



**AT&T Building
Future Use Project**
520 Third Street, Santa Rosa, CA

Mechanical Systems Report

Prepared by:



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BACKGROUND

The City of Santa Rosa Redevelopment Agency contracted with Winzler & Kelly to investigate the existing conditions of the mechanical systems of the AT&T Building located at 520 Third Street, Santa Rosa, California. Additionally the City desired that recommendations be made with regards to future possible uses scenarios. The mechanical systems investigated include the plumbing, fire suppression and the heating, ventilation and air conditioning.

GENERAL CONDITIONS SURVEY

This survey and its findings are based on both field review and review of record documents. The primary record documents were the 1972 plans that included the basement and the first two floors and the 1975 plans that included the design of the third, fourth and fifth floors.

Storm Drainage System

The system consists of roof drains to cast iron piping that is routed down through the building to the basement level. The piping is discharged through a 6-inch pipe to the city main storm drain in Third Street. Some site drainage is connected to a storm drain in the Transit Mall. Additionally, below grade drainage is handled by a pair of sump pumps. It is recommended these lines be investigated with a pipe camera for damage and/or blockage.

Sanitary Sewage and Vent Piping

The piping is cast iron connected to all the fixtures and routed down to the basement level discharged out through an 8-inch pipe to the sewer main in Third Street. It is recommended these lines be investigated with a pipe camera for damage and/or blockage. Additionally there is a sump pump that lifts the basement sewage up to the 8-inch gravity line. It is recommended this sump pump be checked and serviced.

Hot and Cold Water Piping

A 5-inch cold service is connected to city main in Third Street. This is routed directly into the basement mechanical room. This 5-inch serves both the domestic and fire suppression water systems. The domestic water has two systems; a city water pressure system and a pressure boosted system. Primarily the existing fixtures are served by the city pressure system. The booster system has riser for future floors that, because of the static head developed by the building height, required a boosted system.

The pressure boosting system is basically pumps and appurtenances that elevate the pressure. This system serves both the domestic and fire suppression water systems. It appears to be installed in the late 1970's. Due to this system's age and configuration it does not appear applicable to the future needs anticipated. The fire service will need to be separated.

Water Heating

Electric tank type water heaters located in the mechanical rooms supply the hot water to the various fixtures in the building. They are in good condition and serviceable. It is possible that they may be reusable if they meet the requirements of the new tenancy.

Plumbing Fixtures

The plumbing fixtures appear in good to poor condition. Some of the fixtures do not meet current accessibility requirements. Most fixtures do not meet current water conservation standards.

Natural Gas

The building does not have natural gas service. This was likely due to the nature of the building having significant heat gains. There is 12-inch PG&E gas main in the Transit Mall.

FIRE SUPPRESSION

The fire suppression system consists of wet stand pipes and fire hose cabinets. The system does not have a complete fire sprinkler system. There are risers that are routed up through the building that have fire hose cabinets connected to them. These cabinets have manual push buttons that activate the pressure booster system if required. Additionally a 6-inch wet stand pipe is routed up to the roof where it is terminated with a Siamese connection. A fire department connection is located on Third Street at the first floor level.

This system would not be allowed for new tenants. A separate fire service with back flow protection will be required. The building will require a complete fire sprinkler system and likely a fire pump.

HEATING, VENTILATION AND AIR CONDITIONING

The system consists of fan coils with chilled water coils supplied with chilled water from the water cooled chillers located in the basement.

Chilled Water System

Two water cooled chillers located in the basement mechanical rooms appear in good condition. Two chilled water pumps circulate chilled water to the various fan coil units from the chillers. The system was designed to provide 45F supply and 55F return temperature.

Condensing water was supplied by a roof mounted cooling tower located on the adjacent AT&T Building. Two condenser water pumps circulated the condenser water between the chillers and the cooling tower. The condenser piping still runs up the shaft between buildings but has been disconnected on the roof from the piping on the adjacent AT&T building. A new cooling tower would be required to provide cooling for the existing chillers. The piping is steel piping with mechanical joints.

Air Handling

The main air handlers are located in mechanical rooms in the northeast corner of the building. The units obtain outside air and exhausted to the north through louvers in the wall. They appear to be the original units installed with the exception that Air Handler 3 was replaced based on the 1975 drawings.

This unit had a variable speed drive installed in the recent past, perhaps five years ago. These units are serviceable but old, dirty and worn. They are not recommended for reuse.

Most of the ductwork has been demolished but some of the mains from the air handlers remain. The distribution system appeared to be double-duct systems that used all electric heating.

SCENARIOS

The Agency requested that three scenarios be considered for the overall team's consideration and cost estimating to assist in determining the future use recommendations.

SCENARIO 1 – SINGLE USER TENANT

Under this scenario one large user, such as a large retail user, would occupy the entire building.

PLUMBING

The one large user scenario would likely result in toilet rooms not much different than the existing conditions. Toilet rooms on every floor with janitor closets. This would apply to most of the single users discussed; retail or office. The existing toilet rooms could be renovated or completely new toilet rooms could be located elsewhere in the building. If located elsewhere in the building the piping would simply have to be routed to the new location. The existing building sewer and water mains would be sufficient to supply these facilities.

A new natural gas service will be required for the space heating boiler outlined in the HVAC recommendations below. This new gas service would come off the existing 12-inch PG&E gas main in the Transit Mall. If desired a meter room could be constructed within the building but this takes up valuable real estate and requires some additional costs. Likely the meter(s) would be located outside adjacent to the building on the Transit Mall side of the building.

FIRE SUPPRESSION

A new fire sprinkler system would be required for the new tenant. This retail space would be considered Ordinary Group 1 Hazard. The existing fire hose cabinet system would be demolished. A new 8-inch fire service with backflow protection connected to the main in Third Street would be required. This new fire service would serve the new fire sprinkler system and likely require a fire pump to boost the pressure for the upper floors.

HEATING, VENTILATION AND AIR CONDITIONING

A Variable Air Volume (VAV) with hot water reheat is recommended to serve the entire building under this scenario. This system could be configured of a one or two air handlers located on the roof or at grade in rear of the building. Floor by floor air handlers would be the other option similar to the existing system arrangement. This approach takes up significant amount of indoor real estate and due to the additional quantity of units requires more control points.

The cooling could be accomplished by chilled water, direct expansion refrigeration or Indirect/Direct Evaporative Cooling (IDEC) and hot water for heating. Direct expansion system would be the least efficient and the IDEC would be the most efficient.

The existing chiller system would be likely to be appropriately sized for the new use. Variable speed pumps would pump the chilled water to the air handler(s). Because the existing cooling is located on the adjacent property a new cooling tower with variable speed fans would cool the condenser water of this system. New condenser water pumps would pump water to this new tower. This system is recommended for consideration and cost estimating.

The IDEC system would simply require water service and drainage for its cooling system. A small direct expansion system would provide peak cooling. This system is recommended for consideration and cost estimating.

SCENARIO 2 – RETAIL/RESIDENTIAL

Under this scenario one floor of retail with 4 floors of residential above is considered.

PLUMBING

The existing cold water supply should be sufficient for retail and residential space use. New piping would be routed from the existing service in the basement to the new plumbing fixture locations. Local instantaneous electric water heaters and electric tank heaters would provide hot water for the retail spaces.

The 8-inch sewer service would be sufficient for this use. New drain, waste and vent piping would be routed to the new fixture locations.

A new natural gas service will be required for the space heating boiler outlined in the HVAC recommendations below. If any of the retail tenants were a restaurant they would also require a separate gas service for their cook line and water heating. This new gas service would come off the existing 12-inch PG&E gas main in the Transit Mall. If desired a meter room could be constructed within the building but this takes up valuable real estate and requires some additional costs. Likely the meter(s) would be located outside adjacent to the building on the Transit Mall side of the building.

FIRE SUPPRESSION

New fire sprinkler system would be required for the new spaces. The residential space would be considered Light Hazard and the retail space considered Ordinary Group 1 Hazard. The existing fire hose cabinet system would be demolished. A new 8-inch fire service with backflow protection connected to the main in Third Street would be required. This new fire service would serve the new fire sprinkler system and likely require a fire pump to boost the pressure for the upper floors.

HEATING, VENTILATION AND AIR CONDITIONING

The residential units will require systems that allow complete separate control for each unit; some tenants may desire cooling while others heating. Additionally, it is desirable that as much of the power to run the system would be directly part of the individual tenant metered system.

Gas fired furnaces with some type of cooling coils have many drawbacks. To provide gas for each requires a separate gas meter and pipe to each tenant. Additionally, the gas fired appliances such as furnaces and water heater require combustion air via ducts or dual flues up through the roof. This option is not recommended.

A four pipe system with chilled and hot water could be provided. This system type is very efficient but does have high capital costs. It would require a central plant consisting of a chiller, cooling tower, boiler and associated pumps. The piping would be routed to each of the residential unit's fan coil units. These fan coil units would be located within tenants' spaces with ducts to distribute the air throughout the space. A method of distributing the energy costs would require BTU meters for each tenant or use a prorated method. This system applies to retail tenants as well as the residential type.

Direct expansion heat pumps could be used if each tenant space had its own deck or some outdoor area. A condensing unit would have to be located in this outdoor area and fan coil unit would be located inside the unit. Ducts would then distribute the air through out the space. This energy cost of this would all be on the tenants' power meter. This would be a fairly low cost option and is recommended for consideration and cost estimating.

A water source heat pump system is another possibility. This system would require a central plant consisting of a cooling tower, condenser water pumps and a gas fired boiler. Within the tenants' spaces heat pumps would be located. The condenser piping would be routed from the central plant to each of the heat pumps. From the heat pumps ducts would distribute the air through out the space. Most of the energy costs would be on the tenants' meters. This system is recommended for consideration and cost estimating.

Exhaust ducts would have to be provided for the tenants. These would be located in fire protected shafts routed up through the roof to sheet metal hoods. Each residential tenant toilet room would have ceiling mounted exhaust fan ducted to one of these exhaust duct stacks. If the residential tenants have operable windows ducted outside air will not be required. However, the retail units will require ducted outside air. This would require a shaft with a duct routed to the retail tenants in a similar manner as the exhaust duct.

SCENARIO 3 – RETAIL/OFFICE MIXED USE

Under this scenario one floor retail and four floors office will be considered.

PLUMBING

This scenario assumes new toilet rooms, janitors' closets and break-rooms for both the retail and office spaces.

The existing cold water supply should be sufficient for retail and office space use. New piping would be routed from the existing service in the basement to the new plumbing fixture locations. Local instantaneous electric water heaters and electric tank heaters would provide hot water.

The existing 8-inch sewer service would be sufficient for this use. New drain, waste and vent piping would be routed to the new fixture locations.

A new natural gas service will be required for the space heating boiler outlined in the HVAC recommendations below. If any of the retail tenants were a restaurant they would also require a separate gas service for their cook line and water heating. This new gas service would come off the existing 12-inch PG&E gas main in the Transit Mall. If desired a meter room could be constructed within the building but this takes up valuable real estate and requires some additional costs. Likely the meter(s) would be located outside adjacent to the building on the Transit Mall side of the building.

FIRE SUPPRESSION

A new fire sprinkler system would be required for the new spaces. The office space would be considered Light Hazard and the retail space considered Ordinary Group 1 Hazard class. The existing fire hose cabinet would be demolished. A new 8-inch fire service with backflow protection connected to the main in Third Street would be required. This new fire service would serve the new fire sprinkler system and likely require a fire pump to boost the pressure for the upper floors.

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condenser water of this system. New condenser water pumps would pump water to this new tower. This system is recommended for consideration and cost estimating.

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CENTRAL PLANT CONSIDERATIONS

Options for the locations of equipment and piping for the central plants include the roof, basement and on grade on the Transit Mall side of the building. The cooling tower must be located outdoors. The roof or outside at grade are the options. Outside at grade would be the easiest to build and maintain. The roof would leave the at grade area open for other design options but installing the tower on the roof would constrain the future vertical building options.

Indoor locations are best for the chillers and boilers and their associated appurtenances. Considering the piping currently originates from the basement and this area of real estate will likely have the least value the basement is recommended. Additional space will be required for the boiler system outside the current mechanical room.

For each of the systems recommended with boilers the heating hot water systems would be comprised of a high efficiency condensing boiler(s) with high turn down ratios and variable speed pumps. Assume two boilers with 1,200,000 BTUH capacity each and two 250 gpm pumps at 80 feet of head.

For the water source heat pump system and chilled water system assume one 300 ton tower with variable speed fans on the roof with two 600 gpm variable speed pumps at 80 feet of head located in the existing mechanical room in the basement.

For air handling systems assume two units at 45,000 cfm at 5 inches of static pressure.

All of the central systems considered above would require a new Direct Digital Control (DDC) system. This control system would control all the functions, schedules and alarms of the entire HVAC system.