MONTGOMERY COLLEGE

Rockville Campus

Utilities Master Plan Update

Final Report

Wiley|Wilson Comm #211130.01

December 13, 2012

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This report was prepared solely for the use of the Montgomery College for this project. It is a statement of professional opinion based on information available at the time of preparation. It represents conditions at a specific time which is identified in the report and these conditions may change. To develop this report, the standard of care applicable to professional services was used.

INTRODUCTION

Wiley|Wilson was commissioned by Montgomery College to provide Utility Master Plans (UMP) for all three campuses in 2006. These were based upon buildings included in the 2004 Facilities Master Plan (FMP). After completion of the 2006-2016 Facilities Master Plan, Montgomery College engaged Cho Benn Holback + Associates and Wiley|Wilson to update the 2006 UMP to reflect the latest FMP. The 2006 UMP should be consulted for additional background information such as modeling of utilities, which was not part of this update and which contains information which is in most cases still valid for all three campuses.

The new Science Center (SC) has been completed and placed in service in the fall of 2011. This is the only major change to the campus facilities since the 2006 UMP. A number of changes in planned future building projects have occurred from those listed in the 2006 UMP and subsequent utility requirements are addressed in this update. These include the following:

Building	Previous Plan	Current Plan
Computer Science (CS)	Demolish	Renovate 20,862 GSF
Technical Center (TC)	Renovate 55,908 GSF	Replace 124,000 GSF
Art Building (AR)	Renovate 25,594	Renovate/Expand 59,700 GSF
Interim Tech (TT)	Demolish/Replace	84,000 GSF
Science Center (SC)	135,000 GSF	Actual is 140,700 GSF
Physical Plant	43,800 GSF	30,100 GSF
New Student Services Center	72,400 GSF	120,400 GSF
Arts Center	Addition 72,900 GSF	Addition 72,000 GSF
Child Care Center	23,077 GSF	6,900 GSF

The previous FMP included four future academic buildings, each 80,000 GSF in size to be constructed in the 2027 timeframe. These buildings are not in the 2006-2016 FMP and consequently have been deleted in this UMP. The previous plan included three future parking garages while the current plant indicates only two.

This UMP update covers changes in the projected requirements for domestic/fire water, sanitary sewer, storm drainage, heating, cooling, natural gas, compressed air, building automation, and electrical distribution systems. In addition, sections have been added to document existing building fire alarms and exterior emergency.

Tables showing summaries of campus building and utility data for the existing conditions (Table 1-1) and for the future campus (Table 1-2) are located in Appendix A. Table 1-2 lists both existing buildings and future building changes, which are envisioned in the 2006-2016 FMP. The planned dates for several of these buildings have extended from what was in the previous UMP and FMPs; while dates are yet to be determined for some anticipated projects.

Drawing C-1 showing the existing campus and utilities is included in Appendix A. Maps data tables for individual utilities, both for the existing and future conditions are located in additional Appendix sections and are listed in the Table of Contents.

EXECUTIVE SUMMARY

This UMP update follows a similar format as the 2006 UMP, Section 1 contains the Executive Summary and subsequent sections contain detailed discussions of each major utility. The 2006 UMP contained additional background information, which is still applicable such as, computer modeling and was not repeated as part of this update.

A number of recommendations from the 2006 UMP have yet to be implemented and are repeated in this update. An overview of the most significant findings and recommendations for each utility studied are discussed below. More detailed information is contained in each main report section. Opinions of Probable Cost for recommendations were not included in the scope of this Master Plan.

WATER SYSTEM

A combined domestic/fire water system on Campus is supplied through three City connections and meters from the City of Rockville. A separate connection and meter provides water to the Mannakee Building. The City system is capable of providing the required existing and future volumes. Water pressure in the Rockville system at points of service was determined in 2006 to be marginal at 38 to 46 PSI due to the limited elevation difference between the City storage tanks and the Campus. A backflow preventer located at the meter on Hungerford Drive has a high-pressure loss and continues to limit the flow through this connection.

Recommendations made in 2006 included removing the backflow preventer on Hungerford Drive and replacing it with low head loss check valves as soon as possible. Significant sections of existing Campus water mains still need to be replaced with larger diameter lines and additional lines need to be installed to create a stronger loop around Campus. These lines will overcome current pressure losses within the Campus system and low delivery pressures from the City, so that the system is capable of delivering recommended fire flows for existing and future Campus buildings. The future water utility map has been revised to incorporate changes made during the SC construction and to accommodate future building plans.

SANITARY SEWER SYSTEM

The Campus sanitary sewer consists of several 8-inch diameter collectors that convey flows into the City of Rockville collection system. The Homer S. Gudelsky Institute and the Interim Technical Training Center connect to the City line at Mannakee Street on the east side of the Campus. The Mannakee Street City collector runs west and ultimately back across the Campus, so that all flow enters the same City outfall on the west side of the Campus. The 2006 UMP indicated that four sections of sewer line around Science West were surcharged and recommended capacity upgrades prior to Campus expansion. These upgrades have not yet been implemented. The 2006 UMP also recommended that the City be notified of the surcharging within their lines, so that they could plan for improvements to their sewer for current and future College development. The 2006 UMP indicated that the Campus trunk line between Manholes 2 and 25 is undersized for the existing conditions, producing surcharging of Campus lines. In addition, the limited capacity of the City of Rockville lines downstream of Campus produces additional surcharging throughout the Campus System. The College still needs to enter into discussions with the City to have their system upgraded to meet existing and future requirements.

The 20006 recommendation that the Campus trunk line between Manholes 2 and 25 be upgraded to 12-inch and that the City make necessary improvements to their system are still valid. Additional sections of Campus lines needing to be upgraded are indicated and discussed in the Sanitary Sewer Section of the UMP.

STORMWATER DRAINAGE SYSTEM

The existing storm drainage system consists of inlets, pipes, and a stormwater pond. Significant modifications and upgrades were made as part of the SC project and these are discussed in the Stormwater Section of this UMP. Computer modeling as part of the 2006 UMP indicated the possibility of surcharging in certain sections of the stormwater drainage system. The fact that surcharging and other problems have not been experienced during actual storm conditions indicates that the model results may have been somewhat conservative. Recommendations made in 2006 for replacing several sections of the stormwater drainage system with larger diameters of pipe remain valid; however, if problems are not experienced the existing capacity, while marginal, may be adequate without these modifications.

HEATING SYSTEM

The Rockville Campus is heated by a central hot water boiler plant located in the Humanities Building. The plant has three firetube boilers using natural gas with No. 2 fuel oil as a backup fuel. The new SC also includes two high efficiency condensing boilers with capacity to serve as a satellite heating plant and space for two future boilers to supplement the central plant. Heat is also recovered from a natural gas engine driven chiller by the heating hot water system. Hot water is distributed through an underground distribution system to Campus. Buildings currently not connected to the central plant are the Child Care Center, Interim Technical Training Center Maintenance Shops, SC, and the Mannakee Building. The SC satellite plant will be connected to the Central Plant distribution loop during the Science East renovation. Gas is purchased under an interruptible service schedule for the Central Plant; however, the new SC satellite heating plant is on a firm rate schedule. Backup capacity to use fuel oil has not been utilized for an extended period at the Central Plant. The 2006 UMP found that the central boiler plant is capable of supplying 23,436 MBH with all four boilers at full load while the Campus load, adjusted for diversity, was 18,503 MBH. With the largest boiler out of service, the plant capacity was only 10,036 MBH, which was well below the Campus peak demand. With one of the smaller boilers out of service the plant can produce 20,091 MBH, which is still adequate. After the satellite boiler plant in SC is tied into the distribution loop, the capacity addition should alleviate the concerns of the largest boiler being out of service.

The three central plant 100 HP boilers were installed in 1986 and are nearing their typical economic life of 25 years. A new central heating and cooling plant should be constructed in the New Student Services Center to replace the existing plant and to provide additional capacity. The hot water distribution system will need increased flow rates, requiring operation of both existing pumps and installation of a third standby pump to serve additional loads.

The addition of solar photovoltaic and solar hot water systems as part of new or renovation building projects should be considered. Natural gas pricing has dramatically declined as additional reserves have been identified since the 2006 UMP and prices are forecast to remain low well into the future which significantly impacts the relative economics of solar and other clean energy projects. However, other benefits may entice the College to continue applications of these systems, and to consider others such as micro-turbines, geothermal, and fuel cells.

COOLING SYSTEM

A central chilled water plant, located in the Humanities Building, provides chilled water through an underground distribution system to 16 of the 20 air-conditioned buildings on the Rockville Campus. This plant and equipment is nearing the end of its service life and replacement with a new central heating and cooling plant to be located in the New Student Services Center is recommended.

Chillers located in the Science East and Campus Center Buildings can be used to provide building cooling and have the flexibility of providing cooling to the distribution loop or the buildings can be cooled from the distribution loop. The chiller in the Science East Building will be removed during the building renovation and Science East connected to the west distribution loop. The Performing Arts and Mannakee Buildings are served by chillers in the respective buildings, and a few small buildings are served by DX units. Four ice modules supplement chiller capacity during peak cooling periods and shift electrical usage to electrical power off peak periods, which reduces demand charges and reduces energy costs. The chillers installed in the new SC are designed to operate as a satellite plant, but can also supplement the central plant.

The Humanities Building central plant chillers and ice modules are capable of providing 1,475 tons of cooling. The estimated existing Campus building loads of buildings served by these chillers, allowing for diversity, is 1,275 tons. This campus load does not include Campus Center and Science East, and assumes the chillers located in these buildings provide their load. The new SC has 915 tons of chiller capacity which will be added to the Central Plant distribution loop during the Science East renovation.

NATURAL GAS

Major gas transportation lines with City taps to the Local Distribution Company (LDC), Washington Gas & Electric, cross the edge of the Rockville Campus. Distribution lines and meters on the Campus are owned by the LDC up to the buildings. The Campus is transitioning to firm gas delivery schedules which will eliminate the need for burning No. 2 fuel oil. The existing fuel oil storage tanks at Humanities Building will be removed when the central heating plant is installed in the New Student Services Center. Supplies of natural gas have increased and are forecast to be plentiful over an extended period with production of wells from shale deposits underway since the 2006 UMP. New gas service will need to be provided when a new central plant is constructed.

COMPRESSED AIR

The Rockville Campus is served by a central compressed air distribution system from two air compressors and dryers located in the mechanical room in the Macklin Tower Building with a number of small compressors located in individual buildings. New and renovated buildings require significantly less compressed air for HVAC systems as controls are increasingly converted from pneumatic operation to electronic. The 2006 UMP recommendations to maintain the central system and to install additional compressors and dryers in individual buildings remain valid. New buildings can be evaluated and connected to the distribution system should significant air demand for laboratory or other needs justify the expense.

BUILDING AUTOMATION

A number of the building automation systems still in service on the Rockville Campus use out-of-date technology, which is not capable of providing the level of reliability, functionality and networked capabilities needed to provide optimum comfort levels and support energy monitoring and conservation efforts on a Campus-wide basis. The existing individual building systems should be replaced with state-of-the-art systems networked to provide an integrated Campus control and monitoring system. Energy monitoring and automatic reporting features should allow staff to see natural gas, fuel oil and electrical energy usage in the central plant and in individual buildings, as well as energy delivered by the central plant through the Campus chilled water and heating hot water systems. The BAS systems should provide output to a server with the capability of storing data and easily formatting and generating on demand and scheduled reports tailored to user needs. The system should directly control equipment or provide information to allow operators to make timely decisions to minimize energy consumption and cost.

ELECTRICAL SYSTEM

The Rockville Campus is served by Pepco through two 13.2-kV overhead distribution feeders looping the Campus on Campus Drive, Mannakee Street and Route 355. Two other Pepco feeders serve areas near the Campus, which should enhance the reliability of the Campus electrical supply and provide additional capacity for growth.

Buildings are served by vault or pad-mounted transformers from 13.2-kV underground distribution lines, tapped from the overhead lines encircling the Campus. Most buildings are individually metered. Pepco owns the distribution systems, including the building meters up to the service entrance equipment. The electrical systems serving the Campus are generally in good condition, and adequate capacity exists to serve current and future requirements.

Planned Campus growth can be served by Pepco through additional underground medium voltage feeders, transformers, and low voltage services to the respective buildings. Details on transformer sizes and estimated costs are contained in the Electrical Section of the Master Plan. As new buildings are constructed and major renovations take place, the underground 13.2-kV distribution system should be upgraded to provide loops throughout Campus. This will allow buildings to be fed from either end of a loop, which will allow shorter outages should part of a loop fail. Conversion of the overhead distribution lines on Campus Drive to underground would enhance the Campus appearance and provide other benefits.

A number of maintenance issues identified during the 2006 UMP have not been fully addressed and remain valid recommendations. These are discussed in the Electrical Section and include correcting moisture problems in some electrical equipment areas, renovation/replacement of obsolete switchboards, and replacing outdated fire alarm systems.

DOMESTIC/FIRE WATER SYSTEM

SCOPE

This Master Plan provides an evaluation of the existing and future water system at the Rockville Campus based on the Cho Benn Holback + Associates (CBH+A) 2006-2016 Facilities Master Plan (FMP). The Utility Master Plan (UMP) considers peak domestic and fireflow system demands and includes hydrant testing performed during the 1994 UMP update, evaluation of fireflow requirements for all existing and proposed buildings, the evaluation of the distribution system including fire hydrants to meet existing and future requirements, and recommendations for improvements.

INTRODUCTION

The Montgomery College water system is supplied by the City of Rockville at three locations through 12-inch water mains shown on Drawing C-2 located in Appendix B. A fourth smaller connection is provided directly to the Mannakee Administrative Building.

The water is metered through three 8-inch fireflow compound meters, which belong to the City. The size and location of the meters are adequate for both domestic and fireflow demands. A backflow preventer, owned by the Campus, is located downstream of the meter at Hungerford Drive. Backflow preventers, which incur large head losses during fireflow conditions, are not required for water systems serving college facilities by the Maryland Department of the Environment.

PREVIOUS MASTER PLAN

The 2006 Utilities Master Plan Update, prepared by Wiley|Wilson, was an update of the 1994 UMP, and was performed to re-evaluate the electrical and water systems using present day (2006) costs and data, considering the changes and planned changes in the intervening period. The 2006 update utilized the data obtained during the 1994 Water Master Plan Update including hydrant testing and use of a KYPIPE computer model to confirm the water system performance. The 2006 update recommended the following improvements:

1. Removal or bypass during fireflow requirements of the existing Hungerford backflow preventer, or higher delivery pressures will be obtained from the City of Rockville. The preventer could be replaced with a low head loss check valve.
2. The recommended 2004-2012 line improvements were for 4,380 feet of 12-inch main and 150 feet of 8-inch main. These items are listed below:

2004-2012 Proposed Lines

West Campus Drive	
8-inch to New Child Care Center	150 feet
South Campus Drive (eastern end)	
12-inch replace & reroute	830 feet
12-inch Connector	70 feet
12-inch Connector Parking Garage No. 2	70 feet
12-inch Connector to South Campus Instructional Building fire hydrant	300 feet
North Campus Drive	
12-inch reroute of old 8-inch	420 feet
12-inch replacement 8-inch along North Campus Drive	560 feet
12-inch replacement to Grandstand and Maintenance Shops	290 feet
12-inch new East West Connector between existing 8- and 6-inch	790 feet
12-inch new East West to existing 12-inch main	480 feet

2004-2012 Proposed Hydrants

West Campus Drive
Near Proposed Child Care Center
Near Proposed Sciences Center

East Campus Drive
Near Proposed New Student Services Center

North Campus Drive
Near Proposed Physical Plant Building
South of Proposed Physical Plant Building
At Hungerford Drive
At Physical Education Center

3. The suggested 2013-2030 Option A line improvements were for 1,030 feet of 12-inch main, primarily to meet the increased fireflow requirements at the Physical Education Center and the new Performing Arts Center.

2013-2030 Option A Future Lines

Performing Arts Center 12-inch	130 feet
PE North South 12-inch Connector	300 feet
12-inch Replacement of South Campus Drive 6-inch	600

4. FMP Buildings 2013-2030 Option B improvements will require a new 1,500-foot length of 12-inch main running from South Campus Drive towards the Building Quadrangle, then turning parallel to the property line and Hungerford Street up to the Hungerford Master Meter, in order to increase flow contributions from both the South Campus and Hungerford meters.

   2013-2030 Option B Future Lines (include Option A improvements)

New 12-inch to Hungerford Drive	1,500 feet

5. The pipe layout looping across the Campus is not adequate, resulting in unbalanced flows through the three meters and areas of insufficient fire protection.
6. The 8-inch water main along North Campus Drive is not effective in supplying fire flows or normal demands from Hungerford Drive to the central part of the Campus due to the long length of the line.
7. The Hungerford backflow preventer should be bypassed or removed in order to provide adequate delivery pressure to the system.
8. Additional backflow devices should not be considered until the delivery pressure is raised to compensate for the backflow pressure losses.

The areas near the Gudelsky Institute and Maintenance Shops do not have adequate fire protection. In addition to the bypassing of the backflow preventer, the 1994 UMP Update considered three alternatives to improve the water system in order to provide adequate fire protection: an elevated storage tank, an auxiliary fire pump near the Gudelsky Institute, and a 12-inch water main fire loop in the center of the Campus. All three alternatives were found to provide adequate flows for all domestic and fire protection requirements with the exception of the Gudelsky Institute and the Interim Technical Training Center. Supplemental fireflows were considered available to these locations from the City hydrants.

The 1994 UMP Update recommended that new 12-inch water main fire loop improvements be constructed – a total of 2,600 feet of mains. The recommendations included provision for the new South Campus Instructional Building and the 12-inch line improvements around the Gudelsky Institute, both of which have been implemented. Recommendations for line improvements to accommodate building additions in the central portion of the Campus have not been implemented to date.

CITY OF ROCKVILLE WATER SUPPLY

Storage for the Montgomery College water system is provided by City of Rockville facilities. The nearest storage tank is located at Carr Avenue about four blocks from the College. The Carr Avenue tank has a capacity of 3 million gallons and an operating range between elevations 548 and 579 feet. This tank volume is adequate to meet the existing and future storage requirements of Montgomery College.

Since the Campus elevations range from 416 feet at West Campus Drive to 470 feet at the track and football field, the current City delivery Hydraulic Grade Line (HGL) and pressures provided by the Carr Avenue tank are a limiting factor for the Campus water system pressures and reduce fireflow capability. For example, at the minimum Carr Avenue tank elevation, the maximum attainable pressure at the football field would be 33 psi without considering further pressure drops from expected transmission and meter losses.

During the 2004 hydrant testing, the Carr Avenue tank level was 568 feet or 11 feet below maximum tank elevation. The hydraulic grade line at the three delivery points was 558 feet at test start, then 550 feet during test delivery of 700 GPM. This pressure drop during the test represents an additional City of Rockville system transmission loss of 3 psi. The test delivery pressure at the beginning of the test was 55 psi on Mannakee Street and 47 psi on Hungerford Drive. The low delivery pressures and hydraulic grade line, combined with City of Rockville transmission losses will increase the extent and expense of the Campus system improvements required to meet fire protection standards.

EXISTING DOMESTIC/FIRE WATER SYSTEM

The Rockville Campus water distribution system consists of about 2,200 feet of 12-inch pipe, 2,830 feet of 8-inch pipe, and 3,200 feet of 6-inch pipe. A schematic drawing of the water mains is shown on Drawing C-2 in Appendix B. The central part of the system contains two loops of 6-inch piping, which were constructed in 1964.

The 2006 Master Plan Update used a WATERCAD model of the existing Campus water main network and demands were constructed and used to evaluate the capacity of the distribution system to meet peak domestic and fire flow demands. The data required to run the model and the source for this data is listed in the 2006 Master Plan. Using the calibrated WATERCAD model the 2006 Master Plan concluded that portions of the system along North Campus Drive, Hungerford Drive, and the central Campus are inadequate for existing needs, even when bypassing the Hungerford backflow preventer, and that new 12-inch mains are required for the existing system, particularly with regard to flow from the Hungerford and East Mannakee meters.

Since the 2006 UMP was completed the college has made several improvements and updated their FMP. The updated FMP building layouts are shown on drawing C-3. The completion of the new Science Center (SC) included the installation of a 12-inch waterline to serve the West portion of the campus. Improvements to the Science East (SE) building included replacement of the existing 6-inch water line from the Science Center (SC) to the Computer Science (CS), upgrading this line to a 12-inch. Even though some improvements have been made, the suggested improvements from the 2006 UMP still apply. However, the routings for new waterlines must be adjusted to accommodate planned building additions with the updated FMP. These improvements will be discussed in subsequent sections of this report.

PROPOSED DOMESTIC/FIRE WATER SYSTEM

The proposed Domestic/Fire Water System improvements, shown on Drawing C-3 in Appendix B, incorporate the recommendations from the 2006 Master Plan with revised waterline locations to accommodate planned building additions. The proposed line improvements include 2,965 feet of 12-inch main and 100 feet of 8-inch main. Proposed improvements are listed below.

Proposed Line Improvements

South Campus Drive (eastern end)	
12-inch Loop (Mixed Arts, Library Resource, and South Garage)	1,100 feet
12-inch Connector to Mannakee Street	230 feet
8-inch Connector to Physical Plant	100 feet
North Campus Drive	
12-inch replacement 8-inch along North Campus Drive	1,175 feet
12-inch extend along North Campus Drive	460 feet

Proposed Hydrant Locations

East Campus Drive
Garage South

North Campus Drive
Near Future Building
At Hungerford Drive

FUTURE DOMESTIC/FIRE WATER SYSTEM

The future Domestic/Fire Water System improvements, shown on Drawing C-3 in Appendix B, incorporate the recommendations from the 2006 Master Plan with revised waterline locations to accommodate future building additions. The future line improvements include 2,040 feet of 12-inch main and 170 feet of 8-inch main. Future improvements are listed below.

Future Line Improvements

South Campus Drive (eastern end)	
12-inch Loop (Performing Arts to North Campus Drive)	1,300 feet
12-inch relocate for future building at Mannakee Street	260 feet
8-inch Connector to East Future Building	170 feet
North Campus Drive (western end)	
12-inch Connector (North Campus Drive to Campus Center)	480 feet

Proposed Hydrant Locations

East Campus Drive
Between Future Buildings

North Campus Drive
At Physical Education Center

SUMMARY AND RECOMMENDATIONS

Fireflow requirements exceed domestic water demands and along with low delivery pressures from the City of Rockville mains, set the capacity needed for the Rockville Campus distribution system. The distribution system can adequately meet the domestic water flow demands but can only provide fireflows to some buildings over the range of Carr Avenue tank elevations with removal of the Hungerford backflow preventer.

It is recommended that the existing Hungerford backflow preventer be removed or bypassed during fireflow requirements, or higher delivery pressures be obtained from the City of Rockville. The preventer could be replaced with a low headloss check valve.

The proposed recommendations, which includes an increase in the hydraulic connection from the Hungerford and East Mannakee Master Meters and provides the ability to meet all building fireflows, is shown on Drawing C-3 in Appendix B. The recommended proposed line improvements are for 2,965 feet of 12-inch main and 100 feet of 8-inch main.

The suggested future line improvements, shown in Drawing C-3, are for 2,040 feet of 12-inch main and 170 feet of 8-inch main, primarily to provide a 12-inch loop around the core campus buildings.

SANITARY SEWER SYSTEM

INTRODUCTION

This Master Plan provides an evaluation of the existing and future sanitary sewer system at the Rockville Campus based on the College's updated Facilities Master Plan. The College owns and maintains its own sanitary sewer collection system shown on drawing C-4. The system consists of several 8-inch diameter collectors that convey flows into the City of Rockville collection system at two locations. The Homer S. Gudelsky Institute and the Interim Technical Training Center connect to the City line on the east side of the Campus, and that City collector goes to Mannakee Street where it runs west and ultimately back onto the Campus, so that all flow enters the same City outfall on the west side of the Campus.

PREVIOUS MASTER PLAN

The 2006 Master Plan, prepared by Wiley|Wilson, utilized the information obtained during the 1991 "Utilities Master Plan, Rockville Campus,". The 1991 Master Plan concluded that sections of the line below Science West were inadequate to meet existing and future flows. In addition, the City Outfall was determined to be inadequate for the present flows and future City and College combined flows. The City Outfall lines were considered as probably adequate for the City flow alone in 1991 because the Campus lines were considered to be surcharged only slightly and only for short periods of time during peak flows, but not adequate with the addition of the College flow.

Four surcharged sections of sewer line around Science West were recommended for capacity upgrade prior to Campus expansion. These upgrades had not been implemented at the time of the 2006 Master Plan Update. The study also recommended that the City be notified of the surcharging within their lines so that they could plan for improvements to their sewer for current and future College development.

After further investigation and the use of a computer model, the 2006 Master Plan update concluded that the Campus trunk line between Manholes 2 and 25 is undersized for the existing conditions. The surcharge created by this Campus line reduces the capacity of the upstream lines on the Campus. Surcharging from the City downstream trunk lines will further reduce Campus line capacities. Options to reduce impacts between the City and Campus lines are discussed in the following section.

The 2006 Master Plan update suggested the following improvements:

A. Replace the existing 8-inch trunk line from Manhole 2 to 25 with a 12-inch diameter line.
B. Reroute existing sewer segments as necessary to accommodate new building construction. To satisfy future flow requirements the rerouted line will need to be 12-inch diameter.

C. Downstream capacity expansion is recommended. The campus peak flows could be accommodated either by increasing the size of the City lines or by the provision of a flow through storage facility just west of West Campus Drive. Discussions between the City and College are required to explore options to increase drainage from Campus.
D. Install additional 8-inch sewer lines to accommodate future construction. The routing of these new lines will vary depending on selected campus improvement options.

The above improvements are listed in the Summary of 2006 Recommendations

EXISTING SANITARY SEWER SYSTEM

The existing sanitary sewer system remains unchanged since the 2006 Utilities Master Plan with the exception of an 8 inch line that was installed during the construction of the new Science Center (SC). This line serves the new building and connects to the existing system just below MH20. Because the sanitary system remains virtually unchanged all improvements suggested in the 2006 Utilities Master Plan still apply. However, the routings for new sewer lines must be adjusted to accommodate planned building additions with the updated Facilities Master Plan. These improvements will be discussed in subsequent sections of this report.

PROPOSED SANITARY SEWER SYSTEM

The 2006 Master Plan proposed that the existing 8-inch trunk line from Manhole 2 to 25 be replaced by a 12-inch line, immediately. In addition, construction of the new buildings (Mixed Arts, Garage South, and the Performing Arts Addition) requires rerouting of the existing sanitary system. The Science Center (SC) was constructed with a connection to the existing Science East (SE) building. Therefore, the routing of the proposed 12-inch line to accommodate proposed peak flows has been revised to include upgrading the 8-inch line from Manhole 25 to the relocated line segment. The proposed sanitary sewer layout, as shown in Drawing C-5 in Appendix B, also includes rerouting and extension of existing lines to accommodate proposed building additions on campus.

FUTURE SANITARY SEWER SYSTEM

The future Sanitary Sewer System, as shown on Drawing C-5, includes the rerouting and extension of existing sewer lines to accommodate future building additions. Parts of the existing system will be upgraded from a 6-inch to an 8-inch line to accommodate peak flows from both proposed and future building additions. The future building sites located on the south side of campus will require rerouting of existing line segments and the extension of 8-inch lines to serve the future buildings.

SUMMARY AND RECOMMENDATIONS

The existing City of Rockville and Campus sanitary lines are insufficient for peak flows at the downstream end of the system, below Manhole 25. The City lines will cause excessive surcharging within the Campus at the estimated peak flow rates. Additional and replacement Campus trunk lines are recommended. Line replacement benefits are limited without measures to improve City line conveyance capacity. Discussions between the City and College are required to explore options to increase drainage from Campus.

STORM DRAINAGE SYSTEM

INTRODUCTION

The existing storm drainage system consists of inlets, pipes, and a stormwater pond. The 2006 study modeled the storm drain pipe system and pond for the current and future site conditions. The existing and proposed model results were analyzed and compared with acceptable results. System deficiencies were identified along with corrective measures. The purpose of the storm drainage system study is to update the 2006 Utilities Master Plan based on the updated Facilities Master Plan prepared for the Rockville Campus of Montgomery College.

PREVIOUS STUDY

A comprehensive analysis of the existing storm drainage system was performed for the 2006 Utilities Master Plan prepared by Wiley|Wilson. The 2006 Utilities Master Plan's summary and recommendations are listed below:

1. The existing storm pond is adequately sized for stormwater quantity to accommodate current and proposed runoff, based on the proposed site layout for the period 2004 to 2012.
2. The existing storm pond is adequately sized for stormwater quality to accommodate current and future runoff, based on the proposed site layout for the period 2004 to 2012; however, runoff from any area with new construction that does not drain into the existing storm pond will require new stormwater quality treatment measures.
3. The storm model indicates some deficiencies in the storm system. The model has been simplified to include major inlets and pipes. It is acknowledged that no flooding issues have been identified on site; and therefore, the portions of the storm pipe system indicated as being surcharged, could be the result of model simplification or an over-estimation of runoff rates. Generally speaking, stormwater runoff modeling is an inexact science; and therefore, the stormwater flow rates resulting from actual storm events may not coincide with the mathematical modeling. The portions of the storm drainage system model that have surcharged are identified here with comments.

    a. DI-53 Surcharges (inlet east of the Music Building). This deficiency can be corrected by resizing sewer lines P-45 and P-46 from 18-inch diameter to 21-inch diameter. The flows in this area could have been over estimated, and since there is no known flooding or surcharging on site, there is no imminent need to replace these pipes.
    b. Line P-63 Surcharges (pipe discharging into southerly end of pond). It was assumed the off-site drainage area south of Mannakee Street is discharged directly into the on-site storm pond. The presence of an off-site storm pond would greatly reduce the modeled flow rate, and since there is no known flooding or surcharging on site, there is no imminent need to replace these pipes.

c. Line P-67 Surcharges (pipe discharging into swale adjacent to pond outlet pipe). Field investigation and existing mapping could not conclusively determine the storm line layout; and therefore, since there is no known flooding or surcharging on site, there is no imminent need to replace these pipes.
d. MH-21 Surcharges (manhole between the Macklin Tower and the Humanities Buildings). This surcharging is due primarily to the submergence of the outlet end of sewer line P-15 in the pond due to the 10-year water surface elevation. This deficiency can be corrected by resizing sewer line P-15 from 30-inch to 36-inch diameter. The model flow rate may be over estimated, and since there is no known flooding or surcharging on site, there is no imminent need to replace this pipe.
e. CI-9 and CI-10 Surcharges (curb inlets in the parking area on the northerly side of the Campus). This deficiency can be corrected by resizing sewer lines P-6 through P-8 from 18-inch to 21-inch diameter. The flows in these areas could be overestimated and since there is no known flooding or surcharging on site, there is no imminent need to replace these pipes.

DRAINAGE AREA CHARACTERISTICS

The Campus site is approximately 85 acres, and consists of grass, woods, and impervious area, with a total site imperviousness of approximately 50 percent. Approximately 15 acres of the Campus discharges runoff to various tributaries that do not drain into the storm pond on site. The Campus area draining into the pond is approximately 70 acres, with approximately 35 acres of impervious area. The total area draining into the pond, including off-site areas, is approximately 128 acres. The required water quality treatment volume for this impervious area (1 inch of runoff from the impervious area) is 2.9 acre feet. The wet pool volume provided in the pond is 3.9 acre feet; and therefore, the current pond meets the water quality treatment needs of the area draining into the pond.

EXISTING STORM DRAINAGE SYSTEM

The existing storm drainage system, as shown on Drawing C-6, consists of a series of inlets, pipes, and a stormwater pond. There are eleven storm drainage subareas, with six storm pipes discharging runoff into the stormwater pond, and five storm drainage outfalls discharging runoff to various other tributaries.

Since the 2006 Utilities Master plan the college has completed the construction of the Science Center (SC) Building. This construction included rerouting of existing storm lines around the new building as well as pond modifications. The routings for future storm lines must be adjusted to accommodate planned building additions with the updated Facilities Master Plan. These improvements will be discussed in subsequent sections of this report.

FUTURE STORM DRAINAGE SYSTEM

The future storm drain system layout, shown in Drawing C-7 in Appendix B, is based on removing existing storm drain pipes that interfere with proposed building additions on Campus and re-routing new storm pipes around these proposed building locations. The existing pond will not require expansion since building additions are primarily in existing impervious areas, and the addition of a landscaped area will decrease the runoff volume from that area. Runoff from areas draining into the storm pond will not require stormwater quality treatment since the pond has been retrofitted to account for the stormwater quality treatment requirements. However, runoff from any area with new construction that does not drain into the existing storm pond will require new stormwater quality treatment measures.

SUMMARY AND RECOMMENDATIONS

Results of the 2006 storm system modeling indicated that the existing storm pond is adequately sized for both stormwater quantity and quality to accommodate current and future runoff, based on the updated site layout contained in the update facilities master plan. The storm modeling also indicated some deficiencies in the storm system. These deficiencies and recommendations are listed in the previous study section of this report. In addition to the recommendations provided in the 2006 study the storm drain system will have to be adjusted to accommodate proposed building locations. Each site should be evaluated during the design of the individual improvements and recommendations made for storm system improvements.

SCOPE

This portion of the Montgomery College, Rockville Campus – Utility Master Plan addresses the following Campus mechanical systems:

- Heating Water System
- Chilled Water System
- Natural Gas
- Compressed Air/Instrument Air System
- Building Automation

This Mechanical Systems Master Plan meets the following objectives:

1. Updates additions and modifications to the existing mechanical systems for the present Campus.
2. Documents the current configuration and capacity of the existing heating and cooling systems for the present Campus.
3. Identifies modifications at the Campus level for the central/satellite plants and mechanical distribution systems to serve future expansions including renovations and/or additions to existing buildings and new building construction.
4. Provides recommendations to improve the performance of the existing and “proposed” central/satellite plants and distribution systems to meet anticipated growth in heating hot water, chilled water-cooling, and natural gas demands along with building automation upgrades.

INTRODUCTION

A "snapshot" of the existing conditions within the central/satellite plants and each distribution system is defined to establish a benchmark for system performance and to establish necessary modifications to serve future needs. The current mechanical systems are updated from the previous 2006 Utility Master Plan, reviewed for distribution system impacts, and recommendations developed for modifications to accommodate planned future Campus requirements.

Based on the existing system conditions, present Campus loads, and the anticipated construction projects outlined in the Cho Benn Holback + Associates (CHB+A) – 2006 Facility Master Plan, improvements and/or new construction items are determined for the 2006-2016 timeframe to correct deficiencies and provide for sufficient system capacity for pending Campus expansion. Future Campus expansion requirements are provided from the CBH +A Facilities Master Plan document and suggested mechanical system construction projects are outlined to address the Campus expansion that could occur in the 2006-2016 timeframe.

Wiley|Wilson provided the 2006 Utility Master Plan for the Rockville Campus as an update from the original 1991 document. As of 2011, an in-trench, dual-pipe heating distribution system provides low-temperature, hot water for building heating. The hot water originates from four, dual fuel (No. 2 oil and natural gas) fired, hot water boilers that are located in the basement of the Humanities (HU) Building in the Northwest corner of the Campus. From the HU Building, the hot water is distributed through east and West Campus loops. Also, chilled water from the HU central plant, along with satellite, individual chillers in the SE, CC, and PA buildings provides cooling for the main Campus structures.

In 2011, a satellite heating and cooling plant was completed in the new SC and supplies chilled water to the building and in the future to the West Campus distribution loop. The plant also provides hot water to the building and in the future will be capable of supplying hot water to other buildings when two additional boilers are installed during the SE renovation.

HEATING WATER SYSTEM (HWS/R)

This section of the 2011 Utility Master Plan reviews the existing hot water heating system for the Campus. The original central core buildings of the Campus used medium temperature, high pressure hot water for heating with a single pipe distribution system. By the early 1990's, this medium temperature system had been replaced with low temperature, low pressure heating hot water boilers and a two pipe, in-trench distribution system. The HU central plant provides hot water to a split distribution system, one branch to the West Campus and the other branch to the East Campus. A few buildings, Mannakee Building (MK), Child Care, Interim Technical Training Center, and the Maintenance Shops, still have standalone heating systems.

In the following sections, an assessment of the heating water system will provide the current status of the Campus heating facilities. The first section will review the 2006 Utility Master Plan with respect to the heating plant and the changes that have taken place since the plan was prepared by Wiley|Wilson. The second section will review the current equipment in the existing central/satellite heating plants and underground distribution system. The following section will review central plant and distribution system conditions. The last section will review the current capability of the existing central/satellite heating plants and distribution systems.

PREVIOUS MASTER PLAN

At the time of the 2006 Utility Master Plan, the College had a central plant located in the HU building with four boilers. The boilers are capable of burning natural gas or No. 2 fuel oil. The HWS distribution system consists of two separate circulating loops, one for the "East Campus" and one for the "West Campus". Wiley|Wilson made recommendations that included the following:

1) Building a new central heating plant in the basement of Parking Garage #2 and extending the heating distribution system to new buildings.
2) Replacing the existing three 100-BHP boilers with a new, high efficiency, condensing units capable of burning natural gas.

Since the 2006 UMP was issued, Montgomery College has incorporated a satellite heating plant in the new Science Center instead of building a new central plant or replacing existing boilers.

EXISTING HEATING WATER SYSTEM EQUIPMENT

The hot water heating system currently has a primary central plant as well as a new satellite plant. The central plant is located in the HU Building and the satellite plant is in the new SC.

The satellite plant hot water boilers are as follows:

Table 1

Boiler No.	Type	Year Installed	Manufacturer	Capacity
1	Condensing, Nat. Gas	2011	Aerco	3,000 MBH
2	Condensing, Nat. Gas	2011	Aerco	3,000 MBH
3	Condensing, Nat. Gas	Future	TBD	TBD
4	Condensing, Nat. Gas	Future	TBD	TBD

The high efficiency satellite plant consists of two, Aerco hydronic hot-water boilers; two primary heating water supply distribution pumps, expansion tank, and two secondary heating water pumps for the Science Center (SC) building loop. Space has been reserved in this plant for two future boilers which will provide hot water to the "West Campus" heating system loop during the planned renovation of the Science East (SE) building renovation.

Natural gas is supplied to the Campus through a single 6-inch diameter HDPE high pressure natural gas line from the Washington Gas Light Company connection on Mannakee Street. This 6-inch gas main branches south and west around the storm management pond to service the HU building and south and east to supply the new SC building as well as connect to the existing carbon steel service line to AR and MU buildings. The satellite plant is on an uninterruptible gas schedule since the boilers are high efficiency, condensing type, and do not have fuel oil backup.

The current HU building central plant hot water boiler units are as follows:

Table 2

Boiler No.	Type	Year Installed	Manufacturer	Capacity
1	Firetube, Nat. Gas & No. 2 Oil	1986	Cleaver-Brooks	100 HP
2	Firetube, Nat. Gas & No. 2 Oil	1986	Cleaver-Brooks	100 HP
3	Firetube, Nat. Gas & No. 2 Oil	1986	Cleaver-Brooks	100 HP
4	Firetube, Nat. Gas & No. 2 Oil	1994	Cleaver-Brooks	400 HP

The existing HU building central plant heating system consists of four (4), “Cleaver-Brooks” firetube, hot-water boilers; two (2) heating water supply distribution pumps, hot water system expansion tanks that are located in the “Macklin Tower” mechanical room, a heat rejection system from the engine-driven chiller and the “East” and “West” Campus heating distribution loops. All of the major buildings on Campus are heated from this system with the exception of the new Science Center and a couple of small buildings such as the Child Care Center, Interim Technical Training Center, Maintenance Shops, and the Mannakee Building (MK). The Mannakee facility is located in the far Southeast corner of the Campus and is somewhat remote from the central plant and has its own, dedicated HVAC system.

Boiler No. 4 is the largest and most recent addition to the central heating plant. It was installed in 1994 and has a rated net heating output of approximately 13.4 million Btu’s per hour (MMBtu’s/hr). Typically, the unit is base loaded during the peak-heating season. The boilers produce 200-degrees F hot water that is circulated through the East and West Campus distribution loops to provide heating for the Campus buildings. Each boiler is provided with its own circulating pump to maintain constant flow through the boiler unit, while the Campus HWS distribution pumps are provided with variable frequency drives (VFDs) to vary the HWS flow to the underground Campus distribution system based on the Campus heating demand.

The overall Campus demand is determined by measuring the differential pressure (dp) between the supply and return headers at each building. The distribution pumps then are controlled to maintain a 5-psig difference at the lowest dp location.

The HWS pumps, major central plant piping, replacement boiler (No. 4), and distribution piping system were installed in the 1992 to 1996 time period. A 6-inch natural gas line was routed to the Humanities Building and is the primary fuel source for the HW boilers. The central heating plant is on an "interruptible" gas service schedule, and No. 2 fuel oil is used as a backup when natural gas is not available. The two HWS Campus distribution pumps are piped for parallel operation and are each rated for 1380 GPM. One pump is intended to serve as a standby unit.

Heat rejected from the 150-ton R, engine-driven, natural gas chiller is available for heating hot water in mild weather when heating and cooling demands exist at the same time. A shell and tube heat exchanger is provided to capture a portion of the rejected heat from the engine cooling system. Approximately 500 MBH can be obtained from the rejected heat for heating hot water.

EXISTING CENTRAL HEATING PLANT AND DISTRIBUTION SYSTEM CONDITION

The existing heating system components in the central plant are aging and experiencing age related failures. The heating system equipment is described below:

Boilers:

The three small boilers, 1986 vintage, are 100 BHP "Cleaver-Brooks" boilers and have numerous outages that continue to disrupt Campus activities. These smaller units are now 25 years old and have reached the end of their useful life.

Boiler No. 4 is somewhat newer than the three smaller boilers but is also approaching the end of its useful life. As mentioned previously, it appears to be the unit of choice during the winter and mid heating season months. Typical winter operation that Wiley|Wilson observed has Boiler No. 4 in a base-loaded setting and the other 100 BHP units operating with one cycling on and off.

Pumps:

The boiler hot water (primary) pumps are in-line design and circulate a constant volume of hot water through the boilers when the units are operating. Base mounted (secondary) pumps distribute a variable volume of hot water for building heating throughout the Campus. The boiler circulating pumps appear to be in good condition. The Campus distribution pumps also appear to be in fair condition.

Central Plant Piping:

The main piping systems within the central plant are Schedule 40 steel having welded ends, are properly sized for the heating demands and are considered to be in fair condition. Thermal insulation is adequate and of the proper materials. Thermal expansion tanks for the hot water heating system are located in the basement of the Macklin Tower due to lack of space in the Humanities central plant. The plant piping is approaching the end of its useful life and will be replaced with a new central plant in the New Student Services Building.

Existing Heating Distribution System Condition

The hot water distribution piping is Schedule 40 welded steel pipe covered with fiberglass insulation and aluminum jacketing. The piping is located in a pre-cast concrete utility trench having removable covers. On most sections, the removable cover is at grade level and forms a part of a sidewalk. Access manholes are provided in the box trench covers at certain locations for inspection and, so portable pumps can be used to remove any ground water that has collected in the trench. The trench is dry most of the time but there have been instances where standing water has been found at low points at the end of the “West Loop” and in one or two locations in the “East Loop”.

The existing hot water distribution system was constructed in phases between 1992 and 1996. The system consists of two separate supply and return main “loops”. The “West Campus” loop leaves the HU Building at the lower Southwest corner of the central plant and provides heat to HU and the buildings between there and SE. The “East Campus” loop leaves the central plant high on the Northeast corner of the facility and provides heating water for structures starting with the CC Building and extending all the way out to the Homer S. Gudelsky Institute (GU). The existing heating hot water distribution piping is generally in poor condition but is properly sized and arranged for the present buildings. There are specific areas of concern such as the standing water issue and poor insulating quality in certain areas (see photographs below). The distribution system should be replaced as buildings are renovated. Branch lines to CB and CS have been replaced in the last few years and will not need to be upgraded.

See Appendix Section C Drawing M-2 for a site plan showing the routing of the present system, the location and identification of the buildings presently served.

PRESENT CAMPUS HEATING LOAD AND CENTRAL/SATELLITE PLANT CAPABILITIES

Based on a review of the existing Campus building drawings and previous 2006 UMP, Wiley|Wilson has compiled Table 3 below. The table indicates the current connected building heating loads and the factors that were used to determine them. Most of this information was based on the 2006 Master Plan, but it has been updated based on design heating information from the new building drawings and/or “gross square footage” adjustments provided in the CBH+A “2006-2016 Facility Master Plan”. The table also indicates each building and its heating loop connection.

TABLE 3
Montgomery College - Rockville Campus
2011 "Existing" Heating Loads / Factors

Bldg. No.	Bldg. Code	Building Name	Building Function	Year Built	Building Size (GSF)	Heating Load Factor (Btu/GSF)	Design Heating Load (MBH)
Existing Utility Conditions (2011)							
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	25,594	37	773
202	CC	Campus Center	Cafeteria, Bookstore, Recreational, Administrative	1966	74,302	39	2,240
203	CH	Child Care Center (Not connected to CP)	Child Care	1986	2,498	37	72
204	CS	Computer Science Building	Classrooms, Offices, Computer Center	1966	20,862	37	595
205	CB	Counseling & Advising	Offices, Security	1969	17,696	39	624
206	MT	Macklin Tower	Library, Classrooms, Offices, TV Studios	1971	117,282	33	3,249
207	GU	Homer S. Gudelsky Institute for Tech Education	Classrooms, Offices	1992	64,000	35	2,112
208	HU	Humanities Building	Classrooms, Offices, Auditorium, Central Plant	1966	73,912	30	1,697
208		Central Plant	Central Heating and Cooling Plant	1996		---	---
209	TT	Interim Technical Training Center	Auto Shops, Offices, Building Trades Labs	1988	9,360	29	234
210	MS	Maintenance Shops (Not connected to CP)	Misc. Storage for Maintenance Eqmt.	1988	4,720	29	50
211	MK	Mannakee Building (Not connected to CP)	Administrative Offices/Meeting Rooms	1985	42,102	47	1,937
212	MU	Music Building	Classrooms, Offices, Recital Rooms	1971	20,499	48	799
213	PA	Robert E. Parilla Performing Arts Center	Theatre	1984	28,000	40	874
215	PE	Physical Education Center	Gym, Pool, Offices, Classrooms	1966	84,949	35	2,819
216	CN	Canoe Trailer Shed	Shed	1990	420	---	---
217	SC	Science Center (Satellite Plant)	Laboratories, Classrooms	2011	140,700	33	4,643
218	SE	Science East Building	Classrooms, Offices, Labs, Greenhouse	1966	53,737	29	1,333
219	SW	Science West Building	Classrooms, Offices, Labs	1971	41,988	35	1,246
220	SB	South Campus Instructional Building	Classrooms, Offices	1996	29,900	37	897
221	SV	Student Services Center	Offices, Admissions, Student Aid, Records	1966	10,448	47	478
222	TC	Technical Center	Classrooms, Offices, TV Studios, Auditorium	1966	55,908	32	1,550
223	TA	Theatre Arts Building	Classrooms, Theatre	1966	35,032	40	1,092
-	-	Grandstand	Grandstand / Concessions / Restroom	1994	240	---	---
			Total Connected Bldg Loads		954,149		29,314
			Total Central Plant Load		764,129		22,612
			Total Satellite Plant Load		140,700		4,643
			Campus Block Loads				21,985

As can be seen on the chart above, based on the collected data and our calculations, the "present maximum" connected load on the central heating plant is approximately 22,600 MBH. The satellite plant is currently only used for SC and has a "present maximum" connected load of approximately 4,640 MBH, which is the heating load factor multiplied by the building GSF. This maximum connected load, however, is not what the central and satellite heating plants will normally be required to meet. Certain buildings on Campus are constructed and arranged in a manner that they see solar loads most of the day and tend to absorb this energy. Other facilities have a substantial heating load associated with computers and lab equipment. And, finally, still other buildings are used later in the evenings so internal heating is generated within the structures later into the night. Due to these varying building use schedules, building constructions, internal loads, or combinations thereof, the central plant "block" heating load is substantially less than the connected load and is calculated to be approximately 16,950 MBH. The block load indicated also considers the effect of heat losses within the piping distribution system.

The four firetube, hot water boilers in the central heating plant have a net heating output capability of 23,400 MMBtuh when firing natural gas. The SC satellite plant currently has two, condensing, hot water boilers, with a nominal 5,200 MBH total net heating output capacity. So, technically there is enough heating capacity within the central plant to satisfy the current Campus "block" demand and when the satellite plant is connected to the west distribution loop, another 5,200 MBH will become available for the Campus. There are concerns though related to the boiler system for the central plant, due to age and efficiency, and getting this heating capacity out to the Campus. The efficiency of the central plant has decreased with time and probably cannot deliver the net output shown above.

CAMPUS HEATING CAPACITY

In 2006, Montgomery College commissioned the Architects of Cho Benn Holback + Associates to prepare a "Facility Master Plan Update" to review the functional characteristics of each of the College's three Campuses, evaluate the space requirements needed to meet anticipated academic and demographic growth at each Campus, and to determine what types and sizes of new or renovated structures would be needed to meet the future expansion of the College. Based on the information contained in the "Proposed Facilities Program" and "Implementation" portions of the CBH+A Facility Plan for the Rockville Campus, Wiley|Wilson constructed a spreadsheet that reflects the "anticipated" heating and cooling load changes associated with each new building or existing building renovation.

The existing central plant in the HU Building currently serves 16 buildings with a combined area of approximately 765,000 gross square feet. The new satellite heating plant located in the Science Center currently serves only this building. However, during the renovation of the Science East building, this satellite heating plant will be expanded and connected to the west distribution loop. The expanded satellite plant will be capable of providing redundant heating to SE, SW, SC, MT, and under low load conditions supplement the rest of the Campus.

FUTURE HEATING SYSTEM REQUIREMENTS AND ANALYSIS

The CBH+A Facility Master Plan envisions growing the Campus mainly to the south, which appears to be a less cluttered and more attractive alternative from the mechanical utilities perspective. This scenario places most of the proposed new construction and the future "Long-Term" construction either out in the existing South Campus parking areas or in close proximity to existing building footprints. However, there is a New Student Services Center proposed on the north side of the Campus and will take up part of the parking lot south of Campus Drive. An expansion of the PE building and a new parking Garage North will also be on the north side. (See Drawing M-3 in Appendix C.)

Presently, on CBH+A future buildings, the New Student Services Center will be located northeast of the HU. Since this building is scheduled to be completed before the HU is renovated, the new heating Central Plant will be located in this building. A new heating satellite plant will also be installed in the Library that is slated for construction on the south side of the Campus. This satellite plant will serve other future buildings that will be constructed on the south side and be connected to the east distribution loop when this construction phase is completed.

FUTURE CAMPUS HEATING REQUIREMENTS

Assuming that Montgomery College follows the building construction and renovation as indicated in CBH+A's "Facility Master Plan", the projected "future" Campus growth will ultimately increase the Campus building heated area to approximately 1,600,000 gross square feet. Projections include the addition of two "new" Art Buildings, a major renovation and addition to the Humanities Building, the Library building, Humanities and Social Science building, along with other addition and renovation projects. The overall Rockville Campus heating demand will increase by roughly 11,805 MBH to a grand total of 34,000 MBH. Based on the observed 30 degrees F delta T operating condition, the Campus will require approximately 2,300 GPM flowrate in the HWS distribution system to meet the anticipated "future block" load. It is also anticipated that the present "existing" central plant will be replaced by a new central plant in SV around the 2017 time period. The expected Campus growth over this future time frame is as depicted in Table 4.

TABLE 4
Montgomery College - Rockville Campus
2012 "Future" Heating Loads / Factors

Bldg. No.	Bldg. Code	Building Name	Building Function	Year Built	Building Size (GSF)	Heating Load Factor (Btu/GSF	Design Heating Load (MBH)
Future Utility Conditions (Reference 2006 - 2016 Facilities Master Plan Proposed Facilities)							
208	HU	Humanities Building	Classrooms, Offices, Auditorium, Central Plan	1966	73,912	30	1700
208	-	Central Plant in Humanities	Central Cooling and Heating Plant				0
218	**SE**	**Science East Building, Renovation and Additio**	**Classrooms, Offices, Labs, Greenhouse**	**1966**	**57,237**	**29**	**1343**
204	**CS**	**Computer Science Building, Renovation**	**Classrooms, Offices, Computer Center**	**1966**	**20,862**	**37**	**605**
221	**SV**	**Student Services, Demolished**	**Offices, Admissions, Student Aid, Reco**	**1966**			
202	**CC**	**Campus Center, Renovation**	**Cafeteria, Bookstore, Recreational, Adn**	**1966**	**74,302**	**39**	**2229**
215	PE	Physical Education	Gym, Pool, Offices, Classrooms	1966	84,949	35	2803
215	**PE**	**Physical Education Addition**	Offices, Classrooms	TBD	**35,800**	**35**	**0**
223	TA	Theatre Arts	Classrooms, Theatre	1966	35,032	40	1086
222	**TC**	**Technical Center, Demolished**	**Classrooms, Offices, TV Studios, Audito**	**1966**			**0**
205	**CB**	**Counseling & Advising, Demolished**	**Classrooms, Security**	**1969**			**0**
219	**SW**	**Science West, Renovation and Addition**	**Classrooms, Offices, Labs**	**1971**	**62,982**	**35**	**1246**
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	20,499	48	799
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	25,594	37	768
206	**MT**	**Gordon & Marilyn Macklin Tower, Renovation**	**Library, Classrooms, Offices, TV Studios**	**1971**	**117,282**	**33**	**3284**
213	**PA**	**Parilla Performing Arts Center, Addition**	**Theatre**	**1984**	**59,700**	**40**	**868**
203	**CH**	**Child Care Center, Demolished**	**Child Care**	**1986**			**0**
209	**TT**	**Interim Technical Training Center, Demolish**	**Auto Shops, Offices, Building Trades La**	**1988**	**9,360**		**0**
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	4,720	29	50
207	GU	Gudelsky Institute for Tech Education	Classrooms, Offices	1992	64,000	35	2112
211	MK	Mannakee	Administrative Offices/Meeting Rooms	1985	42,102	47	1937
216	CN	Canoe Trailer Shed	Shed	1990	420	---	0
220	**SB**	**South Campus Instruction Building Renovation**	**Classrooms, Offices**	**1996**	**29,900**	**37**	**897**
---	---	Grandstand	Grandstand / Concessions / Restroom	1994	240	---	0
217	SC	Science Center	Laboratories, Classrooms	2011	140,700	39	4221
TBD	**---**	**Humanities & Social Sciences**		**TBD**	**124,000**	**37**	**3720**
TBD	**---**	**Child Care Center (CH), New**		**TBD**	**6,900**	**37**	**207**
TBD	**---**	**New Student Services Center**	**Offices**	**2017**	**120,400**	**37**	**3612**
TBD	**---**	**Communication Arts**		**TBD**	**72,000**	**37**	**2160**
TBD	**---**	**Technical Training and Automotive ( )**	**Classrooms, automotive shops**	**TBD**	**84,000**	**37**	**2520**
TBD	**---**	**Library Resource Center**	**Library, Patron Lounge**	**TBD**	**131,000**	**40**	**3930**
TBD	**---**	**Mixed Arts**	**Classrooms, Labs and Exhibit Spaces**	**TBD**	**72,000**	**37**	**2160**
TBD	**---**	**Physical Plant**	**Maintenance Areas, Offices**	**TBD**	**30,100**	**37**	**903**
TBD	**---**	**Parking Garage No. 1 (Garage North)**	**Parking for 680** cars	**TBD**	**432,000**	---	---
TBD	**---**	**Parking Garage No. 2 (Garage South)**	**Parking for 518** cars	**TBD**	**108,000**	---	---
			Total Connected Bldg Loads		2,139,993		45,160
			Total Central Plant Load				24,017
			Total Satellite Plants Load				18,949
			Other Local Load				2,194
			Total Campus Block Loads				33,870

SUMMARY AND RECOMMENDATIONS

In summary, although the existing central and satellite heating plants have sufficient capacity to meet the existing Campus "peak block" heating load, the Rockville Campus will eventually outgrow the installed capabilities of the heating systems, and the central plant boilers will reach the end of their useful economic life. Based on the information provided in the CBH+A "Montgomery College - Facilities Master Plan", it appears that by the time the New Student Services Center is constructed, the existing central plant will need to be replaced and space for future growth provided in the new central plant in this building. As the Campus expands to the south, additional capacity will be required and a new satellite plant is scheduled for the Library.

With respect to the CBH+A "Facility Master Plan", the present site conditions and the expected need for utility upgrades, Wiley|Wilson, Inc. recommends the following actions be taken related specifically to the mechanical and energy utility infrastructure:

Replace the three (3) existing "1986" vintage, scotch-marine, firetube boilers with a bank of new, high-efficiency, "fully-condensing" hydronic units in the New Student Services Center building. Continue use of the natural gas driven engine chillers which provide supplemental heat recovery for the heating hot water system. Diversify the Rockville campuses energy source portfolio and consider using "renewable" energy sources such as solar hot-water heating and/or photovoltaics. For all new building construction, make every effort to incorporate "LEED" energy efficiency principles, systems and/or guidelines. At the time of the Library construction, incorporate a new satellite plant in this building for the south side of the Campus. The Mannakee building could also then be connected to the overall Campus system if it is determined to economically feasible.

CHILLED WATER SYSTEM (CHWS/R)

INTRODUCTION

This section of the Utility Master Plan describes the existing chilled water production plant and distribution system. These systems are updated from the previous 2006 Utility Master Plan and reviewed for distribution system impacts. The report then looks forward into the chilled water load requirements and mechanical system means necessary to facilitate the planned growth at the Campus over the 2006-2016 time period. This effort has been conducted in order to provide the College with an evaluation of options available to meet its future chilled water infrastructure needs and to provide engineering solutions that will be forward looking, cost effective, and a benefit to the College.

PREVIOUS MASTER PLAN

When the 2006 Utility Master Plan was performed for the College, most of the main buildings on the Campus were being served by the central chilled water plant. This central chiller plant was installed in the early to mid-1990s, with ice storage, electric-driven and natural gas-driven chillers. At the same time, a direct buried, high performance, corrosion resistant distribution system was installed on the east side of the Campus. A carbon steel piping system was installed in a trench along with the heating hot water on the west side of Campus. In the 2000s, satellite chillers were added to SE, CC, and PA to supplement the central plant capacity. Since the 2006 UMP was issued, Montgomery College has incorporated additional chiller capacity in the new SC.

EXISTING CHILLED WATER SYSTEM

The existing central plant, located in the basement of the HU Building, was originally constructed in several phases beginning in 1992, with the last phase completed in approximately 1996. The chilled water distribution system was also constructed during this same time period. Wiley|Wilson is the "Engineer of Record" for the bulk of the HVAC utility construction at this facility.

The central plant is not the primary production location for cooling water for the Campus any longer since about one half the campus capacity is now in satellite plants. Several small outlying buildings have standalone systems. Four other buildings have satellite chillers, with all but SC having the capability of also circulating chilled water into the system served by the central plant.

Chilled water production for the central plant is accomplished by a combination of processes. First, the three existing chillers can be used at night, either individually or as a group, to produce a 20-degree F ethylene glycol and water mix (glycol) that is passed through four ice-building modules. These four modules have the capability to store approximately 4,380 ton-hours of "latent" cooling for later use. As the cooling load of the Campus begins to increase on the following day, the ice in the modules can be melted and the 36-degree F glycol generated by the ice melting process can be passed through two plate and frame heat exchangers to produce 40-degree F chilled water for the Campus' East and West "Chilled Water Supply" (CHWS) loops. The purpose of the overnight "ice-build"/"thermal" storage system is to run the chillers at night and use electrical energy during "off-peak" hours, thus reducing overall energy cost.

Secondly, the chillers can work in series with the ice modules. Chilled water, returning (CHWR) from the Campus loops, comes back to the central plant at roughly 56 degrees F. During the "Glycol/Chilled Water" heat exchanger pass, the glycol headed for the chillers is warmed to 50 degrees F. The chillers can be set to reduce the warm returning glycol from 50 degrees F down to 45 degrees F and then the glycol can be passed through the ice storage modules to reduce the glycol temperature even further to 36 degrees F. Typically, this operational scenario occurs during the peak-cooling season and, as the overall Campus load reaches its maximum, the chillers usually work harder and pick up the load not covered by the ice modules. The system is designed to minimize the required sizes of the costly items such as the chillers and still give the plant the capability to meet the Campus cooling load goals.

The satellite chiller plant in the SC has three chillers installed with a total capacity of 915 tons. The chillers are McQuay, high performance, variable speed, with magnetic levitation bearings. The chilled water system is currently only available to the SC, but will be connected to the Campus “west loop” when the SE renovation is completed and the SC chilled water tied-in to the distribution loop.

PRIMARY AND SATELLITE CHILLER PLANT EQUIPMENT AND CONDITION

There are three chillers in the central plant. The first two are electric motor-driven, low-temperature, ethylene glycol chillers. These units are designed for a 25 to 30 percent by volume mixture of ethylene glycol and water, and are designed to produce either low-temperature glycol for "ice-building" or moderately "chilled" glycol for straight chilled-water cooling. Chiller No. 3, which was installed in 1997, is capable of producing approximately 295 tons R of 20-degree F glycol mix for the purpose of making ice (Thermal Storage). It is also capable of producing roughly 445 tons R of 39-degree F glycol mix for straight cooling. Chiller No. 2, which was installed in 1994, is capable of producing 200 tons R of 20-degrees F glycol for making ice, and is capable of producing roughly 370 tons R of 39-degree F glycol for straight cooling. These chillers have very large electrical motor systems, 450 HP and 500 HP, respectively, due to their low temperature requirements. It is best that they be operated at night during "off-peak" electrical periods. Chiller No. 2 has a significantly different arrangement than Chiller No. 3 in that it has shell-and-tube heat exchangers as opposed to plate-and-frame exchangers. Chiller No. 1, which was installed in 1992, is a natural gas, engine-driven unit that is capable of producing roughly 100 tons R of 20-degree F glycol mix for ice-building and 150 ton R of 39-degree F glycol mix for straight cooling. This unit is also tied into the Campus heating water system to capture the waste heat from the chiller engine by introducing it into the heating system while the unit is operating. Finally, the thermal storage ice modules make up the remainder of the system along with the glycol and chilled water distribution pumps.

When the three chillers are in the night "ice-building" mode, they are capable of producing 595 tons R of "charging" (i.e., ice-building) capacity. The normal ice module charging is between 6 and 8 hours. This process normally takes place between 12:00 (midnight) and 8:00 a.m. during PEPCO's "off-peak" power period. After electrical deregulation, these "ice-charging" time periods may need to be adjusted.

The chillers in the SC satellite plant have been recently installed and are in brand new condition. The satellite chillers in CC and PA are in good condition and will remain while the chiller in SE will be removed during the renovation.

DISTRIBUTION SYSTEM EQUIPMENT AND CONDITION

The existing chilled water distribution system is comprised of two separate chilled water supply and return mains that were installed in phases between 1992 and 1996. The larger of the two is the East Campus loop. This is a 12-inch diameter supply and return piping as it leaves the central plant and provides cooling water for nine structures starting with the Campus Center (CC) and extending out to the GU. The West Campus loop begins as a 10-inch main inside the central plant and feeds the HU Building and all of the structures between HU and including SE. The chilled water piping of the East loop is direct buried outside of the utility box trench shown in the photograph to the right. It does, on occasion, cross under the utility box system. The chilled water piping of the West loop is installed within the utility box trench, except for a portion that feeds the MT. The condition of the piping systems varies throughout the Campus. The West loop is steel pipe located in a distribution trench and has reached the end of its useful life. The termination point at the south end of the "West" Campus loop will be tied into the new chillers at the new SC during the planned renovation of SE.

PRESENT CAMPUS COOLING LOAD AND CAPABILITY

At present, there are 15 Campus buildings connected to the chilled water supply distribution system with a combined "connected load" calculated to be 2,886 tons R (See Table 5). The new SC has an estimated load of 518 tons R and is presently a standalone building until the SE renovation occurs and the SC is connected to the main distribution system. Regular Campus operating hours are between 7:00 a.m. and 11:00 p.m. (16-hour day). Based on "time of day" building usage, building orientation, or building construction, not all of the building areas require "maximum" cooling at the same time; so typically, the "maximum" cooling load that the central plant must meet is significantly lower than the overall connected Campus load. In this case, we have calculated the "Campus peak block load" to be approximately 2,164 tons (Table 5). When the ice modules are fully charged, and are storing the designed 4,380 ton-hours of "latent" cooling, they are capable of providing 545 tons/hour of latent cooling over the 8-hour electrical "on-peak" operating period (12:00 noon to 8:00 p.m.). This, then supplemented by the other chillers operating in series at a 45-degree F setpoint, provides a total "peak" central plant capacity of 1,510 tons/hour of cooling.

TABLE 5
Montgomery College - Rockville Campus
2011 "Existing" Cooling Loads / Factors

Bldg. No.	Bldg. Code	Building Name	Building Function	Year Built	Building Size (GSF)	Cooling Load Factor (Btu/GSF)	Cooling Load (Tons) R
Existing Utility Conditions (2011)							
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	25,594	37	79
202	CC	Campus Center	Cafeteria, Bookstore, Recreational, Administrati	1966	74,302	39	241
203	CH	Child Care Center (Not connected to CP)	Child Care	1986	2,498	37	8
204	CS	Computer Science Building	Classrooms, Offices, Computer Center	1966	20,862	37	64
205	CB	Counseling & Advising	Offices, Security	1969	17,696	39	58
206	MT	Macklin Tower	Library, Classrooms, Offices, TV Studios	1971	117,282	33	323
207	GU	Homer S. Gudelsky Institute for Tech Education	Classrooms, Offices	1992	64,000	35	187
208	HU	Humanities Building	Classrooms, Offices, Auditorium, Central Plant	1966	73,912	30	175
208		Central Plant	Central Heating and Cooling Plant	1996			
209	TT	Interim Technical Training Center	Auto Shops, Offices, Building Trades Labs	1988	9,360	29	23
210	MS	Maintenance Shops (Not connected to CP)	Misc. Storage for Maintenance Eqmt.	1988	4,720	29	11
211	MK	Mannakee Building (Not connected to CP)	Administrative Offices/Meeting Rooms	1985	42,102	47	165
212	MU	Music Building	Classrooms, Offices, Recital Rooms	1971	20,499	48	82
213	PA	Robert E. Parilla Performing Arts Center	Theatre	1984	28,000	40	93
215	PE	Physical Education Center	Gym, Pool, Offices, Classrooms	1966	84,949	35	208
216	CN	Canoe Trailer Shed	Shed	1990	420	---	---
217	SC	Science Center (Satellite Plant)	Laboratories, Classrooms	2011	140,700	46	518
218	SE	Science East Building	Classrooms, Offices, Labs, Greenhouse	1966	53,737	29	130
219	SW	Science West Building	Classrooms, Offices, Labs	1971	41,988	35	122
220	SB	South Campus Instructional Building	Classrooms, Offices	1996	29,900	37	92
221	SV	Student Services Center	Offices, Admissions, Student Aid, Records	1966	10,448	47	41
222	TC	Technical Center	Classrooms, Offices, TV Studios, Auditorium	1966	55,908	32	149
223	TA	Theatre Arts Building	Classrooms, Theatre	1966	35,032	40	117
-	-	Grandstand	Grandstand / Concessions / Restroom	1994	240	---	---
			Total Connected Bldg Loads		954,149		2,886
			Total Central Plant Load		764,129		2,184
			SC Satellite Plant Load		140,700		518
			Campus Block Loads				2,164

FUTURE CHILLED WATER REQUIREMENTS

Based on the recently completed "Facilities Master Plan" prepared by CBH+A and the discussion above, the addition of the SC satellite chiller plant provides enough capacity to supply SC and the buildings on the west side chilled water loop. This satellite plant will be connected to the west side loop during the SE renovation.

The calculated cooling loads to be added to the central plant system for proposed future buildings and renovations are summarized in Table 6. See Drawing M-3 for future chilled water utility maps and tables located in Appendix C for both existing and future Campus buildings.

TABLE 6
Montgomery College - Rockville Campus
2012 "Future" Cooling Loads / Factors

Bldg. No.	Bldg. Code	Building Name	Building Function	Year Built	Building Size (GSF)	Cooling Load Factor (Btu/GSF	Cooling Load (Tons) R
Future Utility Conditions (Reference 2006 - 2016 Facilities Master Plan Proposed Facilities)							
208	HU	Humanities Building	Classrooms, Offices, Auditorium, Central Plan	1966	73,912	30	175
208	-	Central Plant in Humanities	Central Cooling and Heating Plant				
218	**SE**	**Science East Building, Renovation and Additio**	**Classrooms, Offices, Labs, Greenhouse**	**1966**	**57,237**	**29**	**130**
204	**CS**	**Computer Science Building, Renovation**	**Classrooms, Offices, Computer Center**	**1966**	**20,862**	**37**	**64**
221	**SV**	**Student Services, Demolished**	**Offices, Admissions, Student Aid, Reco**	**1966**			
202	**CC**	**Campus Center, Renovation**	**Cafeteria, Bookstore, Recreational, Adn**	**1966**	**74,302**	**39**	**241**
215	PE	Physical Education	Gym, Pool, Offices, Classrooms	1966	84,949	35	208
215	**PE**	**Physical Education Addition**	Offices, Classrooms	TBD	**35,800**	**35**	**104**
223	TA	Theatre Arts	Classrooms, Theatre	1966	35,032	40	117
222	**TC**	**Technical Center, Demolished**	**Classrooms, Offices, TV Studios, Audito**	**1966**			
205	**CB**	**Counseling & Advising, Demolished**	**Classrooms, Security**	**1969**			
219	**SW**	**Science West, Renovation and Addition**	**Classrooms, Offices, Labs**	**1971**	**62,982**	**35**	**184**
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	20,499	48	82
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	25,594	37	79
206	**MT**	**Gordon & Marilyn Macklin Tower, Renovation**	**Library, Classrooms, Offices, TV Studios**	**1971**	**117,282**	**33**	**323**
213	**PA**	**Parilla Performing Arts Center, Addition**	**Theatre**	**1984**	**59,700**	**40**	**199**
203	**CH**	**Child Care Center, Demolished**	**Child Care**	**1986**			
209	**TT**	**Interim Technical Training Center, Demolish**	**Auto Shops, Offices, Building Trades La**	**1988**	**9,360**		**0**
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	4,720	29	11
207	GU	Gudelsky Institute for Tech Education	Classrooms, Offices	1992	64,000	35	187
211	MK	Mannakee	Administrative Offices/Meeting Rooms	1985	42,102	47	165
216	CN	Canoe Trailer Shed	Shed	1990	420	---	---
220	**SB**	**South Campus Instruction Building Renovation**	**Classrooms, Offices**	**1996**	**29,900**	**37**	**92**
---	---	Grandstand	Grandstand / Concessions / Restroom	1994	240	---	---
217	SC	Science Center	Laboratories, Classrooms	2011	140,700	39	439
TBD	**---**	**Humanities & Social Sciences**		**TBD**	**124,000**	**37**	**382**
TBD	**---**	**Child Care Center (CH), New**		**TBD**	**6,900**	**37**	**21**
TBD	**---**	**New Student Services Center**	**Offices**	**2017**	**120,400**	**37**	**355**
TBD	**---**	**Communication Arts**		**TBD**	**72,000**	**37**	**222**
TBD	**---**	**Technical Training and Automotive ( )**	**Classrooms, automotive shops**	**TBD**	**84,000**	**37**	**148**
TBD	**---**	**Library Resource Center**	**Library, Patron Lounge**	**TBD**	**131,000**	**40**	**417**
TBD	**---**	**Mixed Arts**	**Classrooms, Labs and Exhibit Spaces**	**TBD**	**72,000**	**37**	**222**
TBD	**---**	**Physical Plant**	**Maintenance Areas, Offices**	**TBD**	**30,100**	**37**	**31**
TBD	**---**	**Parking Garage No. 1 (Garage North)**	**Parking for 680** cars	**TBD**	**432,000**	---	---
TBD	**---**	**Parking Garage No. 2 (Garage South)**	**Parking for 518** cars	**TBD**	**108,000**	---	---
			Total Connected Bldg Loads		2,139,993		4,598
			Total Central Plant Load				1,960
			Satellite Plants Load				2,441
			Other Local Load				197
			Campus Block Loads				3,448

SUMMARY AND RECOMMENDATIONS

A new central chiller plant needs to be provided in the New Student Services Center to be constructed around 2017. The current central chiller plant is aged and has reached the end of its useful life. As new buildings are added to the south side of the Campus, a new satellite chiller plant should be constructed in the Library. The distribution system from this satellite plant would be connected to the east side loop and provide redundancy to the central plant. Ice storage and an engine driven chiller with heat recovery are recommended for the new chiller plants. However, as a basis for the future requirements, electrical driven chillers are assumed for the proposed building electrical needs. Distribution lines should be extended to serve new buildings as they are constructed.

COMPRESSED AIR/INSTRUMENT AIR SYSTEMS

INTRODUCTION

The Rockville Campus is served by a central compressed air distribution system from two air compressors and dryers located in the mechanical room in the MT Building. This central system serves the control air needs of all buildings except for Counseling & Advising (CB) and the MK Building which have compressors in the buildings.

PREVIOUS MASTER PLAN

At the time of the 2006 Utility Master Plan for Rockville, the various Campus buildings were served by a central compressed air system. Wiley|Wilson's recommendation, at that time, was to maintain the central system for existing building requiring compressed air. The trend will be for reduced compressed air as new and renovated building use DDC technology and electrical motor operators instead of pneumatic valve and damper actuators.

EXISTING CONDITIONS

The Rockville Campus has a central compressed air distribution system located in the mechanical room of the MT Building. The system consists of two 30-HP, 125 standard cubic feet per minute (SCFM) "non-oil free" air compressors, two 3/4-HP refrigerated air dryers, and two 200-gallon air receivers. The air compressors and air receivers were designed to provide 125 psig air but data indicates that they are presently set to deliver air at 100 psig. Secondly, the air compressors were originally specified as Atlas Copco "oil-free" units, but evidence on site suggests that the units installed are not "oil-free" equipment. After the air has been conditioned via the refrigerated air dryers, it leaves the MT Building through a 3-inch compressed air line, and this piping main distributes air to all of the buildings on Campus except CB, and the MK Building. (See Drawing M-4 in Appendix C).

Air is provided through an underground distribution line to all of the other buildings on Campus. Satellite air compressors are located in several building to provide backup and redundancy for the central system. Additional capacity required for laboratory use is supplied by compressors in two buildings. An air compressor is located in the Arts and Music (AR) Machine Room to provide air to the art laboratories, and a separate compressor in SE provides clinical air for their labs. The central system does not serve the MK Building, which has a separate compressed air system. The original carbon steel distribution system experienced corrosion related failures in the last several years and has been replaced with copper pipe.

SUMMARY AND RECOMMENDATIONS

The central compressed air system is adequate to serve existing buildings. New HVAC controls are predominately electronic and compressed air usage is typically lower than in the past. Recommendations are to continue to maintain the central compressed air system until buildings are renovated or replaced. Generally, the only new buildings that will require any significant amount of compressed air will be the central and satellite heating and chiller plants and these should have building based air compressors installed. Some laboratory buildings may have compressed air requirements which can be provided with systems within the building.

NATURAL GAS SYSTEM (NG)

INTRODUCTION

Major gas transportation lines cross the edge of the Rockville Campus and Washington Gas and Light Company supplies natural gas to the Campus from connections on Mannakee Street. Distribution lines and meters on the Campus are owned by the WGL up to the buildings. Gas is presently purchased under interruptible service schedules, and the boilers in the HU central plant continue to the have capability of burning No. 2 fuel oil as a backup fuel to allow continuation of the price benefits of interruptible service. The WGL gas lines have been relocated due to the construction of the new Science Center. The existing service connections have been upgraded to a single high pressure 6-inch diameter HDPE pipe. The new line branches south and east to supply the new SC and intercept the existing carbon steel line to AR and MU. This small portion of carbon steel pipe is the only remaining gas piping from the original low pressure WGL system. Supplies of natural gas are more than adequate for Campus needs.

SUMMARY AND RECOMMENDATIONS

The current 6-inch natural gas main from Mannakee Street that feeds the Campus should be adequate for future building loads. A new uninterruptible gas line will need to be run to the New Student Services building central plant from the 6-inch line that currently serves the HU central plant. Also, a new uninterruptible gas line will need to be run to the new Library satellite heating plant and connected to the 6-inch line that currently serves the SC. The existing Campus house line system will generally remain in place. The gas line serving the AR Building is carbon steel material and should be replaced with cross linked polypropylene when the new Arts building is constructed.

BUILDING AUTOMATION SYSTEM (BAS)

INTRODUCTION

The building automation systems in service on the Rockville Campus use a combination of out-of-date electrical/pneumatic technology and newer DDC controls. DDC technology has been used in all new and renovated buildings since 1985 and since the early 2000s' building controls have been installed with BACnet open protocol architecture. The Campus controls network remains a mixture of electrical/pneumatic, legacy DDC and BACnet DDC

PREVIOUS MASTER PLAN

The 2006 Utility Master Plan recommended that existing individual building control systems be replaced with current technology networked to provide an integrated Campus control and monitoring BAS. All new and renovated buildings comply with the BACnet protocols and integrate building systems and components into a network using internet accessibility.

SUMMARY AND RECOMMENDATIONS

The existing individual building systems should be replaced with state-of-the-art systems networked to provide an integrated Campus control and monitoring system when buildings are renovated, replaced, and for new construction. Energy monitoring and automatic reporting features should allow staff to see natural gas, fuel oil, and electrical energy usage in the central plant and in individual buildings, as well as energy delivered by the central plant through the Campus chilled water and heating hot water systems. The BAS systems should provide output to a server with the capability of storing data and easily formatting and generating on demand and scheduled reports tailored to user needs. The system should directly control equipment or provide information to allow operators to make timely decisions to minimize energy consumption and cost.

ELECTRICAL SYSTEMS

SCOPE

The electrical systems section of the Utility Master Plan (UMP) includes changes made to existing campus facilities and coordinates with the 2006-2016 Facilities Master Plan for future facilities. Documentation of existing building fire alarm systems and of emergency telephone locations has been added, as well as Montgomery College requirements for new fire alarm systems.

INTRODUCTION

The Rockville Campus is located in Pepco's service territory and is served by two 13.2-kV overhead distribution feeders which form a loop around the Campus (Pepco feeders 14876 and 15069). This loop is formed by the arrangement of the feeders around Campus Drive, Mannakee Street, and Route 355. In addition to the two 13.2-kV feeders which serve the College, there are two other feeders in the vicinity (Pepco feeders 14879 and 15059) which are interconnected to the two feeders which serve the Campus. Having these additional feeders in the area should provide Pepco with the ability to switch loads between feeders and restore service more quickly when outages occur. Further, these feeders should give some confidence in Pepco's ability to serve future Rockville Campus growth. As load growth occurs, Pepco may be able to easily extend one or both feeders to provide additional capacity.

PREVIOUS STUDY

One of the primary electrical topics of the 2006 UMP was a discussion of the possible conversion from multi-point metering to single-point metering of utility company electrical energy. Functionally, this would result in the College then owning and maintaining the 13.2-kV campus distribution system.

At that time our decision to not recommend that the College undertake the conversion was influenced by a number of factors, including changes to the regulations governing the electric utility industry, Pepco's unwillingness to sell the existing campus primary distribution system to the College, and a life cycle cost analysis that indicated little economic advantage to one method of metering over the other. However, we did point out that this concept may be worth future reconsideration, dependent on further electricity regulation changes, the development of a long-term electricity purchase agreement, or significant changes to the Rockville Campus Facilities Master Plan. There have been no significant changes that would justify reconsideration of another similar study at this time, and therefore, multi-point versus single-point metering is not addressed in this update.

However, if multi-point metering versus single-point metering is reviewed again in the future, one option to consider, as addressed in the previous master plan, is to create a "virtual" single-point metering system in lieu of a physical single-point metering system. Essentially, this concept would involve the addition of College-owned metering to each Campus building. The metering should be capable of measuring electrical demand (kW) and energy use (kWh), at a minimum, with utility grade accuracy and have the ability to communicate with a central monitoring system which would record and store data. This data might be analyzed from a historical perspective, or perhaps transmitted real-time to an energy broker who could make recommendations to the College regarding system operation. Possible recommendations might include a change to the central plant operations schedule, the addition of electric power co-generation, or perhaps the utilization of emergency generators to shave the peak electrical demand. Peak shaving would minimize energy purchases during high demand charge periods, as well as flatten the College's load curve and possibly result in price incentives from generation suppliers. This is a concept that will certainly require further study and more detailed information. Nevertheless, the plan to begin the installation of building metering should be developed and implemented immediately. This will allow the College to begin collecting historical data for later use.

EXISTING CONDITIONS

All buildings are presently served by vault- or pad-mounted transformers which are fed by 13.2-kV underground distribution lines that tap off the overhead feeders. One underground tap crosses the entire Campus and creates a link between North Campus Drive and Mannakee Street. This underground link is operated as a normally open point, and is a tie point between Pepco feeders 15069 (North Campus Drive) and 14876 (Mannakee Street). See the single line diagram on Drawing E-1 in Appendix D for a representation of the present arrangement.

Most buildings are individually metered by Pepco. The Art and Music Buildings receive a single service, with one meter, which is located in the basement connecting passageway between the two buildings. The Child Care Center is sub-fed from the Science West service. The Canoe Trailer Shed (CN) is served from the Physical Education Center (PE) meter. The Humanities Building (HU) and the Central Plant in Humanities have separate meters.

SYSTEM IMPROVEMENTS

As part of the 2006 Utility Master Plan, a field inspection of each building's service entrance equipment was performed. Most of the equipment was found to be in good, serviceable condition. However, there were several conditions observed which still have not yet been addressed. Refer to the 2006 UMP for photos and additional details. These recommendations are listed again with priority levels established in the earlier UMP.

<u>Priority 1</u>: "Immediate Concerns: Should be undertaken immediately including violations of life safety, building, and electric codes."

1. The Pepco transformer vault located outside the Art and Music Buildings was flooded with water during the 2006 inspection, nearly to the transformer bushings. We understand that recommendations for addressing this problem have not been completed and are still valid. As this is Pepco property, the College's local representative should be contacted and notified of the problem.

<u>Priority 2</u>: "Short Term Concerns (1-2 years): Should be corrected in the near future to maintain the integrity of the building, including systems, which are functioning improperly or not at all, and problems that, if not addressed, will cause additional deterioration."

1. The electrical room in the Science West Building was quite damp resulting in risks to the switchboard. Since Science West is now being renovated it is anticipated that these concerns will be addressed in the renovation.

<u>Priority 3</u>: "Long Term Concerns (3-5 years): Should be corrected in the more distant future to maintain the integrity of the building, including systems that have exceeded their expected useful life, but are still functioning."

1. The Counseling and Advising Building, the Macklin Tower, and the Computer Science Building contain Federal Pacific Electric (FPE) switchboards. FPE equipment is no longer manufactured and replacement parts are expensive and difficult to obtain. In addition, the General Electric (GE) switchboard in the Physical Education Center has surpassed its expected useful life. These switchboards are still operational but do pose a concern. Each of these buildings is scheduled for demolition or renovation some years in the future. The College should monitor these switchboards closely to remain aware of problems that may arise, but plan to demolish or replace them in conjunction with the Facilities Master Plan for the respective building.
2. The fire alarm systems in the Physical Education Center and Science East are outdated and replacement is still recommended as part of future renovations if not before.

<u>Priority 4</u>: "Improvements: Required or desirable to bring the facility to perform as it should, including systems upgrades and aesthetic issues."

1. Consider the replacement of the 13.2-kV overhead feeder around Campus Drive with an underground feeder. This will allow for the planned overhead walkways from the Parking Garages, as well as improve the aesthetics of the Campus. This will require coordination with Pepco.

FUTURE ELECTRICAL SYSTEM

Based on the Rockville Campus Facilities Master Plan Update, there is a good deal of growth expected to occur in the near future. This growth will certainly have an impact on the Campus electrical system, and will therefore need to be considered in planning and budgeting. Based on the determination that single-point metering will not be implemented in the foreseeable future, the following summary of system improvements is based on the assumption that the electrical distribution system will remain a part of the Pepco grid.

Such significant electrical growth will require improvements to the Pepco electrical distribution system, and it will be important to provide load data to Pepco as it becomes available for each project. This data will allow system improvements to be made so that Pepco can ensure that system capacity exists for each new load that the College adds to the system. In addition, since Pepco will remain the owner and operator of the system, any desired modifications to the electrical distribution system on Campus will need to be designed or approved by Pepco.

Estimated loads have been calculated to determine if existing equipment has sufficient capacity to accept additional loading or if new equipment will be required. Service transformers have also been addressed, even though they will remain the responsibility of Pepco. They have been included since changes to the system, based on College construction, will likely result in construction costs that the College will need to reimburse to Pepco. These costs will also need to be budgeted for, so that specific building projects can be planned appropriately.

The projected electrical load increases have been calculated based on gross square foot values of new construction plus the addition of mechanical loads as shown in the mechanical portion of this Plan. The specific value of electrical load per square foot varies depending on the building function. Tabulating mechanical loads separately is required where indicated because this load represents new central plants to be constructed within the buildings. The new central plants will require separate electrical services from the building services. Where no mechanical load is indicated the new or renovated buildings are expected to be provided with heating and cooling by existing central plants.

Table 1 below includes a list of projects identified in the 2006-2016 Facilities Master Plan and the corresponding expected electrical load growth. This table does not show building demolition projects which can be seen in Table 6-1 in Appendix D.

Table 1
Future Electrical Load Increases

Building	Gross Square Footage Increase (GSF)	Total Future Electrical Load (kVA)	Mechanical (kVA)	Total Electrical Load Increase (kVA)
Science East	0	202	N/A	0
Computer Science	0	186	N/A	0
Campus Center	0	554	N/A	0
Physical Education Center Addition	35,800	179	N/A	179
Science West	20,994	220	N/A	73
Macklin Tower	0	330	N/A	0
Robert E. Parilla Performing Arts Center Addition	31,700	407	N/A	216
South Campus Instruction Building	0	56	N/A	0
Humanities & Social Sciences Building	124,000	496	N/A	496
New Child Care Center	6,900	28	N/A	28
New Student Services Center	120,400	482	1600	2082
Communication Arts Building	72,000	612	N/A	612
Technical Training and Automotive	84,000	840	N/A	840
Library Resource Center	131,000	1310	1000	2310
Mixed Arts Building	72,000	360	N/A	360
Physical Plant Building	30,100	181	N/A	181
Parking Garage No. 1	432,000	216	N/A	216
Parking Garage No. 2	108,000	54	N/A	54

Based on the load calculations above, following is a summary of transformer size requirements. For a complete listing of electrical demand data and transformer sizes for the entire Campus, please refer to Table 6-1 in Appendix D.

Science East Renovation and Addition, Computer Science Renovation, and Science West Renovation and Addition: An existing 1,000-kVA transformer provides service to the Science East, Computer Science and Science West buildings. Science East currently has a demand of 202 kVA. This demand isn't expected to change significantly as a result of the renovation and addition. Computer Science currently has a demand of 186 kVA. The building will be renovated, but will retain its existing square-footage. Therefore, the electrical demand for this building isn't expected to change significantly. Science West currently has a demand of 147 kVA. This demand will increase to 220 kVA as a result of the renovation and addition. The total demand after the renovations and additions will be 608 kVA (without consideration of diversity). Therefore, the existing 1000-kVA transformer has sufficient capacity to continue serving these three buildings.

Campus Center Renovation, Student Services Demolition, and Theatre Arts: An existing 1,000-kVA transformer provides service to the Campus Center, Student Services, and Theatre Arts buildings. The Campus Center building currently has a demand of 554 kVA. The building will be renovated, but will retain its existing square-footage. Therefore, the electrical demand for this building isn't expected to change significantly. The Student Services building currently has a demand of 34 kVA, however this building will be demolished. The Theatre Arts building currently has a demand of 128 kVA. There are no plans to modify the Theatre Arts building at this time. The total demand after the renovations, demolition and additions will be 682 kVA (without consideration of diversity). Therefore, the existing 1000-kVA transformer has sufficient capacity to continue serving these three buildings.

Physical Education Center Addition: The addition to the Physical Education Center will add 179 kVA demand to the existing 500-kVA service transformer serving the existing building. The Physical Education Center currently has a demand of 232 kVA. Therefore, the total demand on the service transformer after the addition is completed will be 411 kVA. It is recommended that the existing 500-kVA transformer replaced by a 750-kVA transformer to serve the existing Physical Education Center plus the addition.

Macklin Tower Renovation: The Macklin Tower building currently has a demand of 330 kVA. The building will be renovated, but will retain its existing square-footage. Therefore, the electrical demand for this building isn't expected to change significantly. Therefore, the existing 1000-kVA service transformer has sufficient capacity to continue serving the building.

Robert E. Parilla Performing Arts Center: The existing building will be renovated and expanded in size with a 31,700 GSF addition. The building is presently served by a 300-kVA transformer. The new expanded building is expected to have a demand of 407 kVA. This new expanded building will require a new 750-kVA transformer.

South Campus Instruction Building Renovation: The South Campus Instruction Building currently has a demand of 56 kVA. The building will be renovated, but will retain its existing square-footage and the electrical demand for this building isn't expected to change significantly. Therefore, the existing 500-kVA service transformer has sufficient capacity to continue serving the building.

Humanities & Social Sciences Building: The Technical Center Building will be demolished and replaced by the new Humanities & Social Sciences Building. The Technical Center Building has a demand of 153 kW and is served by a 500-kVA transformer. The new replacement building will have a larger footprint and is expected to have a demand of 496 kVA. This new larger building will require a new 750-kVA transformer.

Child Care Center: The existing Child Care Center will be demolished and replaced by a new larger Child Care Center. The existing building is served by a feeder from the Science West Building. The replacement Child Care Center shall be separated from the Science West Building and served by its own service transformer. The new building is expected to have a demand of 28 kVA. This new building will require a new 75-kVA transformer.

New Student Services Center: This will be a new building with an expected demand of 482-kVA. This building will require a new 750-kVA transformer. A new central plant will also be located in this building. It is estimated that the expected demand of the new central plant will be 1600 kVA. The new central plant will be on a separate service from the building and will require a new 2000-kVA transformer.

Communication Arts Building: This will be a new building with an expected demand of 612 kVA. This building will require a new 750-kVA transformer. The existing Counseling & Advising Building will be demolished to create space for the construction of the new Communication Arts Building.

Technical Training and Automotive Building: This will be a new building with an expected demand of 840 kVA. This building will require a new 1000-kVA transformer. The existing Interim Technology Training Center will be demolished to create space for the construction of the new Technical Training and Automotive Building.

Mixed Arts Building: This will be a new building with an expected demand of 360 kVA. This building will require a new 500-kVA transformer.

Library Resources Center: This will be a new building with an expected demand of 1310 kVA. This building will require a new 2000-kVA transformer. A new central plant will also be located in this building. It is estimated that the expected demand of the new central plant will be 1000 kVA. The new central plant will be on a separate service from the building and will require a new 1500-kVA transformer.

Physical Plant Building: This will be a new building with an expected demand of 181 kVA. This building will require a new 225-kVA transformer.

Parking Garage No. 1: This will be a new structure with an expected demand of 216 kVA. This building will require a new 300-kVA transformer.

Parking Garage No. 2: This will be a new structure with an expected demand of 54 kVA. This building will require a new 75-kVA transformer.

ON-SITE ELECTRICAL GENERATION

The Rockville Campus presently has a number of small diesel and natural gas generators which are designed to provide emergency power for life safety functions (i.e., emergency egress lighting, fire alarm, etc.) in the event of a utility power failure. In addition, several buildings are equipped with battery/inverter systems for the express purpose of providing emergency egress lighting. These systems are tabulated on Table 6-1 in Appendix D.

One concept that the College may consider is the option of a greater magnitude of electricity generation and not just in periods of the loss of utility power. With the existence of the central heating and cooling plant it may be cost effective to incorporate combined heat and power (CHP) generation. CHP or co-generation can increase the thermal efficiency of the fuel used and would provide a method for peak-shaving of the Pepco demand charges. Co-generation allows the generation of electricity 24 hours a day and also generates hot water for use in the central system.

In such a scenario, the College might be eligible for energy efficiency credits or grants. A secondary motivation may be to use such a facility as a teaching tool, if such programs exist, or to further enhance the College's status as an environmental leader. In addition, on-site generation provides a measure of security during utility outages. An impediment to cogeneration would be the fact that PEPCO owns the distribution system and the likely requirement for a power purchase agreement to be negotiated. Further study would be required to determine the economics and technicalities of a specific design concept.

INFORMATION TECHNOLOGY (IT) SYSTEM

The Rockville Campus has an extensive network of communications infrastructure which links most of the buildings. As expected, the importance of this infrastructure is increasing rapidly and systems demands are growing. A thorough analysis of this system is not within the scope of this Plan, but existing College records have been reviewed and a drawing of the complete IT system has been compiled and included as Drawing E-5 in Appendix D of this report.

FIRE ALARM SYSTEMS

The original campus buildings were built with electrical fire alarm systems with sensors, pull stations and alarms all hard wired to a base station cabinet. In newer or renovated buildings electronic systems have been installed with most recent systems having programmable and addressable devices which can provide fault detection capabilities and audible notification. The high priority recommendation of the VFA, Inc. study identified fire alarm systems that required upgrade and emergency response planning, and required building and campus-wide emergency notification capabilities. Open protocol communications capabilities such as ASHRAE BACnet also allow integration of these systems with the BAS to provide maintenance supervisory capabilities. New fire alarm systems are also being connected to remote UL/NFPA monitoring facilities to provide supervisory capabilities that meet code requirements.

The manufacturer and model of the current fire alarm systems, by building, on the Rockville Campus are as follows:

Bldg. No.	Building Name	Manufacturer and Model
208	Humanities (HU)	Simplex 4020
208	Central Plant	Simplex 4204-2
204	Computer Science (CS)	FCI-M# BMFC-6 Rev T
221	Student Services (SV)	Simplex 4204-2
202	Campus Center (CC)	Simplex 4100U
215	Physical Education Center (PE)	Simplex 1204-2
223	Theatre Arts Building (TA)	Simplex 4100U
222	Technical Center (TC)	THORN M-200
205	Counseling & Advising (CB)	Simplex 4002
219	Science West (SW)	Simplex 4002
212	Music Building (MU)	Simplex 4020
201	Paul Peck Art Building (AR)	Siemens/Pyrotronics MXL-IQ
206	Macklin Tower (MT)	Simplex 4100U
213	Parilla Performing Arts Center (PA)	Simplex 4100U
203	Child Care Center (CH)	ESL-1500
209	Interim Tech. Training Center (TT)	Simplex 4001
207	Homer S. Gudelsky Institute (GU)	Pyrotronics System III

211	Mannakee Building (MK)	Simplex 2001
220	So. Campus Instruction Bldg. (SB)	Simplex 4020-4009
217	Science Center (SC)	Simplex 4100U

EMERGENCY PHONES

Emergency phone stations with visual beacon lights attached to the tops are presently deployed around the campus. A thorough discussion of this system is not within the scope of this Plan, but existing College records have been reviewed and a drawing has been compiled showing the exterior emergency phone stations and included as Drawing E-6 in Appendix D of this report.

SUMMARY AND RECOMMENDATIONS

Replace 13.2 kV Overhead Feeder around Campus Drive with an underground feeder. Extend 13.2 kV Electrical Distribution System as required for new buildings. As new buildings are constructed and major renovations take place, the underground 13.2 kV distribution system should be upgraded to provide loops throughout Campus. This will allow buildings to be fed from either end of a loop, which will minimize the duration of outages should part of a loop fail. Replace Obsolete Electrical Service Equipment in the Macklin Tower and the Computer Science Building when these buildings are renovated. Install Metering in the Campus Buildings not presently metered.

Montgomery College Rockville Utility Master Plan Existing Facilities Data
TABLE 1-1 UTILITY SUMMARY SHEETS
Wiley|Wilson Commission No.: 211130.00

Printed: 12/13/2012 17:18

Revised: 2/2/2012

Note: In year built/renovated column, the construction/renovation dates are completion year

Building Number	Building Code	Building Name	Building Function	Year Built	Year Renovated	Building Size (GSF)	Domestic Water Load (GPM)	Fire Water Flow (GPM)	Sanitary Sewer Load (GPM)	Cooling Load (Tons) R	Heating Load (MBH)	Compressed Air / Instr. Air Load (SCFM)	Natural Gas Requirement (MCFH)	Natural Gas (Therms)	Electrical Demand (kW)
Existing Utility Conditions (2011)															
208	HU	Humanities	Classrooms, Offices, Auditorium, Central Plant	1966	90s, 00s	73,912	164	3,000	105	175	1,697	0	0	425,375.0	165.4
208A	HU-CP	Central Plant	Central Cooling and Heating Plant	1966	1996										1018.4
218	SE	Science East	Classrooms, Offices, Labs, Greenhouse	1966	---	53,737	140	3,000	119	130	1,333	0	0	2,000.0	201.6
204	CS	Computer Science	Classrooms, Offices, Computer Center	1966	Partial	20,862	63	1,750	64	64	595	0	0	---	186.2
221	SV	Student Services	Offices, Admissions, Student Aid, Records	1966	---	10,448	57	1,500	52	41	478	0	0	---	34.1
202	CC	Campus Center	Cafeteria, Bookstore, Recreational, Administrative	1966	00s	74,302	134	3,000	104	241	2,240	0	0	20,175.8	554.4
215	PE	Physical Education	Gym, Pool, Offices, Classrooms	1966	---	84,949	223	3,500	210	208	2,819	0	0	---	232.3
223	TA	Theatre Arts	Classrooms, Theatre	1966	Mid 90s	35,032	105	2,500	91	117	1,092	0	0	---	127.8
222	TC	Technical Center	Classrooms, Offices, TV Studios, Auditorium	1966	---	55,908	113	3,000	95	149	1,550	0	0	---	152.6
205	CB	Counseling & Advising	Offices, Security	1969	---	17,696	80	1,500	76	58	624	0	0	---	57.6
219	SW	Science West	Classrooms, Offices, Labs	1971	---	41,988	115	3,000	101	122	1,246	0	0	2,000.0	147.0
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	2002	20,499	54	1,750	45	82	799	0	0	828.0	129.6
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	2000	25,594	55	1,750	47	79	773	0	0		
206	MT	Gordon & Marilyn Macklin Tower	Library, Classrooms, Offices, TV Studios	1971	Mid 90s	117,282	148	3,500	130	323	3,249	0	0	---	330.2
213	PA	Parilla Performing Arts Center	Theatre	1984	---	28,000	107	2,250	85	93	874	0	0	---	190.8
203	CH	Child Care Center	Child Care	1986	---	2,498	40	750	51	8	72	0	0	---	UNK
209	TT	Interim Technical Training Center	Auto Shops, offices, building trades labs	1988	---	9,360	36	3,500	36	23	234	0	0	---	97.9
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	---	4,720	41	2,250	32	11	50	0	0	---	49.2
207	GU	Gudelsky Institute for Tech Education	Classrooms, Offices	1992	---	64,000	108	3,500	80	187	2,112	0	0	---	172.8
211	MK	Mannakee Building	Administrative Offices/Meeting Rooms	1985	---	42,102	87	2,250	68	165	1,937	0	0	8,513.0	285.0
216	CN	Canoe Trailer Shed	Shed	1990	---	420	15	500	12	---	---	0	0	---	UNK
220	SB	South Campus Instruction Building	Classrooms, Offices	1996	---	29,900	5	1,750	61	92	897	0	0	---	55.7
---	---	Grandstand	Grandstand / Concessions / Restroom	1994	---	240	15	0	12	---	---	0	0	---	N/A
217	SC	Science Center	Laboratories, Classrooms	2011	---	140,700	155	4,000	115	518	---	0	0	??	768.0
			Total Bldg Loads			954,149	2,061		1,789	2,885	29,252				4956.6
			Campus Block Loads				1,443		1,252	2,164	21,939			458,890.0	

Montgomery College Rockville Utility Master Plan Future Facilities Data

TABLE 1-2 UTILITY SUMMARY SHEETS

Wiley|Wilson Commission No.: 211130.00

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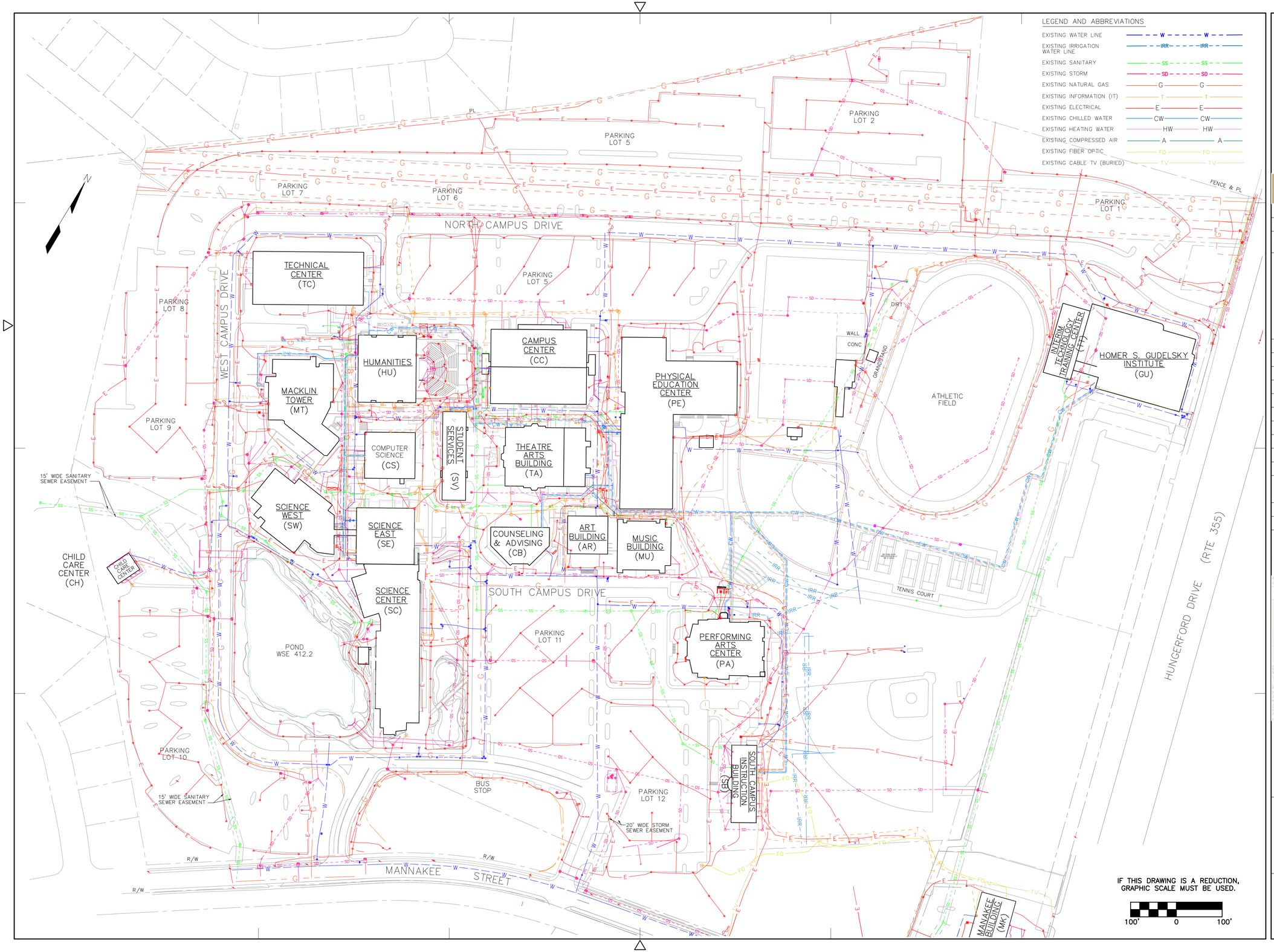
Revised: 12/13/2012

Note: In year built/renovated column, the construction/renovation dates are completed year

Building Number	Building Code	Building Name	Building Function	Year Built/ Proposed Build	Year Renovated/ Demolished	Building Size (GSF)	Domestic Water Load (GPM)	Fire Water Flow (GPM)	Sanitary Sewer Load (GPM)	Cooling Load (Tons) R	Heating Load (MBH)	Compressed Air / Instr. Air Load (SCFM)	Natural Gas Requirement (MCFH)	Natural Gas (Therms)	Electrical Demand (kW)
Future Utility Conditions (Reference 2006 - 2016 Facilities Master Plan Proposed Facilities)															
208	HU	Humanities Building	Classrooms, Offices, Auditorium, Central Plant	1966	---	73,912	164	3,000	105	175	1,700	0	0	425,375.0	165.4
208	-	Central Plant in Humanities	Central Cooling and Heating Plant		---										1018.4
218	**SE**	**Science East Building, Renovation and Addition**	**Classrooms, Offices, Labs, Greenhouse**	**1966**	**2014**	**57,237**	**140**	**3,000**	**119**	**130**	**1,343**	**0**	**0**	**2,000**	**201.6**
204	**CS**	**Computer Science Building, Renovation**	**Classrooms, Offices, Computer Center**	**1966**	**Partial/TBD**	**20,862**	**63**	**1,750**	**64**	**64**	**605**	**0**	**0**	**---**	**186.2**
221	**SV**	**Student Services, Demolished**	**Offices, Admissions, Student Aid, Records**	**1966**	**TBD**										
202	**CC**	**Campus Center, Renovation**	**Cafeteria, Bookstore, Recreational, Administrative**	**1966**	**2020**	**74,302**	**134**	**3,000**	**104**	**241**	**2,229**	**0**	**0**	**20,176**	**554.4**
215	PE	Physical Education	Gym, Pool, Offices, Classrooms	1966	---	84,949	223	3,500	210	208	2,803	0	0	---	232.3
215	**PE**	**Physical Education Addition**	Offices, Classrooms	TBD	---	**35,800**									107.4
223	TA	Theatre Arts	Classrooms, Theatre	1966	---	35,032	105	2,500	91	117	1,086	0	0	---	127.8
222	**TC**	**Technical Center, Demolished**	**Classrooms, Offices, TV Studios, Auditorium**	**1966**	**TBD**										
205	**CB**	**Counseling & Advising, Demolished**	**Classrooms, Security**	**1969**	**TBD**										
219	**SW**	**Science West, Renovation and Addition**	**Classrooms, Offices, Labs**	**1971**	**2016**	**62,982**	**115**	**3,000**	**101**	**184**	**1,246**	**0**	**0**	**2,000**	**220.4**
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	---	20,499	54	1,750	45	82	799	0	0	828.0	129.6
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	---	25,594	55	1,750	47	79	768	0	0		
206	**MT**	**Gordon & Marilyn Macklin Tower, Renovation**	**Library, Classrooms, Offices, TV Studios**	**1971**	**TBD**	**117,282**	**148**	**3,500**	**130**	**323**	**3,284**	**0**	**0**	**---**	**330.2**
213	**PA**	**Parilla Performing Arts Center, Existing & Addition**	**Theatre**	**1984**	**TBD**	**59,700**	**107**	**2,250**	**85**	**199**	**868**	**0**	**0**	**---**	**597.6**
203	**CH**	**Child Care Center, Demolished**	**Child Care**	**1986**	**TBD**										
209	**TT**	**Interim Technical Training Center, Demolish**	**Auto Shops, Offices, Building Trades Labs**	**1988**	**TBD**	**9,360**	**36**	**3,500**	**36**	**---**	**#VALUE!**	**0**	**0**	**---**	**-**
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	---	4,720	41	2,250	32	11	50	0	0	---	49.2
207	GU	Gudelsky Institute for Tech Education	Classrooms, Offices	1992	---	64,000	108	3,500	80	187	2,112	0	0	---	172.8
211	MK	Mannakee	Administrative Offices/Meeting Rooms	1985	---	42,102	87	2,250	68	165	1,937	0	0	8,513.0	285.0
216	CN	Canoe Trailer Shed	Shed	1990	---	420	15	500	12	---	---	0	0	---	UNK
220	**SB**	**South Campus Instruction Building Renovation**	**Classrooms, Offices**	**1996**	**2017**	**29,900**	**5**	**1,750**	**61**	**92**	**897**	**0**	**0**	**---**	**55.7**
---	---	Grandstand	Grandstand / Concessions / Restroom	1994	---	240	15	0	12	---	#VALUE!	0	0	---	N/A
217	SC	Science Center	Laboratories, Classrooms	2011	---	140,700		0	0	439	---	0	0	---	768.0
TBD	**---**	**Humanities & Social Sciences**		**TBD**	**---**	**124,000**		**0**	**0**	**382**	**3,720**	**0**	**0**	**---**	**496.0**
TBD	**CH**	**New Child Care Center**		**TBD**	**---**	**6,900**		**0**	**0**	**21**	207	**0**	**0**	**---**	**28.0**
TBD	**SV**	**New Student Services Center (SV)**	**Offices**	**2017**	**---**	**120,400**		**0**	**0**	**355**	---	**0**	**0**	**---**	**481.9**
TBD	**---**	**Communication Arts**		**TBD**	**---**	**72,000**		**0**	**0**	**222**	**2,160**	**0**	**0**	**---**	**360.0**
TBD	**---**	**Technical Training and Automotive ( )**	**Classrooms, automotive shops**	**TBD**	**---**	**84,000**		**0**	**0**	**148**	2,520	**0**	**0**	**---**	**840.0**
TBD	**---**	**Library Resource Center**	**Library, Patron Lounge**	**TBD**	**---**	**131,000**		**0**	**0**	**417**	---	**0**	**0**	**---**	**1310.0**
TBD	**---**	**Mixed Arts**	**Classrooms, Labs and Exhibit Spaces**	**TBD**	**---**	**72,000**		**0**	**0**	**222**	**2,160**	**0**	**0**	**---**	**360.0**
TBD	**---**	**Physical Plant**	**Maintenance Areas, Offices**	**TBD**	**---**	**30,100**		**0**	**0**	**31**	903	**0**	**0**	**---**	**181.0**
TBD	**---**	**Parking Garage No. 1 (Garage North)**	**Parking for 680** cars	**TBD**	**---**	**432,000**		**0**	**1,674**	**---**	---	**0**	**0**	**---**	**216.0**
TBD	**---**	**Parking Garage No. 2 (Garage South)**	**Parking for 518** cars	**TBD**	**---**	**108,000**		**0**	**1,172**	**---**	---	**0**	**0**	**---**	**54.0**
						1,599,993	1,906		1,674	4,598	45,160				9528.9
							1,334		1,172	3,448	33,870			458,890.0	

Abbreviations:

GSF	gross square feet
GPM	gallons per minute
Block load	load after reducing peak load to account for diversity (non-coincident peak usages)
Btu	British Thermal Unit
Btu/SF*Hr	British Thermal Units per square foot per hour
LTHW	Low temperature hot water
HW	Hot water
CW	Chilled water
Hp	Horsepower
SCFM	standard cubic foot per minute
kW	kilowatts
kVA	kilovolt-amperes



Montgomery College

Central Administration
Office of Facilities
900 Hungerford Drive
Rockville, Md 20850
Telephone: (301)-251-7363

Montgomery College
endless possibilities

Drawn By: JLW	Ckd By: ETH
Designed By: ETH	Approved By: SMT

Notes

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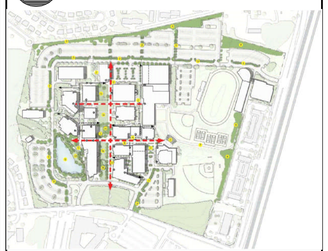
Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

UTILITIES SITE PLAN
EXISTING CONDITIONS

Scale: 1" = 100'

Project No.

Date
12/13/12

Drawing Number
C-1

MC Facilities No.

Montgomery College Rockville Utility Master Plan Existing Facilities Data

Table 2-1A Domestic Water

Wiley|Wilson Commission No.: 211130.00

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Revised: 2/2/2012

Note: In year built/renovated column, the construction/renovation dates are completion year

Building Number	Building Code	Building Name	Building Function	Year Built	Year Renovated	Building Size (GSF)	Fixture Units (Number)	Fixture Units (GPM)	Hose Bib & Wall Hydrant (GPM)	Cooling Tower (GPM)	Boilers (GPM)	Peak Building Domestic Water Load (GPM)	Building Peak System Load @ 70% (GPM)
Existing Utility Conditions (2011)													
208	HU	Humanities	Classrooms, Offices, Auditorium, Central Plant	1966	90s, 00s	73,912	329	113.5	10	25.0	15	163.5	114.5
208	HU	Central Plant	Central Cooling and Heating Plant	1966	1996								
218	SE	Science East	Classrooms, Offices, Labs, Greenhouse	1966	---	53,737	365	120.4	10	10.0	0	140.4	98.3
204	CS	Computer Science	Classrooms, Offices, Computer Center	1966	Partial	20,862	70	57.6	5	0.0	0	62.6	43.8
221	SV	Student Services	Offices, Admissions, Student Aid, Records	1966	---	10,448	54	52.2	5	0.0	0	57.2	40.0
202	CC	Campus Center	Cafeteria, Bookstore, Recreational, Administrative	1966	00s	74,302	318	111.4	5	18.0	0	134.4	94.1
215	PE	Physical Education Center	Gym, Pool, Offices, Classrooms	1966	---	84,949	1,068	213.4	10	0.0	0	223.4	156.4
223	TA	Theatre Arts Building	Classrooms, Theatre	1966	Mid 90s	35,032	248	99.9	5	0.0	0	104.9	73.4
222	TC	Technical Center	Classrooms, Offices, TV Studios, Auditorium	1966	---	55,908	269	103.2	10	0.0	0	113.2	79.2
205	CB	Counseling & Advising	Offices, Security	1969	---	17,696	128	74.8	5	0.0	0	79.8	55.9
219	SW	Science West	Classrooms, Offices, Labs	1971	---	41,988	279	104.7	10	0.0	0	114.7	80.3
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	2002	21,050	48	49.4	5	0.0	0	54.4	38.1
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	2000	25,594	50	50.0	5	0.0	0	55.0	38.5
206	MT	Macklin Tower	Library, Classrooms, Offices, TV Studios	1971	Mid 90s	117,282	481	137.9	10	0.0	0	147.9	103.5
213	PA	Parilla Performing Arts Center	Theatre	1984	---	28,000	211	92.4	5	10.0	0	107.4	75.2
203	CH	Child Care Center	Child Care	1986	---	2,498	28	40.0	0	0.0	0	40.0	28.0
209	TT	Interim Technical Training Center	Auto Shops, offices, building trades labs	1988	---	9,360	15	31.0	5	0.0	0	36.0	25.2
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	---	4,720	23	36.0	5	0.0	0	41.0	28.7
207	GU	Gudelsky Institute for Technical Education	Classrooms, Offices	1992	---	64,000	242	98.0	10	0.0	0	108.0	75.6
211	MK	Mannakee Building	Administrative Offices/Meeting Rooms	1985	---	42,102	162	82.0	5	0.0	0	87.0	60.9
216	CN	Canoe Trailer Shed	Shed	1990	---	420	5	15.0	0	0.0	0	15.0	10.5
220	SB	South Campus Instruction Building	Classrooms, Offices	1996	---	29,900	125		5	0.0	0	5.0	3.5
TBD	TBD	Scoreboard	Grandstand / Concessions / Restroom	1994	---	240	5	15.0	0	0.0	0	15.0	10.5
217	SC	Science Center	Laboratories, Classrooms	2011	---	140,700	517	145.0	10	0.0	0	155.0	108.5
			Total Connected Bldg Loads						Total Connected Peak Gpm			2,060.80	1442.56
			Campus Block Loads						Campus Block Peak Load			1,442.56	

Montgomery College Rockville Utility Master Plan Existing Facilities Data

TABLE 2-1B Fire Water

Wiley|Wilson Commission No.: 211130.00

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Revised: 2/2/2012

Note: In year built/renovated column, the construction/renovation dates are completion year

Building Number	Building Code	Building Name	Building Function	Year Built	Year Renovated	Building Size (GSF)	Fire Flow 1991 ISO (GPM)	Fire Flow 2004 ISO (GPM)
Existing Utility Conditions (2011)								
208	HU	Humanities	Classrooms, Offices, Auditorium, Central Plant	1966	90s, 00s	73,912	3,750	3,000
208	HU	Central Plant	Central Cooling and Heating Plant	1966	1996			
218	SE	Science East	Classrooms, Offices, Labs, Greenhouse	1966	---	53,737	3,250	3,000
204	CS	Computer Science	Classrooms, Offices, Computer Center	1966	Partial	20,862	2,250	1,750
221	SV	Student Services	Offices, Admissions, Student Aid, Records	1966	---	10,448	2,250	1,500
202	CC	Campus Center	Cafeteria, Bookstore, Recreational, Administrative	1966	00s	74,302	3,250	3,000
215	PE	Physical Education Center	Gym, Pool, Offices, Classrooms	1966	---	84,949	5,500	3,500
223	TA	Theatre Arts Building	Classrooms, Theatre	1966	Mid 90s	35,032	3,000	2,500
222	TC	Technical Center	Classrooms, Offices, TV Studios, Auditorium	1966	---	55,908	3,000	3,000
205	CB	Counseling & Advising	Offices, Security	1969	---	17,696	2,000	1,500
219	SW	Science West	Classrooms, Offices, Labs	1971	---	41,988	3,000	3,000
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	2002	21,050	---	1,750
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	2000	25,594	4,000	1,750
206	MT	Macklin Tower	Library, Classrooms, Offices, TV Studios	1971	Mid 90s	117,282	5,250	3,500
213	PA	Parilla Performing Arts Center	Theatre	1984	---	28,000	1,750	2,250
203	CH	Child Care Center	Child Care	1986	---	2,498	1,250	750
209	TT	Interim Technical Training Center	Auto Shops, offices, building trades labs	1988	---	9,360	2,500	3,500
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	---	4,720	1,750	2,250
207	GU	Gudelsky Institute for Technical Education	Classrooms, Offices	1992	---	64,000	3,500	3,500
211	MK	Mannakee Building	Administrative Offices/Meeting Rooms	1985	---	42,102	3,000	2,250
216	CN	Canoe Trailer Shed	Shed	1990	---	420	500	500
220	SB	South Campus Instruction Building	Classrooms, Offices	1996	---	29,900	3,000	1,750
TBD	TBD	Scoreboard	Grandstand / Concessions / Restroom	1994	---	240	0	0
217	SC	Science Center	Laboratories, Classrooms	2011	0	140,700	-----	4,000

Montgomery College Rockville Utility Master Plan Existing Facilities Data

Table 3-1 Sanitary Sewer

Wiley|Wilson Commission No.: 211130.00

Wiley|Wilson Constant Progress

Printed: 12/13/12 5:23 PM

Revised: 2/2/2012

Note: In year built/renovated column, the construction/renovation dates are completion year

Building Number	Building Code	Building Name	Building Function	Year Built	Year Renovated	Building Size (GSF)	Fixture Units (Number)	Total Flow (GPM)	System Load @ 70%
Existing Utility Conditions (2011)									
208	HU	Humanities	Classrooms, Offices, Auditorium, Central Plant	1966	90s, 00s	73,912	279	104.7	73.3
208	HU	Central Plant	Central Cooling and Heating Plant	1966	1996				
218	SE	Science East	Classrooms, Offices, Labs, Greenhouse	1966	---	53,737	135	118.6	83.0
204	CS	Computer Science	Classrooms, Offices, Computer Center	1966	Partial	20,862	89	64.3	45.0
221	SV	Student Services	Offices, Admissions, Student Aid, Records	1966	---	10,448	52	51.6	36.1
202	CC	Campus Center	Cafeteria, Bookstore, Recreational, Administrative	1966	00s	74,302	276	104.3	73.0
215	PE	Physical Education Center	Gym, Pool, Offices, Classrooms	1966	---	84,949	1,021	209.7	146.8
223	TA	Theatre Arts Building	Classrooms, Theatre	1966	Mid 90s	35,032	205	91.1	63.8
222	TC	Technical Center	Classrooms, Offices, TV Studios, Auditorium	1966	---	55,908	221	94.6	66.2
205	CB	Counseling & Advising	Offices, Security	1969	---	17,696	132	75.6	52.9
219	SW	Science West	Classrooms, Offices, Labs	1971	---	41,988	256	101.1	70.8
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	2002	21,050	108	44.5	31.2
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	2000	25,594	118	47.0	32.9
206	MT	Macklin Tower	Library, Classrooms, Offices, TV Studios	1971	Mid 90s	117,282	428	130.2	91.1
213	PA	Parilla Performing Arts Center	Theatre	1984	---	28,000	178	85.0	59.5
203	CH	Child Care Center	Child Care	1986	---	2,498	50	51.0	35.7
209	TT	Interim Technical Training Center	Auto Shops, offices, building trades labs	1988	---	9,360	22	36.0	25.2
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	---	4,720	16	32.0	22.4
207	GU	Gudelsky Institute for Technical Education	Classrooms, Offices	1992	---	64,000	154	80.0	56.0
211	MK	Mannakee Building	Administrative Offices/Meeting Rooms	1985	---	42,102	104	68.0	47.6
216	CN	Canoe Trailer Shed	Shed	1990	---	420	7	11.8	8.3
220	SB	South Campus Instruction Building	Classrooms, Offices	1996	---	29,900	81	61.2	42.8
TBD	TBD	Scoreboard	Grandstand / Concessions / Restroom	1994	---	240	7	11.8	8.3
217	SC	Science Center	Laboratories, Classrooms	2011	---	140,700	329	115.0	80.5
					Total Connected Building Load (GPM)			1,789.1	1,252.4
						Campus Block Load (GPM)		1,252.4	

Montgomery College Rockville Utility Master Plan Future Facilities Data

Table 2-2A Domestic Water

Wiley|Wilson Commission No.: 211130.00

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Revised: 12/13/2012

Note: In year built/renovated column, the construction/renovation dates are completed year

Building Number	Building Code	Building Name	Building Function	Year Built/ Proposed Build	Year Renovated/ Demolished	Building Size (GSF)	Fixture Units (Number)	Fixture Units (GPM)	Hose Bib & Wall Hydrant (GPM)	Cooling Tower (GPM)	Boilers (GPM)	Peak Building Domestic Water Load (GPM)	Building Peak System Load @ 70% (GPM)
Future Utility Conditions (Reference 2006 - 2016 Facilities Master Plan Proposed Facilities)													
208	HU	Humanities Building	Classrooms, Offices, Auditorium, Central Plant	1966	---	73,912	329	113.5	10	25.0	15	163.5	114.5
208	-	Central Plant in Humanities	Central Cooling and Heating Plant		---								
218	**SE**	**Science East Building, Renovation and Addition**	**Classrooms, Offices, Labs, Greenhouse**	**1966**	**2014**	**57,237**	**365**	**120.4**	**10**	**10.0**	**0**	**140.4**	**98.3**
204	**CS**	**Computer Science Building, Renovation**	**Classrooms, Offices, Computer Center**	**1966**	**Partial/TBD**	**20,862**	**70**	**57.6**	**5**	**0.0**	**0**	**62.6**	**43.8**
221	**SV**	**Student Services, Demolished**	**Offices, Admissions, Student Aid, Records**	**1966**	**TBD**	**-**	**54**	**52.2**	**5**	**0.0**	**0**	**57.2**	**40.0**
202	**CC**	**Campus Center, Renovation**	**Cafeteria, Bookstore, Recreational, Administrative**	**1966**	**2020**	**74,302**	**318**	**111.4**	**5**	**18.0**	**0**	**134.4**	**94.1**
215	PE	Physical Education	Gym, Pool, Offices, Classrooms	1966	---	84,949	1,068	213.4	10	0.0	0	223.4	156.4
215	PE	Physical Education Addition	Offices, Classrooms	TBD	---	35,800	306	108.0	5	0.0	0	113.0	79.1
223	TA	Theatre Arts	Classrooms, Theatre	1966	---	35,032	248	99.9	5	0.0	0	104.9	73.4
222	**TC**	**Technical Center, Demolished**	**Classrooms, Offices, TV Studios, Auditorium**	**1966**	**TBD**	**-**	**269**	**103.2**	**10**	**0.0**	**0**	**113.2**	**79.2**
205	**CB**	**Counseling & Advising, Demolished**	**Classrooms, Security**	**1969**	**TBD**	**-**	**128**	**74.8**	**5**	**0.0**	**0**	**79.8**	**55.9**
219	**SW**	**Science West, Renovation and Addition**	**Classrooms, Offices, Labs**	**1971**	**2016**	**62,982**	**279**	**104.7**	**10**	**0.0**	**0**	**114.7**	**80.3**
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	---	20,499	48	49.4	5	0.0	0	54.4	38.1
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	---	25,594	50	50.0	5	0.0	0	55.0	38.5
206	**MT**	**Gordon & Marilyn Macklin Tower, Renovation**	**Library, Classrooms, Offices, TV Studios**	**1971**	**TBD**	**117,282**	**481**	**137.9**	**10**	**0.0**	**0**	**147.9**	**103.5**
213	**PA**	**Parilla Performing Arts Center, Existing & Addition**	**Theatre**	**1984**	**TBD**	**59,700**	**211**	**92.4**	**5**	**10.0**	**0**	**107.4**	**75.2**
203	**CH**	**Child Care Center, Demolished**	**Child Care**	**1986**	**TBD**	**-**	**28**	**40.0**	**0**	**0.0**	**0**	**40.0**	**28.0**
209	**TT**	**Interim Technical Training Center, Demolish**	**Auto Shops, Offices, Building Trades Labs**	**1988**	**TBD**	**9,360**	**15**	**31.0**	**5**	**0.0**	**0**	**36.0**	**25.2**
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	---	4,720	23	36.0	5	0.0	0	41.0	28.7
207	GU	Gudelsky Institute for Tech Education	Classrooms, Offices	1992	---	64,000	242	98.0	10	0.0	0	108.0	75.6
211	MK	Mannakee	Administrative Offices/Meeting Rooms	1985	---	42,102	162	82.0	5	0.0	0	87.0	60.9
216	CN	Canoe Trailer Shed	Shed	1990	---	420	5	15.0	0	0.0	0	15.0	10.5
220	**SB**	**South Campus Instruction Building Renovation**	**Classrooms, Offices**	**1996**	**2017**	**29,900**	**125**	**73.0**	**5**	**0.0**	**0**	**78.0**	**54.6**
---	---	Grandstand	Grandstand / Concessions / Restroom	1994	---	240	5	15.0	0	0.0	0	15.0	10.5
217	SC	Science Center	Laboratories, Classrooms	2011	---	140,700	517	145.0	10	0.0	0	155.0	108.5
TBD	**---**	**Humanities & Social Sciences**		**TBD**	**---**	**124,000**	**400**	**128.0**	**10**	**0.0**	**0**	**138.0**	**96.6**
TBD	**CH**	**New Child Care Center**		**TBD**	**---**	**6,900**						**0.0**	**0.0**
TBD	**SV**	**New Student Services Center**	**Offices**	**2017**	**---**	**120,400**	**278**	**106.0**	**10**	**25.0**	**15**	**156.0**	**109.2**
TBD	**---**	**Communication Arts**		**TBD**	**---**	**72,000**	**278**	**105.0**	**10**	**0.0**	**0**	**115.0**	**80.5**
TBD	**---**	**Technical Training and Automotive ( )**	**Classrooms, automotive shops**	**TBD**	**---**	**84,000**	**269**	**103.2**	**10**	**0.0**	**0**	**113.2**	**79.2**
TBD	**---**	**Library Resource Center**	**Library, Patron Lounge**	**TBD**	**---**	**131,000**	**404**	**128.0**	**15**	**0.0**	**0**	**143.0**	**100.1**
TBD	**---**	**Mixed Arts**	**Classrooms, Labs and Exhibit Spaces**	**TBD**	**---**	**72,000**	**278**	**106.0**	**10**	**0.0**	**0**	**116.0**	**81.2**
TBD	**---**	**Physical Plant**	**Maintenance Areas, Offices**	**TBD**	**---**	**30,100**	**63**	**55.0**	**10**	**0.0**	**0**	**65.0**	**45.5**
TBD	**---**	**Parking Garage No. 1 (Garage North)**	**Parking for 680 cars**	**TBD**	**---**	**432,000**	**0**	**0.0**	**10**	**0.0**	**0**	**10.0**	**7.0**
TBD	**---**	**Parking Garage No. 2 (Garage South)**	**Parking for 518 cars**	**TBD**	**---**	**108,000**	**0**	**0.0**	**10**	**0.0**	**0**	**10.0**	**7.0**
			Total Connected Bldg Loads						Total Connected Peak Gpm			2,246.80	1572.76
			Campus Block Loads						Campus Block Peak Load			1,572.76	

Montgomery College Rockville Utility Master Plan Future Data

TABLE 2-2B Fire Water

Wiley|Wilson Commission No.: 211130.00

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Revised: 12/13/2012

Note: In year built/renovated column, the construction/renovation dates are completed year

Building Number	Building Code	Building Name	Building Function	Year Built/ Proposed Build	Year Renovated/ Demolished	Building Size (GSF)	Fire Flow 1991 ISO (GPM)	Fire Flow 2004 ISO (GPM)
Future Utility Conditions (Reference 2006 - 2016 Facilities Master Plan Proposed Facilities)								
208	HU	Humanities Building	Classrooms, Offices, Auditorium, Central Plant	1966	---	73,912	3,750	3,000
208	-	Central Plant in Humanities	Central Cooling and Heating Plant	---	---			
218	**SE**	**Science East Building, Renovation and Addition**	**Classrooms, Offices, Labs, Greenhouse**	**1966**	**2014**	**57,237**	**3,250**	**3,000**
204	**CS**	**Computer Science Building, Renovation**	**Classrooms, Offices, Computer Center**	**1966**	**Partial/TBD**	**20,862**	**2,250**	**1,750**
221	**SV**	**Student Services, Demolished**	**Offices, Admissions, Student Aid, Records**	**1966**	**TBD**	**-**	**2,250**	**1,500**
202	**CC**	**Campus Center, Renovation**	**Cafeteria, Bookstore, Recreational, Administrative**	**1966**	**2020**	**74,302**	**3,250**	**3,000**
215	PE	Physical Education	Gym, Pool, Offices, Classrooms	1966	---	84,949	5,500	3,500
215	**PE**	**Physical Education Addition**	**Offices, Classrooms**	TBD	**---**	**35,800**		
223	TA	Theatre Arts	Classrooms, Theatre	1966	---	35,032	3,000	2,500
222	**TC**	**Technical Center, Demolished**	**Classrooms, Offices, TV Studios, Auditorium**	**1966**	**TBD**	**-**	**3,000**	**3,000**
205	**CB**	**Counseling & Advising, Demolished**	**Classrooms, Security**	**1969**	**TBD**	**-**	**2,000**	**1,500**
219	**SW**	**Science West, Renovation and Addition**	**Classrooms, Offices, Labs**	**1971**	**2016**	**62,982**	**3,000**	**3,000**
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	---	20,499	---	1,750
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	---	25,594	4,000	1,750
206	**MT**	**Gordon & Marilyn Macklin Tower, Renovation**	**Library, Classrooms, Offices, TV Studios**	**1971**	**TBD**	**117,282**	**5,250**	**3,500**
213	**PA**	**Parilla Performing Arts Center, Existing & Addition**	**Theatre**	**1984**	**TBD**	**59,700**	**1,750**	**2,250**
203	**CH**	**Child Care Center, Demolished**	**Child Care**	**1986**	**TBD**	**-**	**1,250**	**750**
209	**TT**	**Interim Technical Training Center, Demolish**	**Auto Shops, Offices, Building Trades Labs**	**1988**	**TBD**	**9,360**	**2,500**	**3,500**
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	---	4,720	1,750	2,250
207	GU	Gudelsky Institute for Tech Education	Classrooms, Offices	1992	---	64,000	3,500	3,500
211	MK	Mannakee	Administrative Offices/Meeting Rooms	1985	---	42,102	3,000	2,250
216	CN	Canoe Trailer Shed	Shed	1990	---	420	500	500
220	**SB**	**South Campus Instruction Building Renovation**	**Classrooms, Offices**	**1996**	**2017**	**29,900**	**3,000**	**1,750**
---	---	Grandstand	Grandstand / Concessions / Restroom	1994	---	240	0	0
217	SC	Science Center	Laboratories, Classrooms	2011	---	140,700	---	4,000
TBD	**---**	**Humanities & Social Sciences**		**TBD**	**---**	**124,000**	**3,750**	**3,000**
TBD	**CH**	**New Child Care Center**		**TBD**	**---**	**6,900**		
TBD	**SV**	**New Student Services Center**	**Offices**	**2017**	**---**	**120,400**	---	**3,500**
TBD	**---**	**Communication Arts**		**TBD**	**---**	**72,000**	---	**3,500**
TBD	**---**	**Technical Training and Automotive ( )**	**Classrooms, automotive shops**	**TBD**	**---**	**84,000**	**3,000**	**3,000**
TBD	**---**	**Library Resource Center**	**Library, Patron Lounge**	**TBD**	**---**	**131,000**	---	**4,500**
TBD	**---**	**Mixed Arts**	**Classrooms, Labs and Exhibit Spaces**	**TBD**	**---**	**72,000**	---	**3,500**
TBD	**---**	**Physical Plant**	**Maintenance Areas, Offices**	**TBD**	**---**	**30,100**	---	**3,000**
TBD	**---**	**Parking Garage No. 1 (Garage North)**	**Parking for 680 cars**	**TBD**	**---**	**432,000**	---	**3,000**
TBD	**---**	**Parking Garage No. 2 (Garage South)**	**Parking for 518 cars**	**TBD**	**---**	**108,000**	---	**3,000**

Montgomery College Rockville Utility Master Plan Future Data

Table 3-2 Sanitary Sewer

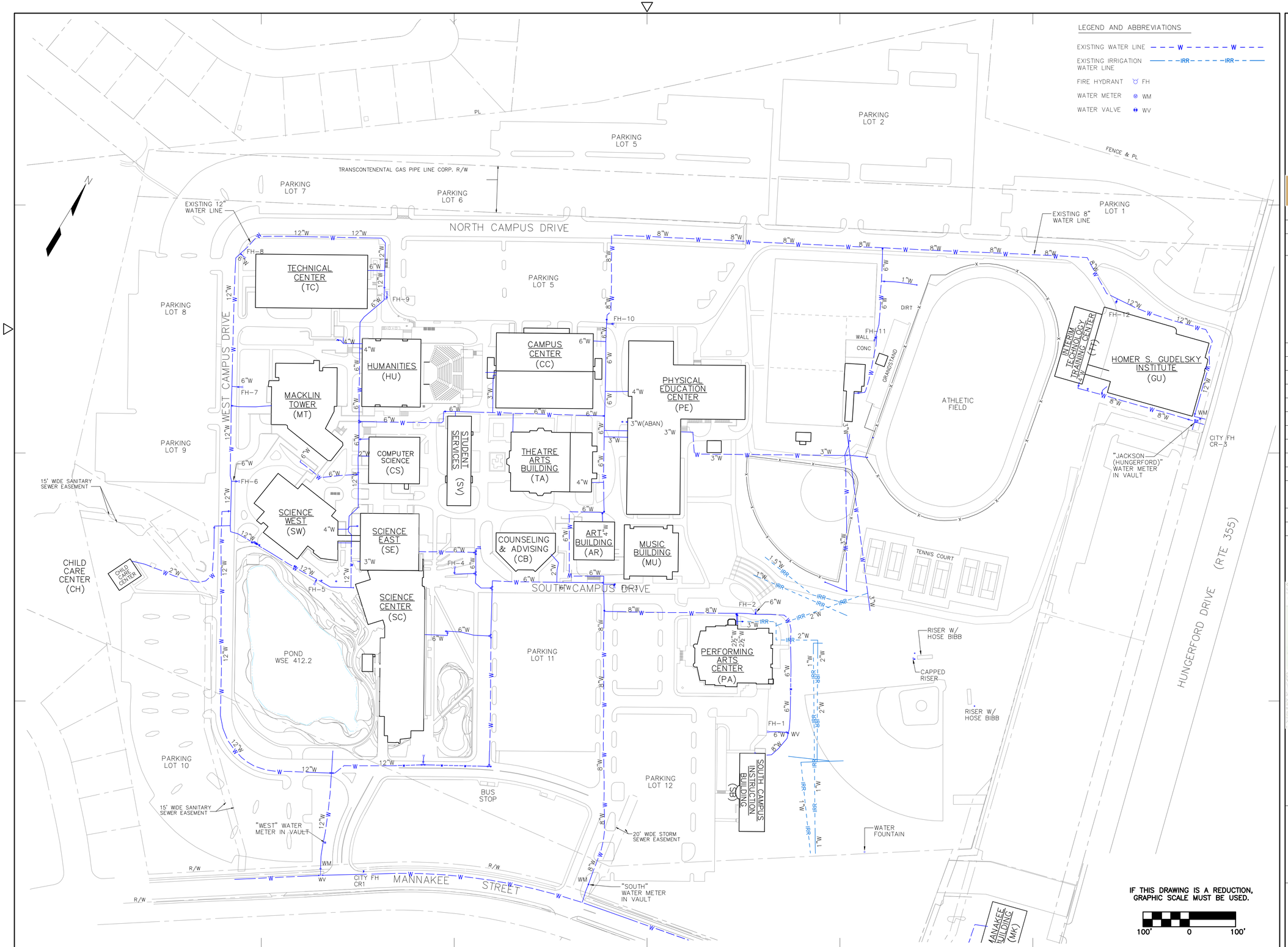
Wiley|Wilson Commission No.: 211130.00

Printed: 12/13/12 5:24 PM

Revised: 12/13/2012

Note: In year built/renovated column, the construction/renovation dates are completed year

Building Number	Building Code	Building Name	Building Function	Year Built/ Proposed Build	Year Renovated/ Demolished	Year Renovated/ Demolished	Fixture Units (Number)	Total Flow (GPM)	System Load @ 70%
Future Utility Conditions (Reference 2006 - 2016 Facilities Master Plan Proposed Facilities)									
208	HU	Humanities Building	Classrooms, Offices, Auditorium, Central Plant	1966	---	73,912	279	104.7	73.3
208	-	Central Plant in Humanities	Central Cooling and Heating Plant		---				
218	**SE**	**Science East Building, Renovation and Addition**	**Classrooms, Offices, Labs, Greenhouse**	**1966**	**2014**	**57,237**	**135**	**118.6**	**83.0**
204	**CS**	**Computer Science Building, Renovation**	**Classrooms, Offices, Computer Center**	**1966**	**Partial/TBD**	**20,862**	**89**	**64.3**	**45.0**
221	**SV**	**Student Services, Demolished**	**Offices, Admissions, Student Aid, Records**	**1966**	**TBD**	**-**	**52**	**51.6**	**36.1**
202	**CC**	**Campus Center, Renovation**	**Cafeteria, Bookstore, Recreational, Administrative**	**1966**	**2020**	**74,302**	**276**	**104.3**	**73.0**
215	PE	Physical Education	Gym, Pool, Offices, Classrooms	1966	---	84,949	1,021	209.7	146.8
215	**PE**	**Physical Education Addition**	**Offices, Classrooms**	**TBD**	**---**	**35,800**			
223	TA	Theatre Arts	Classrooms, Theatre	1966	---	35,032	205	91.1	63.8
222	**TC**	**Technical Center, Demolished**	**Classrooms, Offices, TV Studios, Auditorium**	**1966**	**TBD**	**-**	**221**	**94.6**	**66.2**
205	**CB**	**Counseling & Advising, Demolished**	**Classrooms, Security**	**1969**	**TBD**	**-**	**132**	**75.6**	**52.9**
219	**SW**	**Science West, Renovation and Addition**	**Classrooms, Offices, Labs**	**1971**	**2016**	**62,982**	**256**	**101.1**	**70.8**
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	---	20,499	108	44.5	31.2
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	---	25,594	118	47.0	32.9
206	**MT**	**Gordon & Marilyn Macklin Tower, Renovation**	**Library, Classrooms, Offices, TV Studios**	**1971**	**TBD**	**117,282**	**428**	**130.2**	**91.1**
213	**PA**	**Parilla Performing Arts Center, Existing & Addition**	**Theatre**	**1984**	**TBD**	**59,700**	**178**	**85.0**	**59.5**
203	**CH**	**Child Care Center, Demolished**	**Child Care**	**1986**	**TBD**	**-**	**50**	**51.0**	**35.7**
209	**TT**	**Interim Technical Training Center, Demolish**	**Auto Shops, Offices, Building Trades Labs**	**1988**	**TBD**	**9,360**	**22**	**36.0**	**25.2**
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	---	4,720	16	32.0	22.4
207	GU	Gudelsky Institute for Tech Education	Classrooms, Offices	1992	---	64,000	154	80.0	56.0
211	MK	Mannakee	Administrative Offices/Meeting Rooms	1985	---	42,102	104	68.0	47.6
216	CN	Canoe Trailer Shed	Shed	1990	---	420	7	11.8	8.3
220	**SB**	**South Campus Instruction Building Renovation**	**Classrooms, Offices**	**1996**	**2017**	**29,900**	**81**	**61.2**	**42.8**
---	---	Grandstand	Grandstand / Concessions / Restroom	1994	---	240	7	11.8	8.3
217	SC	Science Center	Laboratories, Classrooms	2011	---	140,700	329	115.0	80.5
TBD	**---**	**Humanities & Social Sciences**		**TBD**	**---**	**124,000**	**255**	**101.5**	**71.1**
TBD	**CH**	**New Child Care Center**		**TBD**	**---**	**6,900**			
TBD	**SV**	**New Student Services Center**	**Offices**	**2017**	**---**	**120,400**	**178**	**85.0**	**59.5**
TBD	**---**	**Communication Arts**		**TBD**	**---**	**72,000**	**178**	**85.0**	**59.5**
TBD	**---**	**Technical Training and Automotive ( )**	**Classrooms, automotive shops**	**TBD**	**---**	**84,000**	**221**	**94.6**	**66.2**
TBD	**---**	**Library Resource Center**	**Library, Patron Lounge**	**TBD**	**---**	**131,000**	**258**	**102.0**	**71.4**
TBD	**---**	**Mixed Arts**	**Classrooms, Labs and Exhibit Spaces**	**TBD**	**---**	**72,000**	**178**	**85.0**	**59.5**
TBD	**---**	**Physical Plant**	**Maintenance Areas, Offices**	**TBD**	**---**	**30,100**	**40**	**46.0**	**32.2**
TBD	**---**	**Parking Garage No. 1 (Garage North)**	**Parking for 680 cars**	**TBD**	**---**	**432,000**	**0**	**0.0**	**0.0**
TBD	**---**	**Parking Garage No. 2 (Garage South)**	**Parking for 518 cars**	**TBD**	**---**	**108,000**	**0**	**0.0**	**0.0**
					Total Connected Building Load (GPM)			2,388.2	1,671.7
						Campus Block Load (GPM)		1,671.7	



Montgomery College

Central Administration
Office of Facilities
900 Hungerford Drive
Rockville, Md 20850
Telephone: (301)-251-7363

Montgomery College
endless possibilities

Drawn By: JLW	Ckd By: ETH
Designed By: ETH	Approved By: SMT

Notes

Wiley & Wilson
Employee-Owned

2310 Langhorne Road
Lynchburg, VA 24501-1547
www.wileywilson.com

COMM. NO. 204145.01

No.	Description	Date

Revisions

Location Map

Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

WATER SYSTEM SITE PLAN – EXISTING CONDITIONS

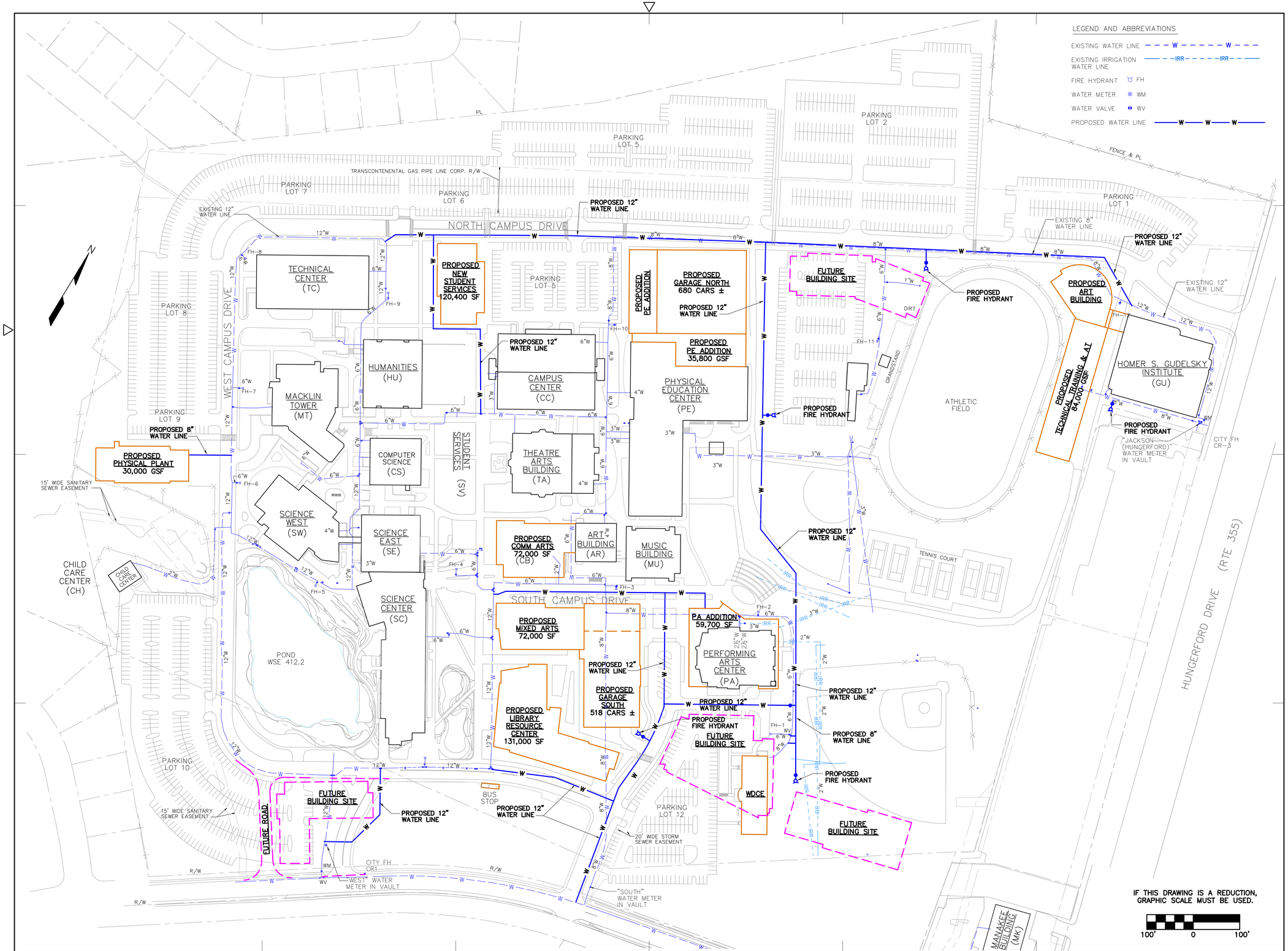
Scale: 1" = 100'

Project No.

Date
12/13/12

Drawing Number
C-2

MC Facilities No.



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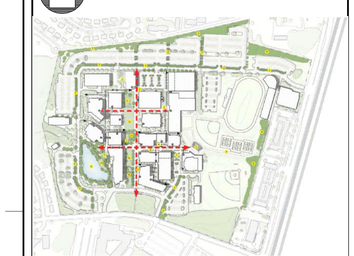
Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

WATER SYSTEM SITE PLAN – FUTURE CONDITIONS

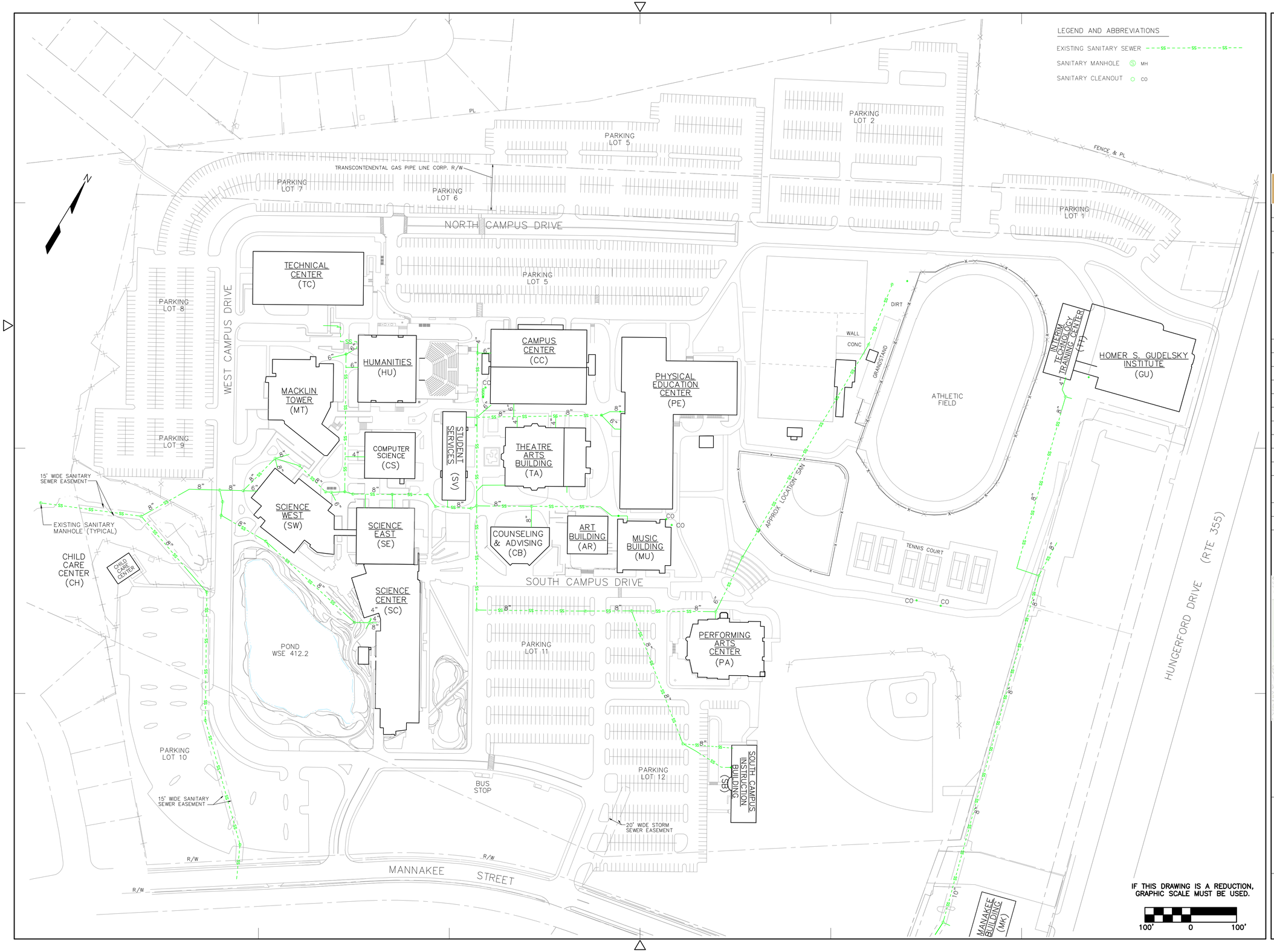
Scale: 1" = 100'

Project No.

Date 12/13/12

Drawing Number C-3

MC Facilities No.



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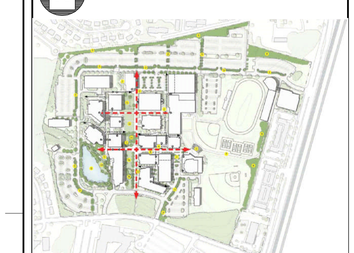
COMM. NO. 204145.01

No.	Description	Date

Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

SANITARY SYSTEM
SITE PLAN –
EXISTING CONDITIONS

Scale: 1" = 100'

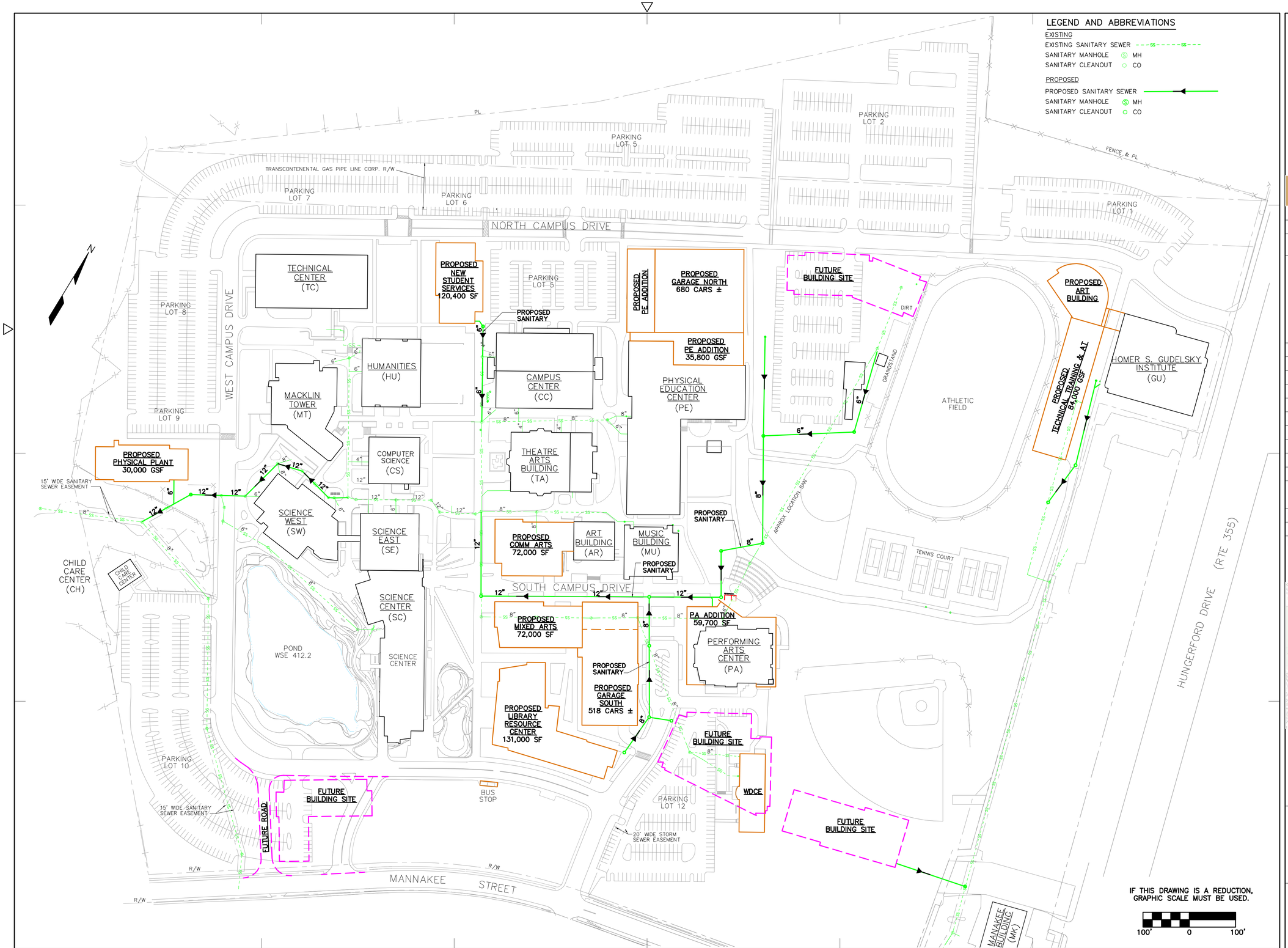
Project No.

Date 12/13/12

Drawing Number

C-4

MC Facilities No.



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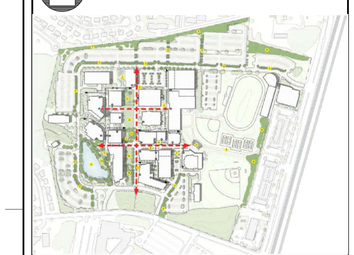
COMM. NO. 204145.01

No.	Description	Date

Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

SANITARY SYSTEM
SITE PLAN –
FUTURE CONDITIONS

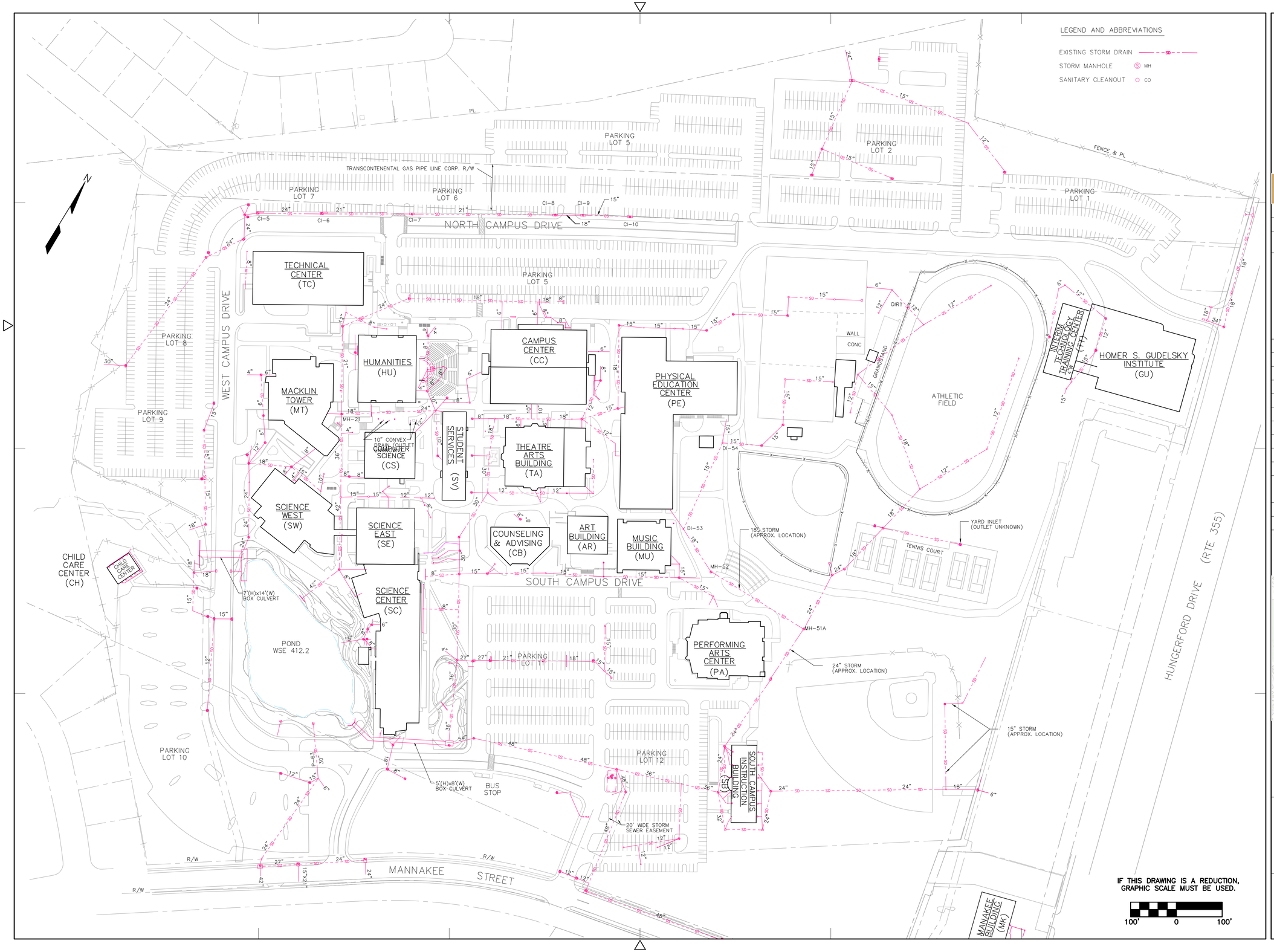
Scale: 1" = 100'

Project No.

Date
12/13/12

Drawing Number
C-5

MC Facilities No.



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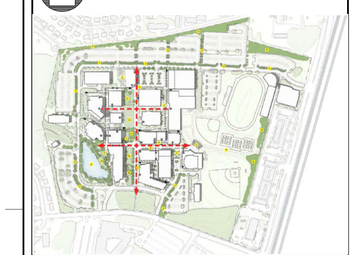
No.	Description	Date

Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

STORM SYSTEM SITE PLAN – EXISTING CONDITIONS

Scale: 1" = 100'

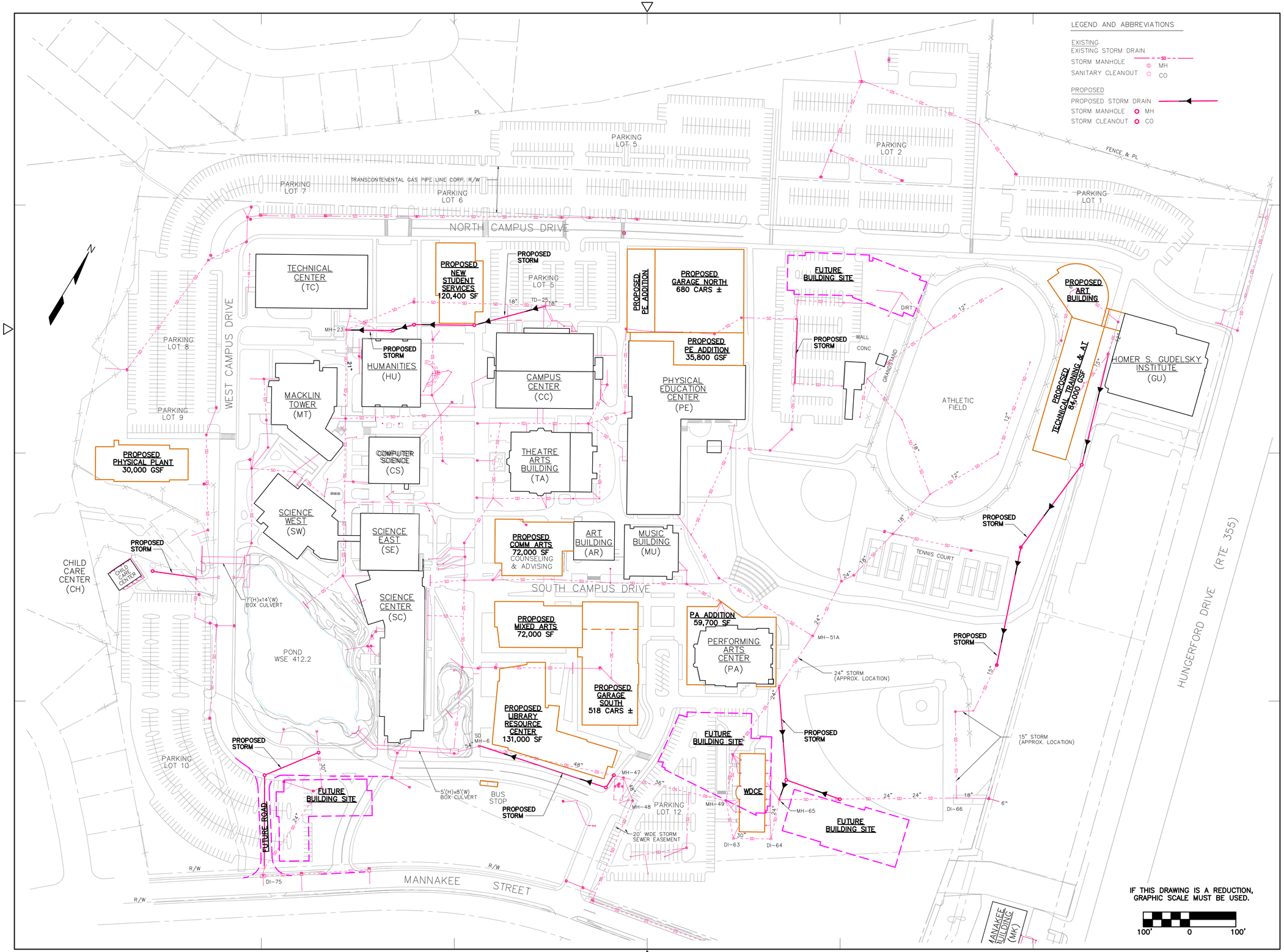
Project No.

Date 12/13/12

Drawing Number

C – 6

MC Facilities No.



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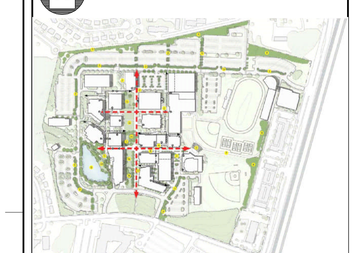
COMM. NO. 204145.01

No.	Description	Date

Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

STORM SYSTEM SITE PLAN – FUTURE CONDITIONS

Scale: 1" = 100'

Project No.

Date 12/13/12

Drawing Number C-7

MC Facilities No.

C

Montgomery College Rockville Utility Master Plan Existing Facilities Data

TABLE 5-1 - Central Plant HVAC

Wiley|Wilson Commission No.: 211130.01

Printed: 12/13/12 5:27 PM

Revised: 2/2/2012

Note: In year built/renovated column, the construction/renovation dates are completion year

Building Number	Building Code	Building Name	Building Function	Year Built	Year Renovated	Building Size (GSF)	Air Cond. Area (GSF)	AC Design Load Factor (Btuh/GSF)	Calculated Design Cooling (Tons)	Actual Chiller (Tons) R	CW Source	Heating Design Load Factor (Btuh/GSF)	Heated Area (GSF)	Design Heating Load (Btu/Hr)	Heating HW Source
Existing Utility Conditions (2011)															
208	HU	Humanities	Classrooms, Offices, Auditorium, Central Plant	1966	90s, 00s	73,912	69,885	30	175	1,495	Central Plant Chiller	23	73,912	1,697,020	Central Plant Boiler
208	HU	Central Plant	Central Cooling and Heating Plant	1966	1996		---	---	---	---	---	---	---	---	---
218	SE	Science East	Classrooms, Offices, Labs, Greenhouse	1966	---	53,737	53,737	29	130	215	CP or Stand Alone	25	53,737	1,332,678	Central Plant Boiler
204	CS	Computer Science	Classrooms, Offices, Computer Center	1966	Partial	20,862	20,862	37	64	---	Central Plant Chiller	29	20,862	595,193	Central Plant Boiler
221	SV	Student Services	Offices, Admissions, Student Aid, Records	1966	---	10,448	10,448	47	41	---	Central Plant Chiller	46	10,448	478,205	Central Plant Boiler
202	CC	Campus Center	Cafeteria, Bookstore, Recreational, Administrative	1966	00s	74,302	74,302	39	241	240	CP or Stand Alone	30	74,302	2,240,205	Central Plant Boiler
215	PE	Physical Education Center	Gym, Pool, Offices, Classrooms	1966	---	84,949	71,449	35	208	---	Central Plant Chiller	33	84,949	2,818,608	Central Plant Boiler
223	TA	Theatre Arts Building	Classrooms, Theatre	1966	Mid 90s	35,032	35,032	40	117	---	Central Plant Chiller	31	35,032	1,092,298	Central Plant Boiler
222	TC	Technical Center	Classrooms, Offices, TV Studios, Auditorium	1966	---	55,908	55,908	32	149	---	Central Plant Chiller	28	55,908	1,549,770	Central Plant Boiler
205	CB	Counseling & Advising	Offices, Security	1969	---	17,696	17,696	39	58	---	Central Plant Chiller	35	17,696	624,315	Central Plant Boiler
219	SW	Science West	Classrooms, Offices, Labs	1971	---	41,988	41,988	35	122	---	Central Plant Chiller	28	44,486	1,246,053	Central Plant Boiler
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	2002	21,050	20,499	48	82	---	Central Plant Chiller	39	20,499	799,461	Central Plant Boiler
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	2000	25,594	25,594	37	79	---	Central Plant Chiller	30	25,594	772,683	Central Plant Boiler
206	MT	Macklin Tower	Library, Classrooms, Offices, TV Studios	1971	Mid 90s	117,282	117,282	33	323	---	Central Plant Chiller	28	117,282	3,248,711	Central Plant Boiler
213	PA	Parilla Performing Arts Center	Theatre	1984	---	28,000	28,000	40	93	110	Local Chiller	31	28,000	873,600	Central Plant Boiler
203	CH	Child Care Center	Child Care	1986	---	2,498	2,498	37	8	---	Local DX units	29	2,498	72,442	Local DX units
209	TT	Interim Technical Training Center	Auto Shops, offices, building trades labs	1988	---	9,360	9,360	29	23	---	Local DX units	25	9,360	234,000	Local DX units
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	---	4,720	4,720	29	11	---	Local DX units	25	2,000	50,000	Local DX units
207	GU	Gudelsky Institute for Technical Education	Classrooms, Offices	1992	---	64,000	64,000	35	187	---	Central Plant Chiller	33	64,000	2,112,000	Central Plant Boiler
211	MK	Mannakee Building	Administrative Offices/Meeting Rooms	1985	---	42,102	42,102	47	165	---	Stand Alone	46	42,102	1,936,692	Stand Alone
216	CN	Canoe Trailer Shed	Shed	1990	---	420	---	---	---	---	---	---	---	---	---
220	SB	South Campus Instruction Building	Classrooms, Offices	1996	---	29,900	29,900	37	92	---	Central Plant Chiller	30	29,900	897,000	Central Plant Boiler
TBD	TBD	Scoreboard	Grandstand / Concessions / Restroom	1994	---	240	---	---	---	---	---	---	---	---	---
217	SC	Science Center	Laboratories, Classrooms	2011	---	140,700	135,000	46	518	915	Satellite Plant Chiller	33	140,700	4,581,000	Satellite Plant Boiler
			Total Connected Bldg Loads						2,885	2,975				29,251,934	
			Campus Block Loads						2,164					21,938,951	

Montgomery College Rockville Utility Master Plan Future Data

TABLE 5-1 - Central Plant HVAC

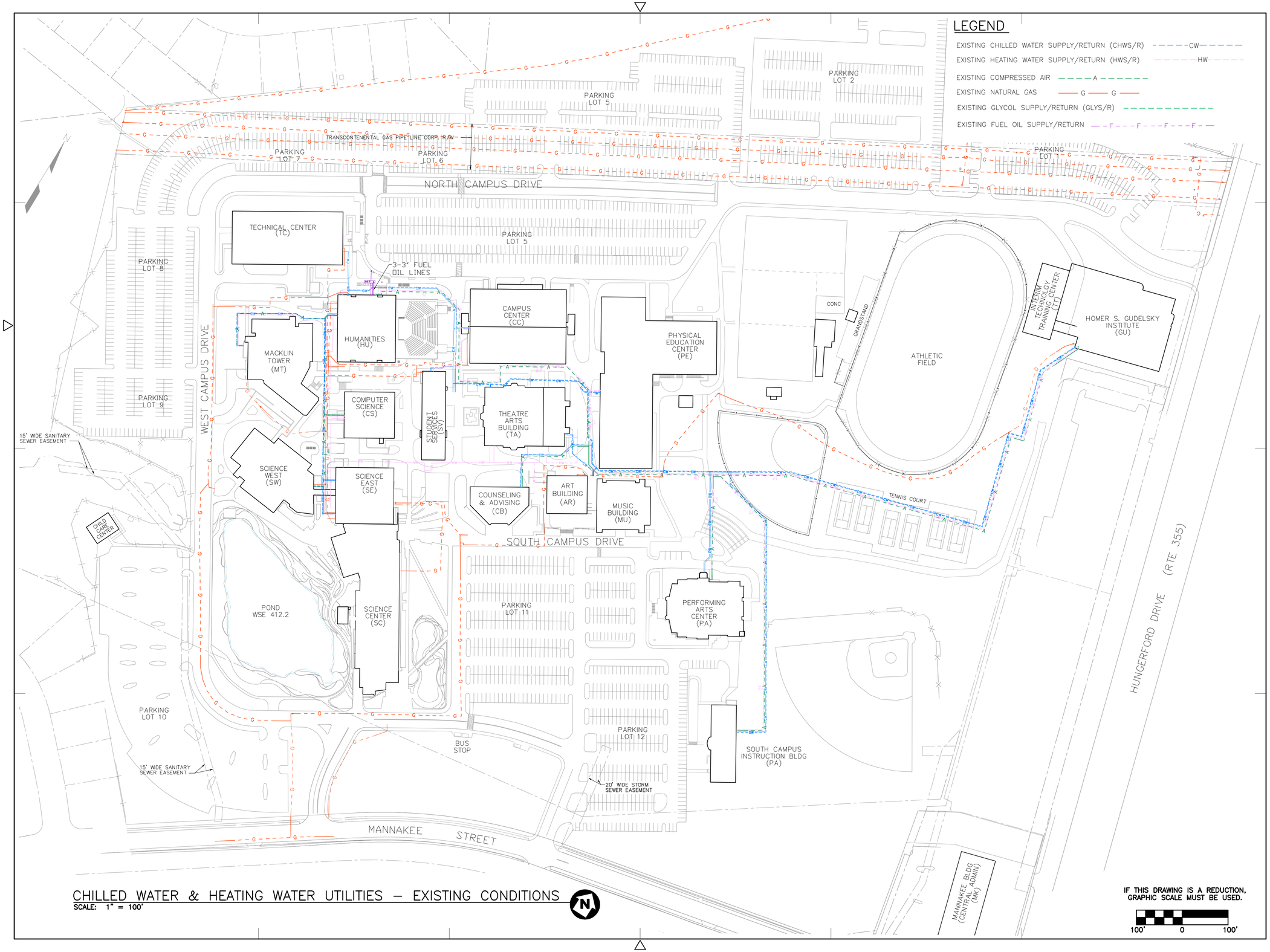
Wiley|Wilson Commission No.: 211130.02

Printed: 12/13/12 5:27 PM

Revised: 12/13/12

Note: In year built/renovated column, the construction/renovation dates are completed year

Building Number	Building Code	Building Name	Building Function	Year Built/ Proposed Build	Year Renovated/ Demolished	Building Size (GSF)	Air Cond. Area (GSF)	AC Design Load Factor (Btuh/GSF)	Calculated Design Cooling (Tons)	Actual Chiller (Tons) R	Primary and Backup CW Source	Heating Design Load Factor (Btuh/SF*Hr)	Heated Area (GSF)	Heating Load (Btu/Hr)	Heating HW Source
Future Utility Conditions (Reference 2006 - 2016 Facilities Master Plan Proposed Facilities)															
208	HU	Humanities Building	Classrooms, Offices, Auditorium, Central Plant	1966	---	73,912	69,885	30	175		SV Central Chiller Plant	23	73,912	1,699,976	SV Central Boiler Plant
208	-	Central Plant in Humanities	Central Cooling and Heating Plant		---		---								
218	**SE**	**Science East Building, Renovation and Addition**	**Classrooms, Offices, Labs, Greenhouse**	**1966**	**2014**	**57,237**	**53,737**	**29**	**130**		**SC Sat Pl or Central**	**25**	**53,737**	1,343,425	**SC Sat Pl or Central**
204	**CS**	**Computer Science Building, Renovation**	**Classrooms, Offices, Computer Center**	**1966**	**Partial/TBD**	**20,862**	**20,862**	**37**	**64**		**SC Sat Pl or Central**	**29**	**20,862**	604,998	**SC Sat Pl or Central**
221	**SV**	**Student Services, Demolished**	**Offices, Admissions, Student Aid, Records**	**1966**	**TBD**	**-**									
202	**CC**	**Campus Center, Renovation**	**Cafeteria, Bookstore, Recreational, Administrative**	**1966**	**2020**	**74,302**	**74,302**	**39**	**241**	240	**CC Chiller or Central**	**30**	**74,302**	2,229,060	**SV Central Plant Boiler**
215	PE	Physical Education	Gym, Pool, Offices, Classrooms	1966	---	84,949	71,449	35	208		SV Central Chiller Plant	33	84,949	2,803,317	Central Plant Boiler
215	**PE**	**Physical Education Addition**	**Offices, Classrooms**	**TBD**	**---**	**35,800**	**35,800**	**35**	**104**		SV Central Chiller Plant				
223	TA	Theatre Arts	Classrooms, Theatre	1966	---	35,032	35,032	40	117		SV Central Plant Chiller	31	35,032	1,085,992	SV Central Plant Boiler
222	**TC**	**Technical Center, Demolished**	**Classrooms, Offices, TV Studios, Auditorium**	**1966**	**TBD**	**-**									
205	**CB**	**Counseling & Advising, Demolished**	**Classrooms, Security**	**1969**	**TBD**	**-**									
219	**SW**	**Science West, Renovation and Addition**	**Classrooms, Offices, Labs**	**1971**	**2016**	**62,982**	**62,982**	**35**	**184**		**SC Sat Pl or Central**	**28**	**44,486**	1,245,608	**SC Sat Pl or Central**
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	---	20,499	20,499	48	82		SV Central Chiller Plant	39	20,499	799,461	SV Central Plant Boiler
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	---	25,594	25,594	37	79		SV Central Chiller Plant	30	25,594	767,820	SV Central Plant Boiler
206	**MT**	**Gordon & Marilyn Macklin Tower, Renovation**	**Library, Classrooms, Offices, TV Studios**	**1971**	**TBD**	**117,282**	**117,282**	**33**	**323**		**SC Sat Pl or Central**	**28**	**117,282**	3,283,896	**SC Sat Pl or Central**
213	**PA**	**Parilla Performing Arts Center, Existing & Addition**	**Theatre**	**1984**	**TBD**	**59,700**	**59,700**	**40**	**199**	110	**PA Chiller or Central**	**31**	**28,000**	868,000	**SV Central Plant Boiler**
203	**CH**	**Child Care Center, Demolished**	**Child Care**	**1986**	**TBD**	**-**								-	
209	**TT**	**Interim Technical Training Center, Demolish**	**Auto Shops, Offices, Building Trades Labs**	**1988**	**TBD**	**9,360**			**0**					-	
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	---	4,720	4,720	29	11		Local DX units	25	2,000	50,000	Local DX units
207	GU	Gudelsky Institute for Tech Education	Classrooms, Offices	1992	---	64,000	64,000	35	187		SV Central Chiller Plant	33	64,000	2,112,000	SV Central Plant Boiler
211	MK	Mannakee	Administrative Offices/Meeting Rooms	1985	---	42,102	42,102	47	165		Stand Alone	46	42,102	1,936,692	Stand Alone
216	CN	Canoe Trailer Shed	Shed	1990	---	420	---	---	---		---	---	---		---
220	**SB**	**South Campus Instruction Building Renovation**	**Classrooms, Offices**	**1996**	**2017**	**29,900**	**29,900**	**37**	**92**		**SV Central Chiller Plant**	**30**	**29,900**	897,000	**SV Central Plant Boiler**
---	---	Grandstand	Grandstand / Concessions / Restroom	1994	---	240	---	---	---		---	**---**	**---**		**---**
217	SC	Science Center	Laboratories, Classrooms	2011	---	140,700	135000	39	439	915	SC Sat Pl or Central	30	140,700	4,221,000	SC Sat Pl or Central
TBD	**---**	**Humanities & Social Sciences**		**TBD**	**---**	**124,000**	**124,000**	**37**	**382**		**SV Central Chiller Plant**	**30**	**124,000**	3,720,000	**SV Central Plant Boiler**
TBD	**CH**	**New Child Care Center**		**TBD**	**---**	**6,900**	**6,900**	**37**	**21**		**Stand Alone**	**30**	**6,900**	207,000	**Stand Alone**
TBD	**SV**	**New Student Services Center**	**Offices**	**2017**	**---**	**120,400**	**115,000**	**37**	**355**	1600	**SV Central Chiller Plant**	**30**	**120,400**	3,612,000	**SV Central Plant Boiler**
TBD	**---**	**Communication Arts**		**TBD**	**---**	**72,000**	**72,000**	**37**	**222**		**Library Sat Pl or Central**	**30**	**72,000**	2,160,000	**Library Sat Pl or Central**
TBD	**---**	**Technical Training and Automotive ( )**	**Classrooms, automotive shops**	**TBD**	**---**	**84,000**	**48,000**	**37**	**148**		**SV Central Chiller Plant**	**30**	**84,000**	2,520,000	**SV Central Plant Boiler**
TBD	**---**	**Library Resource Center**	**Library, Patron Lounge**	**TBD**	**---**	**131,000**	**125,000**	**40**	**417**	1000	**Library Sat Chiller Pl**	**30**	**131,000**	3,930,000	**Library Sat Pl or Central**
TBD	**---**	**Mixed Arts**	**Classrooms, Labs and Exhibit Spaces**	**TBD**	**---**	**72,000**	**72,000**	**37**	**222**		**Library Sat Pl or Central**	**30**	**72,000**	2,160,000	**Library Sat Pl or Central**
TBD	**---**	**Physical Plant**	**Maintenance Areas, Offices**	**TBD**	**---**	**30,100**	**10,000**	**37**	**31**		**SV Central or SC Sat Pl**	**30**	**30,100**	903,000	**SV Central or SC Sat Pl**
TBD	**---**	**Parking Garage No. 1 (Garage North)**	**Parking for 680 cars**	**TBD**	**---**	**432,000**	**---**	**---**	**---**		**---**				
TBD	**---**	**Parking Garage No. 2 (Garage South)**	**Parking for 518 cars**	**TBD**	**---**	**108,000**	**---**	**---**	**---**		**---**				
			Total Connected Bldg Loads						4,598	3,865				45,160,245	
			Campus Block Loads						3,448					33,870,184	



CHILLED WATER & HEATING WATER UTILITIES – EXISTING CONDITIONS

SCALE: 1" = 100'

Montgomery College

Central Administration
Office of Facilities
900 Hungerford Drive
Rockville, Md 20850
Telephone: (301)–251–7363

Montgomery College
endless possibilities

Drawn By: JLW	Ckd By: MCR
Designed By: MCR	Approved By: SMT

Notes

Wiley & Wilson
Employee-Owned

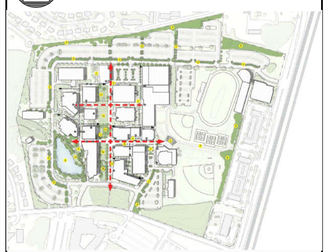
2310 Langhorne Road
Lynchburg, VA 24501–1547
www.wileywilson.com

COMM. NO. 204145.01

No.	Description	Date

Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

MECHANICAL SITE
UTILITIES–EXISTING
CONDITIONS

Scale: 1" = 100'

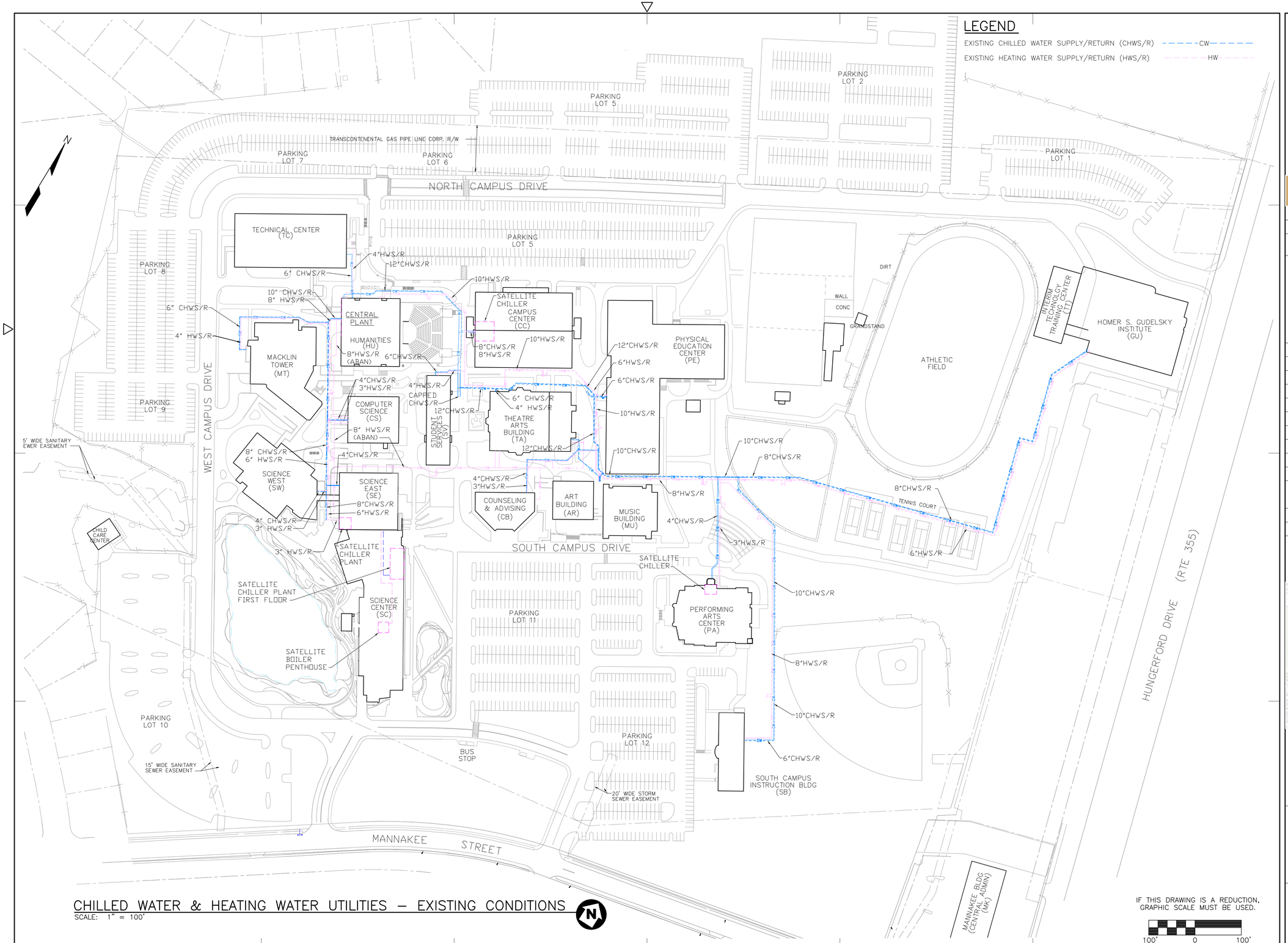
Project No.

Date
12/13/12

Drawing Number

M–1

MC Facilities No.



CHILLED WATER & HEATING WATER UTILITIES – EXISTING CONDITIONS

SCALE: 1" = 100'

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endless possibilities

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Lynchburg, VA 24501–1547
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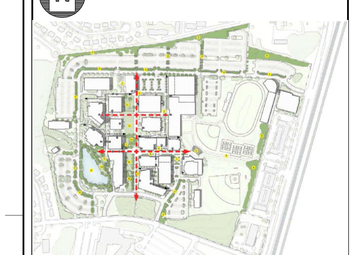
COMM. NO. 204145.01

No.	Description	Date

Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

CHILLED WATER &
HEATING WATER
EXISTING CONDITIONS

Scale: 1" = 100'

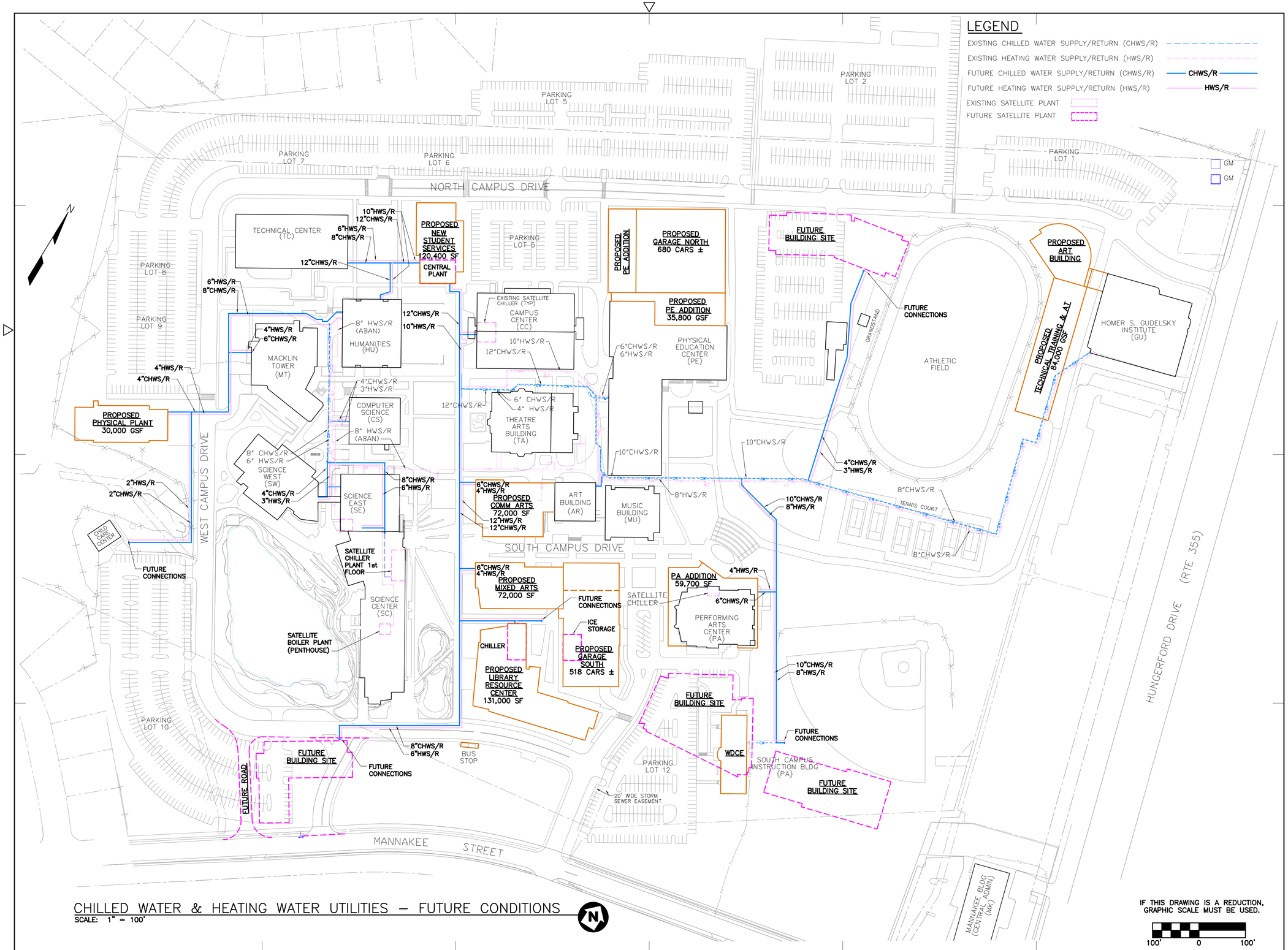
Project No.

Date
12/13/12

Drawing Number

M–2

MC Facilities No.



CHILLED WATER & HEATING WATER UTILITIES – FUTURE CONDITIONS

SCALE: 1" = 100'

Montgomery College

Central Administration
Office of Facilities
900 Hungerford Drive
Rockville, Md 20850
Telephone: (301)–251–7363

Montgomery College
endless possibilities

Drawn By: JLW	Ckd By: MCR
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Notes

Wiley & Wilson
Employee-Owned

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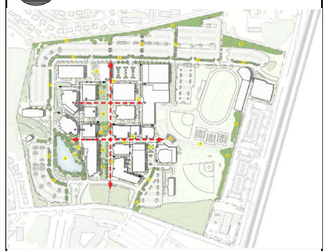
Lynchburg, VA 24501–1547
www.wileywilson.com

COMM. NO. 204145.01

No.	Description	Date

Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

CHILLED WATER &
HEATING WATER
FUTURE CONDITIONS

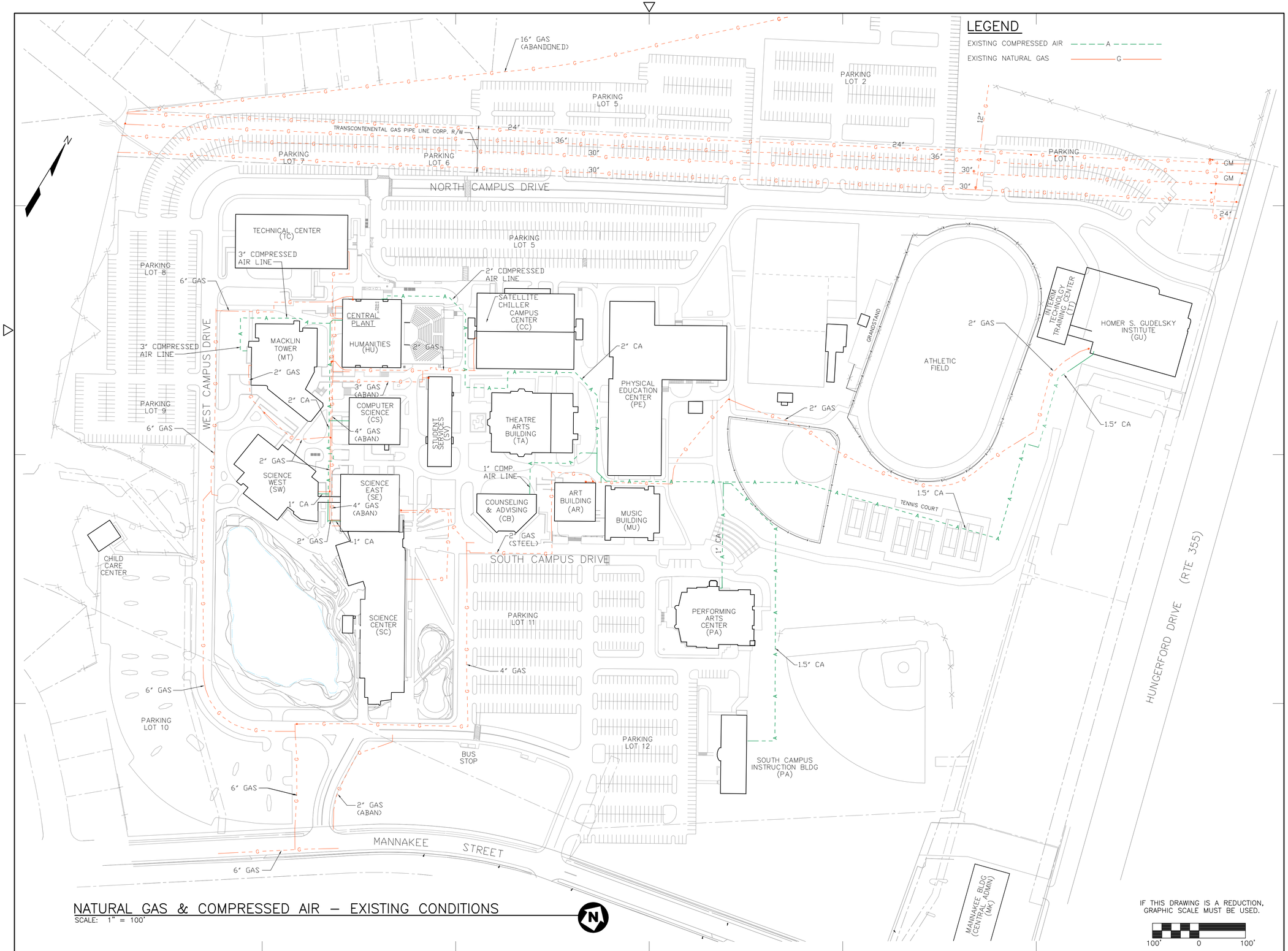
Scale: 1" = 100'

Project No.

Date
12/13/12

Drawing Number
M–3

MC Facilities No.



NATURAL GAS & COMPRESSED AIR – EXISTING CONDITIONS

SCALE: 1" = 100'

Montgomery College

Central Administration
Office of Facilities
900 Hungerford Drive
Rockville, Md 20850
Telephone: (301)–251–7363

Montgomery College endless possibilities

Drawn By: JLW	Ckd By: MCR
Designed By: MCR	Approved By: SMT

Notes

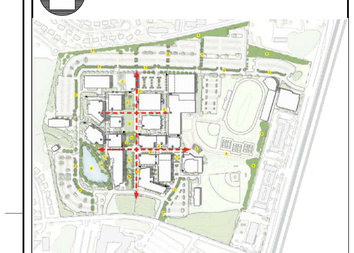
Wiley & Wilson
Employee-Owned
2310 Langhorne Road
Lynchburg, VA 24501–1547
www.wileywilson.com

COMM. NO. 204145.01

No.	Description	Date

Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

NATURAL GAS & COMPRESSED AIR EXISTING CONDITIONS

Scale: 1" = 100'

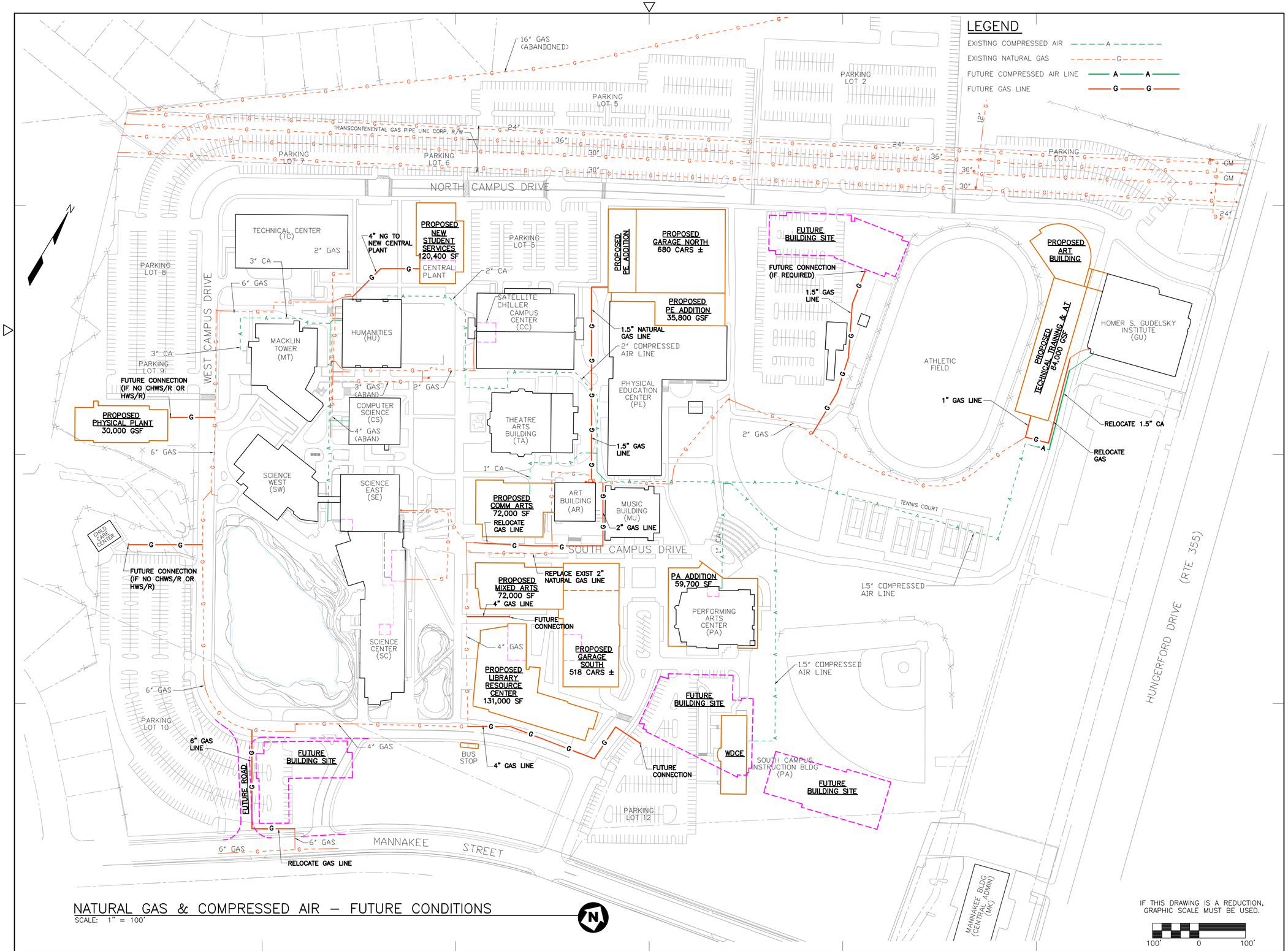
Project No.

Date 12/13/12

Drawing Number

M–4

MC Facilities No.



NATURAL GAS & COMPRESSED AIR – FUTURE CONDITIONS

SCALE: 1" = 100'

Montgomery College

Central Administration
Office of Facilities
900 Hungerford Drive
Rockville, Md 20850
Telephone: (301)–251–7363

Montgomery College
endless possibilities

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Notes

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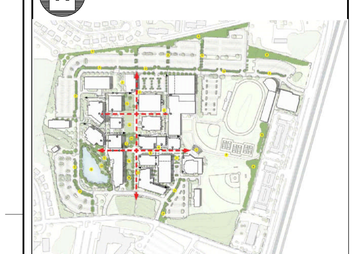
Lynchburg, VA 24501–1547
www.wileywilson.com

COMM. NO. 204145.01

No.	Description	Date

Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

NATURAL GAS & COMPRESSED AIR FUTURE CONDITIONS

Scale: 1" = 100'

Project No.

Date 12/13/12

Drawing Number

M–5

MC Facilities No.

D

Montgomery College Rockville Utility Master Plan Existing Facilities Data

TABLE 6-1 Electrical

Wiley & Wilson Commission No.: 211130.00

Printed: 12/13/12 5:28 PM

Revised: 2/2/2012

Note: In year built/renovated column, the construction/renovation dates are completion year

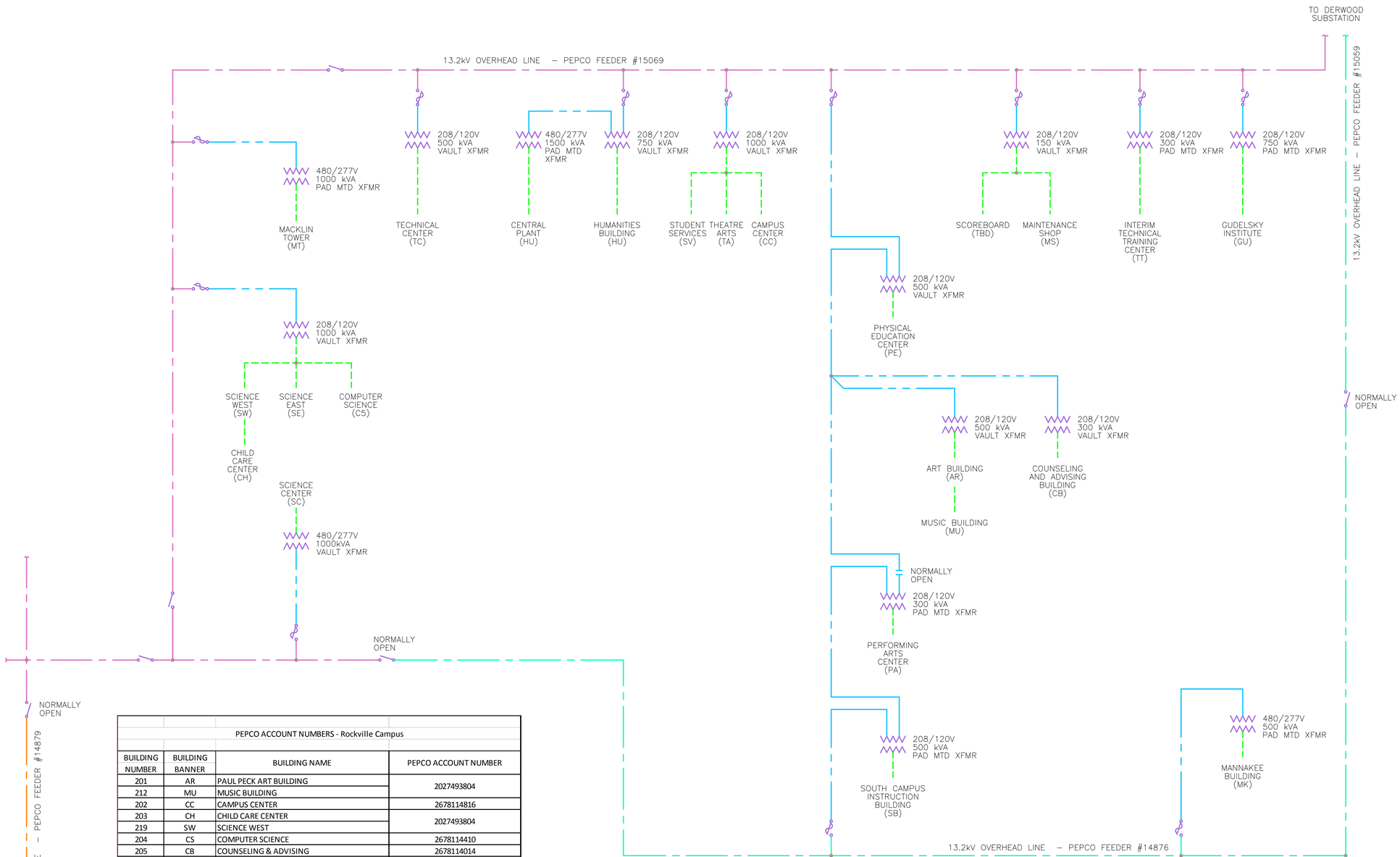
Building Number	Building Code	Building Name	Building Function	Year Built	Year Renovated	Building Size (GSF)	PEPCO Account Number	Rate Schedule	Service Demand (kW)	Service Transformer (kVA)	Service Entrance Voltage	Service Entrance Ampacity	Service Entrance Equipment	Service Notes	Power Generation Notes
Existing Utility Conditions (2011)															
208	HU	Humanities (HU)	Classrooms, Offices, Auditorium, Central Plant	1966	90s, 00s	73912	2678114113	MGTLV / Month2	165.4	750	208/120	1200	Switchboard	-	Three Phase, 25 kW Diesel Generator (Kohler)
208	HU	Central Plant	Central Cooling and Heating Plant	1966	1996		2023303700	GTLV / Daily3	1018.4	1500	480/277	3000	Switchboard	-	Three Phase, 25 kW Diesel Generator (Kohler)
218	SE	Science East	Classrooms, Offices, Labs, Greenhouse	1966	---	53737	2678114519	MGTLV / MMGTL2A	201.6	1000*	208/120	2500	Main Disconnects	*Transformer serves Bldgs. 2, 3, & 10; Two 1200A	Three Phase, 30 kW Diesel Generator (Kohler)
204	CS	Computer Science	Classrooms, Offices, Computer Center	1966	Partial	20862	2678114410	MGTLV / MMGTL2A	186.2	see Bldg 218	208/120	2000	Main Disconnects	1 - 1600A Disconnect, 1 - 400A Disconnect	Three Phase, 250 kW Diesel Generator (Onan)
221	SV	Student Services	Offices, Admissions, Student Aid, Records	1966	---	10448	2678114618	MGTLV / MMGTL2B	34.1	1000*	208/120	800	Main Disconnects	*Transformer serves Bldgs. 4, 5, & 7; Two 400A	Three Phase, 15 kW Nat. Gas Generator (Kohler)
202	CC	Campus Center	Cafeteria, Bookstore, Recreational, Administrative	1966	00s	74302	2678114816	MGTLV / MMGTL2A	554.4	see Bldg 221	208/120	2500	Switchboard	New Switchboard (2004)	Three Phase, 200 kW Diesel Gen. (Detroit Diesel)
215	PE	Physical Education Center	Gym, Pool, Offices, Classrooms	1966	---	84949	2678114915	MGTLV / MMGTL2A	232.3	500*	208/120	2000	Switchboard	2000A Main Breaker	Three Phase, 15 kW Diesel Generator (Kohler)
223	TA	Theatre Arts Building	Classrooms, Theatre	1966	Mid 90s	35032	2678114717	MGTLV / MMGTL2B	127.8	see Bldg 221	208/120	3000	Main Disconnects	Three 800A Disconnects	Inverter System for emergency lighting (Prescolite)
222	TC	Technical Center	Classrooms, Offices, TV Studios, Auditorium	1966	---	55908	2678114329	MGTLV / MMGTL2A	152.6	500	208/120	1600	Switchboard	1600A Main Bolted Pressure Switch	-
205	CB	Counseling & Advising	Offices, Security	1969	---	17696	2678114014	MGTLV / MMGTL2B	57.6	300	208/120	800	Switchboard	800A Main Breaker	-
219	SW	Science West	Classrooms, Offices, Labs	1971	---	41988	2678114220	MGTLV / MMGTL2B	147.0	see Bldg 218	208/120	3000	Switchboard	1600A Main Breaker, with 800A CB tapped ahead	-
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	2002	21050	2027493804	MGTLV / MMGTL2B	129.6	500	208/120	3000	Switchboard	Art & Music are each served by 1600A CB from the same 3000A service entrance main breaker	Three Phase, 15 kVA UPS (Chloride)
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	2000	25594									
206	MT	Macklin Tower	Library, Classrooms, Offices, TV Studios	1971	Mid 90s	117282	2733039024	MGTLV / Month2	330.2	1000	480/277	4000	Switchboard	4000A Main Fused Switch	Three Phase, 125 kW Diesel Generator (Kohler)
213	PA	Parilla Performing Arts Center	Theatre	1984	---	28000	2006618413	MGTLV / MMGTL2A	190.8	300	208/120	1200	Panelboard	1200A Main Breaker	Three Phase, 50 kW Diesel Generator (Kohler))
203	CH	Child Care Center	Child Care	1986	---	2498	2678114220	MGTLV / MMGTL2B	UNK	see Bldg 219	208/120	UNK	UNK	served from Science West	-
209	TT	Interim Technical Training Center	Auto Shops, offices, building trades labs	1988	---	9360	2014646000	MGTLV / MMGTL2B	97.9	300	208/120	1200	Panelboard	-	-
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	---	4720	2014588707	MGTLV / MMGTL2B	49.2	150*	UNK	400	Panelboard	*Transformer serves Bldgs. 17 & 22	-
207	GU	Gudelsky Institute for Technical Education	Classrooms, Offices	1992	---	64000	2018108205	MGTLV / MMGTL2A	172.8	750	208/120	2000	Switchboard	2000A Main Breaker	2 kVA Inverter System for emergency lighting
211	MK	Mannakee Building	Administrative Offices/Meeting Rooms	1985	---	42102	2009366622	MGTLV / MMGTL2A	285.0	500	UNK	UNK	Switchboard	-	Three Phase, 15 kW Diesel Generator (Marathon)
216	CN	Canoe Trailer Shed	Shed	1990	---	420	2678114915	MGTLV / MMGTL2A	UNK	see Bldg 215	208/120	UNK	UNK	-	-
220	SB	South Campus Instruction Building	Classrooms, Offices	1996	---	29900	2023312107	MGTLV / MMGTL2B	55.7	500	208/120	800	Panelboard	800A Main Breaker	3.6 kVA Inverter System for emergency lighting
TBD	TBD	Scoreboard	Grandstand / Concessions / Restroom	1994	---	240	2678113610	GS / MDND	N/A	see Bldg 210	UNK	UNK	UNK	-	-
217	SC	Science Center	Laboratories, Classrooms	2011	---	140700	2035595517	MGTLV / MMGTL2B	768.0	1000	480/277	4000	Switchboard	4000A Main Breaker	Three Phase, 250 kW Diesel Generator (MTU)

Montgomery College Rockville Utility Master Plan Future Data
TABLE 6-2 Electrical
Wiley & Wilson Commission No.: 211130.00

Printed: 12/13/12 5:31 PM
Revised: 12/13/2012

Note: In year built/renovated column, the construction/renovation dates are completed year

Building Number	Building Code	Building Name	Building Function	Year Built/ Proposed Build	Year Renovated/ Demolished	Building Size (GSF)	PEPCO Account Number	Rate Schedule	Service Demand (kW)	Service Transformer (kVA)	Service Entrance Voltage	Service Entrance Ampacity	Service Entrance Equipment	Service Notes	Power Generation Notes
Future Utility Conditions (Reference 2006 - 2016 Facilities Master Plan Proposed Facilities)															
208	HU	Humanities Building	Classrooms, Offices, Auditorium, Central Plant	1966	---	73,912	2678114113	MGTLV / Month2	165.4	750	208/120	1200	Switchboard		Three Phase, 25 kW Diesel Generator (Kohler)
208	-	Central Plant in Humanities	Central Cooling and Heating Plant		---		2023303700	GLTV / Daily3	1018.4	1500	480/277	3000	Switchboard		Three Phase, 25 kW Diesel Generator (Kohler)
218	**SE**	**Science East Building, Renovation and Addition**	**Classrooms, Offices, Labs, Greenhouse**	**1966**	**2014**	**57,237**	2678114519	MGTLV / MMGTL2A	201.6	1000*	208/120	2500	Main Disconnects	*Transformer serves Bldgs. 2, 3, & 10; Two 1200A	Three Phase, 30 kW Diesel Generator (Kohler)
204	**CS**	**Computer Science Building, Renovation**	**Classrooms, Offices, Computer Center**	**1966**	**Partial/TBD**	**20,862**	2678114410	MGTLV / MMGTL2A	186.2	see Bldg 218	208/120	2000	Main Disconnects	1 - 1600A Disconnect, 1 - 400A Disconnect	Three Phase, 250 kW Diesel Generator (Onan)
221	**SV**	**Student Services, Demolished**	**Offices, Admissions, Student Aid, Records**	**1966**	**TBD**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
202	**CC**	**Campus Center, Renovation**	**Cafeteria, Bookstore, Recreational, Administrative**	**1966**	**2020**	**74,302**	2678114816	MGTLV / MMGTL2A	554.4	1000*	208/120	2500	Switchboard	New Switchboard (2004)	Three Phase, 200 kW Diesel Gen. (Detroit Diesel)
215	PE	Physical Education	Gym, Pool, Offices, Classrooms	1966	---	84,949	2678114915	MGTLV / MMGTL2A	232.3	**750**	208/120	2000	Switchboard	2000A Main Breaker	**New Three Phase, 50 kW Diesel Generator**
215	**PE**	**Physical Education Addition**	**Offices, Classrooms**	**TBD**	**---**	**35,800**			**179.0**						
223	TA	Theatre Arts	Classrooms, Theatre	1966	---	35,032	2678114717	MGTLV / MMGTL2B	127.8	see Bldg 202	208/120	3000	Main Disconnects	Three 800A Disconnects	Inverter System for emergency lighting (Prescolite)
222	**TC**	**Technical Center, Demolished**	**Classrooms, Offices, TV Studios, Auditorium**	**1966**	**TBD**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
205	**CB**	**Counseling & Advising, Demolished**	**Classrooms, Security**	**1969**	**TBD**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
219	**SW**	**Science West, Renovation and Addition**	**Classrooms, Offices, Labs**	**1971**	**2016**	**62,982**	2678114220	MGTLV / MMGTL2B	220.4	see Bldg 218	208/120	3000	Switchboard	1600A Main Breaker, with 800A CB tapped ahead of	-
212	MU	Music	Classrooms, Offices, Recital Rooms	1971	---	20,499	2027493804	MGTLV / MMGTL2B	129.6	500	208/120	3000	Switchboard	Art & Music are each served by 1600A CB from the same 3000A service entrance main breaker	Three Phase, 15 kVA UPS (Chloride)
201	AR	Paul Peck Art Building	Classrooms, Offices	1971	---	25,594									
206	**MT**	**Gordon & Marilyn Macklin Tower, Renovation**	**Library, Classrooms, Offices, TV Studios**	**1971**	**TBD**	**117,282**	2733039024	MGTLV / Month2	**330.2**	1000	480/277	4000	Switchboard	4000A Main Fused Switch	Three Phase, 125 kW Diesel Generator (Kohler)
213	**PA**	**Parilla Performing Arts Center, Existing & Addition**	**Theatre**	**1984**	**TBD**	**59,700**	2006618413	MGTLV / MMGTL2A	**406.8**	**750**	**480/277**	**1200**	**New Panelboard**	**1200A Main Breaker**	**New Three Phase, 125 kW Diesel Generator**
203	**CH**	**Child Care Center, Demolished**	**Child Care**	**1986**	**TBD**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
209	**TT**	**Interim Technical Training Center, Demolish**	**Auto Shops, Offices, Building Trades Labs**	**1988**	**TBD**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
210	MS	Maintenance Shops	Misc. Storage for Maintenance Eqmt.	1988	---	4,720	2014588707	MGTLV / MMGTL2B	49.2	150*	UNK	400	Panelboard	*Transformer serves Bldgs. 17 & 22	-
207	GU	Gudelsky Institute for Tech Education	Classrooms, Offices	1992	---	64,000	2018108205	MGTLV / MMGTL2A	172.8	750	208/120	2000	Switchboard	2000A Main Breaker	2 kVA Inverter System for emergency lighting
211	MK	Mannakee	Administrative Offices/Meeting Rooms	1985	---	42,102	2009366622	MGTLV / MMGTL2A	285.0	500	UNK	UNK	Switchboard	-	Three Phase, 15 kW Diesel Generator (Marathon)
216	CN	Canoe Trailer Shed	Shed	1990	---	420	2678114915	MGTLV / MMGTL2A	UNK	UNK	UNK	UNK	UNK	-	-
220	**SB**	**South Campus Instruction Building Renovation**	**Classrooms, Offices**	**1996**	**2017**	**29,900**	2023312107	MGTLV / MMGTL2B	55.7	500	208/120	800	Panelboard	800A Main Breaker	3.6 kVA Inverter System for emergency lighting
---	---	Grandstand	Grandstand / Concessions / Restroom	1994	---	240	2678113610	GS / MDND	N/A	see Bldg 210	UNK	UNK	UNK	-	-
217	SC	Science Center	Laboratories, Classrooms	2011	---	140,700	2035595517	MGTLV / MMGTL2B	768.0	1000	480/277	4000	Switchboard	4000A Main Breaker	Three Phase, 250 kW Diesel Generator
TBD	**---**	**Humanities & Social Sciences**		**TBD**	**---**	**124,000**	**TBD**	**TBD**	**496.0**	**750**	**480/277**	**800**	**Panelboard**	**800A Main Breaker**	**-**
TBD	**CH**	**New Child Care Center**		**TBD**	**---**	**6,900**	**TBD**	**TBD**	**28.0**	**75**	**208/120**	**250**	**Panelboard**	**250A Main Breaker**	**-**
TBD	**SV**	**New Student Services Center**	**Offices**	**2017**	**---**	**120,400**	**TBD**	**TBD**	**481.9**	**750**	**480/277**	**1200**	**Panelboard**	**1200A Main Breaker**	**-**
TBD	**---**	**Communication Arts**		**TBD**	**---**	**72,000**	**TBD**	**TBD**	**612.0**	**750**	**480/277**	**1200**	**Panelboard**	**1200A Main Breaker**	**-**
TBD	**---**	**Technical Training and Automotive ( )**	**Classrooms, automotive shops**	**TBD**	**---**	**84,000**	**TBD**	**TBD**	**840.0**	**1000**	**480/277**	**1600**	**Switchboard**	**1600A Main Breaker**	**-**
TBD	**---**	**Library Resource Center**	**Library, Patron Lounge**	**TBD**	**---**	**131,000**	**TBD**	**TBD**	**1310.0**	**2000**	**480/277**	**3000**	**Switchboard**	**3000A Main Breaker**	**-**
TBD	**---**	**Mixed Arts**	**Classrooms, Labs and Exhibit Spaces**	**TBD**	**---**	**72,000**	**TBD**	**TBD**	**360.0**	**500**	**480/277**	**800**	**Panelboard**	**800A Main Breaker**	**-**
TBD	**---**	**Physical Plant**	**Maintenance Areas, Offices**	**TBD**	**---**	**30,100**	**TBD**	**TBD**	**181.0**	**225**	**208/120**	**800**	**Panelboard**	**800A Main Breaker**	**-**
TBD	**---**	**Parking Garage No. 1 (Garage North)**	**Parking for 680 cars**	**TBD**	**---**	**432,000**	**TBD**	**TBD**	**216.0**	**300**	**480/277**	**400**	**Panelboard**	**400A Main Breaker**	**-**
TBD	**---**	**Parking Garage No. 2 (Garage South)**	**Parking for 518 cars**	**TBD**	**---**	**108,000**	**TBD**	**TBD**	**54.0**	**75**	**480/277**	**100**	**Panelboard**	**100A Main Breaker**	**-**



ELECTRICAL SYSTEM – SINGLE LINE DIAGRAM – EXISTING CONDITIONS

SCALE: NO SCALE

PEPCO ACCOUNT NUMBERS - Rockville Campus

BUILDING NUMBER	BUILDING BANNER	BUILDING NAME	PEPCO ACCOUNT NUMBER
201	AR	PAUL PECK ART BUILDING	2027493804
212	MU	MUSIC BUILDING	
202	CC	CAMPUS CENTER	2678114816
203	CH	CHILD CARE CENTER	2027493804
219	SW	SCIENCE WEST	
204	CS	COMPUTER SCIENCE	2678114410
205	CB	COUNSELING & ADVISING	2678114014
206	MT	MACKLIN TOWER	2733039024
207	GU	GUDELSKY INSTITUTE FOR TECH EDUCATION	2018108205
208	HU	HUMANITIES	2678114113
208	HU	CENTRAL COOLING AND HEATING PLANT	2023303700
209	TT	INTERIM TECHNICAL TRAINING CENTER	2014646000
210	MS	MAINTENANCE SHOPS	2014588707
211	MK	MANNAKEE BUILDING	2009366622
213	PA	PARILLA PERFORMING ARTS CENTER	2006618413
215	PE	PHYSICAL EDUCATION CENTER	2678114915
216	CN	CANOE TRAILER SHED	
217	SC	SCIENCE CENTER	2035595517
218	SE	SCIENCE EAST	2678114519
220	SB	SOUTH CAMPUS INSTRUCTION BUILDING	2023312107
221	SV	STUDENT SERVICES	2678114618
222	TC	TECHNICAL CENTER	2678114329
223	TA	THEATRE ARTS BUILDING	2678114717
TBD	TBD	SCOREBOARD	2678113610

LEGEND

- 13.2 kV OVERHEAD UTILITY FEEDER
- 13.2 kV UNDERGROUND UTILITY FEEDER
- 600V OR LOWER UNDERGROUND SERVICE
- OVERHEAD OR UNDERGROUND UTILITY FEEDER SWITCH, NORMALLY CLOSED, UNLESS NOTED OTHERWISE
- UNDERGROUND UTILITY FEEDER OPEN POINT
- OVERHEAD OR UNDERGROUND UTILITY FEEDER FUSES
- UTILITY FEEDER TAP/CONNECTION POINT
- UTILITY TRANSFORMER (SINGLE LINE)
- UTILITY POLE
- UTILITY PAD–MOUNTED TRANSFORMER (SITE PLAN)
- V — UTILITY VAULT TRANSFORMER (SITE PLAN)
- E — UTILITY MANHOLE/HANDHOLE (SITE PLAN)
- EP — EXTERIOR EMERGENCY PHONE STATION (SITE PLAN)
- S — PAD MOUNTED SWITCHGEAR

Montgomery College

Central Administration
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900 Hungerford Drive
Rockville, Md 20850
Telephone: (301)–251–7363

Montgomery College endless possibilities

Drawn By: DLS	Ckd By: JTO
Designed By: JTO	Approved By: JTO

Notes

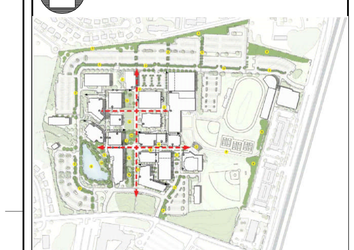
Wiley & Wilson
Employee-Owned
2310 Langhorne Road
Lynchburg, VA 24501–1547
www.wileywilson.com

COMM. NO. 204145.01

No.	Description	Date

Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

ELECTRICAL SYSTEM
SINGLE LINE DIAGRAM
EXISTING CONDITIONS

Scale: NO SCALE

Project No.

Date 12/13/12

Drawing Number E–1

MC Facilities No.

PEPCO ACCOUNT NUMBERS			
BUILDING NUMBER	BUILDING BANNER	BUILDING NAME	PEPCO ACCOUNT NUMBER
201	AR	PAUL PECK ART BUILDING	2027493804
212	MU	MUSIC BUILDING	
202	CC	CAMPUS CENTER	2678114816
219	SW	SCIENCE WEST	
204	CS	COMPUTER SCIENCE	2678114410
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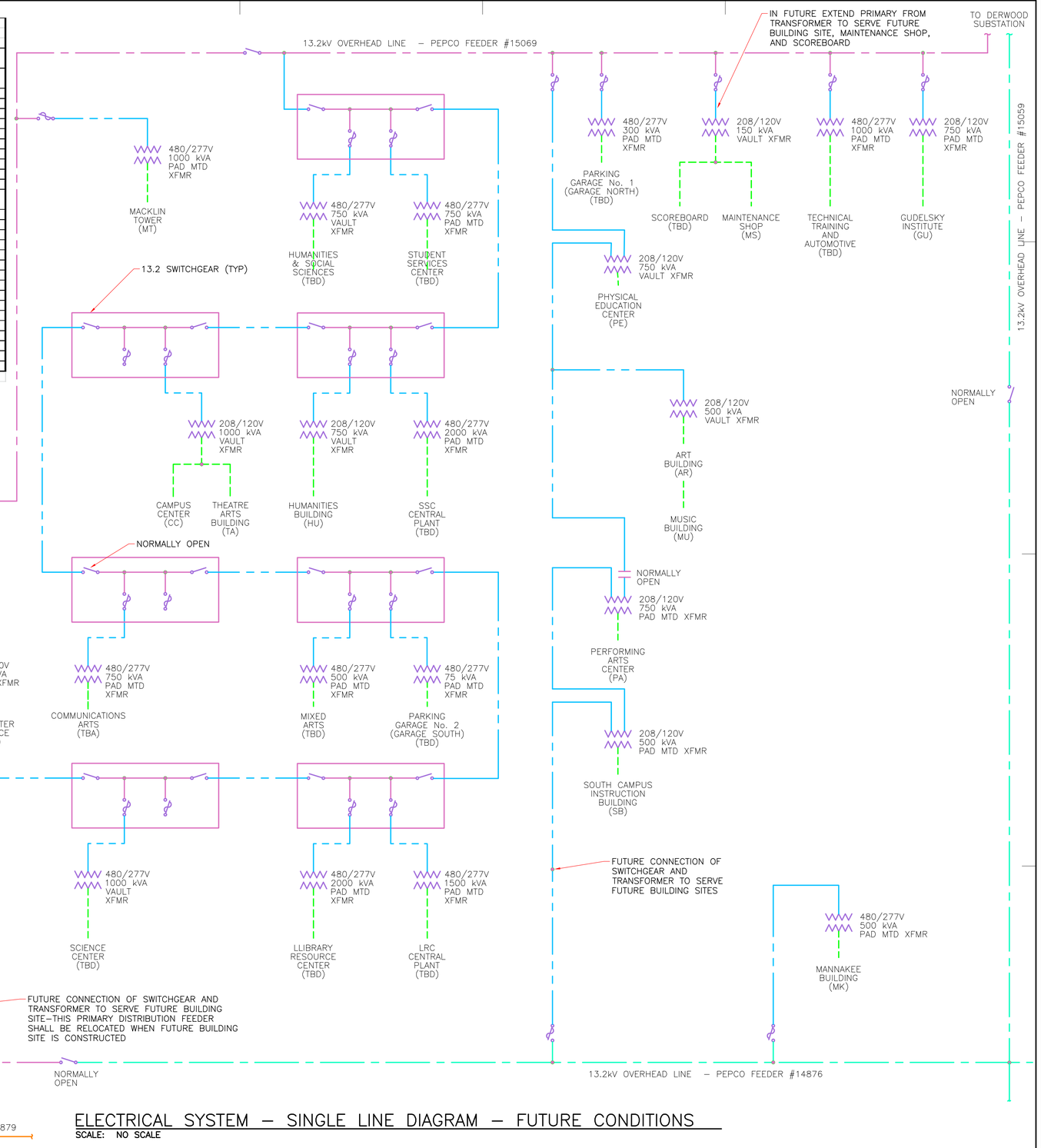
218	SE	SCIENCE EAST	2678114519
220	SB	SOUTH CAMPUS INSTRUCTION BUILDING	2023312107
221	SV	STUDENT SERVICES	2678114618
223	TA	THEATRE ARTS BUILDING	2678114717
TBD	TBD	SCOREBOARD	TBD
TBD	TBD	HUMANITIES & SOCIAL SCIENCES	TBD
TBD	TBD	CHILD CARE CENTER, NEW	TBD
TBD	TBD	STUDENT SERVICES CENTER	TBD
TBD	TBD	COMMUNICATION ARTS	TBD
TBD	TBD	TECHNICAL TRAINING AND AUTOMOTIVE	TBD
TBD	TBD	LIBRARY RESOURCE CENTER	TBD
TBD	TBD	MIXED ARTS	TBD
TBD	TBD	PHYSICAL PLANT	TBD
TBD	TBD	PARKING GARAGE No. 1 (GARAGE NORTH)	TBD
TBD	TBD	PARKING GARAGE No. 2 (GARAGE SOUTH)	TBD



LEGEND

- 13.2 kV OVERHEAD UTILITY FEEDER
- 13.2 kV UNDERGROUND UTILITY FEEDER
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- V UTILITY VAULT TRANSFORMER (SITE PLAN)
- E UTILITY MANHOLE/HANDHOLE (SITE PLAN)
- EP EXTERIOR EMERGENCY PHONE STATION (SITE PLAN)
- S PAD MOUNTED SWITCHGEAR

ELECTRICAL SYSTEM – SINGLE LINE DIAGRAM – FUTURE CONDITIONS

SCALE: NO SCALE

Montgomery College

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Designed By: JTO	Approved By: JTO

Notes

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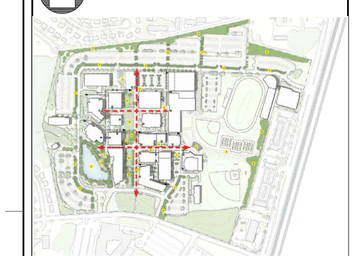
COMM. NO. 204145.01

No.	Description	Date

Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

ELECTRICAL SYSTEM
SINGLE LINE DIAGRAM
FUTURE CONDITIONS

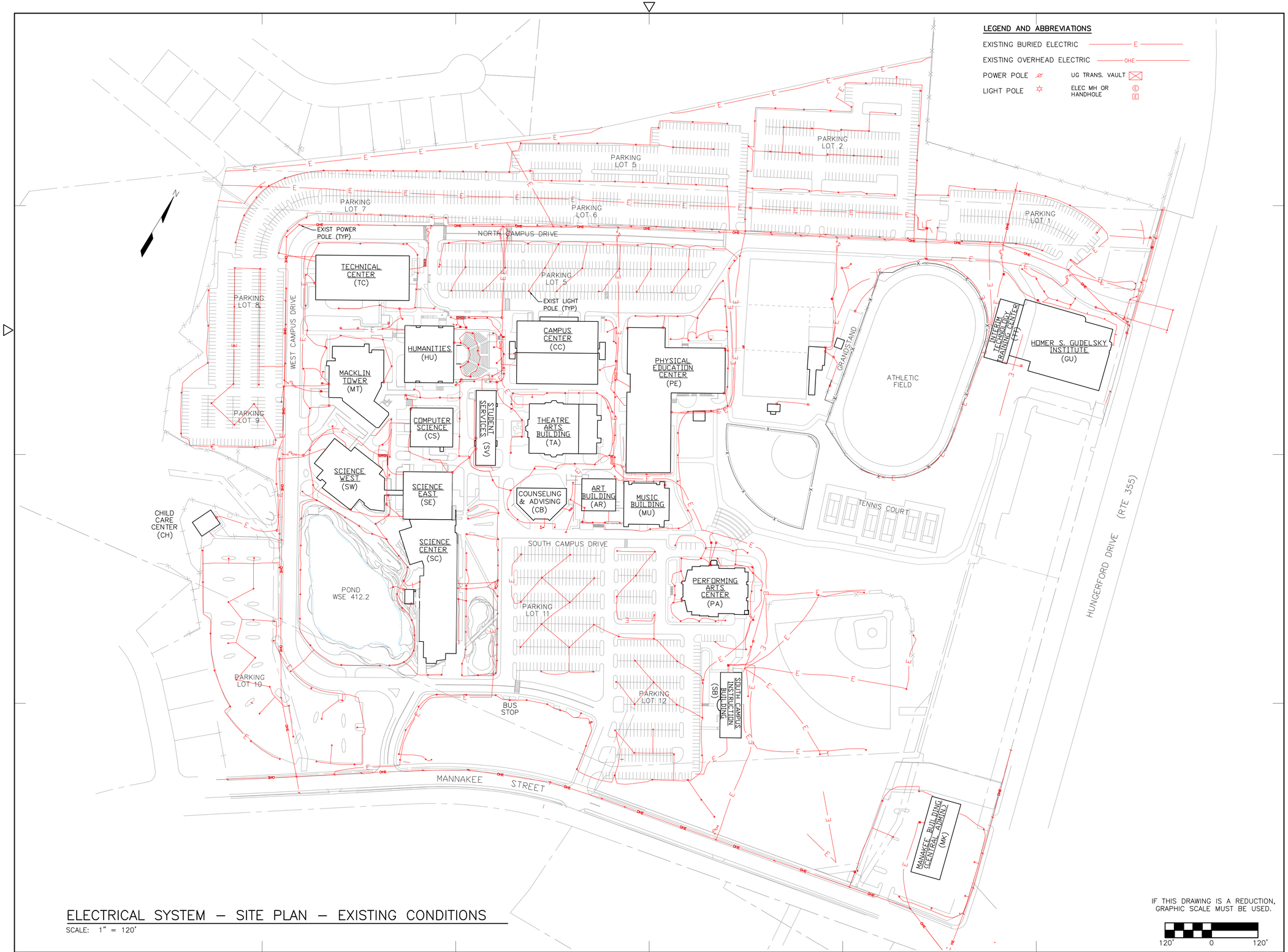
Scale: NO SCALE

Project No.

Date 12/13/12

Drawing Number E–2

MC Facilities No.



ELECTRICAL SYSTEM – SITE PLAN – EXISTING CONDITIONS

SCALE: 1" = 120'

IF THIS DRAWING IS A REDUCTION, GRAPHIC SCALE MUST BE USED.

120' 0 120'

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No.	Description	Date

Revisions

Location Map

Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

ELECTRICAL SYSTEM
SITE PLAN
EXISTING CONDITIONS

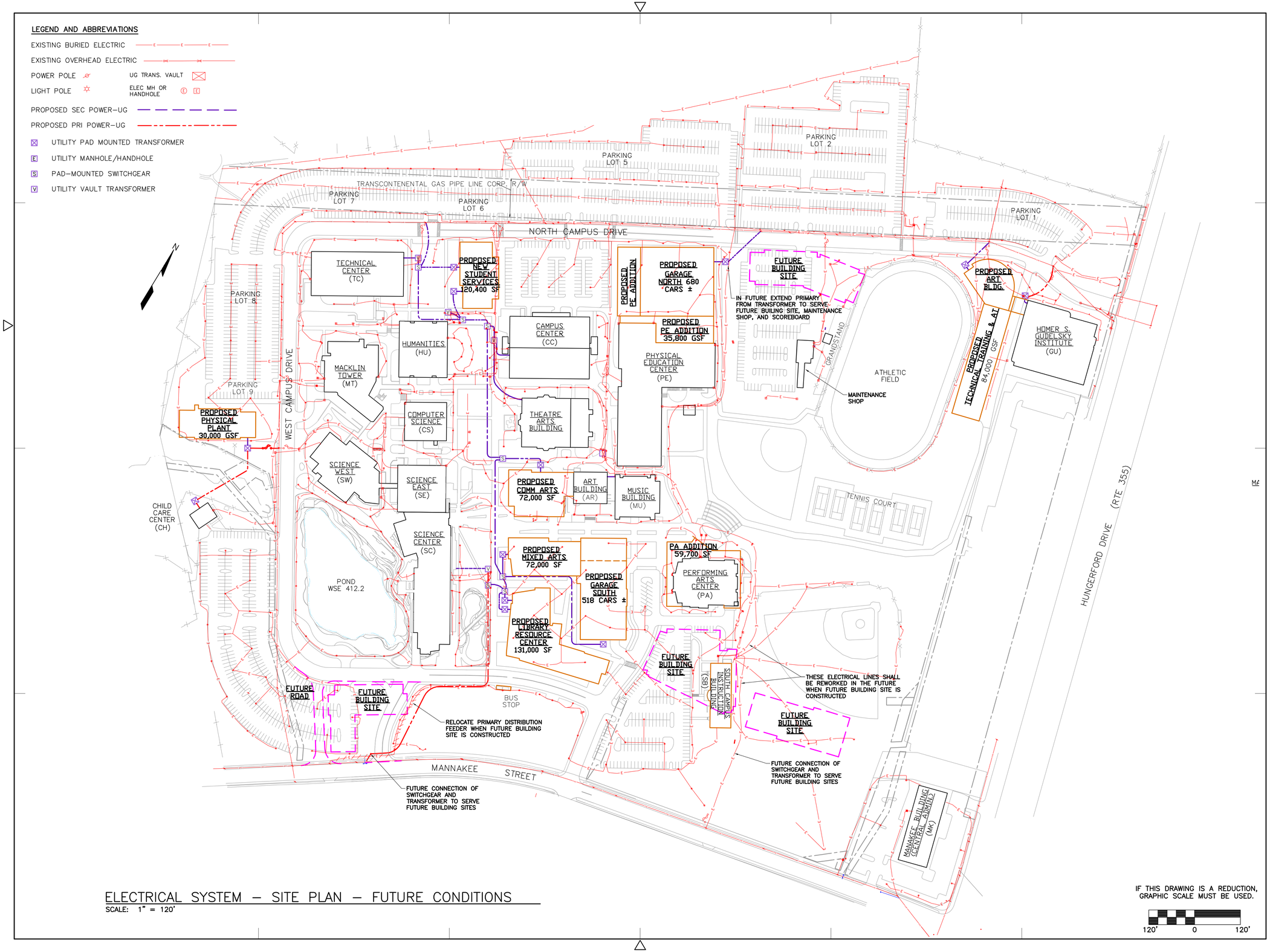
Scale: 1" = 120'

Project No.

Date 12/13/12

Drawing Number E–3

MC Facilities No.



ELECTRICAL SYSTEM – SITE PLAN – FUTURE CONDITIONS

SCALE: 1" = 120'

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COMM. NO. 204145.01

No.	Description	Date

Revisions

Location Map

Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

ELECTRICAL SYSTEM
SITE PLAN
FUTURE CONDITIONS

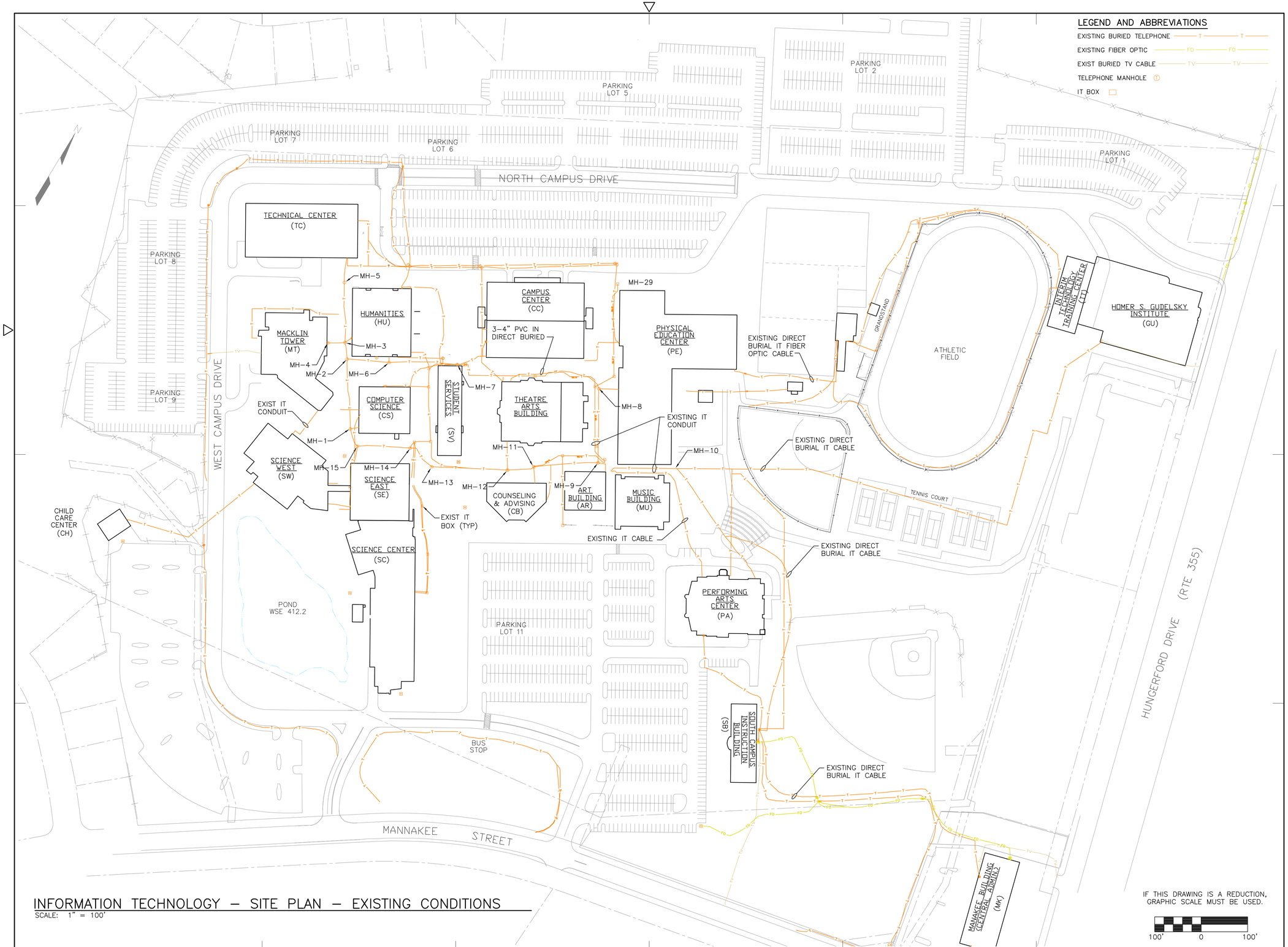
Scale: 1" = 120'

Project No.

Date 12/13/12

Drawing Number E-4

MC Facilities No.



INFORMATION TECHNOLOGY – SITE PLAN – EXISTING CONDITIONS

SCALE: 1" = 100'

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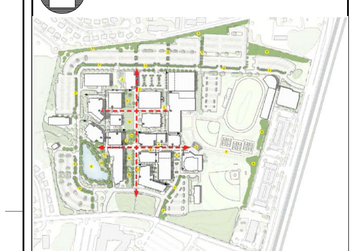
No.	Description	Date

Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

INFORMATION TECHNOLOGY
SYSTEM – SITE PLAN
EXISTING CONDITIONS

Scale: 1" = 100'

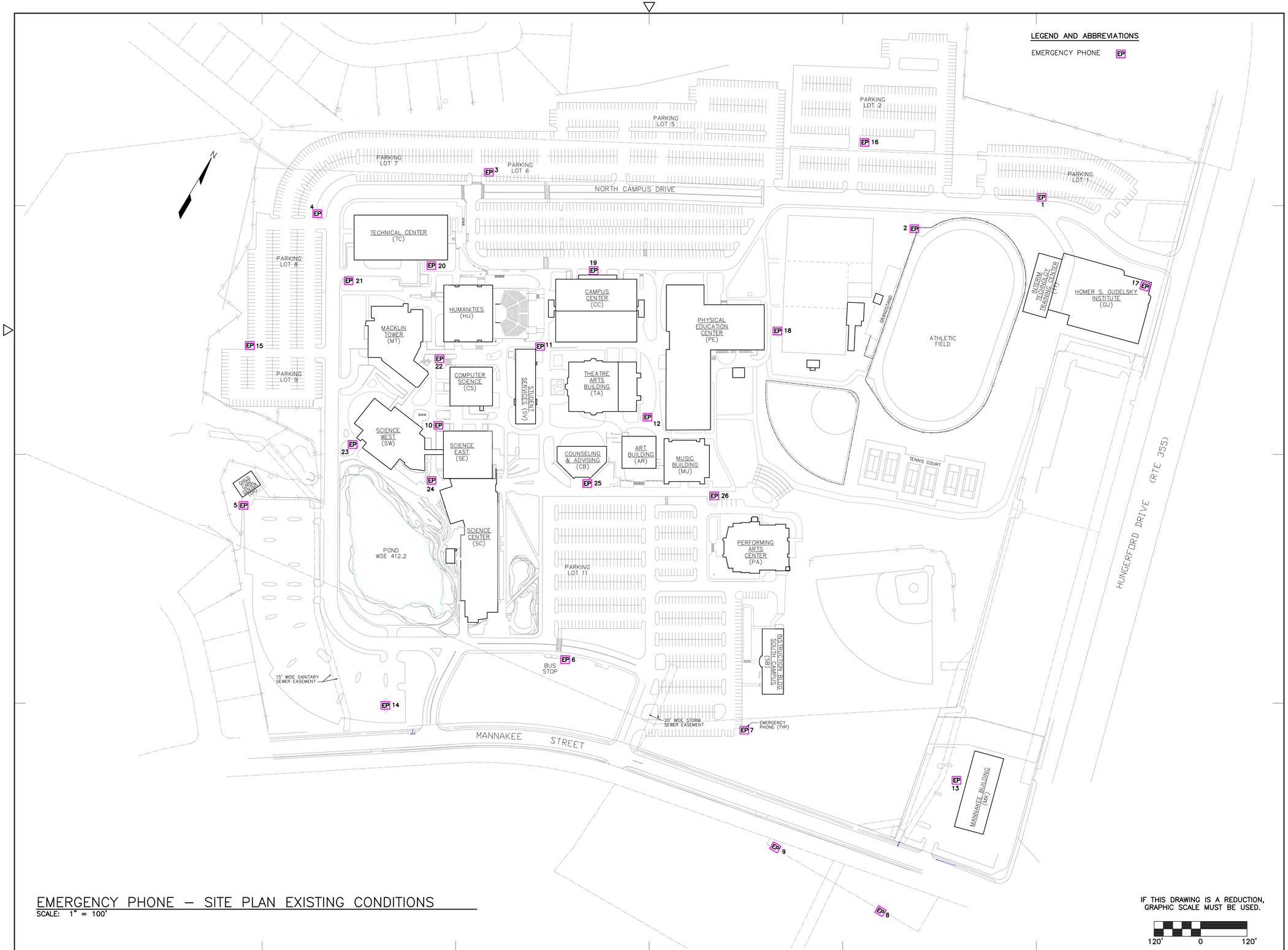
Project No.

Date
12/13/12

Drawing Number

E–5

MC Facilities No.



EMERGENCY PHONE – SITE PLAN EXISTING CONDITIONS

SCALE: 1" = 100'

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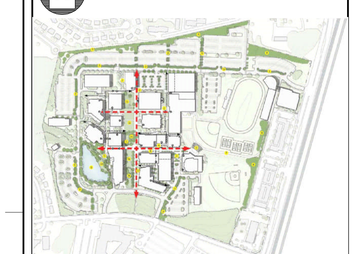
No.	Description	Date

Revisions

Location Map



Project Title

MONTGOMERY COLLEGE
ROCKVILLE CAMPUS
UTILITY MASTER PLAN

Drawing Title

EMERGENCY PHONE
SITE PLAN
EXISTING CONDITIONS

Scale: 1" = 120'

Project No.

Date 12/13/12

Drawing Number E–6

MC Facilities No.

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