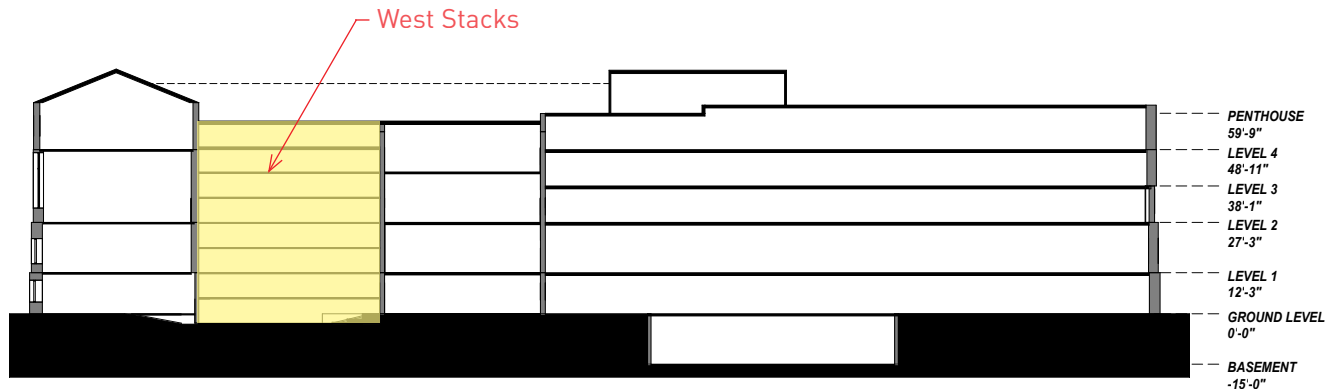


MU ELLIS WEST STACK - CONCEPT DESIGN

The west stack structure was originally constructed as an addition to Ellis Library in 1935. It has eight floor levels and is comprised of thin concrete floor slabs supported by closely spaced vertical steel posts. These posts are designed to carry minimal floor loads as well as adjustable bookshelves, transferring print collection loads directly to the building foundation. The stack floor-to-floor dimension is roughly 7'-6", which yields approximately 7'-3" clear height (code minimum is 7'-0" for occupied spaces). Existing wall construction is unit masonry, and supplemental structural steel has been installed to stabilize walls and prevent further movement due to previous foundation settlement issues in this part of the building.



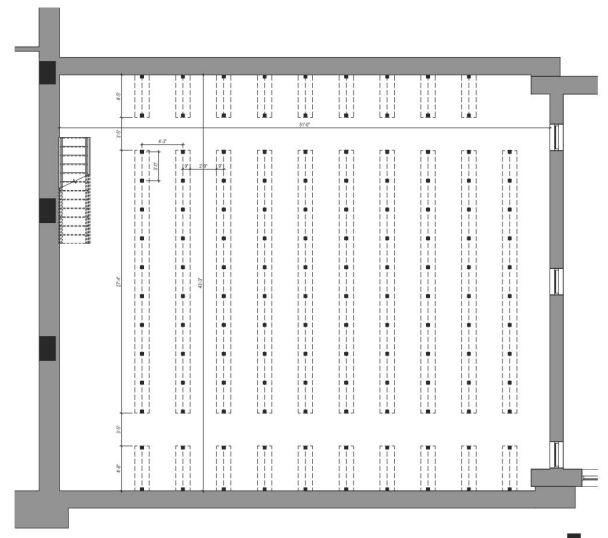
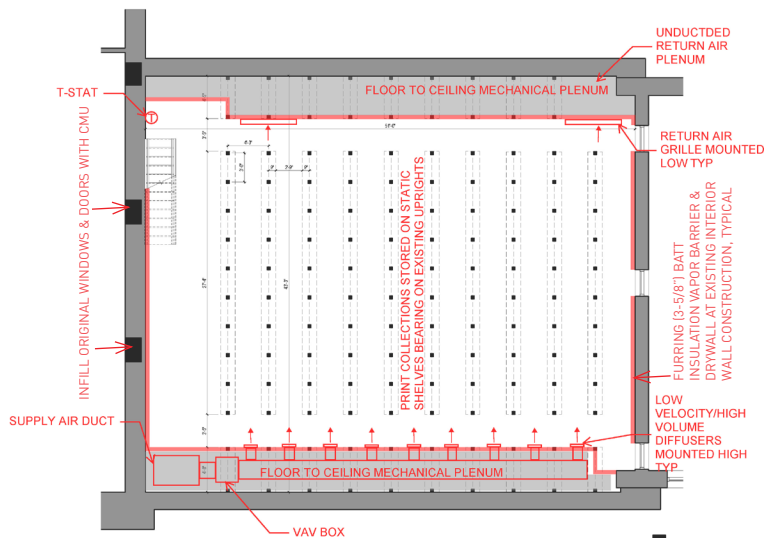
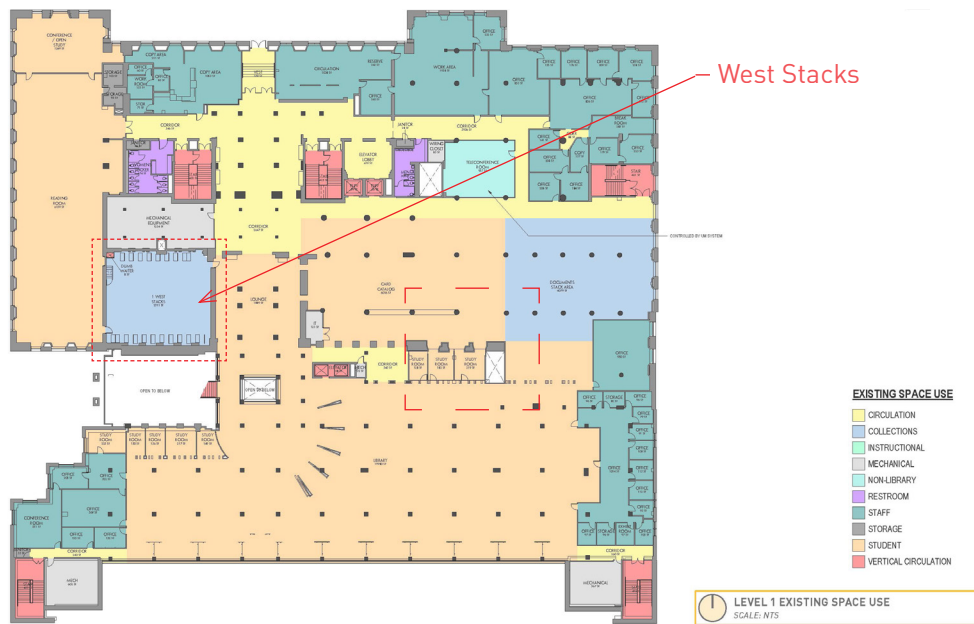
BUILDING SECTION ILLUSTRATING WEST STACK LOCATION AND FLOOR LEVELS



WEST STACK, TYPICAL FLOOR LEVEL



A feasibility study conducted in 2020 explored options for adapting the existing structure for long term print collection storage and preservation. Temperature and humidity control have been noted as the biggest challenge due to the relatively poor building envelope, and the lack of clear height for uniform overhead air distribution. Based on these existing conditions, a concept was developed to seal and insulate the existing perimeter walls, and to create full height mechanical chases/plenums at the narrow stack sections on either side of the cross aisles, avoiding the need for overhead ductwork entirely. This strategy would supply ducted high volume / low velocity conditioned air near the ceiling from one side of the room through variable-air-volume boxes, and return high volume / low velocity air near the floor at the opposite side of the room, utilizing the aisles for air flow. The existing condition and the proposed solution are illustrated in the following diagram.



This solution would yield (10) ranges per floor with (9) 36" wide shelving sections each for collection storage. Of the (8) stack levels, the concept study concluded that (5) will be needed for Special Collections and University Archives, leaving (3) stack levels available for general collection storage. Special Collection materials may require lower temperatures and tighter humidity control than general collection spaces, but the proposed HVAC system will be designed to support the same level of control for all levels for operational flexibility over time.

Fire protection options considered for the space include wet-pipe, dry-pipe, pre-action sprinkler systems, as well as clean agent and hypoxic strategies. Considerations include sprinkler head clearances that may impact how high collections can be stored, risk of accidental discharge, installation cost, and life safety. Fire protection system selection will require further evaluation during design.

Construction costs necessary to complete these improvements are included in the following project cost summary:

	Qty	Unit Cost	Total
Renovation Construction Costs			
Demo Doors	3 EA x	\$150.00 per EA =	\$450
Study Carrel Enclosure Demo	120 EA x	\$525.00 per EA =	\$63,000
Masonry Window Infill	850 SF x	\$10.00 per SF =	\$8,500
Misc Rough Carpentry & Joint Sealant	1 LS x	\$4,500.00 per LS =	\$4,500
Insulation & Vapor Barrier	8,200 SF x	\$3.75 per SF =	\$30,750
Doors, Frames & Hardware	2 EA x	\$2,600.00 per EA =	\$5,200
Gyp Walls - Single-sided	2,000 SF x	\$10.00 per SF =	\$20,000
Gyp Walls - Double-sided	8,120 SF x	\$7.75 per SF =	\$62,930
Rubber Base	1,200 SF x	\$2.75 per SF =	\$3,300
Paint Walls	8,200 SF x	\$1.00 per SF =	\$8,200
Paint Underside of Floors	36,000 SF x	\$1.25 per SF =	\$45,000
Paint Doors & Frames	8 EA x	\$265.00 per EA =	\$2,120
Floor Sealant	14,000 SF x	\$0.90 per SF =	\$12,600
Lighting	14,000 SF x	\$5.25 per SF =	\$73,500
Power	14,000 SF x	\$3.15 per SF =	\$44,100
Fire Protection (Wet Pipe)	14,000 SF x	\$6.30 per SF =	\$88,200
HVAC System	14,000 SF x	\$34.00 per SF =	\$476,000
Renovation Subtotal	14,000 SF		\$948,350
Markups & Contingency			
General Conditions		8.0%	\$75,868
Fee		5.0%	\$51,211
Design/Estimate Contingency		10.0%	\$107,543
Escalation to Midpoint Q4 2022		10.0%	\$118,297
Markup & Contingency Subtotal			\$352,919
WEST STACK RENOVATION ESTIMATED CONSTRUCTION TOTAL			\$1,301,269
Total estimated construction cost per Square Foot			\$92.95