MECHANICAL SYSTEMS

A. Site Utility Services:

1. A new sanitary service will be provided for the plumbing fixtures and sanitary drainage for the cooling plant. New service will be coordinated with the Civil Engineer to determine municipal tie in location.
2. A new storm service will be provided to serve the roof drains associated with the new building.
3. Gas utility service and meter to serve the new building will be coordinated with the Utility Provider.

B. Fire Protection System:

1. The new building will be provided with a water-based fire protection system per NFPA requirements and will be fully sprinklered. The fire protection service piping will enter the building from the new cold water service. New cold water service to serve the buildings cold water and fire protection system.
2. Wet-pipe fire sprinkler main piping shall be schedule 40 black steel with cut-grooved couplings or schedule 10 steel pipe with roll grooved couplings. Branch piping shall be schedule 10 steel pipe with roll grooved coupling. Wet sprinkler heads will typically be upright or sidewall. Sprinkler guards will be provided where subject to abuse or when installed at heights 7'-0" or less.
3. A flow/pressure test will be conducted at the nearest existing fire hydrant to determine the size required for the fire service pipes.

C. Plumbing System:

1. Building domestic water will be served off a combined cold water and fire protection service main. The proposed water service entrance is on the east side of the building.
2. Two tankless gas-fired water heaters will provide domestic hot water to fixtures located within the building. Recirculating hot water piping and an inline circulation pump will be provided to ensure hot water is readily available throughout the building.
3. All domestic water distribution piping will be Type 'L' copper with soldered joints. Piping will be insulated in accordance with energy codes.
4. The proposed sanitary connection location is on the east side of the building. Underground sanitary piping will be specified as schedule 40 PVC pipe. Above grade sanitary piping will be specified as standard weight hubless cast iron pipe with heavy duty couplings.
5. The layout of the storm drainage system will seek to minimize the extent of above grade piping. Underground storm drain piping will be specified as schedule 40 PVC pipe. Above grade storm drain piping will be specified as standard weight hubless cast iron pipe with heavy duty couplings.

D. Heating Plant:

1. The central heating plant for the new building will consist of two high efficiency condensing hot water boilers. The central heating plant will provide up to 140 degree heating water (temperature reset based on outside air temperature) and will be circulated to mechanical equipment throughout the building via variable speed base mounted pump. Heating water will have a 35% propylene glycol solution.
2. Heating water piping up to 2 ½" will be provided as Type 'L' copper with soldered joints. Piping 1 ½" and large will be provided as schedule 40 steel pipe with welded fittings. Piping will be insulated in accordance with energy codes.

E. Chilled Water Plant:

1. The central chilled water plant will serve chilled water to Jefferson High School, with accommodations made to provide chilled water to Olson Elementary School and Middle School. Two magnetic bearing centrifugal chillers and two open-circuit, induced-draft, crossflow cooling tower will be provided, with space left for future chillers and cooling towers. The cooling towers are currently planned to be located on the roof of the building within a screened enclosure.
2. The condenser water will route via gravity from the cooling towers to a condenser water sump pit. There will be (4) separately coupled, vertical turbine centrifugal pumps that will distribute condenser water from the pit to the water cooled chillers and back to cooling towers.
3. Condenser water piping up to 2 ½" will be provided as Type 'L' copper with soldered joints. Piping 1 ½" and large will be provided as schedule 40 steel pipe with welded fittings. Piping will be insulated in accordance with energy codes.
4. The chilled water distribution piping will be set up as a primary/secondary system. The primary loop will circulate between the chillers within the new building, and two secondary loops will tap off the primary loop. One of the secondary loops will be routed to serve the existing chilled water distribution system at the Jefferson High School. The existing chilled water piping within Jefferson High School will be modified as required. The Olson Elementary/Middle School building currently does not have a chilled water system. The secondary chilled water piping system at this building is planned for a future project.
5. The chilled water distribution piping routed between the new chiller plant and the two school buildings will be routed underground. The piping will be horizontally bored where possible to minimize the amount of open trench work.
6. Above ground chilled water distribution piping up to 2 ½" will be provided as Type 'L' copper with soldered joints. Piping 1 ½" and large will be provided as schedule 40 steel pipe with welded fittings. Below ground chilled water distribution piping will be

provided as high density polyethylene pipe and fittings. Piping will be insulated in accordance with energy codes.

F. HVAC Systems:

1. The new building will be provided with a constant volume air handling unit to provide ventilation and space heating and cooling to the building. The air handler will have a hot water heating and chilled water coils. The air handler will be ducted to a louver on an exterior wall for outside air intake. An exhaust fan will be provided for relief to maintain space pressure.
2. The same constant volume air handler will be able to be controlled to provide make-up air to the building when the chiller plant is in purge mode. The air handler will be sized to match the required exhaust rate for purge mode operation. The air handler will be provided with a hot water heating coil maintain acceptable building temperature during purge mode operation.
3. A roof mounted centrifugal exhaust fan will be provided to provide the code required exhaust rate in the building for refrigerant purge operation.

G. Building Automation System:

1. The Building Automation System (BAS) will be added to the existing Siemens network. The central chilled water plant shall operate based on the manufacturer's supplied controls, and the BAS will interface with the manufacturer's controls to provide monitoring and control of setpoints. All other systems included in the building will be provided with Direct digital control (DDC) components able to monitor and control the systems. The BAS will be web-based to allow secure monitoring/control of systems via remote computers over the internet. All control points will be visible to users through the BAS, with adjustment of setpoints available to authorized users. All HVAC systems will feature independent occupancy schedules allowing the BAS to use relaxed setpoints during unoccupied times, increasing energy conservation. Control panels will be lockable and will be located in mechanical rooms. Control valve and damper actuators will be electronic type. Temperature sensors will be installed in each climate control zone.