COLUMBIA TRANSPORTATION / PIONEER HIGH SCHOOL
716 NE MARINE DRIVE

SEISMIC IMPROVEMENTS MADE TO FACILITY IN CONJUNCTION WITH THE 2009 REROOFING PROJECTS

LATERAL UPGRADE AND REROOFING SCOPE IN 2009

The 2009 Reroofing Project for Columbia Transportation / Pioneer HS was planned to include all roof areas of the school including outbuildings. The 1994 Bus Garage, the Shop and the Pump House were removed from the work scope as a cost cutting measure, and will be addressed at a future time. We believe that roof level lateral upgrades are needed for the Shop and the Pump House buildings, and believe that no roof level seismic improvements will be needed for the 1994 Bus Garage. All areas of the main building were reroofed in 2009, with plywood added to all zones which did not have it originally. The following describes the specific seismic improvements completed for each section of the main building.

ORIGINAL 1937 SCHOOL BUILDING [located at north part of complex]

This building had a pitched wood frame roof with spaced sheathing used to support wood shingles. Two options were presented to the contractor and they chose to infill the gaps between spaced sheathing boards with sawn strips of 3/4" plywood to create a uniform surface for the application of a new plywood diaphragm instead of tearing off the skip sheathing and replacing with 3/4" plywood.. This allowed for the following upgrades:

- Add new ½" plywood diaphragm over infilled skip sheathing.
- Strengthen connection of roof diaphragm to perimeter wood frame walls.

The following additional lateral upgrade work is believed to be needed for this section of the facility and should be undertaken in any future upgrade project:

- ✓ Provide lateral load path through attic zone to selected interior shearwalls in both the transverse and longitudinal direction of the building.
- ✓ Provide foundations below selected interior shearwalls to transfer forces to ground.

ORIGINAL 1937 GYM + 1949 GYM ADDITION

The roofs of these sectors differ in elevation, but both received supplemental plywood diaphragm strengthening. The following improvements were made, and are believed to be all needed

seismic improvements for this section of the school:

- Add ½" plywood diaphragm onto existing 2x6 decking for 1937 Gym roof.
- Add ½" plywood diaphragm onto existing 1" nominal sawn sheathing for lower roof of 1949 Addition at south side of gym.
- Improve connection of roof diaphragms to perimeter wood frame shearwalls.
- Confirmed that perimeter shearwalls are constructed using 1" nominal sawn sheathing installed in diagonal orientation.

1950 CLASSROOM SECTOR AT EAST

This addition has a pitched roof constructed from job built wood trusses spaced at 32 inches and supporting one inch nominal sawn sheathing in perpendicular orientation. A new plywood roof diaphragm was added allowing for the following seismic upgrade steps to be completed in this sector:

- New ½" plywood diaphragm added over existing sawn sheathing roof.
- Improve connection of roof diaphragm to perimeter wood frame walls.
- Improve connection and lateral support to top of CMU wall at south side.

The following additional lateral upgrade work is believed to be needed for this section of the facility and should be undertaken in any future upgrade project:

✓ Provide lateral load path through attic zone to selected interior shearwalls in both the transverse and longitudinal direction of the building.
✓ Provide foundations below selected interior shearwalls to transfer forces to ground.

1956 ADDITION = CURRENT TRANSPORTATION OFFICES

This sector has a pitched roof framed with 2x6 decking over bolted wood trusses spaced at 8 feet on center. It received a supplemental plywood diaphragm and other typical improvements, including provisions to mobilize additional interior shearwalls. The following specific improvements were made:

- Add ½" plywood roof diaphragm over 2x6 T & G decking.
- Supplement nailing of diaphragm to selected existing trusses which occur over 4 interior east/west running walls for the purpose of using these trusses to transmit lateral forces through the attic zone and to the interior walls below.
- Improve connection of roof diaphragm to perimeter wood frame walls.

The following additional lateral upgrade work is believed to be needed for this section of the facility and should be undertaken in any future upgrade:

✓ Provide lateral load path through attic zone to four selected interior shearwalls running in the east/west direction by connecting the trusses directly over these walls into the top plate of the walls.

1959 FORMER CAFETERIA AND KITCHEN [Current classroom use]

This sector occurs at the southwest corner of the facility. The original kitchen occupies the north third of the space and is framed with 2x6 decking supported by steel trusses at 48 inch spacing. The original cafeteria was the south two thirds of the addition and is framed by existing 5/8" plywood on 2x8 rafters supported by gluelam beams. The following lateral improvements were undertaken and no additional seismic improvements are believed to be required for this sector of the school:

- Add ½" plywood diaphragm over 2x6 decking of former kitchen area.
- Add supplemental nailing to 5/8" roof plywood over former cafeteria area.
- Improve connection from roof to perimeter walls.

UPGRADE PHILOSOPHY

THIS IS A REROOFING PROJECT WHICH ADDRESSES ALL PORTIONS OF THE SCHOOL CAMPUS INCLUDING THE SHOP, GARAGE AND PUMP HOUSE. —— REMOVED FROM SCOPE

PORTLAND PUBLIC SCHOOLS HAS INITIATED A VOLUNTARY SEISMIC HAZARD REDUCTION PROGRAM FOR EXISTING SCHOOL FACILITIES WITHIN THE DISTRICT. AS PART OF THAT OVERALL PROGRAM, JAMES G. PIERSON INC. HAS BEEN INSTRUCTED TO INCORPORATE SEISMIC STRENGTHENING INTO THE REROOFING WORK WHICH EXPOSES THE STRUCTURAL ROOF SHEATHING FOR IMPROVEMENT AS PART OF THE NATURAL PROGRESS OF THE REROOFING WORK. THE CURRENT PORTLAND PUBLIC SCHOOLS LATERAL UPGRADE GOAL IS COMPLIANCE WITH THE "BASIC SAFETY OBJECTIVE" OUTLINED IN ASCE-31 AND ASCE-41 STANDARDS, USING LIFE SAFETY LEVEL FOR THE BSE-1 EARTHQUAKE, AND COLLAPSE PREVENTION FOR BSE-2 EARTHQUAKE.

STRENGTHENING OF DIAPHRAGMS, CONNECTIONS TO WALLS, AND OTHER SIMILAR SEISMIC IMPROVEMENTS LOGICALLY UNDERTAKEN IN CONJUNCTION WITH THE REROOFING PROJECT ARE INCLUDED. THE DESIGN OF THESE ROOF LEVEL ELEMENTS IS IN ACCORDANCE WITH THE ASCE-31 AND 41 DOCUMENTS IN VIEW TO AN OVERALL BUILDING UPGRADE SCHEME. THE SEISMIC IMPROVEMENTS OF THIS CONTRACT MAY TERMINATE AT OR IMMEDIATELY BELOW ROOF SURFACE LEAVING FURTHER STRENGTHENING OF THE ENTIRE LOAD PATH UNTIL SUBSEQUENT SEISMIC UPGRADE PROJECTS.

REVIEWERS ARE DIRECTED TO THE SUPPORTING STRUCTURAL CALCULATIONS FOR MORE DETAIL AS TO THE OVERALL BUILDING UPGRADE SCHEME PLANNED, AND THE ELEMENTS OF THE BUILDING WHICH PARTICIPATE IN THAT MECHANISM. ELEMENTS OF THAT SCHEME NOT STRENGTHENED AT THIS TIME (BUT IMPORTANT TO THE LATERAL RESISTANCE OF THE BUILDING) ARE IDENTIFIED SPECIFICALLY AND FULLY BY THAT PACKAGE FOR FUTURE ATTENTION, AND MAY NOT BE AS CLEARLY DEFINED IN THE SHORT SUMMARY SENTENCES WHICH FOLLOW BELOW.

FEMA 178 REPORTS FOR ALL PORTLAND PUBLIC SCHOOLS HAVE BEEN COMPLETED PREVIOUSLY IN 1997 THROUGH 1999. A FEMA REPORT BY OTHERS IS PROVIDED IN CONJUNCTION WITH THE STRUCTURAL SUBMITTAL FOR THIS BUILDING PERMIT.

AREAS OF THE BUILDING IDENTIFIED FOR FUTURE UPGRADES

1. PROVIDE ATTIC LEVEL LOAD PATH FROM ROOF TO INTERIOR WALLS OF AREAS W/ PITCHED ROOFS.
2. ADD LATERAL RESISTING ELEMENTS IN CRAWLSPACE OF 1950 ADDITION. & 1937 SECTOR.

2009 REROOF