

Ingress / Egress

Wildfire Safety Strategy Working Group
Meeting #4 – September 24, 2025



Agenda

- Welcome and introductions
- Last meeting's input recap
- Hawaiian Electric ingress and egress discussion
- HWMO community risk map update
- Map activity and Q&A discussion
- What's ahead



Ground Rules

- Chatham House Rule will apply – no personal or organizational attribution will be made to any comments/feedback provided during the meeting by any participant nor in written documentation. Recordings and/or artificial intelligence transcriptions of meetings are prohibited.
- Working group meetings, and other information exchanges are intended solely to provide an open forum for discussion purposes or means for the expression of various points of view in compliance with antitrust laws.
- Under no circumstances shall engagement activities be used as a means for competing companies to reach any understanding, expressed or implied, which tends to restrict competition, or in any way, to impair the ability of participating organizations to exercise independent business judgment regarding matters affecting competition or regulatory positions.
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2024

- Wildfire Safety Symposium – **APR. 10-11**
- Wildfire Risk Map – **JUL. 31**
- Wildfire Mitigation Strategies and Priorities – **AUG. 14**
- Future Operational Strategies and PSPS Enhancements – **AUG. 21**
- Metrics and Performance Tracking / WSS Content – **SEP. 5**
- Risk Model Deep Dive Sub-Group Mtgs 1 & 2 – **SEP. 26 & NOV. 6**
- Putting it All Together – **DEC. 12**
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- Submit WSS to the PUC – **JAN. 10**

2025

- JUL. 16 Meeting 1** – Hawaiian Electric’s Wildfire Safety Strategy
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- JUL. 30 Meeting 2** – Public Safety Power Shutoffs
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- AUG. 13 Meeting 3** – Land Management
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- SEP. 24 Meeting 4** – Ingress/Egress
-
- OCT. 15 Meeting 5** – Grid Hardening & Undergrounding

Today



Incorporating Takeaways From Land Management Meeting

- Expand and strengthen partnerships with community-based organizations through Community Benefits funding
 - Enter into community benefits agreements to fund specific projects that aid in reducing wildfire risk with organizations like Waianae Watershed Management Partnership, Kula Watershed Community Alliance and Queen Emma Land Company
 - Employee volunteer work days with community-based organizations and other groups on the islands to help with plantings and clearings and other wildfire risk reduction projects
- Evaluate risk profile of gulches and consider solutions such as deployment of sensors to have better situational awareness or re-routing of overhead lines
- Identify ways to better understand fuels and vegetation on private lands to improve risk models



Ingress/Egress



Overview

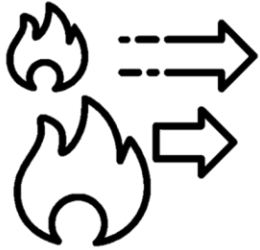
- The ongoing effort of many stakeholders is needed to holistically address all critical components of wildfire prevention, including fire suppression
- Together, Hawaiian Electric, stakeholders and the community are working to create a fire-safe environment in Hawai'i for generations to come



Understanding Ingress and Egress



- **Ingress:** The ability to **enter** an area. How first responders access a neighborhood during a wildfire or emergency.



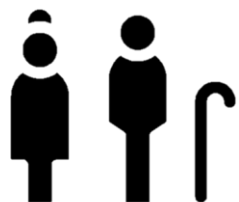
- **Egress:** The ability to **exit** an area. How residents evacuate safely during a wildfire or other hazard.



Ingress/Egress Risks



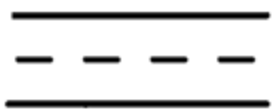
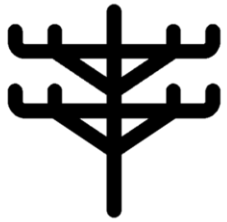
- **High winds fuel rapid wildfire spread**, leaving little time to evacuate.



- **Older adults** and individuals with **access or functional needs** face greater challenges evacuating.



Issues Affecting Ingress/Egress



- Downed utility poles and wires during emergencies may obstruct key evacuation routes.
- Blockages combined with fallen trees, debris, and abandoned vehicles, creating chokepoints.
- Obstructed roads may delay first responders and create risks to evacuating residents in affected neighborhoods.
- Limited road access may leave many neighborhoods with only a single route in or out, creating severe congestion.



There are two potential ways that utility infrastructure could impact ingress/egress

Fall-in Risk: Utility infrastructure falls into roadways and blocks ingress/egress.

Burn-in Risk: A fire that (e.g., originates at utility infrastructure) spreads to roadways and blocks ingress/egress.

Hawaiian Electric's current efforts prioritize mitigation of fall-in risk, although burn-in risk is qualitatively considered in solution selection.



Mitigating ingress and egress risk

Ingress/egress risk is influencing Hawaiian Electric's system hardening plans at multiple levels:

- **Project prioritization:** influencing the order in which circuits are prioritized for mitigation
- **Project scope and design criteria:** portions of circuits in identified high ingress/egress risk areas may be subject to alternative design criteria, such as alternative pole construction or undergrounding



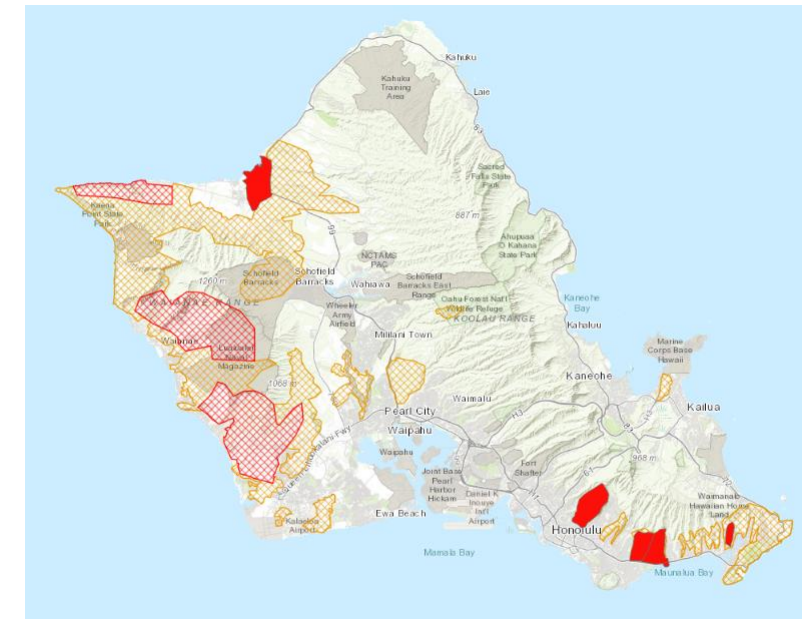
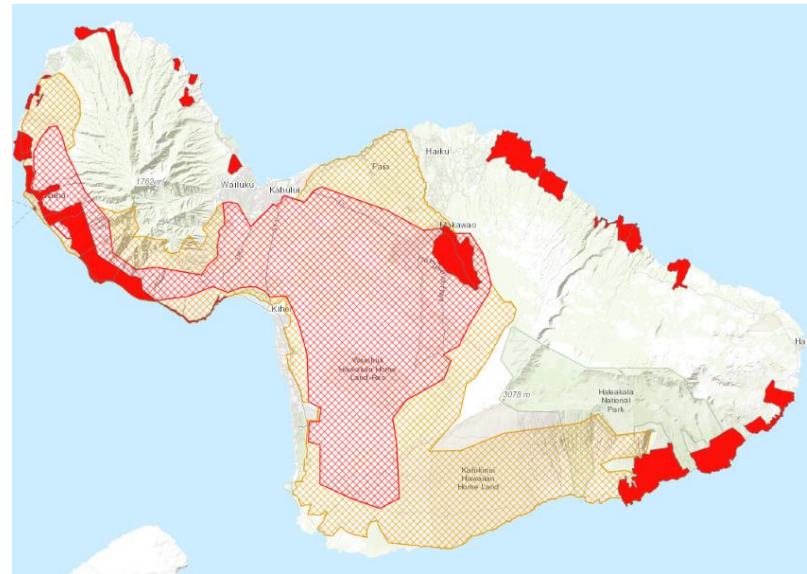
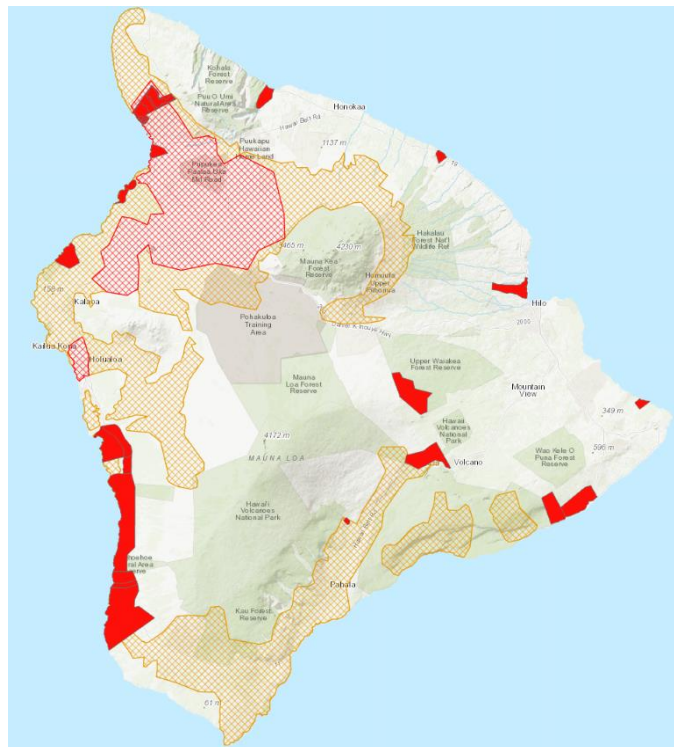
Current Framework for Ingress/Egress Assessment



Evaluating ingress/egress risk at the community/neighborhood scale

Leveraging Hawaii Wildfire Management Organization (HWMO) ingress/egress risk assessments to help identify community roads that are one way in, one way out.

INGRESS / EGRESS		
LOW HAZARD	MODERATE HAZARD	HIGH HAZARD
Multiple entrances and exits are well equipped for fire trucks with turnarounds.	Limited access routes. Two ways in and two ways out. Moderate grades.	Narrow, dead end roads or one way in, One way out. Steep grades.

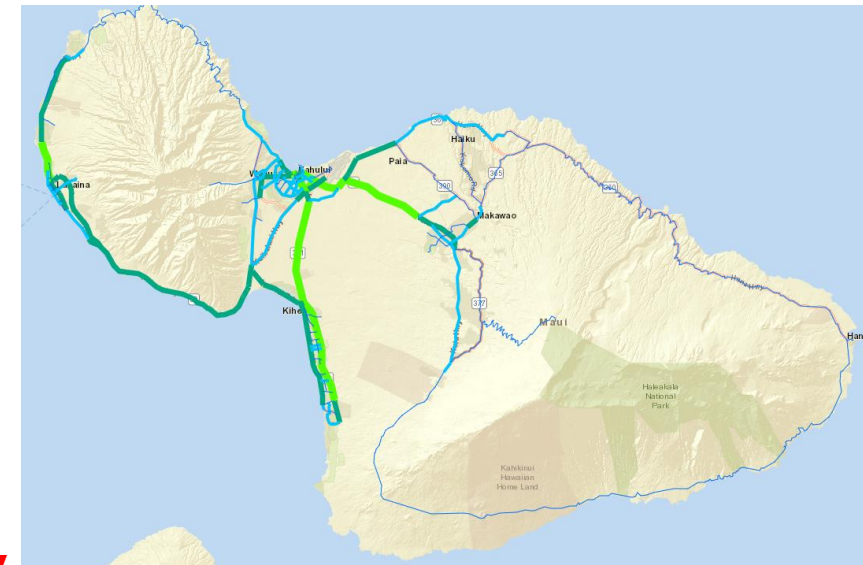
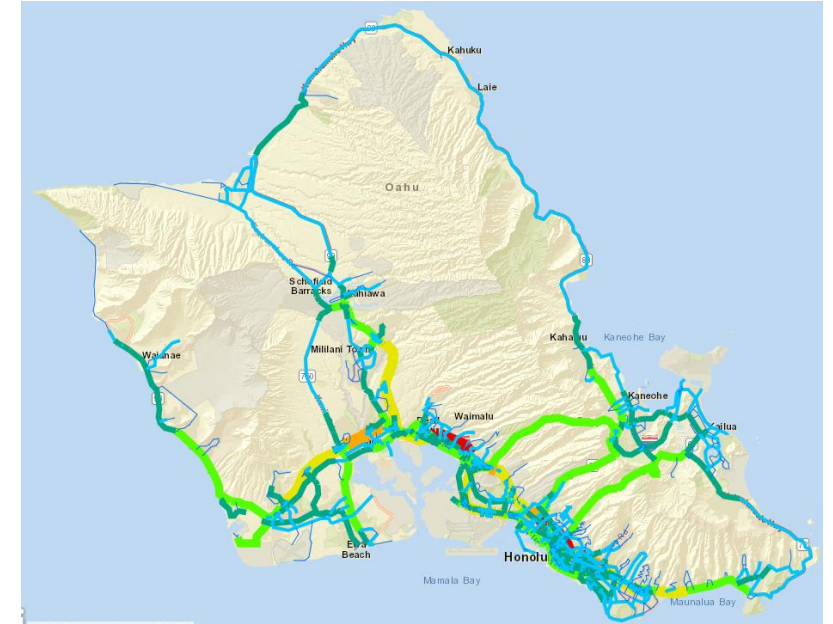
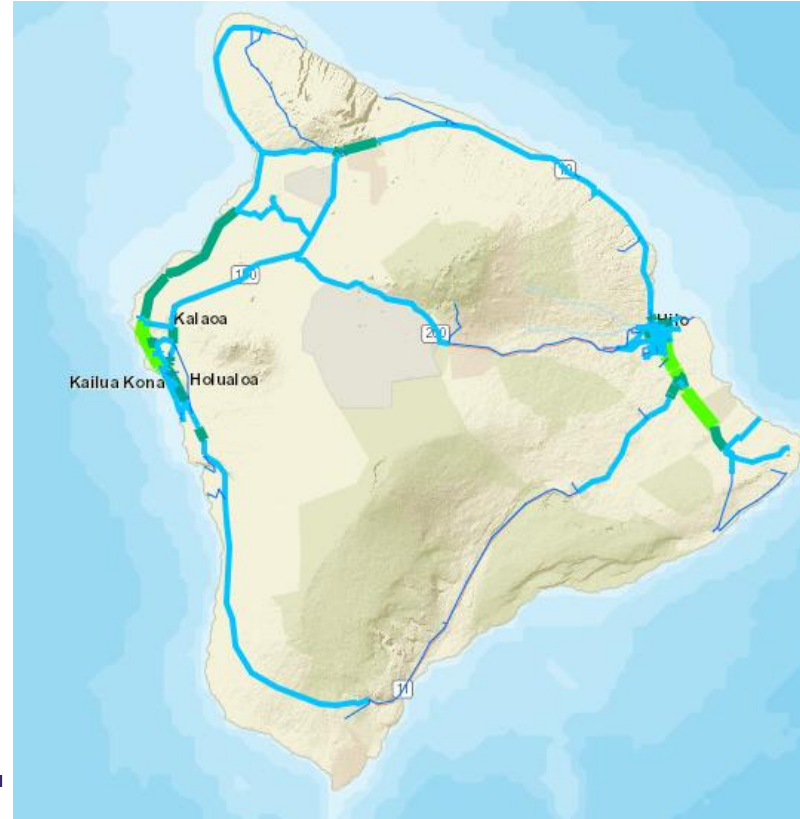


Evaluating ingress/egress risk at the regional scale

Leveraging Hawaii State Department of Transportation (HDOT) traffic volume data to identify roadways with state route numbers (generally larger, important roads) that have relatively higher traffic.

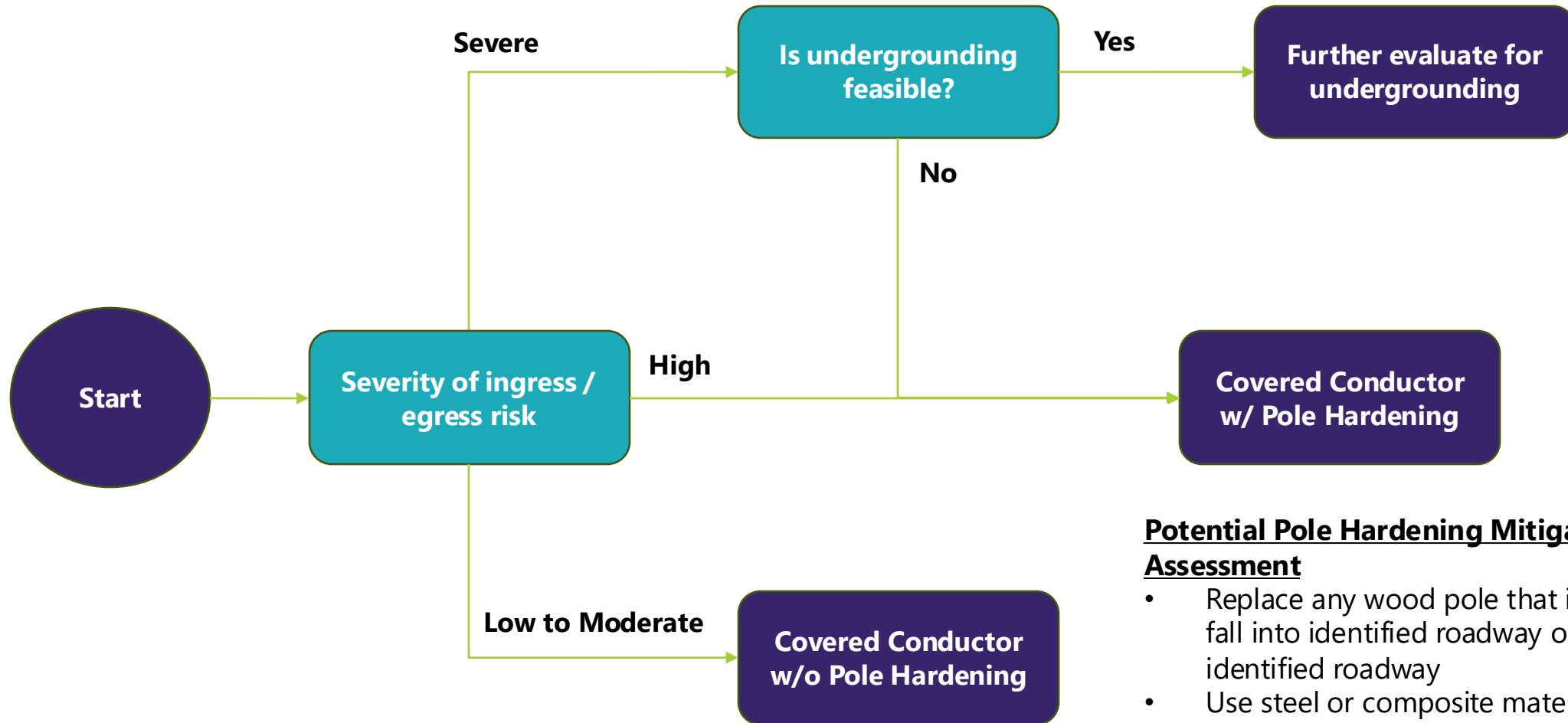
Traffic Volume HPMS 2023

AADT



For Discussion Purposes Only

Application of Ingress/Egress Considerations to Distribution Hardening Project Solution Selection and Design Criteria



Potential Pole Hardening Mitigation based on Risk Assessment

- Replace any wood pole that is 1) close enough to fall into identified roadway or 2) at crossing of identified roadway
- Use steel or composite material
- Apply NESC Rule 250C (Extreme Wind Loading) and NESC Rule 250B Grade B Construction
- Self-supporting preferred



Proposed Improvements for Ingress/Egress



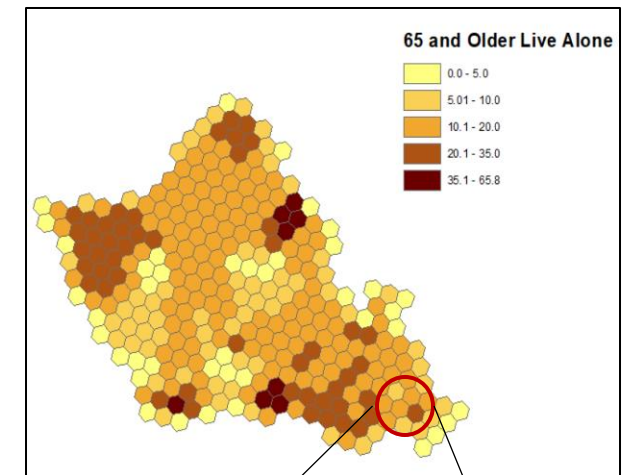
Evaluating Ingress/Egress Risk Identification at Neighborhood Scale

Risk Factors

- **Vegetation Characteristics** (i.e., tree canopy, fuel type)
- **Road Features** (i.e., number of roads, average of max speed, number of lanes, road class, major road length ratio)
- **Utility Overhead Structure** (i.e., number of wood poles)
- **Residential Density** (i.e., number of building footprints)
- **Access and Functional Needs** (i.e., disability ratio, no vehicle ratio, 65 and older live alone ratio)

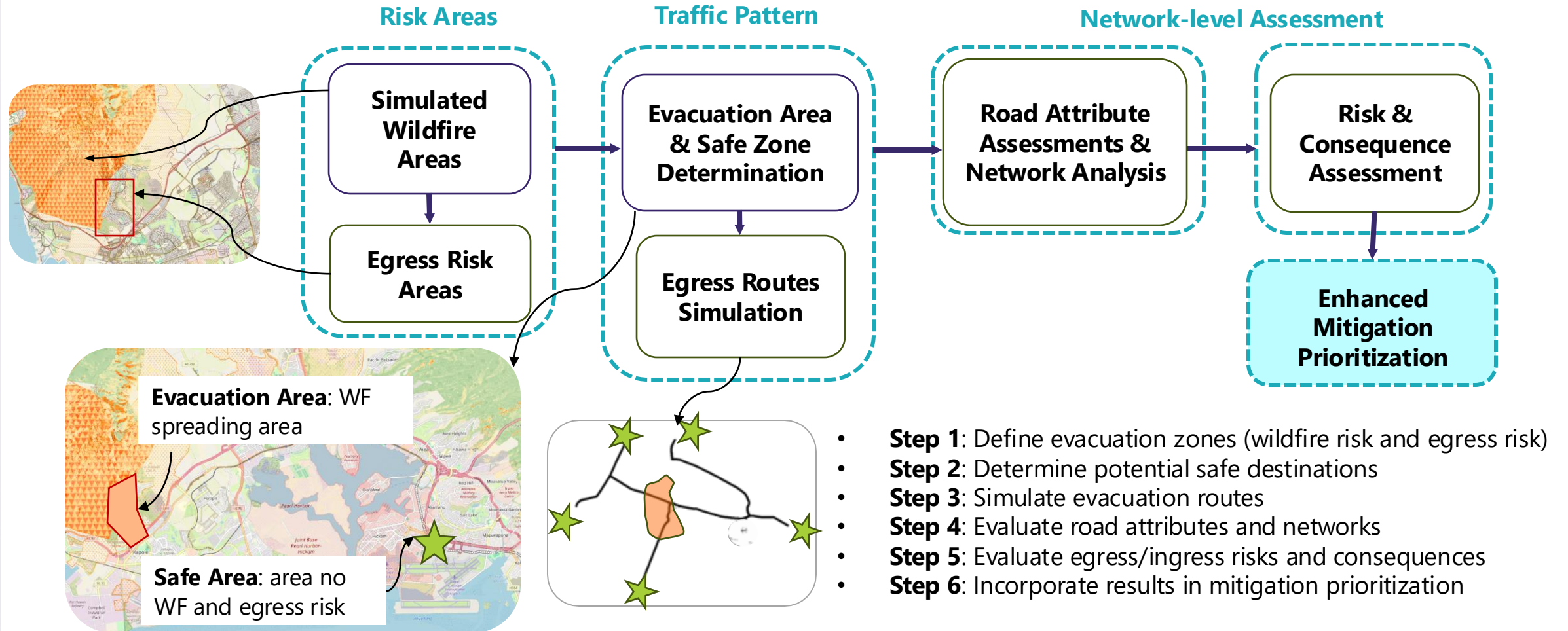
Further Analysis

These factors can be integrated to assess the potential risk to public safety, particularly evacuation challenges and exposure under wildfire spread scenarios and other emergency conditions.



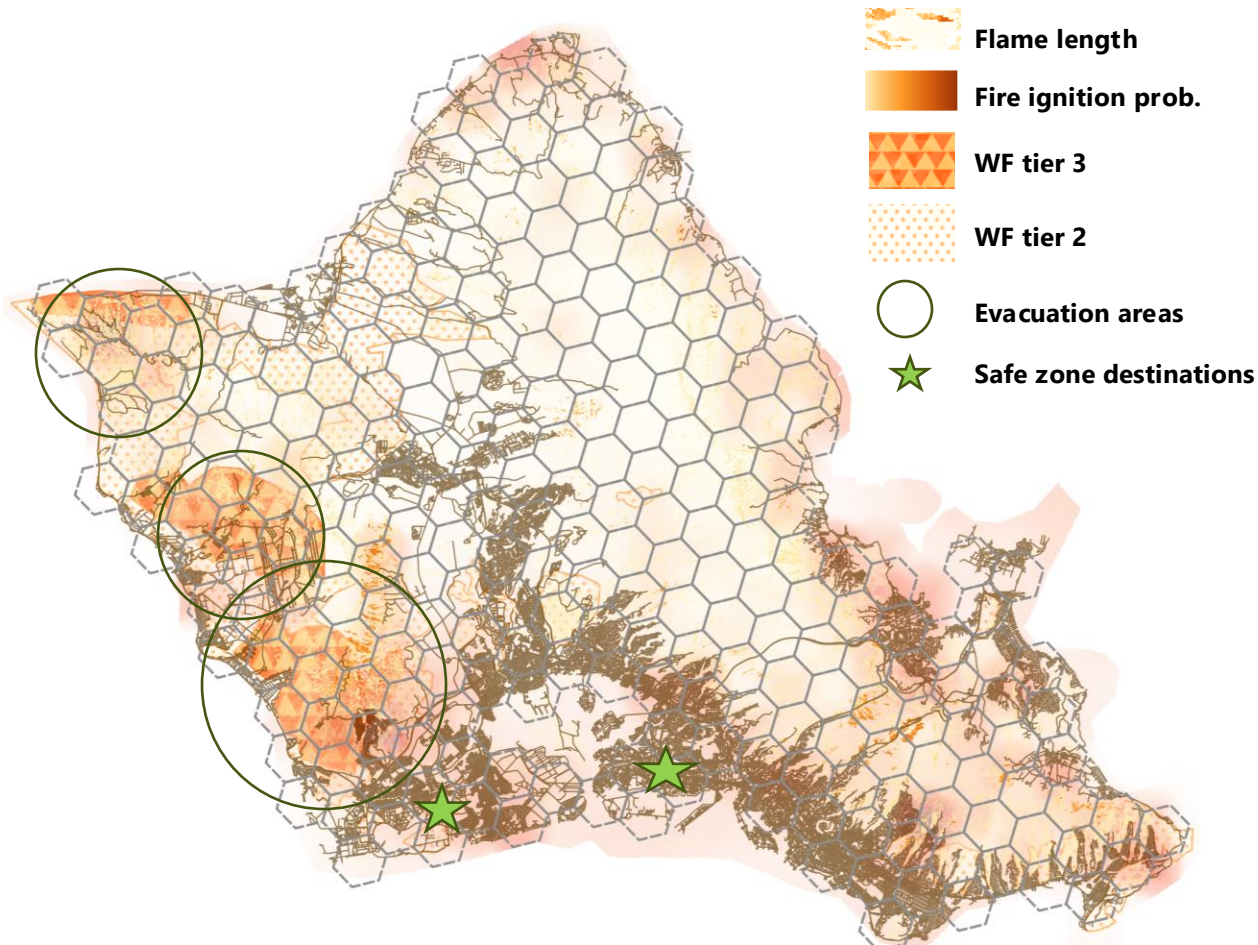
Egress Modeling Framework

Analyzes individual road segments that constitute high-risk routes to identify mitigation needs

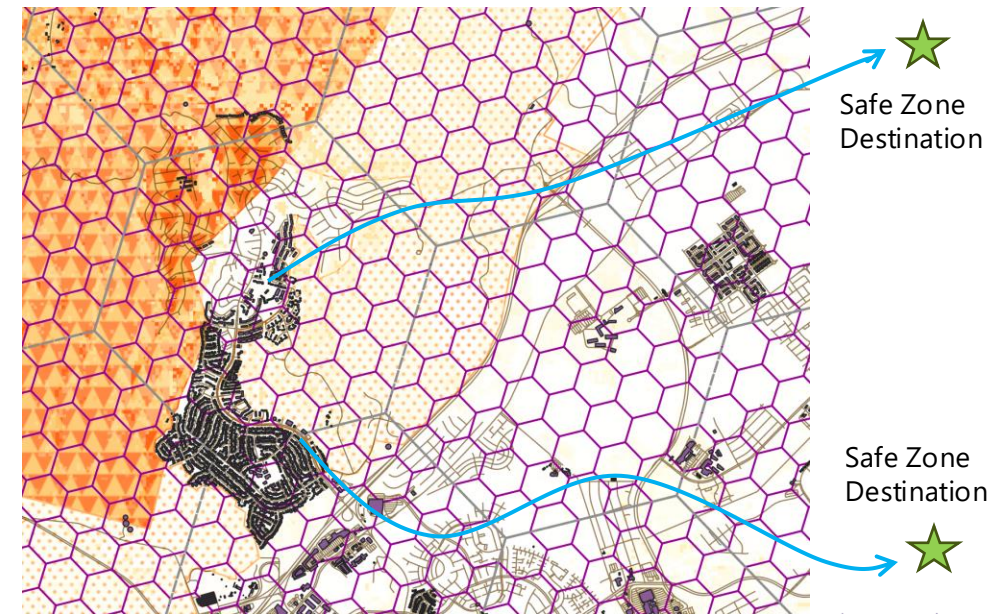


Egress Simulation – Routes Simulation

- Route simulation using greater granularity: from **Evacuation Zones** (based on risk factor) to the identified **Safe Zones** destinations.



The following safe zones are for illustration purposes and are subject to change.



Expected Results: Ingress/Egress Risk Evaluation

Result	Description	Key Outcomes
Route-Level Risk Characterization	Identify and score all likely evacuation routes based on egress/ingress risk and consequence	1. Evacuation routes risk (i.e., likelihood of obstruction or hazard, such as blockage) and consequence (i.e., potential impacts on communities) scores
Road Segment-Level Characterization and Congestion Likelihood	Assess congestion potential of most frequently used individual road segments	1. Congestion severity likelihood for road segments 2. The most frequently used road features will be included (e.g., Road class, width, lane count, shoulder presence)
Enhanced Mitigation Prioritization	Combine results from both route-level and road-segment-level analyses to a ranked list and map of priority locations where mitigation actions are most needed	1. Identification of egress/ingress mitigation options 2. Risk-based investment prioritizations of egress/ingress mitigation options

Hawaiian Electric is actively coordinating with HWMO on ongoing ingress/egress risk evaluations. Findings will be incorporated into this effort, including the integration of available traffic data to support congestion analysis.



HWMO – Community Maps



We need your input

- Previous community engagement has provided insight to Hawaiian Electric on ingress/egress challenges
- Help us identify additional ingress/egress risks:
 - Pin a location or draw on the map where there are concerns, or known projects or plans similarly addressing ingress/egress (e.g., DOT plans)
 - Identify whether the concern is **high**, **medium**, or **low risk**
- This website is only being used for working group discussion purposes.



<https://hawaiipowered.com/ingressegress/>



What's ahead

- Continue to refine and develop framework for ingress/egress mitigation working with HWMO and public safety partners
- Continue outreach to county and state agencies to exchange information, data, and transportation infrastructure plans
- Next Meeting: October 15, Grid Hardening



Mahalo for your time.

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