

NRHS Mechanical Systems Review

Revised 10/27/15

July 14 meeting with Bill Cleary (NRSD Facilities Director), Jim Brigham (NRSD Electrician), and Dom Esposito (NRSD HVAC).

Heating, Ventilation, Air Conditioning (HVAC)

The home team **locker rooms** (in the basement) are - by far - the biggest air quality problem in NRHS. The air distribution units pull in "fresh air" from inside the **Upper Gym** and distributes it to the locker rooms. Using air a second time leads to stale and unhealthy conditions within the locker rooms during the busy athletic seasons. Home team locker rooms were on the outer perimeter of the building and were not changed when the Upper Gym was added. These locker room air intakes are at floor level in the Upper Gym, to the left of the doors nearest the ramp.

The amount of fresh air brought into the Upper Gym is OK for the Upper Gym, but not OK for Upper Gym and two locker rooms.

Auditorium air quality is fine.

There are carbon dioxide monitors on the return units of the auditorium and Upper Gym.

Air filters for the auditorium and Upper Gym are changed at 6-8 month intervals

Locker room air filters are carbon filters and changed every 3 months.

Air handler for **school kitchen** pulls in outside air. It is tied into heating system but could not keep up with super-cold weather this past winter (2014-2015). Exhaust fans pull out warmed kitchen air and must be on when the kitchen is active.

No air quality, cooling, or heating issues with **cafeteria**.

One HVAC unit serves the **Drafting (computer) lab (room 403B), Administration offices and Guidance offices**. The Drafting lab should have its own HVAC unit due to the heat produced from the desktop computers.

Room 224 (computer lab) also overheats due to heat from the desktop computers used in that room.

A single HVAC unit serves the **Media Center and the classrooms below it**. However, there are different heating and cooling needs on each level. Windows in the Media Center result in a lot of solar heat gain, which is not the case in the classrooms below. Temperature on the Media Center windows sometimes reaches 140°F. Added heat from the student use of computers in the Media Center and the school computer servers located there makes this problem worse.

Throughout the school, there is an air gap between the outer skin of the building and the exterior walls of the classrooms. This air gap is not a sealed space and thus provides no insulation. Thus, the exterior walls of the classroom quickly transfer the outside temperature to the inside of the classroom and the wall heaters cannot keep up with the heating demands on excessively low temperature days. Furthermore, on sub-zero temperature evenings the boilers have to run in "building occupied" mode in order to keep the building warm enough to prevent pipe freezing (added utility costs and wear on the systems).

In the **Science labs**, fixed benches are set against the exterior walls. Students feel this cold air coming off the walls, which affects their comfort in the room. Compounding this problem, there is lots of leakage in the ductwork of the science wing. Each year, part of the annual maintenance budget for NRHS addresses this ductwork.

All three **Art** rooms are served by the same HVAC unit.

Water

No drains for eyewash stations or showers in science labs. *This is typical and correct for this application.*

Kitchen Appliances

Food preparation equipment is original to building. Grease trap is undersized for this school population. Cooler in kitchen is 40 years old.

Waste Treatment

Sometimes the septic system backs up into the home team locker rooms.

Security

Not all exterior doors have security cameras. Interior security cameras only in common areas (hallways and stairways), but not all common areas.

General Status of Fans, Compressor, and Pumps

Lifetimes of NRHS mechanical devices are starting to climb. This is mostly fans, compressors, and pumps of various sizes throughout the school. Normal lifetime is 10-12 years. Last major upgrade of these devices was the 2000-2002 renovation. Replacement of these system components included in the long-term maintenance and capital projects plans presented to NRHS Space Needs Task Force.

Roof Leaks

- Upper gym repair last summer (2014)
- Above Guidance Offices is a major leak that is being worked on, but due to the design of the addition it is difficult to track the leak between the two ceilings. Currently this leak is quiet.
- Above Science Labs a thermal scan resulted in an "OK" status for that roof, but it is more than 35 years old.
- Roof over the cafeteria, kitchen and machine shop degraded severely. Most HVAC equipment on this roof. In order to replace this roof the HVAC units will need to be disconnected and the roof installed. This should be coordinated with the replacement of HVAC units. The present protocol is to patch this area when there is an active leak.