

FIRE SAFE DESIGN

Building in Southern California's Wildlands

Choosing to live in the wildland/urban interface requires a commitment to co-existing with endemic natural cycles of flood and fire. In their work designing new and re-modeled residential projects in these areas, DBA follows simple strategies to create fire safe environments.

Our primary strategy is based on limiting natural and built fuel sources. This reduction of combustible material in the structures and their surrounds creates a firebreak allowing the flames to move safely around the immediate area.

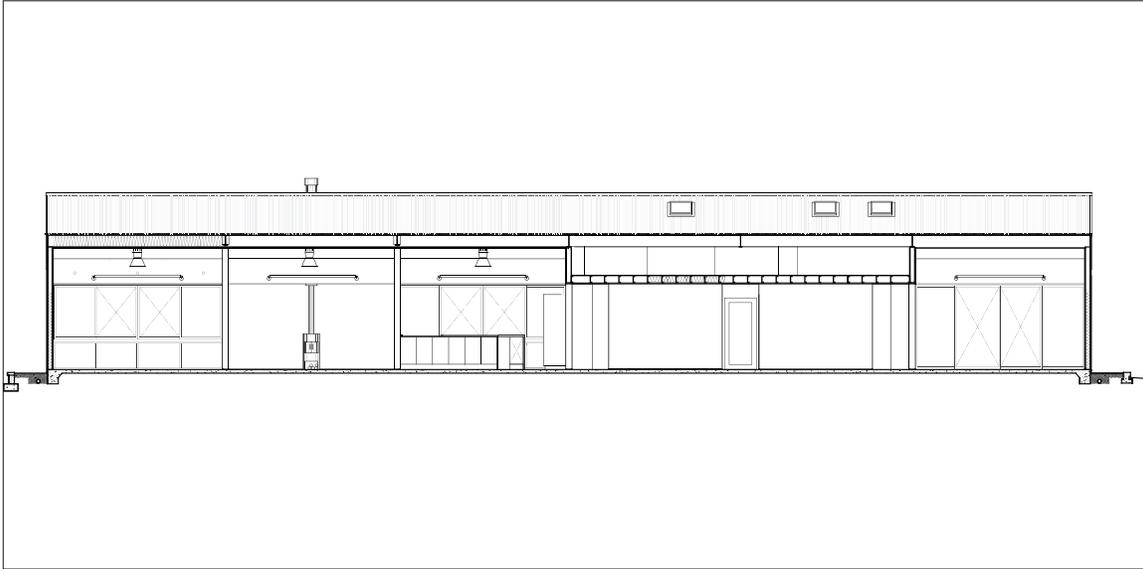
But given the ballistic nature of wind driven embers – generated beyond the firebreak zone - it is

also necessary to protect the building envelope. A comprehensive system of shutters or doors can protect glass areas and complete a defensive, non-combustible hard shell when there is a threat of fire.

Finally, an active array of either ground or roof based exterior sprinklers can ensure that building surfaces are wetted down during wildfire episodes.

All these strategies complement locally mandated safety requirements such as interior sprinklers and landscape fire clearances designed to create defensible space.

MANAGING BUILT FUEL SOURCES



The use of steel studs can eliminate the need for wood in construction and dramatically reduce a structure's vulnerability to fire.

The fuel reduction objective in new structures is primarily achieved by eliminating flammable wood. Concrete, concrete block, concrete insulated panel systems, or, perhaps most economically, cold-formed steel studs with sheet metal shear panels bonded to the interior sheet rock finish all offer opportunities to create wood-free architecture.

Exterior finishes can include stucco, cement fiber board and sheet metal. Integrally colored concrete can be self-finished while block can be selected in a variety of colors and finishes.

Fire-safe roofing materials include sheet metal, clay or concrete tile and waterproof concrete. Roof shear can be achieved with metal decking, steel cross bracing or fire rated ply-wood. Fire-rated roofing paper can also be specified.

Fire-safe interior wall finishes are typically either plaster or fire-rated sheet rock. Batt insulation should be mineral (fiberglass) rather than vegetable based (such as cotton or rice straw).

Doors can be steel, steel and glass or aluminum and glass with windows framed in steel or aluminum. Glass should always be tempered double glazed.

Ipe, a sustainably harvested tropical hardwood, sometimes known as ironwood, is an invaluable fire resistant material. It is rated Class A fire resistant - the same rating applied to steel and concrete. DBA has made use of it in doors, window frames, exterior soffits and decking. It can also be used structurally and can be an integral part of a fire-protected assembly.

HARD SHELL



Steel shutters or sliding barn doors can be used to secure the building envelope and protect the structure from fire.

The precursor to a fire engulfing a wildland structure is a barrage of flaming and re-hot embers driven by the fire winds and fully capable of breaking the two layers of tempered window glass now mandated by the California Building Code in high fire districts. Once interior ignition takes hold the structure explodes leaving it entirely vulnerable to the on-rushing exterior flames.

DBA emphasizes the importance of an impregnable exterior envelope, or hard-shell, in their fire-safe strategies. While non-combustible cladding is a given, doors and windows require protection.

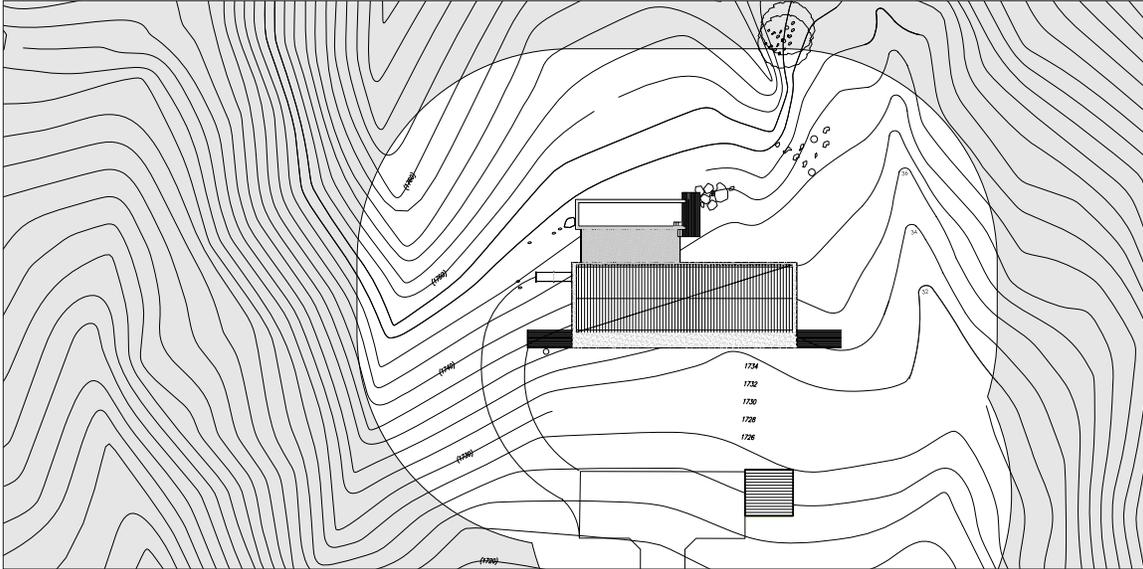
Fire doors and shutters can be fabricated in steel, ipe, or a combination of both. These can function as sliding 'barn doors', horizontally hinged shutters

that, set 'open' can provide shade, hinged vertically as shutters or be roll-down devices. In addition to fire safety they can obviously contribute to building security.

Attention is also paid to other openings in the envelope such as vents. Attic venting is achieved using sheet metal overlapping baffle vents which are both fire and ember resistant.

Where water for fire fighting is stored in tanks, we recommend hard shelled ferro cement or galvanized steel. The cheaper, ubiquitous, green plastic tanks melt at less than 400 degrees Fahrenheit. Chaparral fires can reach 2000 degrees and beyond.

MANAGING LANDSCAPE FUEL SOURCES



The area immediately surrounding the structure is cleared of flammable plant material to create a defensible firebreak.

Fuel reduction in landscape can be achieved by eliminating all flammable cellulosic material in a 100-200 foot zone surrounding buildings. Given that the choice to live in the wildland environment is often based on a desire to enjoy the natural landscape this structure can often appear self-defeating.

DBA's strong tradition of focusing on the interplay between sheltered (architectural) spaces and unsheltered (landscape) spaces and our alliances with garden designers and native landscape ecologists enables us to offer aesthetically appealing solutions to this apparent dilemma.

Our approach is guided by an understanding of horticultural imperatives; of the comparative flamma-

bility or fire-retardant qualities of native species; and of the potential aesthetic qualities of minimal planting strategies combined with ipe decking, concrete, gravel, rock and decomposed granite hardscapes.

Water features, planted ponds, lakes, and swimming pools can offer amenity, beauty and potential fire-fighting water sources. Natural swimming pools (where water sanitization is effected through a planted pond system that 'feeds' the active swimming area) can be highly effective.

We encourage the removal of entirely non-native and highly flammable plantings such as palms and eucalypts and limit the proximity of explosively combustible natives such as laurel sumac.

CONCLUSION

DBA's experience, vision and strategic alliances with like-minded professionals can make a unique contribution to the potential for fire-safe homes in California's wildlands. We design environments in ways that respect the natural cycles of the native landscape and attempt to tread lightly on existing eco-systems.

Our choice of fire-rated, fire-retardant and non-combustible building materials and wise management of the landscape surrounding built structures can increase the likelihood of home and contents

surviving fire independent of fire-fighting efforts or potentially extending survival times sufficient for fire-fighting intervention.

These simple fuel reduction and hard-shell strategies are pursued in tandem with the highest standards of design in pursuit of the practical and aesthetic needs of the client. Fire and flood cycles in wildland areas are critical to our understanding of the design context - but do not preclude our customary considerations of solar orientation, weather patterns, energy management and sustainability.

Relevant Projects

Rock Fall – 3,000 SF New Construction – Upper Ojai Valley

Bear Creek – 2,500 SF Renovation – Upper Ojai Valley