



MDA/MDH Lab Building Infrastructure Improvements



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Building Mission

- Ensure a safe, secure food supply free of pesticides, food-borne pathogens, and environmental contaminants.
- Detect and control infectious diseases like Ebola, Zika, and measles.
- Protect the environment and drinking water from hazardous chemicals, radioactive substances, pharmaceutical compounds, and misuse of agricultural chemicals.
- Detect rare but treatable disorders in newborns, so they can receive treatment to prevent illness, physical disability, or death.

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Building Data

Constructed: 2005

Cost: \$54M

Size: 3 levels, 176,000 square feet

Designed by: HGA Architects

Constructed by: Shaw-Lundquist Construction

Operated and Maintained by: Department of Administration, Facilities Management Division

Occupied by: Minnesota Departments of Agriculture and Health

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Building Data

The MDA/MDH Mission Requires the Lab to Have A Very Sophisticated Air Handling System:

- 9 air handlers and 12 exhaust fans that can move air at over 300,000 cubic feet per minute (CFM)
- 100% outside air/no recirculation
- Hepa filter system
- Heating and cooling reclamation system to reduce energy cost (heat energy wheels)

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History

Shortly after construction of the building was complete we began to encounter operational issues with its mechanical systems.

- Snow entering air intakes due to lack of screening,
- Air pressure sensors failing routinely
- Inability to maintain air volume and pressure as per the design intent
- High risk of interruptions to critical lab operations during power outages due to insufficient electrical redundancy

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History

- **Heat Energy Wheels Began Deteriorating and Failing Routinely**
 - Frosting up in cold weather made them unable to adequately temper the incoming air
 - Cold air to entered duct work and froze heating coils causing leaks throughout the building
 - The January 2014 failure caused significant operational interruption and damage to equipment and the facility

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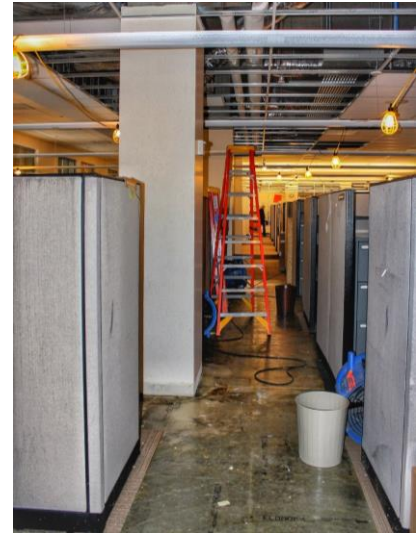
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**Environmental Lab
2nd Floor**



**Infectious Disease Cubes
3rd Floor**



**Admin Area Cubes
1st Floor**

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History

- Other discoveries during the heat energy wheel failure investigation:
 - Hot water circulating pumps piping restricted flow during cold conditions
 - Piped in parallel rather than series with the coil
 - Pressure settings on hot water circulating pumps were set too low at installation
 - Set at 12 PSI rather than 20 PSI as recommended for flow needed in this climate
 - Monitoring points on air handlers were incorrect
 - Data labeled as being reported from one air handler was actually from another

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History

The lack of a formal commissioning at construction completion and numerous systems failures over time caused considerable concern about the operability of the lab.

- Ag, Health and Admin jointly agreed to initiate a point-to-point retro-commissioning to determine if the building operates to adequately support the AG/Health mission
- Retro-commissioning focused on:
 - Mechanical systems (heating, cooling, ductwork, exhaust, and controls)
 - Utility systems (piping, vacuum, acid neutralizer, and reverse osmosis/deionized water systems)
 - Electrical systems (power and distribution)
- Carried out in two stages:
 - Discovery to learn the design intent
 - Verification to learn the on-site operational needs

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Findings

The Retro-Commissioning team of engineers and operators identified 700 Issues that should be tended to in order to improve safety and building performance. The major findings include:

- Deteriorated ductwork
- Insufficient general (not hood) exhaust capability in some areas
- Air pressure control issues
- Air pressure monitoring issues
- Lab space building components need repair and replacement (broken ceiling tiles, missing insulation, abandoned utilities etc.)
- Inadequate lighting

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Corroded Ductwork 2nd Floor



2/17/2020



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Current Status

- Design is underway and currently 60% complete
- Construction manager at risk (CM) has been selected and will be on board soon
 - The CM will provide critical construction logistics, schedule and cost information to the designers
- We are positioning ourselves to be ready to start construction by September 2018
 - Completion scheduled for February, 2020
- Current construction estimate is \$17M

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Questions