
Risk Assessment and Mitigation in Cantera

Evan Lacroix, Connor Mastropoll,
Nate McNeill, Tony Rodriguez



WPI



Mission:

To perform a disaster risk assessment for the Cantera Peninsula and provide guidelines for damage mitigation and recovery optimization in the Cantera community

Outline

Background

Objectives

Methods

Interviews

Assessment/ Development

Deliverables

Conclusion

Background: San Juan



est.
1521



10%
of island pop.



30%
of workforce



Background:

San Juan



- Disaster Vulnerability
 - Flooding, Tsunamis, Earthquakes, Hurricanes
- Exposure: 100-year flood/\$1.2 billion
- Poverty: 33% below poverty line
- Economic stress: Debt crisis

Efforts: *100 Resilient Cities*

- Resilient Urban Planning
- Outreach: workshops, surveys, interviews

Background: **Cantera**



Issues:

- Geography - Low elevation
- Population - ~10,000 residents
- Income - \$10,000/yr
- Social - Resistant to interference

Efforts:

Compañía para el Desarrollo Integral de la Península de Cantera - Sponsor

Objectives

Interviews

Identify issues in the community

Assessment

Investigate community issues

Development
of Materials
Compile guidelines

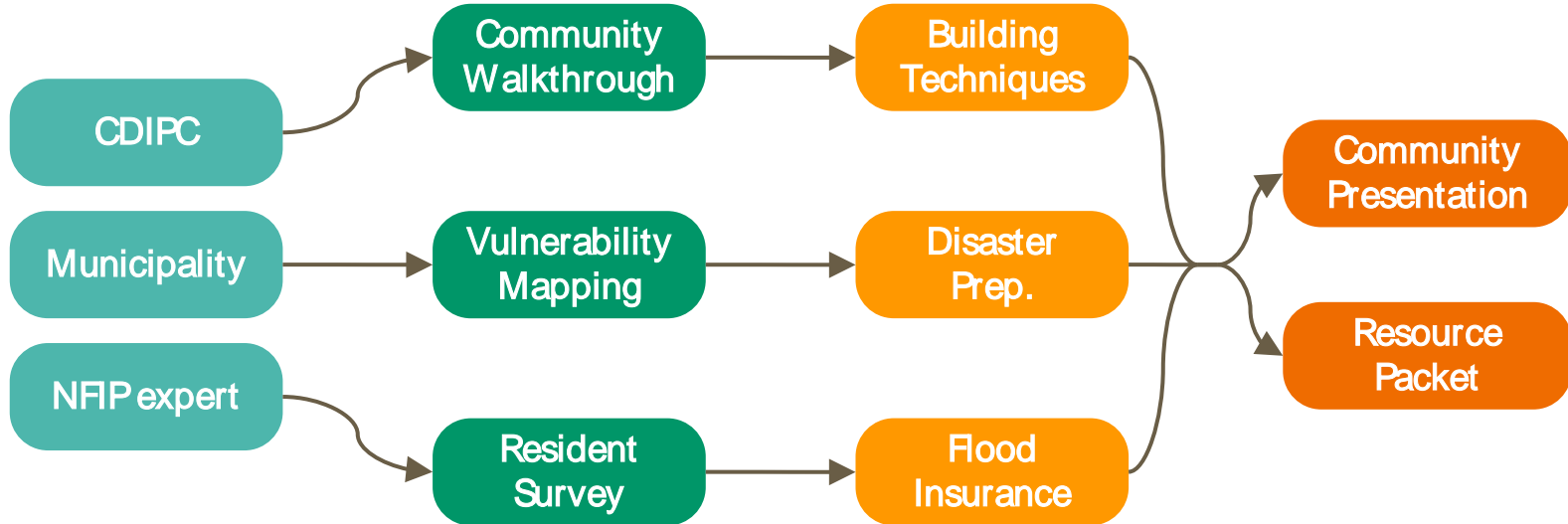
Distribution of
Deliverables
Present results and materials

Interviews

Assessment

Development of
Materials

Distribution of
Deliverables



Interviews

CDIPC

Municipality

NFIP expert

Interview:

ODIPC

Luis Cintrón - *Executive Director*

Alfredo Pérez Zapata - *Project Manager*

Defined our project scope

Assisted in the development of our

Assisted in determining appropriate



Interview:

ODIPC

Tania Arroyo - *Social Worker*

Johan Burgos - *Social Worker*

Initial Interview

Consejo Vecinal

Survey revisions

Survey distribution



Interview: Municipality of San Juan

Alejandra M. Castrodad-Rodríguez:

Chief Resilience Officer, San Juan, PR

In depth information about San Juan

Hazards (Natural disasters)

Socioeconomics

Emergency response delay



Interview: National Flood Insurance Program (NFIP)

Juan Antonio Gonzalez-Moscoso: *Policy Analysis Consultant*

NFIP expert in Puerto Rico

Received information about:

Amount of policies

List of insurance agents

Recommended a survey or focus group



Assessment and Development

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graph LR; A[Assessment and Development] --> B[Community Walkthrough]; A --> C[GIS Mapping]; A --> D[Flood Insurance Survey];
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**Community
Walkthrough**

Building Techniques

GIS Mapping

Disaster Preparedness

**Flood Insurance
Survey**

Flood Insurance Info

Assessment: Community Walkthrough

Assessing Building Techniques

Highlight areas vulnerable to flooding

Architectural and Engineering Case Studies

Community Walkthrough







Development: Building Techniques Research

Objective: to find affordable options to mitigate damages due to natural disasters



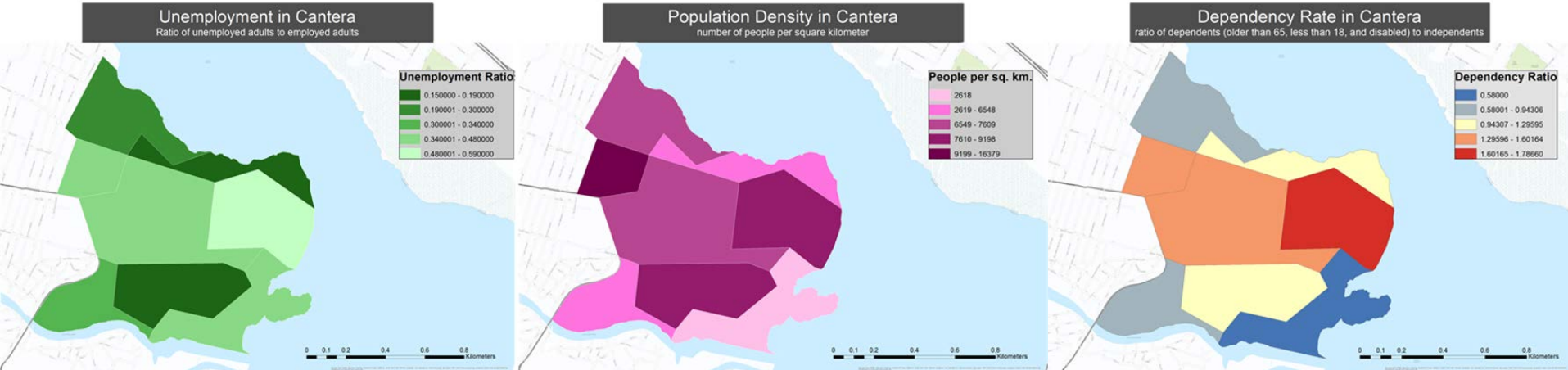
FEMA

Assessment: GIS Mapping

Multiple hazard mapping

Unemployment

Pop. density



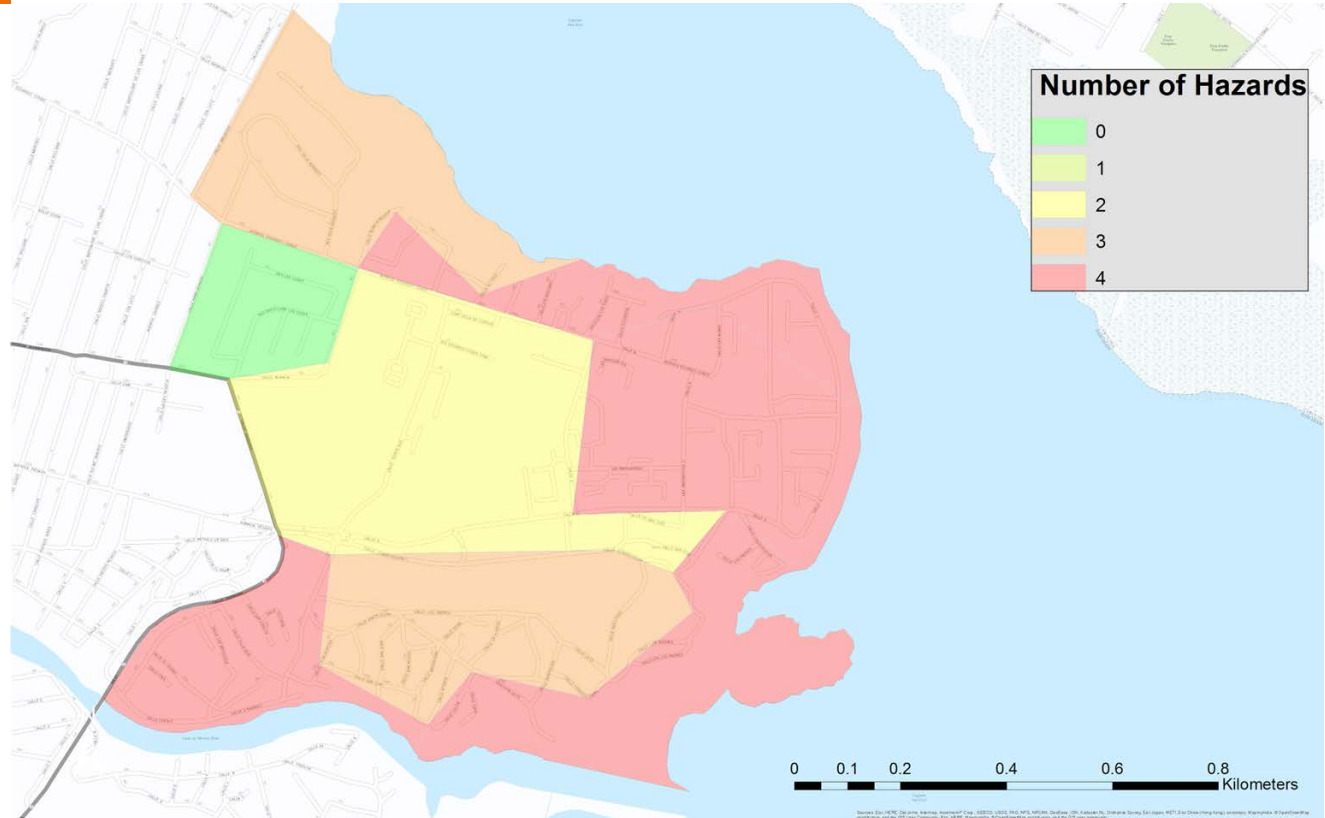
Assessment: Hazard Vulnerability

Liquefaction

Storm Surge

Tsunami

Flood Risk



Development: General Disaster Preparedness



Ready

Prepare. Plan. Stay Informed.



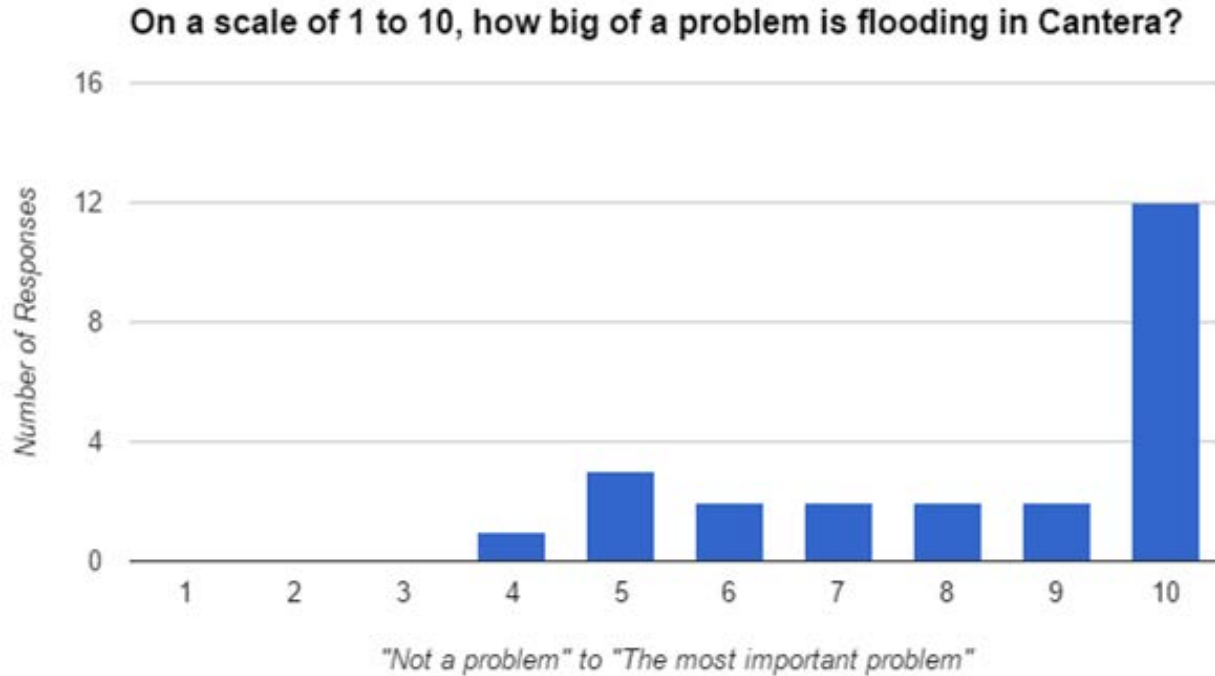
**American
Red Cross**

Assessment: Flood Insurance Survey

- Influenced by the interviews
- Distribution of the survey

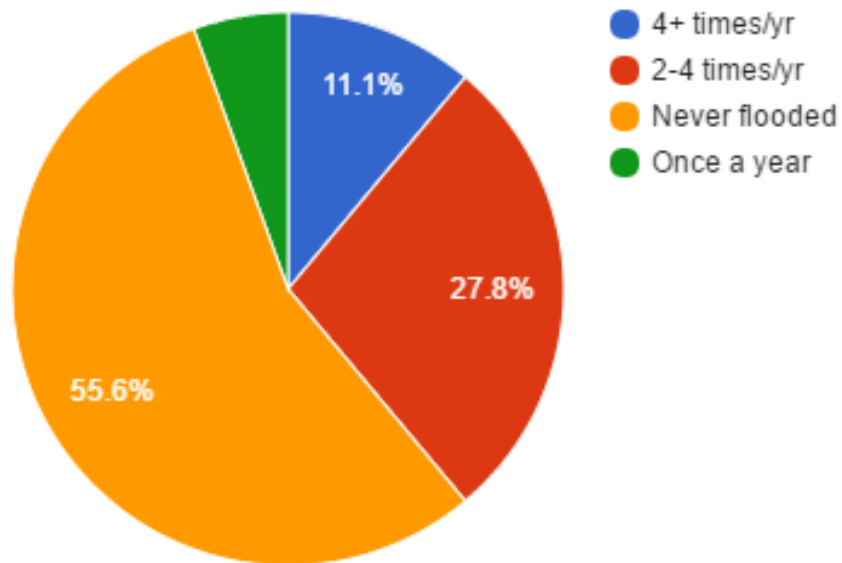


Assessment: Survey Results



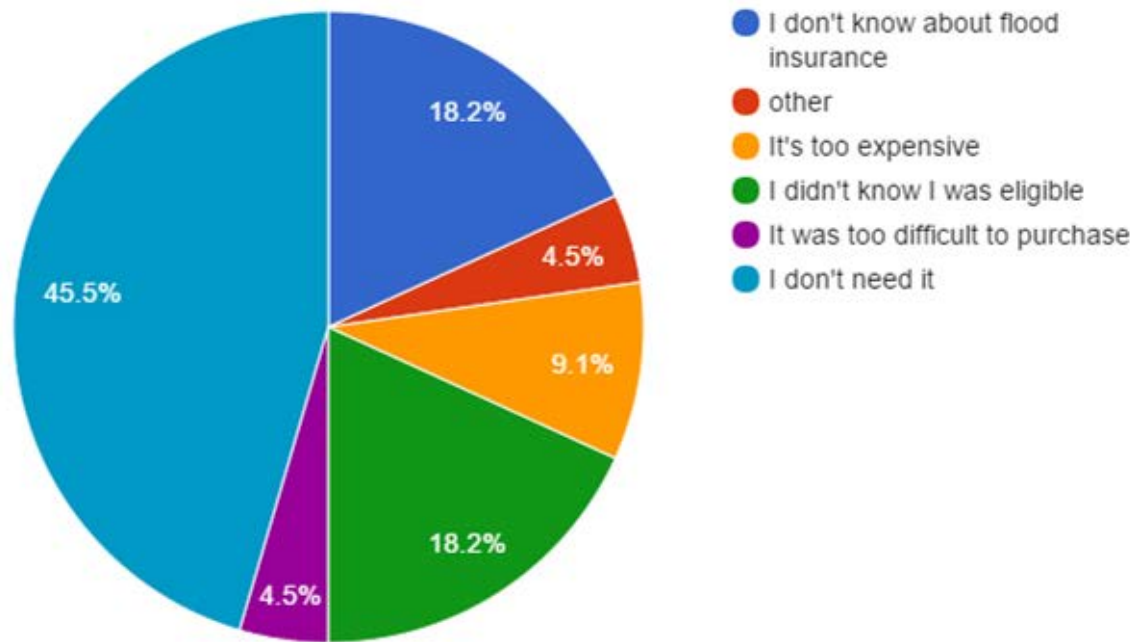
Assessment: Survey Results cont.

How often does your home flood?



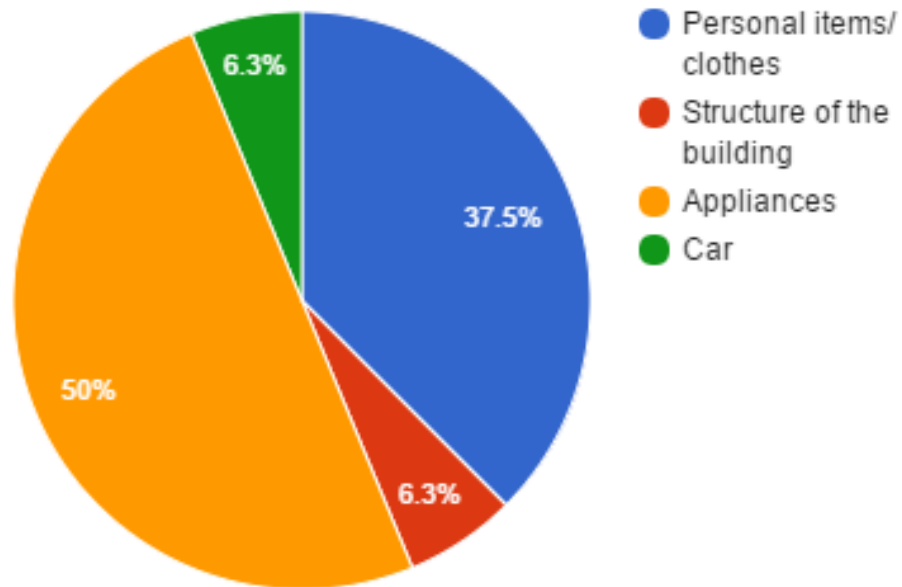
Assessment: Survey Results cont.

If you do not have flood insurance, why not?



Assessment: Survey Results cont.

What do floods damage in your home?



Assessment: Survey Results Analysis

- Conclusions
 - Flooding is a problem understood by the community
 - Lack of information on preventative measures
- Project needs to
 - Inform the community about insurance
 - Connect the community to affordable insurance

Deliverables

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graph LR; A[Deliverables] --> B[Resource Packet]; A --> C[Community Presentation];
```

Resource Packet

Community
Presentation

Informational Resource Packet

Provides information on:

Retrofitting building tips

How to obtain and use flood insurance

General disaster preparedness

Community Presentation

Powerpoint and script:

Vulnerability mapping

Housing damage mitigation strategies

Basic Flood Insurance information and FAQs

General Emergency Preparedness

Guidelines:

Improving Structural Integrity of a Household



Feasible measures to take against high winds/hurricanes

Feasible measures to take against flooding

Flood Damage-Resistant Materials

Unacceptable Materials

Avoiding Hurricane Damage: A Checklist for Owners

- Hurricane Ties
- Storm Shutters

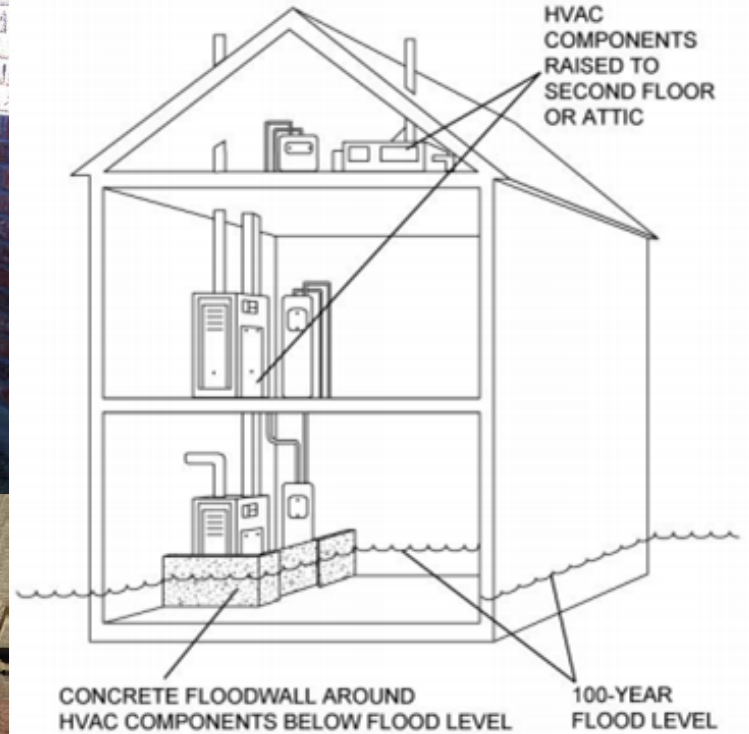


Reducing Flood Risk for Buildings that can't be Elevated

- Elevating or Relocating important utilities
- Exterior Sealant

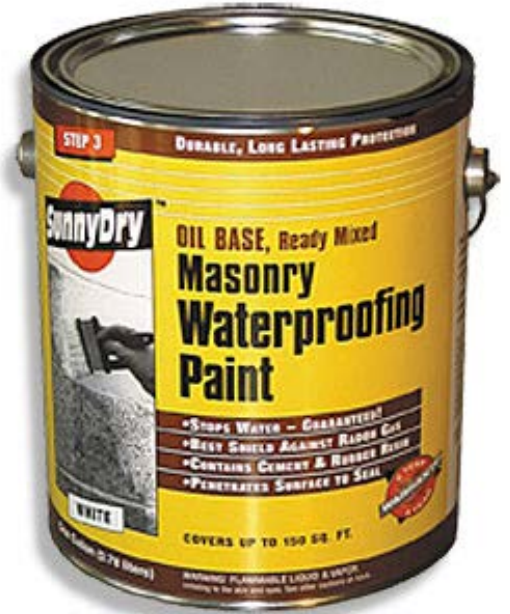
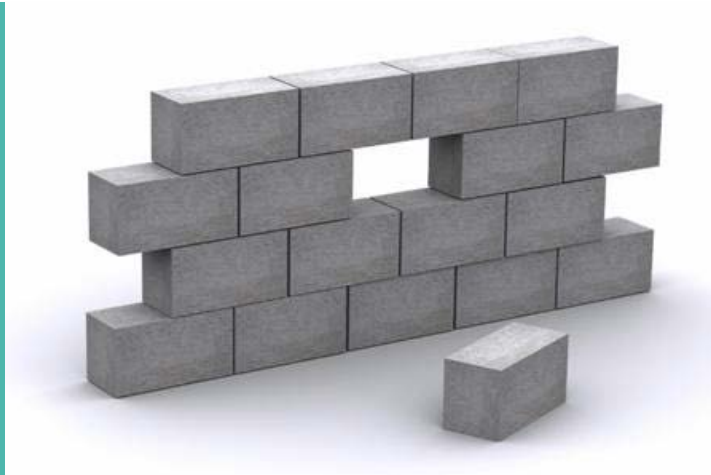


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Flood Damage-Resistant Materials

- Concrete
- Vinyl tile over Concrete floor
- Waterproof paint



Unacceptable Building Materials

- Wood
- Drywall
- Wallpaper



Guidelines: Flood Insurance

Importance of obtaining flood insurance

How to obtain flood insurance

How to use flood insurance

Before

After



Guidelines: Flood Insurance Research

Flood Insurance Rate Map (FIRM)

Zone X: Low to moderate risk

- Qualify for reduced annual premiums

Zone AE: High risk

- Premiums increase with decreasing elevation



Before a Flood

Safeguard your possessions

Prepare your house

Have an evacuation plan



After a Flood

If any flood damage is found, contact your insurance agent to begin the claims process

An adjuster will be provided to assist you in the claims process



Guidelines: General Disaster Preparedness Tips

Divided into four categories:

Floods

Hurricanes

Tsunamis

Earthquakes

Flood

- Assemble an emergency kit
- Evacuate if safe



Hurricane

- Fridge and Freezer on coldest setting
- Sturdy shoes and flashlight by bed
- Do not drink tap water until deemed safe



Tsunami

- Evacuate to higher ground
- Leave belongings, your life is more important
- Do not return until emergency responders



Earthquake

- Secure belongings and appliances
- Drop, cover, and hold on



wild How to Deal With Being Indoors During an Earthquake



Objectives

Interviews

Identify issues in the community

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Investigate community issues

Development
of Materials
Compile guidelines

Distribution of
Deliverables
Present results and materials

Conclusions

Our project researched and determined the most effective ways to minimize disaster risk in Cantera

Ideas were refined into three points:

- Guidelines to improve housing infrastructure in Cantera

- Guidelines on obtaining and using flood insurance

- General disaster preparedness tips

Community survey shed light on obstacles

Recommendations

Distribution of deliverables

- Community presentation and packet

Disaster-resistant construction

- Materials

- List of contractors

Flood insurance

- Public info

Acknowledgements

The CDIPC

Luis Cintrón and Alfredo Pérez Zapata -
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Lauren Mathews - Director

Tania Arroyo - Social Worker

Johan Burgos - Social Worker

Alejandra M. Castrodad-Rodríguez -
Municipality of San Juan

Juan Gonzalez-Moscoso - NFIP expert

Consejo Vecinal - Community Leaders

Sarah Crowne - ID 2050 Professor

Beatriz Arsuaga - Local Coordinator

Questions?