

OVERTON STREET VETERINARY HOSPITAL

3-STORY STRUCTURE WITH BELOW GRADE PARKING GARAGE



RENDERING OF VETERINARY HOSPITAL FACADE



LOCATION OF PROJECT IN PORTLAND METRO

PROJECT BACKGROUND

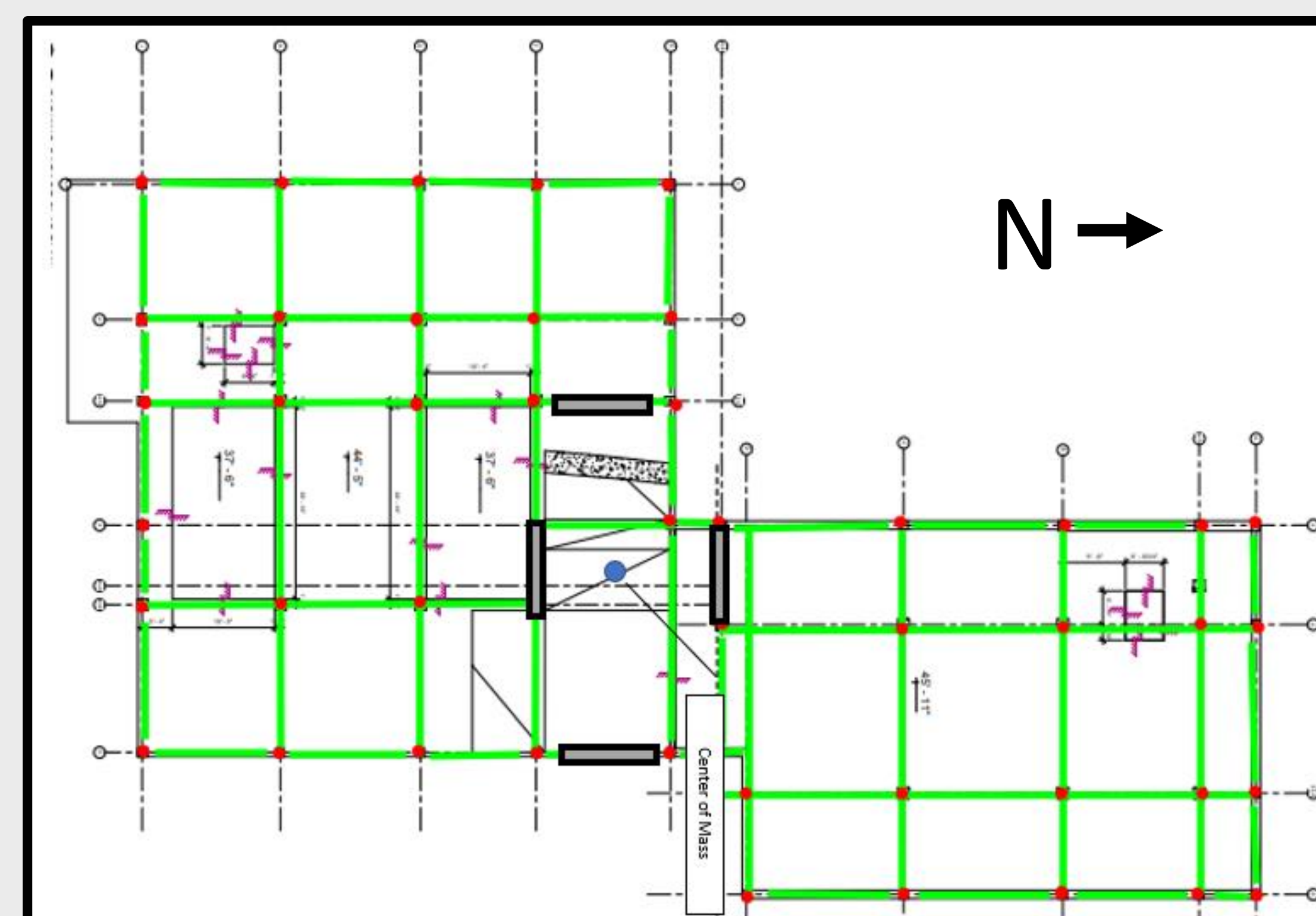
- LOCATED IN PORTLAND, OREGON
- STATE-OF-THE-ART NEW CONSTRUCTION FACILITY INCLUDING SPACES FOR SURGERY AND MRI

DESIGN OBJECTIVES

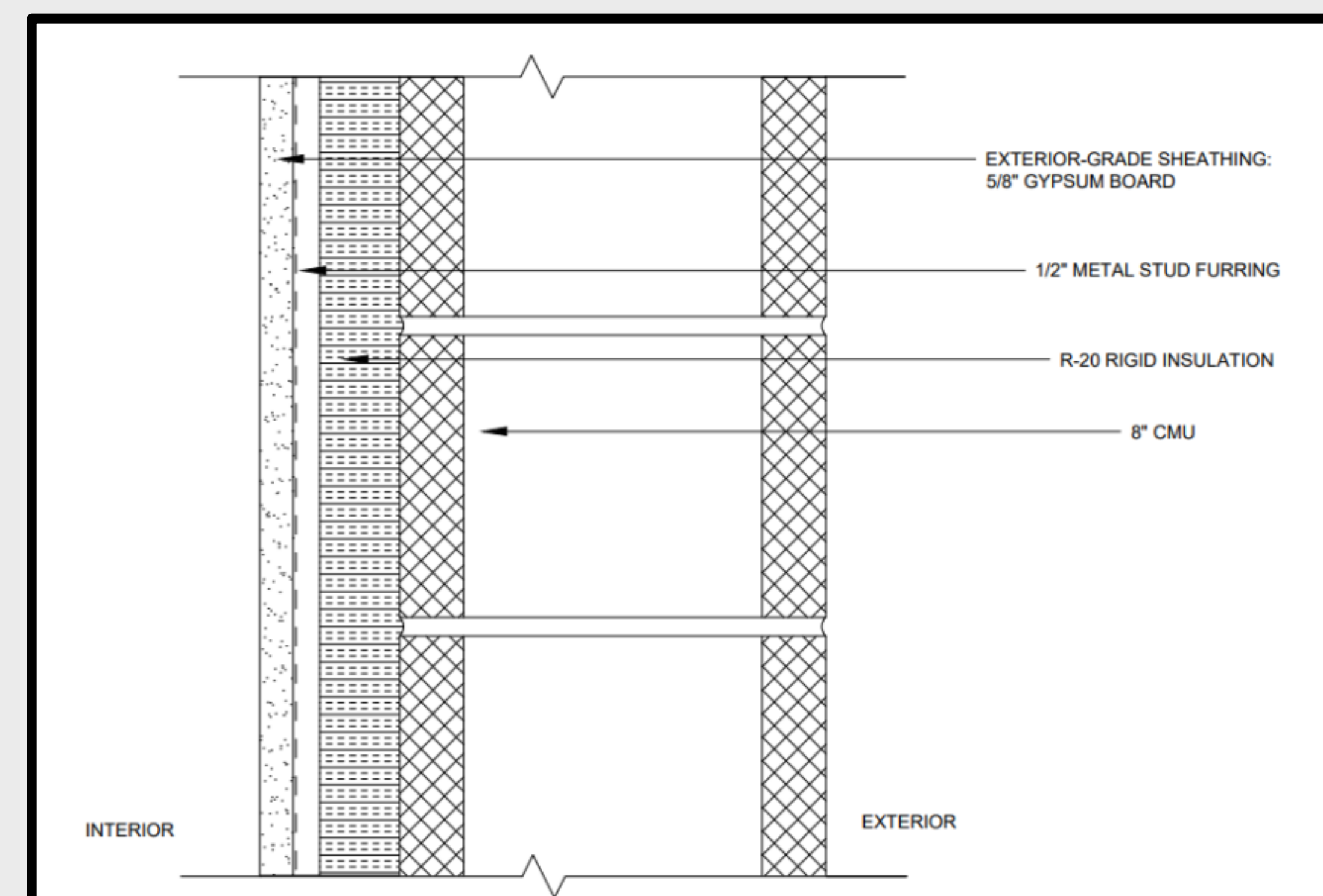
- DESIGN A STRUCTURE CAPABLE OF WITHSTANDING EARTHQUAKE LOADS BEYOND MITIGATION OF LOSS-OF-LIFE
- CREATE A COMPREHENSIVE DESIGN THAT CAN BE CONSTRUCTED QUICKLY TO LIMIT CLIENT MOVE-IN TIME
- EVALUATE ARCHITECT'S DESIGN FOR AREAS TO IMPROVE THERMAL RESISTANCE AND BUILDING PERFORMANCE
- LOWER LONG-TERM OPERATING COSTS OF BUILDING THROUGH EFFICIENT HEATING, VENTILATION, AND COOLING (HVAC) DESIGN AND CONSTRUCTION

GRAVITY FRAME DESIGN

- CONSIDERED WOOD, STEEL, AND CONCRETE FOR BEAMS AND COLUMNS
- SELECTED STEEL FOR DUCTILITY AND CONSTRUCTION SPEED (EFFICIENCY)
- CONSIDERED WIDE FLANGED SHAPES (W-SHAPES), SQUARE HOLLOW STRUCTURAL STEEL (HSS), AND ROUND HSS FOR COLUMNS; SQUARE HSS SELECTED FOR SYMMETRY AND COST
- CONSIDERED W-SHAPES AND SQUARE HSS FOR BEAMS; W-SHAPES SELECTED FOR EFFICIENCY AND COST



BEAM AND SHEAR WALL PLAN LAYOUT



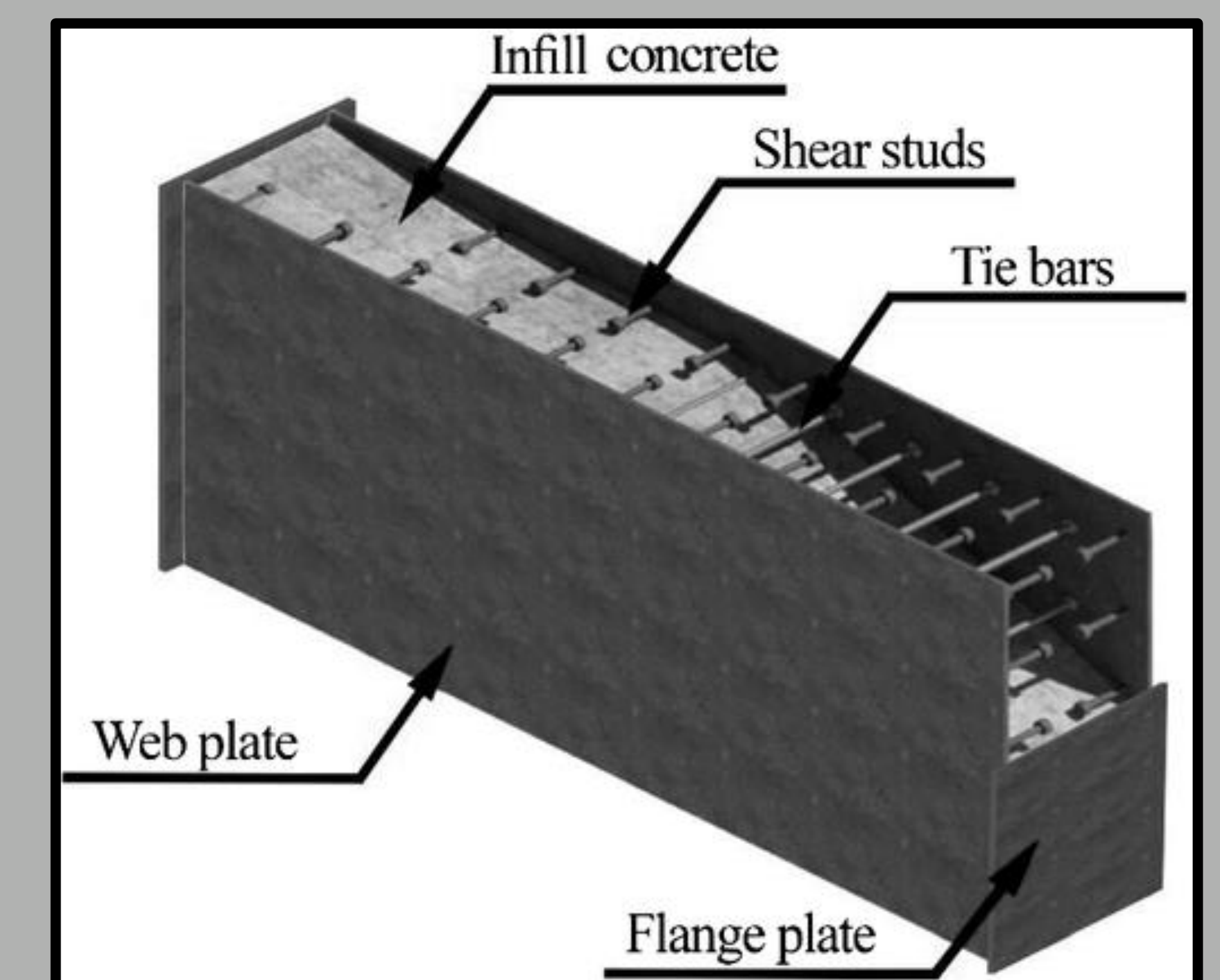
DRAWING OF REDESIGNED WALL COMPONENT

BUILDING ENVELOPE DESIGN

- REVIEWED THERMAL RESISTANCE (R-VALUE) OF 7 UNIQUE COMPONENTS OF THE ENVELOPE
- SELECTED BASE ON LOCATION OF COMPONENT AND USAGE OF ROOM
- EACH LAYER OF COMPONENT ADDED TO EXCEL SHEET TO DETERMINE TOTAL THERMAL RESISTANCE
- COMPARED TO OREGON RESIDENTIAL REACH CODE AND REDESIGNED IF R-VALUE IS LOWER THAN EXPECTED

LATERAL FORCE-RESISTING SYSTEM DESIGN (EARTHQUAKES)

- MOMENT FRAMES, BRACED FRAMES, AND SPEEDCORE SHEAR WALLS CONSIDERED
- FINAL SELECTION IS SPEEDCORE SHEAR WALLS
- PROVIDE IMPROVED CONSTRUCTION SPEED (EFFICIENCY) AND ARE AS EFFECTIVE AS CONCRETE WALLS
- DIAPHRAGMS CONNECTED BY WELDS
- DESIGNED IN MODULES FOR EASE OF CONSTRUCTION



EXAMPLE OF SPEEDCORE WALL DESIGN FROM ASCE LIBRARY

STRUCTURAL LOADS

- PORTLAND, OREGON IS A REGION AT RISK OF EARTHQUAKES AND REQUIRES CAREFUL CONSIDERATION OF THE LATERAL FORCE-RESISTING SYSTEM (LFRS)
- SENSITIVE MECHANICS IN-HOUSE REQUIRE CONSIDERATION OF DEFLECTION LIMITS
- HEAVIER DEAD-LOADS TAKEN FOR GRAVITY FRAME AND LFRS DESIGN