Beaverton School District's Resilience Design for New Schools

Mountainside High School

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Beaverton School District

One School District's Response to Risks from The Big One

Beaverton School District
2014 Bond Program

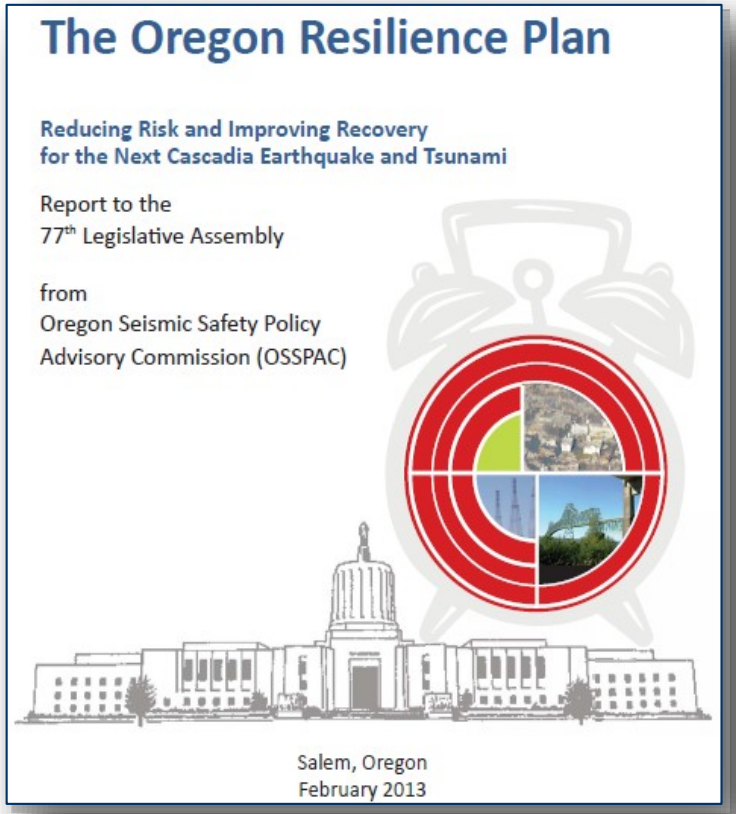
$680 Million Bond Program
- Passed in May 2014
- Construct **seven school buildings**

New Capacity Construction
- High School
- Middle School
- Elementary School (K-5)

Replace Four Outdated Schools
- Three K-5 school buildings
- One magnet school (6-12 grades)

Additional Investments
- $100M in Capital Repairs
- Multiple School Renovations
- Classroom Technology

The Oregon Resilience Plan (2013)

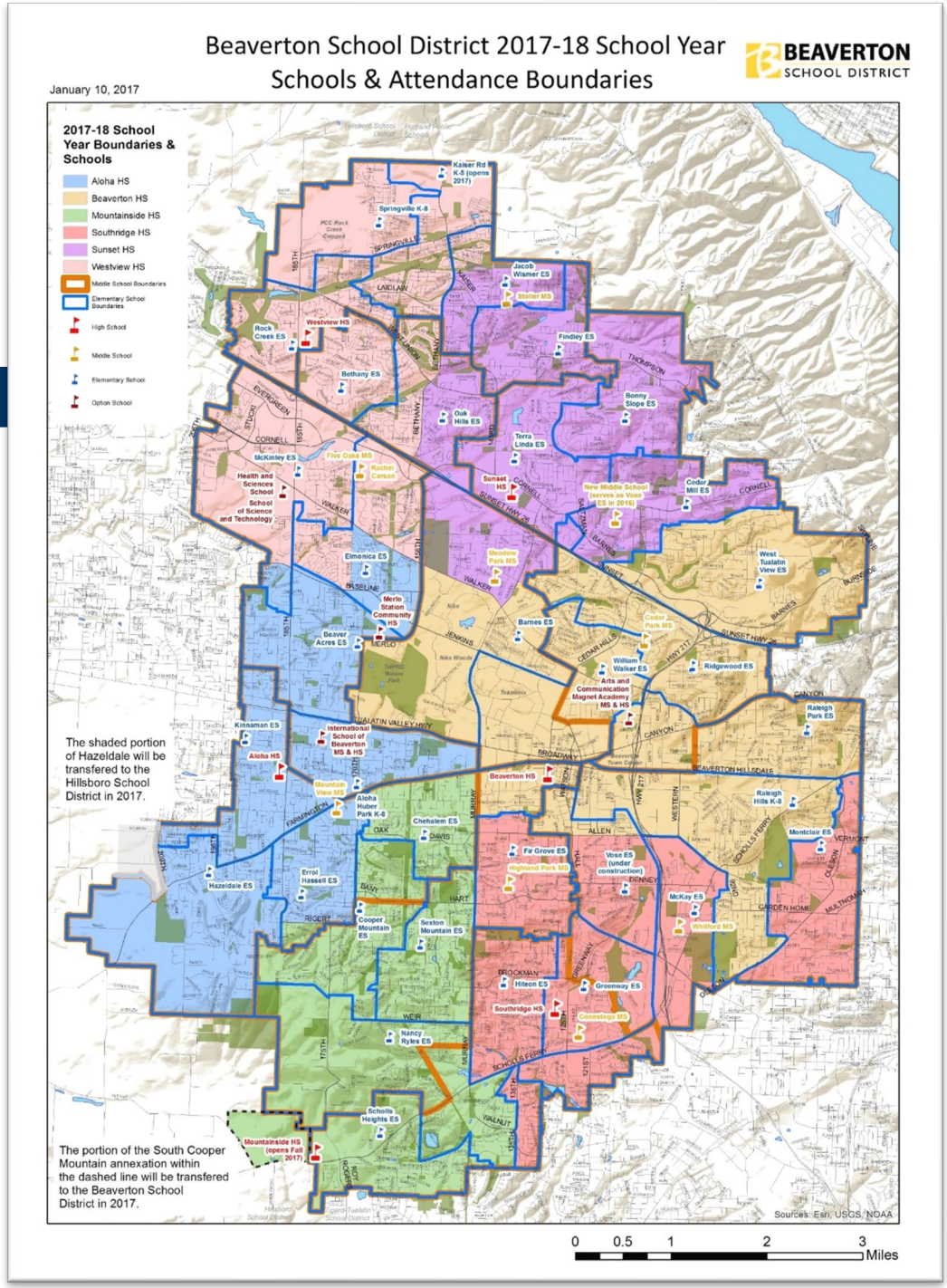


50-year Comprehensive Plan

- ❑ **Cascadia Earthquake Scenario**
- ❑ **Business/Workforce Continuity**
- ❑ **Coastal Communities**
- ❑ **Critical & Essential Buildings**
- ❑ **Transportation**
- ❑ **Energy**
- ❑ **Information and Communication**
- ❑ **Water & Wastewater**

Schools are Different …

- Widely distributed; walkable
- Large indoor spaces
- Open outdoor spaces
- Thousands of children
  - ➢ 7,000+ in 7 new schools
- Retained by “owner” for decades
- Failure to meet scheduled opening date <u>not an option</u>!



Driving Factors

Special Opportunity – Special Duty

- Seismic Code based upon “Life Safety” Standard
  - Building may not be Economically Repairable
- Schools are Distributed in Neighborhoods & Walkable
- Schools Attract People Needing Emergency Shelter
- New School Buildings may be in Inventory for ~100 years
- Probability of “The Big One” during Service Period is High

Beaverton School District Philosophy

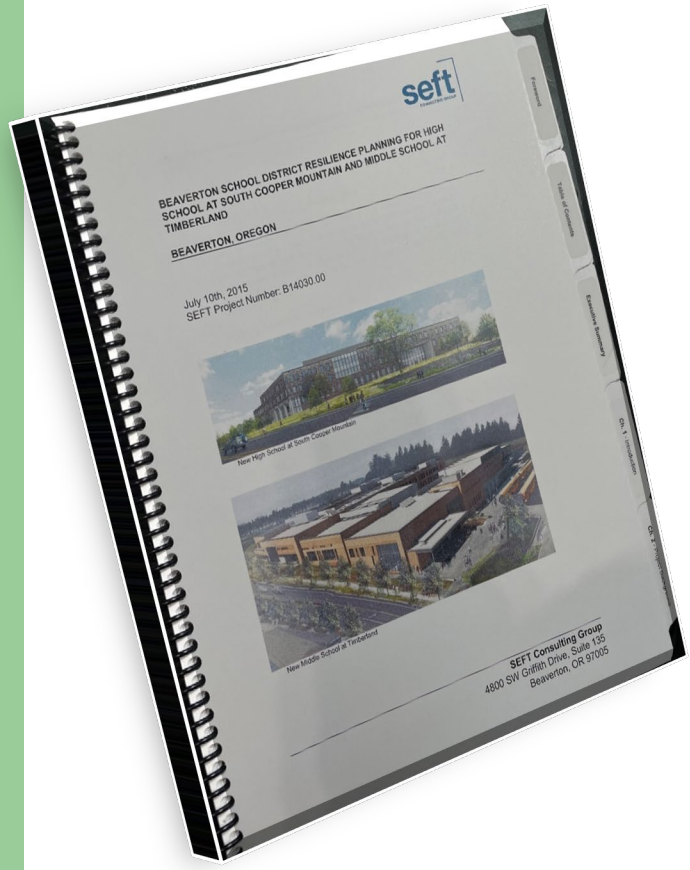
Justification for Exceeding Code Minimums:

- Enhanced Safety for Students and Staff
- Emergency Shelter to Support the Community
- Inexpensive Insurance Policy Against Economic Loss
- Original Construction: Only Opportunity to Build-in Features

- Strategy:
  Maximum Benefits for Smallest Cost without Schedule Impact!

Beaverton School District Resilience Design Plan

https://www.beaverton.k12.or.us/departments/facilities-development/2014-bond-construction-projects/seismic-projects



- Developed in 2014-15
- Compressed Schedule
  - The Kids are Coming!
  - Needed Quick Decisions
- Constrained Budgets
  - Bond $$ Amount Locked-In
- Based Upon New HS and MS
- Applicable to all 7 New Schools
- Published to Provide Beginning Framework for other Districts

Stakeholder Workshop

Workshop at Tualatin Valley Fire & Rescue Command & Business Operations Center
February 10, 2015

Key Participants 33 Individuals
Beaverton School District
A&E Design Teams for HS & MS
Critical Utility Service Providers
Emergency Planning Managers
Emergency Responders
American Red Cross
SEFT Consulting Group

Mountainside High School

- 3-Stories plus Partial Basement
- 342,000 SF
- 40 Acres
- 2,200 Students
- $100 M (building only)

Structure Strategy

- Risk Category IV – Structural / Seismic Design
  - Code Requirement – Category III
  - Category IV: Immediate Occupancy Standard – whole building
  - Insurance against total economic loss

- Non-structural Components
  - Equipment (required to operate after EQ) seismically certified
  - Components required for use as shelter: Category IV seismic bracing
  - Others: Category III seismic bracing

Water & Waste Water Strategy

- Restrained pipe joints between city lines and building
  - Water and sewer lines
- Stub-out water connections for exterior tanker to supply:
  - Kitchen
  - Locker rooms & showers
  - Drinking fountains in common spaces
  - Restrooms serving dining / commons
- Seismic bracing of building plumbing per Category IV
- Sewer Short Term: Others to provide portable toilets

Electricity & HVAC Strategy

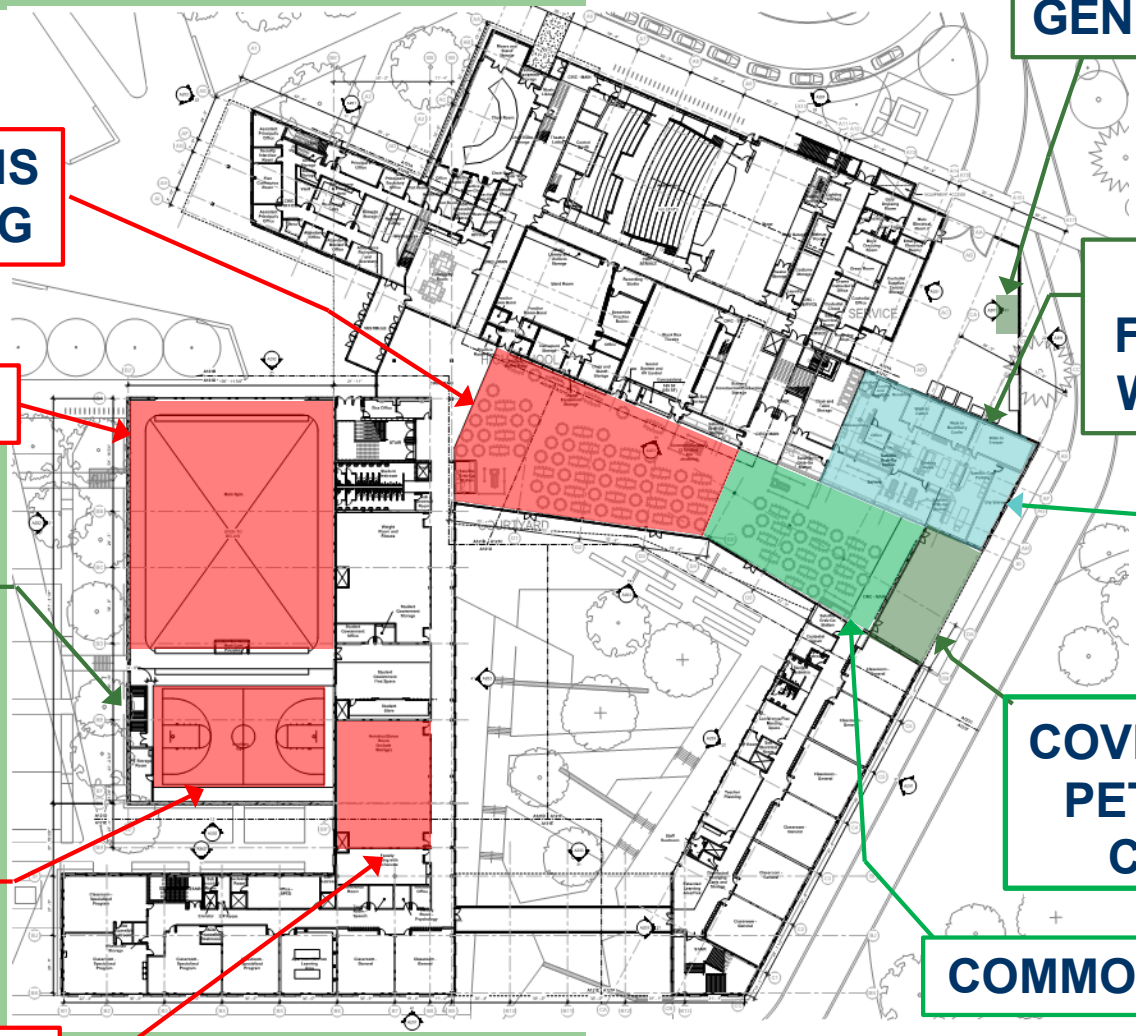
- Emergency Power
  - 375 KW generator; 96-hour fuel storage
    - *Code standard: support emergency exiting*
  - Supplemented with solar PV system
  - Power for lighting and ventilation in common areas

- Heating & Cooling
  - Assume no natural gas service: jackets / blankets
  - Natural ventilation: doors, windows, and exhaust fans

Mountainside High School
1-24-2017

BEAVERTON SCHOOL DISTRICT

Mountainside High School



COMMONS SLEEPING

MAIN GYM

CONNECTION FOR EXTERNAL WATER TANKER

AUXILIARY GYM

AEROBICS / DANCE

GENERATOR

CONNECTION FOR EXTERNAL WATER TANKER

KITCHEN

COVERED AREA FOR PETS (WITH HOSE CONNECTION)

COMMONS – DINING

BEAVERTON SCHOOL DISTRICT

1% Cost Impact – High School

Resilience Feature	Cost Estimate
Category IV Structure	$500,000
Generator & Fuel Storage	$330,000
Electrical Wiring	$8,000
Water Service Sub-Outs	$15,000
Natural Gas Seismic Shut Off Valve	$5,000
Restrained Joints - Water & Sewer Lines	$108,000
Solar PV Interconnection	$80,000
Approximate Total	$1,000,000