Building Hazmat Capabilities Through Preparedness Activities

Bob Campbell, PE




Alliance Solutions Group, Inc.

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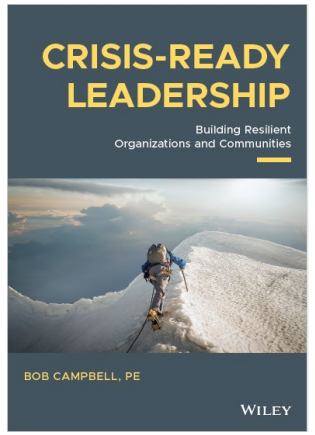
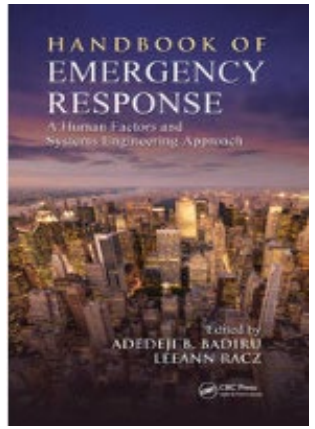
Background

Bob Campbell, PE

- Experience
  - 2013-Present: Founder and Chairman, Amanah Solutions DMCC, UAE
  - 2005-Present: Founder and CEO, Alliance Solutions Group, Inc.
  - 1997-2005: Bioenvironmental Engineer, U.S. Air Force
- Education
  - 2002: Executive Masters of International Business, St. Louis University
  - 1997: Masters of Science in Environmental Engineering, University of Illinois
  - 1995: Bachelors of Civil Engineering, Villanova University
- Publications
  - Campbell, B. (2023). Crisis-ready Leadership: Building Resilient Organizations and Communities. Wiley: Hoboken.
  - Campbell, B. (2014). “Overcoming Obstacles to Integrated Response Operations Among Incongruent Responders,” Handbook of Emergency Response: A Human Factors and Systems Engineering Approach. Chpt 18, CRC Press, ISBN 13:978-1-4665-1456-0, New York.





Alliance Solutions Group

Preparing for a Safe and Secure Tomorrow

Our Vision:

Communities Prepared with Innovative Solutions and Backed by Lasting Relationships

Our Mission:

Partnering with Clients to Prepare for a Safe and Secure Tomorrow in their Workplace, Environment and Community

We are the Team That has:

- ✓ Real World Experience: Projects in 49 States and 17 Countries on 3 Continents
- ✓ 200+ Medical Facilities Prepared in 15 Countries
- ✓ 2,300+ Exercises and Drills Conducted with Clients
- ✓ U.S. FEMA, EPA, OSHA, and DoD Subject Matter Experts
- ✓ Served 100+ LEPCs
- ✓ 20 years of Experience

50 BEST WORKPLACES

Inc. 5000

bsi. ISO 9001 Quality Management | ISO 14001 Environmental Management | ISO 45001 Occupational Health & Safety Management

FM 611261 EMS 611265 OHS 611266

Multnomah County ERP, ERP Update, TTX, LEPC Strategic Planning workshop, Community Workshop, ERP update, SIP/Evac workshop (6 projects)

Clackamas County ERP, Rail HAZMAT Response Plan, TTX, ERP Update, SIP/Evac workshop, ERP Update/TTX (6 projects)

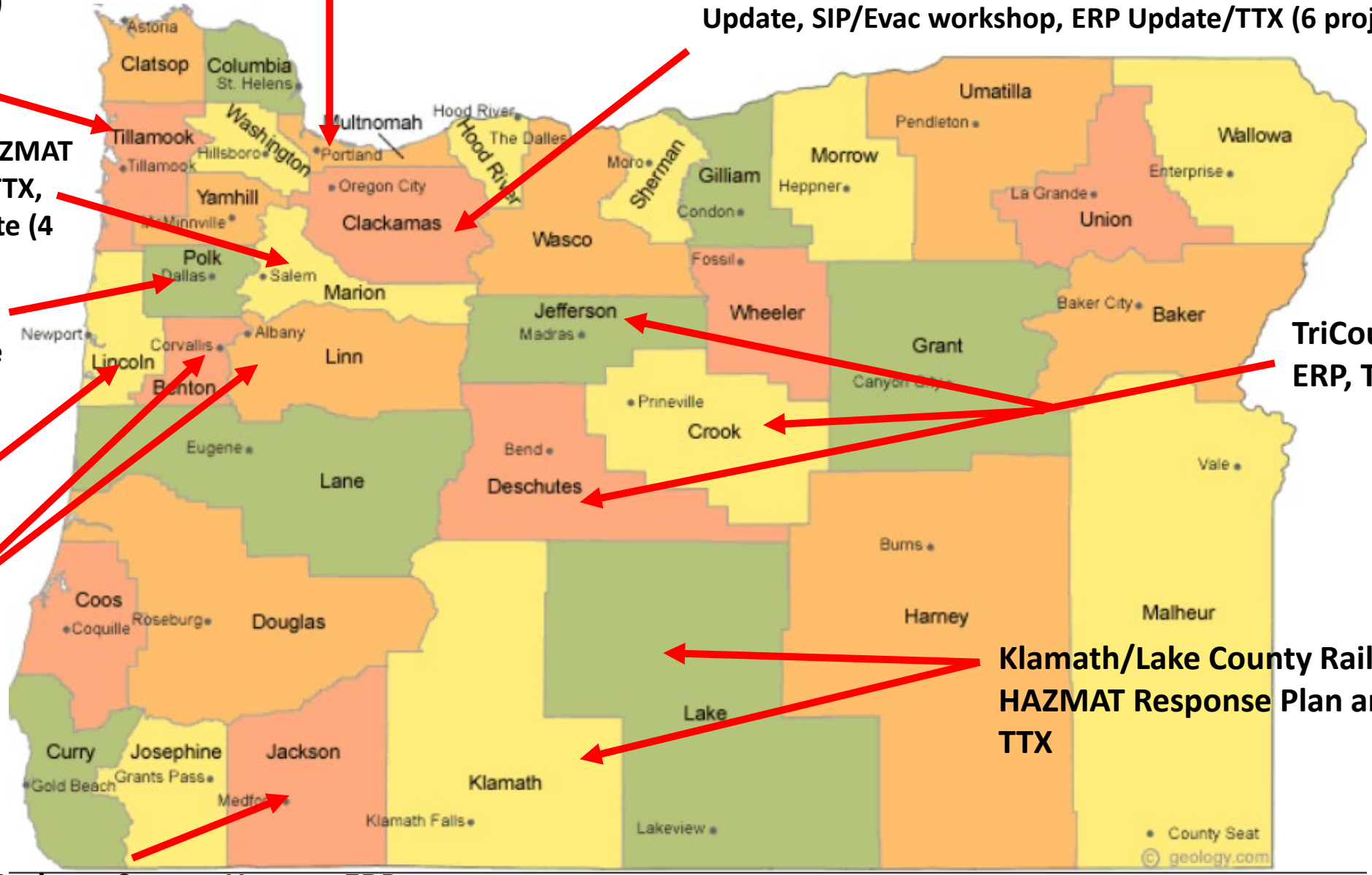
Tillamook ERP

Marion County HAZMAT ERP, ERP Update, TTX, 19 City EOPs Update (4 projects)

Polk County Rail HAZMAT Response Plan

Lincoln County Rail HAZMAT Response Plan

Linn-Benton HAZMAT ERP, TTX, FE, FSE (3 projects)



TriCounty LEPC ERP, TTX

Klamath/Lake County Rail HAZMAT Response Plan and TTX

Jackson County Hazmat ERP and TTX

DHS/FEMA-Hazmat Training

We are the Team that has Developed and Delivered

- ✓ Partnered with GTRI to design, develop, and deliver 40 in-person courses in 25 states
- ✓ Resolved U.S. Chemical Safety Board investigation findings and recommendations to FEMA related to nation-wide training deficiencies
- ✓ Addressed West Fertilizer Company explosion root causes and contributing factors with training
- ✓ Addressed Crude-by-Rail incident response training deficiencies
- ✓ Developed five (5) courses:
  - ✓ Building Whole Community Engagement through Local Emergency Planning Committees
  - ✓ On-scene Crisis Leadership and Decision Making for Hazmat Incidents
  - ✓ Hazmat Risk Analysis
  - ✓ Effective Risk Communication among Responders and the Public
  - ✓ Hazmat Pre-Incident Planning

Overview

- Six steps of the National Preparedness System applied to Hazmat related capabilities
- Building Resilience
- Case Study discussion

National Preparedness – PPD 8

What is preparedness?

- Presidential Policy Directive (PPD) 8 issued in 2011
  - Established the National Preparedness Goal and National Preparedness System
- National Preparedness Goal
  - "A secure and ***resilient*** nation with the capabilities required across the ***whole community*** to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk."
- National Preparedness System
  - Six-step process

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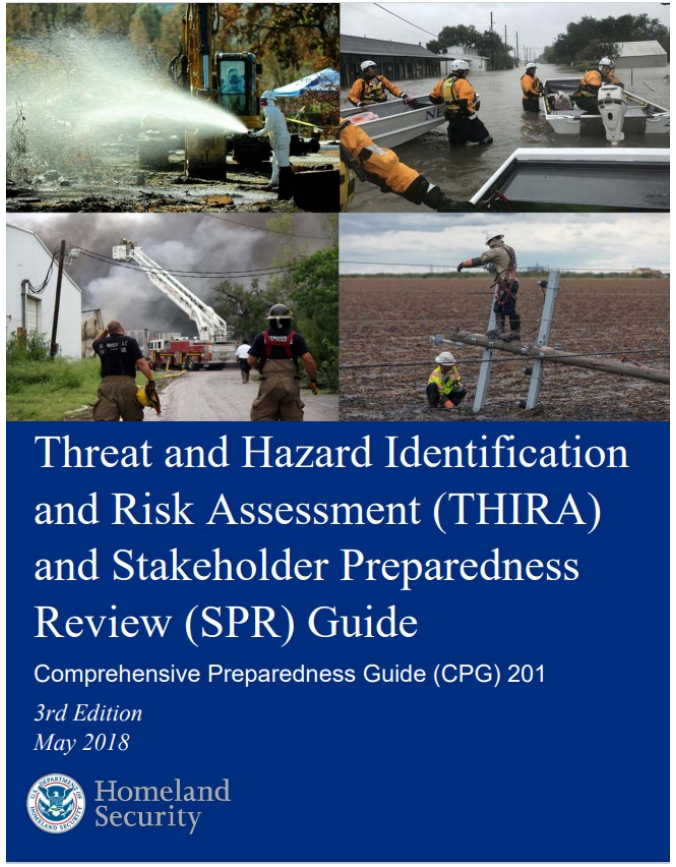
Step 1: Identifying and Assessing Risk

- Collect historical and recent data on existing, potential and perceived threats and hazards
- The risk assessments results form the basis for the remaining steps



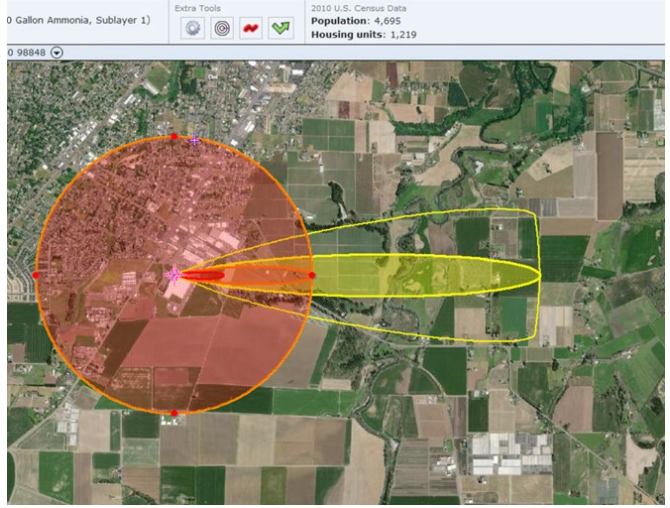
Hazard Identification

Information Sources

- CR2K – Tier II reports
- EPA Envirofacts – Facility reporting information on permits
- Commodity Flow Density Reports
- Radioactive material licenses
- Pipeline information

Risk Assessment

Methods



- Consider trigger events
- Likelihood: Natural disasters, accidents, wind direction
- Severity: Plume and explosive modeling
- Impact Analysis: People, Economic, Infrastructure
- Risk calculation
- Consider facility controls, environmental releases, capabilities

Technological Hazard			Most Probable or Worst Case Scenario		
#	Facility	Hazard	Severity	Probability	Risk
1	Truck Incident	TDI	5000	0.0891	445.5
2	Truck Incident	TDI	2000	0.0446	89.2
3	POWER/GAS GENERATING STATION	HF	10000	0.0136	136
4	CONSOLIDATED CHEMEX CORP	HF	10000	0.0134	134
5	DOW CHEMICAL CO	Isocyanates	7000	0.0088	61.6
6	AKZO CHEMICALS INC	TDI	7000	0.0043	30.1
7	POWER/GAS GENERATING STATION	Ammonia	7000	0.0036	25.2
8	AMERICAN CUSTOM DRYING	Ammonia	7000	0.0034	23.8
9	RESIN COMPANY	Ammonia	7000	0.0034	23.8
10	REFRIGERANT ENTERPRISES	Ammonia	7000	0.0034	23.8
Other Scenarios of Interest					
13	Truck Incident at Gate	Fuel-Unleaded	400	0.0567	22.7
14	CAMPBELL SOUP CO.	Chlorine	8000	0.0023	18.4
16	Chlorine scenario on base	Chlorine	400	0.0034	1.4
17	MAINSHIP CORP.	Styrene	65	0.0022	0.1
18	Nuclear Facility	RAD	0	3.63E-05	0.0

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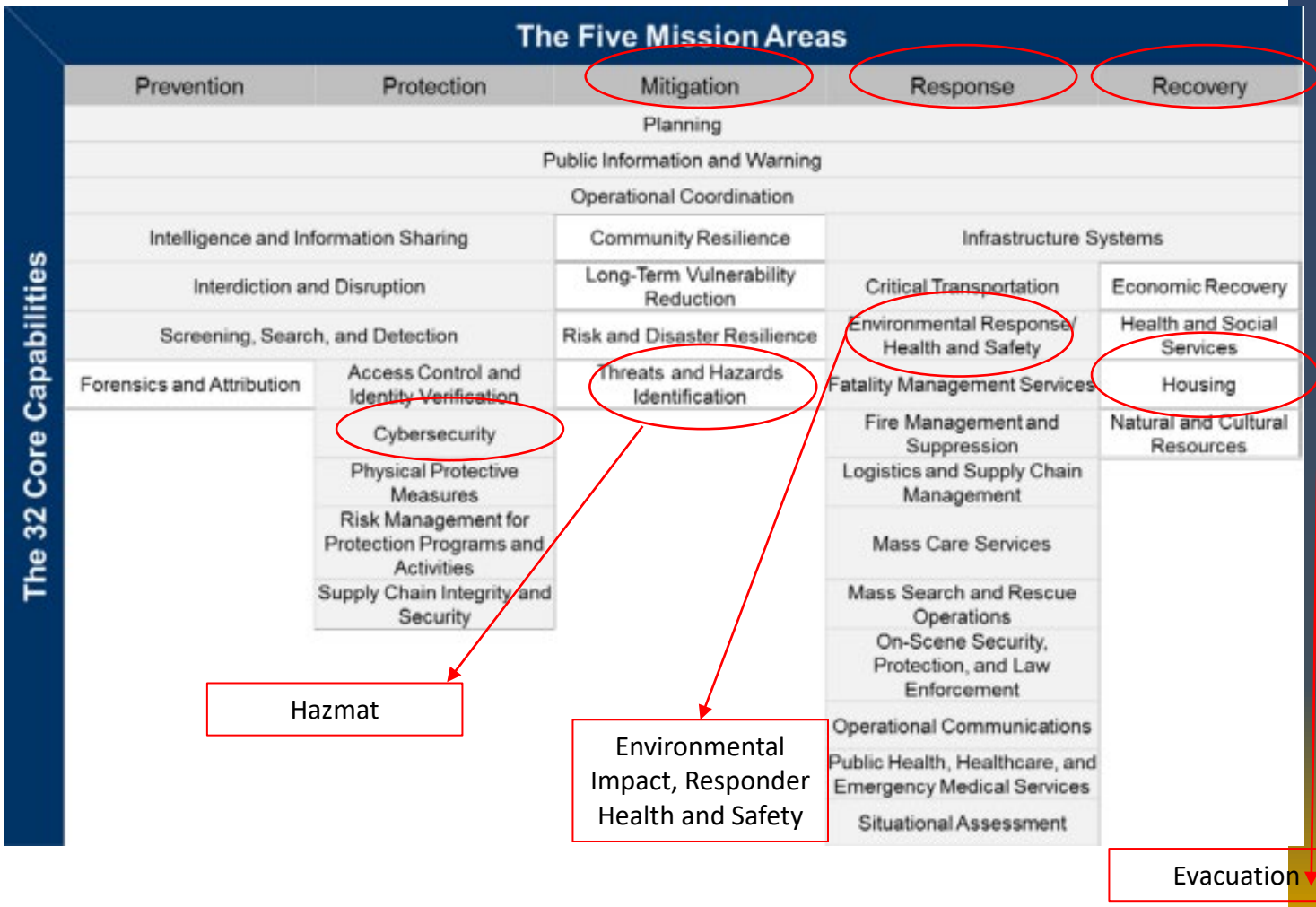
Step 2: Estimating Capability Requirements

- Determine the specific capabilities and activities to best address those risks
  - 5 Mission Areas
  - 32 Core Capabilities
  - Planning, Public Information and Warning
  - Operational Coordination
- Protection: EHS Facility
  - Cybersecurity
  - Supply Chain Integrity and Security
- Mitigation
  - Community Resilience
  - Threat and Hazards Identification
- Response
  - Environmental Response
  - Mass Care Services
  - Operational Communications
  - Situational Assessment



Establishing Capability Requirements (1 of 2)

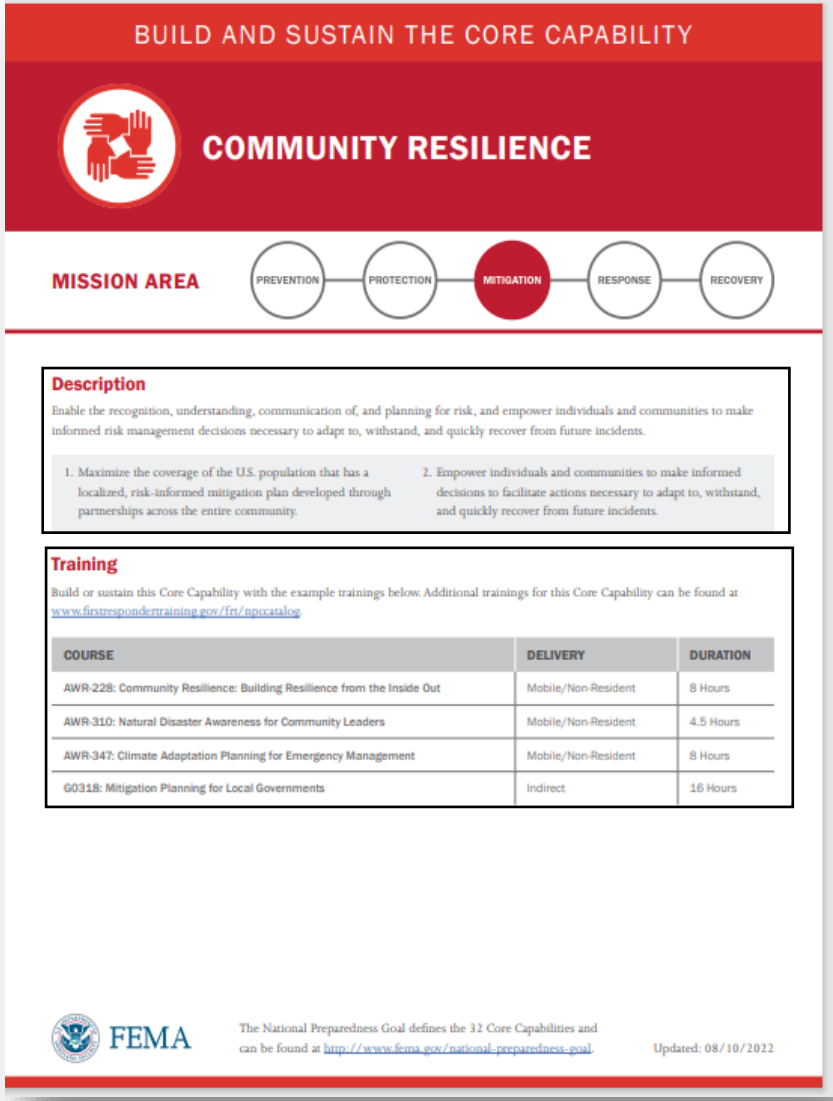
- Insert community-specific ***numbers*** into standardized target language
- Consider which ***threat/hazard*** places the greatest challenge on each critical task described in a target
- Establish ***timeframe*** metrics
- Intent is to create ***measurable*** indicators of preparedness
- Can also develop non-standardized capability targets if beneficial

Example Target Language

- Within 45 minutes of an incident, determine public protective actions.
- Within 60 minutes of an incident, disseminate public information alert/warning to effected population and organizations.
- Within 2 hours of an incident, deploy RHMRT on-scene.
- Within 3 hours of an incident, contain and control the release.
- Within 3 hours of an incident, notify the water purveyor and determine any mitigation measures.
- Triage and transport 25 casualties to regional healthcare centers.
- Decontaminate 20 people within 45 minutes of exposure.
- Evacuate 100 people requiring public assistance within 2 hours of incident.

Establishing Capability Requirements (2 of 2)

- Core Capability Development Sheets
- Starting point for building a capability(s) and targets
- Outlines:
  - Description/Tasks
  - Training
  - Targets
  - Resource Types
  - Other information



BUILD AND SUSTAIN THE CORE CAPABILITY

COMMUNITY RESILIENCE

MISSION AREA — PREVENTION — PROTECTION — MITIGATION — RESPONSE — RECOVERY

Description

Enable the recognition, understanding, communication of, and planning for risk, and empower individuals and communities to make informed risk management decisions necessary to adapt to, withstand, and quickly recover from future incidents.

1. Maximize the coverage of the U.S. population that has a localized, risk-informed mitigation plan developed through partnerships across the entire community.
2. Empower individuals and communities to make informed decisions to facilitate actions necessary to adapt to, withstand, and quickly recover from future incidents.

Training

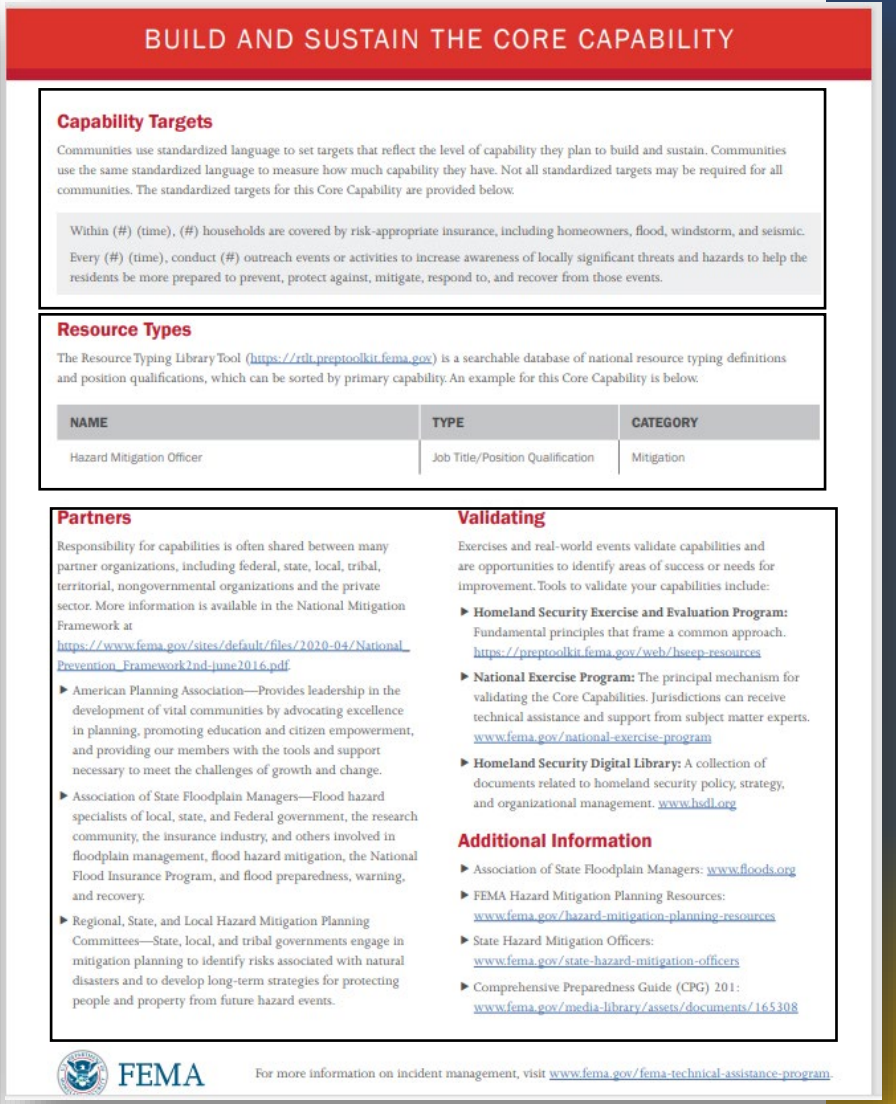
Build or sustain this Core Capability with the example trainings below. Additional trainings for this Core Capability can be found at www.firstrespondertraining.gov/frt/npccatalog.

COURSE	DELIVERY	DURATION
AWR-228: Community Resilience: Building Resilience from the Inside Out	Mobile/Non-Resident	8 Hours
AWR-310: Natural Disaster Awareness for Community Leaders	Mobile/Non-Resident	4.5 Hours
AWR-347: Climate Adaptation Planning for Emergency Management	Mobile/Non-Resident	8 Hours
G0318: Mitigation Planning for Local Governments	Indirect	16 Hours

FEMA

The National Preparedness Goal defines the 32 Core Capabilities and can be found at http://www.fema.gov/national-preparedness-goal.

Updated: 08/10/2022



BUILD AND SUSTAIN THE CORE CAPABILITY

Capability Targets

Communities use standardized language to set targets that reflect the level of capability they plan to build and sustain. Communities use the same standardized language to measure how much capability they have. Not all standardized targets may be required for all communities. The standardized targets for this Core Capability are provided below.

Within (#) (time), (#) households are covered by risk-appropriate insurance, including homeowners, flood, windstorm, and seismic.

Every (#) (time), conduct (#) outreach events or activities to increase awareness of locally significant threats and hazards to help the residents be more prepared to prevent, protect against, mitigate, respond to, and recover from those events.

Resource Types

The Resource Typing Library Tool (https://rtlt.preptoolkit.fema.gov) is a searchable database of national resource typing definitions and position qualifications, which can be sorted by primary capability. An example for this Core Capability is below.

NAME	TYPE	CATEGORY
Hazard Mitigation Officer	Job Title/Position Qualification	Mitigation

Partners

Responsibility for capabilities is often shared between many partner organizations, including federal, state, local, tribal, territorial, nongovernmental organizations and the private sector. More information is available in the National Mitigation Framework at https://www.fema.gov/sites/default/files/2020-04/National_Prevention_Framework2nd-june2016.pdf.

- American Planning Association—Provides leadership in the development of vital communities by advocating excellence in planning, promoting education and citizen empowerment, and providing our members with the tools and support necessary to meet the challenges of growth and change.
- Association of State Floodplain Managers—Flood hazard specialists of local, state, and Federal government, the research community, the insurance industry, and others involved in floodplain management, flood hazard mitigation, the National Flood Insurance Program, and flood preparedness, warning, and recovery.
- Regional, State, and Local Hazard Mitigation Planning Committees—State, local, and tribal governments engage in mitigation planning to identify risks associated with natural disasters and to develop long-term strategies for protecting people and property from future hazard events.

Validating

Exercises and real-world events validate capabilities and are opportunities to identify areas of success or needs for improvement. Tools to validate your capabilities include:

- **Homeland Security Exercise and Evaluation Program:** Fundamental principles that frame a common approach. https://preptoolkit.fema.gov/web/hseep-resources
- **National Exercise Program:** The principal mechanism for validating the Core Capabilities. Jurisdictions can receive technical assistance and support from subject matter experts. www.fema.gov/national-exercise-program
- **Homeland Security Digital Library:** A collection of documents related to homeland security policy, strategy, and organizational management. www.hsdl.org

Additional Information

- Association of State Floodplain Managers: www.floods.org
- FEMA Hazard Mitigation Planning Resources: www.fema.gov/hazard-mitigation-planning-resources
- State Hazard Mitigation Officers: www.fema.gov/state-hazard-mitigation-officers
- Comprehensive Preparedness Guide (CPG) 201: www.fema.gov/media-library/assets/documents/165308

FEMA

For more information on incident management, visit www.fema.gov/fema-technical-assistance-program.

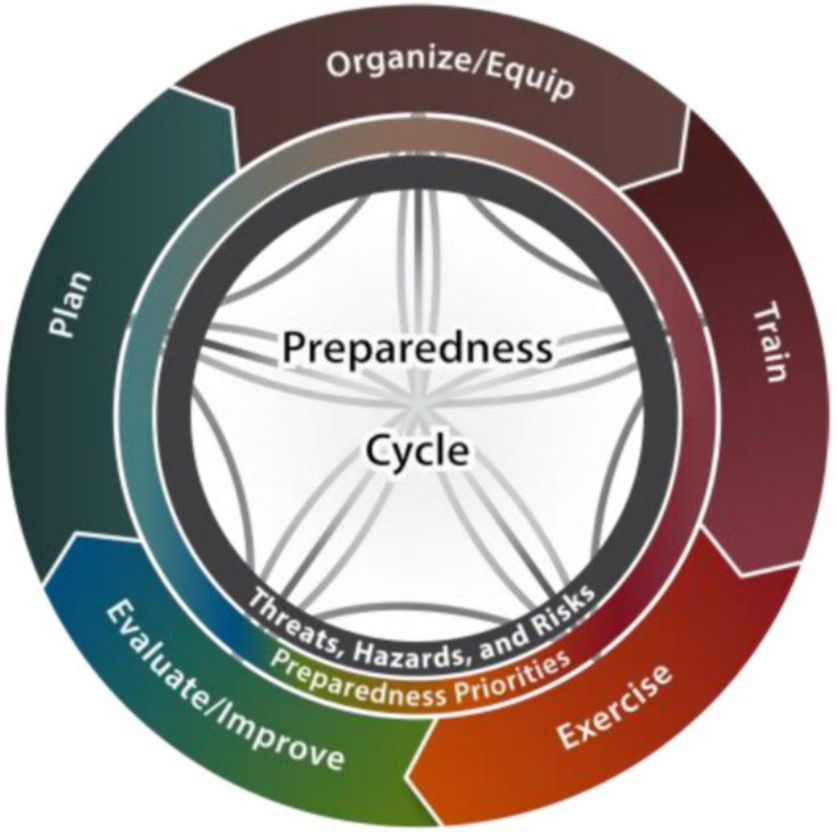
Step 3: Building and Sustaining Capabilities

- Identifying the best way to use limited resources to build capabilities
- Use the risk assessment results to prioritize resources based on highest risk

		Consequences				
		Insignificant (1) No injuries / minimal financial loss	**Minor (2)** First aid treatment / medium financial loss	**Moderate (3)** Medical treatment / high financial loss	**Major (4)** Hospitable / large financial loss	**Catastrophic (5)** Death / massive financial loss
Likelihood	**Almost Certain (5)** Often occurs / once a week	Moderate (5)	High (10)	High (15)	Catastrophic (20)	Catastrophic (25)
	Likely (4) Could easily happen / once a month	Moderate (4)	Moderate (8)	High (12)	Catastrophic (16)	Catastrophic (20)
	Possible (3) Could happen or known it to happen / once a year	Low (3)	Moderate (6)	Moderate (9)	High (12)	High (15)
	Unlikely (2) Hasn't happened yet but could / once every 10 years	Low (2)	Moderate (4)	Moderate (6)	Moderate (8)	High (10)
	Rare (1) Conceivable but only on extreme circumstances / once in 100 years	Low (1)	Low (2)	Low (3)	Moderate (4)	Moderate (5)

Building Capabilities

- POETE framework
  - **P**lanning – Policies, plans, procedures
  - **O**rganization – Teams, organizational structure
  - **E**quipment – Supplies and systems
  - **T**raining – Content and methods of delivery
  - **E**xercise – Exercises and actual incidents that provide an opportunity to demonstrate, evaluate, and improve the ability of core capabilities



Building Capabilities – POETE (general)

	Protection	Mitigation	Response	Recovery
Planning	Facility cybersecurity plans	Facility SWPPP	Hazmat Emergency Response Plan	Local Community Healthcare Coalition Recovery Plan
Organization	Critical Infrastructure Partnership Groups	Mitigation Framework Leadership Group	Regional Hazardous Material Response Teams	Recovery Support Function Leadership Group
Equipment	Fenceline monitors/alarms	Spill containment	Hazmat detectors, decontamination, PPE	Booms, vacuums, disposal containers
Training	Critical Infrastructure Resilience Awareness	RAPT/CRCI Training, LEPC Training and Workshops	Hazmat Operations, Technician, Specialist; Shelter-in-Place Workshop	Coordinating Health and Social Services Recovery
Exercises	Supply Chain Integrity and Security Workshop	Community Preparedness and Outreach Workshop	Hazardous Materials Release Full-Scale Exercise	Water Contamination Functional Exercise

Building Capabilities – POETE (specific)

	Within 45 minutes of an incident, determine public protective actions.	Within 60 minutes of an incident, disseminate public information alert/warning to effected population and organizations.	Decontaminate 20 people within 45 minutes of exposure.
Planning	Emergency Response Plan Procedures, ERG	EOP, ERP, software procedures, PIO templates	ERP, decontamination procedures
Organization	Assigned responsibility to FD or RHMRT that can provide within 45 minutes	Assigned responsibility to PIO	Assigned decon team members to FD/EMS within 20 min of facility/incident
Equipment	ALOHA plume modeling	Social media, Everbridge, etc.	Expedient decon-hose/water Operational: pop-up tent system
Training	Hazmat Awareness, ALOHA trained personnel	Social media, Everbridget, etc. Messaging	Hazmat Awareness/Ops, Decontamination
Exercises	Annual drill or functional exercise	Annual functional exercise testing dissemination process	Annual drill

Building Capabilities – POETE (your turn)

	Within 3 hours of an incident, notify the water purveyor and determine any mitigation measures.	Triage and transport 25 casualties to regional healthcare centers.	Evacuate 100 people requiring public assistance within 2 hours of incident.
Planning			
Organization			
Equipment			
Training			
Exercises			

Step 4: Planning to Deliver Capabilities

- Preparedness efforts involve and affect the ***whole community***
- Provides a methodical way to engage whole community
- Important to coordinate plans with other organizations

85% of critical infrastructure owned by private sector

Six Step Planning Process

Emergency Response Plan Development and Annual Update

Emergency Response Plan

EPCRA Required Items

(1) Identification of facilities, routes likely to be used for the transportation of EHSs, and vulnerable facilities.

(2) Public/private response methods and procedures.

(3) Designation of a community and facility emergency coordinators.

(4) Public notification procedures (reliable, effective, and timely).

(5) Methods for determining the occurrence of a release, and the affected area or population.

(6) Response resources in community and at facilities.

(7) Evacuation plans, including provisions for a precautionary evacuation and alternative traffic routes.

(8) Training programs and schedule (responders, medical).

(9) Methods and schedules for exercising the emergency plan.

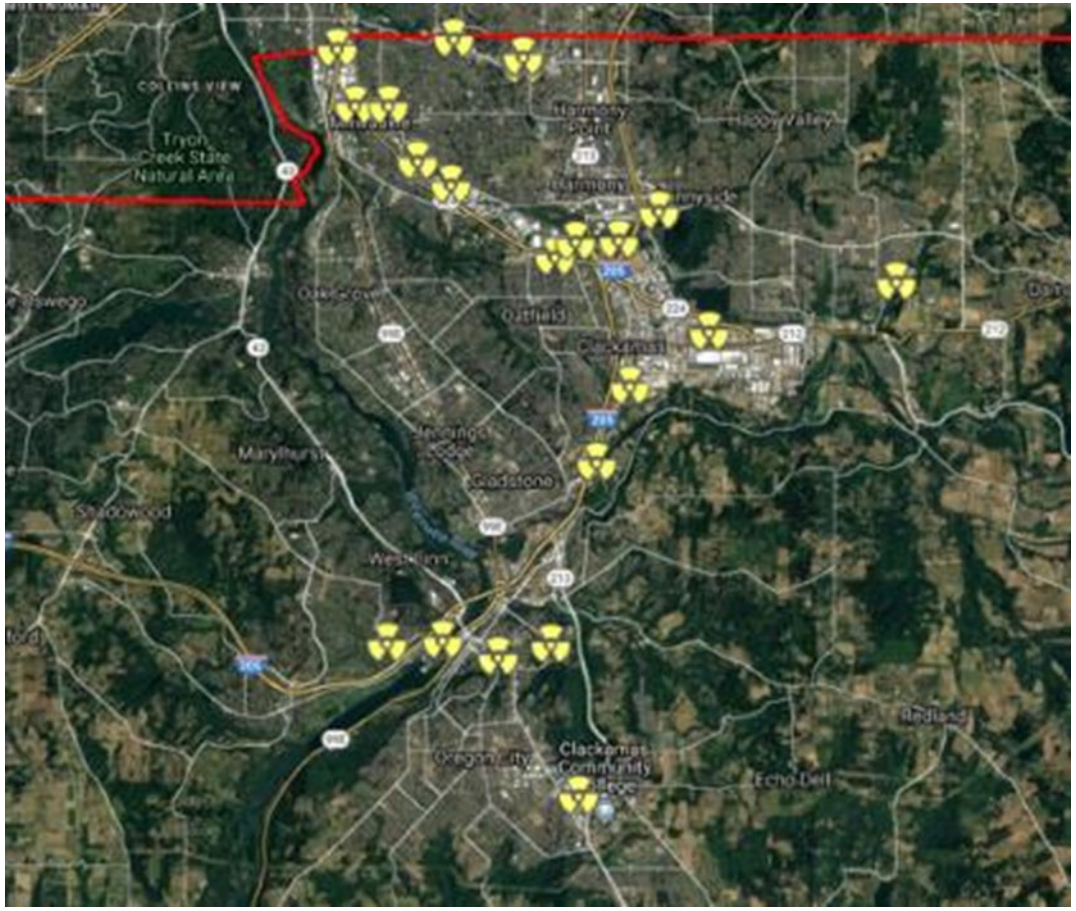
Emergency Response Plan

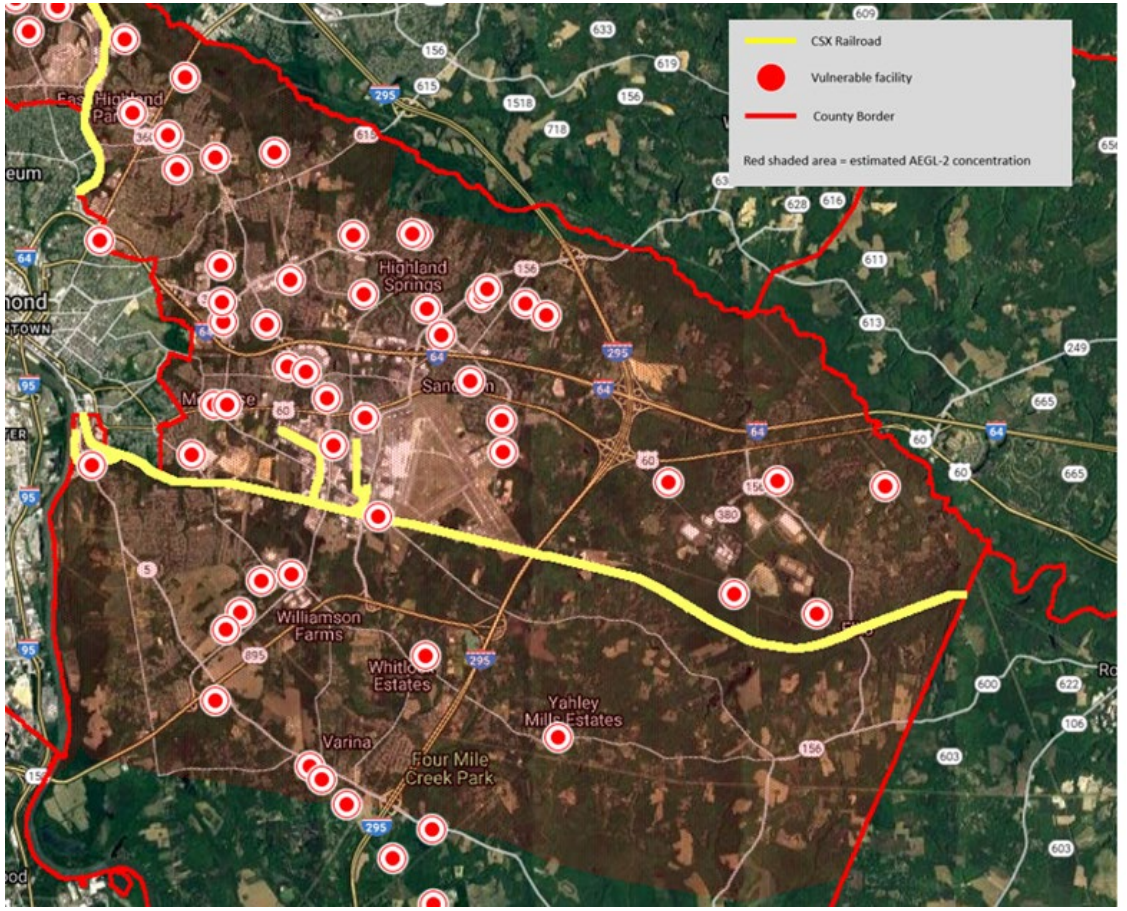
Additional Value: Impact analysis, Gap analysis, Recommendations

- America's Water Infrastructure Act (2018)
  - Amended EPCRA: Notification to Community Water Systems
  - Amended SDWA: Risk and Resilience Assessments/ERP
- Environmental Sensitive Areas
- Explosion Overpressure Analysis
- Radioactive Material Storage
- Mobile Hazard Integration
  - Pipelines
  - Rails Commodity Density Report
  - Ports/Barge Transport

Hazard Identification

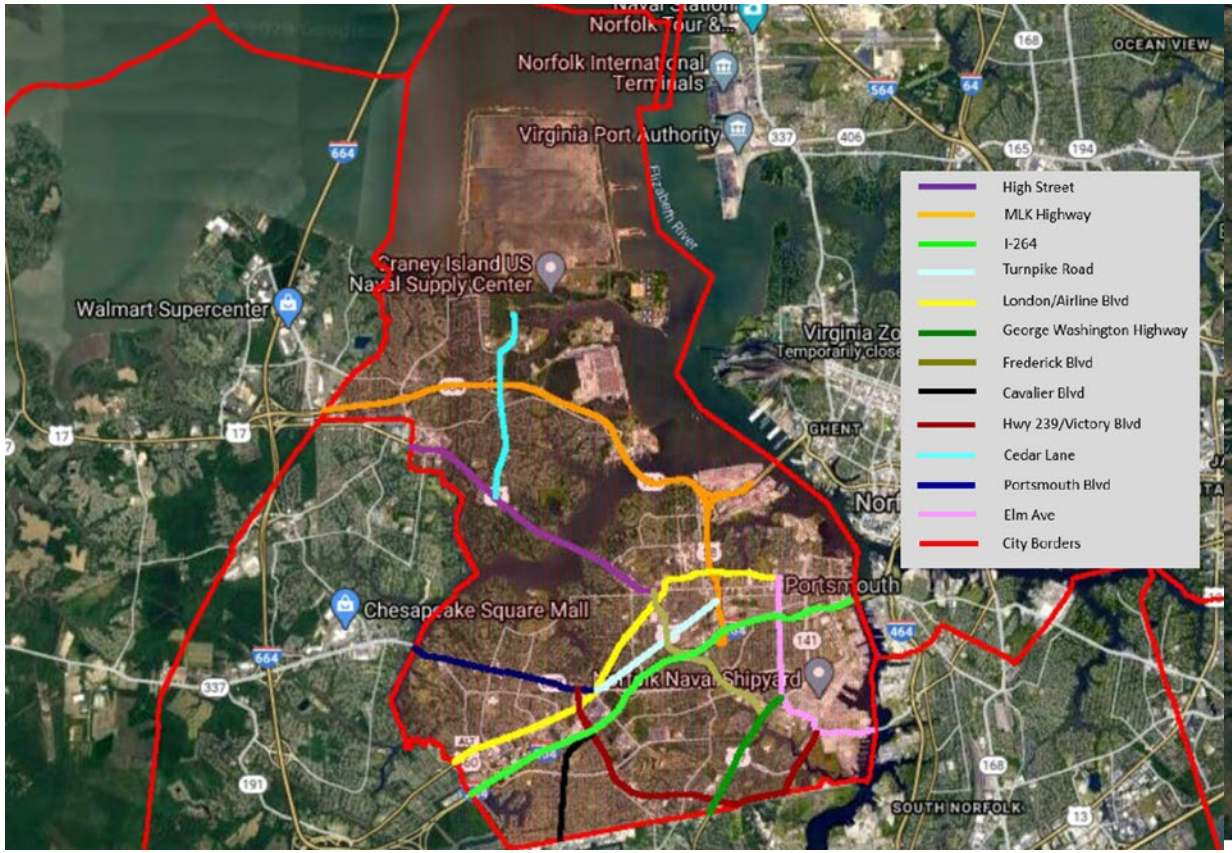
Examples: Facilities and Railway

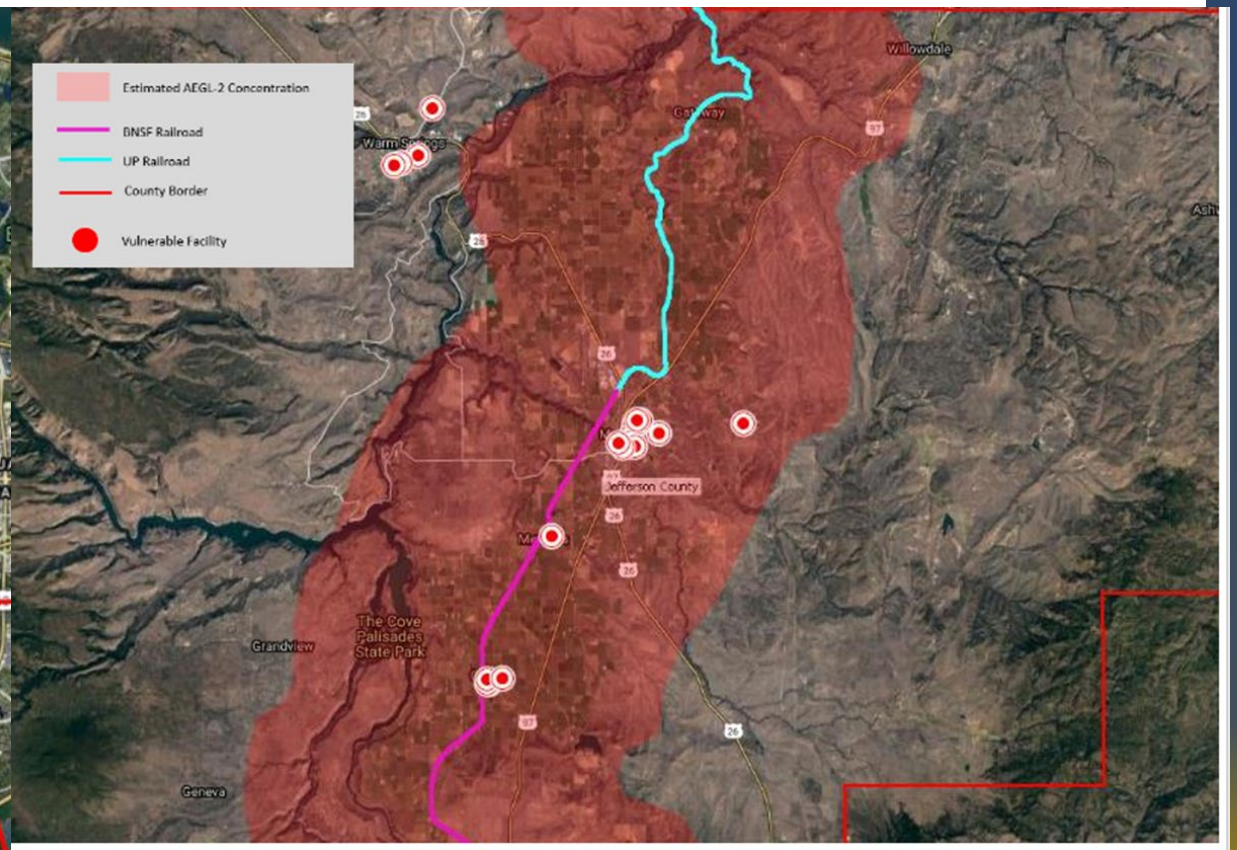




Hazard Identification

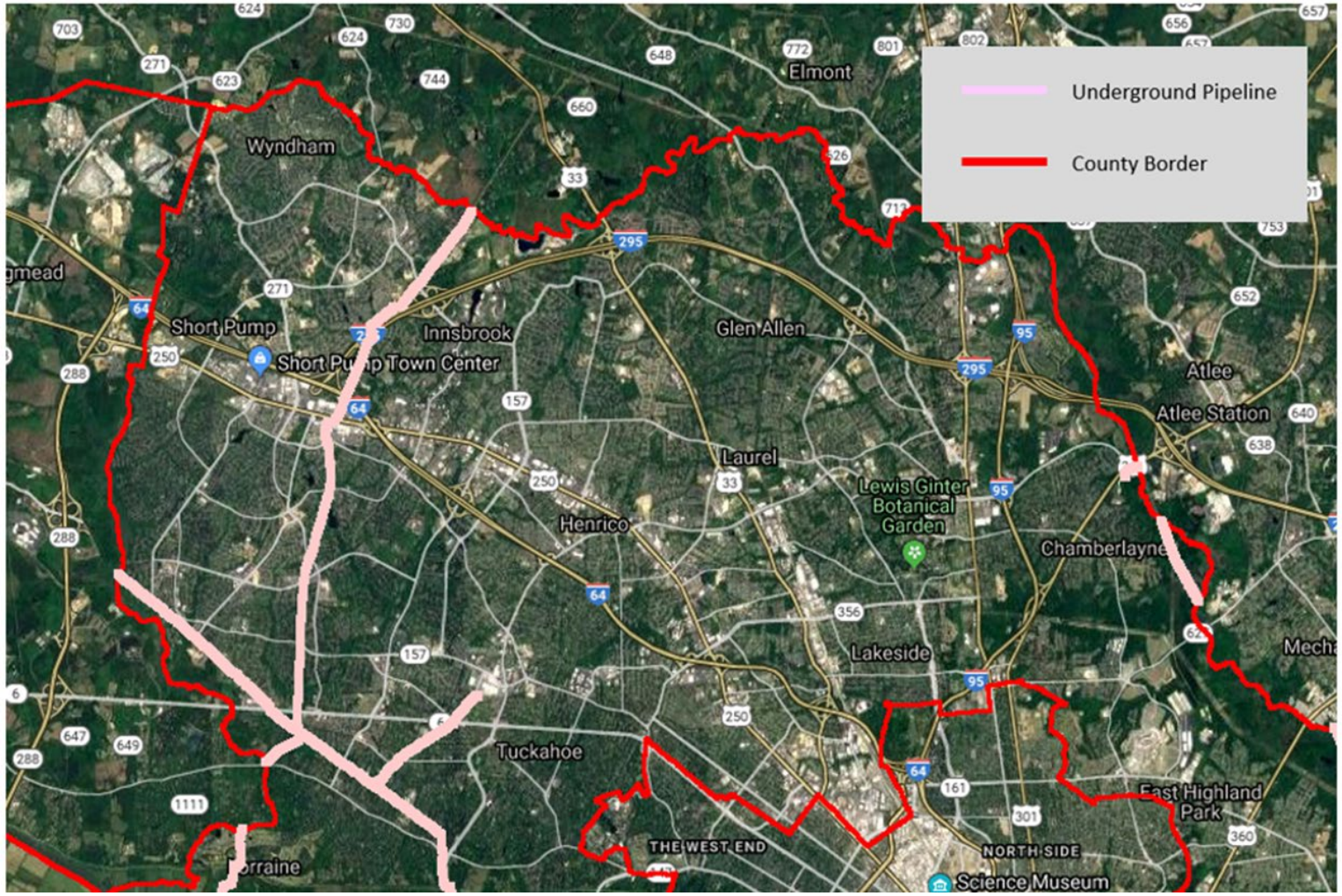
Transportation: Highway Hazmat Routes and Railway with Plume Model



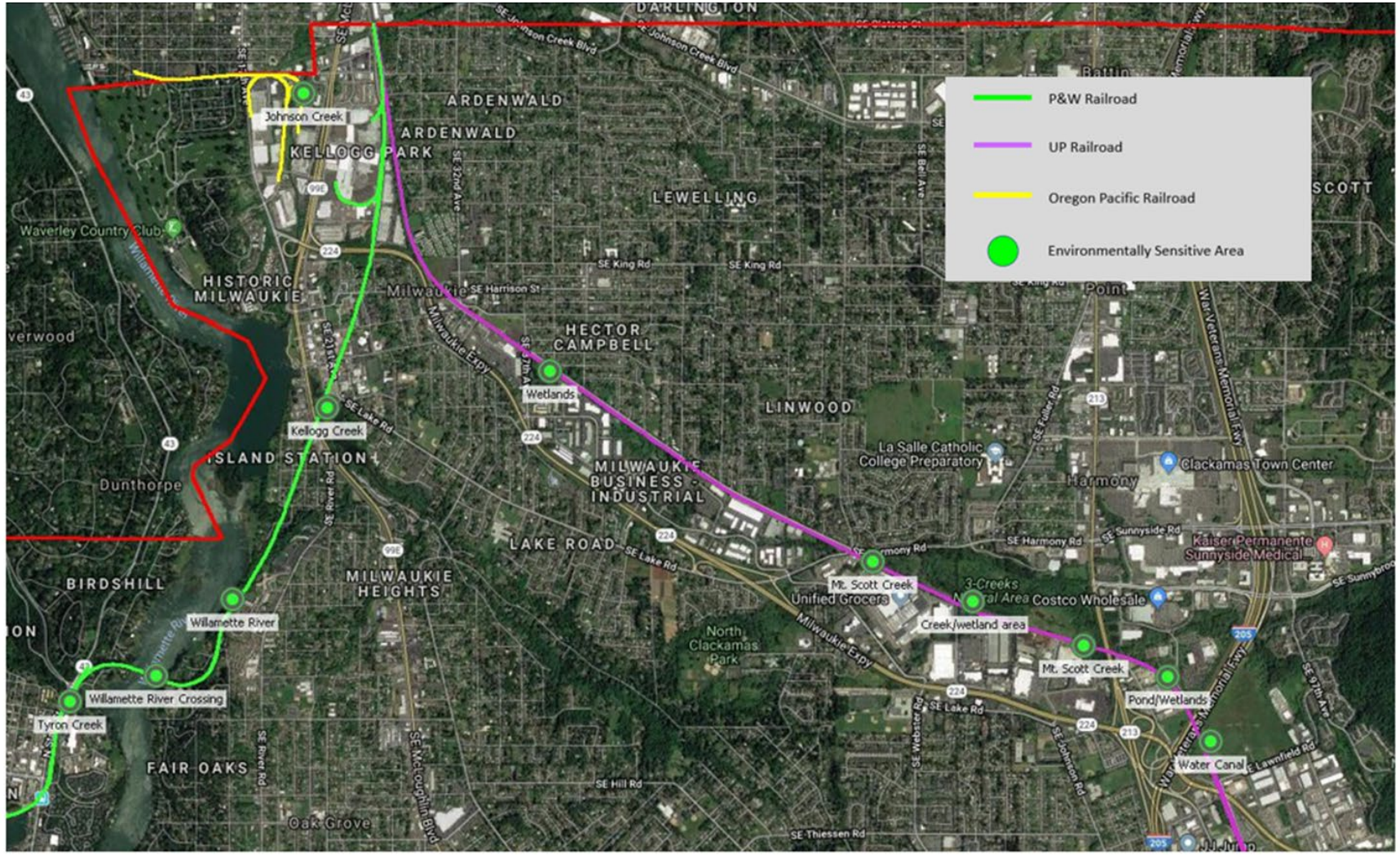


Hazard Identification

Pipelines

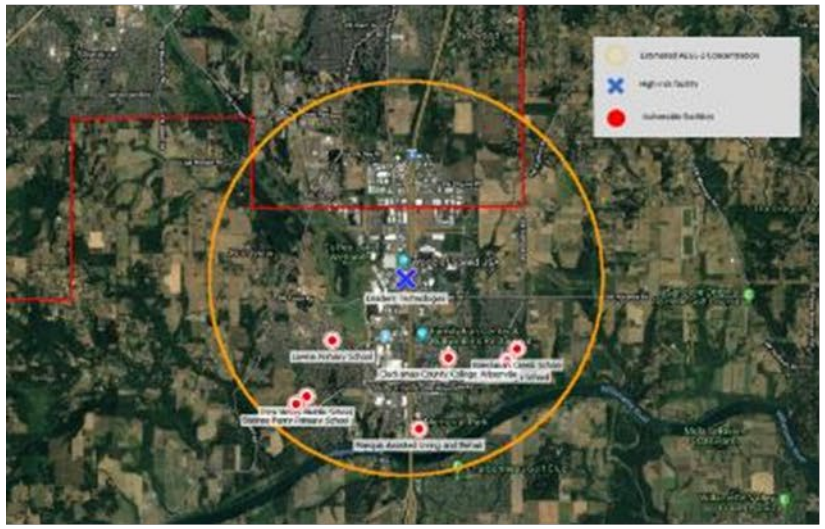


Environmentally Sensitive Areas

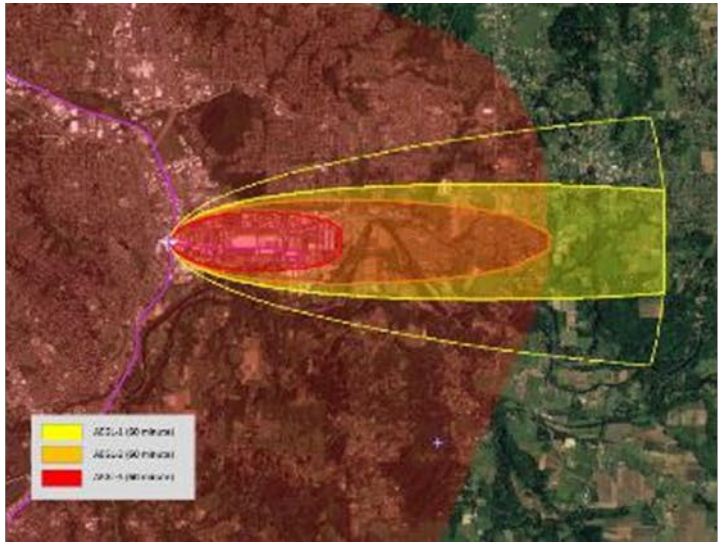


Risk Assessment

Modeling



7,500 gallons of HCl acid release

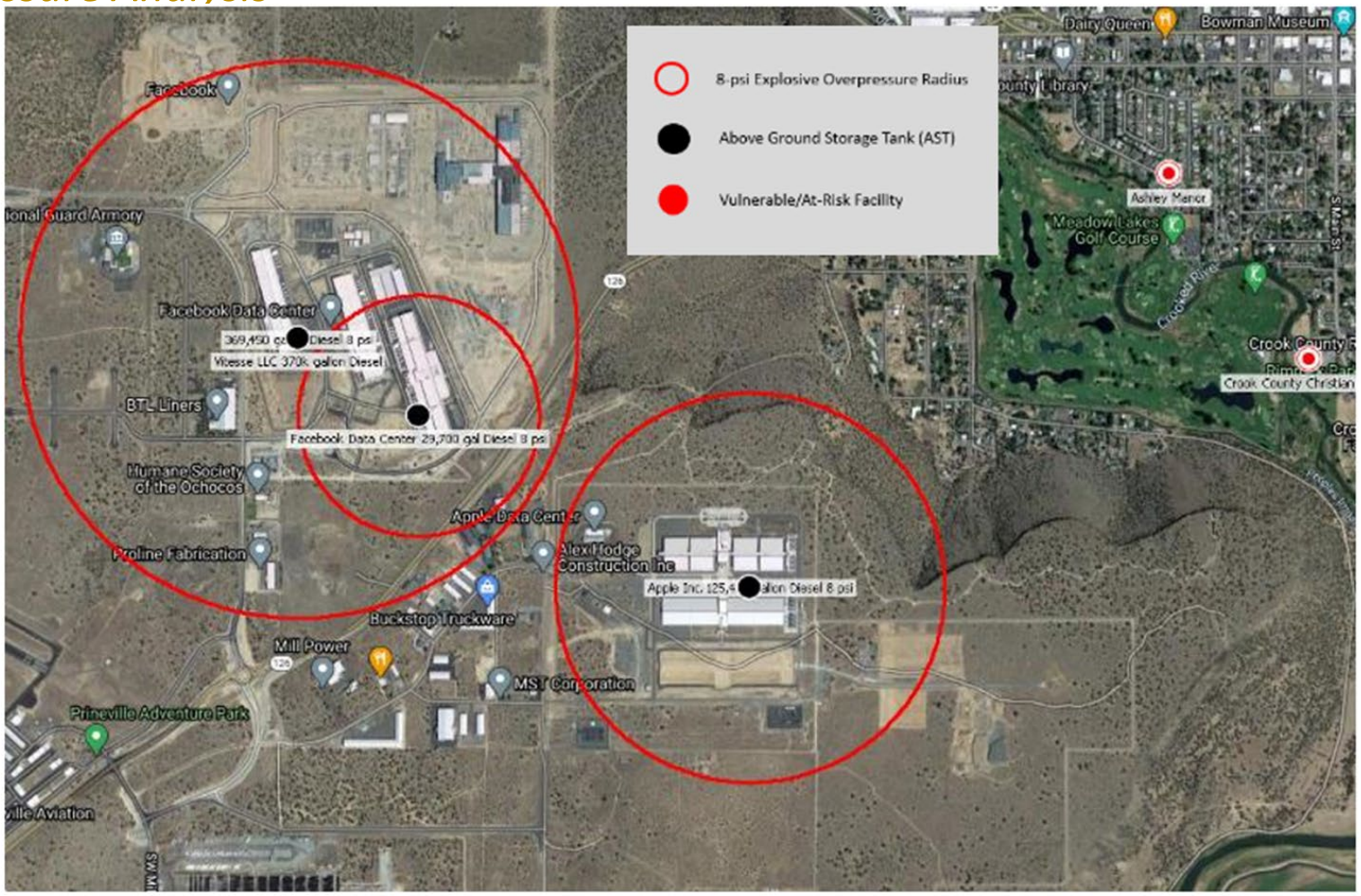


30,000 gallons of ammonia along a rail line

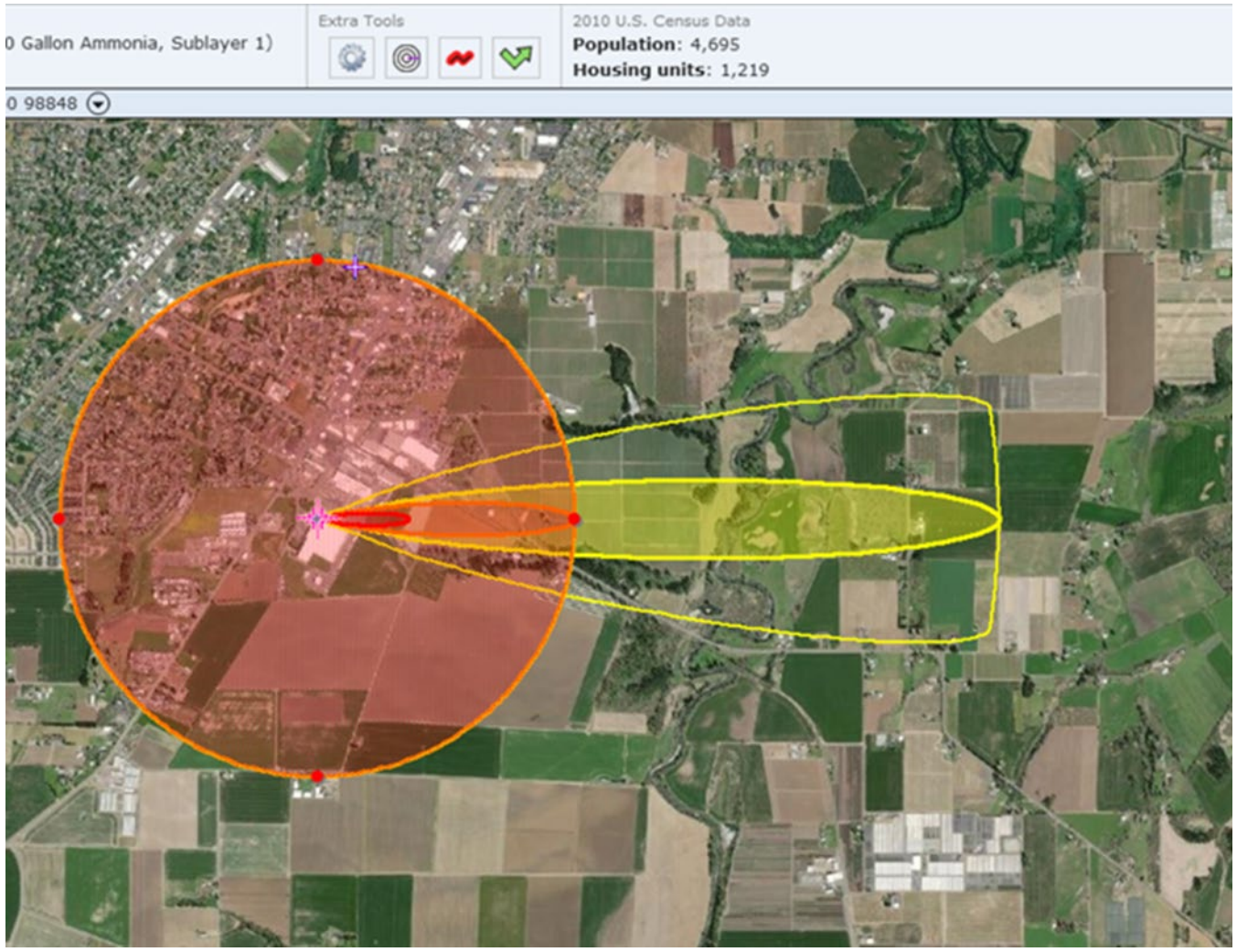
8 psi overpressure zone along highway – gasoline tanker explosion

Risk Assessment

Explosive Overpressure Analysis



Vulnerable Populations



Facility Surveys

Plans

1. Which of the following plans does your facility have?

- [x] Emergency action plan (EAP)
- [x] Hazardous materials (Hazmat) contingency emergency response plan
- [ ] Clean Air Act, Risk Management Plan
- [x] Clean Water Act, Spill Prevention, Control and Countermeasures Plan
- [x] Hazardous Waste, Large Quantity Generator Contingency Response Plan
- [x] Clean Water Act, Stormwater Pollution Prevention Plan

2. Does the plan include the following:

2a. A process for evaluating on an offsite consequences/impacts:

- [x] Yes
- [ ] No
- [ ] N/A

Summarize the process:

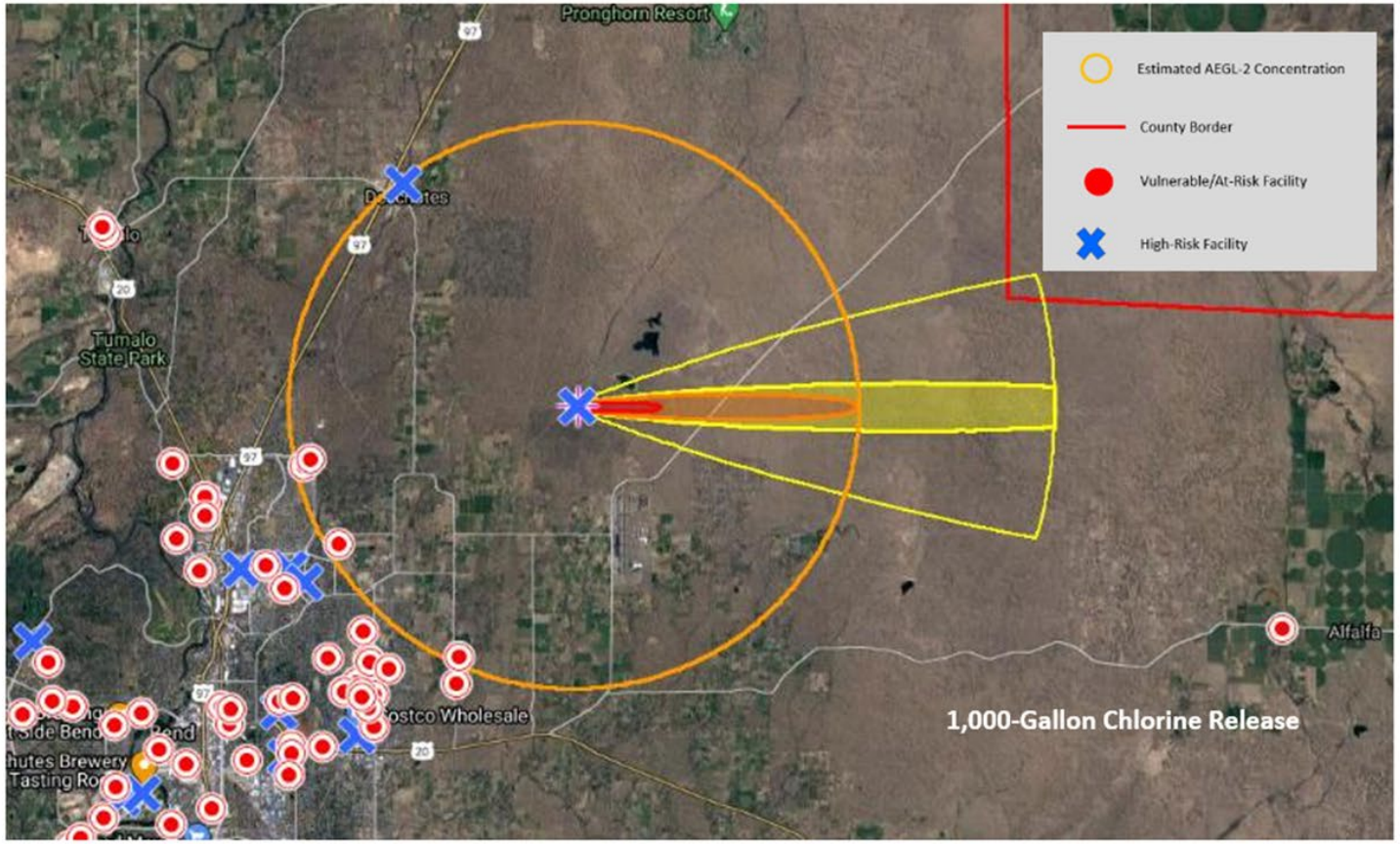
In the event of a release, immediate steps are taken to identify the extents of the release and to prevent any further migration of spilled material. ODEQ and the LEPC will be contacted for any releases of reportable quantity or releases which extend past the property boundaries. If off-site soil, surface water, or groundwater are potentially

2b. Emergency response procedures upon discovery of a hazmat incident:

Facility Profiles

Pre-inc

Facility Name:	Facility Address:	Facility Coordinator:	Responding Fire Dept:



Vulnerable Facilities

- Buckingham Elementary School (SSW)
- Ponderosa Elementary School (SW)
- Lava Ridge Elementary School (W)
- Skyview Middle School (W)

Facility Profiles

Plan procedures summary: ERP and EAP direct employees to attempt to mitigate small HAZMAT incidents if it is safe to do so, otherwise, employees evacuate the facility to McGrath Road and dial 9-1-1. The ERP and EAP are reviewed and updated annually.

Summary of employee PPE: Self-Contained Breathing Apparatus (SCBA), Powered Air Purifying Respirator (PAPR) and chemical aprons.

Facility details/resources summary: When the facility's leak detection system (lower explosive limit - LEL) is triggered, an audible alarm sounds onsite and text messages are automatically sent to all water operations staff. Employees have access to a portable hand-held 4-gas meter. Adequately sized secondary containment is in place. All buildings and/or tanks where HAZMAT is stored are labeled with the NFPA 704 four colored diamond placard. Lead/acid battery charging operations occur at this facility in a room with exhaust ventilation. Acid neutralizing kits are not available onsite. HAZMAT is delivered by truck to this facility on a monthly basis.

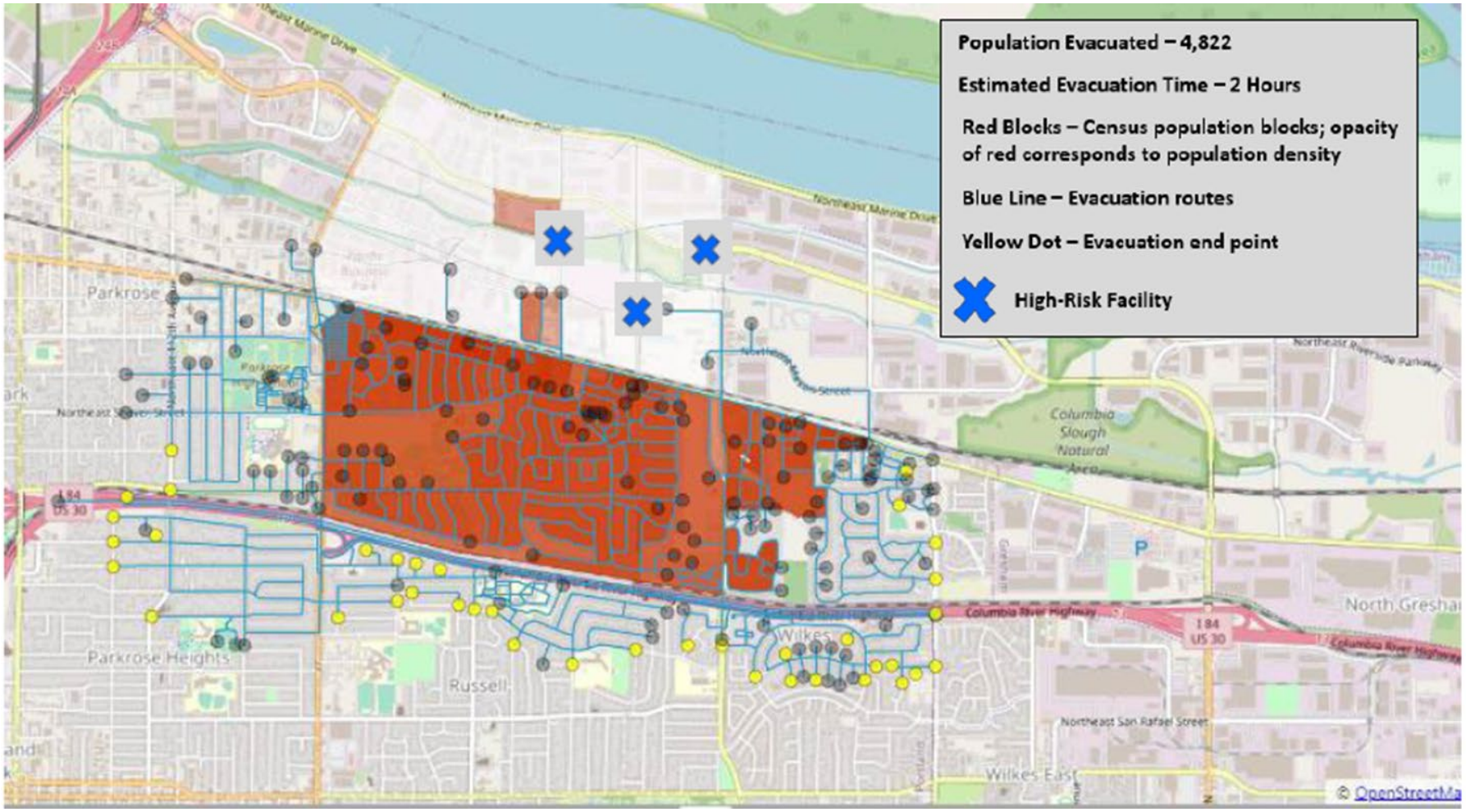
Facility access protocols: Facility is only accessible after normal hours with the use of a City issued badge.

Plans	Organization	Equipment	Training	Exercises
Emergency Action Plan (EAP) ☒ HAZMAT Emergency Response Plan (ERP) ☒ Risk Management Plan (RMP) ☒ Evacuation Plan ☒	Eyewash stations ☒ Water showers ☒ Can responders access the facility after normal work hours? Yes ☐ No ☒	HAZMAT leak detection system Yes ☒ No ☐ System fully automated Yes ☒ No ☐ System monitored 24/7 Yes ☒ No ☐ Portable HAZMAT Detection Equipment: Yes ☒ No ☐	Hazard Communication (HAZCOM) ☒ HAZMAT Awareness ☒ HAZWOPER ☒	Facility HAZMAT release exercises conducted: Yes ☐ No ☒

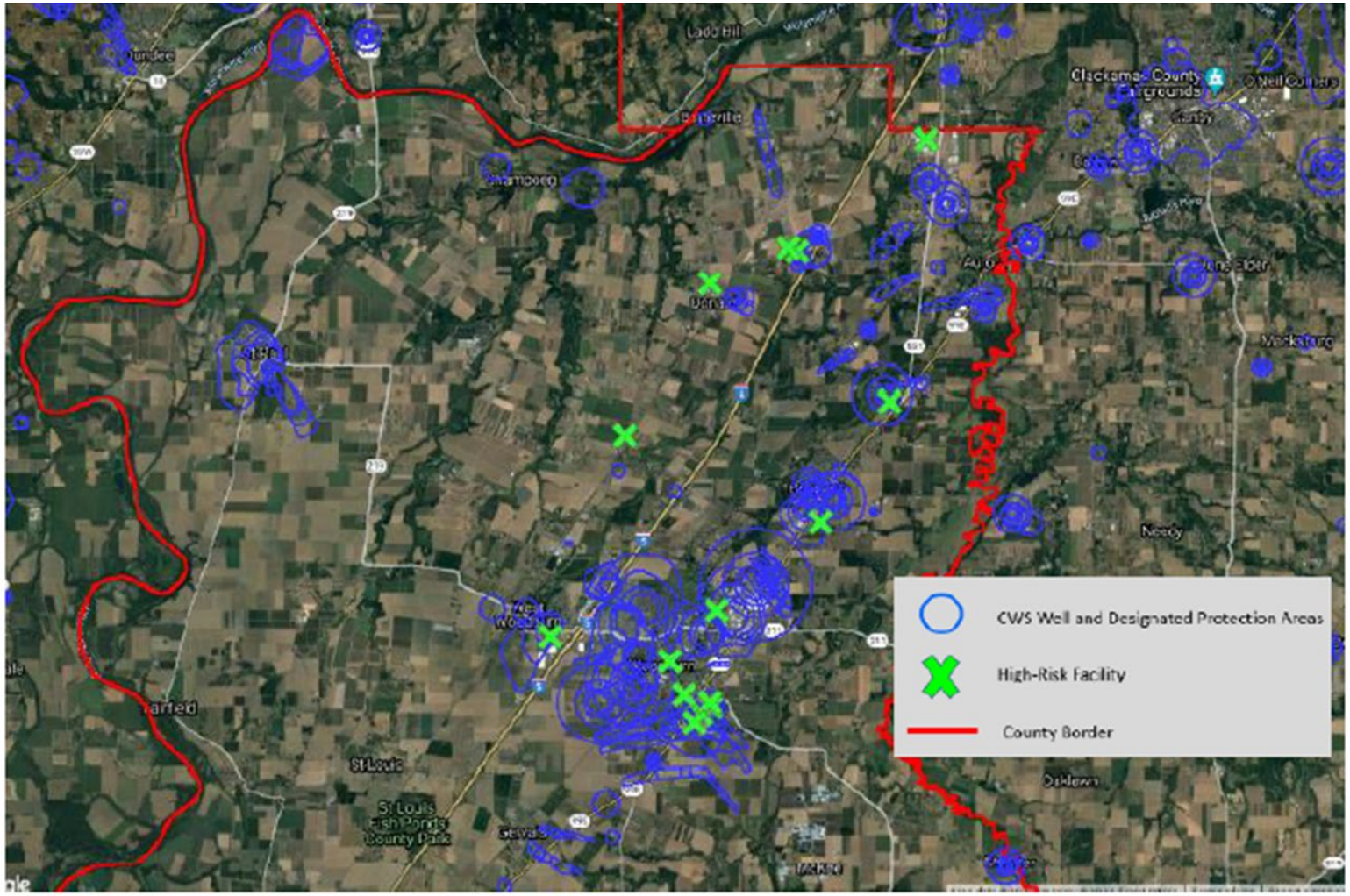
Community Evacuation

https://fleet.vmasc.odu.edu/

Fast Local Emergency Evacuation Times



Source Water Impact Analysis

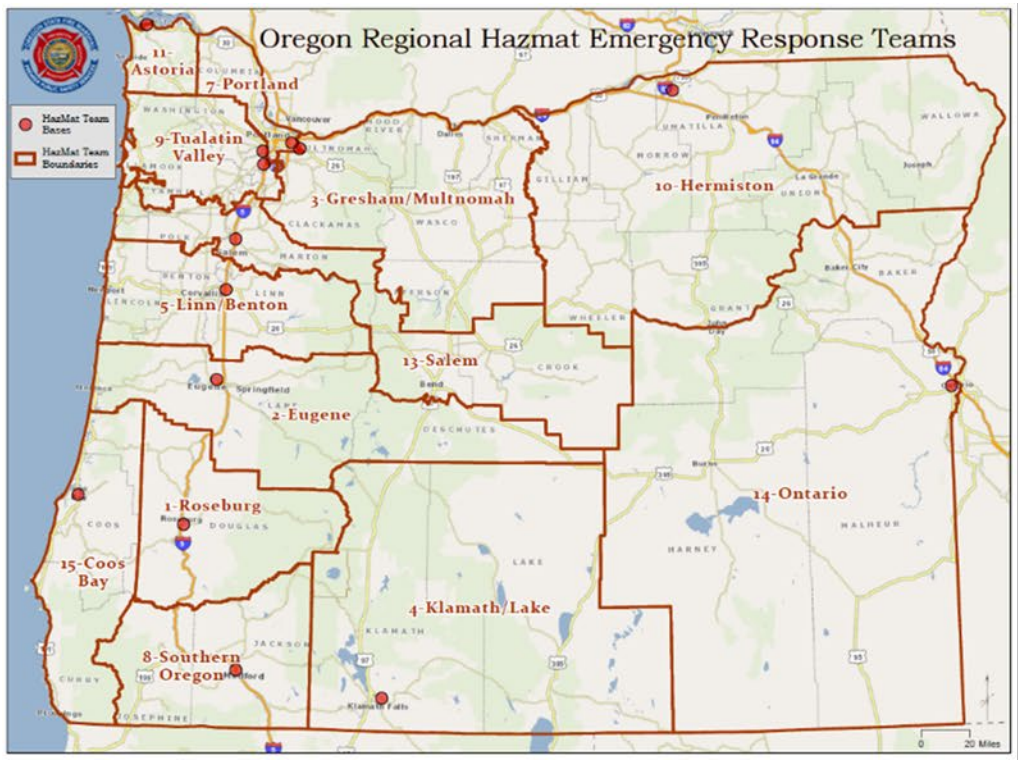


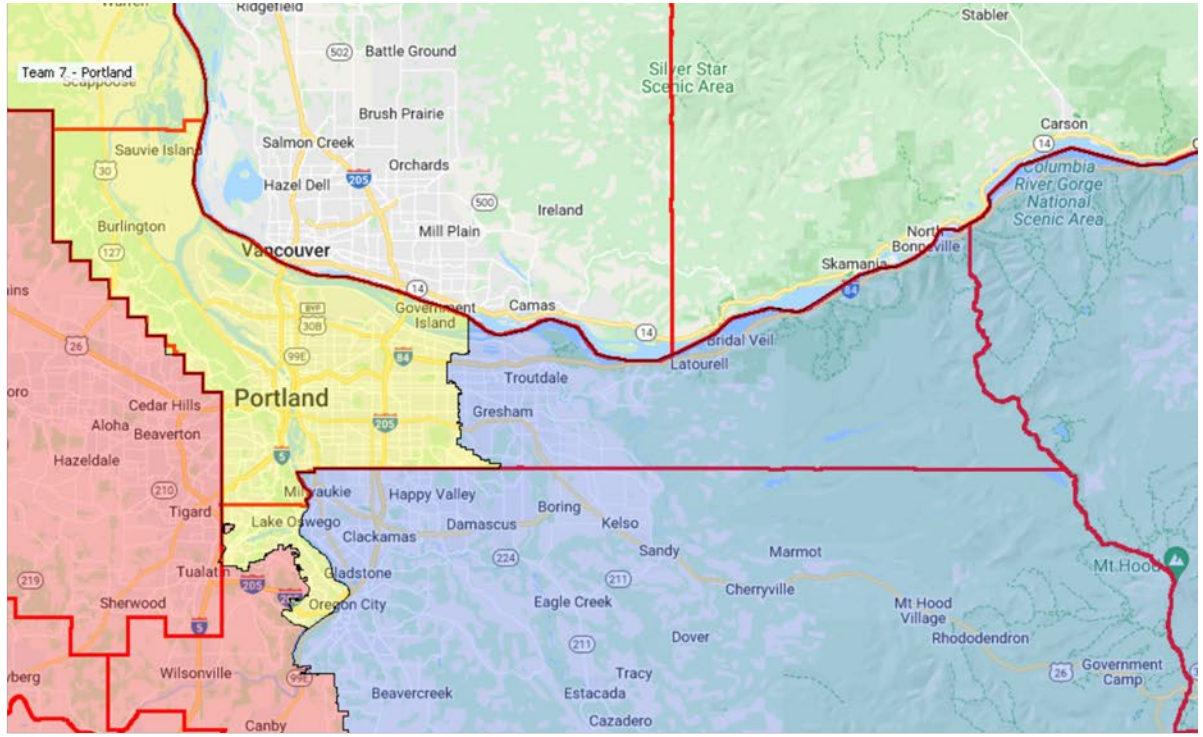
Capability Analysis

Organization	Manpower/Training	Personal Protective Equipment	HAZMAT Equipment	Decontamination Capabilities	Estimated Response Time
Hepaco Inc. Hazmat Response Team - Richmond (Contracted by Norfolk Southern and CSX Railroad Companies)	18 responders who receive 40-hour HAZWOPER training	Level-A and B suits MSA Self-contained breathing apparatuses (SCBAs) and North full-face air purifying respirators with multiple types of cartridges available (hazard dependent) Nitrile rubber inner gloves Chemical resistant boots	MultiRAE Plus Photo Ionization Detector (PID) with 10.6 eV lamp Drager colorimetric tubes (wide array of tubes available)	Limited technical decontamination consisting of containment pools, water hoses and brushes	Within 60 minutes
Henrico County Division of Fire Emergency Medical Services (EMS)	All firefighters receive Emergency Medical Technician (EMT) Training; some trained to the Paramedic Level	Ambulance 13 maintains same PPE as Hazmat team; all other ambulances equipped with N95 masks, face shields and latex exam gloves	16 ambulances available between 20 stations	N/A	Within 15 minutes
Henrico County Division of Fire Hazmat Response Team (Primary team located at	A minimum of 9 Hazmat Technician Level trained responders available between the three stations listed; typically, 15 Hazmat	25 Level A suits Level B suits - (20 cases) Nitrile, viton butyl rubber,	**Station 21:** HAZMAT ID, Chemring PGR 1064 pistol grip Raman Spectroscopy detector, APD 2000,	9-step Zoomer Tent Shower system Dahlgren	Within 15 minutes First arriving Battalion Chief makes the decision to SIP/evac

Areas of Responsibility

Oregon Hazmat Teams





Gap Analysis

Recommendations

Category	Limiting Factor/Shortfall	Recommendations	Priority
Plans	Many facilities designated as critical/vulnerable by Emergency Management have not developed evacuation or shelter-in-place plans or have not shared them with the Portsmouth Office of Emergency Management. Hazard models estimate that some of these facilities may be impacted by a technological hazard release or explosion hazard.	Share information about potential hazards and impacts to vulnerable facilities and multi-agency partners. As appropriate, assist facility owners in developing and exercising evacuation and/or shelter-in-place plans.	1
Plans	A commodity flow density report request submitted to the Commonwealth Railway Company (CWRY) was denied while attempts to contact the Norfolk and Portsmouth Beltline (NPB) Railroad Company were unsuccessful.	Collaborate with CWRY and NPB representatives to establish procedures for obtaining commodity flow density report information and update the risk assessment results based upon the updated commodity flow information.	1
Equipment	A review of existing PHRT detection equipment revealed that responders may not have the capability to quantify allyl chloride and/or allylamine concentrations following a release. Chemical quantification data is useful to the IC for supporting PPA decisions and PPE recommendations for responders.	Conduct research to determine if on hand detection equipment can quantify allylamine. Consider procuring equipment capable of quantifying this hazard such as a Drager colorimetric quantification tube or a hand-held detector if available on the market.	1

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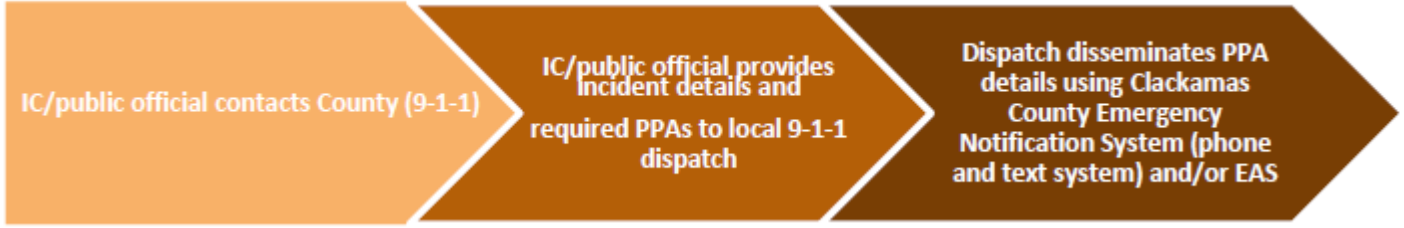
Notification Procedures

Incident Reporting Source: **Public citizen**

Incident Reporting Source: **P&W Railroad Company**

Public Notification Process



Training and Exercises

Train to the Role

- Develop training and exercises that align with community high-risk hazards and vulnerable populations
  - Review Tier II data
  - THIRA results
- Conduct training and exercises regularly to keep responders interested and engaged
- Blend online and hands-on training to maximize effectiveness
  - Online/AWR/IS = knowledge-based capabilities
  - Performance/PERS = application-based capabilities
  - MGT = Judgment and evaluation capabilities

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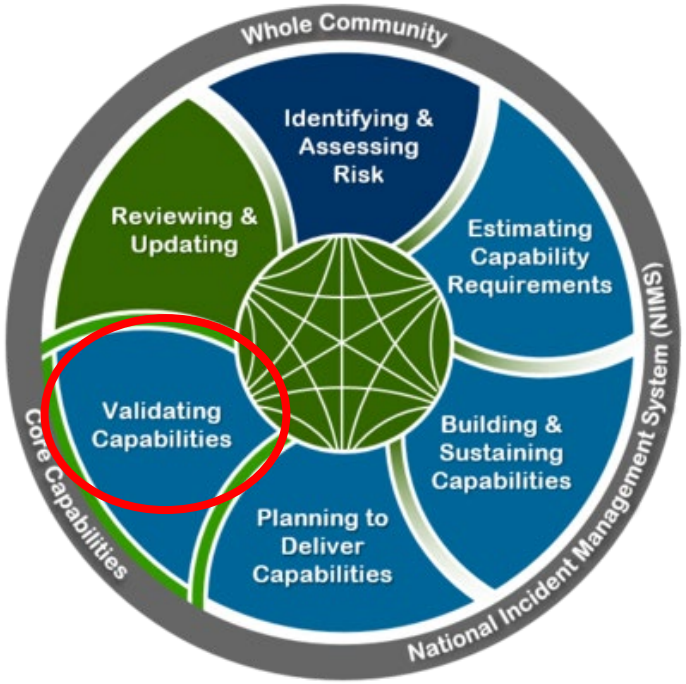
Training and Exercises

Time Period	Action/Exercise Type	Recommended Frequency	Recommended Objectives
Year 1	Seminar	Within 1 month	• Orient response organizations to the ERP
Year 1	Tabletop	Within 3-6 months	• Enhance ERP awareness and validate the plan • Verify HAZMAT stakeholder roles/responsibilities • Test understanding of communication systems
Year 1	Drill	Within 6-12 months	• Assess effectiveness of a specific function • Establish technical decontamination line to thoroughly clean HAZMAT team members exiting the scene • Conduct scene size-up
Year 2	Functional exercise	Within 12-18 months	• Test incident notification procedures based on a rail car release in a populated area • Establish a Unified Command between public and private sector and demonstrate effected C2 • Test notification to community water systems
Year 2	Full-scale exercise	Within 18-24 months	• Assess patient triage, medical transport efficiency, and medical surge capacity within the county

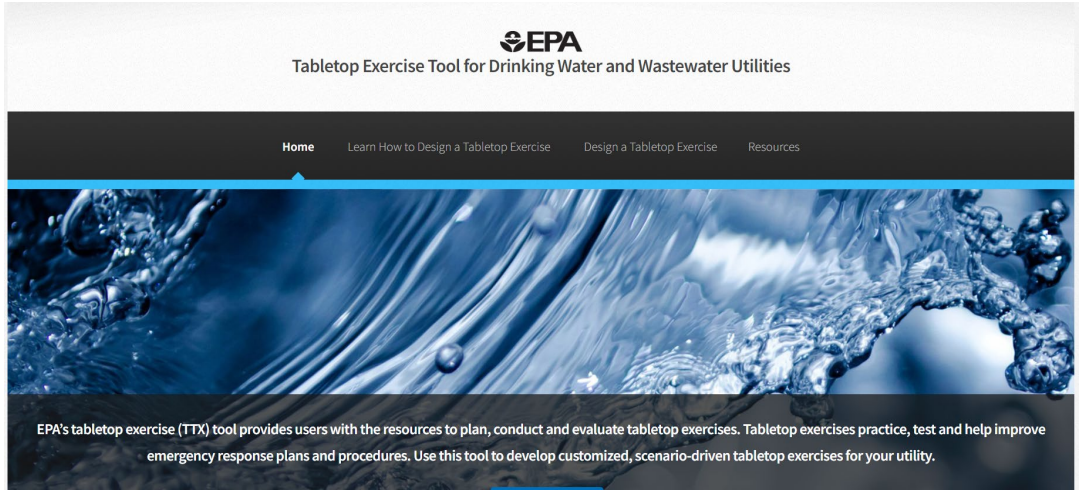
Step 5: Validating Capabilities

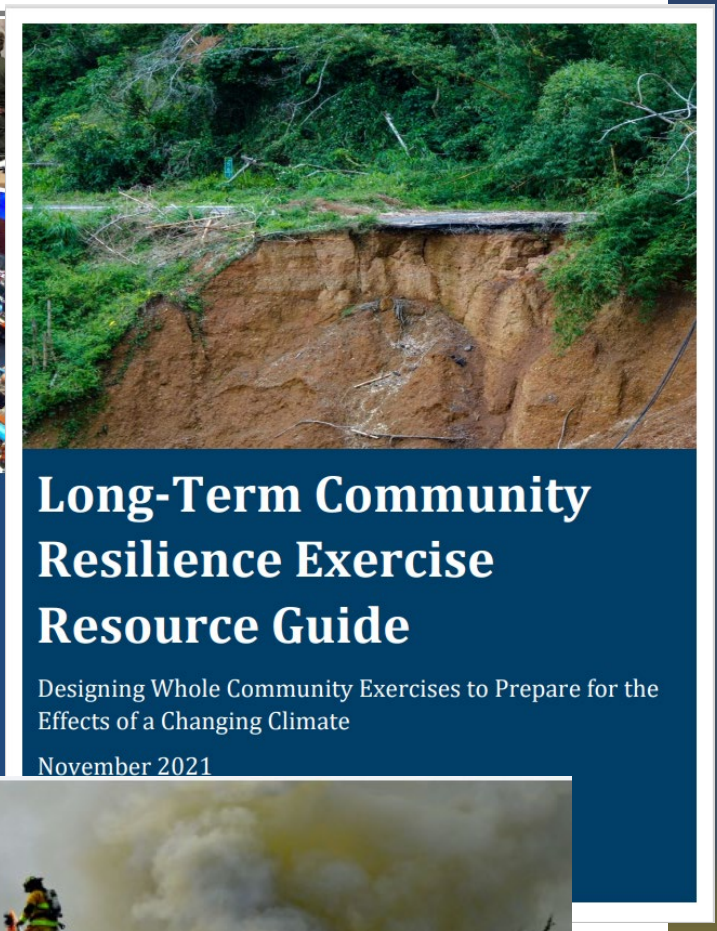


- Participating in exercises helps identify gaps in your plans and capabilities.
- Exercises build preparedness for threats and hazards by providing a low-risk, cost-effective environment to:
  - Test and validate plans, policies, procedures and capabilities
  - Identify resource requirements, capability gaps, strengths, areas for improvement, and potential best practices

Exercise Resources

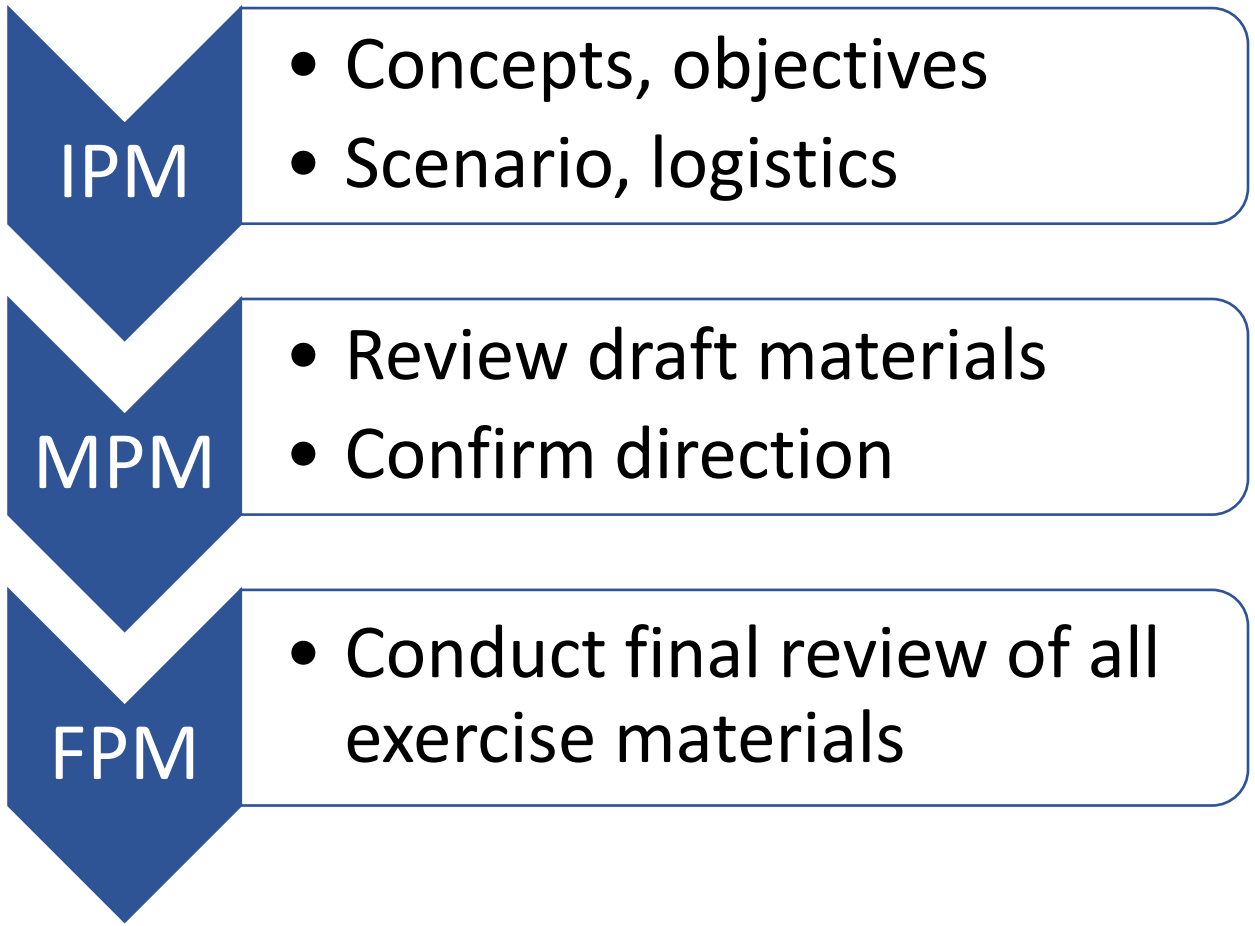
- HSEEP
- Resource guides
- PrepToolkit
- EPA





Exercise Design and Development

- Design objectives and scenario
- Develop exercise materials
- Conduct exercise
- Evaluate exercise
- Write after action report/improvement plan



Discussion-Based Exercises

- Seminar
- Workshop
- Tabletop (TTX)
- Game

Operations Based Exercises

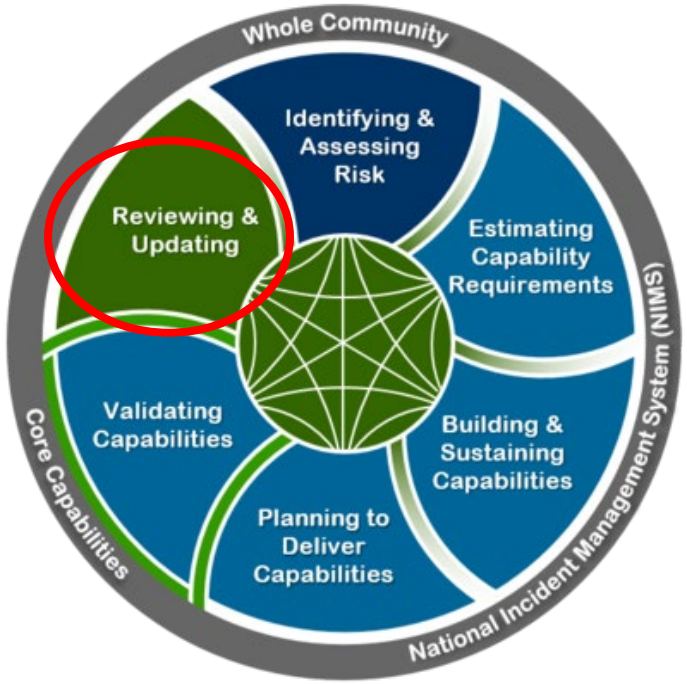
- Drill
- Functional Exercise
- Full-scale Exercise

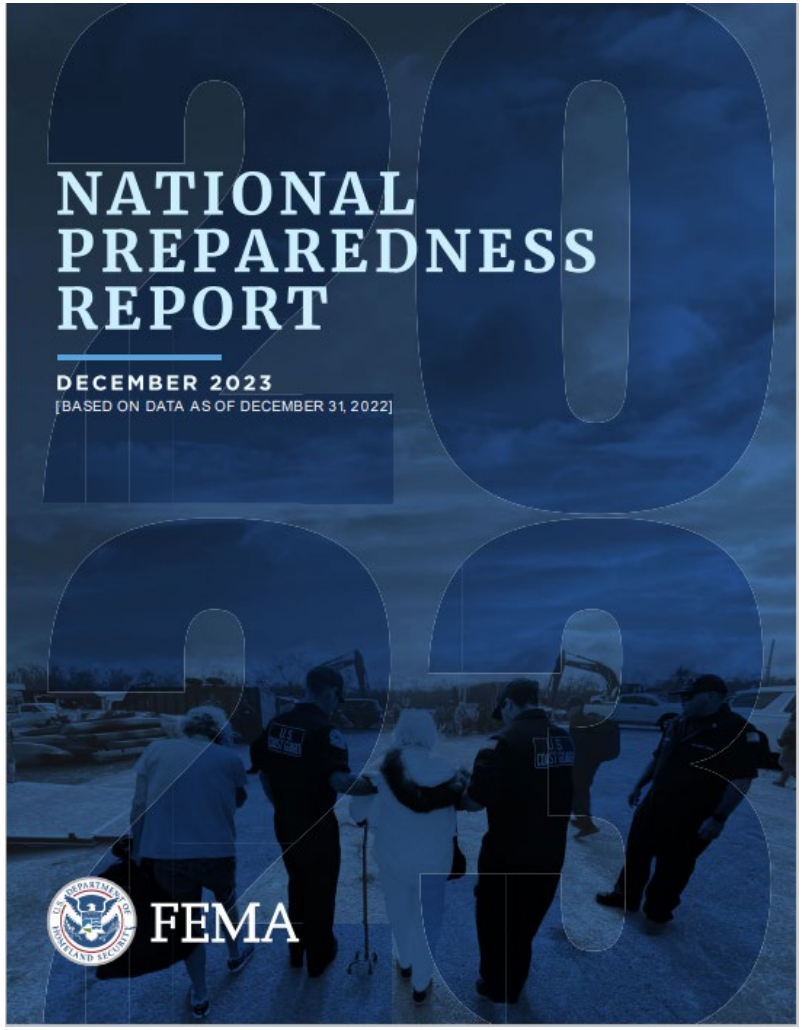
Exercise Series

Seminar → TTX → Drill → Functional → Full-scale

Step 6: Reviewing and Updating

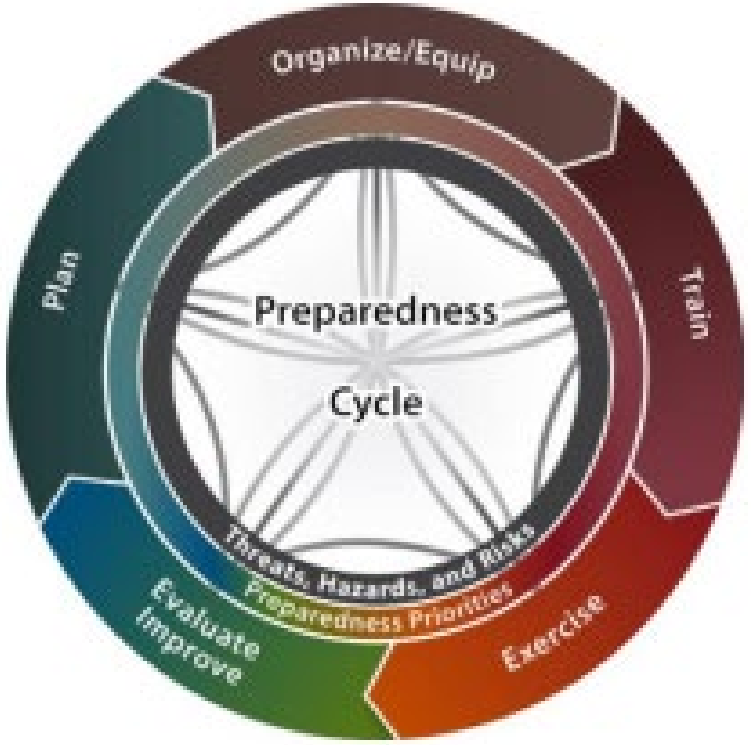
- Regularly review and update all capabilities, resources, and plans





Integrated Preparedness Plan

- IPP Workshop (IPPW)
  - Consider range of preparedness activities
  - Senior leader(s) guidance
  - Identify priorities
- Planning Team – Whole Community
- How do we get them there? (WIIFM?)



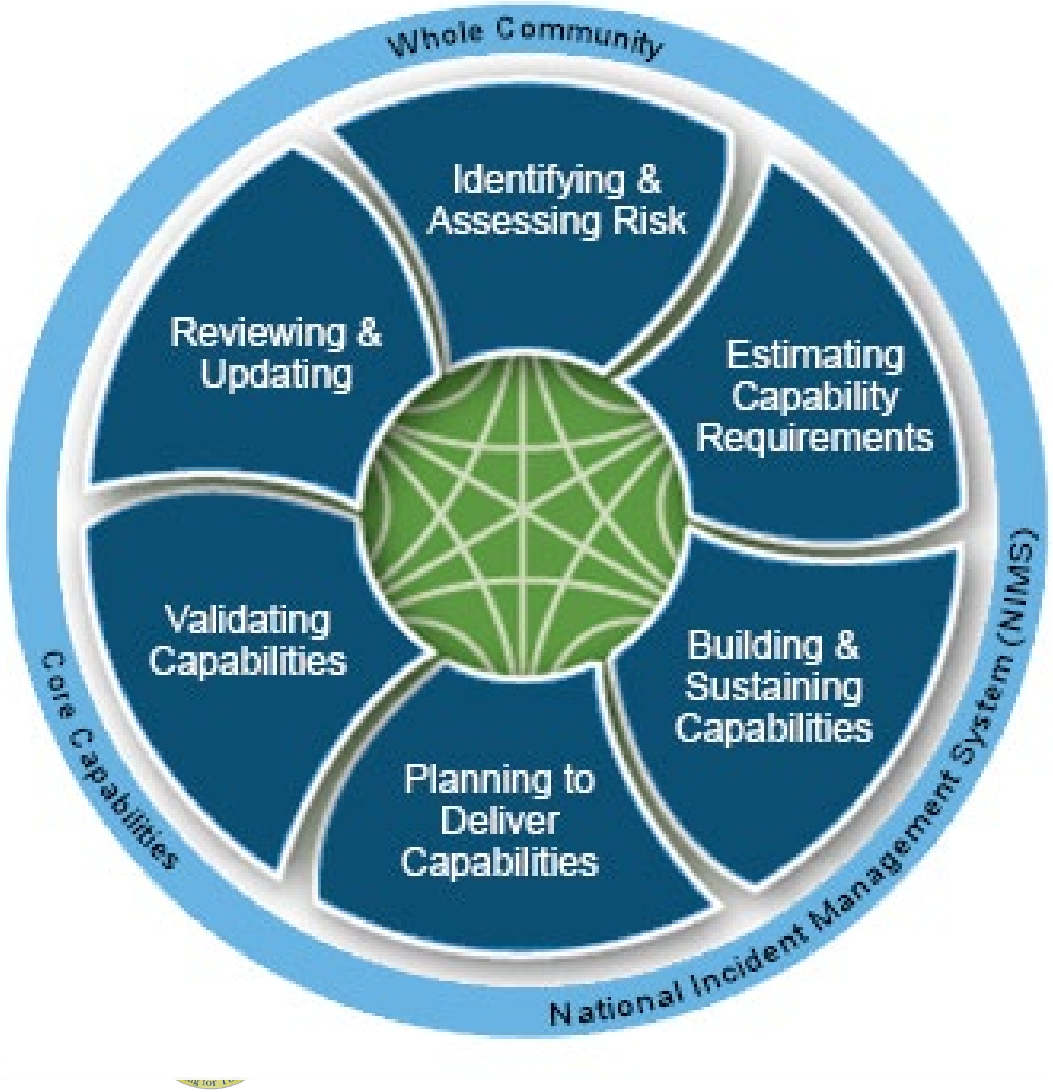
Identify Preparedness Priority Factors → Establish Preparedness Priorities → Develop a Multi-Year Schedule → Establish Program Reporting

Plan Reviews

- Preparedness is a shared responsibility
- Community-wide involvement is an important principle in preparedness
- NPS calls for ***everyone*** to be involved:

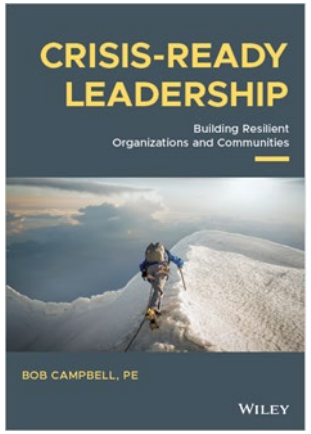
- What are the advantages of including stakeholders early on and throughout the THIRA/SPR process?
  - Accurate and comprehensive assessments
  - Empowers them to use the data to drive priorities and investments
  - Buy-in from all stakeholders

Preparedness Summary



- Conduct risk assessment: plume modeling, impact analysis on community
- Estimate capability requirements with SMART goal statements (delivery)
- Build capabilities: POETE
- Planning: ERP, EOP integration, procedures
- Validate: Exercises and AARs

Resilience



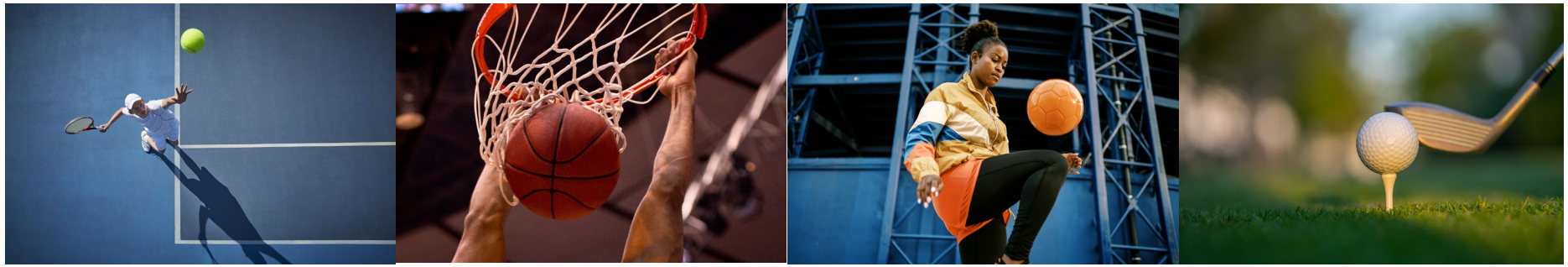
Crisis-Ready Leadership: Building Resilient Organizations and Communities

Meriam-Webster Dictionary defines **Resilience** as:

1: the capability of a strained body to recover its size and shape after deformation caused especially by compressive stress

2: an ability to recover from or adjust easily to misfortune or change

Community Resilience is defined by National Institute of Standards and Technology (NIST) as “the ability of a community to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.”



Resilience

Crisis-Ready Leadership: Building Resilient Organizations and Communities

A systematic approach to resilience:

1. Define the system (e.g., community, business, school, economy, market, infrastructure, etc.)
2. Identify local, relevant hazards and assess the risk. These are the stressors that will be applied to your system.
3. Identify the components of the system that are impacted by the hazards.
4. Identify interdependent components and the extent of impact.
5. Aggregate the impact on all components based on risk of each hazard.
6. Determine vulnerabilities within the system.
7. Develop strategies to strengthen components to enhance resilience.
8. Evaluate and prioritize resilience measures that increase system-wide resilience.
9. Implement actions to increase resilience.

Resilience

Crisis-Ready Leadership: Building Resilient Organizations and Communities

The 6 R's of Resilience outline several attributes of resilient systems that can be used to formulate resilience measures or evaluate the extent of a system's resilience.

Ready: How well is the system prepared for the hazards and threats outlined in its risk profile? How prepared is the organization to take advantage of opportunities in a timely manner?

Redundant: Are redundancies built into essential components of the system? e.g., redundant sources of supply, RHMRTs, key staffing, sources of water, facility controls, secondary containment, etc.

Repairable: How easily and quickly can an essential component of the system be repaired if it is damaged? Are the supplies, resources, and procedures in place to return the damaged component to an operable state within the required timeframe?

Resistant: How resistant to damage are the essential components of the system? e.g., are structures built to a standard that can resist or prevent damage from hazards such as flooding, wind, hail, blasts, earthquake, etc.?

Robust: How strong and persistent are the system and its components when facing disruptions? Is the system mature, defined, managed, scalable, replicable, etc.?

Reserves: Have leaders adequately established and maintained reserves such as sufficient cash to maintain operations during cash flow interruptions, liquid assets that can be converted to cash, excess personnel capacity to deal with staffing shortages, adequate inventory reserves, or additional space to accommodate physical distancing or take advantage of process modifications?

Hazmat Resilience

A Systematic Approach	Example
1. Define the system (e.g., community, business, school, economy, market, infrastructure, etc.)	Community
2. Identify local, relevant hazards and assess the risk. These are the stressors that will be applied to your system.	Hazmat facilities, rails, pipelines
3. Identify the components of the system that are impacted by the hazards.	Downwind populations, businesses, water supply
4. Identify interdependent components and the extent of impact.	Employers, water system and users, transportation routes
5. Aggregate the impact on all components based on risk of each hazard.	$$, health/safety
6. Determine vulnerabilities within the system.	RHMRT response time, less than adequate facility controls, notification systems (reach)
7. Develop strategies to strengthen components to enhance resilience.	Plus up local FDs, reachback, facility/community awareness
8. Evaluate and prioritize resilience measures that increase system-wide resilience.	Facility preparedness, whole community exercises, community awareness
9. Implement actions to increase resilience.	ERP, exercise project, community prep workshop, SIP workshop, LEPC strategic planning

Hazmat Resilience

Measurable Criteria for Risk of Hazmat Incident

Criteria	Community
Ready	Risk assessment integrated future risk projections; current emergency response plan; whole community exercises; EOC/PIO notification training and exercises
Robust	Adopted latest Build code/stds at facilities; zoning prohibits buildings hazmat facilities near housing developments; consistent and mature Hazmat IC training
Repairable	C-kits and other repair kits available for railcars, tanks, etc.
Redundant	Evacuation routes; overlapping RHMRTs and local resources; back-up recovery teams; multiple mass alerting/warning systems
Reserves	Excess boom supply for waterways; alternate water supplies/tanks; excess inventory of detection, PPE, decon equipment; backup Hazmat teams available
Resistant	Structurally sound secondary containment; latest railcar design

Atchison, KS – USA (Oct. 21, 2016)

The Incident:

- Sulfuric Acid inadvertently unloaded into a tank of Sodium Hypochlorite, releasing Chlorine Gas
- The dense cloud of Chlorine Gas drifted over the surrounding community and neighborhoods
- 140 employees, responders and residents injured in the surrounding community

Root Causes:

- Human Factors – unfamiliarity with facility equipment, coupling design, labeling pipelines, automated shutdown/interlocks
- PPE inaccessible during the incident
- Procedures not followed

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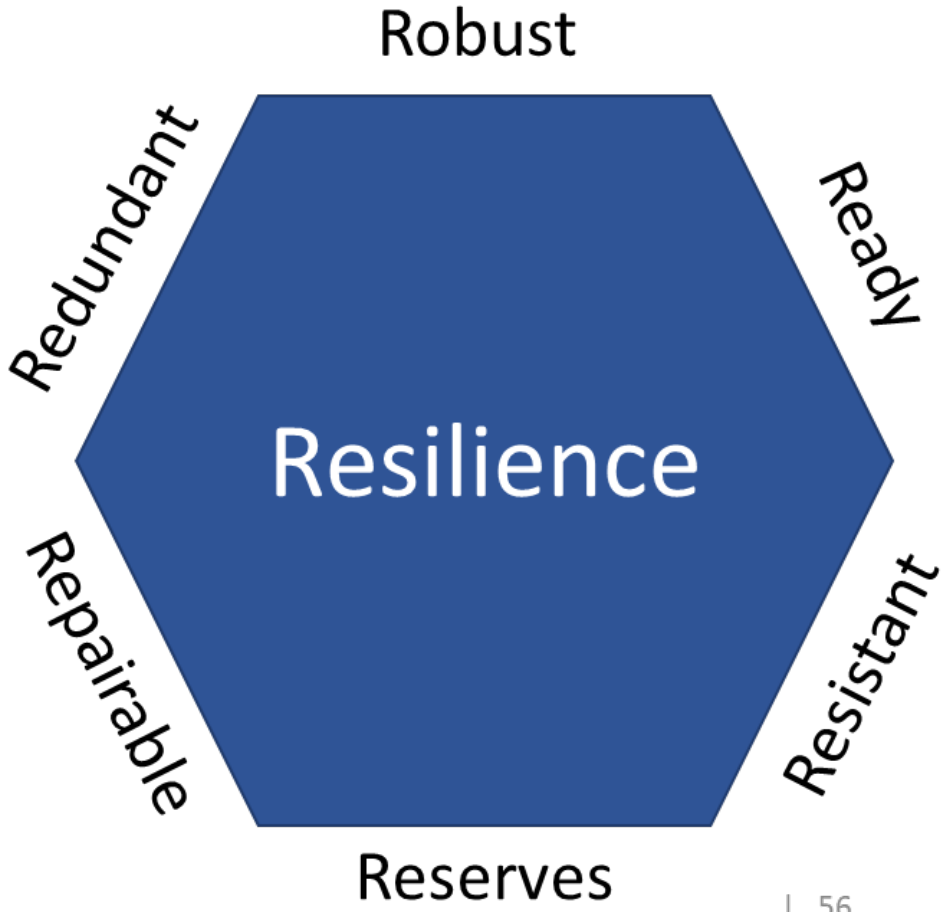
Summary



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Grazie - danke – شكرا - THANK YOU – merci - спасибо

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