



E x i s t i n g S t r u c t u r a l S y s t e m





BUILDING DESCRIPTION

The existing floor system for the University of Central Florida's Academic Villages is called the "Infinity System." This is a composite floor system with 2" 22 GA. Epicore MSR metal decking with a 4 1/4" concrete topping with W6x6 W2.1xW2.1 WWF reinforcement. The slab has a 28 day strength of 3000 psi. It spans between interior and exterior load bearing CMU walls in the east-west direction and load bearing metal stud wall panels. Epicore MSR has triangular dovetail shaped ribs spaced 8" on center that allow for longer spans and higher concrete strength. The bottom flutes are completely closed which allows for the deck to have a flat bottom profile. This makes it ideal to combine with load bearing stud walls because it distributes the load evenly over the metal studs eliminating the need for load distribution devices. The typical span in this building for this floor type is 12 feet. The typical bay for this floor system is shown in figure 3 below.

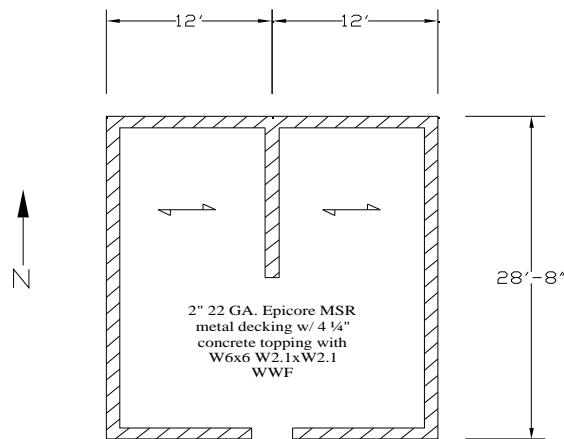


Figure 3: Typical bay



Building Footprint

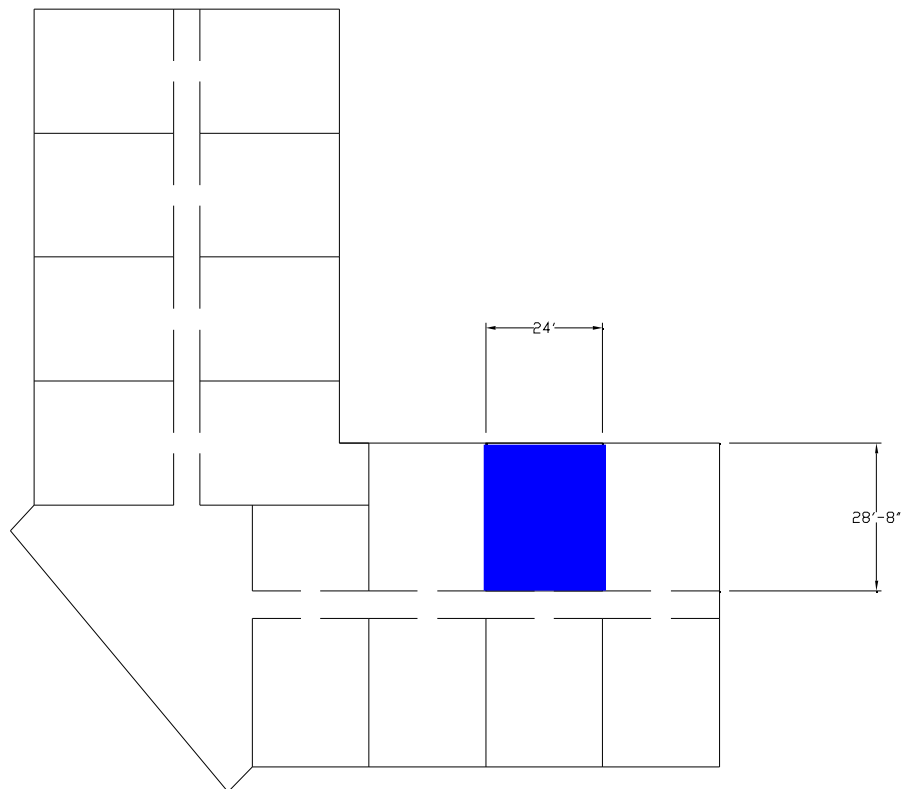


Figure 4: Building Footprint

LATERAL SYSTEM

The lateral system for the Academic Villages uses both exterior and interior masonry shear walls in both N-S and E-W directions to resist seismic and wind forces. All shear walls are typically 8" masonry units with Type S mortar and #5@24" reinforcement. See figure 5 below for the location of the shear walls at every level.



SHEAR WALLS

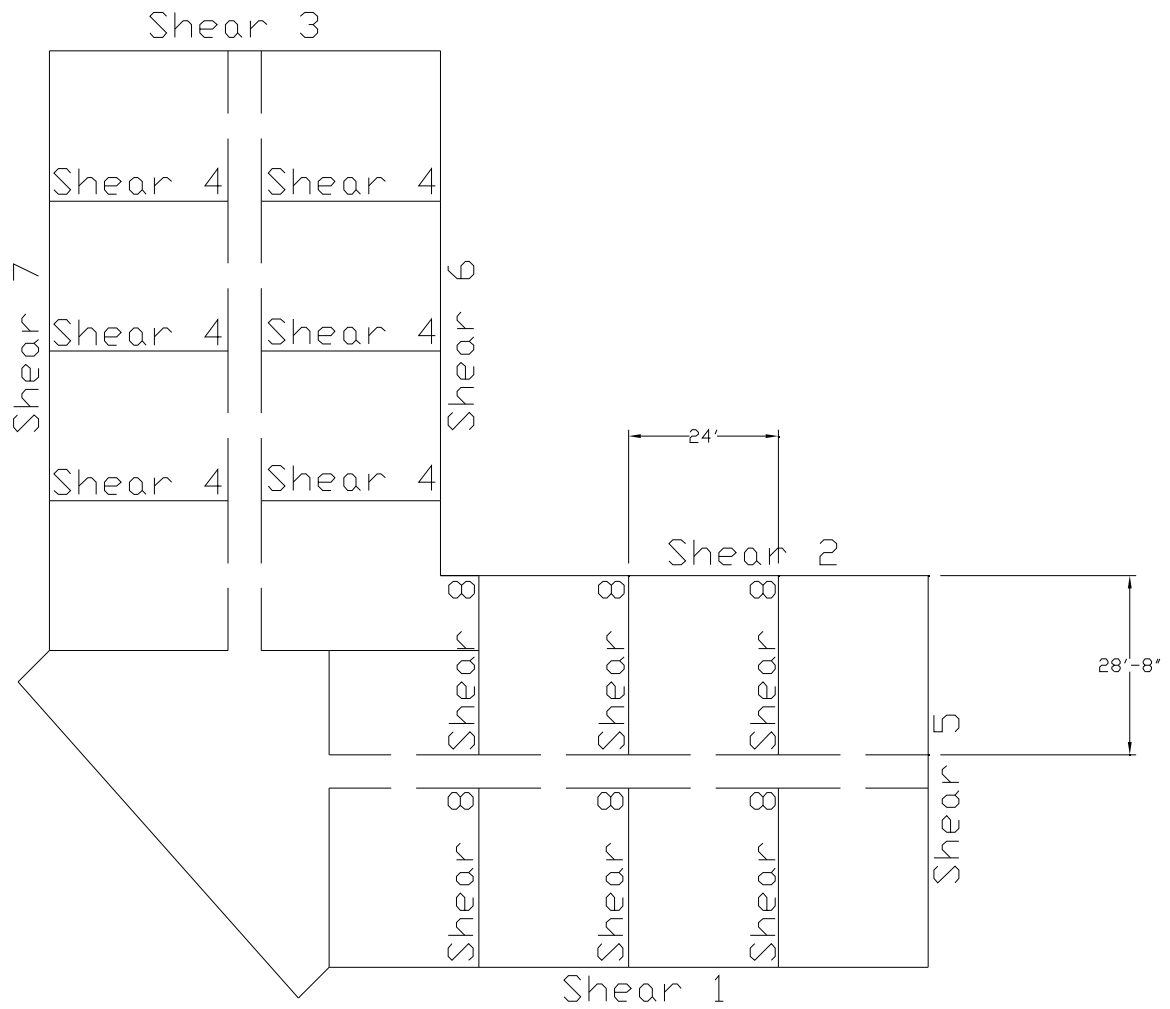


Figure 5: Location of Shear Walls



Shear Wall Force Schedule (kips)

	Shear 1		Shear 2		Shear 3		Shear 4	
	Each Floor	Total	Each Floor	Total	Each Floor	Total	Each Floor	Total
4th Floor	7.21	7.21	6.01	6.01	2.56	2.56	1.07	1.07
3rd Floor	13.52	20.73	11.27	17.28	4.79	7.35	1.97	3.04
2nd Floor	13.48	34.21	11.23	28.51	4.77	12.12	1.98	5.02
	Shear 5		Shear 6		Shear 7		Shear 8	
	Each Floor	Total	Each Floor	Total	Each Floor	Total	Each Floor	Total
4th Floor	2.1	2.1	6.04	6.04	5.18	5.18	1.07	1.07
3rd Floor	3.94	6.04	11.32	17.36	9.7	14.88	1.97	3.04
2nd Floor	3.93	9.97	11.28	28.64	9.67	24.55	1.98	5.02

Table 1: Shear Wall Forces

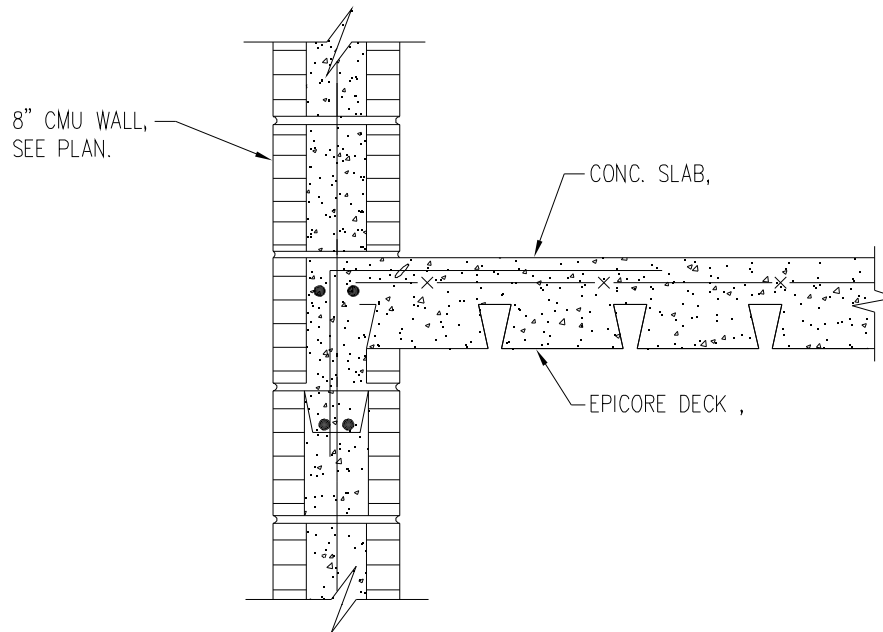


Figure 6: Typical Shear wall/Composite Deck Connection

ROOF SYSTEM

The roof of the Academic Villages is a hip roof consisting of hip trusses, girder trusses and light gage metal trusses spaced 4' o.c. All trusses are shop fabricated and have a minimum yield strength of 33 ksi. Metal roof decking is



11" - 2Ø Gauge Galvanized G-9Ø spanning a minimum of 3 spans. Several of the buildings have flat roofs. The roofs of these buildings consist of the same Epicore metal decking and concrete slab found in the floor systems.

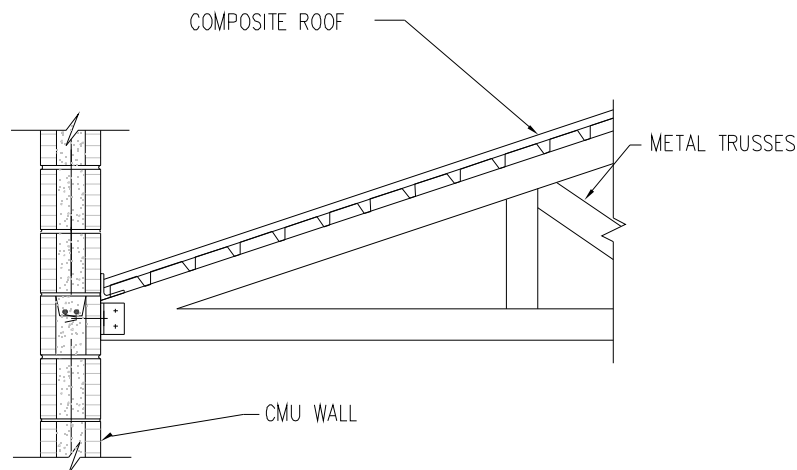


Figure 7: Typical Roof Connection

COLUMN SYSTEM

Concrete Columns with a 28 day compressive strength of 4000 psi span only between the foundation and the first floor. The columns are reinforced with Grade 60 #6 bars and #3 ties at various spacings. In addition to the concrete columns, there are also light gage metal built-up columns incorporated within the metal stud walls. These columns are found on every floor.

FOUNDATION SYSTEM

The foundation used in the Academic Villages is a shallow foundation system consisting of continuous strip footings to support 8" masonry shear walls



and stepped footings of various sizes centered under the interior concrete columns. The footings were designed to take the maximum soil bearing pressure of 2000 psi. The footings work together with a 4" concrete slab on grade. Both the footings and the slab have a 28 day strength of 3000 psi.

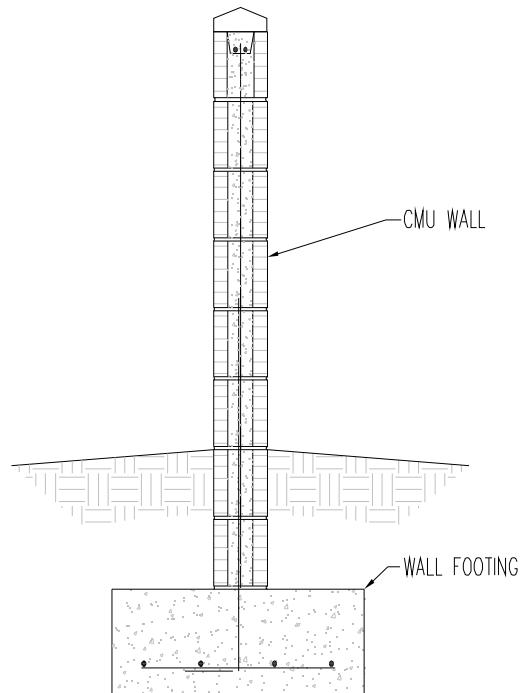


Figure 8: Typical Footing Connection

DESIGN CODES

Design Codes
American Institute of Steel Construction (AISC)
Load and Resistance Factor Design (LRFD)
American Society for Testing and Materials (ASTM)
Specifications for Structural Concrete (ACI 301)
Specifications for Masonry Structures (ACI 530.1)
American With Disabilities Act (ADA)
Florida Accessibility Code

Table 2: Design Codes



REQUIRED LOADS

Design Live Loads	
Roof	20 psf
Corridors	80 psf
Mechanical Rooms	150 psf
Stairs, Public Areas, Lobby	100 psf
All Other Rooms	40 psf
Superimposed Dead Loads	
M/E/P	10 psf
Partitions	20 psf

Table 3: Required Loads