



Bridging Codes and Science: Integrating IWUIC and IBHS Wildfire Prepared Home Standards for Community Protection

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Learning Objectives:

- Understand the foundational principles of ICC's Wildland Urban Interface Code and IBHS Wildfire Prepared Home standards.
- Identify areas of alignment between IWUIC provisions and IBHS recommendations.
- Explore the role of fire professionals in advancing community wildfire resilience.
- Share examples of successful fire service engagement in communities using both IWUIC and IBHS strategies.



Wildfire Crisis- Lives, Homes, Dollars



180 lives lost on two wildfires in two states



50k wildfire related fatalities in CA from 2008-2018



Globally up to 600,000 wildfire smoke related fatalities



1/3 of Americans live in the Wildland Urban Interface



36% of new growth since 2000 occurred in WUI area



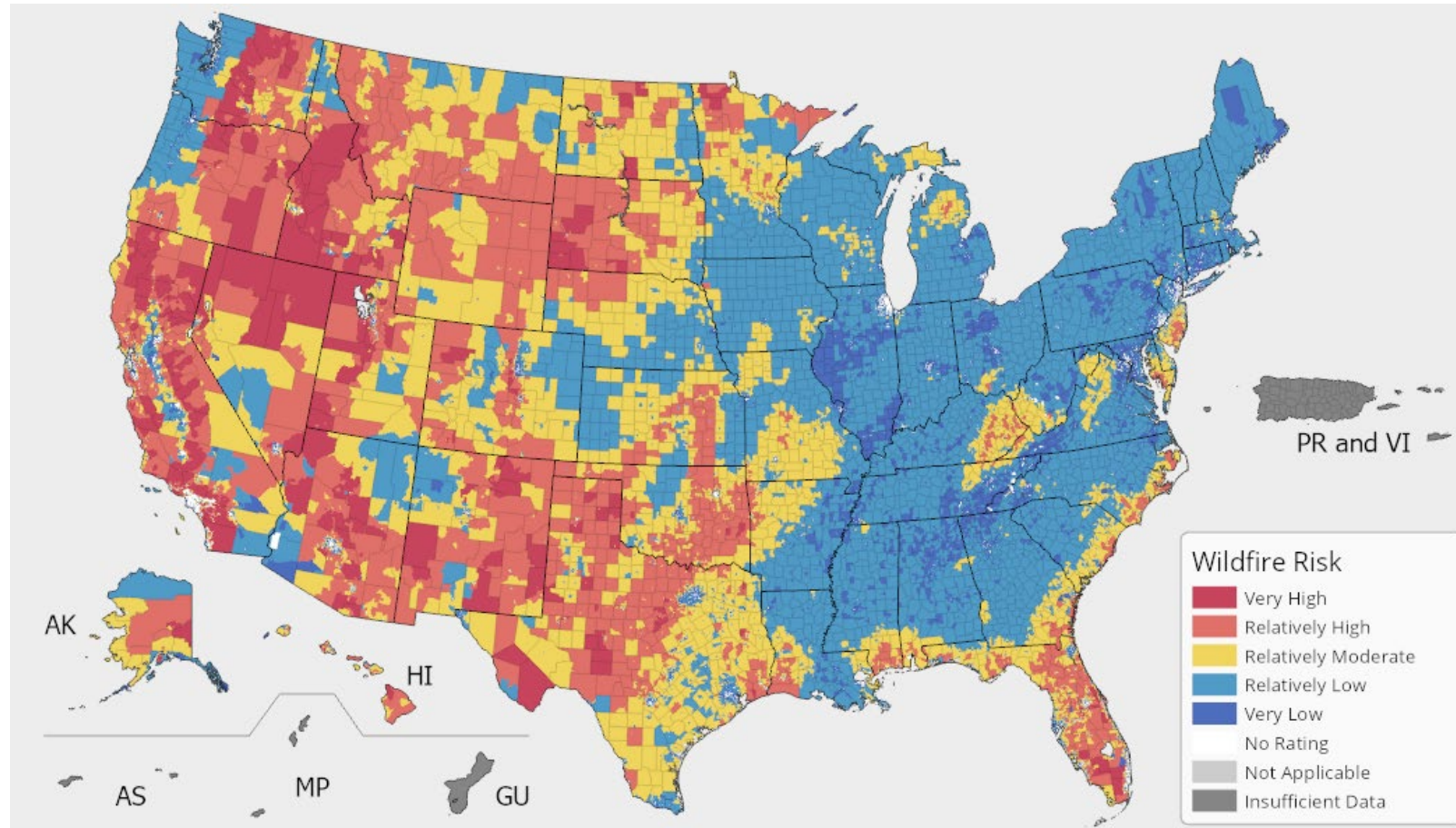
161% increase in the average number of structures destroyed



\$400-\$900 Billion in annual US damages



FEMA Wildfire Risk Map



1 in 20 homes in the U.S.
is at **high or extreme**
wildfire risk



Why it Matters Now



- Wildfire trends and losses demand structure resiliency centered solutions
- Building to wildfire-resistant standards can cut losses by up to 43%(HE)
- Combining Home Hardening and Defensible space cut wildfire damage to communities roughly in half (UC Berkely)
- 51% of homes built after 2008 were undamaged on the Camp Fire
- It works



Foundational Principles of the IWUC

- Structures that do not ignite, do not burn
- Structures that do not burn, do not burn other structures
- Structures that do not burn are safer for people

ICC's Role in Wildfire Resiliency

Set the floor: Publish the IWUIC and align with the I-Codes for construction, access, and water.

Make it local: Provide adoption language, amendment support, and equivalency paths (e.g., recognize IBHS WPH).

Make it stick: Train officials and industry; deliver implementation guidance and tools.



What is the IWUIC

The International Wildland-Urban Interface Code (IWUIC) is the International Code Council's model code that establishes minimum, enforceable requirements—spanning WUI area designation, emergency access and water supply, ignition-resistant construction, and defensible space—to safeguard life and property from wildland fire where development meets wildland fuels.



The 2024 IWUIC is a systems code



CH. 4

Access, addressing, water supply, and the fire-protection plan make the site serviceable.

CH. 5

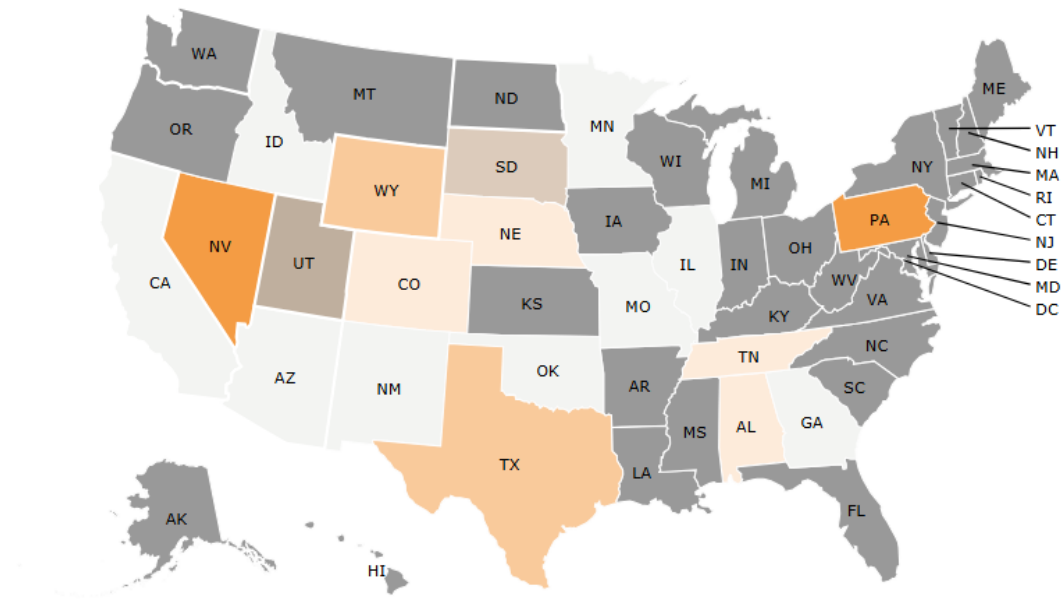
Ignition-resistant construction is selected by the code-defined construction class and project conditions.

CH. 6

Sprinkler provisions, defensible space, fuel modification, and maintenance complete the system.

INTERNATIONAL WILDLAND-URBAN INTERFACE CODE® (IWUIC®)

ADOPTION MAP



MAP KEY

Edition of code currently in effect by state:

- 2018 IWUIC®
- 2015 IWUIC®
- 2012 IWUIC®
- 2009 IWUIC®
- 2006 IWUIC®
- Local Adoptions
- No state-wide IWUIC adoption

Adoption information is provided for states where the IWUIC is adopted statewide, adopted statewide for certain categories of buildings, or adopted by a state body to guide local code adoption.

Adoption information across this display is maintained by the International Code Council (ICC). ICC makes every effort to provide current, accurate code adoption information. To obtain more detailed information on amendments and changes to adopt codes, please contact the jurisdiction. To submit adoption information, please visit our [Code Adoptions Resources](#) page.

New Mexico is already using codes

SANTA FE COUNTY

Adopted the 2021 IFC and 2021 IWUIC, with local modifications, for unincorporated areas.

LOS ALAMOS COUNTY

Chapter 22, Article IV establishes urban–wildland interface areas and fuels-management requirements.

BERNALILLO COUNTY

Applies WUI ignition-resistant construction and defensible-space requirements in the East Mountain Area.

RUIDOSO

Uses local fire-code and fuels-management provisions in Chapter 42 to address community wildfire risk.

Sources: Santa Fe County Ord. 2023-06; Los Alamos County Code Ch. 22; Bernalillo County WUI Manual; Ruidoso Code Ch. 42.

Codes are how we care

We do not only face a wildfire problem. Once homes ignite, we face a structure-to-structure urban conflagration problem.

CARE FOR HOMES

Ignition-resistant construction and defensible space reduce the chance a home becomes fuel.

CARE FOR NEIGHBORS

Consistent minimums reduce the chance one property passes fire to the next.

CARE FOR RESPONDERS

Access, water supply and addressability support safer, more effective operations.



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.







ring

Embers



Flames & Heat



Embers & Flames

WILDFIRE PREPARED

A PROGRAM OF IBHS



ADDITIONAL MITIGATIONS AGAINST FLAMES

- ✓ Cover gutters.
- ✓ Enclose eaves.
- ✓ Install noncombustible siding.
- ✓ Upgrade windows & doors.
- ✓ Upgrade to a noncombustible deck.
- ✓ Move accessory structures at least 30 feet away.
- ✓ Remove back-to-back fencing.

MITIGATIONS AGAINST EMBERS

ROOF

- ✓ Ensure the roof covering is Class A fire-rated & maintained clear of debris.
- ✓ Choose noncombustible gutters & downspouts.

BUILDING FEATURES

- ✓ Install flame- and ember-resistant vents or 1/8-inch metal mesh vents.
- ✓ Ensure 6-inch vertical noncombustible clearance at base of exterior walls and decks.
- ✓ Clear & maintain the underdeck area; enclose low-elevation decks.

0-5 FOOT NONCOMBUSTIBLE ZONE

- ✓ Establish a **0-5 Foot Noncombustible Zone** around the home and decks; remove overhanging branches; replace combustible fences within 5 feet.

5-30 FOOT DEFENSIBLE SPACE ZONE

- ✓ Maintain yard with spaced vegetation, structures, & other connective fuels; clear debris; remove firewood.
- ✓ Move structures at least 10 feet away & maintain a 0-5 Foot Noncombustible Zone around them.



Wildfire = Wildland fuels

Embers

Radiant Heat

Flame Contact





Wildfire = Wildland fuels

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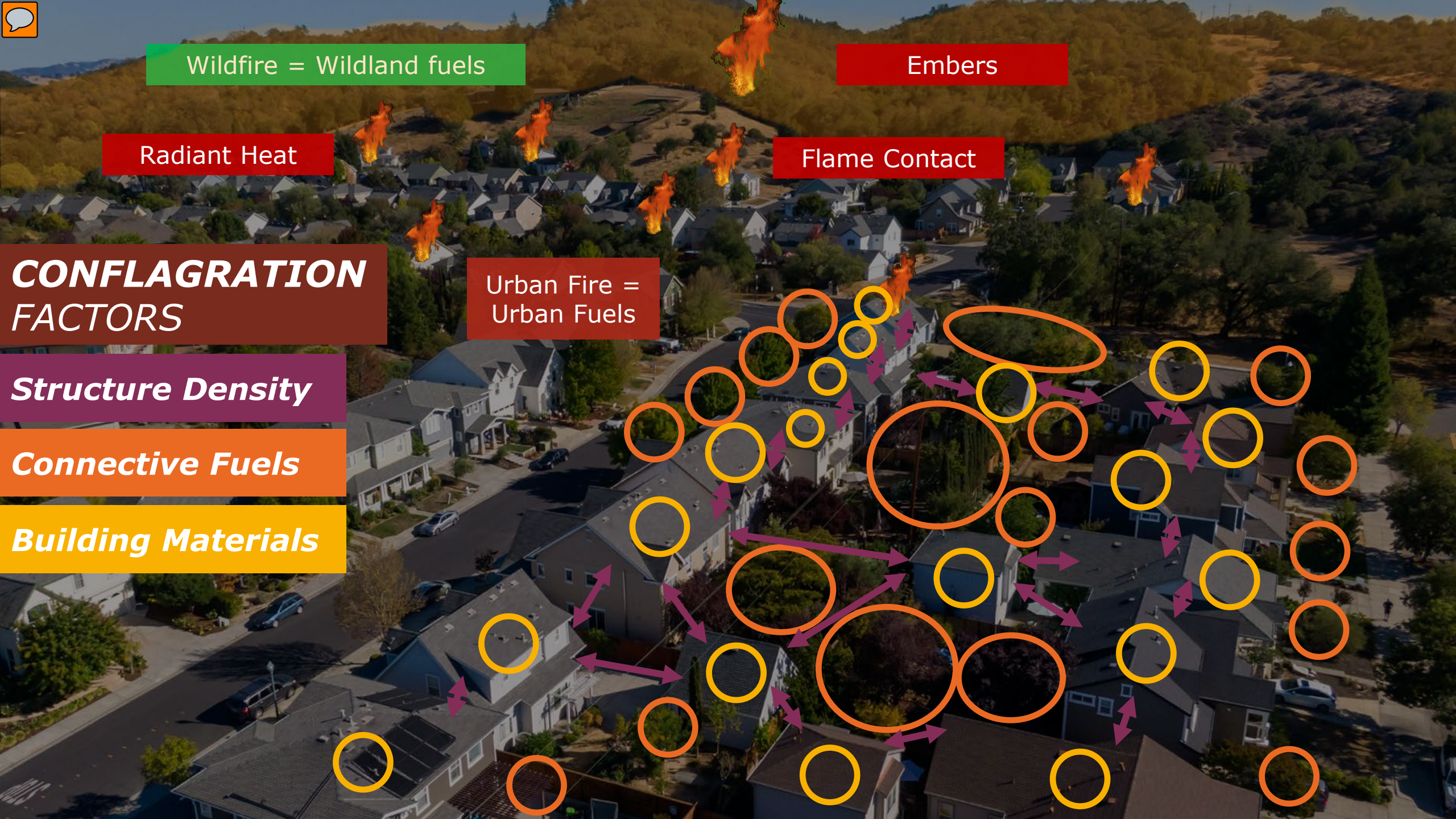
CONFLAGRATION FACTORS

Structure Density

Connective Fuels

Building Materials

Urban Fire =
Urban Fuels





DEFENSIBLE SPACE & ZONE 0

LAB OBSERVATIONS

Noncombustible 5ft

- (0-5') around the house, fuel separation.
- No combustibles

Remaining Parcel

- Plants, trees, and grass/ground cover
- Horizontal and vertical separation of fuels slow fire spread



Embers accumulate at the base of walls and within 5 ft
(Quarles et. al, 2023)



DEFENSIBLE SPACE

**FIELD OBSERVATIONS: LA
COUNTY**



Fences



Plants



Synthetic Lawn



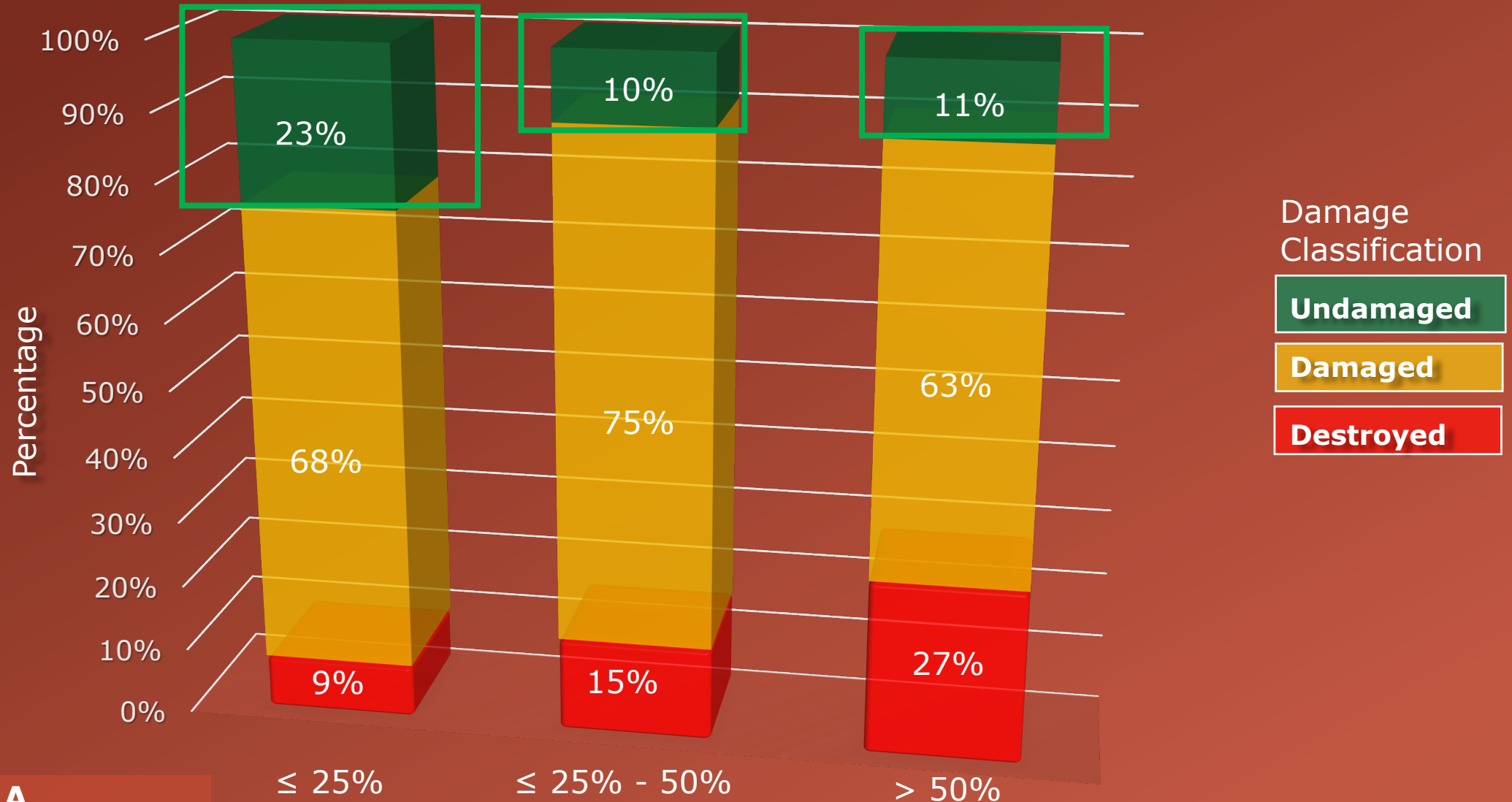
Trash Cans



Plants



Impact of fuel coverage in first 5' on Damage Classification



The 2025 LA Conflagrations

(Sanchez-Monroy et. al, 2025)

Mean fuel cover in Zone 0



BUILDING MATERIALS

LAB OBSERVATIONS

Gutters are a prime location for leaves and pine needles to accumulate, which can expose the edge of the roof to direct flames during wildfires

(Sindelar, 2011).



***ROOFS &
GUTTERS***



BUILDING MATERIALS

FIELD OBSERVATIONS: LA COUNTY



ROOFS



BUILDING MATERIALS

LAB OBSERVATIONS

Vents - Pathway for fire to enter the building

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





BUILDING MATERIALS

FIELD OBSERVATIONS: LA COUNTY



VENTS





BUILDING MATERIALS

LAB OBSERVATIONS



WINDOWS

Double-pane windows consistently provide better fire barrier performance (Shields et al., 2005)

Windows with an external annealed pane and internal tempered pane performed better than the opposite orientation (Willi et al., 2024)



CLADDING

Combustible cladding can support unlimited vertical flame spread

(Oleszkiewicz, 1990)



WALLS

Embers accumulate at the base of walls and within 5 ft

(Quarles et. al, 2023)



BUILDING MATERIALS

FIELD OBSERVATIONS: LA COUNTY



WINDOWS



CLADDING



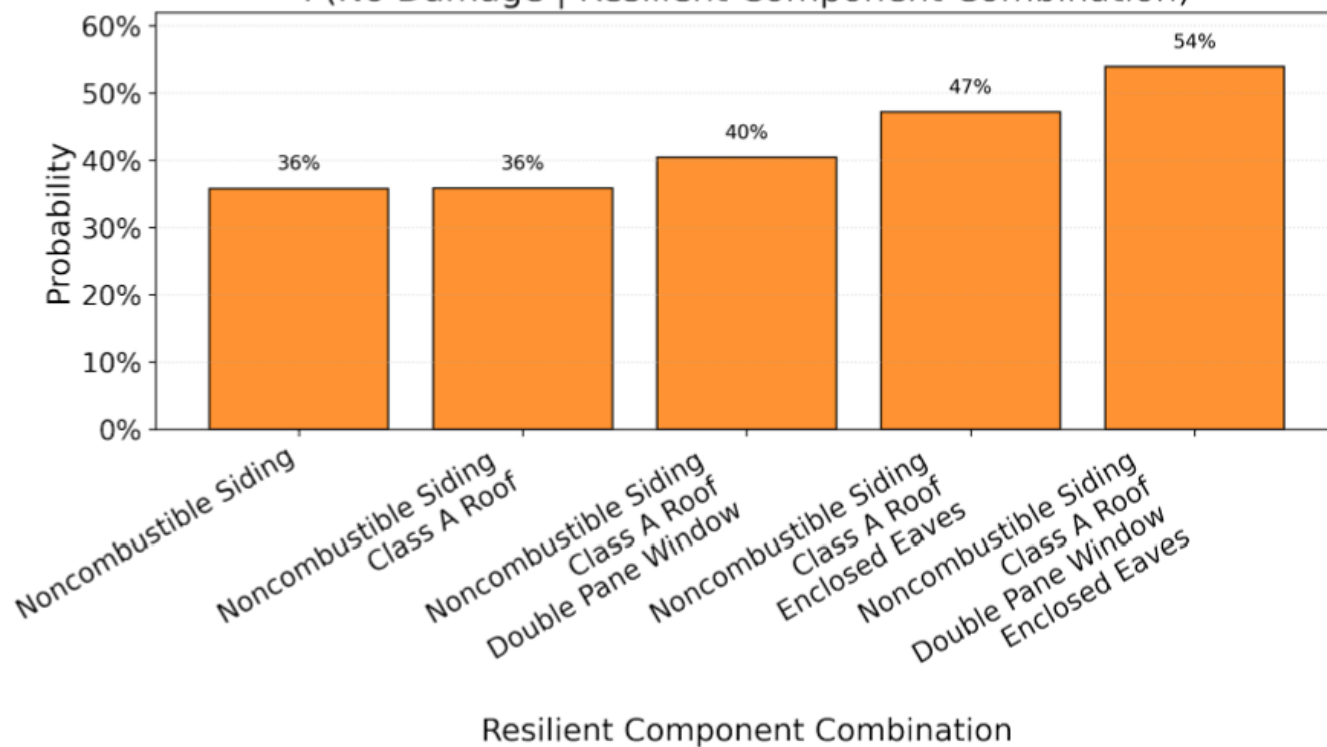
WALLS



Homes with four hardening features—Class A roof, noncombustible siding, double-pane windows and enclosed eaves—had

a **54% chance of avoiding damage**, compared to **36%** when only a single mitigation was in place.

P(No Damage | Resilient Component Combination)





Cold Flow
Measurement

No-wind
Shed
Burns

Modeling
Shed
Burns

With Wind
Shed
Burns

Modeling
ADUs

ADU Burns



**STRUCTURE
DENSITY**

Wind-Driven Building-to-Building Fire Spread



NIST

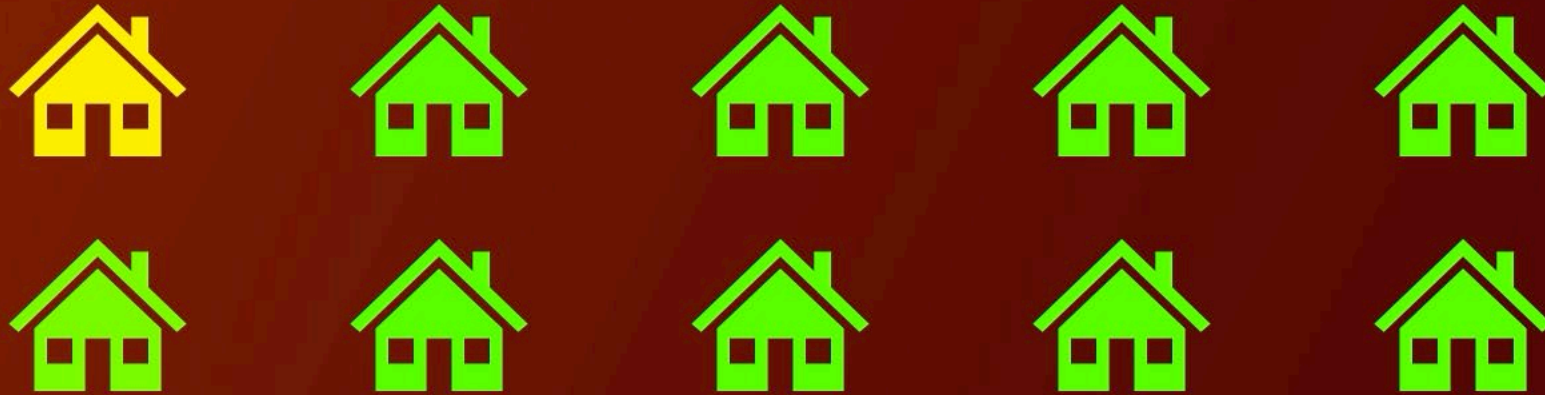
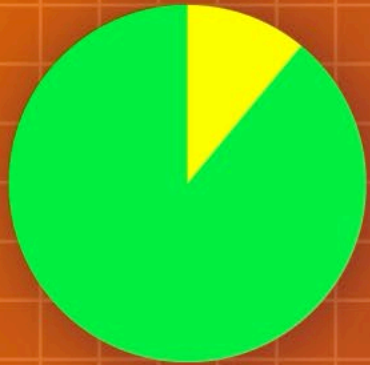




DAMAGE PROBABILITIES

DAMAGE TYPES

-  NONE
-  COSMETIC
-  ENVELOPE
-  DESTROYED



DISTANCE BETWEEN HOMES

40

35

30

25

20

15

10

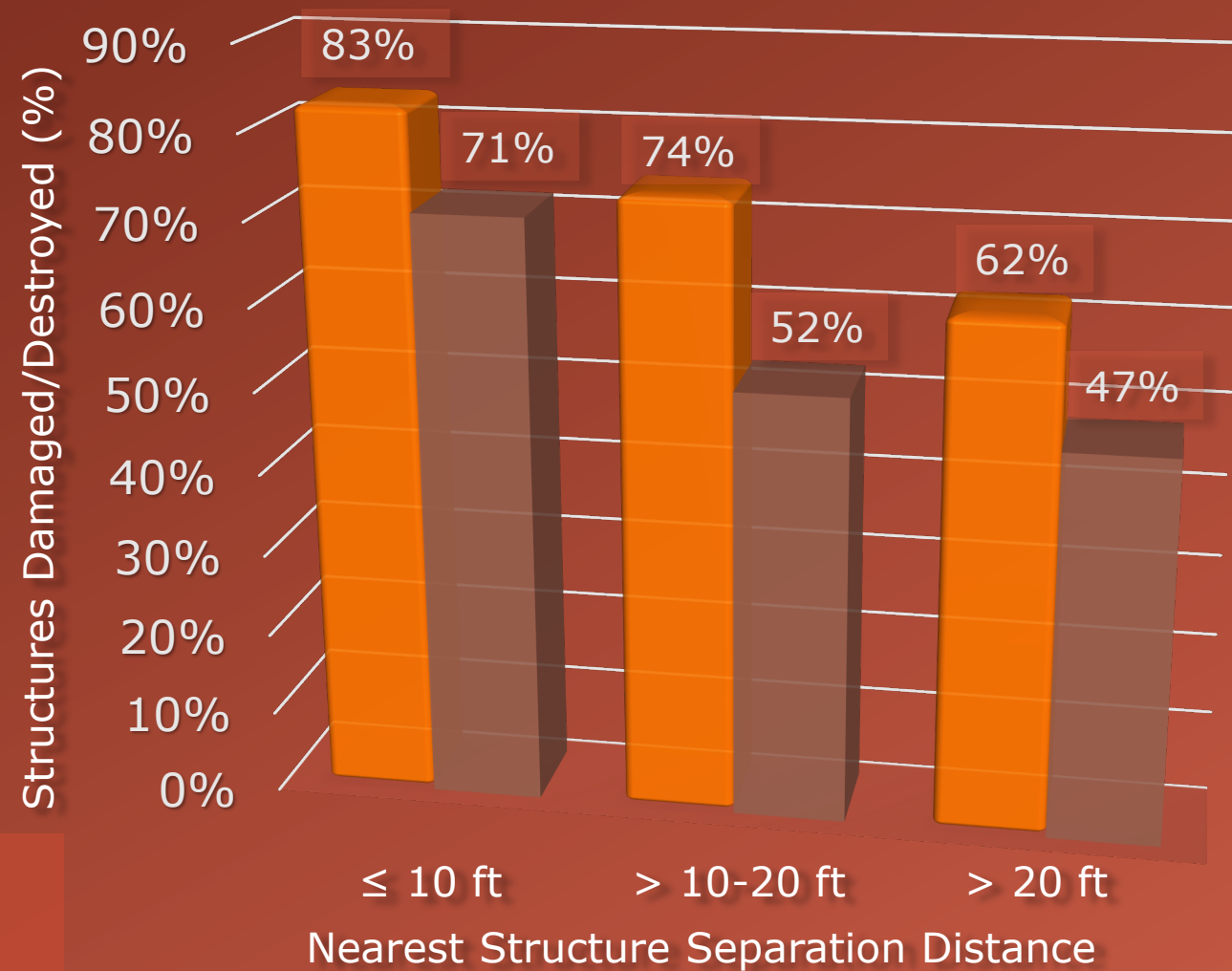


Palisades Fire

SSD alignment:

Downwind

Upwind & Crosswind



The 2025 LA Conflagrations

(Sanchez-Monroy et. al, 2025)

CONNECTIVE FUELS



**Hot Tub, Retaining Wall,
Vegetation**

FIELD OBSERVATIONS: LA COUNTY



Deck



CONNECTIVE FUELS

LAB OBSERVATIONS



**Fences provide a pathway
for fire to reach the home**
(Butler et al, 2022; Insurance Institute for
Business & Home Safety, 2020)

Scope & Intent of WPH and IWUIC

Wildfire Prepared Home (WPH)

- **Program/standard aimed at existing 1–2 family homes (and townhomes), focused on retrofit practicality and homeowner actionability.**
- **Single-hazard (wildfire ignition from embers, radiant heat, direct flame).**
- **Uniform criteria regardless of jurisdictional hazard mapping; emphasizes 0–5 ft Ember-Resistant Zone as a must-do.**

IWUIC

- **Model code for jurisdictions, applies through adoption to new construction (and certain alterations/additions) in mapped WUI areas.**
- **Integrates land use, site development, water supply, fire access, defensible space, and construction features (ignition-resistant construction).**
- **Scales requirements by hazard severity area (Moderate/High/Very High) and exposure**

Regulatory Mechanism

- **WPH:** Voluntary designation framework (owner-driven, insurer-recognized in some markets).
- **IWUIC:** Enforceable when adopted; integrates with building/fire officials, plan review, and inspections

Alignment of IWUIC and WFPH Programs

Compare requirements

- Ignition Resistant Materials**
- Defensible space**
- Ember protection**

Wildfire Prepared Home and ICC Comparison

<i>STRUCTURAL COMPONENT</i>	2025 IBHS WFPH Essential	<i>2025 IBHS WFPH Enhanced</i>	2024 IWUI	<i>2025 CBC Part 7</i>	<div>✓</div> Construction requirements referenced as an acceptable method by the code.
Roof – Class A	✓	✓	✓	✓	
Gutters, Gutter Protection, and Downspouts	✓	✓	✓	~	
Protection of Eaves	X	✓	✓	✓	<div>~</div> Construction requirements partially addressed by the code.
Vents	✓	✓	✓	✓	
Exterior Wall Covering	X	✓	✓	✓	
6-inch Noncombustible Vertical Clearance	✓	✓	X	✓	<div>X</div> Construction requirements not referenced by the code.
Exterior Glass	X	✓	✓	~	
Exterior Doors	X	✓	✓	✓	



Wildfire Prepared Home and ICC Comparison Continued

STRUCTURAL COMPONENT	2025 IBHS WFPH BASE	2025 IBHS WFPH PLUS	2024 IWUI	2025 CBC Part 7
Appendages & Projections	X	✓	✓	✓
Decks	Ember Exposure Addressed	✓	~	~
0-5 Foot Zone: Trees, Plants, Fences, and Retaining Walls	✓	✓	X	X
Detached Accessory Structures & ADUs	Ember Exposure Addressed	✓	NO SSD	~



Construction requirements referenced as an acceptable method by the code.



Construction requirements partially addressed by the code.



Construction requirements not referenced by the code.

How both frameworks contribute to wildfire risk reduction in built environment

- **Research → Code:** IBHS wildfire science clarifies what works (e.g., embers, Zone 0); IWUIC provides the enforceable model-code baseline.
- **Amendable Alignment:** Jurisdictions can amend IWUIC to incorporate WPH best practices (e.g., 0–5 ft non-combustible buffer, ember-resistant vents).
- **Complementary Roles:** **IWUIC** sets minimums for permitted work/new construction; **WPH** offers a **voluntary compliance mechanism** and a clear **retrofit path** for existing homes.
- **Community Scale:** Use IWUIC for new projects and WPH designations across existing homes to accelerate ignition-risk reduction neighborhood-wide.

Strategies for integrating code and voluntary programs into local mitigation

- **Adopt + Align:** Adopt IWUIC and amend to mirror WPH essentials .
- **Recognize WPH:** Use WPH as a voluntary retrofit path/credit for existing homes .
- **Incent + Streamline:** Offer rebates/fee reductions and fast-track permits for WPH actions. (greenbuilding)
- **Verify + Maintain:** Tie defensible-space/WPH checks to permit inspections and annual reminders.

Case Studies

**Austin Fire Department
Fire Prevention Division**

**California Wildfire Prepared
Communities**



An aerial photograph of a residential neighborhood. In the center is a two-story house with a light-colored stucco exterior, a brown tiled roof, and a small front porch. Several solar panels are installed on the roof. To the right is a single-story house with a dark grey roof. To the left is another single-story house with a light grey roof. The houses are surrounded by a fence and some landscaping. In the background, there is a dirt lot with construction equipment and a road with cars. A red banner is overlaid at the top of the image.

Reduce structure ignitions.

Reduce the likelihood of conflagration.



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↗ ibhs.org



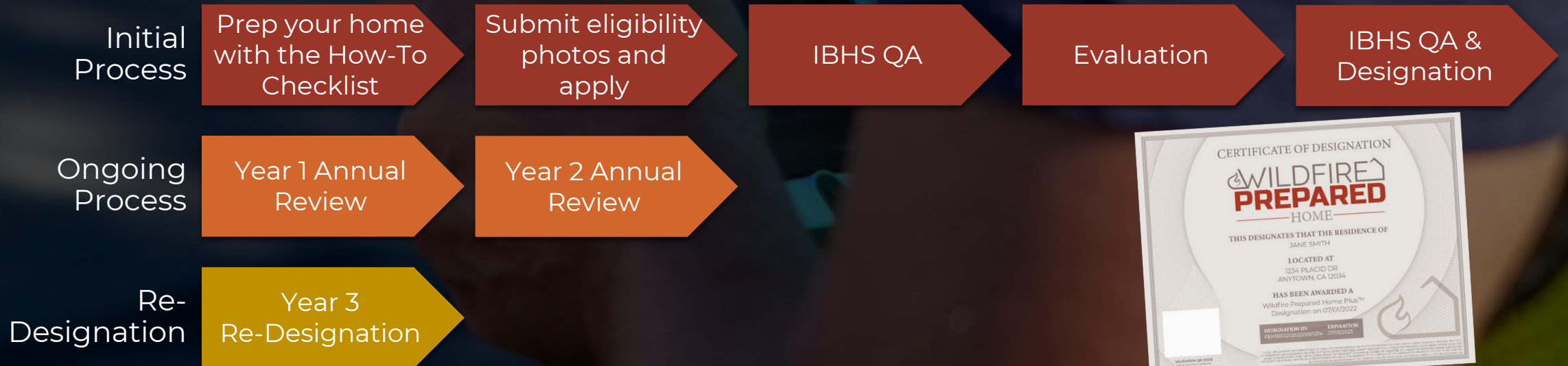
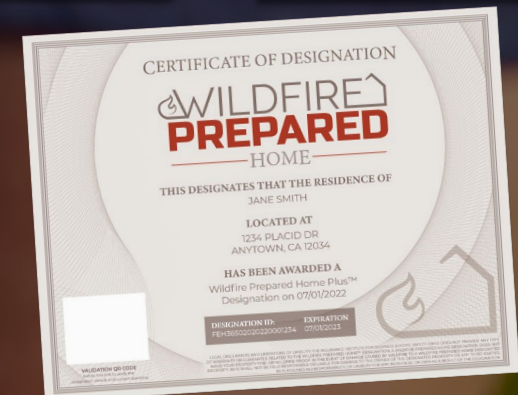
🐦 [IBHS_org](https://twitter.com/IBHS_org)



Designation Process WFPH



Step-by-step checklist on How to Prepare Your Home for Evaluation

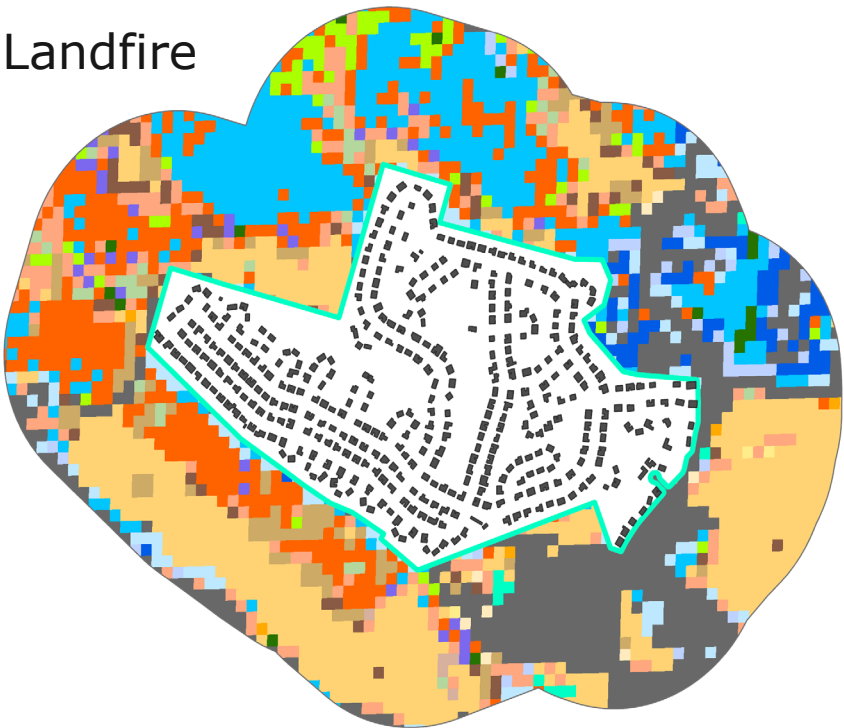




Embers

+4.25 miles, with a 70 mph
from any sector direction

Landfire

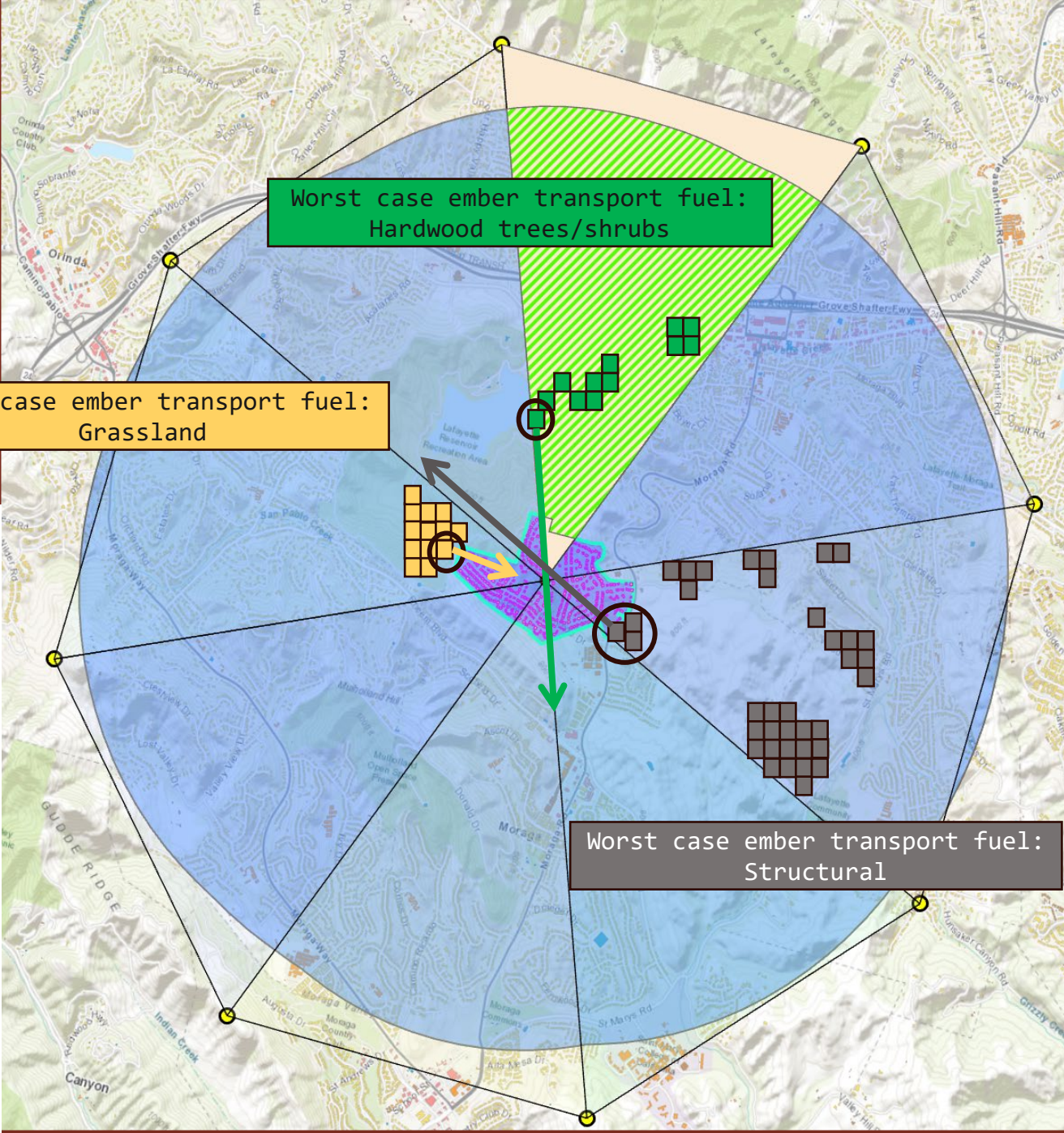


- Legend**
- Fuel Class
- Activity Fuel Fine
 - Bare Ground
 - Canopy Litter Moderate with Shrub
 - Canopy Litter Moderate with Shrub and Grass
 - Conifer Canopy Litter High with Shrub
 - Dead Woody Fuel Litter Broadleaf Low
 - Dead Woody Fuel Litter Broadleaf Moderate
 - Dead Woody Fuel Litter Conifer High
 - Dead Woody Fuel Litter Conifer Moderate
 - Dead Woody Fuel Litter Conifer Very High
 - Dead Woody Fuel Litter Course and Fine
 - Dead Woody Fuel Litter Long Needle Pine
 - Dead Woody Fuel Litter Recently Burned
 - Grass Moderately Course Continuous
 - Grass Short Patchy
 - Grass Very Course
 - Open Water
 - Shrub Heavy
 - Shrub Low Fuel Load
 - Shrub Low to Moderate
 - Shrub Moderate Load
 - Shrub Very Heavy
 - Shrub/Grass Moderate Load
 - Shrubs 1 Foot
 - Shrubs 1-3 Foot
 - Urban and Suburban

Worst case ember transport fuel:
Grassland

Worst case ember transport fuel:
Hardwood trees/shrubs

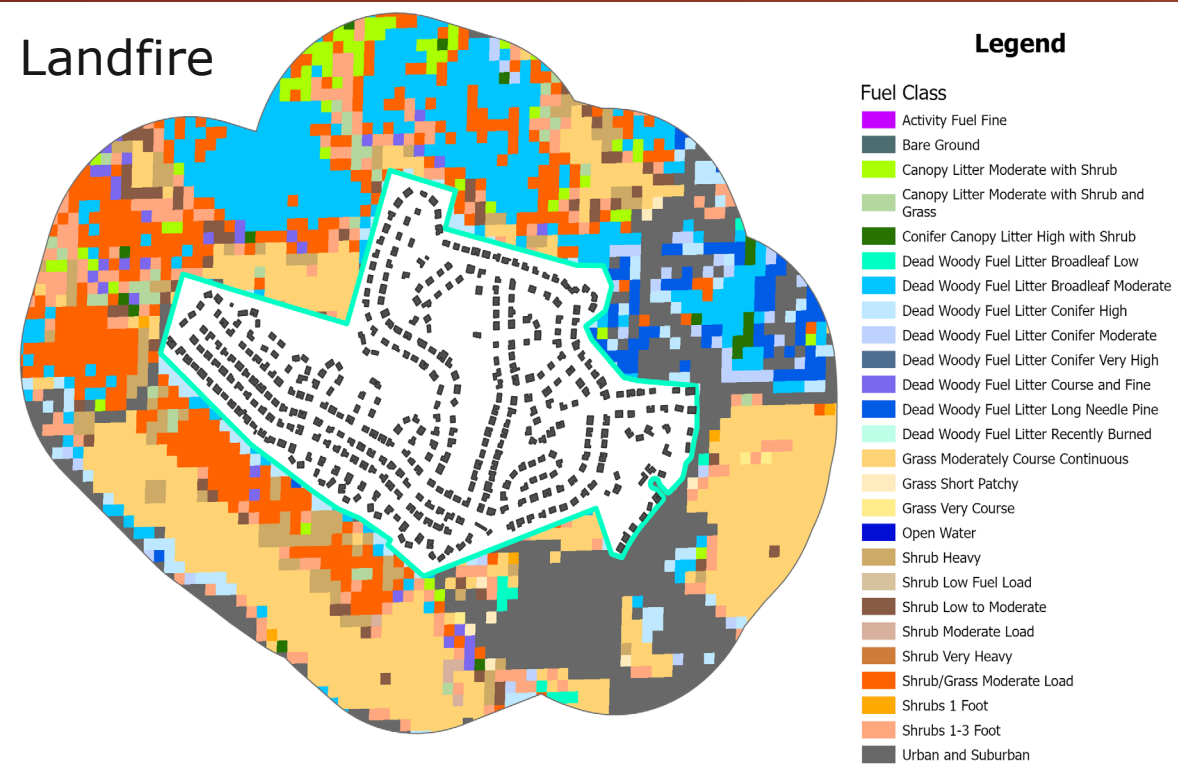
Worst case ember transport fuel:
Structural





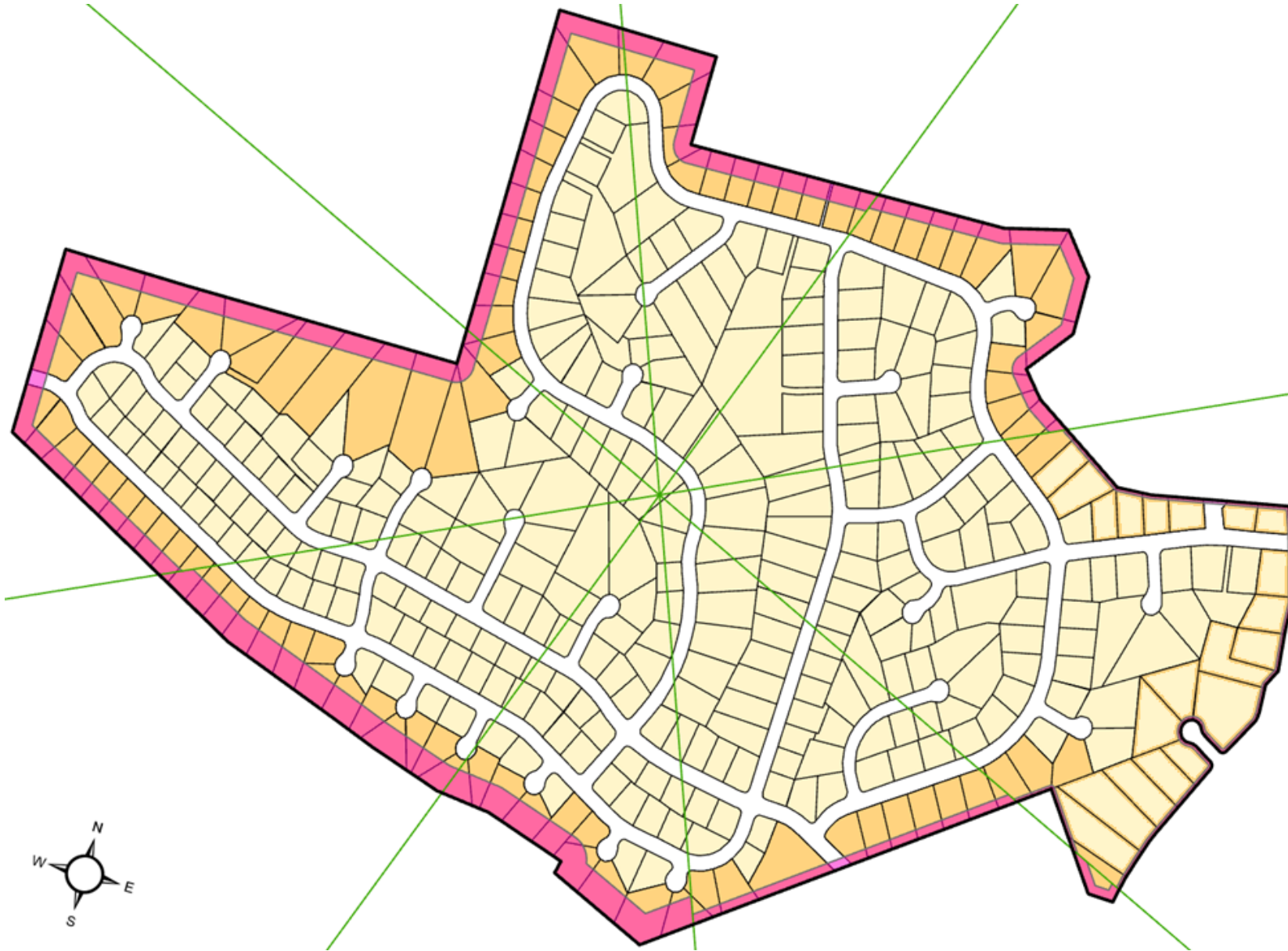
Flames & Radiant Heat

+0.25 miles, with a 70 mph
from any sector direction



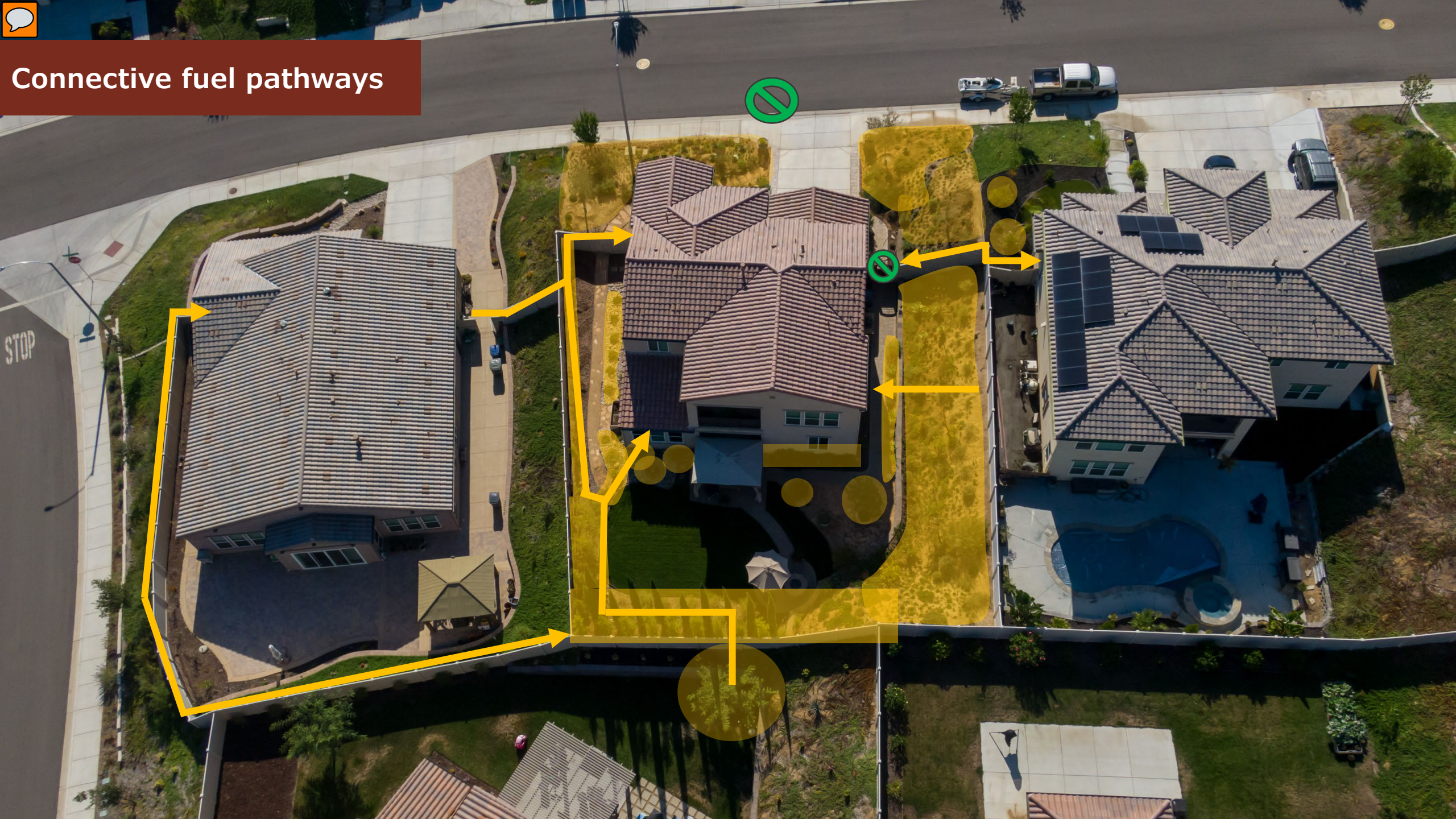


Neighborhood Flame Zone





Connective fuel pathways





Designation Process WFPN

