, the design offers low maintenance and long-lasting protection that reduces future replacement costs.

passive strategies such as deep overhangs, a thermal mass concrete slab, cross ventilation, and rainwater harvesting further lower operational expenses by reducing energy and water demands.



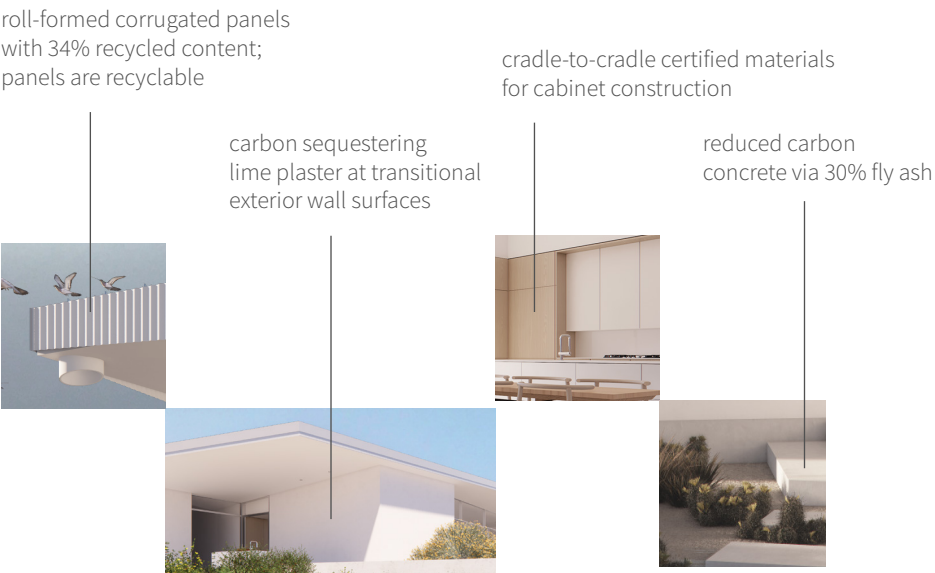
corrugated metal cladding on wood frame construction

design for resources

casa ala blanca embraces the AIA Materials Pledge by selecting materials and assemblies that advance climate action, support human health, and build long-term resilience.

low-carbon concrete pairs with FSC-certified wood framing to reduce embodied carbon while supporting responsible forestry. durable materials like corrugated metal siding and standing seam roofing promote a shift toward a circular economy by minimizing maintenance and being fully recyclable at end of life.

mineral wool insulation, with its recycled content and low-toxicity profile, contributes to healthier indoor air quality and ecosystem protection. interior finishes, including cradle-to-cradle certified tile and cabinetry materials, reinforce the project’s commitment to human and environmental health, transparency, and material sourcing.



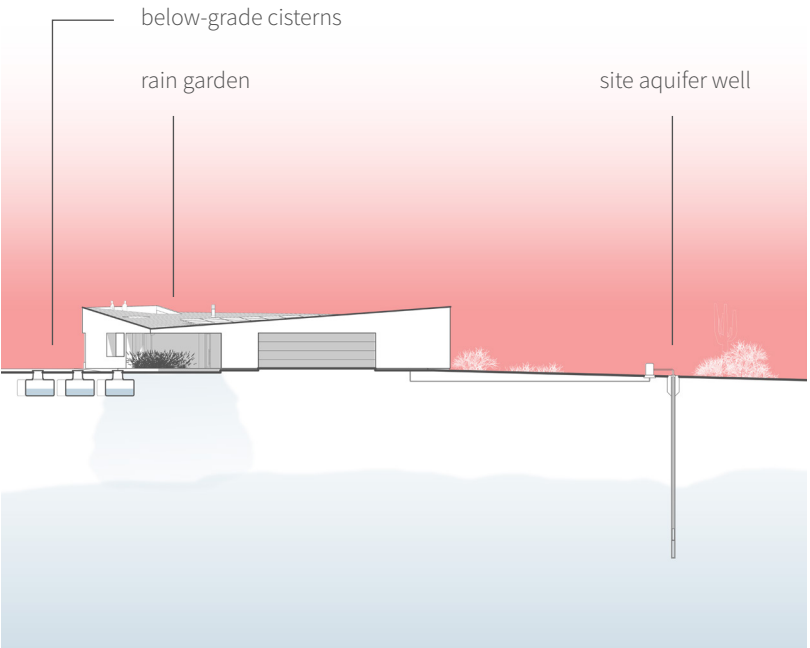
material selection

design for water

casa ala blanca employs a holistic water strategy that reduces reliance on groundwater, aligning with Oro Valley’s community commitment to long-term aquifer health and resource resilience.

rainwater harvested from the home’s 3,700 sf butterfly roof supplies 100% of the landscape irrigation via three below-grade cisterns, while greywater reuse further offsets well demand by serving adjacent native plantings. together, these strategies reduce equivalent groundwater extraction by approximately 70%.

the design aligns storage capacity of 15,000 gallons/year with practical use, prioritizing efficiency, and minimizing construction cost and embodied carbon in balance with the site’s natural hydrology. arizona allows rainwater to be treated for potable use if health and safety standards are met. future pairing of the storage with a filtration system could supply up to 10,950 gallons/year of treated water, enough to meet the drinking and cooking needs for a three-person household.



aquifer recharge diagram



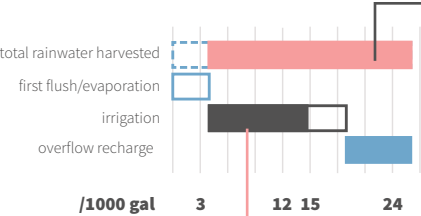
remnants of well pump-house at historic Steam Pump Ranch in Oro Valley

harvested rainwater

reduces
stormwater runoff and erosion

enhances
site biodiversity while supporting low potable water demand

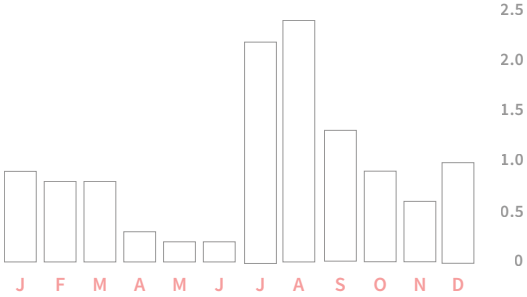
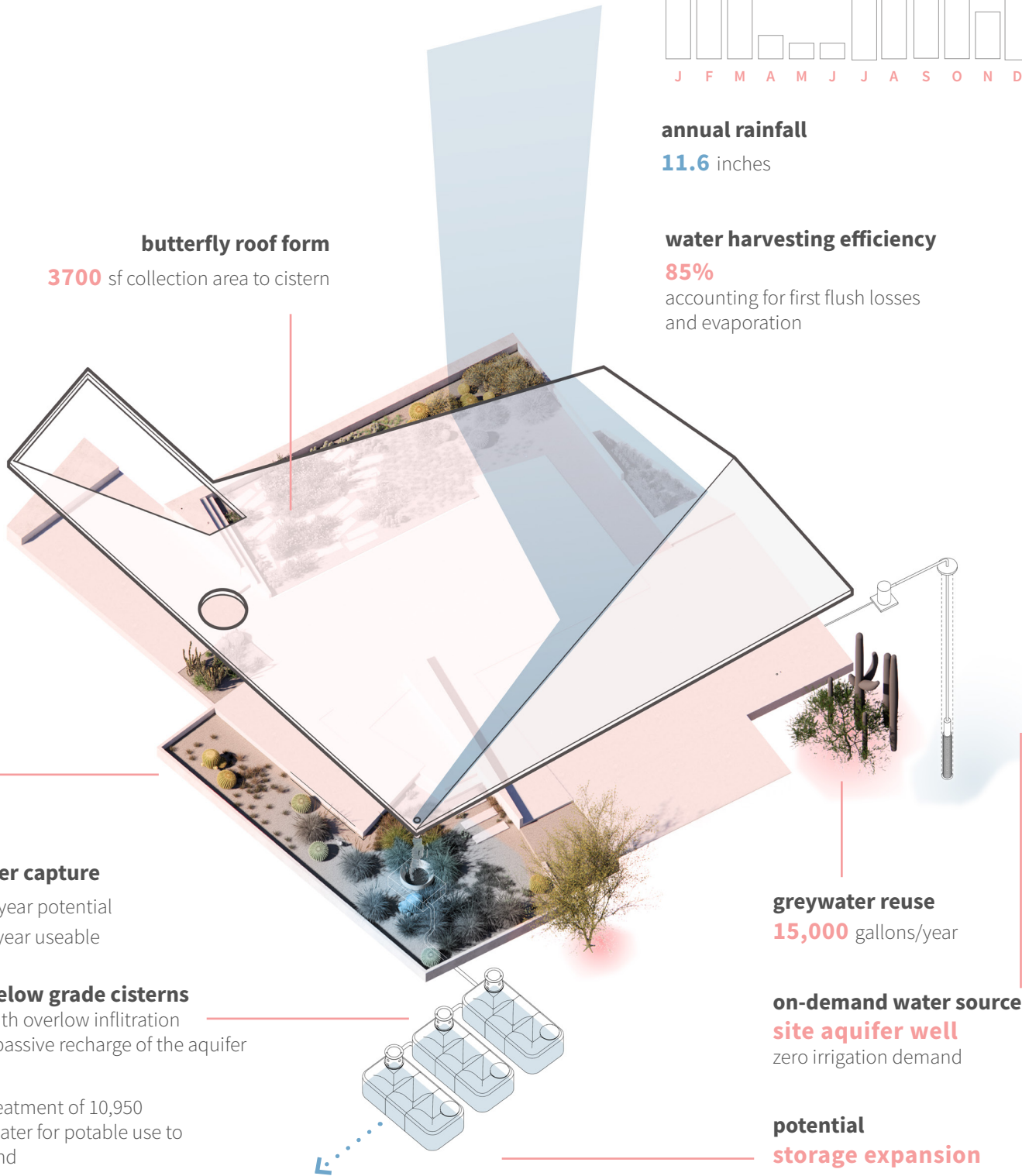
supports
pollinator species and wildlife habitat



annual rainwater capture
26,739 gallons/year potential
22,728 gallons/year useable

3 (5,000 gallon) **below grade cisterns**
balance storage with overflow infiltration at rain garden for passive recharge of the aquifer

future potential treatment of 10,950 gallons/year rainwater for potable use to reduce well demand



annual rainfall
11.6 inches

water harvesting efficiency
85%
accounting for first flush losses and evaporation

greywater reuse
15,000 gallons/year

on-demand water source
site aquifer well
zero irrigation demand

potential storage expansion

design for ecosystems

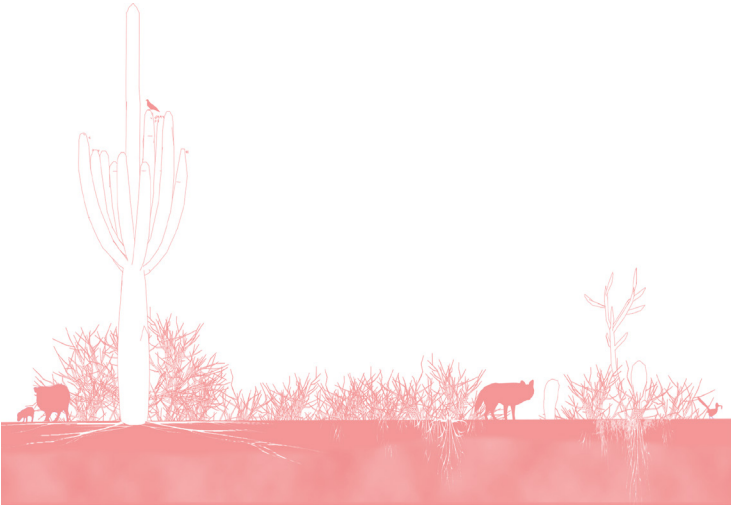
an assemblage of rainwater-irrigated gardens supports pollinators, enhances biodiversity, and promotes soil health without drawing from municipal or groundwater sources.

by capturing and reusing onsite rainfall, these planted zones integrate with the architecture as a resilient, living system that complements the ecology of the surrounding desert.

the gardens' healthy soils act as a carbon sink, drawing atmospheric CO₂ into organic matter, while improving infiltration and helping to recharge the local aquifer.

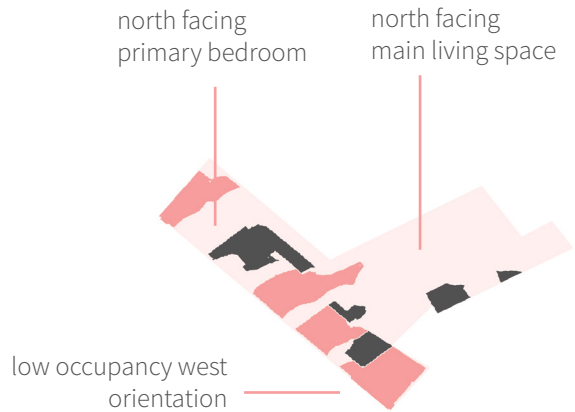
a selection of native plants provides host environments for butterflies and bees, while seasonal flowering species and seed-bearing grasses offer forage for birds and other species.

beyond the garden walls, greywater is reused to irrigate undisturbed native vegetation.

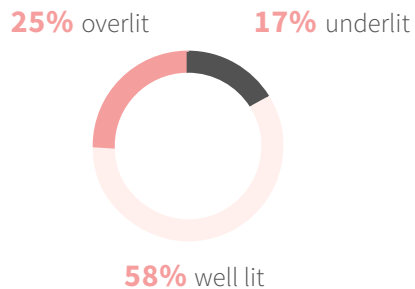




design for well-being

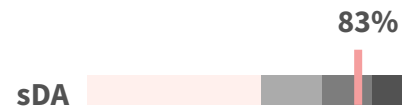


daylighting plan analysis of conditioned living spaces



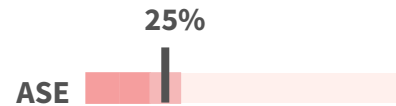
overlit - underlit analysis

casa ala blanca prioritizes comfort and sensory connection through balanced daylighting, passive thermal strategies, and layered access to nature. north-facing living spaces, deep overhangs, and solar screens reduce glare and solar heat gain. a network of rainwater-irrigated garden microclimates enhances biodiversity, food cultivation, and seasonal awareness. with 83% sDA and 25% ASE, interior spaces offer visual comfort while engaging the desert landscape. the home integrates light, air, and ecology, to foster ease and well-being.



spatial daylight autonomy

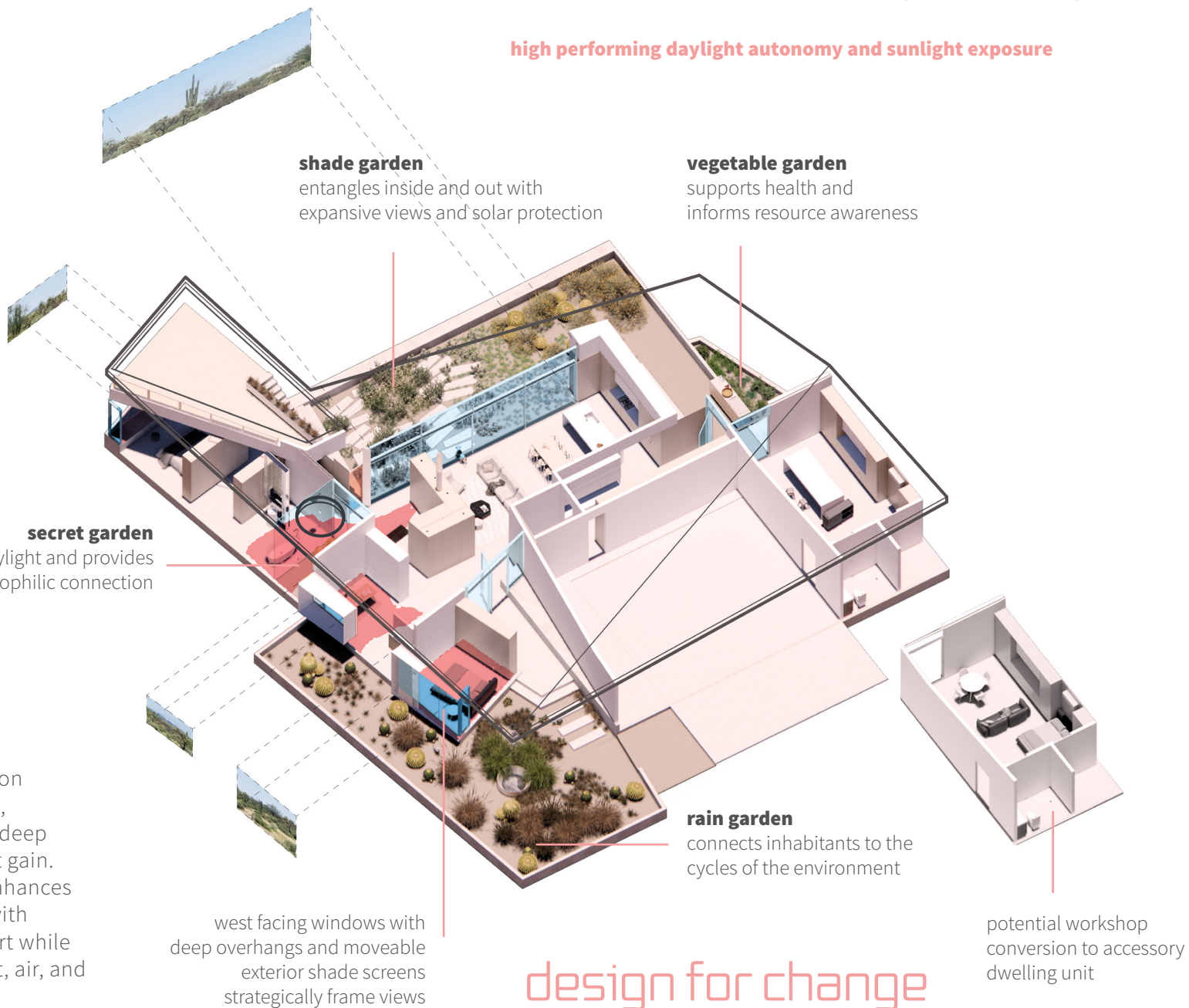
the percentage of floor area that receives at least 300 lux of daylight for 50% of occupied hours annually



annual sunlight exposure

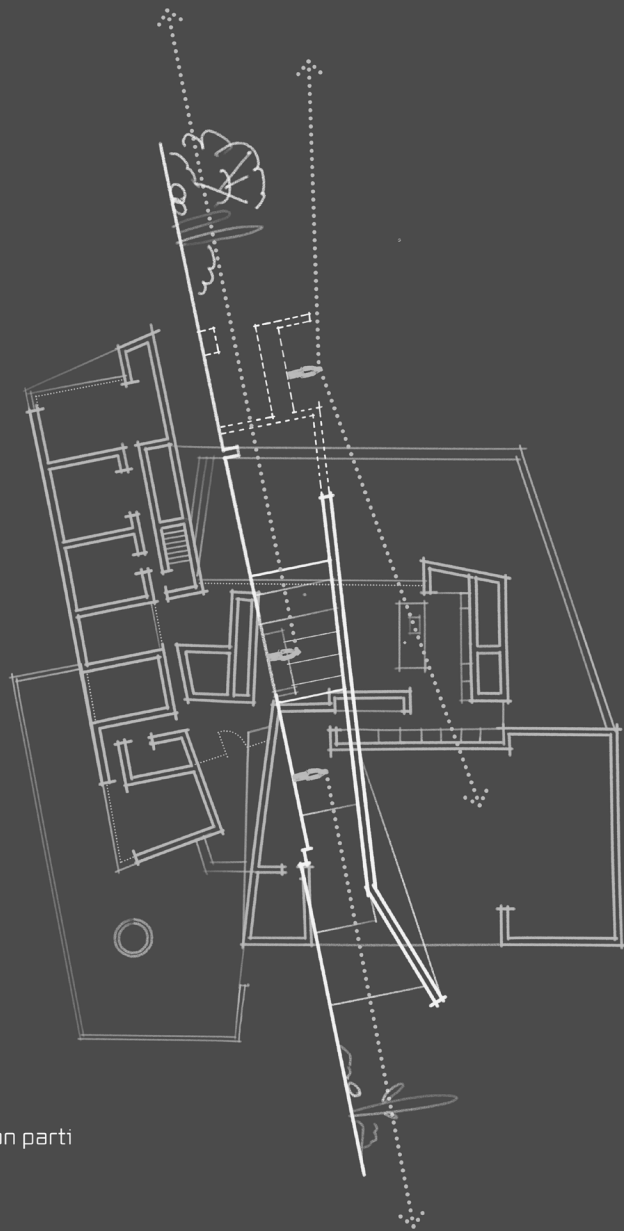
space that receives over 1000 lux for more than 250 hours per year → risk of glare and overheating

high performing daylight autonomy and sunlight exposure

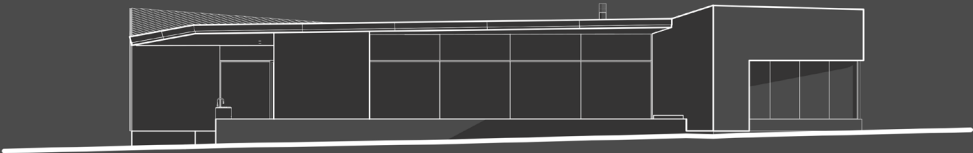


design for change

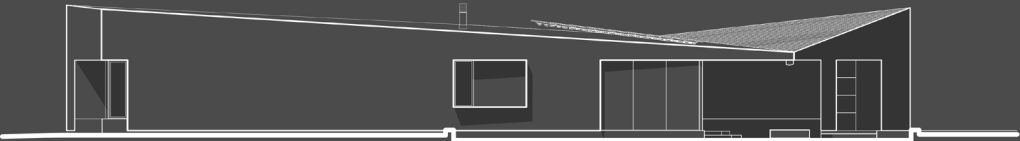
design for discovery



section parti



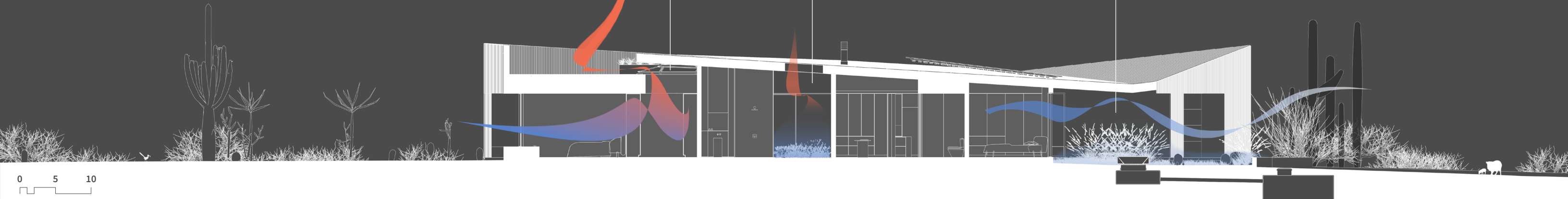
north

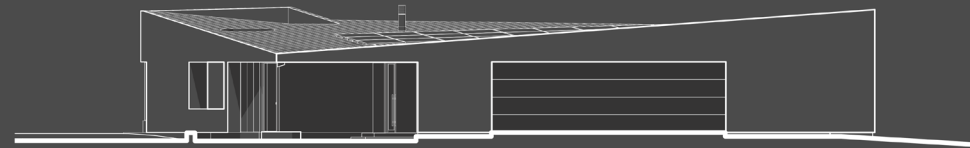


west

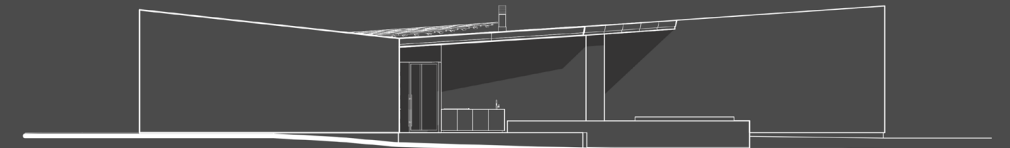
night flush
operable high clerestories
release hot air

**microclimate
cooling + comfort**
gardens irrigated by harvested
rainwater enhance nighttime
evaporative cooling





south



east

**microclimate
cooling + comfort**
gardens irrigated by harvested
rainwater enhance nighttime
evaporative cooling

