

Attachment J-C20.1

Description of Utility Distribution Systems

Domestic Water Distribution System

The Domestic Water Distribution feeds all of the building at the Center. The underground system consists of approximately 42,000 lineal feet of water mains and approximately 27,000 lineal feet of lateral piping to the individual buildings. There are approximately 115 fire hydrants and 440 underground water valves.

Central Chilled Water Distribution System

The current building cooling needs of the GRC Lewis Field Main Campus are primarily served by two centralized chilled water plants, the Bldg. 9 North Central Chilled Water Plant and the Bldg. 94 South Central Chilled Water Plant. The Central Chilled Water Distribution System consists of approximately 19,000 lineal feet of underground piping from these two central plants to approximately 36 building in the central area of the Center.

High Pressure Steam and Condensate Distribution System

High pressure steam is generated at the Bldg. 12 Steam Plant and distributed underground to approximately 45 building in the central area of the Center. The High Pressure Steam Distribution System consists approximately 15,000 lineal feet of steel piping up to 12 inches in diameter and a parallel condensate return system up to 6 inches in diameter. The majority of the piping is located in below-grade concrete trenches with several access covers and approximately 66 manholes. There are approximately 80 regulating stations associated with this system.

Natural Gas Distribution System

The Natural Gas Distribution is an underground piping system that is distributed around the entire Center. The system consists of approximately 13,500 lineal feet of main piping with 43 main valves and approximately 18,500 lineal feet of lateral piping with 48 lateral valves to individual to buildings. There are approximately 115 building regulators on this system.

Sanitary Sewer System

The Sanitary Sewer System collects sewage and routes it to the Bldg. 25 Main Sanitary Lift Station, near the Main Gate entrance. The lift station pumps the sewage through a force main to a gravity sewer on Brookpark Road. There is also another Sanitary Lift Station that collects sewage from the West Area of the campus and pumps the sewage through a force main to the gravity drains that go to the Main Lift Station. This system consists of approximately 16,000 lineal feet of gravity main storm piping, 6,500 lineal feet of force main piping and 23,000 lineal feet of lateral piping to the buildings. There are 255 manholes associated with this system.

Storm Sewer System

The Storm Sewer System is an underground piping system that collects rain and snow melt and discharges the storm water to the outfalls into the Rocky River or Abram Creek, a tributary of the Rocky River. The system consists of approximately 26,000 lineal feet of storm main pipe and 111,000 lineal feet of lateral pipe to buildings. There are 229 manholes, 602 catch basins and 11 water quality units associated with this system.

Industrial Waste System

The Industrial Waste System is an underground piping system that is primarily being used for a cooling tower water collection system. The system collects water drained by the large cooling towers and routes it to two large concrete retention basins (1,000,000 gallons each). This water is then discharged slowly into the sanitary sewer system. The system consists of approximately 1400 lineal feet of piping and 50 manholes.

High Voltage Electrical Distribution System

The High Voltage Electrical Distribution system is a large, complex network with voltages at the 138kV, 34.5kV, 13.8kV, 7.2kV, 4.16kV and 2.4kV levels. The normal utility feed consists of four 138kV overhead lines into the primary substation. This is transformed to 34.5kV and distributed to feed the Center's 34.5kV looped system. There are four large 34.5kV substations for this distribution. In addition to these four (4) substations, there are eight (8) smaller substations that have equipment for distribution purposes throughout the Center.

The system consists primarily of underground duct banks containing cables that are covered with either solid dielectric insulation or paper/lead insulation with pressurized gaseous nitrogen (GN₂). The only overhead lines are the four 138kV utility feeds mentioned above and one 34.5kV line in the GRC Lewis Field West Area. There is approximately 52,000 lineal feet of primary duct bank and approximately 99,000 lineal feet of other duct banks. There are approximately 190 manholes within this system.

Communication Distribution System

The Communication System Distribution system is underground distribution system for all communications systems such as telephone, video, and other IT systems. The system consists of underground duct banks (underground conduits grouped together and encased in concrete) that run between manholes, handholes and buildings. There is approximately 46,500 lineal feet of duct bank, 150 manholes and 23 handholes associated with this system.