Resilient Campus Planning

Part of the RoseVilla Flourish Project

Presented By:

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ROSEVILLA

Agenda

RESILIENT CAMPUS PLANNING | ROSEVILLA

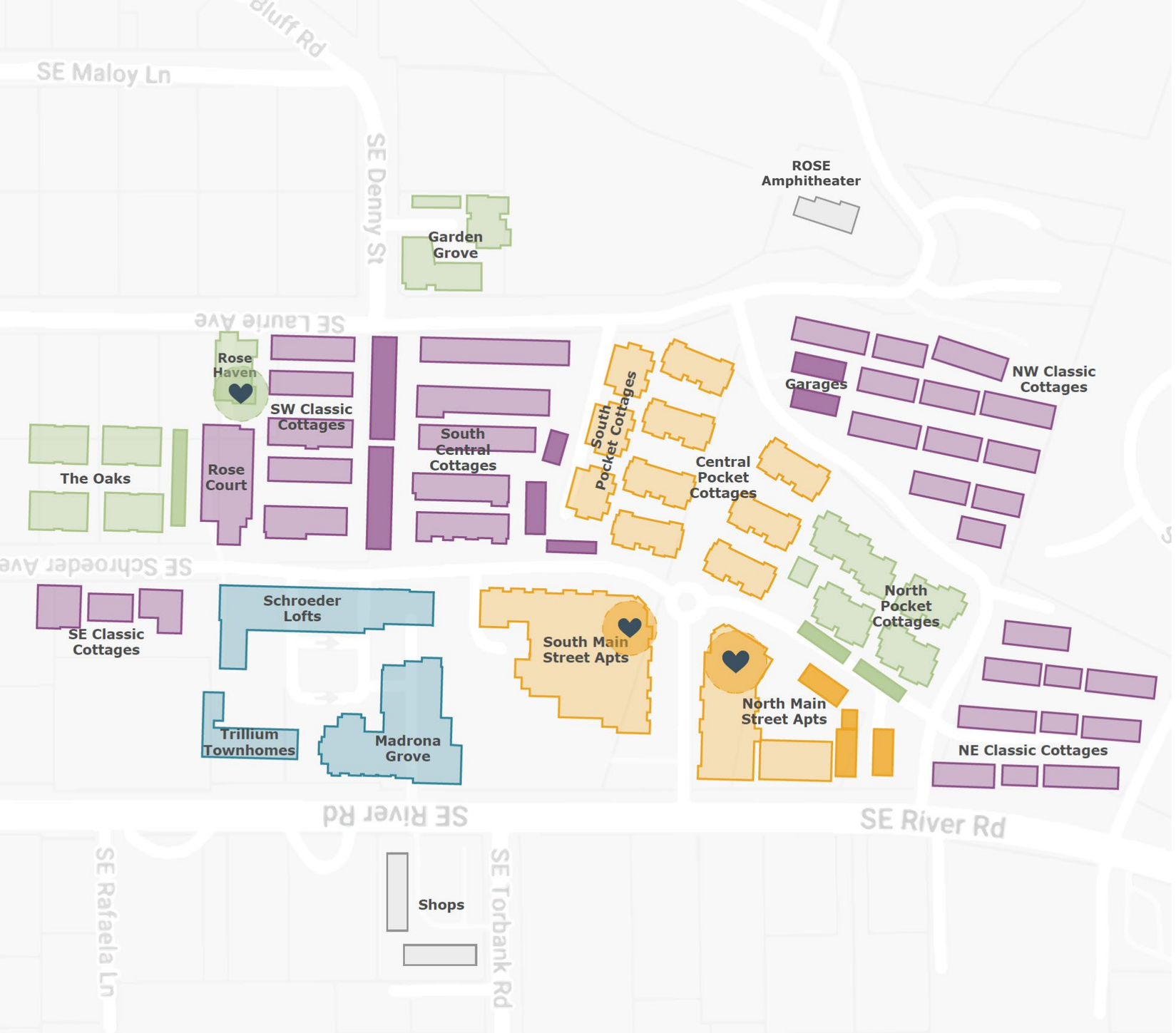
Introduction
RoseVilla Campus

STEP **01**
Set Goals
Resilience Action Plans

STEP **02**
Implement Projects
Example**:** ROSE Port

STEP **03**
Measure + Share Success
Example: Report Outs

STEP **04**
Discussion
Questions and Answers



RoseVilla Campus

MAP LEGEND

- PHASE 0
- PHASE 1
- PHASE 2
- PHASE 3
- BUILDING
- CARPORT
- ROSE HAVENS

Life lived in full bloom

A culture built on resiliency & social responsibility

ZERO ENERGY DEVELOPMENTS

THE OAKS COMMUNITY

12 ZERO ENERGY HOMES

- **Passive House** Design Principles
- **Solar Array** 74 KW
- **Earth Advantage** Platinum Certified
- **Community Courtyard** with natives

TRILLIUM TOWNHOMES

6 ZERO ENERGY HOMES

- Passive House Design Principles
- Solar Array 38 KW
- Earth Advantage Platinum Certified
- Central courtyard with natives

STEP 1

Setting Goals

Resilience Action Plans

Resilience Action Plans

1. The RAP is a long-range plan that requires **long-range vision** and community buy-in.

2. The goals and strategies are both **aspirational and achievable**

3. The solutions result in **measurable** advancements and **operational savings**

4. The RAP is **coordinated** with capital & master planning; it’s a **lens** not a separate project.

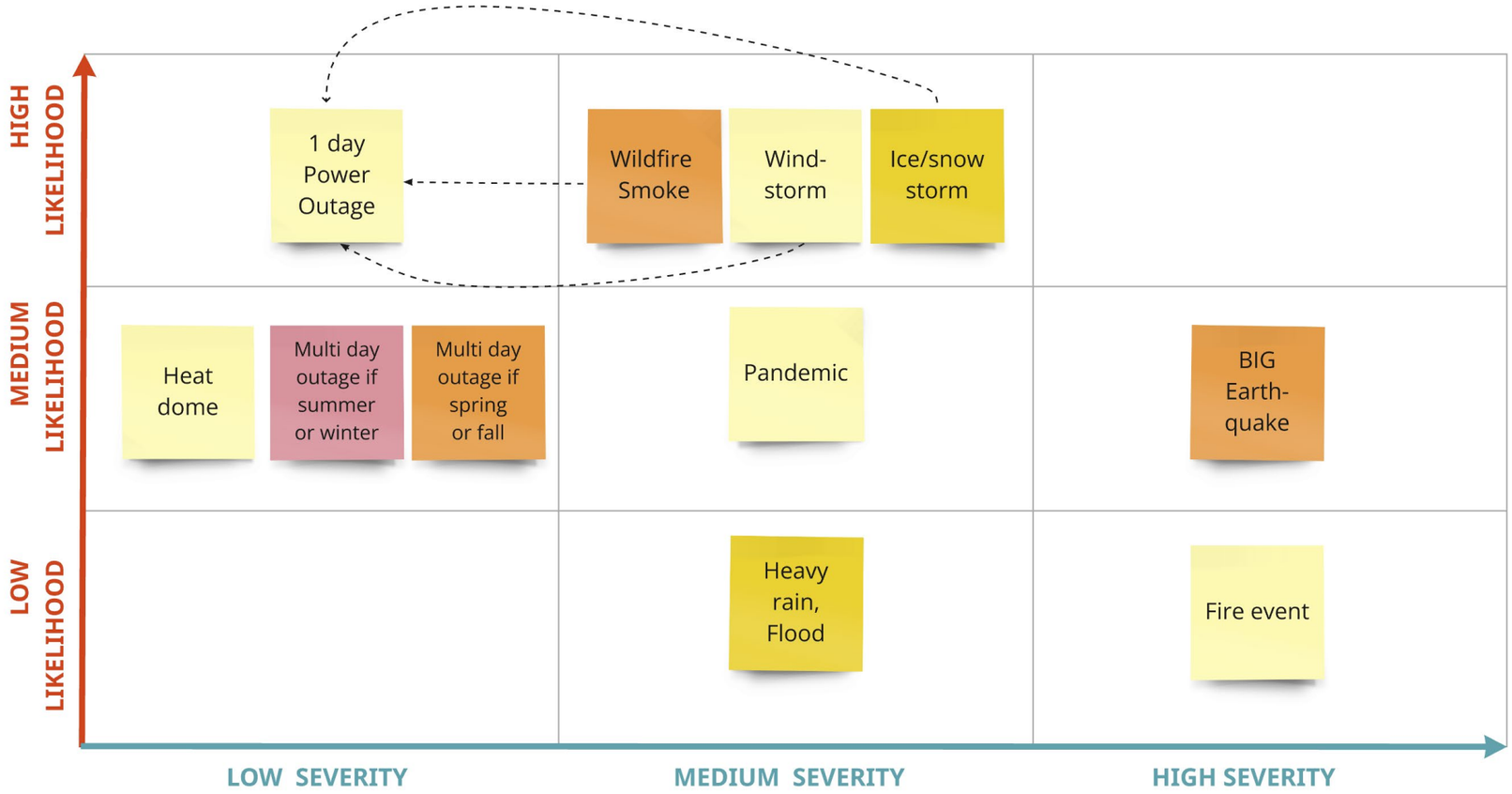
Define Resiliency & Clarify Priorities

ROSE VILLA'S DEFINITION

A resilient campus can maintain:

— **Stability** of its operations

— **Safety** of its community



LEGEND

highest priority

medium priority

mid-low priority

lowest priority

Set Measurable Goals

	PHASE 1 SET Goals & Strategies **END OF 2023**	PHASE 2 ANALYZE Scope & Cost **END OF 2023**	PHASE 3 ACHIEVE Goals & Capital Plan **END OF 2025**	PHASE 4 ACHIEVE Goals & Assess Progress **END OF 2030**	PHASE 5 ACHIEVE Goals & Set New Ones **END OF 2040**	
ENERGY RESILIENCE	**PHASE 1 REPORT** Establish RAP Goals and Strategies	**PHASE 2 REPORT** Strategy Analysis, Cost, and Work Plans	**REDUCE** Energy Use Marginally **BACKUP** Energy for 3-5 Days	**REDUCE** Energy Use by 20% **BACKUP** Energy for 1-2 Weeks	**REDUCE** Energy Use by 50% **BACKUP** Energy for 2-3 Weeks	**Reduce campus energy use by 50%** and has **microgrid(s) that power critical loads** for **more than 2-3 weeks without the grid.**
WATER RESILIENCE	**PHASE 1 REPORT** Establish RAP Goals and Strategies	**PHASE 2 REPORT** Strategy Analysis, Cost, and Work Plans	**REDUCE** Water Use Marginally **BACKUP** Water & Sanitation 2 Wks	**REDUCE** Water Use by 13% **BACKUP** Water & Sanitation 4 Wks	**REDUCE** Water Use by 25% **BACKUP** Water & Sanitation 4+ Wks	**Reduce campus water use by 25%** and has **4+ weeks of backup water supply and sanitation** in an emergency.
STRUCTURAL RESILIENCE	**PHASE 1 REPORT** Establish RAP Goals and Strategies	**PHASE 2 REPORT** Strategy Analysis, Cost, and Work Plans	**REINFORCE** Furniture and Equipment	**REINFORCE** Pre-1975 Homes	**REINFORCE** ROSE Havens	All buildings **meet code for safe evacuation** at a minimum and **1+ ROSE Havens** are retrofit for immediate occupancy

5 Big Projects to Meet our Goals

GOALS

Reducing Energy Use by 50%
Through building retrofit and replacements

Developing Microgrid system(s)
to meet critical loads for >2-3 weeks

Reducing Water Use by 25%
Through fixture/equipment replacement

Providing Water + Sanitation
to meet critical needs for >4 weeks

Reinforcing Older Buildings
to better seismic resilience standards

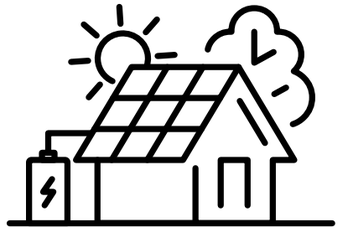
Refreshing Emergency Supplies
and resident/staff knowledge annually

Improving Air Filtration
particularly wildfire smoke

Aligning Master Planning
and capital planning with RAP goals

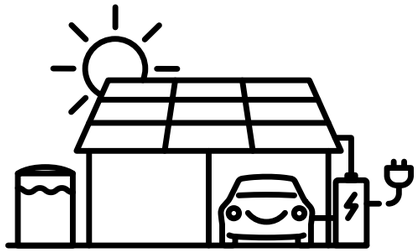
Identify Versatile Strategies

ROSE = Resilient Operations + Sustainable Energy

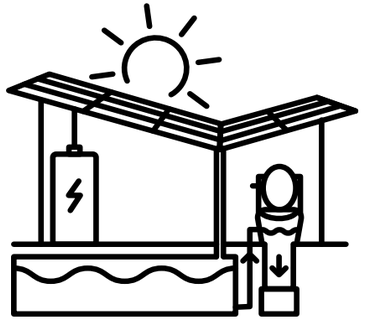


151 ROSE Homes
Retrofit old cottages into resilient homes

2 ROSE Havens
Retrofit of commons for emergency shelter



12 ROSE Ports
Retrofit carports into neighborhood hub



1 ROSE Amphitheater
Regenerative venue and emergency shelter

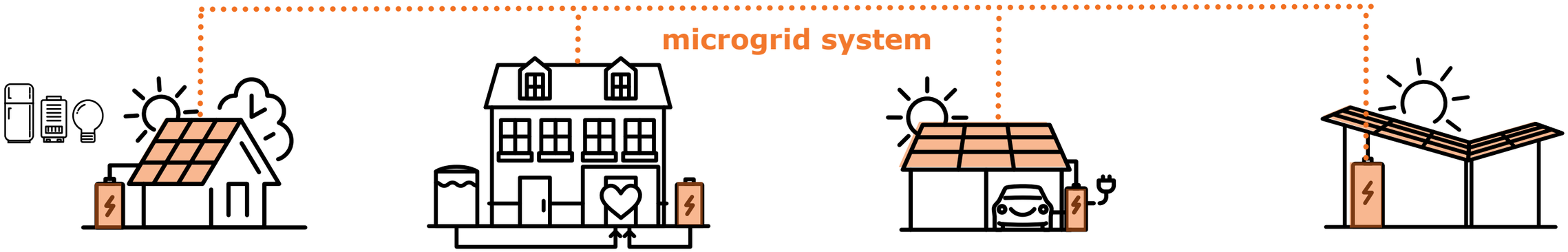
These **ROSE** buildings each contribute to all of our resiliency goals

Energy
50% reduction in campus energy use
2-3 wks microgrid emergency power supply

Water
25% reduction in campus water use
4 wks emergency water supply and sanitation

Seismic
Structurally reinforcing older buildings for safety
Building amphitheater for immediate occupancy

Key Strategies for Energy Resilience



ROSE Homes

- Increase insulation, air tightness
- Replace windows, fixtures, equip.
- Add solar and battery systems

ROSE Havens

- Optimize generator backups
- Transition to campus microgrid
- Upgrade for energy efficiency

ROSE Ports

- Add solar photovoltaic panels
- Add battery back up
- Add EV charging

ROSE Amphitheater

- Solar photovoltaic panels
- Battery backup
- EV charging

REDUCE ENERGY USE GOAL

~48* kBtu/sf/yr		PHASE 3
save 20% ~38 kBtu/sf/yr		PHASE 4
save 50% ~24 kBtu/sf/yr		PHASE 5

*current energy usage

ENERGY SUPPLY DURATION GOAL

3-5 days	more if sunny
1-2 weeks	more if sunny
2-3 weeks	more if sunny

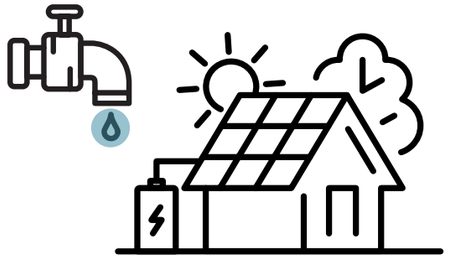
Energy Summary

1. **Focus first on least energy efficient buildings** as well as building/spaces that are to serve as emergency shelters.

2. **Reduce energy loads with passive efficiency** upgrades, then right-size mechanical systems that actively use energy.

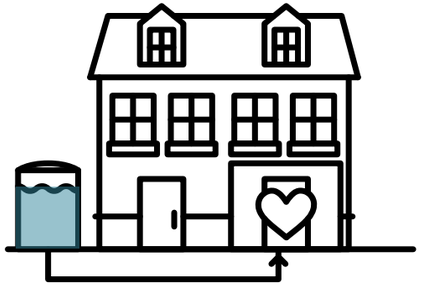
3. **Time Solar installs with roof replacements** and/or w/ funding opportunities for cost efficiency

Key Strategies for Water Resilience



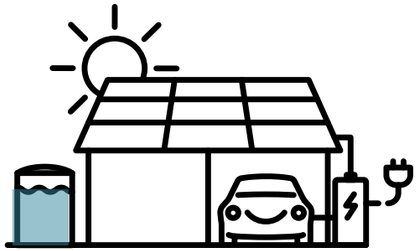
ROSE Homes

- Increase water efficiency w/
- Fixture & equipment replacement
- Store bottled water



ROSE Havens

- Add rainwater catchment
- Add rainwater purification
- Store bottled water



ROSE Ports

- Add rainwater catchment
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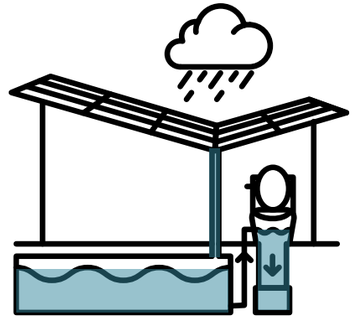


ROSE Amphitheater

- Rainwater Catchment
- Rainwater purification
- Composting toilets

REDUCE WATER USE GOAL		WATER SUPPLY + SANITATION GOAL
1,009,870* gal/month	PHASE 3	2 weeks
save 13% ~878,587 gal/month	PHASE 4	2 weeks or more if rainy; 2-4 weeks for sanitary
save 25% ~757,403 gal/month	PHASE 5	4 weeks or more if rainy

*current water usage

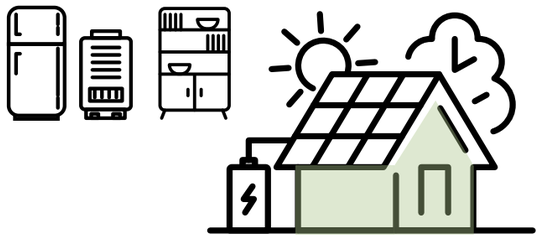
Water Resiliency Summary

1. **Invest in water resiliency upgrades** using cost savings from lower water bills.

2. **Purifying rainwater is the safest source** of renewable emergency potable water supply, compared to filtering greywater or river water.

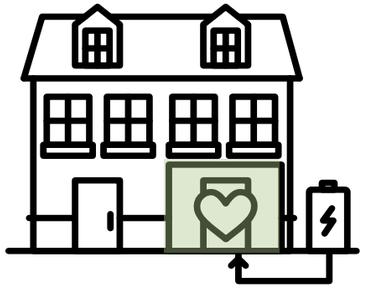
3. **Human waste management can be rudimentary** during an emergency. Living Machines require too much maintenance and space, and cost too much.

Key Strategies for Seismic Resilience



ROSE Homes

- Strap objects to walls
- Seismically reinforce structure
- Install earthquake gas shut offs



ROSE Havens

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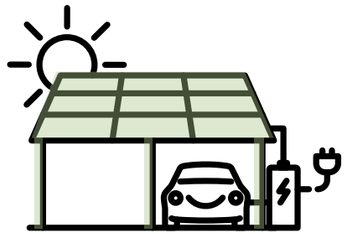
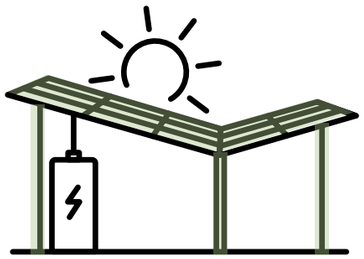


ROSE Ports

- Design for Immediate Occupancy
- Seismic Category 4 Standard



ROSE Amphitheater

- Design for Immediate Occupancy
- Seismic Category 4 Standard

PHASE 3	PHASE 4	PHASE 5

INCREASE SAFE EVACUATION		INCREASE QUAKE-SAFE PLACES
Cottages don't meet seismic code **Secure Objects**	PHASE 3	No campus buildings meet code for "immediate occupancy"
Retrofit TBD% Pre-1975 Cottages	PHASE 4	Consider increasing cottage resiliency from Category II to IV
Retrofit Rest of Pre-1975 Cottages	PHASE 5	**Retrofit 1+ Haven to meet code for "immediate occupancy"**

Optimize Strategies!

1. **Synchronize strategies**
   to minimize costs and time during design and construction

2. **Scale strategies**
   appropriately so that solutions occur at building, neighborhood & campus.

3. **Phase strategies**
   to increase resiliency over time and align with other campus development

4. **Everyday benefits**
   to increase resiliency over time and align with other campus development

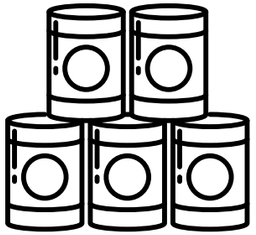
Engage Your Community!

1. **Form a Resident Committee** that provides feedback, analysis and even some implementation of actions

2. **Educate Team Members & Residents** regularly to keep them engaged, informed and supportive of the RAP

3. **Collaborate** with change makers and Garner buy-in from your jurisdiction

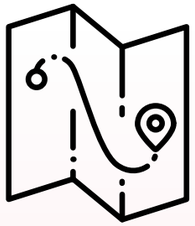
Emergency Response Plan



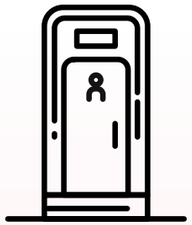
Improved Stockpiles

Revise ReadyForce Response Guide

Improve Sanitation.



Create Campus Response Maps



Supply Water and Sanitation

Host Annual "Refresh" Parties

ONGOING

STEP 3

Implement Projects

ROSE Port

ROSE Port

NEIGHBORHOOD RESILIENCE HUB

— **4-stall carport (881 sf)**
for four residents’ vehicles

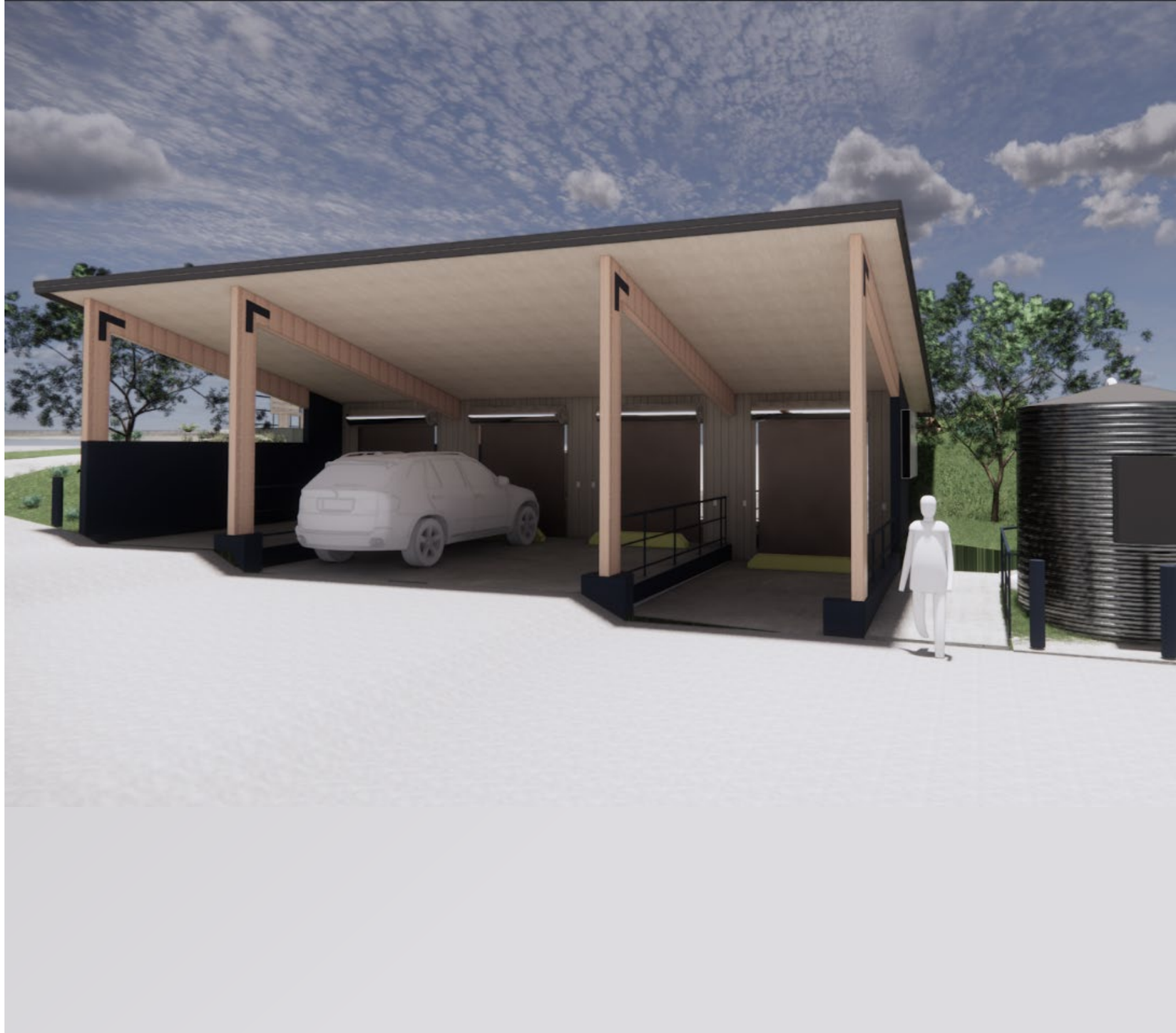
— **Existing concrete slab/walls**
of previous bermed garage

— **MassPly roof** and Glulam beams

— **Collects and stores**
solar energy and potable water

— **Neighborhood emergency hub** with backup energy, water, supplies

— **Proof of concept**
for ~12 more ROSE Ports on campus



ROSE POT

Resilient Energy Systems

— **17.2 kW solar** photovoltaic panels + battery backup

— **27 kW battery** system

— **Certified Zero Energy** by ILFI after 1yr of operation

— **Level 1 trickle charging** for (4) residents’ EV vehicles

— **Net metering** and meter aggregation

ROSE PORT

Resilient Water Systems

— **950sf** metal roof receives

— **~21,000 gallon/year** of rainwater

— Stored in **3100 gallon** cistern

— Pumped using PV+battery power

— Filtered and purified w/ **UV system**

— For emergency **potable** water use

— For some/all residents for **2-4 wks**

— Clear pipes for educational purpose

ROSE Port
Next Steps

- **Educational placards**
- **Gathering space**
- **Mural on walls**

Campus Resiliency Projects for 2025 and Beyond

Fleet Electrification

PURCHASED EV FLEET AND INSTALLING 12 EV CHARGERS THROUGH THE MAKE READY PROGRAM

Advancements TV Show

AIRING THIS YEAR ON AMAZON PRIME

Web Dashboard with Resources

WITH EUI DASHBOARD AND OTHER METRICS, EDUCATIONAL RESOURCES

Upcoming Development

NEW ZERO ENERGY NEIGHBORHOODS AND A PASSIVE HOUSE TOWER

Keys to Success

RoseVilla Leadership

Community Engagement

Aspirational Yet Achievable Goals

Synchronizing and Scaling Solutions

Questions?

ROSE VILLA

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