

# Local Government Risk Agency Update

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# Agenda

1. Background and key issues
2. Draft models for assessing risk
  - Examples
  - Discuss advantages and disadvantages

# Background

## Issue

- Silos of activity
- Cross sector integration
- Risk Management vs Resilience
- Range of hazards
- 'Areas' of risk for local government
- Lack of risk management resources
- Management of residual risks
- Risk management 'maturity'

## Comment

- Need framework applicable at corporate & activity level
- DRM, AM, CDEM, Lifelines, CCA, policy development, social sciences, economics, and sustainable dev. Etc.
- Is resilience a result of good risk management, or an approach in itself ?
- Natural, technological and human-caused hazards, as well as 'stress' events, 'shock' events and 'black swans'.
- Corporate risk, Activity risk (**Asset risk**, delivery risk, planning risk, and management risk) . Also risks more broadly to communities from **natural hazards**.
- Many smaller local government agencies lack the knowledge, skills and resources to manage risks appropriately.
- There is a lack of clarity around the range of approaches used in the management of residual risks.
- There is a lack of understanding of the maturity and competence of risk management across local government.

## Example – sector confusion in the Hazards / AM sector

- Asset management practice *often* does not incorporate natural hazard risk assessments from, for example, Lifelines studies. Assessments are often high level / generic and concentrate on the risk of failure.
- Lifelines groups *generally* undertake a ‘vulnerability’ assessment which overlays hazard extents on infrastructure networks and prioritises based on criticality.
- Disaster risk management often uses a L x C risk approach but also considers exposure, vulnerability and hazard.
- CDEM groups assess risk based on SMUG: Seriousness, Manageability, Urgency and Growth.
- Climate vulnerability is a function of exposure, sensitivity and adaptive capacity.

# Example – sector confusion

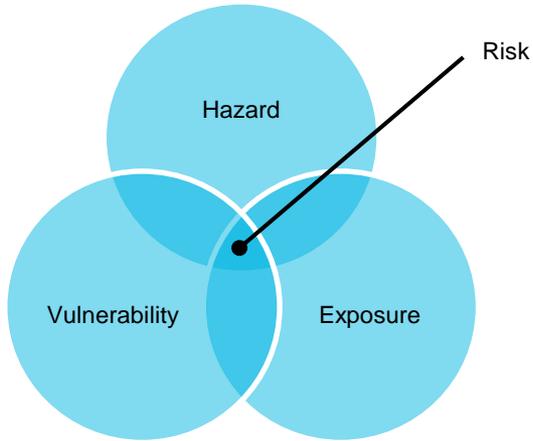


Fig 1: The intersection of hazard, exposure and vulnerability yields the risk



Fig 2: Risk can be assessed through a combination of likelihood and consequence (ISO31000)

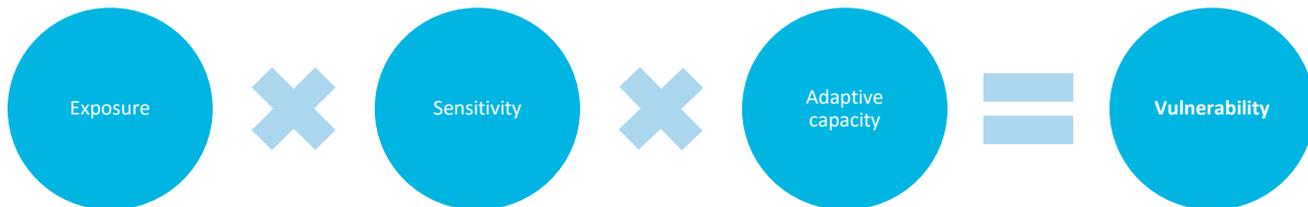


Fig 3: Vulnerability can be assessed by considering exposure, sensitivity and adaptive capacity (IPCC)

# Risk assessment Areas in Councils

## Intrinsic

### Corporate level

- Governance risk
- Business risk
- Financial management
- Legal / compliance
- Asset risk
- IT Risk
- Human Resource risk
- H&S

### Activity level

- Asset risk, delivery risk, planning risk, management risk

### Project level

- Project management, H&S, financial management, stakeholder risk etc

## Extrinsic

### Corporate level

- Hazard impacts on communities (including natural hazards, pandemics etc)
- Climate change impacts
- Societal incl inequality / equity
- Economic factors (global / national)
- Resource scarcity (eg oil prices)

### Activity level

- Hazard impacts on communities (including natural hazards, pandemics)
- Climate change impacts

*Intrinsic* – those risks that impact on Council or their activities, or the services they deliver.

*Extrinsic* – those risks that impact on communities directly that Council has less control over.

# Challenge

1. To provide a single high-level framework which can be used to assess risk at both the corporate level AND the activity level?

***AND, importantly –***

Be applicable to:

- Risks to Council assets through failure (eg deterioration)
- Risks to Council assets from natural hazards
- Risks to communities from natural hazards

2. To develop a model for natural hazards and assets that clarifies and simplifies terminologies across AM, Lifelines, DRM, CCA etc.?

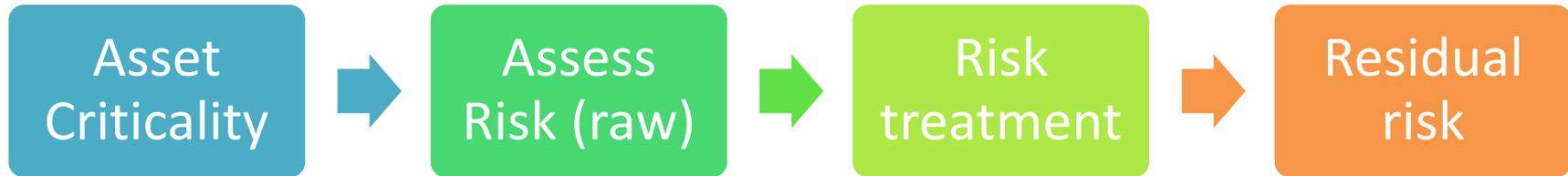
Draft Risk Models for discussion

## Key elements

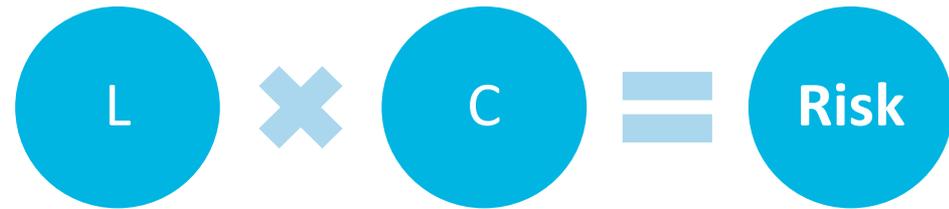
- Likelihood and consequence approach
- Applicable at a corporate level, as well as activity level (eg asset management and land use planning)
- Considers hazard likelihood
- Considers asset condition (fragility or vulnerability) – related to age, material, design etc.
- Considers consequence –
  - For assets: relates to the *criticality* of the asset in question
  - For land use: relates to factors such as impact on property, buildings, life / safety, infrastructure,
  - Includes community vulnerability factors
- Captures raw (gross / untreated) risk and treated (net) risk

# Risk management approach

- Typical approach – for assets



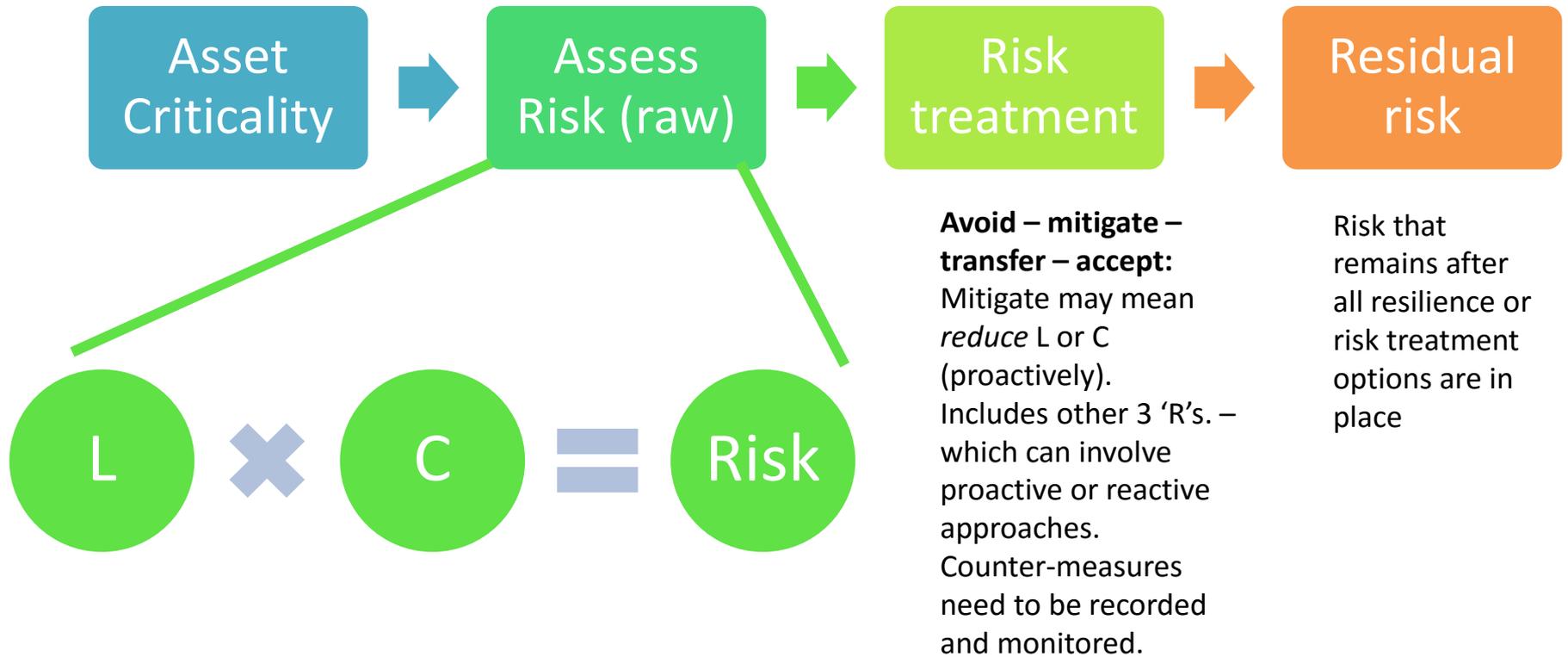
- Risk assessment generally involves assessing both **likelihood** and **consequence** of an event



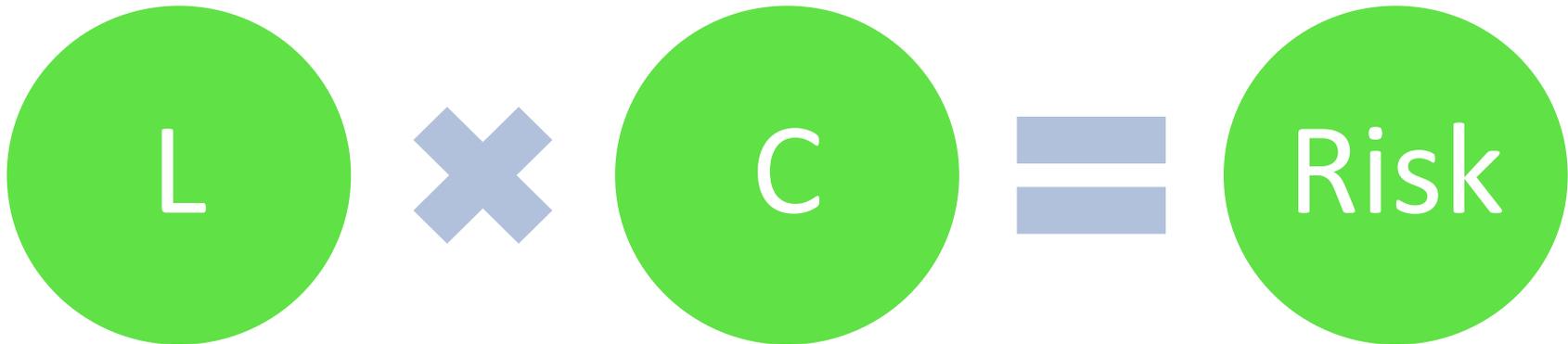
- Risk treatment may include: Avoid – reduce/mitigate – transfer or accept



# Model 1:



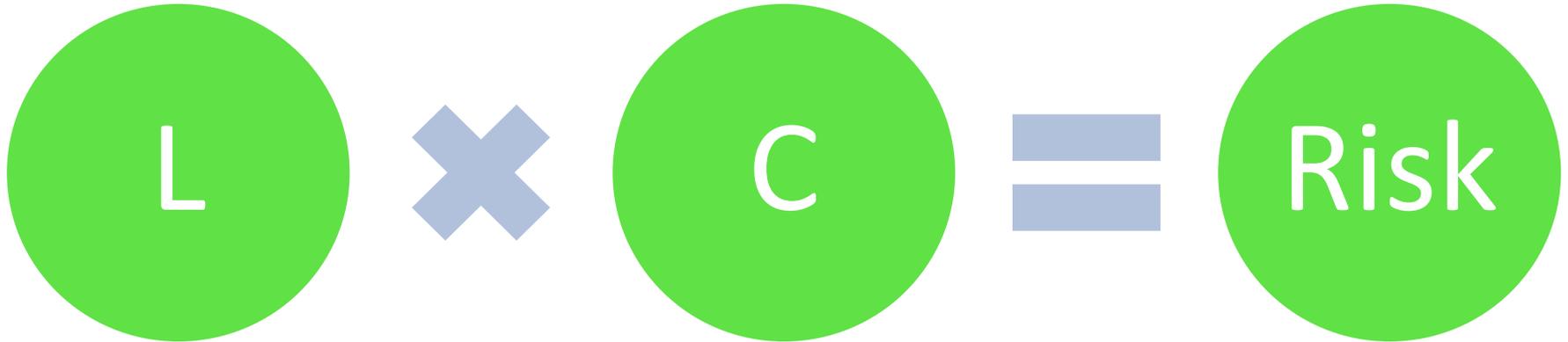
## Examples



Where to fit:

- Hazard likelihood?
- Exposure to hazard?
- Asset vulnerability / fragility?
- Asset criticality?
- Community vulnerability?

## Example: risk of pipe failure (loss of service) due to poor condition (no external hazard)

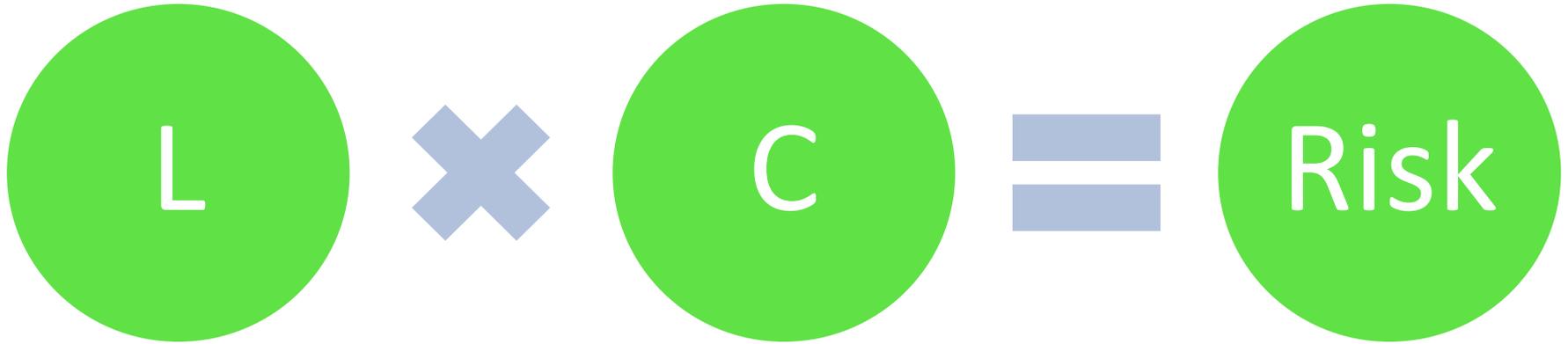


### Asset related 'vulnerability':

- Condition of asset
- Age of asset
- Material of asset

- Based on asset 'criticality'
- Taking into account vulnerable populations that are served as there will be a higher consequence due to failure
- Other consequence criteria (eg environmental)

# Example: risk of earthquake liquefaction impacting pipelines



- EQ magnitude / ARI
- Liquefaction zones (exp)
- Asset 'vulnerability' (condition, age etc)

- Based on asset 'criticality'
- Taking into account vulnerable populations that are served as there will be a higher consequence due to failure
- Other consequence criteria (eg environmental)

# Example: risk of earthquake liquefaction impacting an area / community

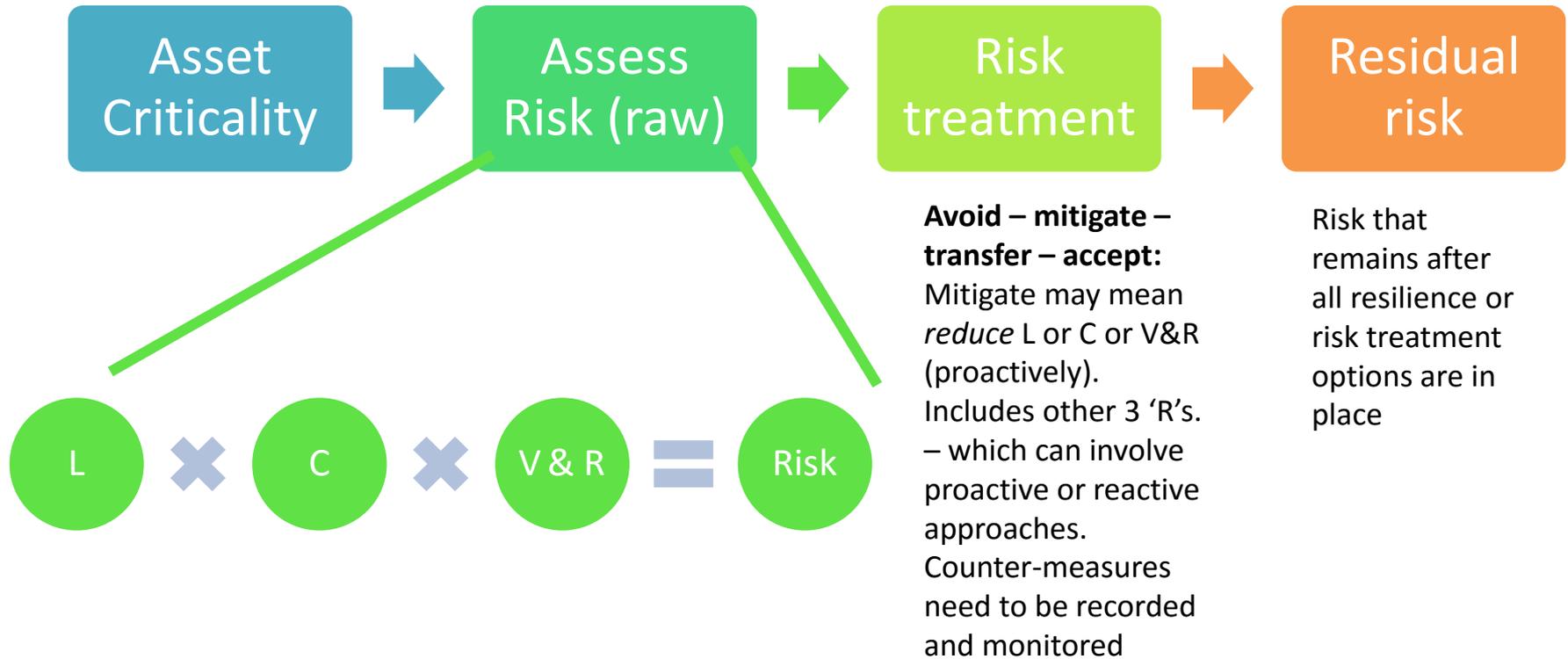


- EQ magnitude / ARI
- Liquefaction zones

- People exposed
- Assets / prop exposed (\$)
- Vulnerability of people and assets
- Importance / criticality of assets (eg hospital)

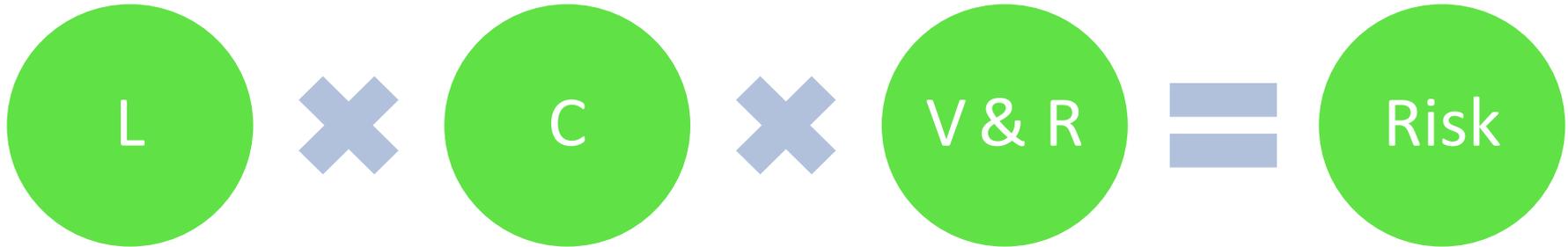
A better model?

## Model 2:



***Vulnerability*** in this sense is 'inherent vulnerability' and not 'biophysical vulnerability' (after Brooks, 2003). That is vulnerability independent of a hazard.

# Example: risk of earthquake liquefaction impacting an area / community

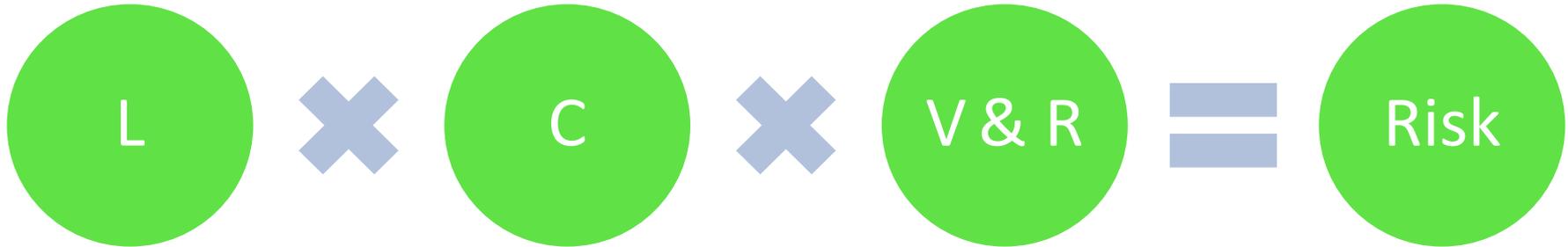


- EQ magnitude / ARI
- Liquefaction zones

- People exposed
- Assets exposed (\$)
- 3rd party loss
- Environmental
- Critical buildings or assets affected (eg hospitals)

- Vulnerability of communities
- Vulnerability and / or resilience of assets

# Example: risk of earthquake liquefaction impacting on an asset



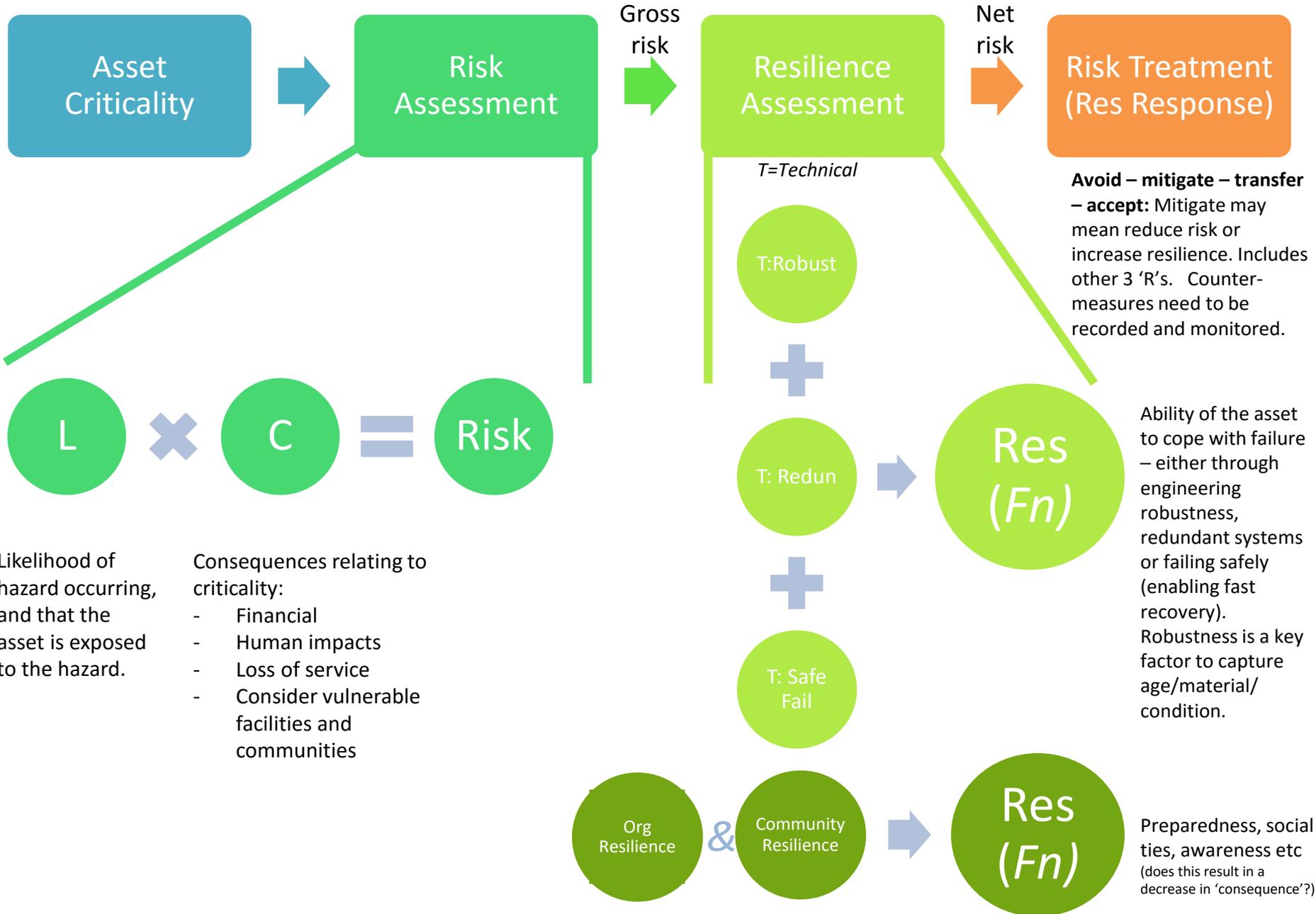
- EQ magnitude / ARI
- Liquefaction zones

- People exposed
- Assets exposed (\$)
- 3rd party loss
- Environmental
- Critical buildings or assets affected (eg hospitals)

- Inherent vulnerability and / or resilience of assets

A third option

# Model 3:



## Summary

- L x C model can work and is useful for corporate level risks
- L x C x V&R is useful for activity level and extrinsic risks. This incorporates many of the elements found across disciplines.
- Could provide basis for a consistent approach across the various disciplines
- Separating vulnerability (and resilience) has benefits in transparency and application
- This model is scalable and flexible
- Application would require a range of consequence tables / templates for different risk areas.
- Consistent with ISO31000

## Further work / next steps

- Further sector consultation (workshops in Nov) ideally to bring in perspectives from AM, CDEM, CCA, Lifelines etc
- Ultimately – develop guidance on approaches for different risk areas (corporate, activity, intrinsic/extrinsic) and how these interlink
- Templates for likelihood and consequence tables, and risk ratings
  - Likelihood values (ARI) need to be developed for different hazards.
  - Consequence criteria and templates need to be developed for all risk areas – and for different applications (eg asset assessment versus land use assessment).
- How to consider ‘resilience’ and black swan events separately (the ‘what if’ scenarios)?
- Better understand risk treatment processes and assessment of options (including how risk ‘mitigation’ links with the ‘Four Rs’)
- Management of residual risks: guidance
- Risk assessment ‘maturity’ tracking

Thank You