The project scope at the VA Hospital in Indianapolis consisted of reviewing current conditions of areas served by specific AHU units and provide as-built marked up HVAC drawings, measure airflow of each of the air handlers associated distribution systems, and finally set each specified AHU unit to maximum load setpoints and provide performance characteristics. We started off with some original HVAC drawings that were dated anywhere from 1978 to 2007 pending on which area we were working. After spending a couple of days at the facility we realized the daunting task of trying to mark up old HVAC drawings due to the fact that just about every floor layout have been modified substantially. Locating boxes or air devices in areas on the older prints was just not feasible. We were able to talk to the facilities team and they were able to get us updated floor plan layouts for all the areas we were working that had wall layout but no HVAC. This at least allowed us to understand the use & arrangement of each of the spaces. With the new floor plans we had to start from scratch and layout our own air devices and VAV locations on the floor plans. We then utilized the old HVAC drawings to identify where the main HVAC trunklines are located & worked from this point to layout the duct routing on the new floor plans. Once we were able to have a good understanding of the HVAC layout in respect to the new floor plan drawings, we were able to reference back to the older HVAC drawings and mark up these drawings focusing on the ductwork only & not the space layout.

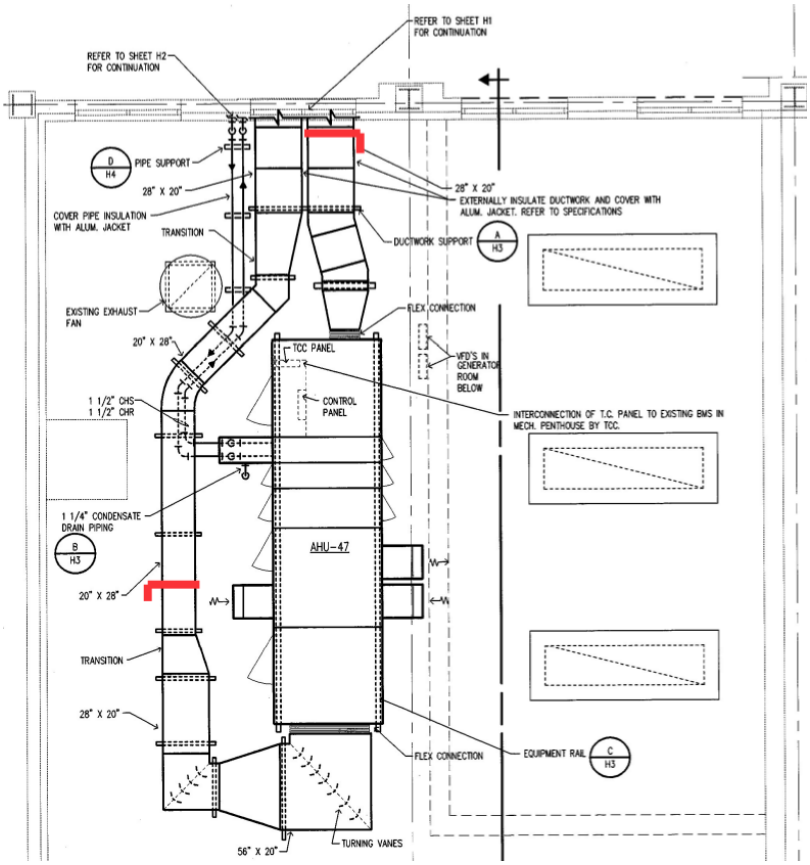
Each report provided to the team will consist of the following information:

- Test report with the results of each of the AHU units and there associated VAV & air devices. The VAV & air device identification # is marked on each of the associated floor plan with the new HVAC schematic. When measuring the air devices in the occupied spaces we were able to use our JCI (Johnson) controller at the thermostats and drive each VAV to its Max programmed CFM setpoint and then measure each supply diffuser of the associated VAV. We could only drive one box at a time due to occupancy and our controller itself. We had limited time in each of the spaces. However, each of the VAVs are pressure independent type boxes and can be measured and would be balanced using the same methodology. While most of the VAVs function properly, there are several that either have not been converted to JCI DDC system or have a service issue. At the end of each of the VAV sections there is a list of these VAV's and the issue that occurred for reference. The returns in the space were also measured but the recorded readings in the report does not represent the maximum airflow potential of each of the returns. To do this we would had to put the entire system of each of the AHU units at maximum load capacity and all VAV's simultaneously which would have been a nuisance to the staff and patience since the testing for each system took any where from several days to a couple of weeks pending on size of the system testing. So, the airflow readings for the returns are normal operations of the system based upon trying to achieve desired temperature in the prospective spaces. The total airflow's were measured performing traverses on all of the main duct systems and are included in the report for documentation. We also took a snapshot of the Building Management System (BMS) setpoints & outputs at time of testing to understand what the systems are controlling too at current arrangement.
- The set of Marked Up HVAC drawings are provided in a supplemental document (separate) to provide additional insight of the original HVAC layout compared to the As-Built floor plans. Each air device and VAV or asset are labeled on the drawings and the correspondence label is in test report with test results.

Understanding the Testing

AHU47/Associated Space: The unit is an older unit that sits on lower roof & serves the 2nd floor area. The Conserv BMS system is a Johnson Control (JCI) protocol. The BMS can see the unit but it has not ability to control the VAV systems. Our JCI Controller at the thermostats would not control the VAV boxes either. When measuring the VAV systems we tried to open the boxes by hand. However, a # of the VAV's are inaccessible due to equipment under the VAV's that was in use & could not be moved.

Below is the layout of AHU-47 on the lower roof. The duct size & layout is exactly the same today. The locations marked in RED are the locations where the team Traversed the total supply & return airflow for the unit.



When testing the unit, we could only test the unit as it operated that specific day (10/1/25) since the facilities BMS does not control the VAV systems. The unit had no outside air being introduced into the space. However, it was relieving approximately 800 CFM of air (exhaust out of space). This is why the total Return CFM is higher than the Total Supply CFM.

The current HVAC layout Is very similar to original design/installation. There are a couple of supply diffusers added that are ducted directly off the main trunkline & not connected to any VAV box. When measuring the VAV systems we could not control them, so we lowered the temperature at the stat to try to drive each VAV open prior to measuring the air devices. The facility BMS does not have the AHU-47 boxes tied to the system.