



APPENDIX E

SEISMIC ASSESSMENT REPORT (EXECUTIVE SUMMARY)

KPFF Consulting
Engineers, April 2019

[This page intentionally left blank for the purpose of double-sided printing.]

SEISMIC ASSESSMENTS FOR THE BEAVERTON SCHOOL DISTRICT

(VOLUME 1 OF 4)

KPFF PROJECT No. 10021800125

APRIL 12, 2019



SUBMITTED TO:

AARON BOYLE, CONSTRUCTION OPERATIONS SUPERVISOR
BEAVERTON SCHOOL DISTRICT – FACILITIES
16550 SW MERLO ROAD
BEAVERTON, OR 97003

SUBMITTED BY:

NATHAN INGRAFFEA, PRINCIPAL
KPFF CONSULTING ENGINEERS
111 SW FIFTH AVENUE, SUITE 2500
PORTLAND, OR 97204-3628



SEISMIC ASSESSMENTS FOR THE BEAVERTON SCHOOL DISTRICT

TABLE OF CONTENTS

DESCRIPTION	PAGE NO.
VOLUME 1	
EXECUTIVE SUMMARY	1 – 31
CAMPUS REPORTS	1 – 176
VOLUME 2	
<u>ASCE 41-13 CHECKLISTS</u>	
APPENDIX A	ELEMENTARY SCHOOLS
VOLUME 3	
<u>ASCE 41-13 CHECKLISTS</u>	
APPENDIX B	MIDDLE SCHOOLS
APPENDIX C	HIGH SCHOOLS
APPENDIX D	OPTION SCHOOLS
APPENDIX E	SUPPORT FACILITIES
VOLUME 4	
APPENDIX F	CAMPUS RISK ZONE PLANS

Executive Summary

THIS PAGE INTENTIONALLY LEFT BLANK

Seismic Assessments for the Beaverton School District

Executive Summary

Project Intent

In 1995, the Beaverton School District performed a Lateral Force Investigation of their school district facilities. The 1995 report and analysis was based on the provisions of the 1993 Edition of the Oregon Structural Specialty Code using seismic UBC Zone 3. In 2000, 2010 and 2013, reports were completed which summarized the status of the progress since the 1995 Lateral Force Investigation report. In September of 2013, a Next-In-Line Seismic Assessment was completed for seven schools based on ASCE-31. These schools were Cooper Mountain, Beaver Acres, Cedar Mill, ACMA, Beaverton HS, Aloha HS and William Walker.

The purpose of this report is to provide the Beaverton School District with an updated summary of how each campus is expected to perform during a seismic event according to ASCE 41-13. The current report also satisfies the requirement of section 2 (4), chapter 248, Oregon Laws 2005 which notes:

“Subject to available funding...the local school district board...shall conduct such additional seismic safety evaluations of building as each of those boards considers necessary. The boards shall conduct the evaluations for life safety as set forth in the American Society of Civil Engineers Standard for Seismic Evaluation of Existing Buildings (SEI/ASCE 31-03), 2003 Edition, or in any later edition of that standard allowed for seismic safety evaluation use under a rule adopted by the State Department of Geology and Mineral Industries or using a stricter standard selected by the board that conducts the survey.”

The information in this report can be used to prioritize future seismic improvements within the district and to step toward meeting the goal of the 2017 Oregon Revised Statute (ORS) 455.400 which notes:

“Subject to available funding, all seismic rehabilitations or other actions to reduce seismic risk must be completed before January 1, 2032.”

Seismic Assessment Process

Seismic assessments included a review of available structural drawings, walkthroughs of the buildings and preliminary seismic evaluations to determine likely seismic deficiencies.

ASCE 41-13, *Seismic Evaluation and Retrofit of Existing Buildings*, was utilized as this was the current standard at the time of the campus evaluations. ASCE 41-13 was developed around 2013 and was a combination of two preceding ASCE documents, ASCE 31-03 and ASCE 41-06. Both of these documents have FEMA and ATC predecessors dating back to the 1990s. ASCE 41-17 was recently released and is beginning to be utilized. ASCE 41-17 utilizes a similar checklist style of evaluations.

We do not expect the content included in this report to significantly change based on the updates included in ASCE 41-17.

The Tier 1 checklists from ASCE 41-13, *Seismic Evaluation and Retrofit of Existing Buildings*, were used as a guide for the seismic assessments of all Beaverton School District Campuses. These checklists assist in identifying seismic deficiencies of a structure. A full Tier 1 evaluation was not completed for each school as this assessment is intended to be a higher-level review. Checklists for each building are included in the Appendix of this report, where appropriate.

A list of building type definitions used in ASCE 41-13 is provided in Table 1 for reference.

ASCE 41 Building Types	
Abbreviation	Description
W1	Wood Light Frame
W1A	Multi-Story, Multi-Unit Residential Wood Frame
W2	Wood Frame, Commercial and Industrial
S1	Steel Moment Frame with Stiff Diaphragm
S1A	Steel Moment Frame with Flexible Diaphragm
S2	Steel Braced Frame with Stiff Diaphragm
S2A	Steel Braced Frame with Flexible Diaphragm
S3	Steel Light Frame
S4	Dual System with Backup Steel Moment Frame and Stiff Diaphragm
S5	Steel Frame with Infill Masonry Shear Wall and Stiff Diaphragm
S5A	Steel Frame with Infill Masonry Shear Wall and Flexible Diaphragm
C1	Concrete Moment Frame
C2	Concrete Shear Wall with Stiff Diaphragm
C2A	Concrete Shear Wall with Flexible Diaphragm
C3	Concrete Frame with Infill Masonry Shear Wall and Stiff Diaphragm
C3A	Concrete Frame with Infill Masonry Shear Wall and Flexible Diaphragm
PC1	Precast Concrete or Tilt-Up Concrete Shear Wall with Flexible Diaphragm
PC1A	Precast Concrete or Tilt-Up Concrete Shear Wall with Stiff Diaphragm
PC2	Precast Concrete Frame with Shear Wall
PC2A	Precast Concrete Frame Without Shear Wall
RM1	Reinforced Masonry Bearing Wall
RM1A	Reinforced Masonry Bearing Wall with Stiff Diaphragm
URM	Unreinforced Masonry Bearing Wall with Flexible Diaphragm
URMA	Unreinforced Masonry Bearing Wall with Stiff Diaphragm

TABLE 1: ASCE 41-13 BUILDING TYPE ABBREVIATION DESCRIPTIONS

Damage Control is the performance level target for Beaverton School District which is between Life Safety and Immediate Occupancy. The intent for the Damage Control Performance Level is to limit damage to the building beyond what would be expected for the Life Safety Performance Level. Damage Control is the recommended performance level for Risk Category III buildings, which is the code required Risk Category for new school buildings.

Since there are not specific checklists for the Damage Control Performance Level, ASCE 41-13 uses the Life Safety Checklists as a baseline with a variance on certain criteria through the checklists.

These assessments are high level and used the Tier 1 checklists as guidance. A complete Tier 1 evaluation was beyond the scope of this seismic assessment and was not performed for this report. There are a number of items in the checklists that are marked as unknown. These items should be confirmed during a complete Tier 1 evaluation before implementing a retrofit plan. Should any of these structures be chosen for a seismic rehabilitation grant application, comprehensive ASCE 41 evaluations will be required to be completed. The results of comprehensive evaluations are anticipated to indicate retrofit work within the cost per square foot estimates provided in this assessment.

Not all nonstructural deficiencies found were listed for each campus. Typical deficiencies, not specifically listed, are fall prone contents and tall/narrow contents (furniture, file cabinets, etc.) and MEP bracing/anchorage, including kitchen equipment (double stacked ovens).

Hazards due to slope failure are unlikely to exist at any of the campuses but this can only be confirmed by a qualified geotechnical engineer. We also recommend that liquefaction potential be confirmed with a geotechnical engineer as this hazard could affect building foundations and slab-on-grade structures. Note that all probable costs provided in this report assume liquefaction is not present.

Estimated Probable Costs

Estimated probable costs per square foot for seismic rehabilitation of discovered deficiencies are provided for each site. Both structural and nonstructural deficiencies listed for each site are included in the estimate. The dollar per square foot amounts assume that seismic rehabilitation is not occurring in conjunction with other upgrade work and includes an allotment for repairing architectural finishes and features after the structural work is complete. These costs are based on previous seismic rehabilitation studies of other campuses of similar building construction types and ages. These estimates are not fully developed cost estimates and are intended to provide the Beaverton School District with a rough estimate of probable costs. These estimates do not include soft costs that could be up to an additional +/- 30%.

Non-seismic related structural deficiencies observed on site are also listed. These items are listed under "Additional Structural Observations". The costs to repair these items are not included in the seismic cost per square foot estimates.

Organization of the Report

Each campus is numbered and grouped based on Campus Type. Each campus type is color-coded throughout the report for ease of reference.

Campus Type	Campus Number
Elementary Schools (including K-8)	01 - 34
Middle Schools	35 - 43
High Schools	44 - 49
Option Schools	50 - 54
Support Facilities	55 – 60

We have created individual reports for each campus. These reports should be used in conjunction with this executive summary as background information.

The appendices include the completed checklists that were used as a guideline for determining deficiencies for each campus and the campus risk plans. The appendices are as follows:

- **Appendix A:** Elementary School Tier 1 Checklists
- **Appendix B:** Middle Schools Tier 1 Checklists
- **Appendix C:** High School Tier 1 Checklists
- **Appendix D:** Option School Tier 1 Checklists
- **Appendix E:** Support Facility Tier 1 Checklists
- **Appendix F:** Campus Risk Zone Plans
 - Risk Zone Plans were prepared for those campuses that do not meet the Life Safety Performance Objective. These plans show color-coded zones that indicate the expected seismic performance level across the campus. Campuses with multiple additions and alterations over a long period of time typically have a larger variety of expected seismic performances.

There are five campuses that KPFF has recently completed full ASCE 41 Tier 1 evaluation reports, strengthening schemes and cost estimates for. These schools are:

- 03 – Beaver Acres Elementary School (ASCE 41-13 for SRGP Winter 2017 and Fall 2018)
- 06 – Cedar Mill Elementary School (ASCE 41-17 for SRGP Fall 2018)
- 08 – Cooper Mountain Elementary School (ASCE 41-17 for SRGP Fall 2018)
- 44 – Aloha High School (ASCE 41-13 for awarded SRGP Winter 2017/currently under design)
- 45 – Beaverton High School (ASCE 41-13)

There are seven campuses that were constructed recently enough that they are considered “benchmark buildings” according to ASCE 41-13 and automatically comply with the Damage Control Performance Level due to the year and type of construction. Checklists were not necessarily completed for these campuses:

- 14 – Hazeldale Elementary School (constructed in 2018)
- 27 – Sato Elementary School (constructed in 2017)
- 32 – Vose Elementary School (constructed in 2017)
- 34 – William Walker Elementary School (constructed in 2018)
- 41 – Timberland Middle School (constructed in 2017)
- 46 – Mountainside High School (constructed in 2017)
- 50 – Arts & Communication ACMA (to be constructed in 2019, 2009 Performing Arts Center)

Beaverton School District

Map of Campuses

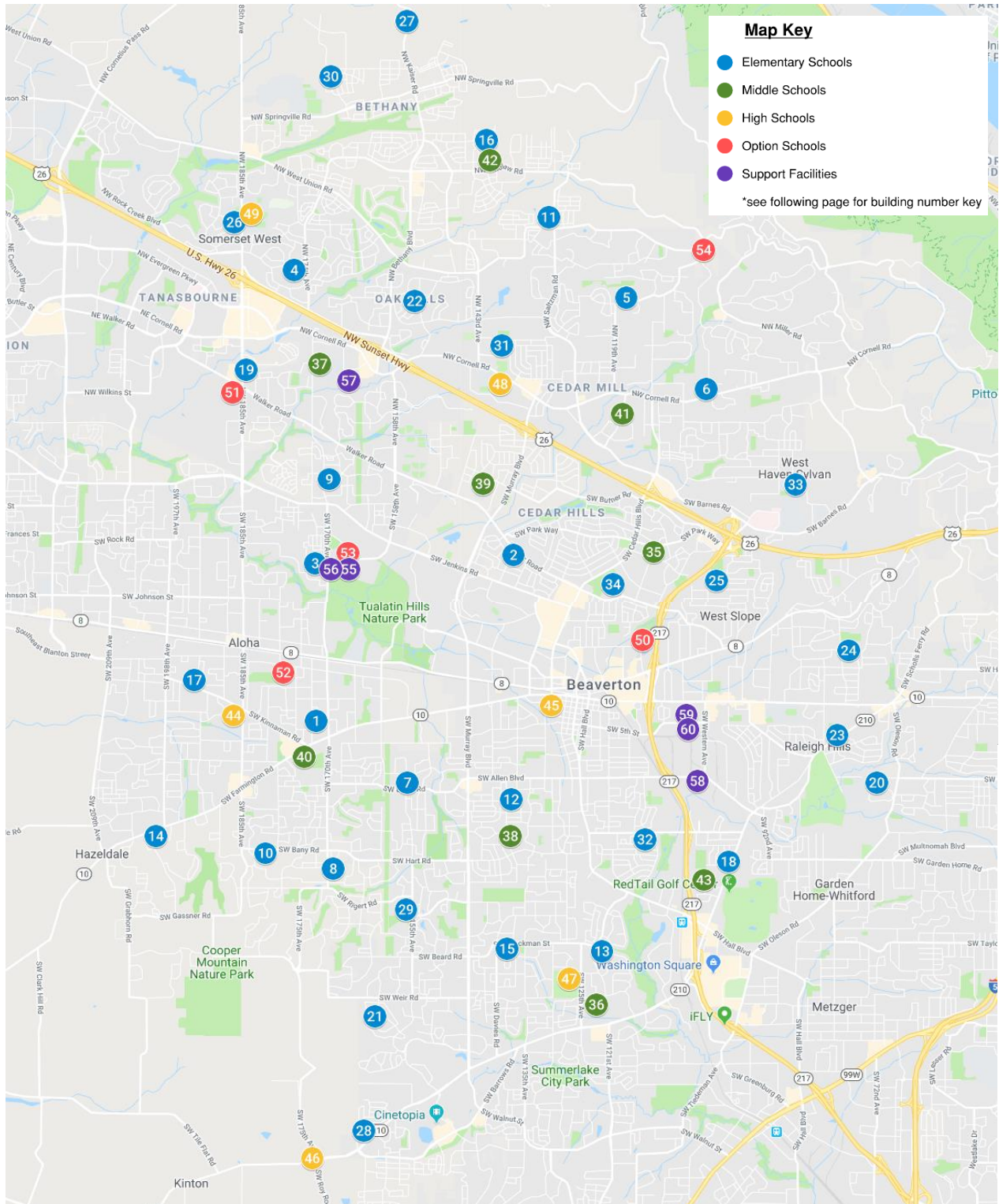


FIGURE 1: MAP

Beaverton School District
Building Key

TYPE	#	CAMPUS NAME
ELEMENTARY SCHOOLS	01	Aloha-Huber Park (K-8)
	02	Barnes
	03	Beaver Acres
	04	Bethany
	05	Bonny Slope
	06	Cedar Mill
	07	Chehalem
	08	Cooper Mountain
	09	Elmonica
	10	Errol Hassell
	11	Findley
	12	Fir Grove
	13	Greenway
	14	Hazeldale
	15	Hiteon
	16	Jacob Wismer
	17	Kinnaman
	18	McKay
	19	McKinley
	20	Montclair
	21	Nancy Ryles
	22	Oak Hills
	23	Raleigh Hills (K-8)
	24	Raleigh Park
	25	Ridgewood
	26	Rock Creek
	27	Sato
	28	Scholls Heights
	29	Sexton Mountain
	30	Springville (K-8)
	31	Terra Linda
	32	Vose
	33	West Tualatin View
	34	William Walker

TYPE	#	CAMPUS NAME
MIDDLE SCHOOLS	35	Cedar Park
	36	Conestoga
	37	Five Oaks
	38	Highland Park
	39	Meadow Park
	40	Mountain View
	41	Timberland
	42	Stoller
	43	Whitford
	44	Aloha
HIGH SCHOOLS	45	Beaverton (with Merle Davies)
	46	Mountainside
	47	Southridge
	48	Sunset
	49	Westview
OPTION SCHOOLS	50	Arts & Communication ACMA
	51	Capital Center - Health & Science
	52	International School ISB
	53	Merlo Station Community High
	54	Terra Nova School of Science &
SUPPORT FACILITIES	55	Administration Building
	56	Maintenance Building
	57	Transportation Main
	58	Transportation Allen
	59	Transportation 5th St. North
	60	Transportation 5th St. South

Results

The ASCE 41-13 performance standards are listed below in order of highest performance to lowest performance. Both structural and nonstructural performance objectives are ranked separately, as they are considered separately in ASCE 41.

Structural Performance Objectives:

- S-1: Immediate Occupancy
 - Very limited structural damage has occurred.
 - Risk of life-threatening injury as a result of structural damage is very low.
 - Minor repairs might be required, but not generally to re-occupy.
 - Continued use of the building will not be limited by its structural condition.
- S-2: Damage Control Range (district's goal)
 - Half way between Immediate Occupancy and Life Safety.
- S-3: Life Safety
 - Significant damage to the structure will occur but some margin against partial or total collapse will remain.
 - Some structural elements will be severely damaged, but this damage will not result in large falling debris hazards, either inside or outside the building.
 - Injuries might occur during the earthquake; however, the overall risk of life-threatening injury as a result of structural damage is expected to be low.
 - It should be possible to repair the structure; however, for economic reasons, this repair might not be practical.
 - Although the damaged structure may not be an imminent collapse risk, it would be prudent to implement structural repairs or install temporary bracing before re-occupancy.
- S-4: Limited Safety Range
 - Half way between Life Safety and Collapse Prevention.
- S-5: Collapse Prevention
 - Little to no lateral strength or stiffness to resist lateral loads.
 - Large permanent drifts to the building where doors may not open.
 - Structural collapse possible in aftershock events thus not safe to occupy after event.
 - Cost to repair structure will likely outweigh demo/replacement.
- S-6: < Collapse Prevention
 - Possible partial or full collapse of structure.
 - Non-collapsed areas have minimal reserve capacity and significant residual drift.
 - Full structural collapse probable in aftershock or wind event.
 - Building will likely require full demo/rebuild.

Nonstructural Performance Objectives:

- N-A: Operational
 - Cladding: Connections may yield, but no loss of weather tightness.
 - Partitions: Only minor drywall cracking or hairline cracks in CMU.
 - Ceilings: Negligible damage – no loss of functionality.

- Parapets: Only minor damage, no loss of strength or permanent deflections.
- Doors: Minimal to no damage – all doors remain operational.
- N-B: Position Retention (district's goal)
 - Cladding: Connections may yield with minor cracking and minimal leaks possible.
 - Partitions: Minor cracking in drywall or CMU, limited permanent racking.
 - Ceilings: Minor spalling of ceiling tiles or gyp. Minimal loss of ceiling tiles.
 - Parapets: Minor damage – possible residual deformation.
 - Doors: Minor damage, some doors may stick.
- N-C: Life Safety
 - Cladding: Extensive distortion of cladding system, likely failure of weather tightness. No panels fall off structure.
 - Partitions: Significant cracking/damage including permanent racking, no partitions fall.
 - Ceilings: Likely damage to ceilings system including loss of some panels. Possible damage to adjacent systems due to movement. Egress possibly limited by damage.
 - Parapets: Extensive damage and significant permanent deformation. Possible falling of minor debris. No significant failure/dislodgement.
 - Doors: Damage across all door systems possible. Most doors will stick and some doors may have significant residual deformation causing them to jamb and be unusable.
- N-D: Hazards Reduced
 - Cladding: Extensive distortion of cladding system including possible broken windows and failure of connections to structure.
 - Partitions: Permanent racking of walls including possible failure of bracing connections leading to partial or full failure of walls.
 - Ceilings: Extensive damage to ceiling systems including loss of significant number of tiles and light fixtures. Movement of ceiling could cause extensive damage to adjacent systems.
 - Parapets: Failure of parapets including possible collapse and falling debris.
 - Doors: Damage across door systems likely with significant number of doors being jammed and unusable.
- N-E: < Hazards Reduced
 - Cladding: Damage of the cladding system including possible panels becoming detached from the structure.
 - Partitions: Damage including possible collapse of partitions.
 - Ceilings: Possible full failure of ceiling system including significant falling debris inhibiting egress.
 - Parapets: Significant failure of parapets including likely collapse with falling debris.
 - Doors: Most doors are jammed or extensively damaged due to movement of building. Most if not all doors are unpassable.

The district's goal of Damage Control for the Structural Performance Objective and Position Retention for the Nonstructural Performance Objective meets the ASCE 41-13 Basic Performance Objective for Existing Buildings (BPOE) for Risk Category III buildings, which schools fall under.

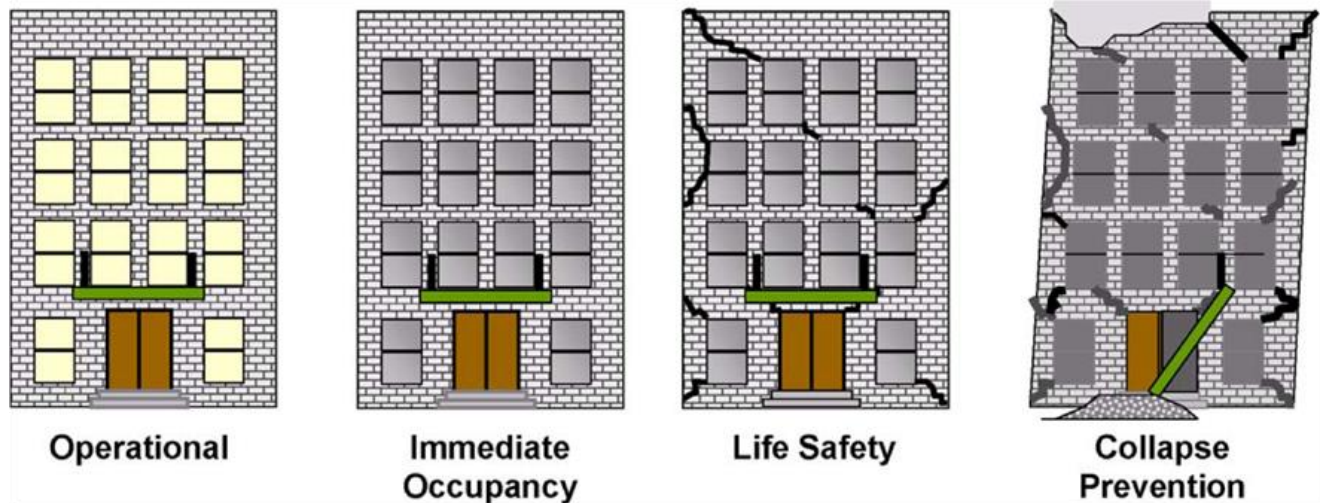


FIGURE 2: EXPECTED DAMAGE PER PERFORMANCE LEVEL

Each campus was given a score based on its seismic vulnerabilities. This score indicates how it would likely perform during a seismic event based on the ASCE 41-13 performance objectives. The scoring ranges are below in Tables 2 and 3.

Structural Performance Objectives and Score Ranges					
S-1	S-2	S-3	S-4	S-5	S-6
Immediate Occupancy	Damage Control Range	Life Safety	Limited Safety Range	Collapse Prevention	< CP
100-91	90-81	80-71	70-61	60-51	50-41

TABLE 2: STRUCTURAL PERFORMANCE OBJECTIVES AND SCORE RANGES

Nonstructural Performance Objectives and Score Ranges				
N-A	N-B	N-C	N-D	N/A
Operational	Position Retention	Life Safety	Hazards Reduced	< Hazards Reduced
100-91	90-81	80-71	70-61	60-51

TABLE 3: NONSTRUCTURAL PERFORMANCE OBJECTIVES AND SCORE RANGES

A structural score of 70 indicates that a building is very close to meeting the LS performance objective, but there are likely minor deficiencies preventing that designation. A structural score below 50 indicates that a portion of a building is seismically vulnerable to collapse. Typically, structural and nonstructural vulnerabilities correlate.

The following figures show the results of each school grouped by campus type. There is a trend line from the top left of the chart to the bottom right. The bubble size indicates the relative probable cost to seismically upgrade the building to the district's standard (Damage Control for the structural performance and Immediate Occupancy for the nonstructural performance).

The district's goal "zone" has been indicated by a green dashed perimeter. The Life Safety "zone" has been indicated by a yellow dashed perimeter. The orange "zone" indicates campuses that scored below Life Safety, but above "Collapse Prevention". The red "zone" indicates campuses that scored below Collapse Prevention.

The probable costs were based on set cost ranges and are shown in Table 4. Each campus was assigned a probable cost "score" based on the expected range of construction costs.









Probable Cost Ranges		
	\$/SF Range	\$ Score
	\$0	0
	\$1 - 9	5
	\$10 - 19	15
	\$20 - 29	25
	\$30 - 39	35
	\$40 - 49	45
	\$50 - 59	55
	\$60+	65

TABLE 4: PROBABLE COST RANGES

For each campus type, there is a table and figures as listed below on the following pages:

- Table indicating campus structural, nonstructural and probable cost scores.
- Figure showing the structural performance versus nonstructural performance versus probable cost for each campus.
 - The probable cost is indicated by the bubble size shown in Table 4.
 - Figure 3 defines the performance objective zones for this type of chart.
 - Figure 20 shows all 60 campuses on the same chart with campus type indicated by color.
- Figure showing the structural performance versus probable cost for each campus.
 - Figure 4 defines the performance objective zones for this type of chart.
 - Figure 21 shows all 60 campuses on the same chart with each campus type indicated by color.
- Figure showing the probable cost for each campus.

A few notes to keep in mind when reviewing the scores:

- 02: Barnes ES – The 2007 addition brought down the \$/SF range based on overall SF. The \$/SF cost of the original building would be in the \$45/SF range.
- 17: Kinnaman ES – It was unclear if the CMU wall in the play area was reinforced. This stood out to be a deficiency that could be easily addressed.
- 25: Ridgewood – The most significant repair for this school would be out-of-plane bracing for gymnasium walls, corridors and end classroom wing walls.
- 36: Conestoga ES – The cost for this school mainly accounts for blocking of the diaphragm. Further analysis might prove this school to meet the Damage Control objective as is.
- 37: Five Oaks ES – The most significant repair for this school would be wall to roof diaphragm connections.
- 38 Highland Park MS, 39: Meadow Park MS and 43: Whitford MS – A significant stand-alone repair for these schools would be to strengthen or just replace the entry canopies.
- 40: Mountain View MS – Replacing/strengthening of the tectum roof in the gym should be the priority at this school.
- 45: Beaverton HS – The \$/SF number at this school is based on a large overall building square footage. There is a significant portion of the building with \$/SF costs that would be higher than the \$65/SF range.
- 51: Capital Center – The most significant repair for this building would be strengthening of the in-plane shear connections from the diaphragm to the concrete shear walls.
- 52: International School ISB – The most significant repair for this building would be strengthening the URM parapets around the old front entry and the roof trusses in the gymnasium. The 2005 addition brought down the \$/SF range based on overall SF. The \$/SF cost of the previous additions would be in the \$45/SF range.
- 54: Terra Nova School of Science & Sustainability – The most significant repair for this building would be strengthening the out-of-plane walls at the gymnasium.

We found the lowest performing schools (either holistically or partially, starting with the lowest) to be:

- 33: West Tualatin View ES – This school has a gymnasium that is supported by concrete pilasters with single wythe unreinforced masonry infill. The masonry infill is a falling hazard during a seismic event.
- 45: Beaverton HS – A considerable portion of this school is URM. There have also been a number of undocumented additions to the original building causing the probable cost estimate risk to be relatively high.
- 23: Raleigh Hills (K-8) – This school has many additions and alterations with multiple deficiencies.
- 12: Fir Grove ES – This school lacks shear walls and contains unbraced/unanchored masonry walls that need bracing.
- 52: International School ISB – This school has many additions and alterations with multiple deficiencies.
- 18: McKay ES – This school has many additions and alterations with multiple deficiencies.
- 24: Raleigh Park – This school stood out to have a significant hazard since most interior corridor walls were CMU that do not extend to the roof diaphragm. The Tectum roof diaphragm has been mostly strengthened, but there are a number of interior falling hazards from heavy walls that are unbraced.
- 35: Cedar Park MS, 38: Highland Park MS, 40: Mountain View MS and 43: Whitford MS – These schools are almost identical. While some have been partially seismically upgraded, they still contain significant deficiencies particularly around the concrete gymnasium, cafeteria and wrestling rooms. The classroom wings do not have shear walls.

THIS PAGE INTENTIONALLY LEFT BLANK

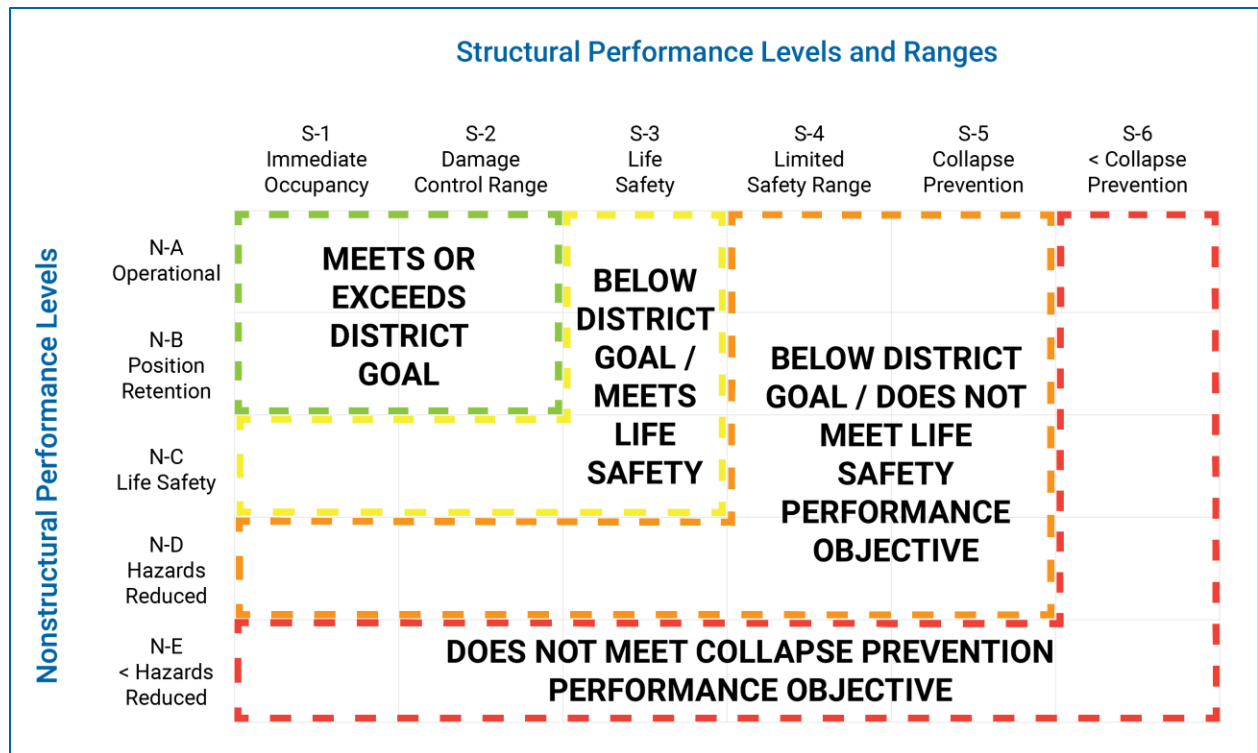


FIGURE 3: STRUCTURAL VS. NONSTRUCTURAL VS. PROBABLE COST ZONES

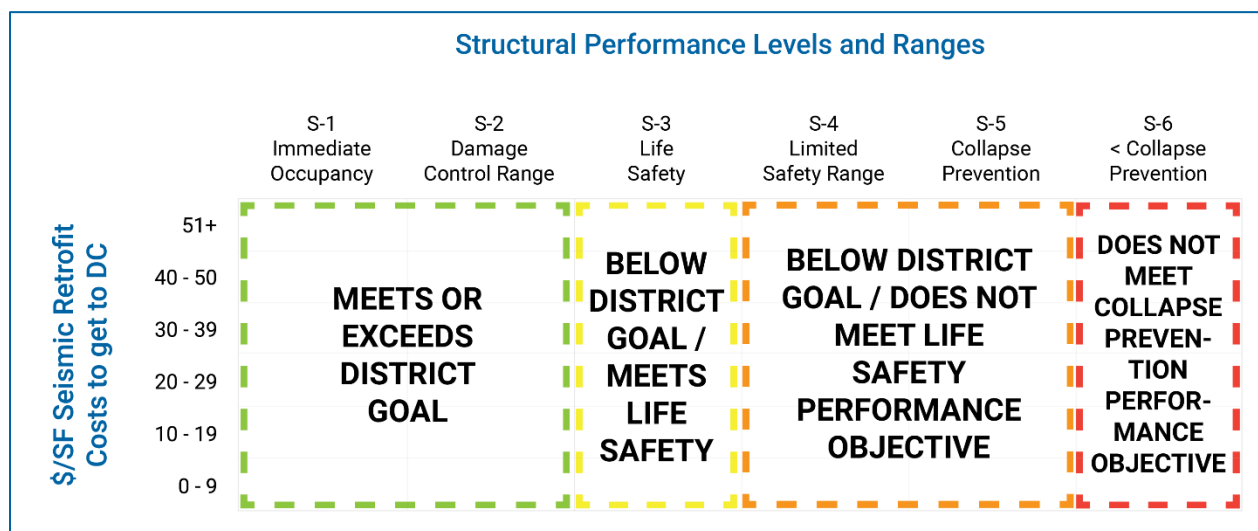
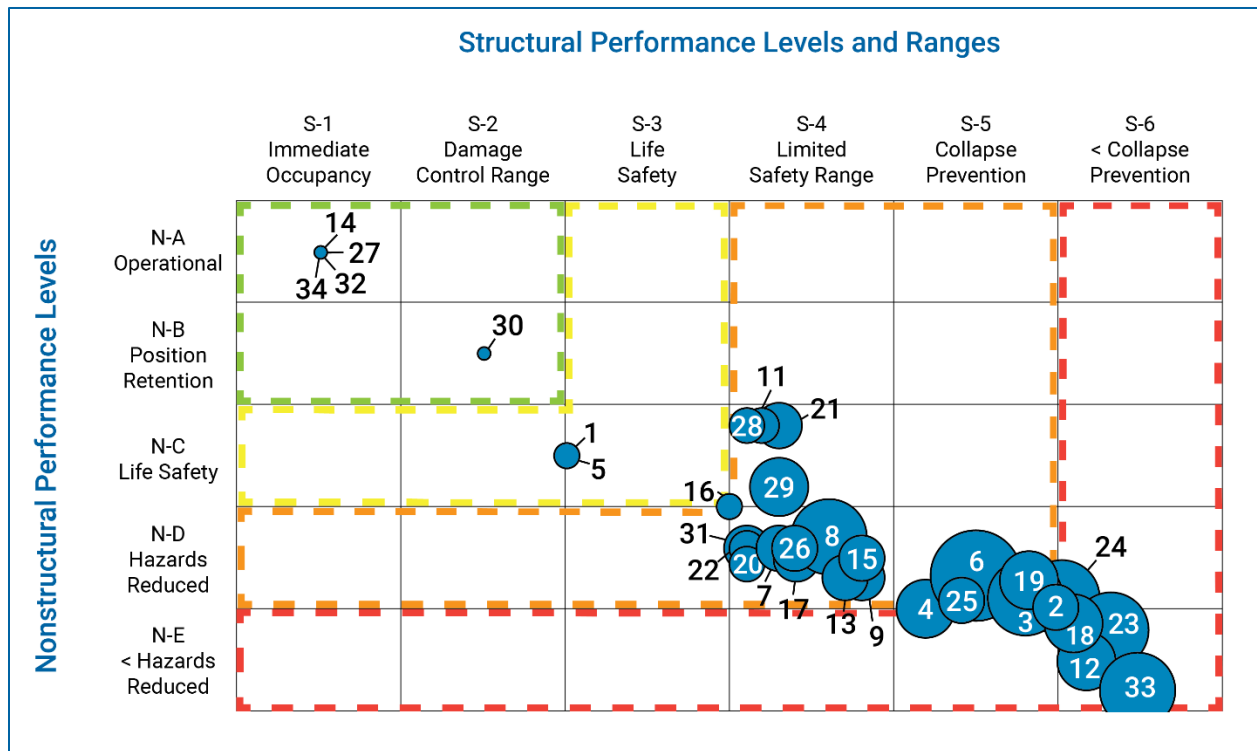


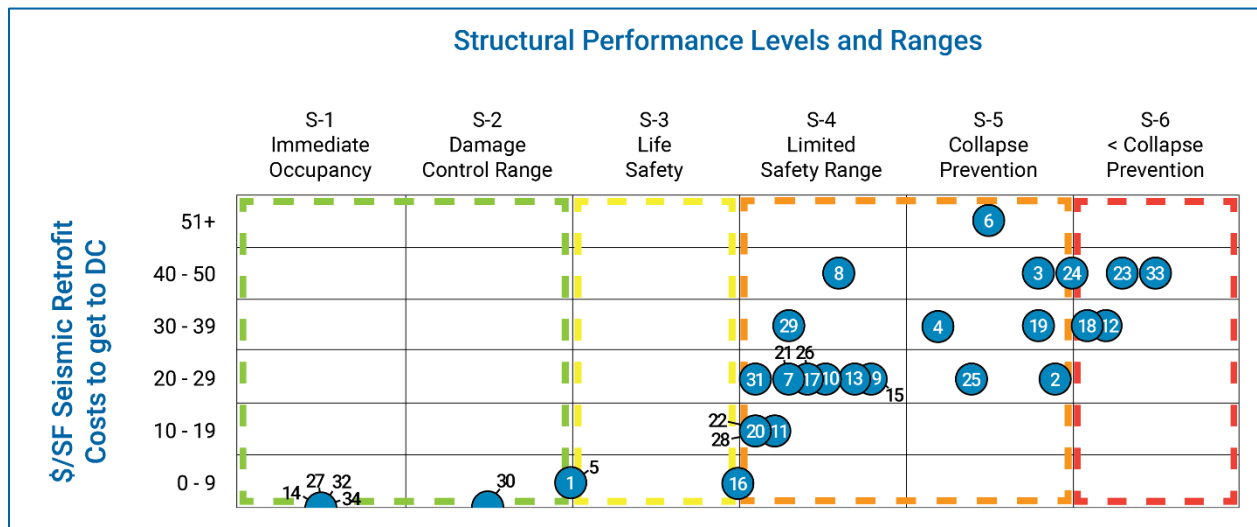
FIGURE 4: STRUCTURAL VS. PROBABLE COST ZONES

TYPE	#	Facility Name	Structural Score	Nonstructural Score	\$/SF to get to District's Goal
ELEMENTARY SCHOOLS	01	Aloha-Huber Park (K-8)	80	75	5
	02	Barnes	51	61	25
	03	Beaver Acres	52	61	45
	04	Bethany	58	60	35
	05	Bonny Slope	80	75	5
	06	Cedar Mill	55	63	55
	07	Chehalem	67	66	25
	08	Cooper Mountain	64	67	45
	09	Elmonica	62	63	25
	10	Errol Hassell	65	63	25
	11	Findley	68	78	15
	12	Fir Grove	48	55	35
	13	Greenway	63	63	25
	14	Hazeldale	95	95	0
	15	Hiteon	62	65	25
	16	Jacob Wismer	70	70	5
	17	Kinnaman	66	65	25
	18	McKay	49	59	35
	19	McKinley	52	62	35
	20	Montclair	69	65	15
	21	Nancy Ryles	67	78	25
	22	Oak Hills	69	66	15
	23	Raleigh Hills (K-8)	47	58	45
	24	Raleigh Park	50	61	45
	25	Ridgewood	56	61	25
	26	Rock Creek	66	66	25
	27	Sato	95	95	0
	28	Scholls Heights	69	78	15
	29	Sexton Mountain	67	72	35
	30	Springville (K-8)	85	85	0
	31	Terra Linda	69	66	25
	32	Vose	95	95	0
	33	West Tualatin View	45	52	45
	34	William Walker	95	95	0

TABLE 5: ELEMENTARY SCHOOL CAMPUS SCORES



**FIGURE 5: ELEMENTARY SCHOOLS
STRUCTURAL VS. NONSTRUCTURAL VS. PROBABLE COST**



**FIGURE 6: ELEMENTARY SCHOOLS
STRUCTURAL VS. PROBABLE COST**

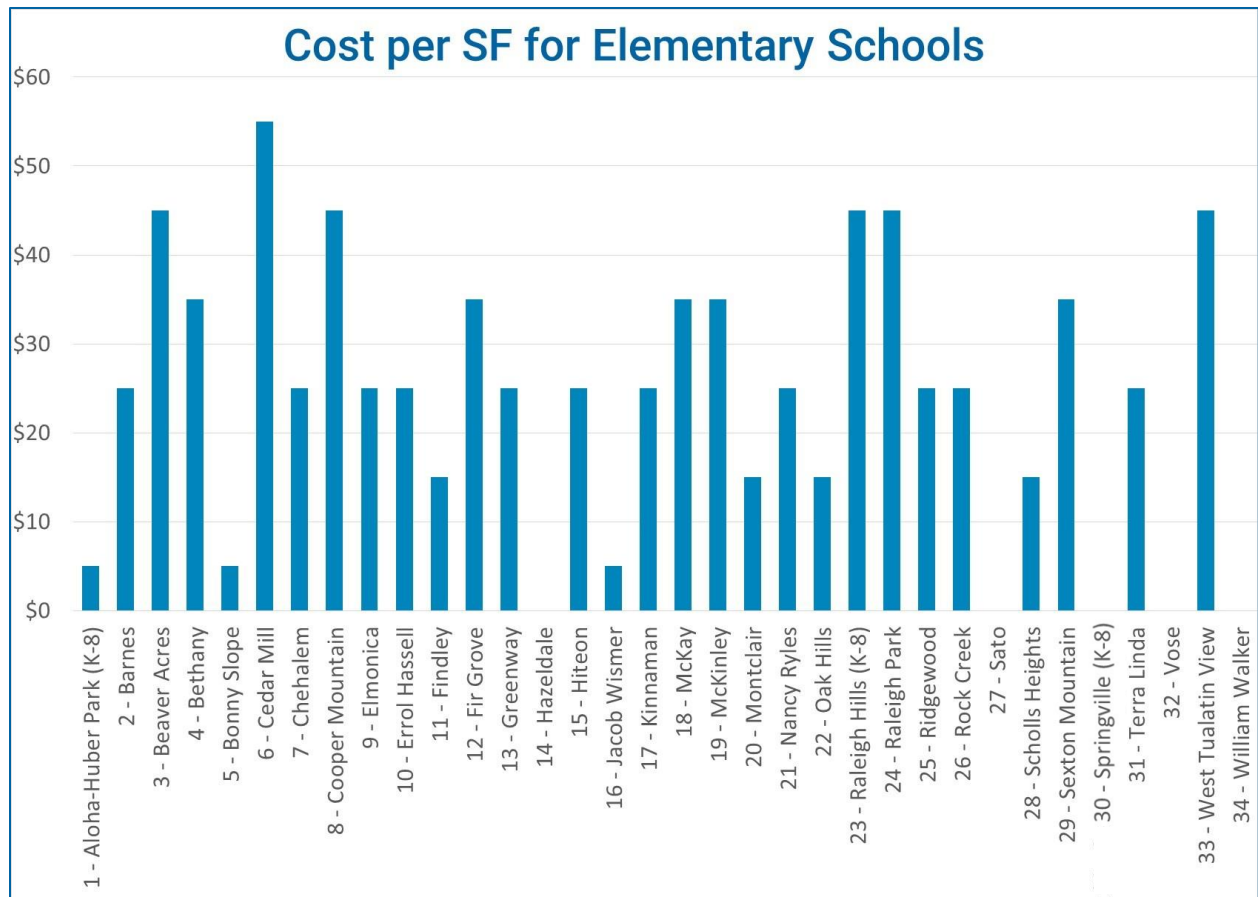


FIGURE 7: ELEMENTARY SCHOOLS PROBABLE COST

THIS PAGE INTENTIONALLY LEFT BLANK

TYPE	#	Facility Name	Structural Score	Nonstructural Score	\$/SF to get to District's Goal
MIDDLE SCHOOLS	35	Cedar Park	50	65	45
	36	Conestoga	70	78	25
	37	Five Oaks	55	62	35
	38	Highland Park	50	65	45
	39	Meadow Park	54	65	35
	40	Mountain View	50	65	35
	41	Timberland	95	95	0
	42	Stoller	70	78	25
	43	Whitford	50	65	45

TABLE 6: MIDDLE SCHOOL CAMPUS SCORES



FIGURE 8: MIDDLE SCHOOLS PROBABLE COST

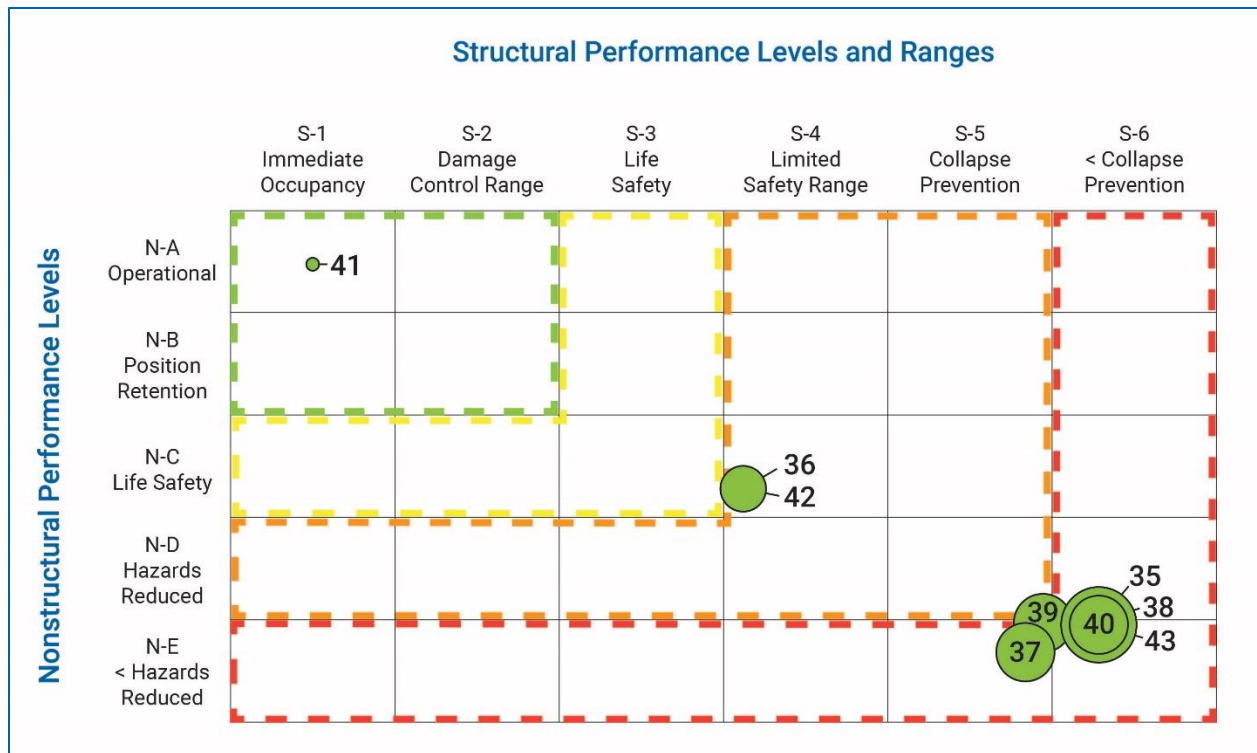


FIGURE 9: MIDDLE SCHOOLS
STRUCTURAL VS. NONSTRUCTURAL VS. PROBABLE COST

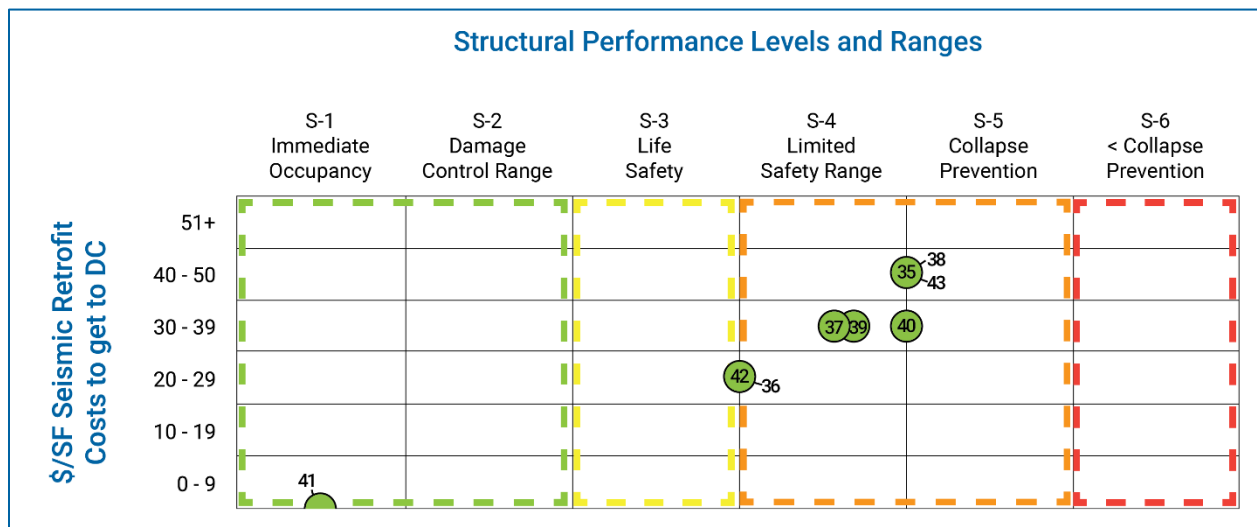


FIGURE 10: MIDDLE SCHOOLS
STRUCTURAL VS. PROBABLE COST

TYPE	#	Facility Name	Structural Score	Nonstructural Score	\$/SF to get to District's Goal
HIGH SCHOOLS	44A	Aloha	63	65	25
	45A	Beaverton High School (Main)	45	60	65
	45B	Beaverton High School (Cafeteria)	75	75	15
	45C	Merle Davies	69	69	15
	46	Mountainside	95	95	0
	47	Southridge	70	70	15
	48	Sunset	55	55	55
	49	Westview	68	68	25

TABLE 7: HIGH SCHOOL CAMPUS SCORES

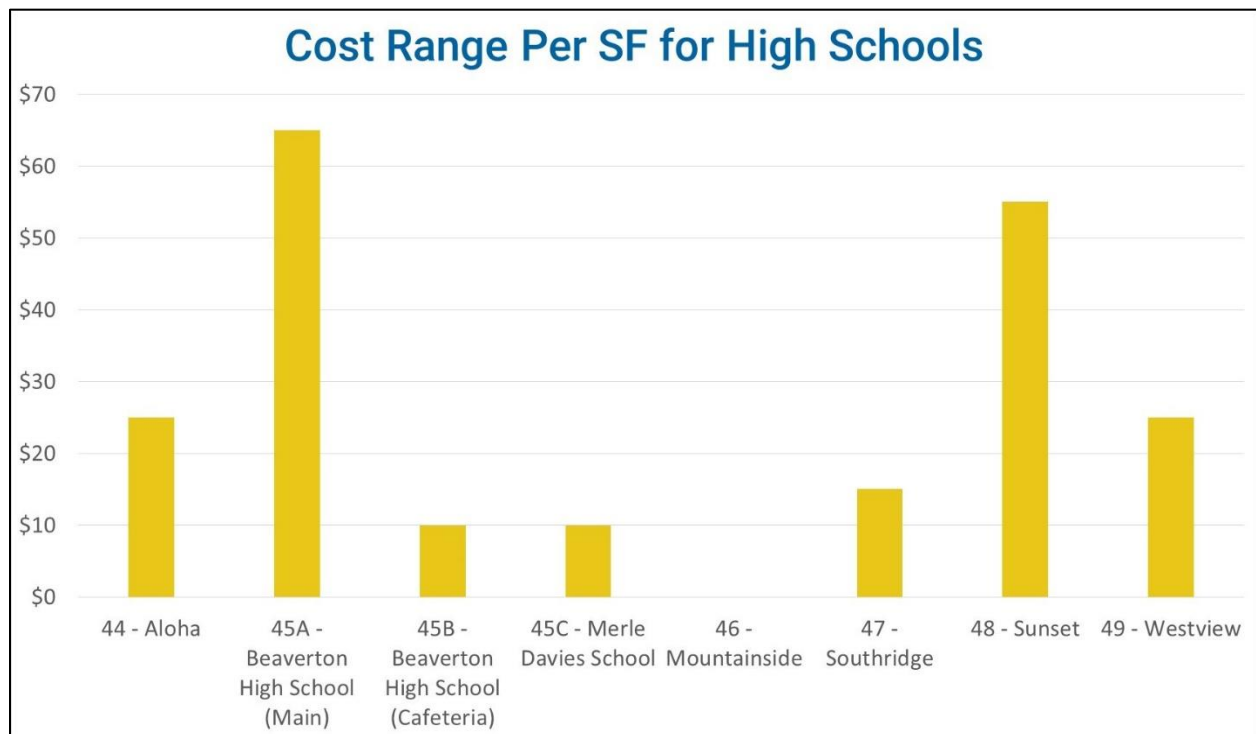
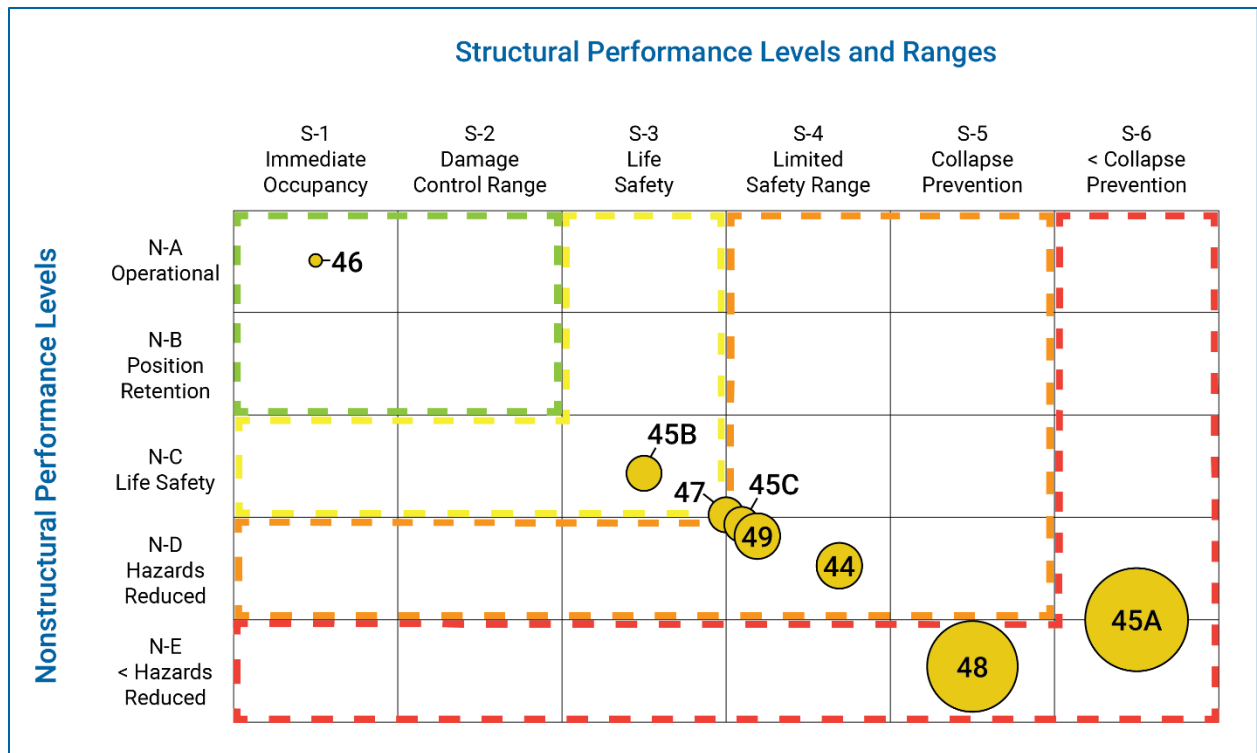
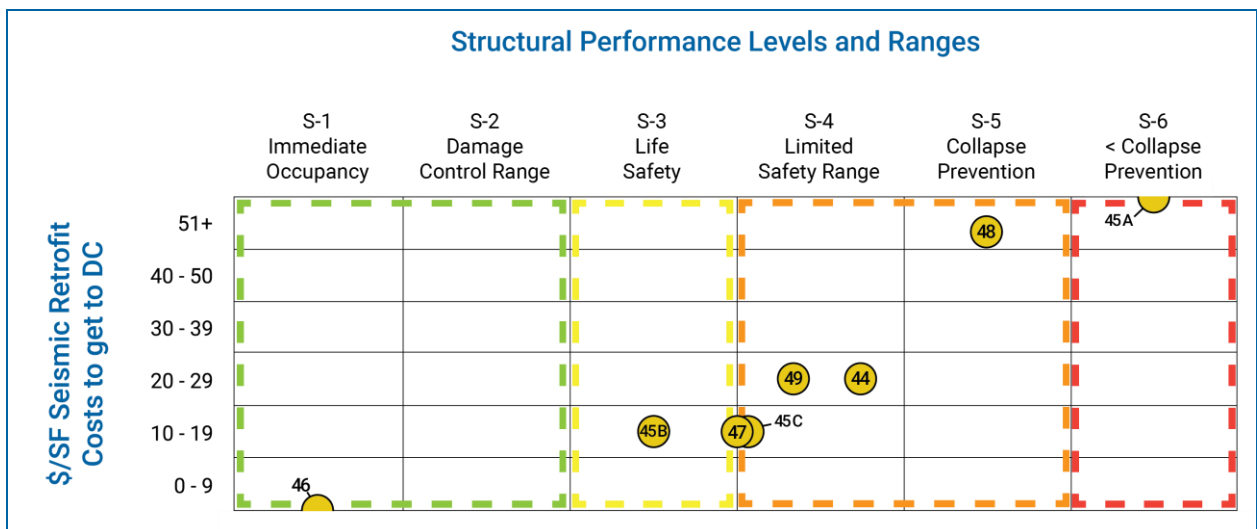


FIGURE 11: HIGH SCHOOLS PROBABLE COST



**FIGURE 12: HIGH SCHOOLS
STRUCTURAL VS. NONSTRUCTURAL VS. PROBABLE COST**



**FIGURE 13: HIGH SCHOOLS
STRUCTURAL VS. PROBABLE COST**

TYPE	#	Facility Name	Structural Score	Nonstructural Score	\$/SF to get to District's Goal
OPTION SCHOOLS	50A	Arts & Communication ACMA (Main Building)	95	95	0
	50B	ACMA (Performing Arts Building)	85	85	0
	51	Capital Center - Health & Science School	58	60	15
	52	International School ISB	48	58	35
	53	Merlo Station Community High	69	65	15
	54	Terra Nova School of Science & Sustainability	62	55	45

TABLE 8: OPTION SCHOOL CAMPUS SCORES

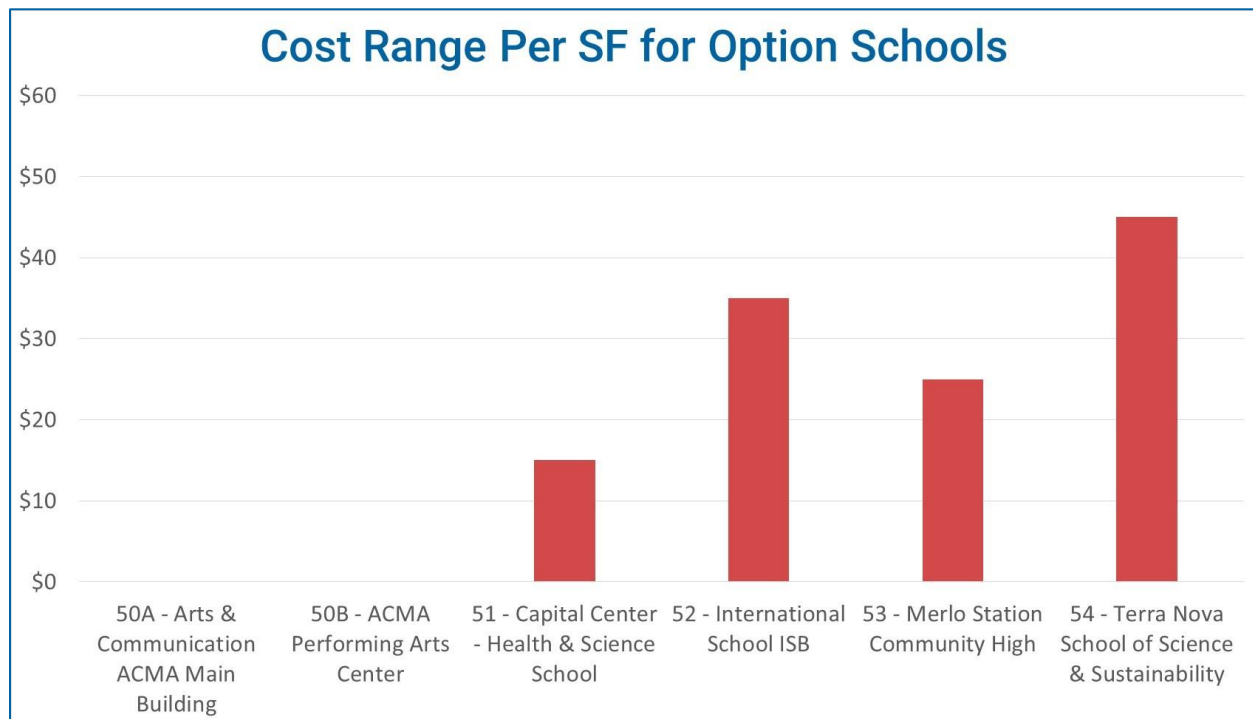
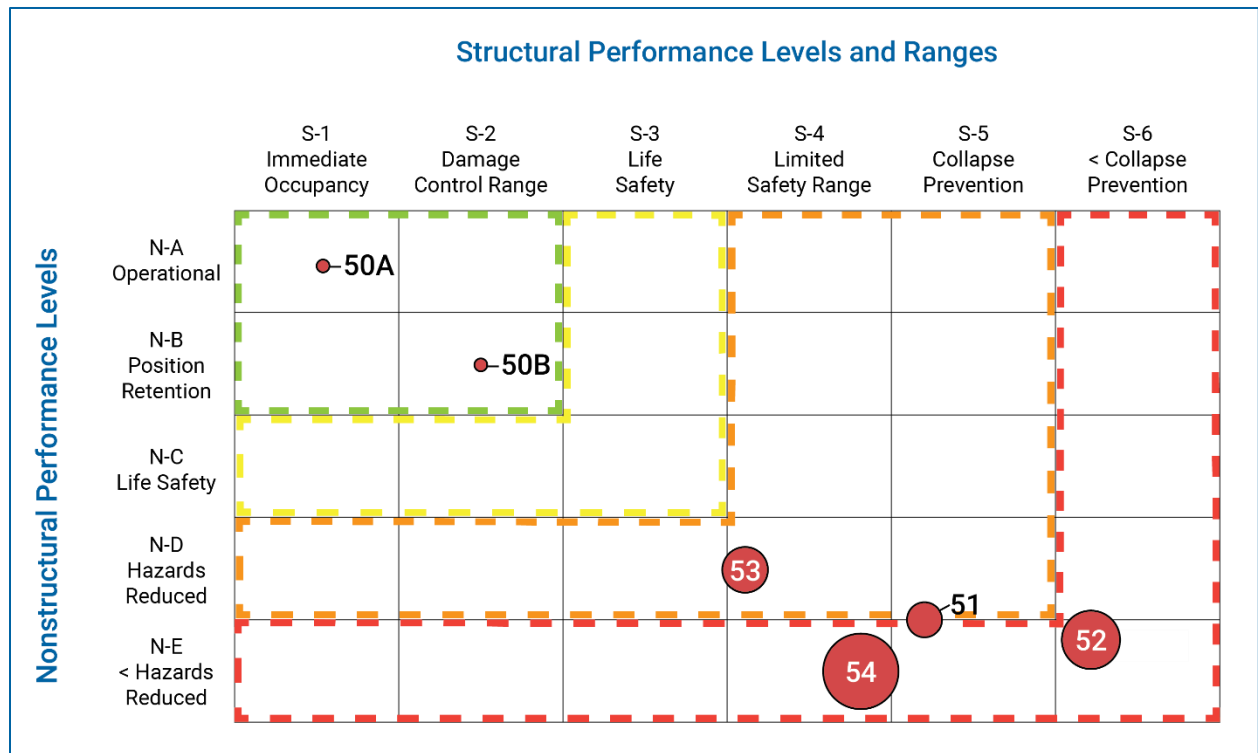
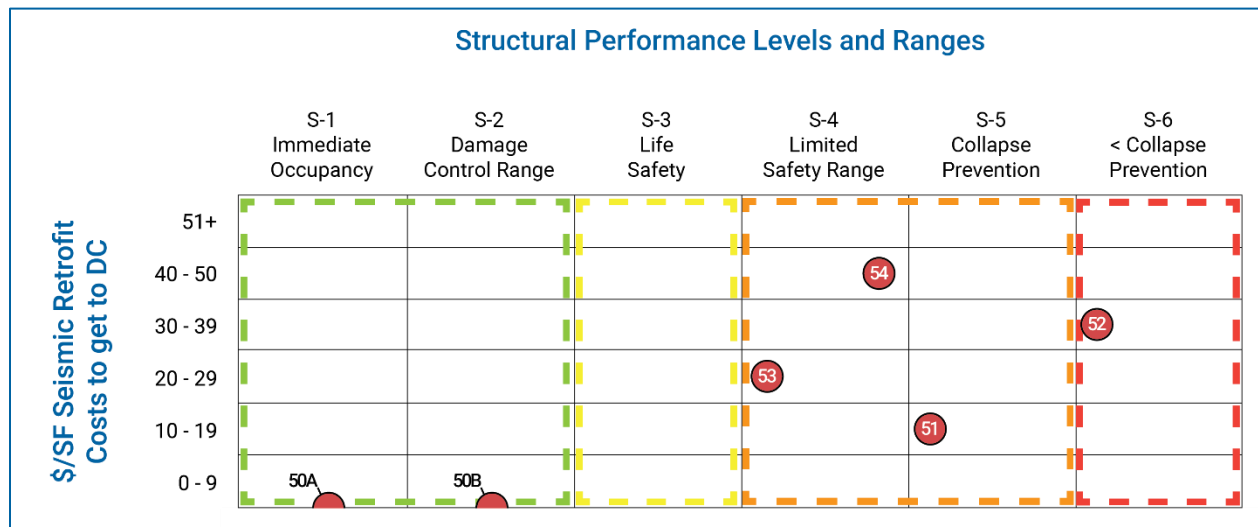


FIGURE 14: OPTION SCHOOLS PROBABLE COST



**FIGURE 15: OPTION SCHOOLS
STRUCTURAL VS. NONSTRUCTURAL VS. PROBABLE COST**



**FIGURE 16: OPTION SCHOOLS
STRUCTURAL VS. PROBABLE COST**

TYPE	#	Facility Name	Structural Score	Nonstructural Score	\$/SF to get to District's Goal
SUPPORT FACILITIES	55	Administration Building	68	66	25
	56	Maintenance Building	67	60	25
	57	Transportation Main	67	61	15
	58	Transportation Allen	58	69	25
	59	Transportation 5th St. North	68	69	15
	60	Transportation 5th St. South	58	68	25

TABLE 9: SUPPORT FACILITY CAMPUS SCORES

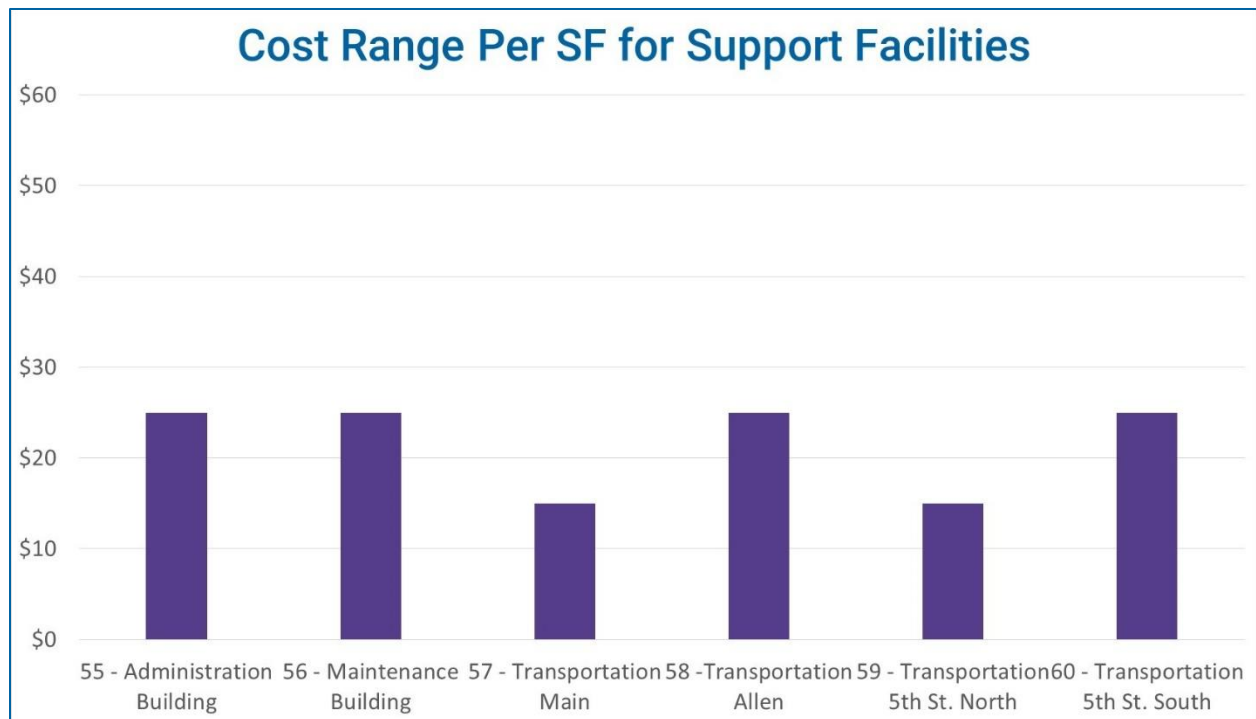
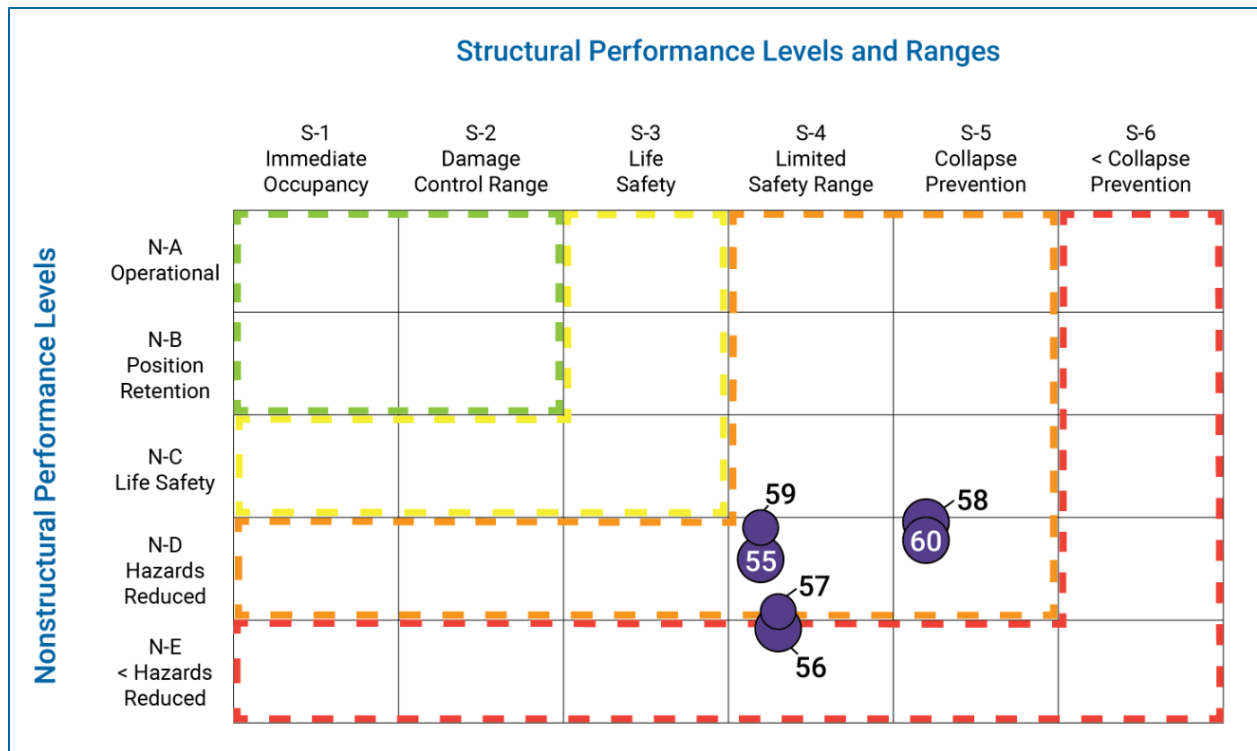
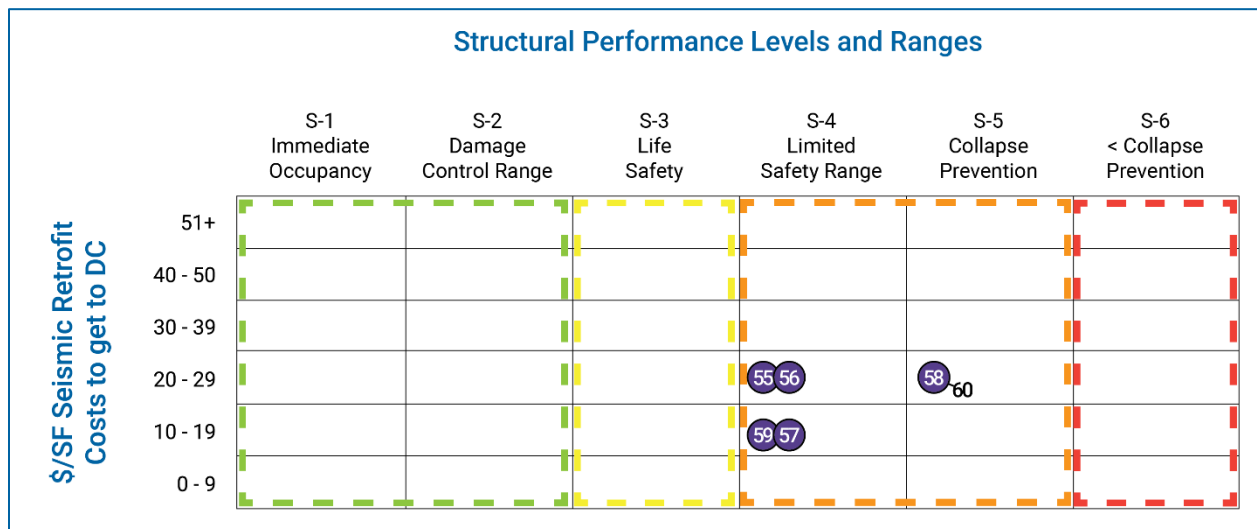


FIGURE 17: SUPPORT FACILITIES PROBABLE COST



**FIGURE 18: SUPPORT FACILITIES
STRUCTURAL VS. NONSTRUCTURAL VS. PROBABLE COST**



**FIGURE 19: SUPPORT FACILITIES
STRUCTURAL VS. PROBABLE COST**

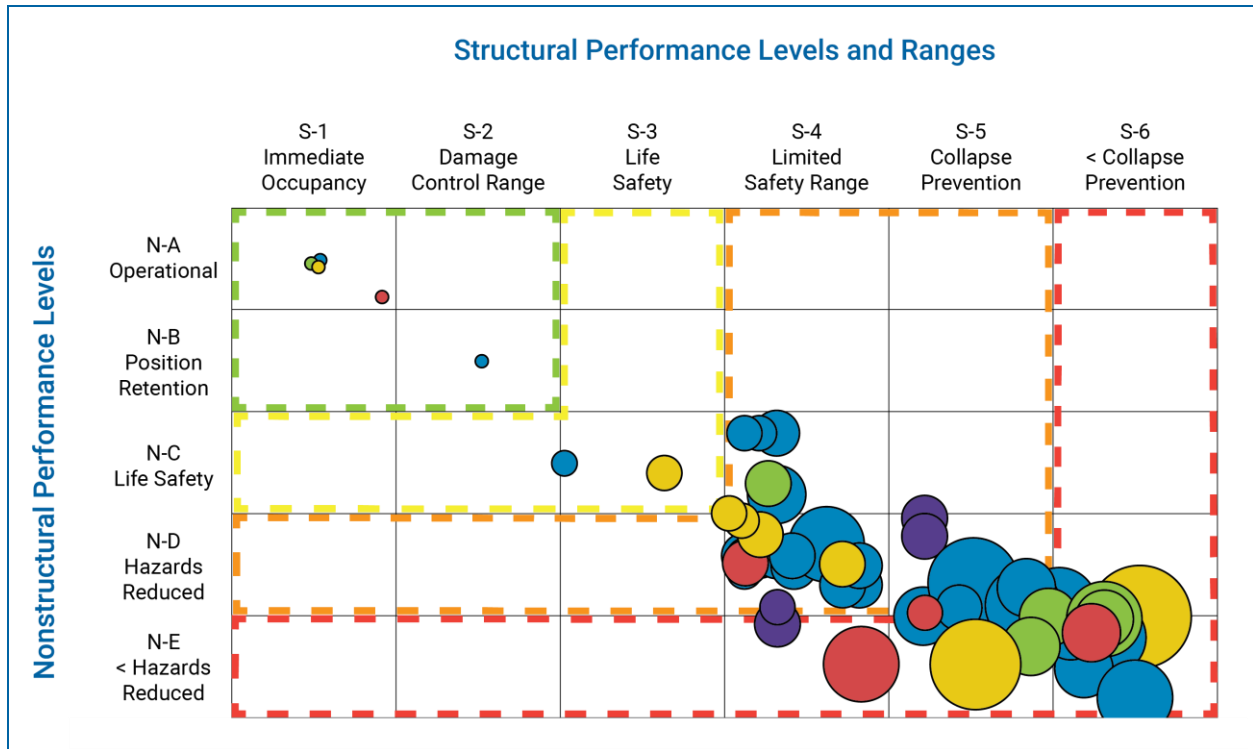


FIGURE 20: ALL CAMPUSES
STRUCTURAL VS. NONSTRUCTURAL VS. PROBABLE COST

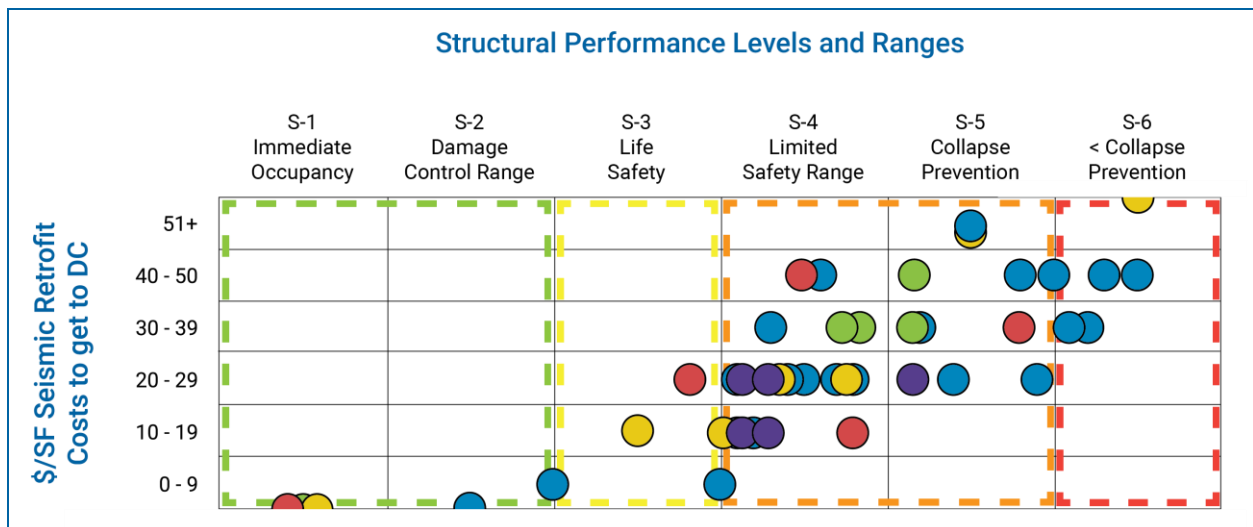


FIGURE 21: ALL CAMPUSES
STRUCTURAL VS. PROBABLE COST

Tables 10 through 13 group the facilities based on the structural performance scores into the four performance zones:

- **Red Zone:** Less than Collapse Prevention Performance Level
- **Orange Zone:** Limited Safety Range & Collapse Prevention Performance Level
- **Yellow Zone:** Life Safety Performance Level
- **Green Zone:** District's Goal Zone - Damage Control Range & Immediate Occupancy Performance Level

The following tables indicate the \$/SF costs (as shown in previous tables), the facility square footage and the total cost to reach the district goal. It is important reiterate the following about the \$/SF and total costs indicated below:

- The \$/SF costs assume that seismic rehabilitation is not occurring in conjunction with other upgrade work and includes an allotment for repairing architectural finishes after the structural work is complete.
- These costs are based on previous seismic rehabilitation studies of other campuses of similar building construction types and ages and do **NOT** include escalation past 2018/2019.
- These estimates are **NOT** fully developed cost estimates and are intended to provide the Beaverton School District with a ROUGH estimate of probable costs.
- These estimates do **NOT** include soft costs that could be up to an additional +/- 30%.
- These estimates do **NOT** include other MEP or architectural upgrades that might occur during a seismic rehabilitation project.

	School #	Facility Name	Structural Score	\$/SF *	Square Footage	Total \$ to get to District's Goal *
< Collapse Prevention	33	West Tualatin View	45	45	43,447	\$ 1,955,115
	45A	Beaverton HS (Main Building)	45	65	233,844	\$ 15,199,860
	23	Raleigh Hills (K-8)	47	45	56,647	\$ 2,549,115
	12	Fir Grove	48	35	60,666	\$ 2,123,310
	52	International School ISB	48	35	75,585	\$ 2,645,475
	18	McKay	49	35	48,736	\$ 1,705,760
	24	Raleigh Park	50	45	45,166	\$ 2,032,470
	35	Cedar Park	50	45	117,054	\$ 5,267,430
	38	Highland Park	50	45	116,892	\$ 5,260,140
	40	Mountain View	50	35	133,942	\$ 4,687,970
	43	Whitford	50	45	116,962	\$ 5,263,290
Total for < Collapse Prevention Campuses =						\$ 48,689,935

TABLE 10: < Collapse Prevention Costs

***Reference cost estimate notes on this page**

	School #	Facility Name	Structural Score	\$/SF *	Square Footage	Total \$ to get to District's Goal *
Limited Safety Range & Collapse Prevention	02	Barnes	51	25	75,900	\$ 1,897,500
	03	Beaver Acres	52	45	79,507	\$ 3,577,815
	19	McKinley	52	35	61,265	\$ 2,144,275
	39	Meadow Park	54	35	116,682	\$ 4,083,870
	06	Cedar Mill	55	55	41,055	\$ 2,258,025
	37	Five Oaks	55	35	143,039	\$ 5,006,365
	48	Sunset	55	55	253,727	\$ 13,954,985
	25	Ridgewood	56	25	54,059	\$ 1,351,475
	04	Bethany	58	35	49,913	\$ 1,746,955
	51	Capital Center	58	15	105,883	\$ 1,588,245
	58	Transportation Allen	58	25	9,779	\$ 244,475
	60	Transportation 5th St. South	58	25	25,800	\$ 645,000
	09	Elmonica	62	25	50,734	\$ 1,268,350
	15	Hiteon	62	25	78,972	\$ 1,974,300
	54	Terra Nova School	62	45	11,800	\$ 531,000
	13	Greenway	63	25	54,991	\$ 1,374,775
	44	Aloha	63	25	260,677	\$ 6,516,925
	08	Cooper Mountain	64	45	54,821	\$ 2,466,945
	10	Errol Hassell	65	25	60,345	\$ 1,508,625
	17	Kinnaman	66	25	80,837	\$ 2,020,925
	26	Rock Creek	66	25	51,505	\$ 1,287,625
	07	Chehalem	67	25	54,316	\$ 1,357,900
	21	Nancy Ryles	67	25	71,119	\$ 1,777,975
	29	Sexton Mountain	67	35	67,318	\$ 2,356,130
	56	Maintenance Building	67	25	21,390	\$ 534,750
	57	Transportation Main	67	15	47,000	\$ 705,000
	11	Findley	68	15	72,052	\$ 1,080,780
	49	Westview	68	25	281,183	\$ 7,029,575
	55	Administration Building	68	25	35,995	\$ 899,875
	59	Transportation 5th St. North	68	15	5,139	\$ 77,085
	20	Montclair	69	15	38,526	\$ 577,890
	22	Oak Hills	69	15	49,890	\$ 748,350
	28	Scholls Heights	69	15	68,941	\$ 1,034,115
	31	Terra Linda	69	25	51,636	\$ 1,290,900
	45C	Merle Davies	69	15	39,000	\$ 585,000
	53	Merlo Station High	69	25	51,125	\$ 1,278,125
	16	Jacob Wismer	70	5	72,863	\$ 364,315
	36	Conestoga	70	25	128,179	\$ 3,204,475
	42	Stoller	70	25	143,788	\$ 3,594,700
	47	Southridge	70	15	256,070	\$ 3,841,050
	Total for Limited Safety & Collapse Prevention Range =					\$ 89,786,445

TABLE 11: Limited Safety Range & Collapse Prevention Costs

***Reference cost estimate notes on Page 29**

	School #	Facility Name	Structural Score	\$/SF *	Square Footage	Total \$ to get to District's Goal *
Life Safety	01	Aloha-Huber Park (K-8)	80	5	106,046	\$ 530,230
	05	Bonny Slope	80	5	80,405	\$ 402,025
	45B	Beaverton HS (Cafeteria)	75	15	30,172	\$ 452,580
	Total for Life Safety Range =					\$ 1,384,835

TABLE 12: Life Safety Costs
***Reference cost estimate notes on Page 29**

	School #	Facility Name	Structural Score	\$/SF	Square Footage	Total \$ to get to District's Goal
Damage Control Range & Immediate Occupancy	30	Springville (K-8)	85	These schools meet the District's Goal and do not need to be seismically retrofitted.		
	50A	Arts & Communication ACMA (Main Building)	95			
	50B	ACMA (Performing Arts Building)	85			
	14	Hazeldale	95			
	27	Sato	95			
	32	Vose	95			
	34	William Walker	95			
	41	Timberland	95			
	46	Mountainside	95			
Total for Damage Control Range & Immediate Occupancy =					\$	0

TABLE 13: Damage Control Range & Immediate Occupancy Costs

Total to meet District's Goal = \$ 139,861,215

***Reference cost estimate notes on Page 29**

THIS PAGE INTENTIONALLY LEFT BLANK