

# Cooling of Racks on Top of Detector

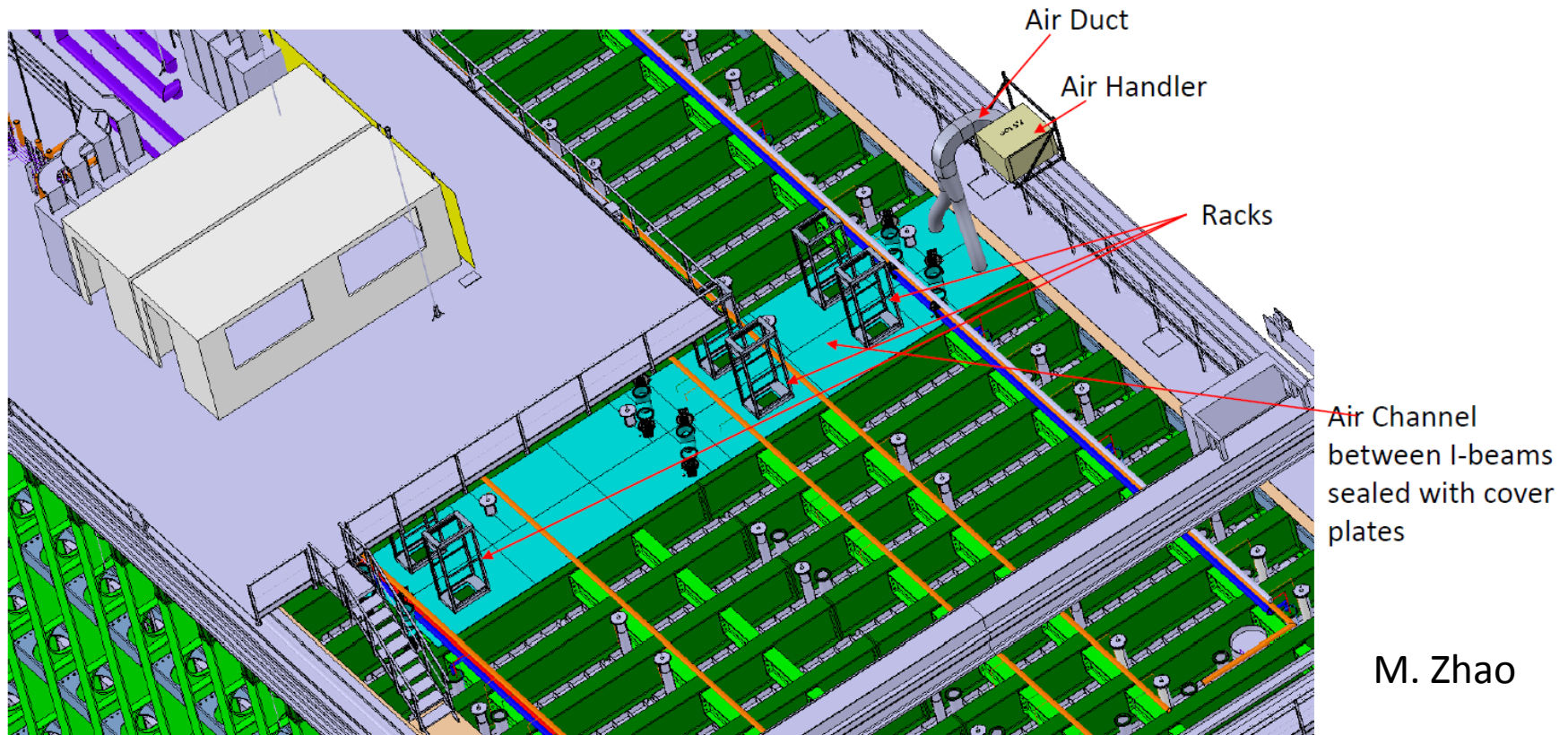
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August 16, 2018

# Rack Cooling Scheme

- Air is drawn from cavern and cooled in air handling units
- Cooling is provided by facility chilled water
- Air handling units direct cooled air to bottom of racks through air channels
- Each air handler will have a filter on the intake air
- Air is exhausted from top of racks back into the cavern
- Air channel from AHU to racks under investigation:
  - Seal the deck and channel air between I-beams
  - Use air ducts between I-beams, does not require a sealed deck
  - Use air duct above racks
- Each AHU has a 29 kW capacity, anticipate needing ~19 units
- Each AHU can cool up to 6 racks
- Control scheme for AHUs not defined yet
  - Controlled individually or centrally
  - Controlled by rack heat load

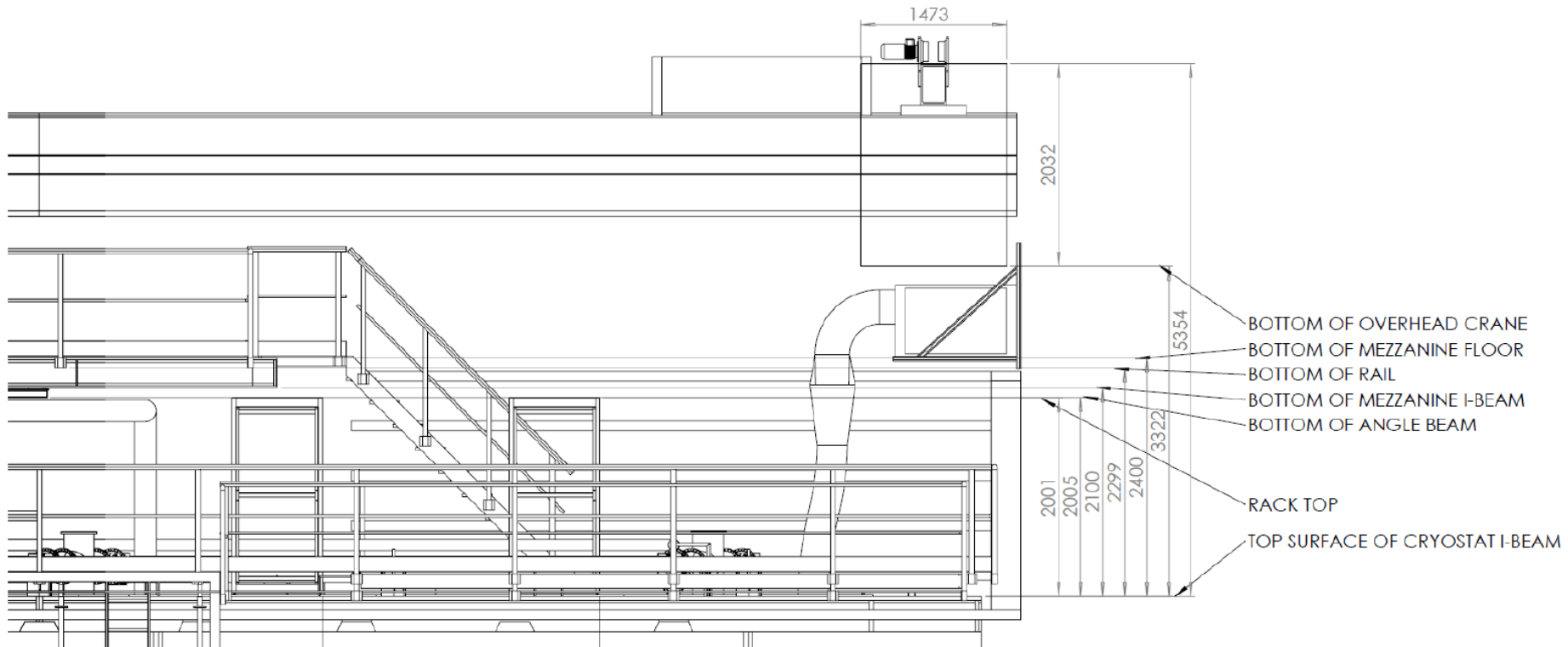
## Location of Air Handlers on Cavern Wall

One AHU and 6 racks shown with sealed deck option  
This arrangement is repeated 19 times



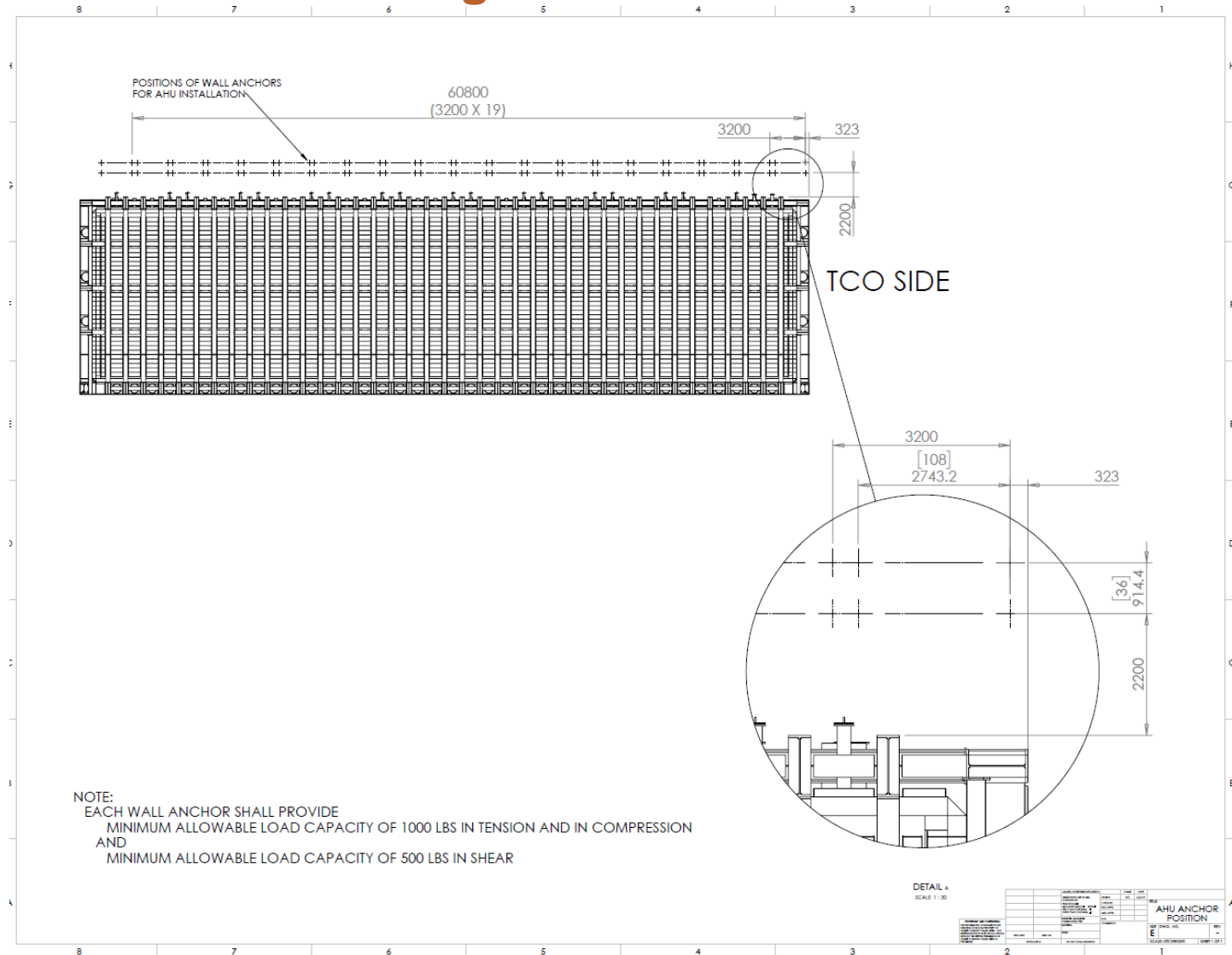
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# Interfaces with Crane, Cryostat, Mezzanine



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# Locations of Mounting Holes for Air Handlers



# Air Handling Unit (AHU)

The wall anchors shall support the installed weight of 623.6 lb of the AHU and the weight of the shelf.

## Dimensions

Unit length	68.935 in	Unit width	47.000 in
Unit height	32.500 in	Rigging weight	592.3 lb
Installed weight	623.6 lb		



## Performance Climate Changer

Job Information			
Name	BNL - Design File	Tag	UCCA-1
Address	Long Island	Quantity	1
Sales Team		Model Number	UCCAG06C0C0EL012
Comments			000000DD887AA000 00000000

General			
Unit type	Indoor unit	Configuration	Horiz/front top Direct Drive Plenum
Unit size	6	Design airflow	3000 cfm
Elevation	0.00 ft	Door selection	Standard - door on motor side
Filter media	2" MERV 8	Main coil system type	Hydronic
Preheat coil system type	None	Reheat coil type	None
Unit coil # 1 type - 1st in air stream	6R, 9 FPI	Apply AHRI range?	Yes
Controller options	Term block plus starter or disconnect	Coil, drain and motor side	SS / RH Coil & Motor
Pipe cab / curb / paint	None	Filter / mixing / econ section	2" flat filter rack
Filter condition	Clean	Filter/Mixing section APD	0.243 in H2O
AHRI 410 classification coil 1	AHRI ACHC Certified	Coil options	Al fin, galv coil casing, 1/2"
Combined dry coil weight	89.3 lb	Combined wet coil weight	120.6 lb
Coil 1 dry coil weight	89.3 lb	Coil 1 wet coil weight	120.6 lb
Coil 2 dry coil weight	0.0 lb	Coil 2 wet coil weight	0.0 lb

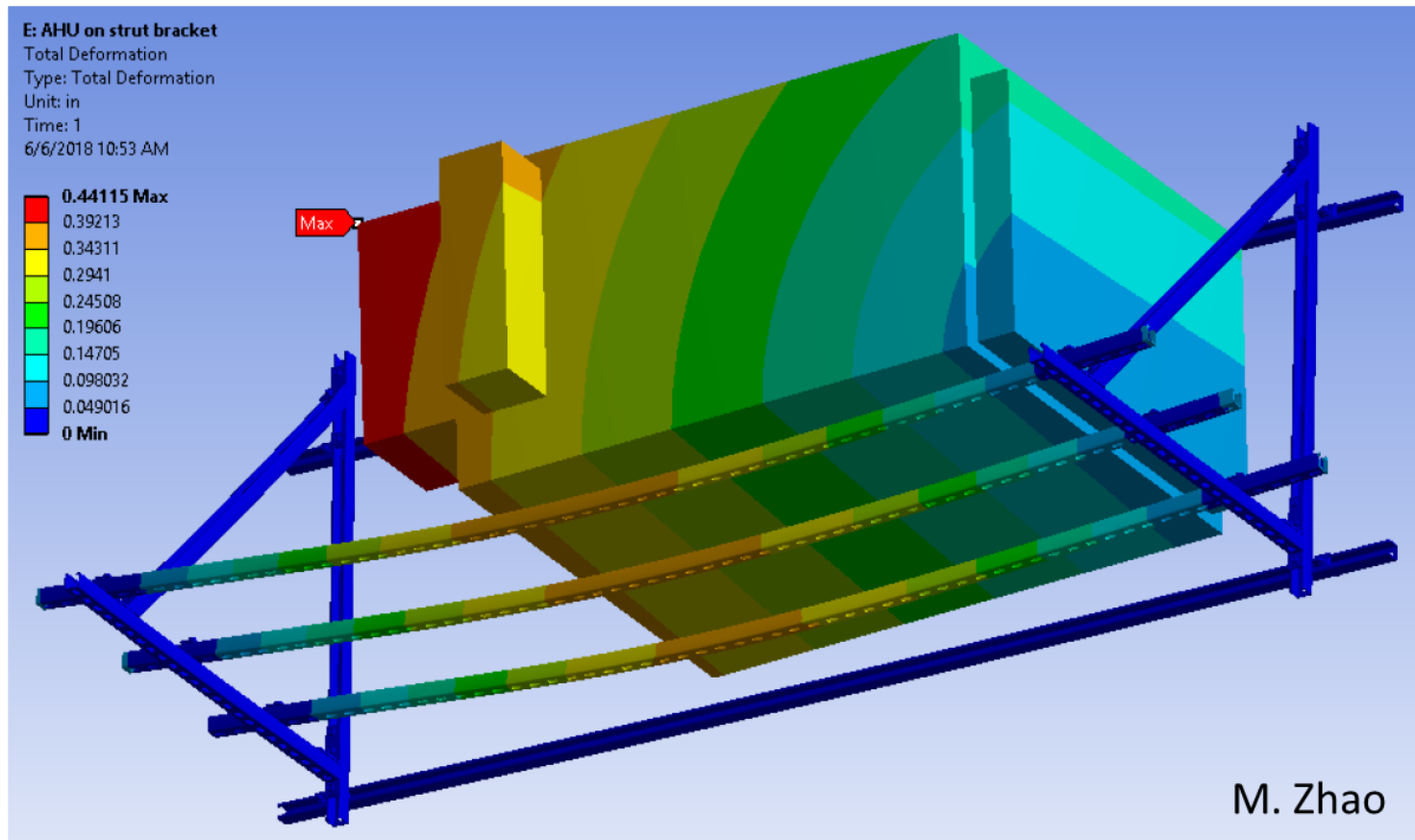
Main Coil			
Fluid type	Water	Cooling EDB	80.00 F
Cooling EWB	67.00 F	Cooling ent fluid temp	45.00 F
Total cooling capacity	99.10 MBh-8.26 ton-29 kW	Sensible capacity	76.11 MBh-6.34 ton-22.3 kW
Cooling flow rate	19.75 gpm	Cooling fluid temp rise	10.00 F
Cooling LDB	56.99 F	Cooling LWB	56.51 F
Cooling lvg fluid temp	55.00 F	Turbulators	No
Cooling face velocity	533 ft/min	Cooling APD	0.759 in H2O
Cooling fluid PD	2.33 ft H2O	Reynolds number	5825.75
Fluid volume	3.74 gal	cooling coil	
Cooling fluid velocity	1.99 ft/s	Fluid freeze pt	32.00 F

Motor/Electrical			
Unit voltage	460/60/3	Supply motor hp - per fan	3 hp
Supply fan volume control	FC or DDP fan w/VFD and SG	Supply fan ESP	0.500 in H2O
Supply fan quantity	1.00 Each	Supply total brake hp per fan	2.554 hp
Supply fan speed	2613 rpm	Supply fan VFD setting / DDP fan speed	87 Hz / 2584 RPM
Supply fan TSP	1.502 in H2O	Unit min circuit ampacity	6.22 A
Unit max fuse size	15.00 A	Unit full load amps	5.02 A
Supply VFD panel amps	4.80 A	Supply fan drives	Direct drive plenum fan / MI fan
Outlet velocity	2555 ft/min		

<http://www.trane.com/commercial/north-america/us/en/products-systems/equipment/air-handlers/performance-air-handlers/performance-ucca.html>

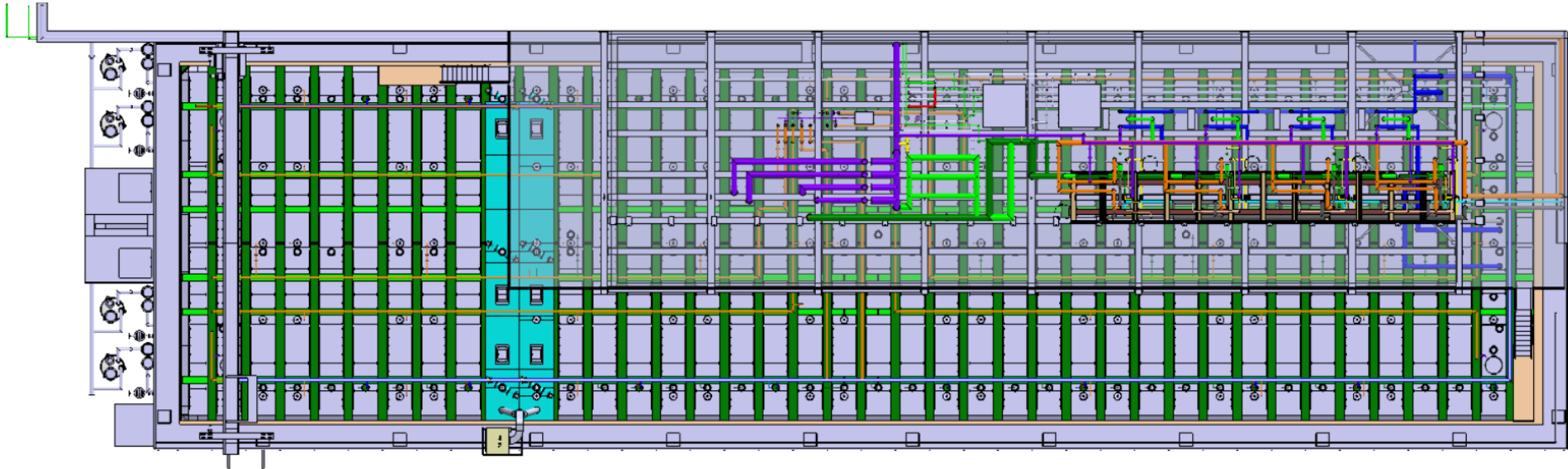
# Mounts for Air Handling Units

## FEA Result





# Top View



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## Cross section at AHU location

