IBHS Research

Mitigations for a Wildfire Prepared Home

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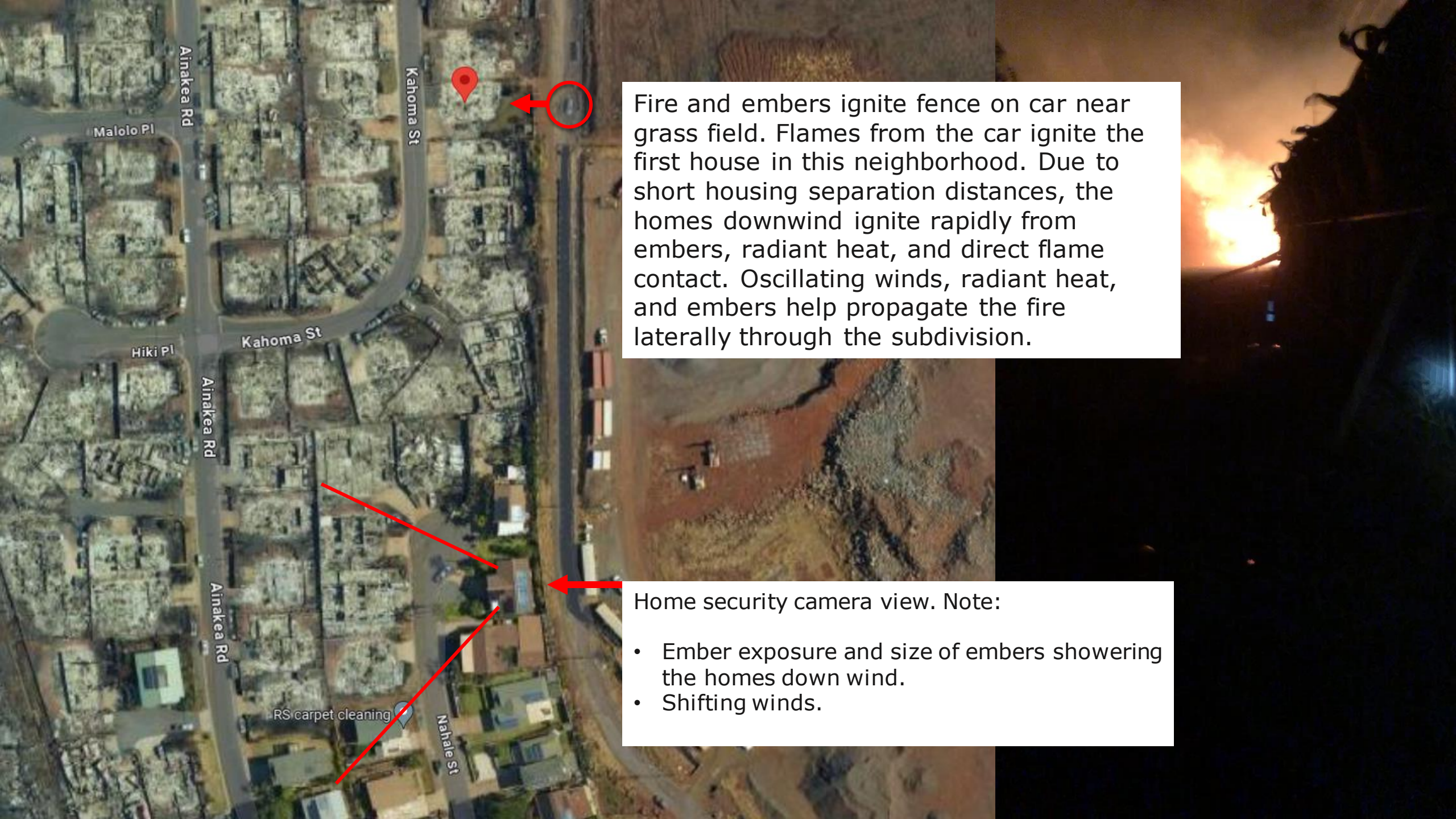
WHY?

Severe weather disrupts lives, displaces families, and drives financial loss. IBHS delivers top-tier science and translates it into action so we can prevent avoidable suffering, strengthen our homes and businesses, inform the insurance industry and support thriving communities.


Video by FOX 4 Dallas-Fort Worth


Dec 30, 2021 6:29:22 PM MST
Video from Holly Browarsky,
Emerson Lane
KUNA



Fire and embers ignite fence on car near grass field. Flames from the car ignite the first house in this neighborhood. Due to short housing separation distances, the homes downwind ignite rapidly from embers, radiant heat, and direct flame contact. Oscillating winds, radiant heat, and embers help propagate the fire laterally through the subdivision.

Home security camera view. Note:

- Ember exposure and size of embers showering the homes down wind.
- Shifting winds.


WYZE
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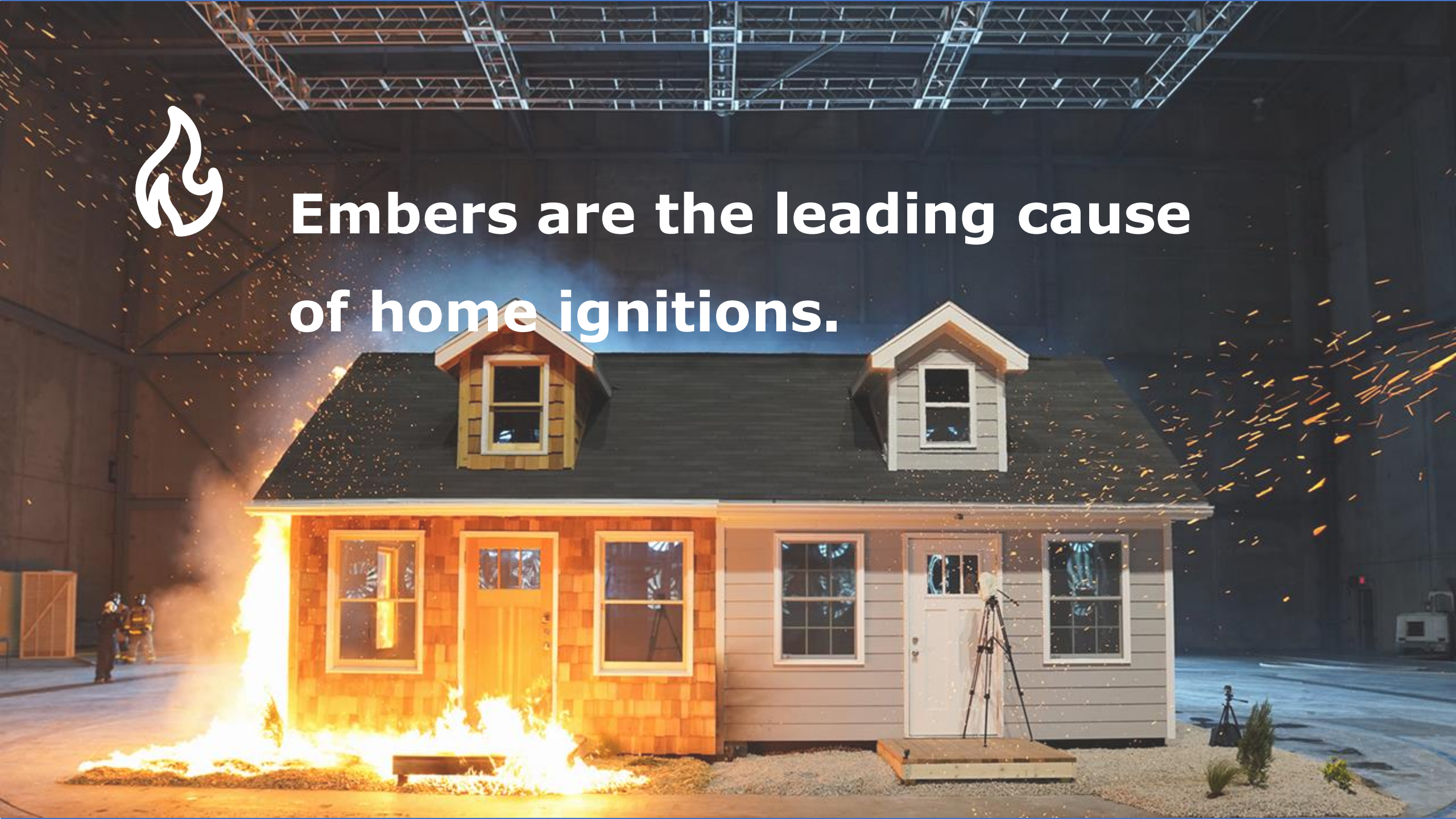
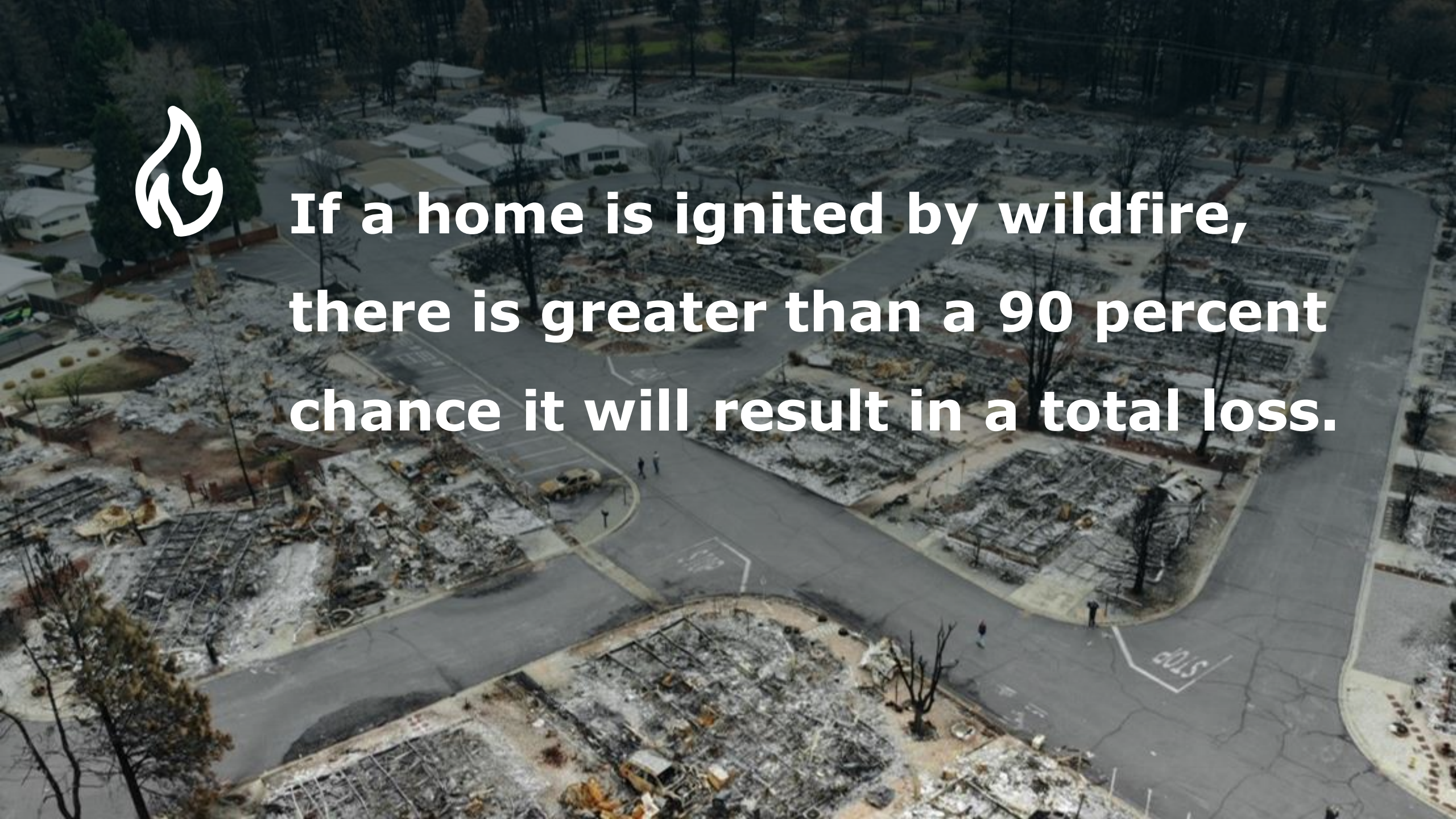
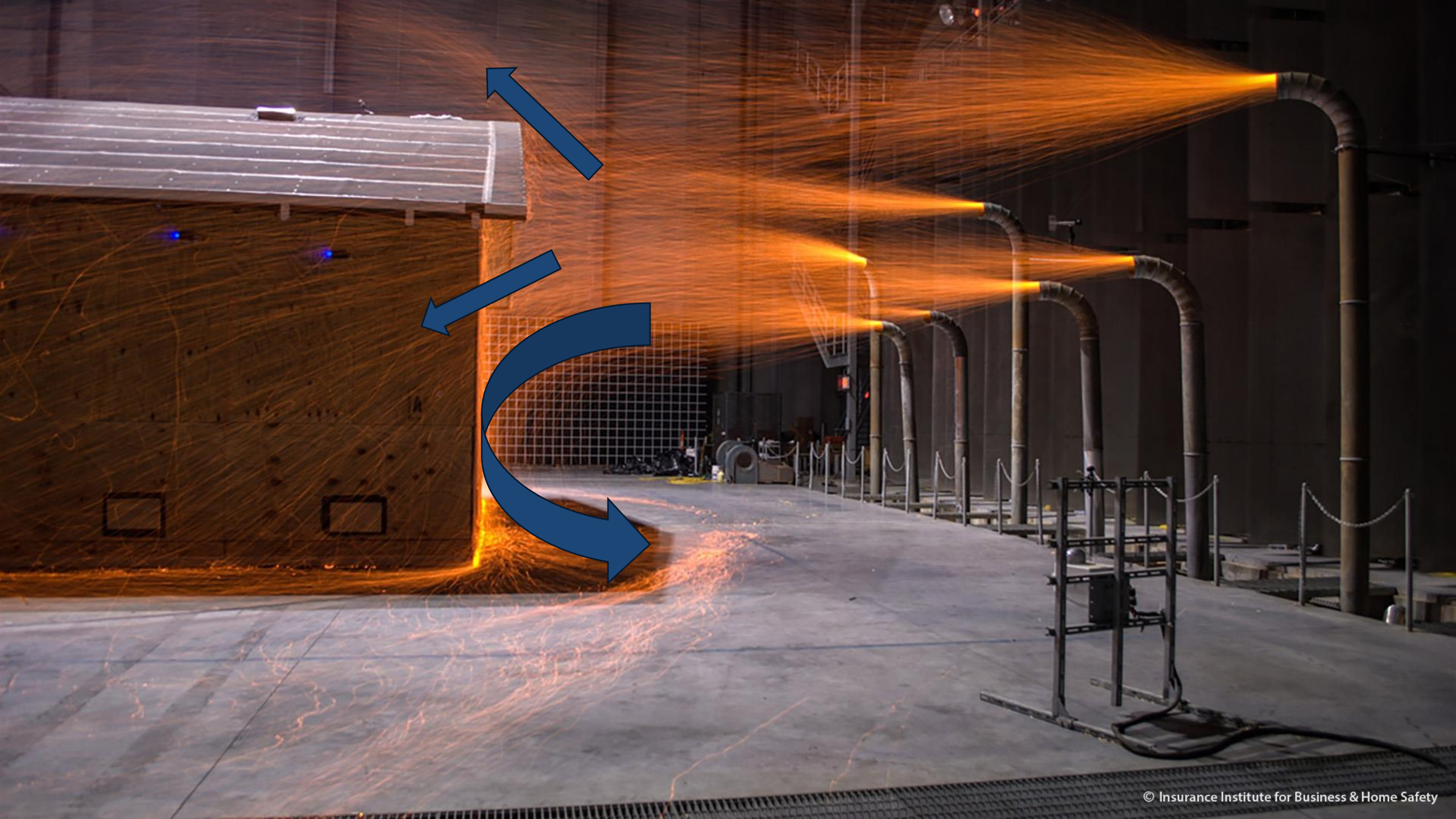
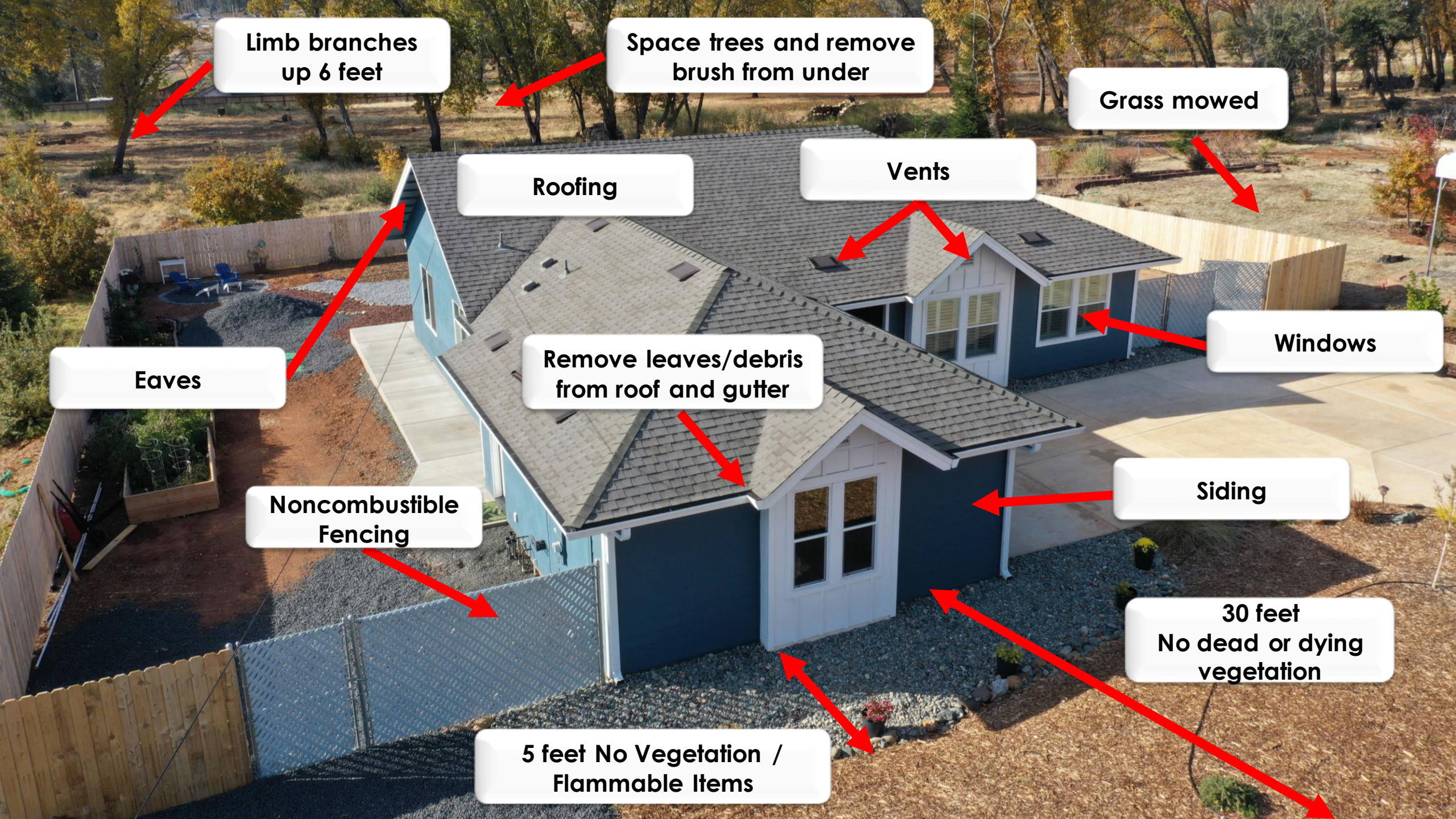
Severe Wildfire Conditions
WEATHER
FUEL
TOPOGRAPHY
1. Ignition Source
2. Extreme fire behavior
High intensity, fast growth
3. Residential fires
Ignitable structures, proximity,
many ignitions
4. Fire protection resources
Number of ignitions +
environment overwhelms resources
5. Fire protection effectiveness
Reduced or nonexistent
6. Suburban Conflagration Catastrophe
Adapted from Cohen (2008)


Embers are the leading cause
of home ignitions.



If a home is ignited by wildfire, there is greater than a 90 percent chance it will result in a total loss.




Limb branches up 6 feet
Space trees and remove brush from under
Grass mowed
Roofing
Vents
Windows
Eaves
Remove leaves/debris from roof and gutter
Siding
Noncombustible Fencing
30 feet
No dead or dying vegetation
5 feet No Vegetation / Flammable Items

Roof

- Statistical correlation between wood roofs and building losses. (Davis, 1990; Foote et al., 2011)
- Each burning home with a NFRT wood shake roof contributed to the ignition of ten other homes. (Bryner, 2000)

Roof

- Embers can ignite debris in the roof valley, but the damage was limited to the asphalt and not the sheathing underneath. (Quarles, 2015)

Camp Fire 2018

Roof

- Class A Roof covering.
- Maintain roof clear of debris.


Gutters
• Debris in gutters can expose the roof edge to direct flames. (Quarles, 2011)
© Insurance Institute for Business & Home Safety

Gutters

- Noncombustible gutters and downspouts.
- Gutter covers limit debris accumulation and shield the fascia board.
- Maintain gutters and the top of gutter covers clear of debris.

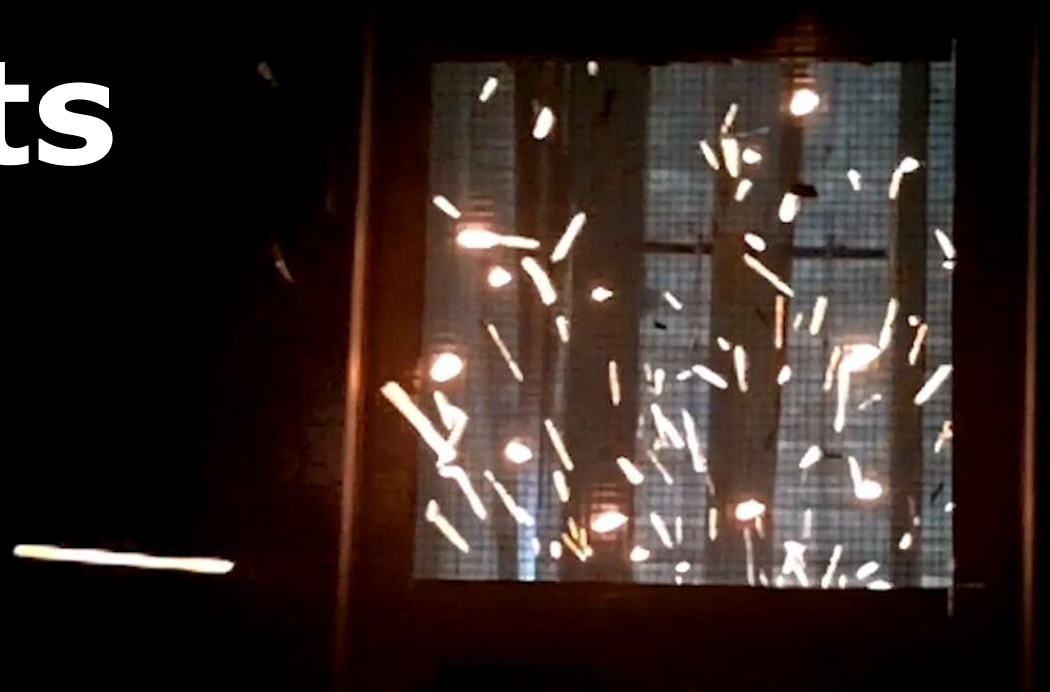
Eaves & Soffits

- Open-eave designs that incorporate a fascia board are more vulnerable to direct flame contact exposures compared to soffited-eave designs. (Quarles et al., 2011)
- Enclosed eaves have a significant protective effect compared to no eaves and open eaves. (Syphard & Keeley, 2019)

Eaves & Soffits

- Enclose eaves with noncombustible materials.

Vents

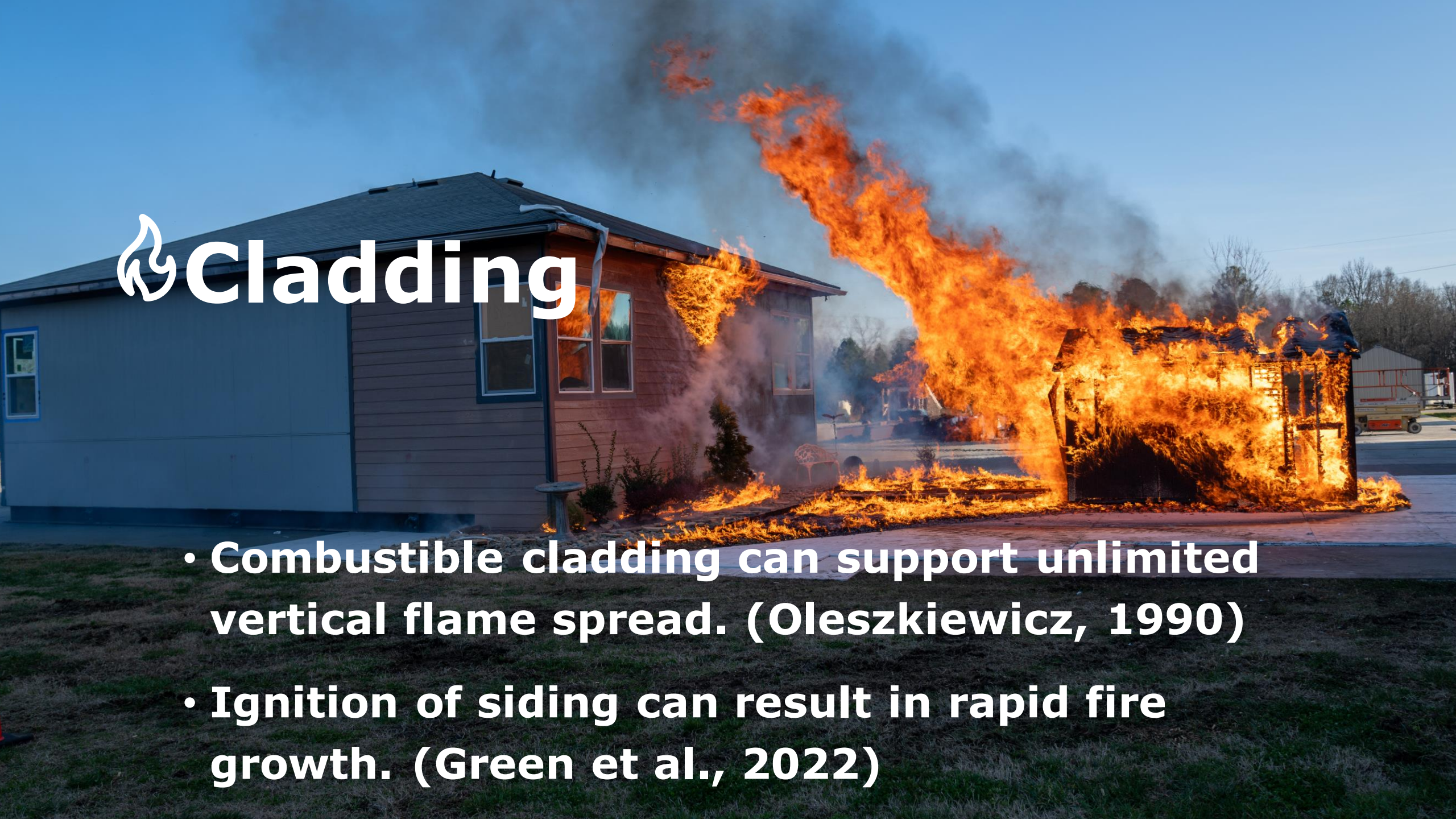


- **Pathway for fire to enter the building.**

  (Caton et al., 2017; Manzello et al., 2007; Quarles, 2017; Quarles & Gorham 2019)

Vents

- Install 1/8-inch corrosion-resistant metal mesh or ember- and flame-resistant vents.
- Dryer vents must have a metal louver or flap.



Cladding

- Combustible cladding can support unlimited vertical flame spread. (Oleszkiewicz, 1990)
- Ignition of siding can result in rapid fire growth. (Green et al., 2022)

Cladding

- Noncombustible siding reduces the vulnerability of walls to flames.

Glass Fire 2020

Windows

- Double-pane windows consistently provide better fire barrier performance. (Shields et al., 2005)
- Tempered windows provide higher heat resistance. (Babrauskas, 2003)

Windows

- Multipaned windows with at least two tempered panes provide the highest resistance to radiation.

Doors

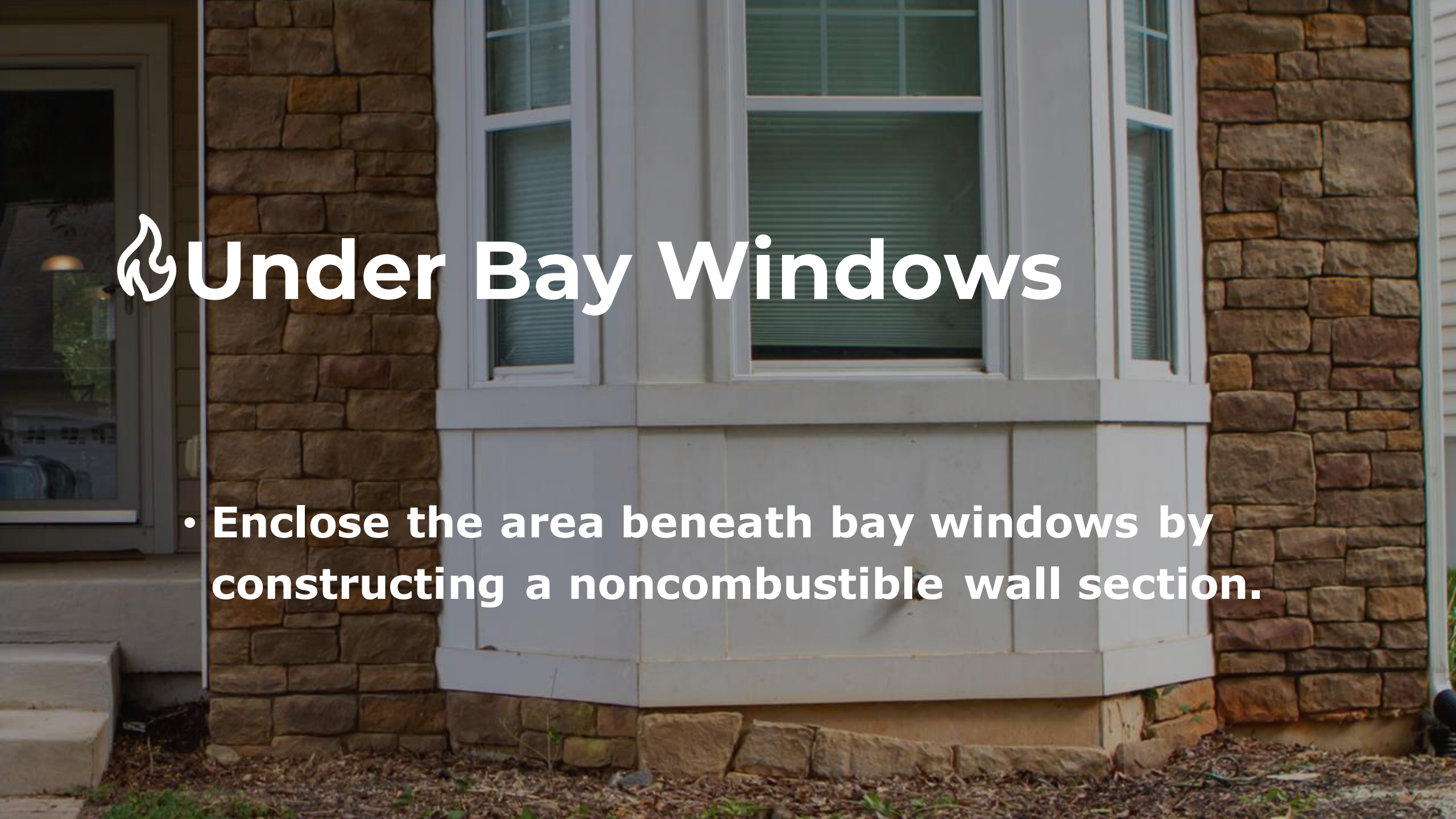
- Exterior doors were frequently damaged in the Waldo Canyon Fire. (Maranghides et al., 2015)

Doors

- Fire-rated doors are the most practical solution available.
- Utilize a metal threshold.

🔥Under Bay Windows

- Post-event investigations show bay windows trap heat, embers, and debris. (Maranghides et al., 2015)



Under Bay Windows

- Enclose the area beneath bay windows by constructing a noncombustible wall section.

6-inch Vertical Noncombustible

- Flames can reach from combustible mulch to ignite cladding. (Manzello et al., 2017)

6-inch Vertical Noncombustible

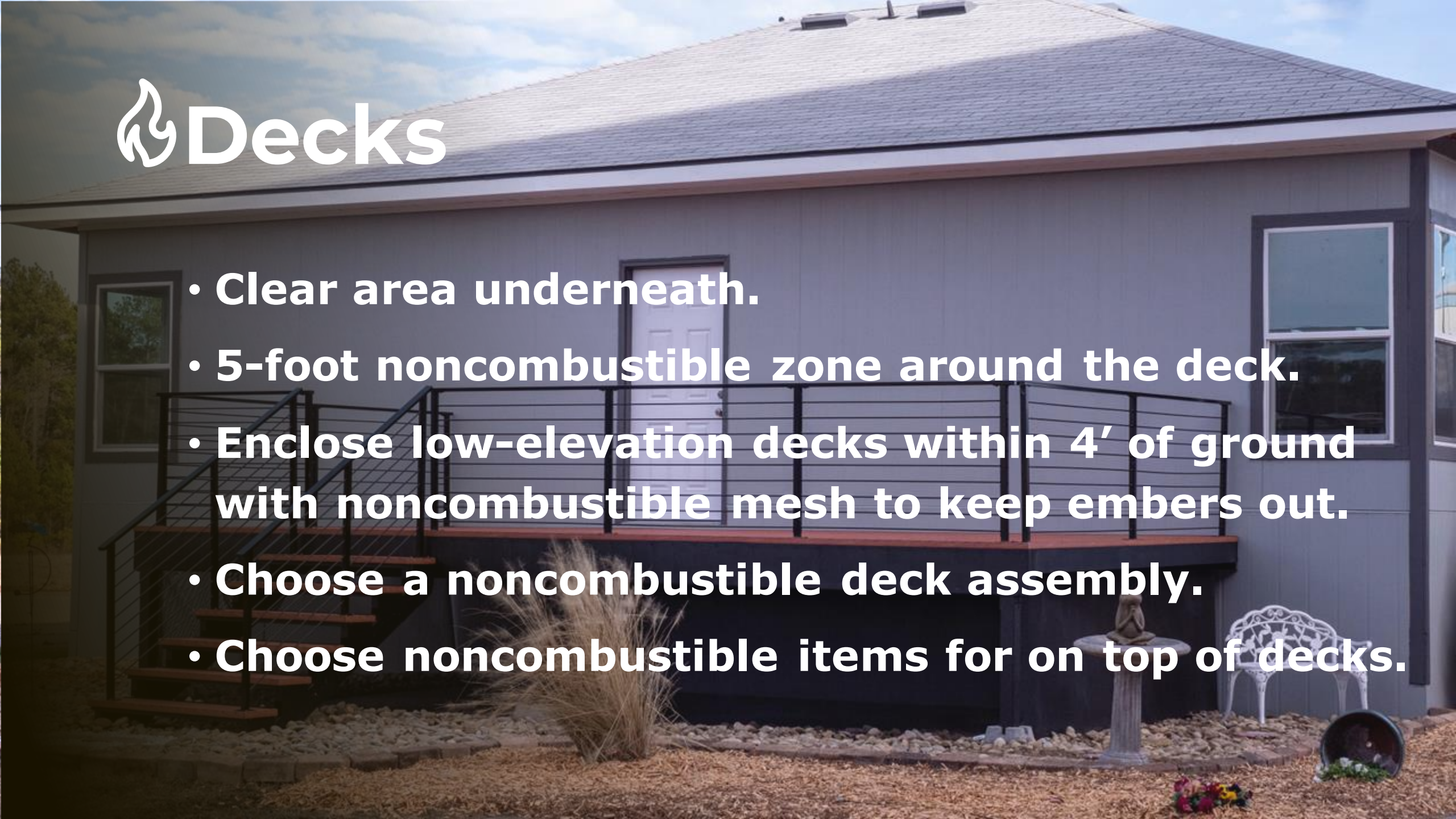
6-inches

- Noncombustible wall material required in the International Residential Code for termite control

Lahaina Fire 2023

Decks

- **Deck substructure plays a major role in vulnerability to flame impingement. (Hedayati et al., 2022)**



Decks

- Clear area underneath.
- 5-foot noncombustible zone around the deck.
- Enclose low-elevation decks within 4’ of ground with noncombustible mesh to keep embers out.
- Choose a noncombustible deck assembly.
- Choose noncombustible items for on top of decks.

Zone 0: Noncombustible

- **Reducing woody vegetation cover up to 40% immediately adjacent to structures and preventing vegetation from overhanging or touching structures were the most effective actions. (Syphard et al., 2014)**

Photo: Brian Vander Brug / Los Angeles Times

Zone 0: Noncombustible

- Reducing vegetation in the 0-5-foot zone ***nearly doubles*** a property's wildfire survival rate

- Remove all vegetation from the first 5 feet.
- Remove combustible wood mulch.
- Replace with rock mulch, pavers, etc.

Fences

- Fences provide a pathway for fire to reach the home. (Butler et al., 2022; IBHS, 2020)

Fences

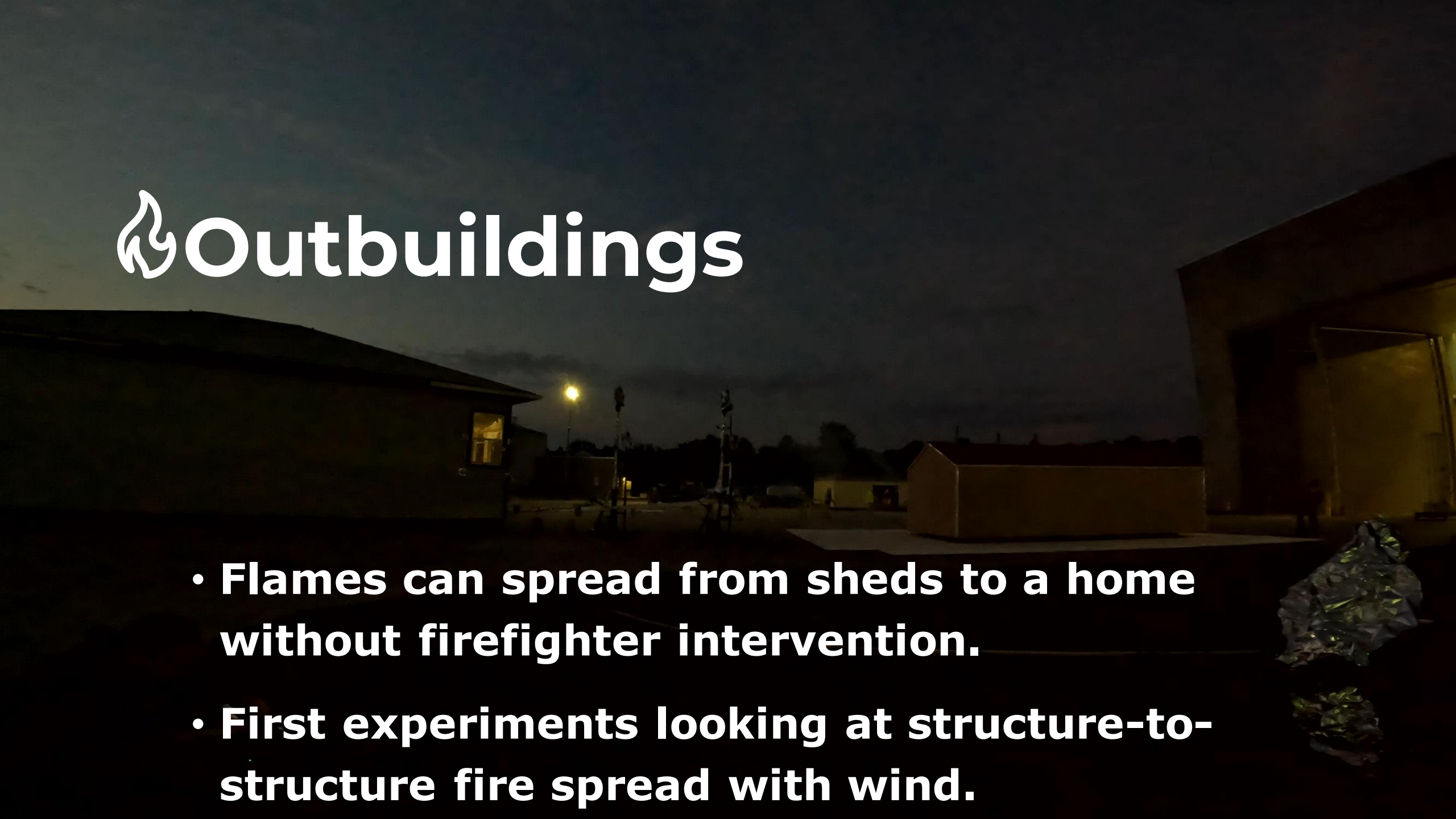
- **Parallel fence rows create an inferno.**

(Butler et al., 2022)

Image: (Butler et al., 2022)

Fences

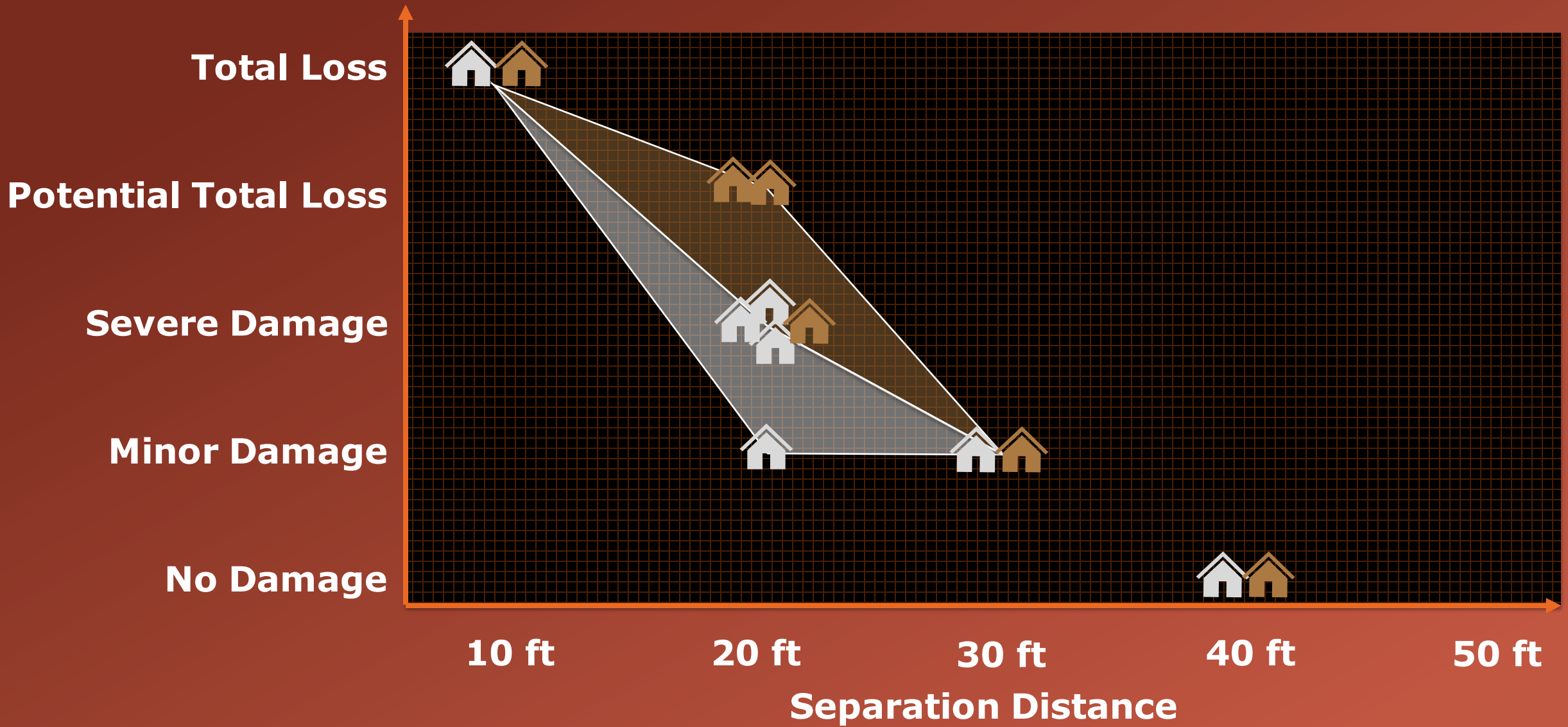
- Replace combustible fencing within Zone 0.
- No parallel fences closer than 5’ from each other.



Outbuildings

- **Flames can spread from sheds to a home without firefighter intervention.**
- **First experiments looking at structure-to-structure fire spread with wind.**

Outbuildings


Total Loss
Potential Total Loss
Severe Damage
Minor Damage
No Damage
10 ft
20 ft
30 ft
40 ft
50 ft
Separation Distance
Wood Shed
Metal Shed

Outbuildings

- Apply the same mitigations as the home.
- Move outbuildings like sheds at least 30 feet away.


6”


6”

ROOF

- ✓ Choose a Class A fire-rated roof maintained clear of debris
- ✓ Choose noncombustible gutters & downspouts

BUILDING FEATURES

- ✓ Install ember- & flame-resistant vents
- ✓ Ensure 6-inch vertical noncombustible clearance at base of wall

WILDFIRE PREPARED HOME + PLUS

ADDITIONAL MITIGATION

- ✓ Remove back-to-back fencing
- ✓ Eliminate combustible siding
- ✓ Enclose eaves
- ✓ Enclose under bay windows
- ✓ Upgrade to a wildfire-resistant deck
- ✓ Upgrade windows & doors
- ✓ Cover gutters
- ✓ Move outbuildings at least 30 feet away

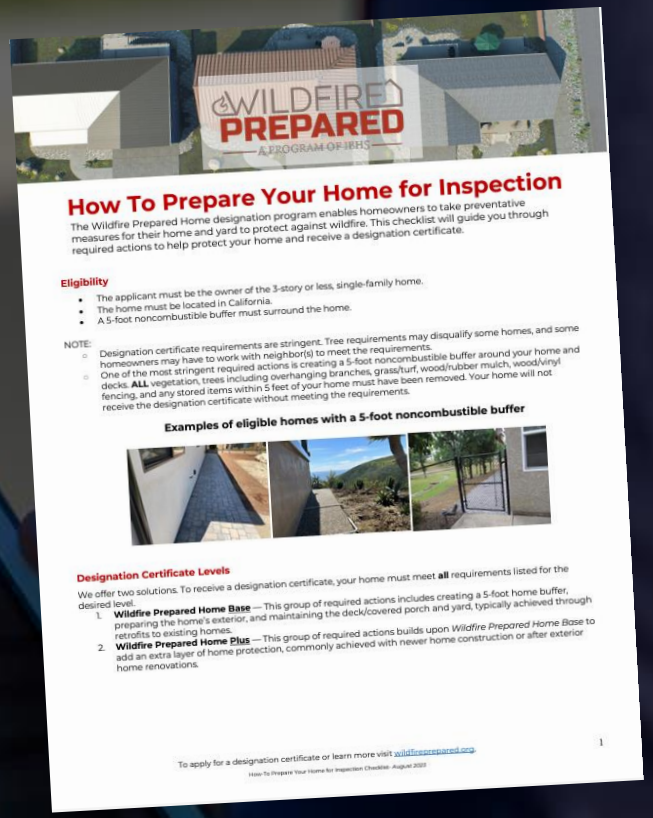
DEFENSIBLE SPACE

- ✓ Create & maintain the home ignition zone (0-5 ft) including the removal of branches that overhang this area
- ✓ Clear & maintain the underdeck area; enclose low-elevation decks
- ✓ Maintain yard clear of debris
- ✓ Replace combustible fencing within 5 ft of the home

WILDFIRE PREPARED

A PROGRAM OF IBHS

Designation Process



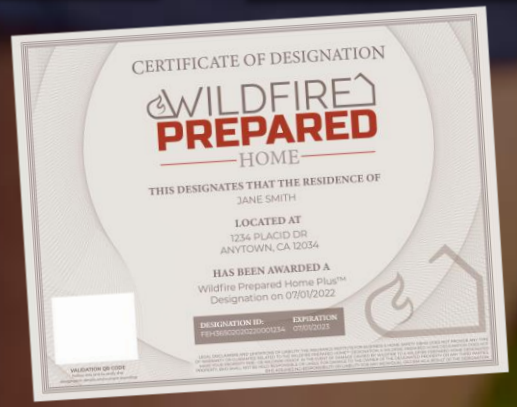
Step-by-step guide on How to Prepare Your Home for Inspection

Initial Process

Explore the How To Prepare Your Home Guide → Take the Free Online Home Assessment → Apply → Inspection → IBHS QA & Designation

Ongoing Process

Annual Landscape Review → Re-Designation



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