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## Schematic Description of Structural Frame

Fountain Inn High School Addition

Fountain Inn, South Carolina

July 21, 2023

### Structural Roof System

The structural roof system will consist of 1-1/2", 22 gage, Type B, primed steel roof deck bearing on open web steel bar joists spaced at 5'-0" to 6'-0" centers. The bar joists will be supported by a structural steel frame at the class room wing and on load bearing 8" concrete masonry unit walls at the chorus addition. The approximate weight of the roof system will be five pounds per square foot.

A portion of the roof over the classroom wing will be framed with wide flange steel beams to support roof top mounted mechanical equipment.

### Structural Floor System

The structural floor system in the Classroom Wing will be five inch thick normal weight concrete slabs on 2" x 20 gage composite steel deck bearing on composite steel beams which will be spaced at approximately 8'-4" center to center. The slab will be reinforced with WWF6x6-W2.9xW2.9 and some conventional reinforcing over the girder beam lines and at re-entrant corners. The filler beams and girders will bear on wide flange or hollow structural shape columns. The floor system steel will weigh approximately nine pounds per square foot.

### Structural Steel Finish Requirements

The steel in the classroom wing will be considered Architecturally Exposed Structural Steel (AESS) which requires more stringent finishing requirements to provide a cleaner appearance than typical structural steel. A commercial blast cleaning prior to shop priming and removal of piece marks will be a minimum requirement for this steel.

### Lateral Load Resisting System

Resistance to lateral loads generated by wind or seismic events will be provided by floor and roof diaphragms engaging concentric steel vertical braced frames in the class room wing and engaging concrete masonry unit shear walls in the chorus addition. The steel frames will consist of diagonal vertical bracing between columns. The bracing will most likely be 8" square tubes (HSS8x8x3/8) with field welded connections to gusset plates shop welded to beams or columns.

### Miscellaneous Steel

Stair systems will be concrete filled steel pan type stairs. The stair in the exhibition space will be a monumental stair with higher finish requirements than other, more typical stairs.

Hot dipped galvanized loose steel lintels and suspended lintel systems will support exterior masonry veneer.

Horizontal tube framing will laterally support heads and sills of curtain wall and storefront systems.

Tube steel framing will create screen walls for the roof top mechanical equipment. The screen wall framing will weight approximately 50 pounds per linear foot.

## Foundation System

Structural steel columns and walls will bear on conventional, isolated reinforced concrete spread footings. CMU walls will bear on continuous 3'-0" (+/-) wide by 1'-0" thick footings. The top of footing elevation will be approximately 1'-4" below slab elevation. Steel column footings will be average to be approximately 7'-0"x7'-0" x 16" thick.

Slabs-on-grade will be constructed with a 4", 3000 psi concrete slab placed on a zero permeability vapor barrier on a 4" crushed stone or sand sub-grade. The slabs will be reinforced with either microfiber or welded wire fabric (depending on if the slabs will be exposed to view) with sawcut control joints or construction joints with 12'-0" maximum spacing. Re-entrant corner reinforcing will be required. Slabs will be cured using a wet curing method. Slabs will receive a hard trowel finish, with the exception of exterior areas under roof (light broom) and areas under tile (float finish).

## Firewall

A structurally independent firewall will be required to separate the classroom wing addition from the existing space. We anticipate the wall to be 12" CMU with #6 at 16" on each face of the wall. The footing for wall support will be 5'-0" wide by 16" thick; and will be reinforced with (7) continuous #5 in the top and bottom of the footing; and #5 at 16" in the short direction in top and bottom.

## Structural Design Criteria

### Building Code

2021 International Building Code

### Occupancy Category

K-12 Education. Risk Category III.

### Vertical Loads

#### Dead Loads at Roof

Roofing, Insulation, Steel Deck	4 psf
Framing	5 psf
HVAC, Electrical, Plumbing, etc.	5 psf
Miscellaneous Hanging	5 psf

#### Live Loads at Roof

Occupancy	20 psf
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#### Live Loads at Floor

Classrooms	40 psf
Common (Public) Spaces	100 psf
Stage	125 psf
Toilet Areas	40 psf
Corridors above First Floor	80 psf
Mechanical Penthouse	100 psf

#### Snow Loads

10 psf Ground Snow Load

Importance Factor

1.1

### Lateral Loads

#### Wind Design Criteria

Velocity (Ultimate)	120 mph
Exposure	C
Internal Pressure Coefficient, Gcp	0.18 (Enclosed Structure)

#### Seismic Design Criteria

Ss	30%
S1	11%
Site Classification (Verified)	C
Response Modification Coefficient	3 (Structures not Detailed for Seismic Response)
Importance Factor	1.15
Seismic Design Category	B

Allowable Soil Bearing Pressure based on S&ME Soils Report dated November 3, 2017 is 3,000 pounds per square foot. Seismic Site Class is C.