P2S ENG

Snipes-Dye associates
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# Utility Infrastructure Master Plan

## San Bernardino Valley College

P2S Project #0191

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# CHAPTER 1
## Executive Summary

## BACKGROUND AND SCOPE

San Bernardino Junior College was established in 1926 and is the twenty-fifth oldest community college in California. [citation needed] In 1926, San Bernardino Valley College's campus was split between San Bernardino High School and Colton High School and consisted of 140 students and one administrator, George H. Jantzen, who was dean of the college. Today, San Bernardino Valley College offers classes to 25,000 students and runs on an annual budget of $59 million. The college district, which includes two campuses, has 148 full-time faculty, 429 part-time faculty and staff of 459. It serves multiple high school districts, and the district encompasses nearly 500 square miles.

The proposed campus master plan adds approximately 425,000 square feet of space to the campus inventory excluding parking structures.  A campus map showing the proposed near-term facilities that are being added at the campus is provided at the end of the chapter. The map also indicates buildings that are being replaced under the proposed plan.

Snipes Dye and P2S Inc. were contracted by the District to provide an aerial map and a topographical map of the campus and map and evaluate the existing utilities currently serving the campus. The scope also includes providing specific recommendations to alter/upgrade/ modify the existing utility infrastructure to support the facilities proposed as part of the near-term development and provide an updated utility master plan for the campus.

The utilities within the campus boundaries comprise of domestic and fire water, sewer, storm drain, irrigation water, chilled and hot water distribution, gas, electrical and telecommunications systems, and are all owned and operated by the campus. Southern California Gas Company and Southern California Edison Company provide gas and power to the campus respectively. AT&T is the local exchange carrier (LEC) for the telecommunication services.

The College has its own electrical distribution system which receives 4.16kV service from Southern California Edison and purchases its electric supply directly from SCE.

The College also has a central heating and cooling plant with a thermal energy storage that provides heating and cooling to majority of the buildings on campus.

The campus has a combined electric and gas expenditures of nearly $1.432 million. The University's total energy consumption is approximately 14,491,000kwh with a total energy usage of 106,000BTU's per sqft each year.

The total domestic water and sewer costs at the University total to about $182,325 per year.

## OBJECTIVE

The objective of this utility master plan study is to evaluate the existing utilities currently serving the existing Campus and provide cost-effective and specific recommendations to alter/upgrade/modify the existing utility infrastructure to support new buildings, major renovations, and building replacements that form part of the proposed near-term development plan.

## METHODOLOGY

The following methodology was adopted in formulating our utility infrastructure master plan.

- A critical aspect in the evaluation of the existing utility systems serving a facility is a detailed and accurate field investigation of the current systems. A detailed survey of the existing utility systems that currently serve the facilities at the campus was undertaken, and existing conditions, together with potential problems, were identified. The surveyed information was verified through available record drawings and meetings with the campus facilities staff.
- Each utility system was then evaluated for capacity, functionality, reliability, ease of maintenance, age, and its ability to serve the present and future needs of the campus.
- Alterations/upgrade/modifications necessary to support new buildings, major renovations, and building replacements that form part of the proposed near-term development plan were identified.
- Costs associated with each of the required utility upgrades were then developed based on our recommendations.

## REPORT OVERVIEW

Our following Utility Infrastructure Master Plan update report provides maps of existing utilities, an analysis of the existing utilities currently serving the facilities, identifies alterations/upgrade/ modifications necessary to support new buildings, major renovations, and building replacements that form part of the proposed near term development plan and outlines recommended solutions and costs to implement the same. The utility systems that were evaluated and included in our report are: Domestic and Fire Water System, Sewer System, Storm Drain System, Irrigation Water, Natural Gas System, Chilled and Heating Hot Water Systems, Electrical Systems and Telecommunication Systems.

## SUMMARY OF OUR ANALYSIS AND RECOMMENDATIONS

The following spreadsheet summarizes our analysis and our recommended solutions for each of the existing utility systems to support the near-term development. Estimated cost to upgrade each of these systems to support the near term development is also included following our recommendations.

# EXISTING CAMPUS MAP


## FACILITY LEGEND

| | |
|---|---|
| AD | ADMINISTRATION |
| ART | ART CENTER |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP1 | CENTRAL PLANT 1 |
| CP2 | CENTRAL PLANT 2 |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GRND | GROUNDS |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PAC | PERFORMING ARTS CENTER |
| PATH1 | CAREER PATHWAYS 1 |
| PATH 2 | CAREER PATHWAYS 2 |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SS/INST | STUDENT SERVICES/ INSTRUCTIONAL BUILDING |
| TRANS | TRANSPORTATION |
| TECH | TECHNOLOGY BUILDING |
| WARE | WAREHOUSE |

## LEGEND

EARTHQUAKE FAULT LINE

NORTH

0 300'

# PROPOSED MASTER PLAN


## FACILITY LEGEND

| | |
|---|---|
| AD | ADMINISTRATION |
| ART | ART CENTER |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP1 | CENTRAL PLANT 1 |
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| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PAC | PERFORMING ARTS CENTER |
| PATH1 | CAREER PATHWAYS 1 |
| PATH 2 | CAREER PATHWAYS 2 |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SS/INST | STUDENT SERVICES/ INSTRUCTIONAL BUILDING |
| TRANS | TRANSPORTATION |
| TECH | TECHNOLOGY BUILDING |
| WARE | WAREHOUSE |

## BUILDING LEGEND

EXISTING BUILDING.....

UNDER CONSTRUCTION.....

FUTURE PARKING STRUCTURE.....

FUTURE BUILDING.....

BUILDING RENOVATION/EXPANSION.....

## LEGEND

EARTHQUAKE FAULT LINE

NORTH

0 300'

# SUMMARY OF COSTS

| | | | | | |
|---|---|---|---|---|---|
| Priority 1 | Critical - Need replacement in 0-3years | Priority 3 | Fair Condition - Need Replacement in Next 5-10 years | Priority 5 | New Building Impact - Based on project schedule |
| Priority 2 | Moderately Critical - Need replacement in 3-5 years | Priority 4 | Adds Value and Redundancy 5-10 years or as funding is available | | |

| Utility | Description of Project | Priority 1 | Priority 2 | Priority 3 | Priority 4 | Priority 5 |
|---|---|---|---|---|---|---|
| **Electrical** | | | | | | |
| 1 | Replacement of MV Cables | | $975,000 | | | |
| 2 | Provision of new meters | | | | $910,000 | |
| 3 | Provision of new selector switches to offer primary selective system and duct banks | | | | $2,275,000 | |
| | | | | | | |
| **Civil** | | | | | | |
| 1 | Sewer, SD and DW Relocation | | | | | $1,820,000 |
| 2 | Irrigation Controller Replacement | | $455,000 | | | |
| 3 | Campus Wide ADA Upgrades | | | | | |
| | | | | $650,000 | | |
| **Natural Gas** | | | | | | |
| 1 | Provisions for New Earthquakes Valve | $26,000 | | | | |
| 2 | Replacement of Steel Gas Lines | | $780,000 | | | |
| 3 | Installation of Gas Submeters | | | | $32,500 | |
| 4 | Extension of new gas lines | | | | | $195,000 |
| | | | | | | |
| **Mechanical** | | | | | | |
| 1 | Main Central Plant - Secondary Chilled Water Pump Replacement or Booster Pump Addition | | $130,000 | | | |
| 2 | North Central Plant Boiler Replacement and Heat Recovery Chiller Addition | | | $260,000 | | |
| 3 | Extension of Chilled Water Lines to new buildings planned as part of the proposed master plan | | | | | $2,600,000 |
| | | | | | | |
| **Telecom** | | | | | | |
| 1 | Provision of new duct banks and media to new buildings. | | | | | $650,000 |
| | | | | | | |
| **Total Costs** | | **$26,000** | **$2,340,000** | **$910,000** | **$3,217,500** | **$5,265,000** |

**Project Categories**

**DM** Deferred maintanance: systems or facilities that have not been maintained due to lack of staffing or funding. While operational, failure is imminent.

**EM** Emergency projects are systems or facilities that have failed or do not function as designed. Repair or replacement is required.

**UF** Projects or intiatives that would improve systems, facilities or operations on campus.

**REG** Projects related to Fire, Life, Safety; Code or OSHA compliance. Risk of harm and potential for fines or shutdown directives from regulating authorities.

**NC** New construction to support proposed buildings

[1]Refer to Appendix for breakdown of costs.

# CHAPTER 2
## Cooling and Heating Systems

# CHILLED WATER SYSTEM

## SYSTEM DESCRIPTION

The cooling needs of majority of the facilities at the campus are met by a central plant located next to the Maintenance and Operation facility off of K Street on the south east side of the campus. A few of the facilities are served by dedicated package systems.

## METHODOLOGY

The following methodology was adopted in formulating our mechanical utility infrastructure master plan. The methodology presented below outlines the critical tasks that were performed in development of this master plan report.

- A critical aspect in the evaluation of the existing mechanical systems serving a facility is a detailed and accurate feld investigation of the current system(s). A detailed survey of the existing mechanical system that currently serves the facilities at the campus was undertaken, and existing conditions, together with potential problems, were identifed. The surveyed information was verifed through available record drawings and meetings with the campus facilities staff.
- A load study of the existing and future facilties loads was developed and existing and proposed capacity requirements were developed. A sq. ft./Ton of proposed facilities was assumed in our load studies. For all existing buildings, existing installed capacities were taken to estimate the total loads.
- Options for meeting cooling and heating needs of existing and proposed facilities were evaluated to support new buildings, major renovations, and building retrofts that form part of the proposed campus facilities master plan
- Recommendations were then developed based on functionality, reliability, ease of maintenance, and its ability to serve the present and future needs of the campus
- Costs associated with each of the options were developed and the most cost-effective solution was recommended

The following sections provide a description of the central plant system and individual mechanical systems currently serving each of the facilities at the campus.

**TABLE 1 - COLLEGE BUILDING LIST**

| Building ID | Building Name | Cooling | Heating |
|---|---|---|---|
| AD/SS | Administration / Student Services | Central CHW | Central HHW |
| ART | Art & Gallery | Central CHW | Central HHW |
| AUD | Auditorium | Central CHW | Local HHW |
| B | Business | Central CHW | Local HHW |
| CC | Campus Center | Central CHW | Gas |
| CDC | Child Development Center | DX | Gas |
| HLS | Health & Life Sciences | Central CHW | Gas |
| LA | Liberal Arts | Central CHW | Local HHW |
| LIB | Library | Central CHW | Gas |
| OBS | Observatory | DX | Gas |
| PL | Planetarium | Central CHW | - |
| G1 & G2 | Gym | Central CHW | Local HHW |
| SHS | Student Health Services | DX | GAS |
| T | Tech | DX | GAS |
| MEDIA | Media / Communications | Central CHW | Local HHW |
| NCP | North Central Plant | - | - |
| M&O | Maintenance & Operations | DX | Gas |
| NH | North Hall | Central CHW | Local HHW |
| SCI | Chemistry / Physical Sciences | Central CHW | Local HHW |

**TABLE 2 - CHILLERS IN CENTRAL PLANT**

| Chiller Tag | Manufacturer | Type | Rated Tonnage | LWT (°F) | EWT (°F) | Year Installed | Age (Years) |
|---|---|---|---|---|---|---|---|
| CH-1 | Trane | Centrifugal | 600 | 39 | 54 | 2013 | 7 |
| CH-2 | Trane | Centrifugal | 600 | 39 | 54 | 2013 | 7 |

**TABLE 3 - CHW AND CW PUMPS IN CENTRAL PLANT**

| Pump Tag | Manufacturer | Service | Flow (GPM) | Head (FT) |
|---|---|---|---|---|
| CHWP-1 | Armstrong | Primary | 960 | 35 |
| CHWP-2 | Armstrong | Primary | 960 | 35 |
| CHWP-3 | Armstrong | Secondary | 2000 | 100 |
| CHWP-4 | Armstrong | Secondary | 2000 | 100 |
| CWP-1 | Armstrong | CT-1 | 1300 | 60 |
| CWP-2 | Armstrong | CT-2 | 1300 | 60 |

**TABLE 4 - COOLING TOWERS IN CENTRAL PLANT**

| Cooling Tower Tag | Manufactuer | Capacity (GPM) | LWT (°F) | EWT (°F) | Year Installed | Age (Years) |
|---|---|---|---|---|---|---|
| CT-1 | Evapco | 520 | 84 | 94 | 1999 | 20 |
| CT-2 | Evapco | 520 | 84 | 94 | 1999 | 20 |
| CT-3 | Evapco | 500 | 81.1 | 96.1 | 2009 | 10 |

### Central Cooling Plant

The central cooling plant was constructed in 2013. There are two (2) Trane centrifugal chillers rated at 600 tons each, utilizing R-123 refrigerant. Associated with the chillers are two (2) Evapco induced draft counter flow cooling towers. The cooling towers are elevated with piped Condenser Water Supply and Return (CWS&R) connections to each cell. There is a piped equalizer line between the two cells. A side stream sand filter serves the condenser water system and is located within the cooling tower yard. To offset peak electrical demand, and to provide additional capacity during peak periods, there is also a large Thermal Energy Storage (TES) tank in the central plant. The TES tank has a rated capacity of 8,000 ton-hours, and a rated discharge rate of 1,500 tons/hour. It is sized to handle the campus load during the peak electrical charge period of 12pm-6pm. Tank diameter is 45ft and is it 65ft tall.The chilled water system is pumped primary variable secondary variable.

Each chiller has a dedicated primary pump. Two large secondary distribution pumps are headered together and located within the chiller room. All pumps are vertical inline Armstrong pumps and are on VFDs. Condenser water pumps are located within the chiller room directly upstream of the chillers. Each chiller has a dedicated condenser water pump directly upstream of the condenser barrel. Condenser water pumps are vertical inline Armstrong pumps and have VFDs mounted on the motors.

All equipment is roughly 7 years old and are in good condition. See Table 2, Table 3, and Table 4 for a breakdown of the equipment.

### CHW Distribution

A 12" Chilled Water Supply and Return (CHWS&R) main line leaves the Central Plant and heads west to serve the buildings in the southwestern part of campus. The buildings served include:

- Gymnasium
- Media / Communications
- Campus Center
- Business
- Library
- Liberal Arts
- North Hall
- Planetarium

Further north, an 8" CHWS&R main line continues to serve the northwestern part of campus, consisting of the following buildings:

- Auditorium
- Chemistry / Physical Sciences
- Administration / Student Services
- Art & Gallery
- Health & Life Sciences

The lines head east, between the Tech Building and the baseball fields, then turn south and run alongside K Street back to the Central Plant. The rest of the campus facilities are cooled with DX air conditioning equipment. Schedule 40 Steel pipe and Type K copper, for larger and smaller pipe sizes, respectively, were used to connect the campus buildings to the central plant. The piping distribution network was installed in 2013 and is in good condition. Refer to Table 1 for a campus building list and associated sources of cooling service. An exhibit of the existing chilled water distribution is provided at the end of the section for reference.

HHW Pumps at Central Plant


HHW Pumps and Chillers at Central Plant

Cooling Tower at Central Plant

Thermal Energy Storage Tank

## GYMNASIUM

The Gymnasium was constructed in 2016 and houses one (1) mechanical room for the local heating hot water (HHW) plant. Domestic hot water is created from a heat exchanger connected to the HHW system. There are seven (7) Western Aire variable speed air handlers – located on the roof and split between the north, south, and center of the building. The air handling units have CHW & HHW coils. The building uses VAV boxes with reheat coils for zone temperature control. The air handlers are approximately 4 years old and are in good condition.

Exhaust Fans at Gym


AHU Coil Connections at Gym

## MEDIA / COMMUNICATIONS

The Media / Communications building was constructed in 2010. There are four (4) rooftop air cooled package units that are original to the building. In 2013, the rooftop units were converted from DX through addition of cooling coils and connected to the central cooling plant. The rooftop package units are approximately 10 years old and are nearing the 15 years of life expectancy. Because the cooling coils were replaced in 2013, an additional ten years can be anticipated from the units.

Chilled Water Valves

Media Comm Rooftop Mechanical Equipment

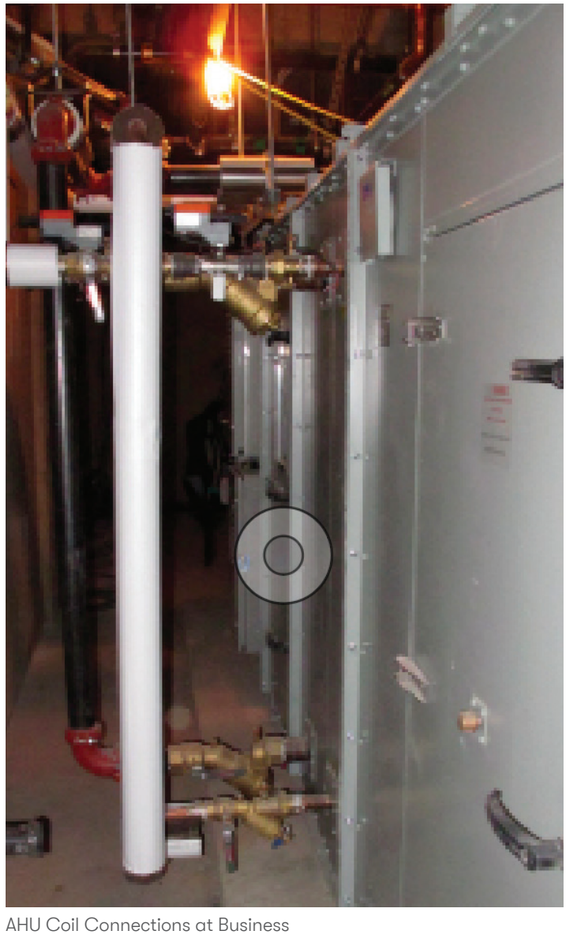
## CAMPUS CENTER

The Campus Center is a two-story building served by sixteen (16) packaged rooftop units and two (2) Trane single-zone air handling units, all located on the roof. The packaged rooftop units are approximately 16 years old. ASHRAE suggests a useful life of 15 years for this type of equipment, however in 2013, these units were converted from DX through addition of cooling coils and connected to the central cooling plant. The replacement of coils is anticipated to increase the life by at least ten years. The single-zone air handling units were installed in 2013 and are approximately 7 years old. ASHRAE suggests a useful life of 20-25 for this type of equipment.

CHW Pipe Chase

## BUSINESS

The Business building was renovated in 2013, and houses three (3) mechanical equipment rooms. There are two (2) Energy Labs variable speed air handling units serving the building. AHU-1 has a return fan module tagged as AHU-3, while AHU-2 has a return fan module tagged as AHU-4. The air handling units have both CHW and HHW coils. The air handling units are approximately 7 years old. ASHRAE suggests a useful life of 20-25 years for this type of air handling unit. The system employs VAV with reheat for individual zone temperature control. There are two cooling only split system units serving the IDF rooms with



AHU Coil Connections at Business

condensing units located in the basement.

## LIBRARY

The Library building was constructed in 2012 is approximately 17 years old. There are seventeen (17) rooftop package units that are original to the building. Originally, they were DX cooling coils, but were converted to chilled water cooling coils and connected to the central cooling plant in 2013. ASHRAE suggests a useful life of 15 years for this type of package rooftop unit, but it is anticipated that this life expectancy will be extended for another ten years due to the 2013 coil replacement.

## LIBERAL ARTS

The Liberal Arts building is approximately 50 years old. There are two (2) large multi-zone air handling units located in the basement serving the building which were installed in 1969. ASHRAE suggests a useful life of 20-25 years for this type of air handling unit. The units have well exceeded the suggested useful life. The building was connected to the central plant in 2013. All controls for this building are pneumatic with DDC ETP transducers with HHW reheat coils and pneumatic valves and thermostats at the zone level.

According to the proposed Master Plan, this building will be demolished and replaced within the next 5 years.

## NORTH HALL

The North Hall building was constructed in 2010 as a replacement to the original building. There are (4) rooftop package units that are original to the building. Installed as DX systems, they were converted to chilled water units in 2013 through addition of cooling coils. The rooftop package units are approximately 10 years old. ASHRAE suggest a useful life of 15 years for this type of equipment but it is anticipated that this life expectancy will be extended due to the 2013 coil replacement.

## PLANETARIUM

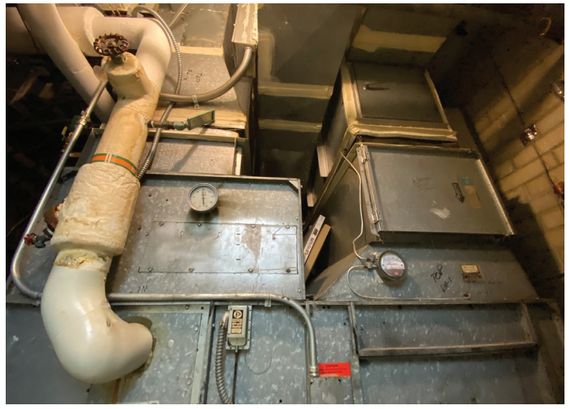
The Planetarium building is approximately 45 years old. There is an existing multi-zone air handling unit that appears to be original to the building. ASHRAE suggests a useful life of 20-25 for multi-zone air handling units. This unit has well exceeded its suggested useful life. All controls

CHWS&R Lines on Roof of Library Building

CHWS&R Lines at Liberal Arts Building

CHW Valves

CHW Valves



Multi-zone at Planetarium Building

Air Handling Unit on Library Building

Multi-zone Units in Liberal Arts Basement


North Hall Building

Pneumatic Controls in Planetarium Building

are pneumatic and should be replaced with a full DDC system.

## AUDITORIUM

The Auditorium building is approximately 85 years old and houses two (2) mechanical equipment rooms. There is an air handling unit serving the building that is approximately 17 years old. ASHRAE suggests a useful life of 20-25 for this type of unit. The rest of the HVAC system was renovated in 2013. During the renovation, thirteen (13) CHW/HHW fan coils were installed. They are 6 years old and need no replacement over the next 15 years.

## CHEMISTRY / PHYSICAL SCIENCES

Chemistry / Physical Sciences was constructed in 2010. There are three (3) large Trane air handling units on the roof providing cooling that are original to the building. The air handling units have CHW coils. The building is connected to the central cooling plant, and it also has an air-cooled chiller on the roof rated at 230-tons. This chiller is no longer in service. It is recommended to remove all non-functioning equipment and cap existing lines.

## ADMINISTRATION / STUDENT SERVICES

The Administration / Student Services buildings are connected to the central cooling plant and are served by thirty-seven (37) IEC 4-pipe fan coil units that are approximately 16 years old. According to ASHRAE, typical service life for these fan-coil units is 20 years. All of the fan coils should be considered for replacement within the next 5-10 years.

## ART & GALLERY

Art & Gallery buildings are connected to the central cooling plant and is served by thirty-seven (37) IEC 4-pipe fan coil units that are approximately 15 years old. According to ASHRAE, typical service life for these fan-coil units is 20

AHU in Auditorium Building

CHW Valve Connections to Chemistry/Physical Sciences

Abandoned Cooling Tower at Admin Student Services North Central Plant

CHW Lines

CHW Valves


Art Center

years and should be considered for replacement within the next 5-10 years.

## HEALTH & LIFE SCIENCES

Health & Life Sciences is served by thirty-four (34) rooftop package units that are approximately 18 years old. ASHRAE suggest a useful life of 15 years for this type of equipment. The units were originally DX cooling but were converted through addition of cooling coils and connected to the central cooling plant in 2013. The replacement of the coils

Chilled Water Pipe Chase

is anticipated to extend the life of this equipment by an additional 10 years.

## ANALYSIS OF EXISTING SYSTEMS

Information on the existing equipment of the central plant was gathered through as built drawings as well as verification during a site visit. All equipment in the central plant were installed in 2013 and are in good condition. The piping distribution network was also installed in 2013 and is in good condition.

The size of the distribution piping mains and branches were evaluated using the following methodology.

- Information regarding the size, usage and chilled water demands of each building or complex which utilize the campus chilled water system to meet their cooling needs was compiled through various sources. Much of the information regarding older campus buildings was provided by the campus in the form of historical documentation, as built drawings. Some information was obtained using documentation from previous retrofit projects. Several buildings were based on current proposed or actual construction documents. The balance was determined by applying accepted engineering practice rule of thumb factors based on individual building occupancy and usage type.
- When known, actual installed tonnage was used for the cooling design peak load (tons). Where this information was not known the building area was multiplied by an accepted square foot/ton factor. This factor was determined based on a combination of experience, good engineering design practice and referenced material from the most recent version of ASHRAE Fundamentals
- Having determined the diversified tonnage for each building or complex of buildings to be served by the central plant a diversified GPM was calculated. Diversified GPM is calculated using the formula;
  - Q = Load / (500 * ΔT)
  - Where
    - Load = diversified tonnage x 12,000, Btu/h
    - Q=flow rate, GPM
    - ΔT=temperature increase or decrease, °F
- The design chilled water temperature difference, ΔT (°F), for the campus is 16°F. The calculated GPM shown on shown on Table 5 - Chilled Water Building Analysis assumes all existing buildings and all buildings scheduled to be operational in the future will use at least a 16°F ΔT in sizing the cooling coils for those buildings.
- The total estimated chilled water load and flow requirements to serve the campus are broken into (2) phases. The first phase includes buildings currently connected to the campus chilled water system and buildings currently planned for construction under the proposed Master Plan. Size, usage and date of demolition for existing buildings or completed construction for proposed buildings are based on the proposed campus buildings list provided by the Campus.
- The model was constructed using known parameters with regards to location of the central plant in relationship to each building. The routing and material of the distribution piping to each building was based on information obtained using historical documentation and site survey performed by us.

**TABLE 5 - CHILLED WATER BUILDING ANALYSIS EXISTING CONDITIONS**

| Building ID | Building Name | Year Built | GSF | Installed Cooling (Tons) | Installed SF / Ton | Block SF / Ton | Block Load (Tons) | GPM |
|---|---|---|---|---|---|---|---|---|
| AD/SS | Administration / Student Services | 2003 | 33,300 | 140 | 237 | 400 | 83 | 125 |
| ART | Art & Gallery | 2004 | 22,500 | 80 | 282 | 400 | 56 | 84 |
| AUD | Auditorium | 1935 | 26,200 | 97 | 271 | 300 | 87 | 131 |
| B | Business | 1960 | 43,700 | 145 | 302 | 300 | 146 | 219 |
| CC | Campus Center | 2003 | 34,700 | 157 | 221 | 400 | 87 | 130 |
| HLS | Health & Life Sciences | 2001 | 40,200 | 240 | 167 | 400 | 101 | 151 |
| LA | Liberal Arts | 1969 | 39,400 | 120 | 328 | 300 | 131 | 197 |
| LIB | Library | 2001 | 40,000 | 187 | 214 | 400 | 100 | 150 |
| PL | Planetarium | 1976 | 11,300 | 26 | 428 | 300 | 38 | 57 |
| G1 & G2 | Gymnasium | 2013 | 72,949 | 303 | 240 | 300 | 243 | 365 |
| MEDIA | Media / Communications | 2009 | 18,300 | 66 | 277 | 400 | 46 | 69 |
| NH | North Hall | 2010 | 49,800 | 217 | 229 | 400 | 125 | 187 |
| SCI | Chemistry & Physical Sciences | 2011 | 57,000 | 302 | 189 | 300 | 190 | 285 |
| **Total** | | | | | | | **1,432** | **2,148** |

**TABLE 6 - CHILLED WATER BUILDING ANALYSIS FUTURE CONDITIONS**

| Construction Year | Bldg. # | Building Name | GSF | Installed Cooling (Tons) | Installed SF / Ton | Block SF / Ton | Block Load (Tons) | GPM |
|---|---|---|---|---|---|---|---|---|
| 2003 | 1 | Administration / Student Services | 33,300 | 140 | 237 | 400 | 83 | 125 |
| 2004 | 2 | Art & Gallery | 22,500 | 80 | 282 | 400 | 56 | 84 |
| 1935 | 3 | Auditorium | 26,200 | 97 | 271 | 300 | 87 | 131 |
| 1960 | 4 | Business | 43,700 | 145 | 302 | 300 | 146 | 219 |
| 2003 | 5 | Campus Center | 34,700 | 157 | 221 | 400 | 87 | 130 |
| 2001 | 7 | Health & Life Sciences | 40,200 | 240 | 167 | 400 | 101 | 151 |
| 2001 | 9 | Library | 40,000 | 187 | 214 | 400 | 100 | 150 |
| 2011 | 17 | Chemistry / Physical Sciences | 57,000 | 302 | 189 | 300 | 190 | 285 |
| 2010 | 18 | North Hall | 49,800 | 217 | 229 | 400 | 125 | 187 |
| 2009 | 19 | Media / Communications | 18,300 | 66 | 277 | 400 | 46 | 69 |
| 1976 | | Planetarium | 11,300 | 26 | 428 | 300 | 38 | 57 |
| 2013 | | Gymnasium | 72,949 | 303 | 240 | 300 | 243 | 365 |
| Future | | Student Services / Instructional | 59,100 | - | - | 400 | 148 | 222 |
| Future | | Performing Arts Center | 30,000 | - | - | 400 | 75 | 113 |
| Future | | CP1 (aeronautics) | 22,940 | - | - | 400 | 57 | 86 |
| Future | | CP2 (allied health) | 39,206 | - | - | 400 | 98 | 147 |
| Future | | Tech Building | 100,000 | - | - | 400 | 250 | 375 |
| **Total** | | | | | | | **1,929** | **2,893** |

A hydraulic model of the campus' chilled water distribution system was created to form an understanding of how the existing chiller plant would operate under today's most demanding cooling conditions. This model was created using the PIPE-FLO Professional modeling software by using building performance information to analyze the combined chilled water performance of the system.

There are 13 buildings connected to the chilled water distribution system at the campus. The total cooling capacities of these buildings were estimated using record drawings from each building and summing the capacities of all the air conditioning equipment. This sum represents the total cooling demand of a building under the condition that the entire building is at its peak cooling load, which is an unrealistic scenario, however, it does give a better idea of the actual upper limit of the building's operation. To estimate a more realistic peak cooling demand, each building was assigned a block cooling load based on its age and occupancy type. This was then converted to a building flow rate under the assumption that the campus' central plant is producing a 16-degree temperature differential.

By modeling each of the buildings, and the piping network that connects them, a complete model of the chilled water distribution system was created. A building pressure differential of 15 psid was assumed for each building. The secondary distribution pumps at the central plant were included in the model to gain a better understanding of the distribution pump's operation at the expected peak load.

## ANALYSIS OF FUTURE NEEDS

As shown in Table 6, the addition of the Career Pathways, Student Services/Instructional buildings and Performing Arts Center in the future will bring the anticipated chilled water peak block load above the present TES discharge sizing capacity. It is anticipated that at full build out, the campus will peak at approximately 1,930 tons. This will require either running chillers at the same time as discharging TES or adding Heat Recovery Chillers at the Career Path Building, Technology Building, Performing Arts Center, Student Services/Instructional Building and the North Satellite Central Plant location. This will allow the campus to augment their overall chilled water system capacity while taking advantage of the energy efficiency of utilizing simultaneous heating and cooling.

## FINDINGS AND RECOMMENDATIONS

The model showed that, under present day conditions, the total campus chilled water demand amounts to 2,150 GPM, which correlates to a required differential pressure of 95 ft hd to be supplied by the secondary distribution pumps. For campus distribution piping, the ideal upper limit of distribution pipe is 8 feet per second. The max velocity in any of the piping network between the buildings at the campus did not exceed 9.5 feet per second, indicating that the network has an adequate amount of capacity to support existing and future buildings at the campus.

The future building scenario included the replacement of the Liberal Arts building with a new Student Service / Instructional building as well as a new Career Pathways 1 and 2, a new Technical building and a new Performing Arts Center building to replace the Technical building (which is currently not connected to the chilled water distribution system). These buildings added another 630 GPM to the loop for a total of about 2,900 GPM. This increases the total requires system pressure to 185 ft hd.

The secondary distribution pumps are sized for a maximum pressure of 100 ft hd. Therefore, as additional buildings are constructed and connected to the chilled water distribution system, the operation of the secondary pumps at the central plant should be re-evaluated and considered for replacement with pumps capable of providing a greater pressure differential.  Adding booster pumps at selected connected buildings should also be evaluated as an alternative to replacing the Central Plant secondary pumps. Utilizing booster pumps as needed will save overall pumping energy.

A review of the capacities at the central plant revealed that the plant also appeared to be operating close to its maximum capacity. When future loads come on, the campus loop will require additional chiller capacity for redundancy in meeting the campus load and additional flexibility. Adding a heat recovery chiller to the north satellite chiller plant  and the proposed Technology Center which already has built in infrastructure connections to the campus CHW and north HHW loop will provide additional chiller capacity and provide required redundancy. The addition of heat recovery chiller (through use of waste heat) will also minimize gas usage and reduce overall greenhouse gas emissions. An exhibit of the proposed chilled water distribution and proposed heat recovery chillers is provided at the end of the section for reference.

## IMPLEMENTATION AND PHASING PLAN

Heat recovery chillers shall be installed as a part of the Career Pathways 2/North Central Plant, Technology Building, Performing Arts & Student Services/Instructional Building project in order to meet the anticipated future chilled water and heating hot water campus loads.

# ROUGH ORDER COST ESTIMATES

| | | | | | |
|---|---|---|---|---|---|
| Priority 1 | Critical - Need replacement in 0-3years | Priority 3 | Fair Condition - Need Replacement in Next 5-10 years | Priority 5 | New Building Impact - Based on project schedule |
| Priority 2 | Moderately Critical - Need replacement in 3-5 years | Priority 4 | Adds Value and Redundancy 5-10 years or as funding is available | | |

| Sequential Tracking # | Campus | Infrastructure Scope | Utility | Installed Year(s) | Brief Description of the Need | Priority Level (1..4) | Project Name | Brief Scope of Project | Project Category | Can the Project be Phased - Y/N | Total Construction Costs ($)[1] | Total Project Costs - Including Soft Costs ($) | Study by (Prime Consultant) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SBVC-M1 | SBVC | Main Central Plant- Secondary Chilled Water Pump Replacement or Booster Pump Addition | Mechanical | - | After the future Master Plan build outs the secondary chilled water pumps at the Main Central Plant may need to be upsized due to anticipated increased head requirements. Trend data should be analyzed and the existing pumps should be reviewed with larger impellers and safely oversped motors. If the existing pumps cannot meet the anticipiated increased head demand, secondary chilled water pumps should be replaced or booster pumps should be selectively installed around the campus in order to meet the new loads. | 2 | Main Central Plant- Secondary Chilled Water Pump Replacement or Booster Pump Addition | Pump Replacement | NC | Y | $100,000 | $130,000 | P2S Inc |
| **Total Priority 2 Costs** | | | | | | | | | | | **$100,000** | **$130,000** | |
| SBVC-M2 | SBVC | North Central Plant - Boiler Replacement and Heat Recovery Chiller Addition and Addition of New Heat Recovery Chiller at New Technology Building | Mechanical Heating Hot Water | - | The (2) Boilers in the North Central Plant are nearly 20 years old and will require replacement over the next 10 years. The boilers should be replaced with either high efficiency condensing boilers and/or a heat recovery chiller. The heat recovery chiller will offer waste heat and minimize gas consumption. | 3 | North Central Plant Boiler Replacement and Technology Building Heat Recovery Chiller Addition | Boiler Replacement and Heat Recovery Chiller Addition | DM | Y | $200,000 | $260,000 | P2S Inc |
| **Total Priority 3 Costs** | | | | | | | | | | | **$200,000** | **$260,000** | |

| Sequential Tracking # | Campus | Infrastructure Scope | Utility | Installed Year(s) | Brief Description of the Need | Priority Level (1..4) | Project Name | Brief Scope of Project | Project Category | Can the Project be Phased - Y/N | Total Construction Costs ($)[1] | Total Project Costs - Including Soft Costs ($) | Study by (Prime Consultant) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SBVC-M3 | SBVC | Extension of Chilled Water Lines to new buildings planned as part of the proposed master plan | Mechanical | - | Extension of Chilled Water Lines to new buildings planned as part of the proposed master plan | 5 | Extension of Chilled Water Lines to new buildings planned as part of the proposed master plan | New Chilled Water lines | NC | Y | $2,000,000 | $2,600,000 | P2S Inc |
| **Total Priority 5 Costs** | | | | | | | | | | | **$2,000,000** | **$2,600,000** | |
| **Total Costs** | | | | | | | | | | | **$2,300,000** | **$2,990,000** | |

**Project Categories**

**DM** Deferred maintanance: systems or facilities that have not been maintained due to lack of staffing or funding. While operational, failure is imminent.

**EM** Emergency projects are systems or facilities that have failed or do not function as designed. Repair or replacement is required.

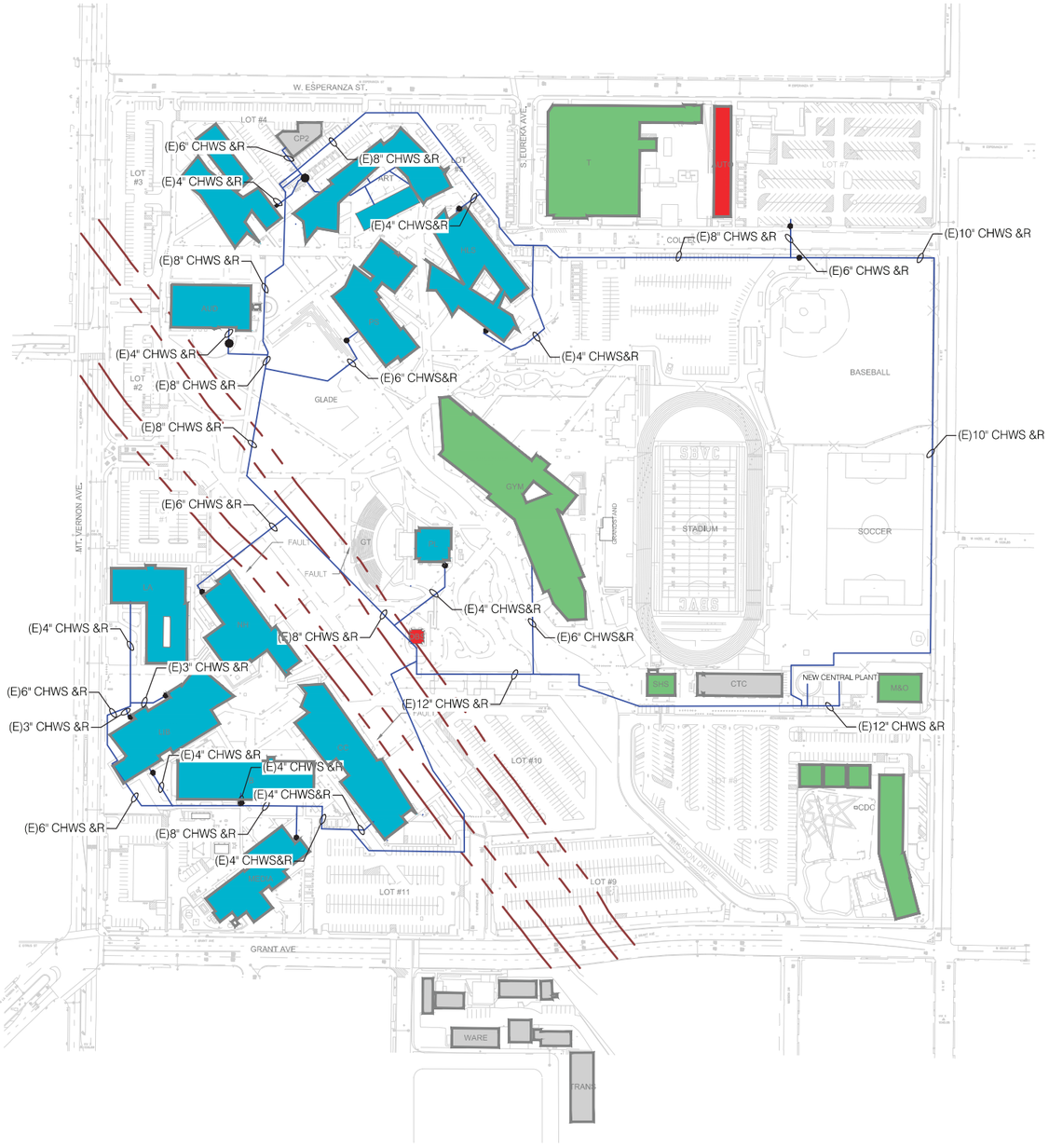
**UF** Projects or intiatives that would improve systems, facilities or operations on campus.

**REG** Projects related to Fire, Life, Safety; Code or OSHA compliance. Risk of harm and potential for fines or shutdown directives from regulating authorities.

**NC** New construction to support proposed buildings

[1]Refer to Appendix for breakdown of costs.

# EXISTING CHILLED WATER DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | |
|---|---|
| AD/SS | ADMINISTRATION / STUDENT SERVICES |
| ART | ART & GALLERY |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP | CENTRAL PLANT |
| CS | CUSTODIAL STORAGE |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LA | LIBERAL ARTS |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SHS | STUDENT HEALTH SERVICES |
| T | TECHNICAL |
| TRANS | TRANSPORTATION |
| WARE | WAREHOUSE |

## LEGEND

- EXISTING CHILLED WATER LINE
- ABANDONED LINE
- VALVE
- HANDHOLD
- VAULT
- EARTHQUAKE FAULT LINE

## BUILDING LEGEND

- NO A/C SERVICE
- UNDER CONSTRUCTION
- CHILLED WATER SERVICED BY CENTRAL PLANT
- PACKAGED SYSTEMS

NORTH

0 300'

# PROPOSED CHILLED WATER DISTRIBUTION SYSTEM


## FACILITY LEGEND

| | |
|---|---|
| AD | ADMINISTRATION |
| ART | ART CENTER |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP1 | CENTRAL PLANT 1 |
| CP2 | CENTRAL PLANT 2 |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GRND | GROUNDS |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PAC | PERFORMING ARTS CENTER |
| PATH1 | CAREER PATHWAYS 1 |
| PATH 2 | CAREER PATHWAYS 2 |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SS/INST | STUDENT SERVICES/ INSTRUCTIONAL BUILDING |
| TRANS | TRANSPORTATION |
| TECH | TECHNOLOGY BUILDING |
| WARE | WAREHOUSE |

## LEGEND

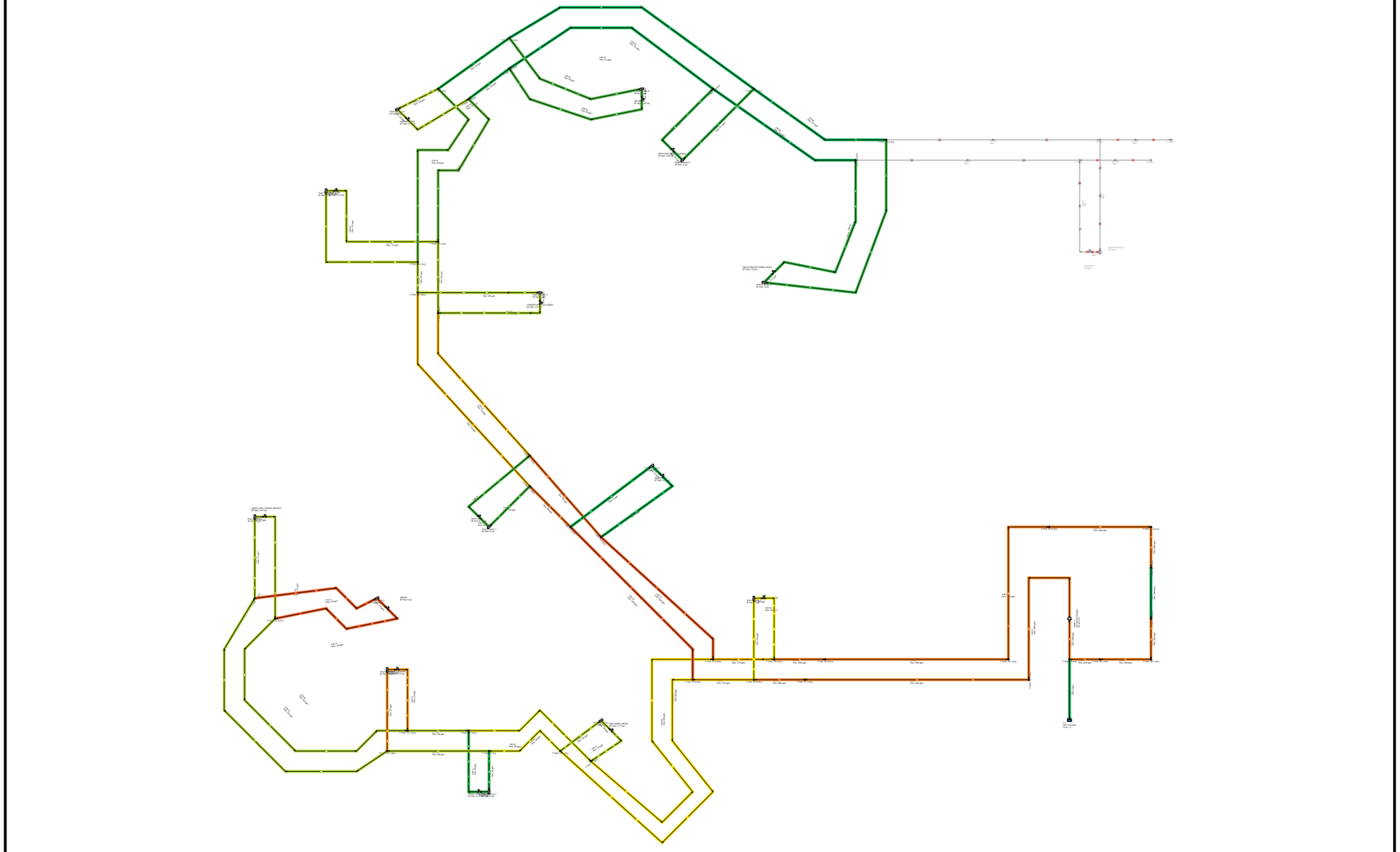
- PROPOSED CHILLED WATER LINE
- EXISTING CHILLED WATER LINE
- VALVE
- HANDHOLD
- VAULT
- EARTHQUAKE FAULT LINE

## BUILDING LEGEND

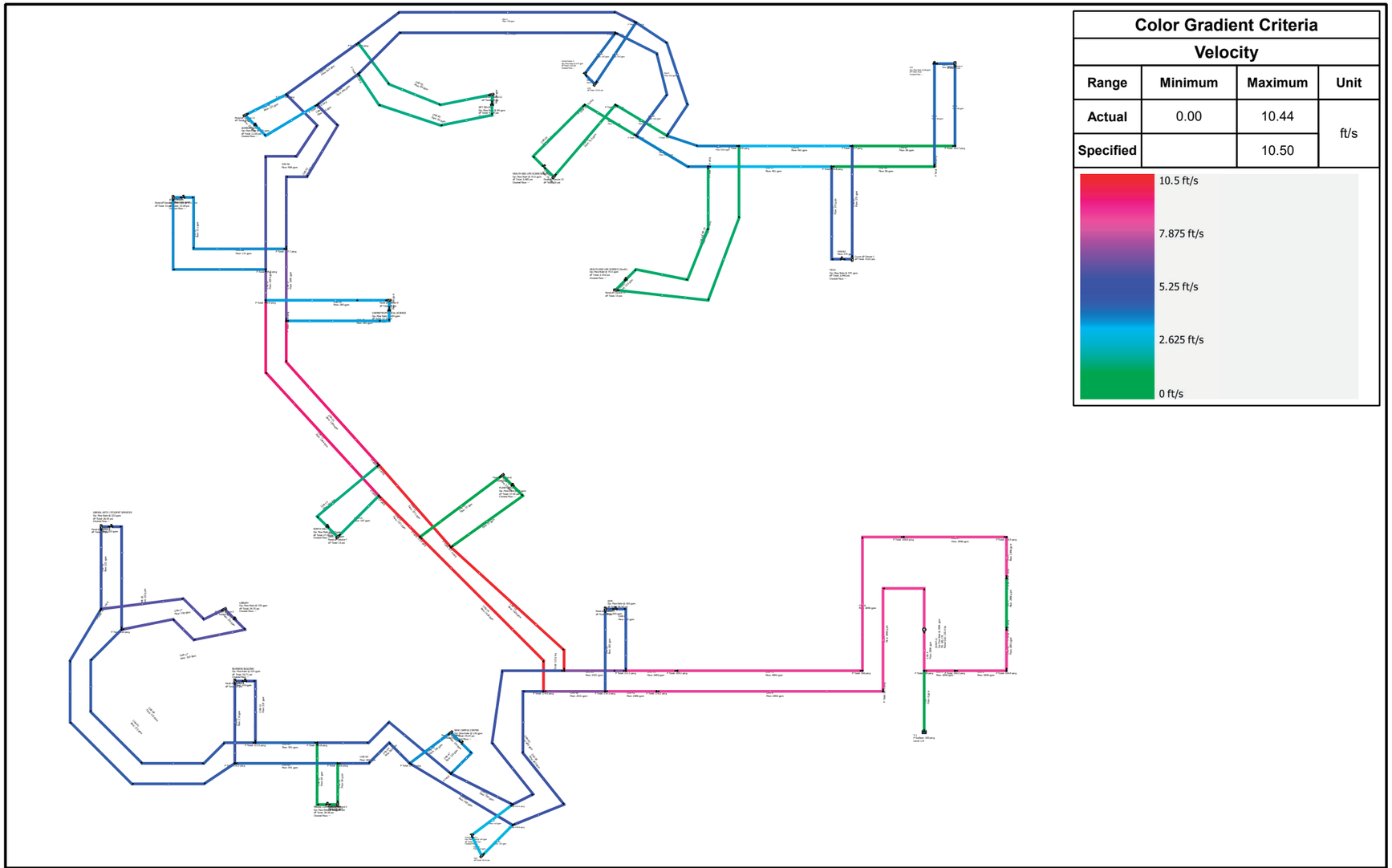
- NO A/C SERVICE
- UNDER CONSTRUCTION
- CHILLED WATER SERVICED BY CENTRAL PLANT
- CHILLED WATER NOT SERVICED BY CENTRAL PLANT
- PACKAGED SYSTEMS
- EXISTING BUILDING
- FUTURE PARKING STRUCTURE
- POTENTIAL BUILDING SITE
- FUTURE BUILDING
- PLANNED BUILDING SITE
- REPLACEMENT BUILDING
- BUILDING RENOVATION/EXPANSION

NORTH

0 300'



| PIPE-FLO Professional | | Units | | | | | Project Information | |
|---|---|---|---|---|---|---|---|---|
| **Program Version:** | 16.1.41643 | **Area:** | ft² | **Flow rate:** | gpm | **Heat Transfer Rate:** | BTU/h | **Company:** P2S Engineering |
| **Calculation Method:** | Darcy-Weisbach | **Length:** | ft | **Pressure:** | psi | **Heat Transfer Coefficient:** | BTU/h*ft²°F | **Project:** San Bernardino Valley College |
| **Maximum Iterations:** | 100 | **Elevation:** | ft | **Power:** | hp | **Specific Heat Capacity:** | BTU/lb°F | **Drawn by:** |
| **Percent Tolerance:** | 0.01 % | **Size:** | in | **Temperature:** | °F | **Thermal Capacitance:** | BTU/h°F | **File Name:** 5789 SBVC FCP.pipe |
| **Laminar Cutoff Re:** | 2100 | **Velocity:** | ft/s | **Density:** | lb/ft³ | **Thermal Insulance:** | h*ft²°F/BTU | **Lineup:** <Design Case> |
| **Allowable Deviation:** | 1 % | | | **Viscosity:** | cP | **Atmospheric Pressure:** | 14.7 psi a | **Print Date:** Monday, November 25, 2019 02:34 PM |



| Color Gradient Criteria | | | |
|---|---|---|---|
| **Velocity** | | | |
| **Range** | **Minimum** | **Maximum** | **Unit** |
| **Actual** | 0.00 | 10.44 | ft/s |
| **Specified** | | 10.50 | |

10.5 ft/s
7.875 ft/s
5.25 ft/s
2.625 ft/s
0 ft/s

| PIPE-FLO Professional | | Units | | | | | | Project Information | |
|---|---|---|---|---|---|---|---|---|---|
| **Program Version:** | 17.0.50496 | **Area:** | ft² | **Flow rate:** | gpm | **Heat Transfer Rate:** | BTU/h | **Company:** | P2S Engineering |
| **Calculation Method:** | Darcy-Weisbach | **Length:** | ft | **Pressure:** | psi | **Heat Transfer Coefficient:** | BTU/h*ft²°F | **Project:** | San Bernardino Valley College |
| **Maximum Iterations:** | 100 | **Elevation:** | ft | **Power:** | hp | **Specific Heat Capacity:** | BTU/lb°F | **Drawn by:** | |
| **Percent Tolerance:** | 0.01 % | **Size:** | in | **Temperature:** | °F | **Thermal Capacitance:** | BTU/h°F | **File Name:** | 5789 SBVC FCP.pipe |
| **Laminar Cutoff Re:** | 2100 | **Velocity:** | ft/s | **Density:** | lb/ft³ | **Thermal Insulance:** | h*ft²°F/BTU | **Lineup:** | Future Build Out |
| **Allowable Deviation:** | 1% | | | **Viscosity:** | cP | **Atmospheric Pressure:** | 14.7 psi a | **Print Date:** | Thursday, April 16, 2020 09:03 AM |

# HEATING WATER SYSTEM

## SYSTEM DESCRIPTION

The heating needs of the buildings at the campus are met by a combination of gas fired package units and heating hot water systems. A cluster of buildings that make up the Administration / Student Services buildings, as well as the Art & Gallery buildings are served by a small Heating Hot Water Central Plant located on the northernmost section of campus.

The remainder of the buildings heating needs are met by gas package units, or hydronic heating hot water systems in the individual buildings served by local gas boilers. See Table 1 for a breakdown of the buildings on campus and their associated heating system.

### NORTH CENTRAL PLANT (HEATING ONLY)

This central heating plant was installed in 2004. It contains two (2) small outdoor boilers (Camus & Lochinvar), giving the plant a total heating capacity of 2,155 million BTU/ Hr (MBH). The boilers are approximately 16 years old. ASHRAE suggests a useful life of approximately 20 years for this type of equipment and it should be considered for replacement over the next 5-10 years. The North Plant also contains a water cooled chiller room and cooling tower yard that have been decommissioned. See Table 2 and Table 3 for a breakdown of the boilers and pumps.

**TABLE 1 - COLLEGE BUILDING LIST**

| Building ID | Building Name | Cooling | Heating |
|---|---|---|---|
| AD/SS | Administration / Student Services | Central CHW | Central HHW from North Plant |
| ART | Art & Gallery | Central CHW | Central HHW from North Plant |
| AUD | Auditorium | Central CHW | Local Boiler HHW |
| B | Business | Central CHW | Local Boiler HHW |
| CC | Campus Center | Central CHW | Gas package unit |
| CDC | Child Development Center | DX | Gas package unit |
| HLS | Health & Life Sciences | Central CHW | Gas package unit |
| LA | Liberal Arts | Central CHW | Local Boiler HHW |
| LIB | Library | Central CHW | Gas package unit |
| OBS | Observatory | DX | Gas package unit |
| PL | Planetarium | Central CHW | - |
| G1 & G2 | Gym | Central CHW | Local Boiler HHW |
| SHS | Student Health Services | DX | Gas package unit |
| T | Tech | DX | Gas package unit |
| MEDIA | Media / Communications | Central CHW | Local Boiler HHW |
| NCP | North Central Plant | - | - |
| M&O | Maintenance & Operations | DX | Gas package unit |
| NH | North Hall | Central CHW | Local Boiler HHW |
| SCI | Chemistry / Physical Sciences | Central CHW | Local Boiler HHW |

**TABLE 2 - BOILERS IN NORTH CENTRAL PLANT**

| Boiler Tag | Manufactuer | Output (MBH) | Year Installed | Age (Years) |
|---|---|---|---|---|
| B-1 | Camus | 1,275 | 2004 | 16 |
| B-2 | Lochinar | 880 | 2004 | 16 |

**TABLE 3 - HHW PUMPS IN NORTH CENTRAL PLANT**

| Pump Tag | Manufacturer | Service | Flow (GPM) | Head (FT) |
|---|---|---|---|---|
| HHWP-1 | | | | |
| HHWP-2 | | | | |

## ADMINISTRATION / STUDENT SERVICES

The Administration / Student Services buildings are connected to the north heating hot water plant and is served by thirty-seven (37) IEC 4-pipe fan coils units that are approximately 16 years old. According to ASHRAE, typical service life for these fan-coil units is 20 years and should be considered for replacement over the next 5-10 years.

## ART & GALLERY

The Art & Gallery buildings are connected to the north heating plant and is served by thirty-seven (37) IEC 4-pipe fan coils units that are approximately 15 years old. According to ASHRAE, typical service life for these fan-coil units is 20 years and should be considered for replacement over the next 5-10 years.

## AUDITORIUM

The Auditorium building is approximately 85 years old and houses two (2) mechanical equipment rooms. There is an air handling unit serving the building that is approximately 17 years old. A heating coil was installed in 2013. ASHRAE suggests a useful life of 20-25 for this type of unit. The rest of the HVAC system was renovated in 2013. During the renovation, thirteen (13) CHW/HHW fan coils were installed. They are new and need no replacement. The building also has two (2) small RBI Futera boilers, rated at 425MBH each. The boilers were installed in 2013, and are approximately 7 years old. ASHRAE suggests a useful life of approximately 20 years for this type of equipment. The system has a primary-secondary pumping arrangement. The secondary pumps are on VFDs.

## BUSINESS

The Business building was renovated in 2013, and houses three (3) mechanical equipment rooms. There are four (4) single-zone air handling units serving the building. The air handling units are approximately 7 years old. ASHRAE suggests a useful life of 20-25 years for this type of air handling unit. The building also has two (2) small Raypack boilers, rated at 658MBH each. The boilers were installed as part of the renovation, and are approximately 7 years old. ASHRAE suggests a useful life of approximately 20 years for this type of equipment. The system has a primary-secondary pumping arrangement.

Boilers


Art Center


Boilers in Auditorium

Expansion Tank at Business

Building Pumps at Business

## LIBERAL ARTS

The Liberal Arts building is approximately 50 years old. There are two (2) large multi-zone air handling units located in the basement serving the building which were installed in 1969. ASHRAE suggests a useful life of 20-25 years for this type of air handling unit. The units have well exceeded the suggested useful life. All controls for this building are pneumatic with DDC ETP transducers for the major AHU and building level controls. At the time of the field survey, the pneumatic controls system was not functioning due to water buildup in the compressed air lines. Additionally, scale build-up has blocked branch HHW lines and reheat coils in various zones. Terminal zones are served by mixing boxes with HHW reheat coils and pneumatic valves and thermostats. According to the proposed Master Plan, this building will be demolished and replaced within the next 5 years.

The building is served by a local heating plant, consisting of a 2,000MBH boiler, pumps, and accessories. The boiler was installed in 2003 and is approximately 23 years old. ASHRAE suggests a useful life of approximately 20 years for this type of equipment. Considering that the building will be demolished within the next 5 years, replacement is not recommended.

## GYM

The Gymnasium building was constructed in 2016 and houses one (1) mechanical room for the local heating hot water (HHW) plant. There are three (3) small Aerco condensing type boilers serving the heating needs for this building, each rated at 1,759MBH. The boilers are approximately 4 years old and are in good condition.

Condensing Boilers at Gym

## MEDIA / COMMUNICATIONS

The Media / Communications building was constructed in 2010. There are two (2) outdoor rooftop boilers that provide a total of 522MBH to the building. The boilers are approximately 10 years old. ASHRAE suggests a useful life of approximately 20 years for this type of equipment and should be considered for replacement in the next 10-15 years.

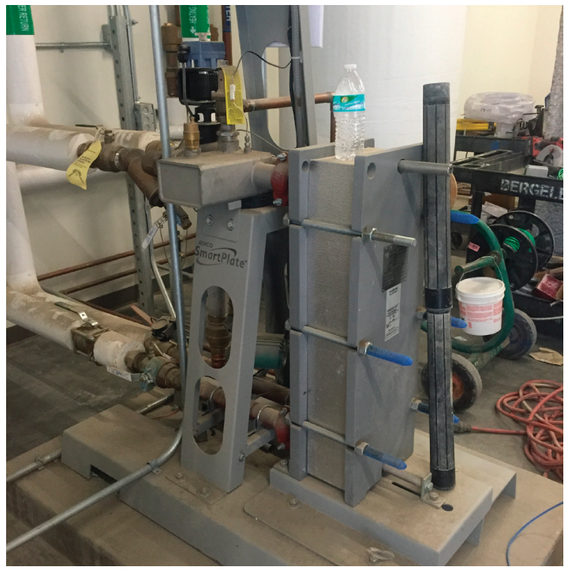
Media Comm Rooftop Mechanical Equipment

## NORTH HALL

The North Hall building was constructed in 2010 as a replacement to the original building. There are two (2) outdoor rooftop boilers that provide a total of 1,132MBH to the building. The boilers are approximately 10 years old. ASHRAE suggests a useful life of approximately 20 years for this type of equipment.


North Hall Building

Boiler at Liberal Arts building




Heat Exchanger

### CHEMISTRY / PHYSICAL SCIENCES

Chemistry / Physical Sciences was constructed in 2010. There are three (3) outdoor boilers that provide a total of 4,000MBH to the building. The boilers are approximately 10 years old. ASHRAE suggests a useful life of approximately 20 years for this type of equipment.

Physical Sciences Building

## ANALYSIS OF EXISTING SYSTEMS

Information on the existing equipment of the local heating plants was gathered through As-Built drawings as well as verification during a site visit.

The size of the distribution piping mains and branches for the San Bernardino Valley College utility master plan were studied using the following methodologies.• Information regarding the size, usage and heating hot water demands of each building or complex which will utilize the campus heating hot water system to meet their cooling needs was compiled through various sources. Much of the information regarding older campus buildings was provided by the campus in the form of historical documentation, as built drawings. Some information was obtained using documentation from previous retrofit projects. Several buildings were based on current proposed or actual construction documents. The balance was determined by applying accepted engineering practice rule of thumb factors based on individual building occupancy and usage type.

- When known, actual installed heating capacity was used for the design peak load. Where this information was not known the building area was multiplied by an accepted square foot factor. This factor was determined based on a combination of experience, good engineering design practice and referenced material from the most recent version of ASHRAE Fundamentals
- A diversity of 0.90 was used as a basis for determining the required equipment capacities and distribution piping sizes. This assumes a maximum 90% of the total connected load will require chilled water at any one time. Based on extensive experience in the design of campus central plant systems a 90% is a slightly conservative basis of design for the campus.
- Having determined the diversifed tonnage for each building or complex of buildings to be served by the central plant a diversifed GPM was calculated. Diversifed GPM is calculated using the formula;
    - Q = Load / (500 * ΔT)
    - Where
        - Load = diversified MBH x 12,000 Btu/h
        - Q = flow rate, GPM
        - ΔT = temperature increase or decrease, °F

## ANALYSIS OF FUTURE NEEDS

In order to meet the increased cooling demands of the campus, Heat Recovery Chillers shall be installed connecting the new Career Pathways building to the existing North Satellite Central Plant heating hot water network. This will augment the overall chilled water capacity of the campus loop system and provide heating for all of the buildings on the North Satellite Central Plant HHW network.

Campus should continue to utilize local boiler plants at the new Performing Arts and Student Services/Instructional Buildings in conjunction with heat recovery chillers.

## FINDINGS AND RECOMMENDATIONS

The following are our recommendations for improvements to the hot water system to accommodate future development shown in the Master Plan Update.

- Due to the significant cost of implementing a central heating hot water system and campus wide distribution piping and the limited savings that would result, the recommendation is to continue providing distributed systems within each building or complex of buildings.
- Interviews with campus facilities staff indicated that no regular water treatment service contract is in place for the local heating hot water plants at the buildings. Due to poor water quality, it is highly recommended that the campus engage a water treatment vendor to regularly maintain a chemical treatment program for each of the HHW hydronic loops.

An exhibit providing locations of north heating plant and local boilers in each of the buildings is provided at the end of the section for reference.

## IMPLEMENTATION AND PHASING PLAN

Heat recovery chillers shall be installed as a part as the career pathways project, Technology Building and at new Performing Arts & Student Services/Instructional Building in order to meet the anticipated future chilled water and heating hot water campus loads.

# ROUGH ORDER COST ESTIMATES

| | | | | | |
|---|---|---|---|---|---|
| Priority 1 | Critical - Need replacement in 0-3years | Priority 3 | Fair Condition - Need Replacement in Next 5-10 years | Priority 5 | New Building Impact - Based on project schedule |
| Priority 2 | Moderately Critical - Need replacement in 3-5 years | Priority 4 | Adds Value and Redundancy 5-10 years or as funding is available | | |

| Sequential Tracking # | Campus | Infrastructure Scope | Utility | Installed Year(s) | Brief Description of the Need | Priority Level (1..4) | Project Name | Brief Scope of Project | Project Category | Can the Project be Phased - Y/N | Total Construction Costs ($)[1] | Total Project Costs - Including Soft Costs ($) | Study by (Prime Consultant) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SBVC-M1 | SBVC | Main Central Plant- Secondary Chilled Water Pump Replacement or Booster Pump Addition | Mechanical | - | After the future Master Plan build outs the secondary chilled water pumps at the Main Central Plant may need to be upsized due to anticipated increased head requirements. Trend data should be analyzed and the existing pumps should be reviewed with larger impellers and safely oversped motors. If the existing pumps cannot meet the anticipiated increased head demand, secondary chilled water pumps should be replaced or booster pumps should be selectively installed around the campus in order to meet the new loads. | 2 | Main Central Plant- Secondary Chilled Water Pump Replacement or Booster Pump Addition | Pump Replacement | NC | Y | $100,000 | $130,000 | P2S Inc |
| **Total Priority 2 Costs** | | | | | | | | | | | **$100,000** | **$130,000** | |
| SBVC-M2 | SBVC | North Central Plant - Boiler Replacement and Heat Recovery Chiller Addition and Addition of New Heat Recovery Chiller at New Technology Building | Mechanical Heating Hot Water | - | The (2) Boilers in the North Central Plant are nearly 20 years old and will require replacement over the next 10 years. The boilers should be replaced with either high efficiency condensing boilers and/or a heat recovery chiller. The heat recovery chiller will offer waste heat and minimize gas consumption. | 3 | North Central Plant Boiler Replacement and Technology Building Heat Recovery Chiller Addition | Boiler Replacement and Heat Recovery Chiller Addition | DM | Y | $200,000 | $260,000 | P2S Inc |
| **Total Priority 3 Costs** | | | | | | | | | | | **$200,000** | **$260,000** | |

| Sequential Tracking # | Campus | Infrastructure Scope | Utility | Installed Year(s) | Brief Description of the Need | Priority Level (1..4) | Project Name | Brief Scope of Project | Project Category | Can the Project be Phased - Y/N | Total Construction Costs ($)[1] | Total Project Costs - Including Soft Costs ($) | Study by (Prime Consultant) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SBVC-M3 | SBVC | Extension of Chilled Water Lines to new buildings planned as part of the proposed master plan | Mechanical | - | Extension of Chilled Water Lines to new buildings planned as part of the proposed master plan | 5 | Extension of Chilled Water Lines to new buildings planned as part of the proposed master plan | New Chilled Water lines | NC | Y | $2,000,000 | $2,600,000 | P2S Inc |
| **Total Priority 5 Costs** | | | | | | | | | | | **$2,000,000** | **$2,600,000** | |
| **Total Costs** | | | | | | | | | | | **$2,300,000** | **$2,990,000** | |

**Project Categories**

**DM** Deferred maintanance: systems or facilities that have not been maintained due to lack of staffing or funding. While operational, failure is imminent.

**EM** Emergency projects are systems or facilities that have failed or do not function as designed. Repair or replacement is required.

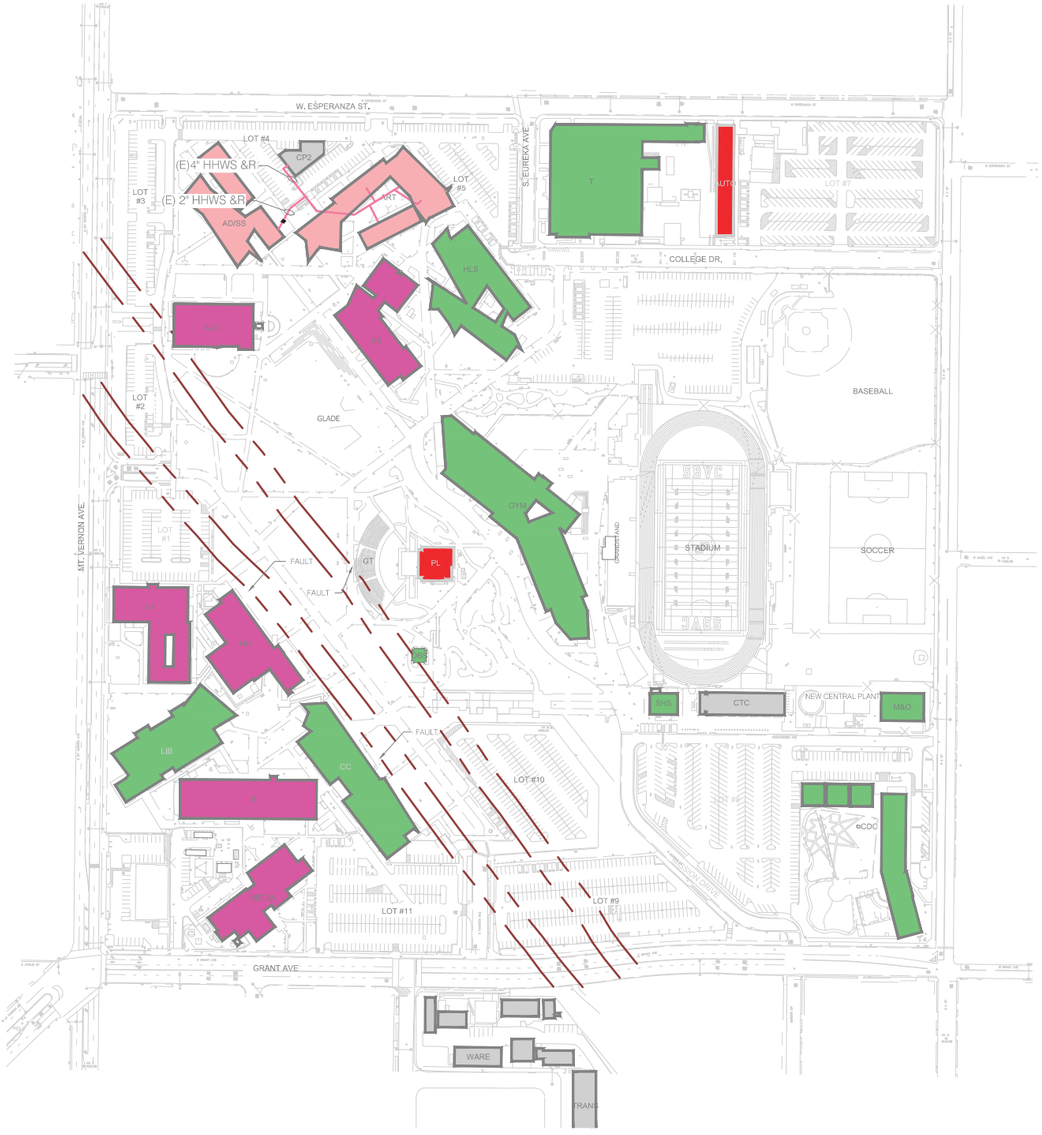
**UF** Projects or intiatives that would improve systems, facilities or operations on campus.

**REG** Projects related to Fire, Life, Safety; Code or OSHA compliance. Risk of harm and potential for fines or shutdown directives from regulating authorities.

**NC** New construction to support proposed buildings

[1]Refer to Appendix for breakdown of costs.

# EXISTING HEATING HOT WATER DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | |
|---|---|
| AD/SS | ADMINISTRATION / STUDENT SERVICES |
| ART | ART & GALLERY |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP | CENTRAL PLANT |
| CS | CUSTODIAL STORAGE |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LA | LIBERAL ARTS |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SHS | STUDENT HEALTH SERVICES |
| T | TECHNICAL |
| TRANS | TRANSPORTATION |
| WARE | WAREHOUSE |

## LEGEND

- EXISTING HOT WATER LINE
- VALVE
- HANDHOLD
- VAULT
- EARTHQUAKE FAULT LINE

## BUILDING LEGEND

- NO HEATING HOT WATER SERVICE.....
- UNDER CONSTRUCTION.....
- HEATING HOT WATER SERVICED.....
- HEATING HOT WATER SERVICED LOCALLY.....
- PACKAGED SYSTEMS.....

NORTH

0 300'

# PROPOSED HEATING HOT WATER DISTRIBUTION SYSTEM


## FACILITY LEGEND

| | |
|---|---|
| AD | ADMINISTRATION |
| ART | ART CENTER |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP1 | CENTRAL PLANT 1 |
| CP2 | CENTRAL PLANT 2 |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GRND | GROUNDS |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PAC | PERFORMING ARTS CENTER |
| PATH1 | CAREER PATHWAYS 1 |
| PATH 2 | CAREER PATHWAYS 2 |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SS/INST | STUDENT SERVICES/ INSTRUCTIONAL BUILDING |
| TRANS | TRANSPORTATION |
| TECH | TECHNOLOGY BUILDING |
| WARE | WAREHOUSE |

## LEGEND

- PROPOSED HOT WATER LINE
- EXISTING HOT WATER LINE
- VALVE
- HANDHOLD
- VAULT
- EARTHQUAKE FAULT LINE

## BUILDING LEGEND

- NO HEATING HOT WATER SERVICE
- UNDER CONSTRUCTION
- HEATING HOT WATER SERVICED
- PACKAGED SYSTEMS
- EXISTING BUILDING
- FUTURE BUILDING
- BUILDING RENOVATION/EXPANSION

NORTH

0 300'

# CHAPTER 3
## Electrical System

## SYSTEM DESCRIPTION

San Bernardino Valley College campus is currently served from a 4.16kV, 1200A 3phase, 3wire switchgear that derives its service from a 3,750KVA, 4.16kV SCE switch and transformer located in the utility yard on the north side of the campus. The switchgear comprises of a main 5kV, 600A, 3P breaker with a SCE main meter section and four 4.16kV, 600A fused interrupter switches housed in a seven sectional outdoor switchgear. The service is metered at 4.16kV and distributes power to substations in each building on campus through a series of manholes and medium voltage duct banks. The main switchgear was installed in 2003 with a main 5kV breaker and four 5kV feeder switches equipped with modern microprocessor relays and Square D power logic digital meters for monitoring energy usage and is in fairly good condition.

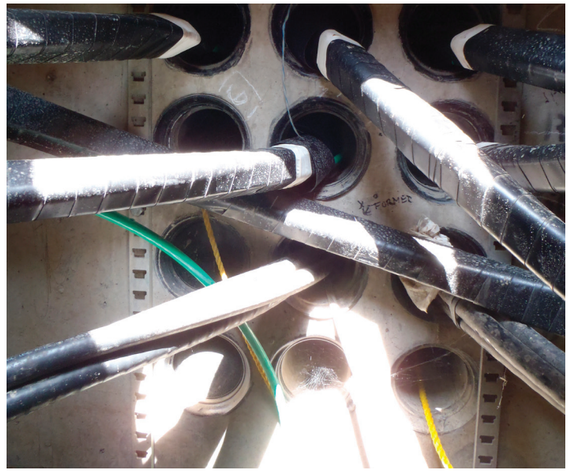
North Central Plant and Utility Yard

Main Switchgear in North Central Plant

Power to each building on campus is served through a series of manholes and concrete encased medium voltage ductbank originating from the main switchgear. The medium voltage feeders are routed primarily through modular splice connectors located in individual manholes and provide limited redundancy for isolating power to the building without affecting all the other building being served from the same feeder. 15kV, 600A selector switches(4) are installed at certain locations on the campus as part of some of the recently completed projects that enable to facilitate disconnection of few individual buildings.

Feeders '1', '2', '3' and '4' originate from the main switchgear and are protected through 600A fuse housed in the main 5kV switchgear. The feeders are routed through duct banks and manholes to form radial feeds at the campus. Each of the radial feeders traverse through 5kV, 200A modular splice connectors in manholes and radially serve each building substation on campus. Majority of the feeders are rated at 5kV, 500kcmil with 133% EPR insulation, with some portion of feeders rated at 5kV, 4/0 AWG feeder.

Main Switchgear in North Central Plant



Electrical Manhole

The electrical power distribution system at the campus was installed in 1990's and is approximately 30 years old. Majority of the underground cables were installed in 1970, at the inception of the campus. The cables are approximately 35-40 years old and at the end of their useful life. Portion of feeders '1' to '4' have been replaced as part of building upgrade project but no major improvements have been undertaken to upgrade the existing power distribution system since the inception of the campus.

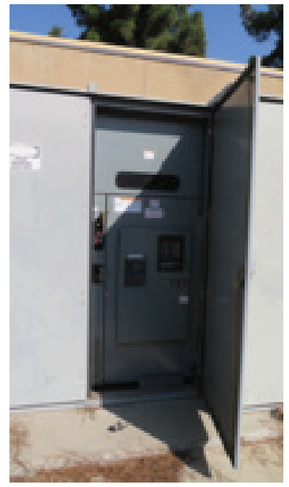
Electrical Manhole

T-body Splice inside Electrical Manhole

While majority of the buildings have undergone renovation in recent years and are equipped with new transformer substations and distribution switchboards, a few buildings still have the original transformer substations and switchboards from the time of building inception. The individual buildings have transformers with 4.16kV primary and 277/480V and 120/208V secondary voltages.

The following is a brief description of each of the feeders and their routing to serve each building on campus.

Feeder '1' and '2' originating from the main switchgear traverse parallelly towards south along the west side of the campus through a series of duct banks and manholes and extend upto manhole EMH-11. Radial feeders originating from modular splice connectors located in manholes serve facilities located on the west side of the campus.



Main Switchgear in North Central Plant

Feeder '3' and '4' originating from the main switchgear traverse parallelly towards south along the east side of the campus through a series of duct banks and manholes and extend upto manhole EMH-18. Radial feeders originating from modular splice connectors located in manholes serve facilities located on the west side of the campus.

The radial configuration currently existing at the campus allows limited flexibility and redundancy of the individual buildings without affecting power to the rest of the buildings connected to the feeder. Few buildings on the

campus are presently served from selector switches that enable to facilitate disconnection of few individual buildings without affecting power to the other buildings being served from the feeder.

A map of the existing site electrical distribution system and campus single line diagram is provided at the end of the section for reference.

The following table provides installed capacities by substations and feeders.

**TABLE - BUILDING DEMAND LOADS BY FEEDERS**

| Feeder | Buildings | Transformer Size | Demand KVA(15% of transformer size) |
|---|---|---|---|
| 1 | Auditorium | 500 | 75 |
| | North Hall | 1000 | 150 |
| | LRC | 750 | 112.5 |
| 2 | Liberal Arts | 525 | 80 |
| | Campus Center | 1000 | 150 |
| 1 & 2 | Media Communications | 1000 | 150 |
| | Business Building | 450 | 67.5 |
| | Computer Services | 150 | 22.5 |
| | Central Plant | 1500 | 250 |
| | Student Health Services/ Football Field | 750 | 112.5 |
| | Child Development Center | 300 | 45 |
| 3 | Health Life Sciences | 1000 | 150 |
| | Physical Sciences | 1500 | 250 |
| 4 | Technology | 1650 | 250 |
| | North Central Plant/ Student Services Administration | 1500 | 225 |
| | Art | 750 | 112.5 |
| 3 & 4 | Gymnasium | 1500 | 225 |
| | Theatre | 750 | 112.5 |
| **Total** | | | **2542.5** |

## METHODOLOGY

The following methodology was adopted in formulating our electrical utility infrastructure master plan. The methodology presented below outlines the critical tasks that were performed in development of this master plan report.

- A critical aspect in the evaluation of the existing electrical system serving a facility is a detailed and accurate field investigation of the current system. A detailed survey of the existing electrical system that currently serve the facilities at the campus was undertaken, and existing conditions, together with potential problems, were identified. The surveyed information was verified through available record drawings and meetings with the campus facilities staff.
- A load flow study of the existing loads was developed and existing capacity requirements were developed. For all existing buildings, existing installed capacities of the substations/transformers were taken to estimate the total loads.
- The Electrical system was then evaluated for capacity, functionality, reliability, ease of maintenance, age, and its ability to serve the present and future needs of the campus.

## ANALYSIS OF EXISTING SYSTEM

San Bernardino Valley College campus is currently served from a 4.16kV, 1200A 3phase, 3wire switchgear that derives its service from a 3,750KVA, 4.16kV SCE Transformer and switch located in the utility yard on the north side of the campus. The switchgear comprises of a main 5kV, 600A, 3P breaker with a SCE main meter section and four 4.16kV, 600A fused interrupter switches housed in a seven sectional outdoor switchgear. The service is metered at 4.16kV and distributes power to substations in each building on campus through a series of manholes and medium voltage duct banks. The main switchgear was installed in 2003 with a main 5kV breaker and four 5kV feeder switches equipped with modern microprocessor relays and digital meters and is in fairly good condition.

SCE Transformer at North Central Plant

While majority of the buildings have undergone renovation in recent years and are equipped with new transformer substations and distribution switchboards, a few buildings still have the original transformer substations and switchboards from the time of building inception, The individual buildings have transformers with 4.16kV primary and 277/480V and 120/208V secondary voltages.

Majority of the Campus Facilities are served by a primary selective feeder system, fed from the main 5kV switchgear.

### Selector Switches

#### SELECTOR SWITCH SS8

15kV, 600A, 5 position Selector switch SS8 has been recently installed as part of the Business Building Renovation project on the south side of facility adjacent to manhole EMH-8 that enables to isolate the power to Business Building, Media Communications Facility and Computer Services Building.

Selector Switch SS8

#### SELECTOR SWITCH SS9

15kV, 600A, 6 position Selector switch SS9 has been recently installed as part of the Central Plant Project on the south side of Football Field that enables to isolate the power to Child Development Center, Football Field and Central Plant without affecting power to other buildings being served

Selector Switch SS9

from Feeder '1' and '2'.

#### SELECTOR SWITCH SS10

15kV, 600A, 6 position Selector switch SS10 has been recently installed as part of the Gymanisum Complex project is located on the west side of the Theatre Building that enables to isolate the power to the Gymansium


Selector Switch SS10

Complex and theatre Building without affecting power to other buildings being served from Feeder '1' and '2'.

## Building Evaluation

### NORTH CENTRAL PLANT/ADMINISTRATION STUDENT SERVICES

North Central Plant and Administration Student Services building located on the north side of the campus are presently served from feeder '4' and has no redundancy of isolating the service to the building without affecting the other buildings being served from feeder '4'. Radial feeder originating from manhole EMH-1 traverses to the main switchgear electrical yard to serve a 1500kVA, 4.16kV-480Y/277V padmount liquid filled transformer. Radial feeder originating from secondary side of padmount transformer serves a 1600A, 480Y/277V Swicthboard located in the electrical yard that serves the north central plant. Radial feeder originating from secondary side of padmount transformer traverses south and west to serve an 800A, 480Y/277V switchboard located in the administration building. The padmount transformer and switchboard are in good working condition.

North Central Plant Transformer

North Central Plant Switchboard

### ART BUILDING

Art building located on the north side of the campus is presently served from feeder '4' and has no redundancy of isolating the service to the building without affecting the other buildings being served from feeder '4'. Radial feeder originating from manhole EMH-1 traverses to the main switchgear electrical yard to serve a 1500kVA, 4.16kV-480Y/277V padmount liquid filled transformer. The primary side of the 1500kVA padmount transformer is double lugged inturn to serve a 750kVA, 4.16kV-480Y/277V padmount liquid filled transformer and 800A 480Y/277V switchboard.

Art Building Transformer at North Central Plant

Art Building Main Switchboard at North Central Plant

Art Building Electrical Room

Radial feeder originating from switchboard traverses south to serve an 800A, 480Y/277V switchboard located in the arts building. The padmount transformer and switchboards are approximately 10-15 years old and in excellent working condition.

### HEALTH LIFE SCIENCES

Health life sciences building located on the north side of the campus is presently served from feeder '3' and has no redundancy of isolating the service to the building without affecting the other buildings being served from feeder '3'. Radial feeder originating from manhole EMH-13 traverses south to serve a 1000kVA, 4.16kV-480Y/277V padmount transformer located on the east side of the facility. Radial feeder originating from 1000kVA transformer traverse west to serve a 1600A, 480Y/277V switchboard located in the first floor electrical room of the facility. The padmount transformer and switchboard were installed in 2004 and are in good working condition.

Health Life Sciences Outdoor Padmount Transformer

Health Life Sciences Electrical Room

Health Life Sciences Electrical Room

### PHYSICAL SCIENCES

Physical sciences building located on the north side of the campus is presently served from feeder '3' and has no

Physical Sciences Outdoor Padmount Transformer and Main Switchboard

Physcial Sciences Electrical Room

redundancy of isolating the service to the building without affecting the other buildings being served from feeder '3'. Radial feeder originating from manhole EMH-15 traverses north east to serve a 1500kVA, 4.16kV-480Y/277V padmount transformer and a 2500A, 480Y/277V switchboard located outdoor on the east side of the facility. The padmount transformer and switchboard are approximately 10-15 years old and in good working condition.

Liberal Arts Building Load Interrupter Switch and Transformer

Liberal Arts Electrical Room

## LIBERAL ARTS

Liberal Arts facility located on the west side of the campus is presently served from feeder '2' and has no redundancy of isolating the service to the building without affecting the other buildings being served from feeder '2'. Radial feeder originating from manhole EMH-5 traverses north to serve a 4.16kV-480Y/277V transformer and Switchboard housed in the basement electrical room.

## TECHNOLOGY BUILDING

Technology building located on the north east side of the campus is presently served from feeder '4' and has no redundancy of isolating the service to the building without affecting the other buildings being served from feeder '4'. Radial feeder originating from manhole EMH-9 traverse north to serve two 300kVA, 4.16kV substations located in the first floor electrical room of technology building. The substations have been installed as part of the building inception and are old at the end of their useful life.


Technology Lab/Shop Load Interrupter Switch and Transformer

Technology Lab/Shop Main Switchboard


Technology Lab/Shop Load Interrupter Switch

Radial feeder originating from manhole EMH-13 traverse north to serve a 5kV load interrupter switch, 300kVA, 4.16kV-480Y/277V dry type transformer and 800A, 480Y/277V switchboard that serves the technology lab/ shops. Electrical distribution system for the technology lab/ shops is approximately 15-20 years old and in fair working condition.

Technology Bungalow/ Classroom Outdoor Padmount Transformer

Technology Bungalow/ Classroom Outdoor Switchboard


Technology Bungalow/Classroom Outdoor Equipment Yard

Radial feeder originating from manhole EMH-13 traverse north to serve a 750kVA, 4.16kV-480Y/277V padmount transformer and 1200A, 480Y/277V switchboard housed outdoor in an electrical enclosure that serves the technology bungalows and classrooms. Electrical distribution system for the technology bungalows and classrooms is approximately 5 years old and in excellent working condition.

## AUDITORIUM

Auditorium building located on the east side of the campus is presently served from feeder '1' and has no redundancy of isolating the service to the building without affecting the other buildings being served from feeder '1'. Radial feeder originating from manhole EMH-4 traverses north to serve a 5kV Load interrupter Switch, 500kVA, 4.16kV-208Y/277V dry type transformer and 1200A, 208Y/277V Switchboard.

Auditorium Building was recently constructed in 2014 and the electrical distribution system is new and in excellent working condition.



North Hall Outdoor Padmount Transformer

North Hall Outdoor Padmount Transformer and Main Switchboard

## NORTH HALL

North facility located on the west side of the campus is presently served from feeder ‘1’ and has no redundancy of isolating the service to the building without affecting the other buildings being served from feeder ‘1’. Radial feeder originating from manhole EMH-6 traverses northwest to serve a 1500kVA, 4.16kV-480Y/277V padmount transformer and 2500A, 480Y/277V switchboard installed in the outdoor enclosure at the facility. 1500kVA padmount transformer and 2500A switchboard are approximately 10 years old and in good working condition.

Substation at Library Electrical Room

Library Electrical Room

## LIBRARY

Library Building located on the south west side of the campus is presently served from feeder ‘1’ and has no redundancy of isolating the service to the building without affecting the other buildings being served from feeder ‘1. Radial feeder originating from manhole EMH-6 traverses west to serve a 5kV Load interrupter Switch, 750kVA, 4.16kV-480Y/277V transformer and 1200A, 480Y/277V Switchboard. 5kV load interrupter switch, transformer and switchboard are approximately 15 years old and in good working condition.


Business Electrical Room

Business Electrical Room

## BUSINESS

Business Hall located along the south west side of the campus is presently served from selector switch 8 which in turn is derives it service from feeders ‘1’ and ‘2’. The building has redundancy of isolating the service to the building without affecting the other buildings. Radial feeder originating from manhole EMH-8 traverses south to serve two 5kV substations located in the basement electrical room of the facility. 5kV duplex Load interrupter Switch, 225kVA, 4.16kV-480Y/277V dry type transformer and 350A, 480Y/277V Switchboard and a 5kV duplex Load interrupter Switch, 225kVA. 4.16kV-208Y/120V dry type transformer and 750A, 208Y/120V Switchboard are presently installed in the basement electrical room that presently serve the building. Business Hall was recently renovated in 2013 and the electrical distribution system is new and in excellent working condition.

Computer Services Building Outdoor Padmount Transformer And Main Switchboard


Diesel Generator at Computer Services Building

## COMPUTER SERVICES BUILDING

Computer Services building located along the south west side of the campus is presently served from selector switch 8 which in turn is derives it service from feeders ‘1’ and ‘2’. The building has redundancy of isolating the service to the building without affecting the other buildings. Radial feeder originating from manhole EMH-8 traverses westto serve a, 150kVA, 4.16kV-208Y/120V padmount transformer and 208Y/120V Switchboard. Transformer and switchboard are approximately 10-15 years old and are in good working condition.


Outdoor Padmount Transformer at Media Comunnications Building

Outdoor Padmount Transformer at Media Comunnications Building

## MEDIA COMMUNICATIONS

Media Communications Facility located on the west side of the campus is presently served selector switch 8 which in turn is derives it service from feeders '1' and '2'. The building has redundancy of isolating the service to the building without affecting the other buildings. Radial feeder originating from manhole EMH-8 traverses south to serve a 1000kVA, 4.16kV-480Y/277V padmount transformer and 1200A, 480Y/277V switchboard located in the outdoor area on the west side of the building. Transformer and switchboard are approximately 10-15 years old and are in good working condition

Child Development Center Outdoor Padmount Transformer

Child Development Center Main Switchboard

## CHILD DEVELOPMENT CENTER

Child Development Center Facility located on the south east side of the campus is presently served from selector switch 9 which in turn is derives it service from feeders '1' and '2'. The building has redundancy of isolating the service to the building without affecting the other buildings. Radial feeder originating from selector switch traverses south through ductbanks and manholes to serve a 300kVA, 4.16kV-208Y/120V transformer installed outdoor on the east side of the facility. Radial feeder originating from padmount transformer traverse south to serve a 800A, 208Y/120V switchboard located in the first floor electrical room of the facility. Transformer is approximately 15 years old and in good working condition. Switchboard is approximately 10 years old and in excellent working condition.

Central Plant

Central Plant

Central Plant

## CENTRAL PLANT

Central Plant located on the east side of the campus drive is presently served from selector switch SS9 which in turn is derives it service from feeders '1' and '2'. The building has redundancy of isolating the service to the building without affecting the other buildings. Radial feeder originating from selector switch SS9 traverses south and west to serve a 5kV, 600A load interrupter Switch, 1500kVA, 4.16kV-480Y/277V dry type transformer and 2000A, 480Y/277V Switchboard installed inside the central plant facility. Electrical distribution system at the facility were recently replaced and upgraded in 2011 and are in excellent working condition.

Selector Switch SS9

Student Health Services Outdoor Padmount Transformer

## STUDENT HEALTH SERVICES/FOOTBALL FIELD

Student Health Services/Football Field located on the east side of the campus drive is presently served from selector switch SS9 which in turn is derives it service from feeders '1' and '2'. The building has redundancy of isolating the service to the building without affecting the other buildings. Radial feeder originating from selector switch 9 traverses north to serve 750kVA, 4.16kV-208Y/120V padmount transformer and 208Y/120V Switchboard installed outdoor on the south side of the football field facility. Electrical distribution system at the facility are approximately 15 years old and are in good working condition.

Theatre Complex Outdoor Padmount Transformer

Selector Switch SS10

Theatre Complex Main Switchboard

## THEATRE

Theatre Complex located along the central quad of the campus is presently served from selector switch SS10 which in turn is derives it service from feeders ‘3’ and ‘4’. The facility has redundancy of isolating the service to the building without affecting the other buildings. Radial feeder originating from selector switch 10 serves a 750kVA, 4.16kV-208Y/120V padmount transformer located on the east side of the facility. Radial feeder originating from transformer traverse west to serve a 1200A, 208Y/120V Switchboard installed inside the first floor electrical room of the facility. Transformer and switchboard are approximately 15 years old and are in good working condition.


Selector Switch SS10 and Gymnasium Complex Outdoor Padmount Transformer

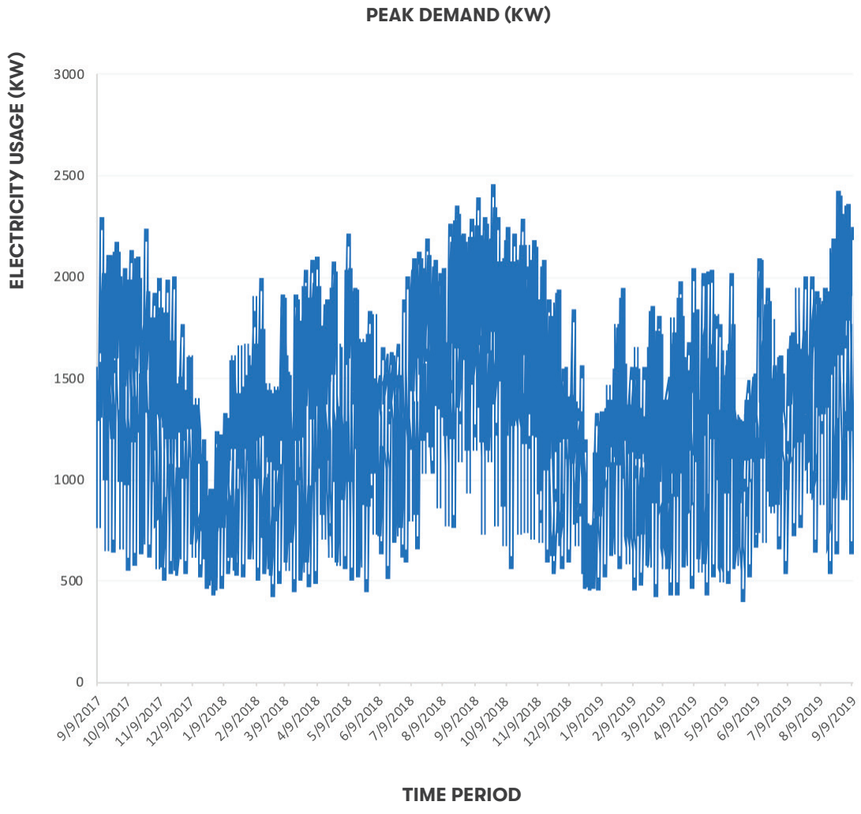
## GYMNASIUM COMPLEX

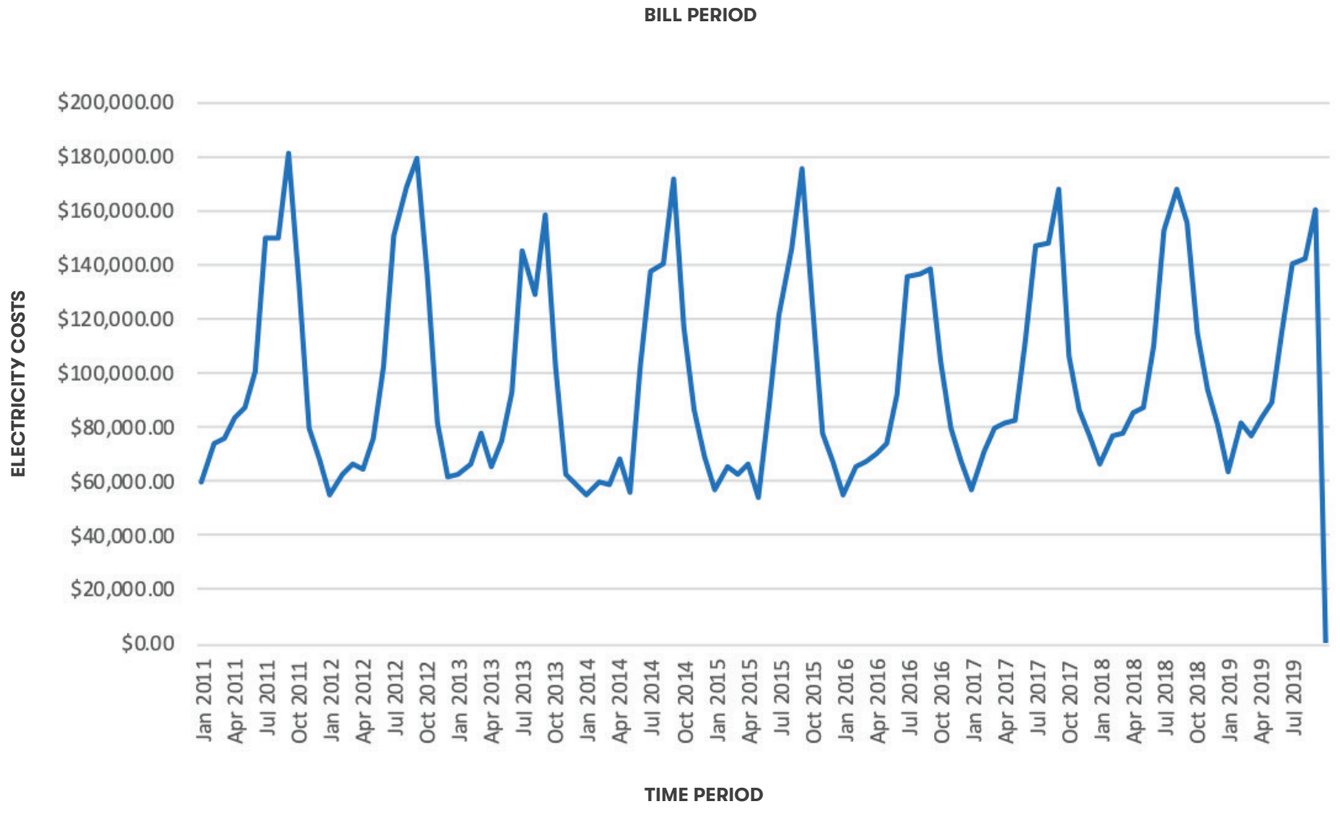
Gymnasium Complex located along the central quad of the campus is presently served from selector switch SS10 which in turn is derives it service from feeders '3' and '4'. The facility has redundancy of isolating the service to the compplex without affecting the other buildings. Radial feeder originating from selector switch 10 serves a 1500kVA, 4.16kV-480Y/277V padmount transformer located on the west side of the facility. Radial feeder originating from transformer traverse east and north to serve a 2500A, 480Y/277V Switchboard installed inside the first floor electrical room of the facility. Gymnasium complex was recently completed constructed in 2016 and the electrical distribution system is new and in excellent working condition.

### System Evaluation

The peak demand seen by the campus varies between 2.26MW to 2.4MW. The main switchgear can accommodate an overall capacity of 3,750KVA. Thus the main switchgear has adequate capacity to not only support existing loads but also has adequate spare capacity to support future loads. Graph below provides the total kW peak demand for the period September 2017 through August 2019:

The current peak electricity cost incurred by the campus is approximately $165k/month, in the summer months in the recent years. Below is a graph depicting the net electricity cost incurred by the college for the period January 2011-September 2019.



## ANALYSIS OF FUTURE NEEDS

An analysis of the current 5kV distribution system was conducted to evaluate a) existing spare capacities available in each substations/feeders b) the impact of the proposed facilities on the existing electrical distribution system and c) modifications required to support the future build out of the campus. The current electrical distribution was also analyzed for electrical duct-banks/manholes that will be in conflict with the proposed facilities and will require relocation. A campus site plan identifying electrical duct-banks/manholes that require demolition/relocation and extension of feeders to new facilities to serve the planned facilities is provided at the end of the section for reference.

An evaluation of the existing electrical system currently serving the campus revealed that the existing electrical infrastructure is in good condition. An evaluation of the existing loads revealed that feeders '1' through '4' capacities are of adequate capacities to support existing and future planned facilities. Based on load calculations, an estimated overall demand of approximately 2800kVA is anticipated for the campus. the existing switchgear and 5kV distribution system is sized adequately to serve the present demands and meet the future growth of the campus. In addition, an evaluation of the existing system revealed that the existing system provides limited redundancy because of its configuration. Primary selective configuration. Few buildings are equipped with selector switches that enable isolation and transfer of building to the redundant feeder. however most of the buildings on campus are fed from radial feeders originating from t-bodies inside manhole, providing no redundancy to the buildings. Since the campus operates and maintains the 5kV switchgear and the electrical distribution system, the campus requires an electrical system that must provide (a) Improved system reliability (b) ease of maintenance and isolation of circuits either during a fault or during a regular maintenance without interrupting power to every building on campus (c) be sized to accommodate existing loads and planned future loads resulting from new buildings addition as well as additions to existing buildings (d) be well coordinated to eliminate nuisance tripping of upstream protective devices (e) have all equipment listed for the short circuit availability at the point of installation.

**TABLE - BUILDING DEMAND LOADS BY FEEDERS**

| Feeder | Buildings | Transformer Size | Demand KVA(15% of transformer size) |
|---|---|---|---|
| 1 & 2 | **Auditorium** | **500** | **75** |
| | North Hall | 1000 | 150 |
| | **LRC** | **750** | **112.5** |
| | **Student Services** | **500** | **75** |
| | **Campus Center** | **1000** | **150** |
| | Media Communications | 1000 | 150 |
| | Business Building | 450 | 67.5 |
| | Computer Services | 150 | 22.5 |
| | Central Plant | 1500 | 250 |
| | Student Health Services/Football Field | 750 | 112.5 |
| | Child Development Center | 300 | 45 |
| | **Performing Arts Center** | **500** | **75** |
| | **Parking Structure** | **225** | **30** |
| 3 & 4 | **Health Life Sciences** | **1000** | **150** |
| | **Physical Sciences** | **1500** | **250** |
| | **Technology** | **1500** | **225** |
| | **North Central Plant/Student Services Administration** | **1500** | **225** |
| | **Art** | **750** | **112.5** |
| | Gymnasium | 1500 | 225 |
| | **Theatre** | **750** | **112.5** |
| | **Softball** | **300** | **45** |
| | **Campus Pathway 1** | **300** | **45** |
| | **Campus Pathway 2** | **500** | **75** |
| **Total** | | | **2780.5kVA** |

*An evaluation of the existing loads revealed that feeders '1' through '4' capacities are of adequate capacities to support existing and future planned facilities. Based on load calculations, an estimated overall demand of approximately 2600kVA is anticipated for the campus. The existing switchgear and 5kV distribution system is sized adequately to serve the present demands and meet the future growth of the campus.*

## FINDINGS AND RECOMMENDATIONS

A critical aspect in evaluating the reliability of a system is to study the failure rates from the utility and failure rates internal to the campus in the past. Discussions with the campus maintenance staff revealed that there have been minimum failures in the campus owned 5kV distribution system.

An evaluation of the capacities of the existing feeders revealed that the feeder are adequately sized to support the future planned facilities at the campus.

Following are thus our recommendations to upgrade the existing electrical infrastructure at the campus to (a) Improve system reliability (b) provide ease of maintenance and isolation of circuits either during a fault or during a regular maintenance without interrupting power to every building on campus (c) to provide adequate capacity of feeders to accommodate existing loads and planned future loads resulting from new buildings addition as well as additions to existing buildings (d) be well coordinated to eliminate nuisance tripping of upstream protective devices (e) have all equipment listed for the short circuit availability at the point of installation.

- Provide new 5kV switches close to each proposed building to enable isolation of feeders during a fault condition and for ease in undertaking maintenance work.
- Replace ageing existing 5kV medium voltage feeders routed as part of the underground distribution system. While majority of the medium voltage cable has been recently replaced in 2010 and is in good condition, some portions of existing medium voltage feeders are old and at the end of their useful life.
- Provide sub metering at each building to monitor demand at each building.

The campus system however needs to provide redundancy and also facilitate isolation of each building on campus and conduct maintenance on a feeder without affecting power service to each building on campus.

In order to provide the campus with redundancy and capability of scheduling maintenance on high voltage equipment without interrupting power to the campus, a primary selective system is recommended.

Primary Selective system would provide the campus with the ease of isolating faults within the campus distribution system and minimize power interruptions to the buildings during maintenance on the medium voltage distribution system.

Below is a brief description of the two systems that were evaluated as part of our study.

- Primary loop system with isolating switches at each building.
- Primary selective system with isolating switches at each building.

### Primary Loop System

A primary closed loop system with isolating switches at each building offers improved system reliability and service continuity in comparison to a radial distribution system. In this system, power is supplied continuously from two sources at the ends of the loop. A properly designed loop quickly recovers from a single cable fault with no continuous loss of power to utilization equipment.

A second important feature of the loop system is that a section of the cable may be isolated from the loop for repair or maintenance while other parts of the system are still functioning.

### Primary Selective System

The primary selective system is comprised of two separate feeders that originate from the main switchgear and run

to each isolating switch located at each building thereby providing a source of normal and alternate source of power. Upon failure of the normal source, the building is switched to the alternate source. Switching can be either automatic or manual, but there will be an interruption until load is transferred to the alternate source. Cost is higher for these systems as compared to a loop system because of the duplication of the primary cable and switchgear.

An evaluation of both the above systems and the current layout of the electrical distribution at the campus revealed that a primary selective system would be economical and will provide the campus with the ability to isolate faults easily without interrupting power to the entire campus as well as provide a reliable service.

## IMPLEMENTATION AND PHASING PLAN

The installation for new selector switches should be implemented at a time when class is not in session. This will minimize interruption of service to campus buildings.

Installation of medium voltage feeders and ductbanks shall be planned and implemented in a phased manner to minimize shutdown of service to campus buildings.

# ROUGH ORDER COST ESTIMATES

| | | | |
|---|---|---|---|
| Priority 1 | Critical - Need replacement in 0-3years | Priority 3 | Fair Condition - Need Replacement in Next 5-10 years |
| Priority 2 | Moderately Critical - Need replacement in 3-5 years | Priority 4 | Adds Value and Redundancy 5-10 years or as funding is available |

| Priority 5 | New Building Impact - Based on project schedule |
|---|---|

| Sequential Tracking # | Campus | Infrastructure Scope | Utility | Installed Year(s) | Brief Description of the Need | Priority Level (1..4) | Project Name | Brief Scope of Project | Project Category | Can the Project be Phased - Y/N | Total Construction Costs ($)[1] | Total Project Costs - Including Soft Costs ($) | Study by (Prime Consultant) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SBVC-E1 | San Bernardino Valley College | Replacement of existing MV Cables | Electrical | 1980 | The existing MV Cables are old and are at the end of their useful life.The same need to be replaced to provide a reliable service to campus buildings an minimize power interruptions | 2 | Replacement Of MV Cables | Replacement of MV Cables | DM | N | $750,000 | $975,000 | P2S Inc |
| **Total Priority 2 Costs** | | | | | | | | | | | **$750,000** | **$975,000** | |
| SBVC-E2 | San Bernardino Valley College | Provision of new meters in main 5kV switchgear and main switchboards in each of the buildings | Electrical | 2010's | Provision of new meters at main 5kV Switchgear and main switchbaords in each of the buildings | 4 | Provision Of New Meters | Provision of new meters in main 5kV switchgear and main switchbaords in each of the building | UF | Y | $700,000 | $910,000 | P2S Inc |
| SBVC-E3 | San Bernardino Valley College | Provision of new selector switches and dcut banks to serve new buildings planned as part of the proposed master plan and form a primary selective system to provide system around the campus and provide redundancy | Electrical | - | The current system is a primary selective system and needs to be extended to all buildings on campus. | 5 | Provision Of New Selector Switches | Provision of new selector switches to offer primary selective system | UF | Y | $1,750,000 | $2,275,000 | P2S Inc |
| **Total Priority 4 Costs** | | | | | | | | | | | **$2,450,000** | **$3,185,000** | |
| **Total Costs** | | | | | | | | | | | **$3,200,000** | **$4,160,000** | |

**Project Categories**

**DM** Deferred maintanance: systems or facilities that have not been maintained due to lack of staffing or funding. While operational, failure is imminent.

**EM** Emergency projects are systems or facilities that have failed or do not function as designed. Repair or replacement is required.

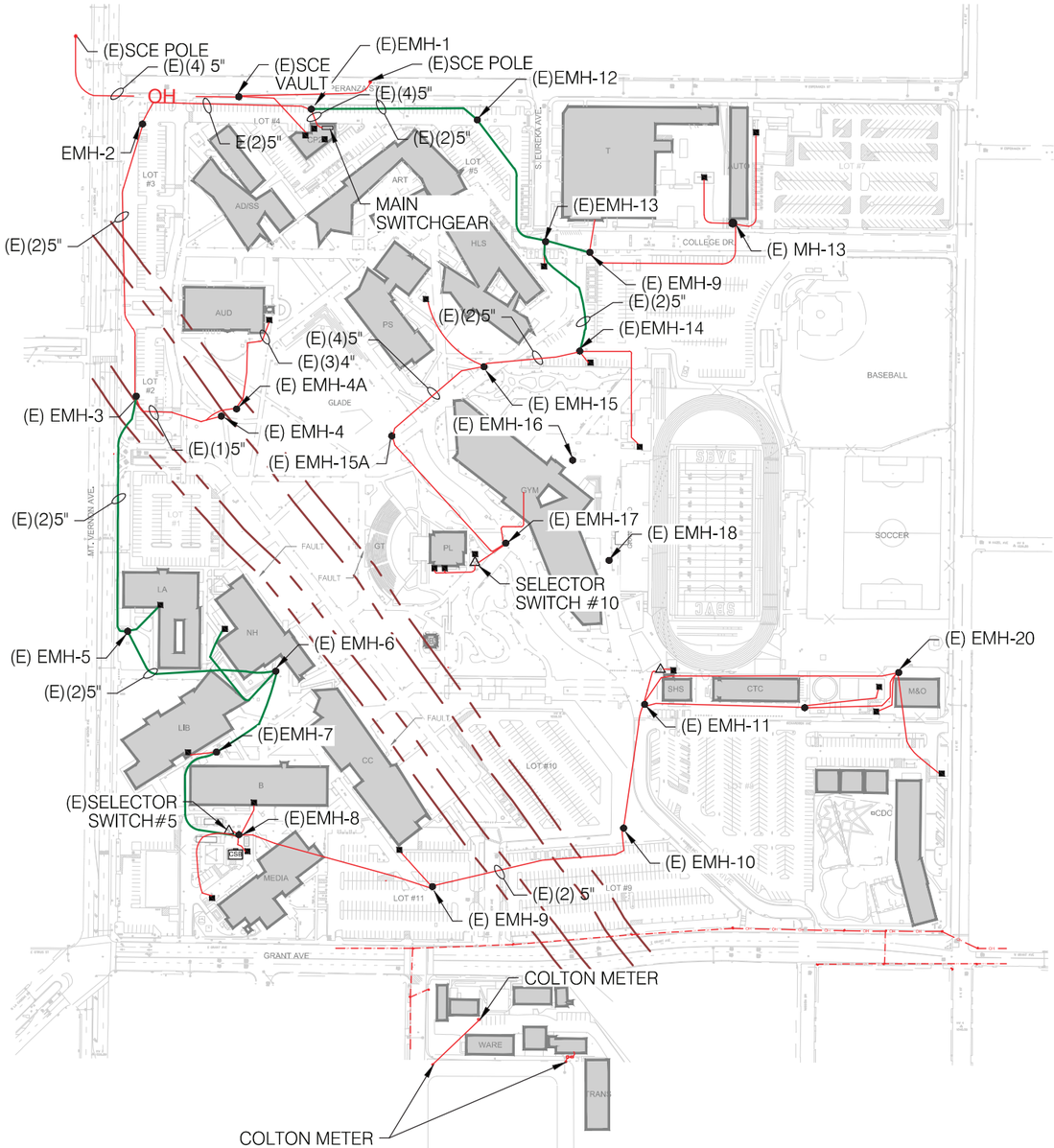
**UF** Projects or intiatives that would improve systems, facilities or operations on campus.

**REG** Projects related to Fire, Life, Safety; Code or OSHA compliance. Risk of harm and potential for fines or shutdown directives from regulating authorities.

**NC** New construction to support proposed buildings

[1]Refer to Appendix for breakdown of costs.

# EXISTING ELECTRICAL DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | | | |
|---|---|---|---|
| AD/SS | ADMINISTRATION / STUDENT SERVICES | LA | LIBERAL ARTS |
| ART | ART & GALLERY | LIB | LIBRARY |
| AUD | AUDITORIUM | M&O | MAINTENANCE & OPERATIONS |
| AUTO | AUTO SHOP | MEDIA | MEDIA/COMMUNICATIONS |
| B | BUSINESS | NCP | NORTH CENTRAL PLANT |
| CC | CAMPUS CENTER | NH | NORTH HALL |
| CDC | CHILD DEVELOPMENT CENTER | OBS | OBSERVATORY |
| CP | CENTRAL PLANT | PL | PLANETARIUM |
| CS | CUSTODIAL STORAGE | PS | CHEMISTRY/PHYSICAL SCIENCES |
| CTC | COMPUTER TECHNOLOGY CENTER | SHS | STUDENT HEALTH SERVICES |
| GT | GREEK THEATER | T | TECHNICAL |
| GYM | CYMNASIUM | TRANS | TRANSPORTATION |
| HLS | HEALTH & LIFE SCIENCES | WARE | WAREHOUSE |

## LEGEND

- EXISTING ELECTRICAL
- ABANDONED ELECTRICAL
- MANHOLE
- TRANSFER SWITCH
- PULLBOX
- TRANSFORMER
- SELECTOR SWITCH
- DAMAGED/UNDERSIZED MANHOLE
- OLD/AGING FEEDERS
- EARTHQUAKE FAULT LINE

## BUILDING LEGEND

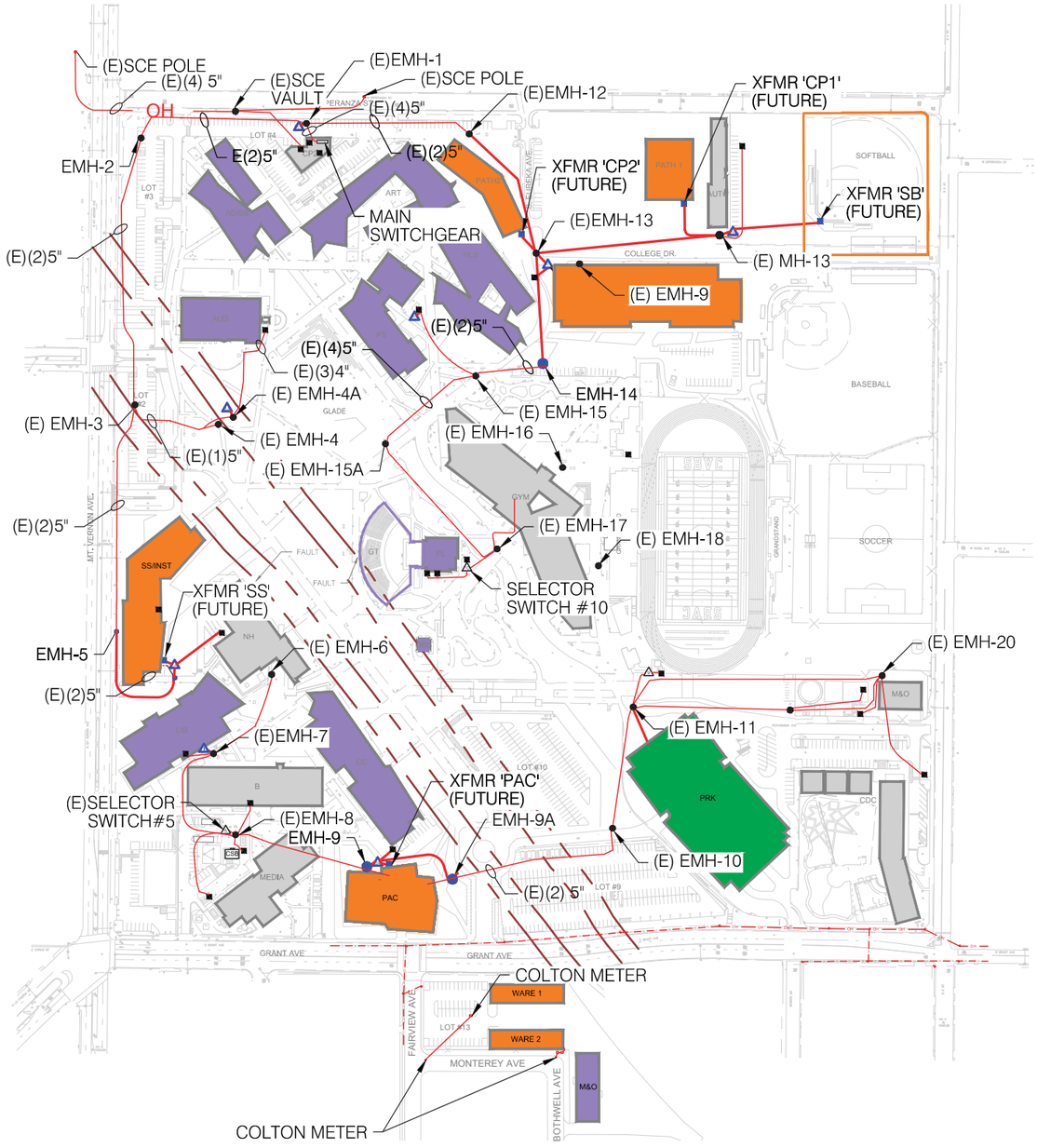
EXISTING BUILDING.....

UNDER CONSTRUCTION.....

NORTH

0 300'

# PROPOSED ELECTRICAL DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | | | |
|---|---|---|---|
| AD | ADMINISTRATION | M&O | MAINTENANCE & OPERATIONS |
| ART | ART CENTER | MEDIA | MEDIA/COMMUNICATIONS |
| AUD | AUDITORIUM | NCP | NORTH CENTRAL PLANT |
| AUTO | AUTO SHOP | NH | NORTH HALL |
| B | BUSINESS | OBS | OBSERVATORY |
| CC | CAMPUS CENTER | PAC | PERFORMING ARTS CENTER |
| CDC | CHILD DEVELOPMENT CENTER | PATH1 | CAREER PATHWAYS 1 |
| CP1 | CENTRAL PLANT 1 | PATH 2 | CAREER PATHWAYS 2 |
| CP2 | CENTRAL PLANT 2 | PL | PLANETARIUM |
| CTC | COMPUTER TECHNOLOGY CENTER | PS | CHEMISTRY/PHYSICAL SCIENCES |
| GRND | GROUNDS | SS/INST | STUDENT SERVICES/ INSTRUCTIONAL BUILDING |
| GT | GREEK THEATER | | |
| GYM | CYMNASIUM | TRANS | TRANSPORTATION |
| HLS | HEALTH & LIFE SCIENCES | TECH | TECHNOLOGY BUILDING |
| LIB | LIBRARY | WARE | WAREHOUSE |

## LEGEND

- PROPOSED ELECTRICAL
- EXISTING ELECTRICAL
- PROPOSED MANHOLE
- EXISTING MANHOLE
- EXISTING TRANSFER SWITCH
- EXISTING PULLBOX
- EXISTING TRANSFORMER
- PROPOSED TRANSFORMER
- EXISTING SELECTOR SWITCH
- PROPOSED SELECTOR SWITCH
- EARTHQUAKE FAULT LINE

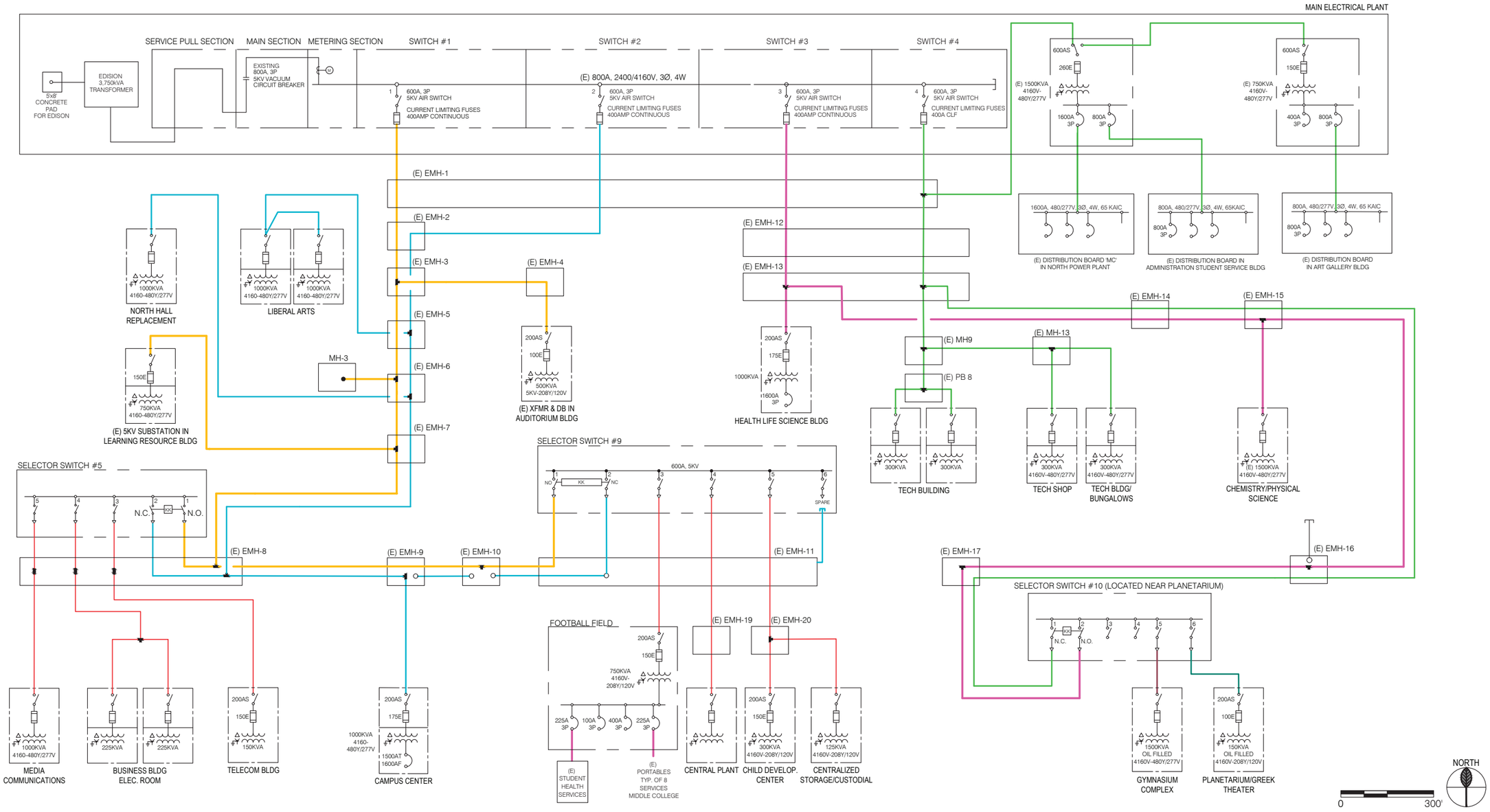
## BUILDING LEGEND

- EXISTING BUILDING
- UNDER CONSTRUCTION
- FUTURE PARKING STRUCTURE
- FUTURE BUILDING
- BUILDING RENOVATION/EXPANSION

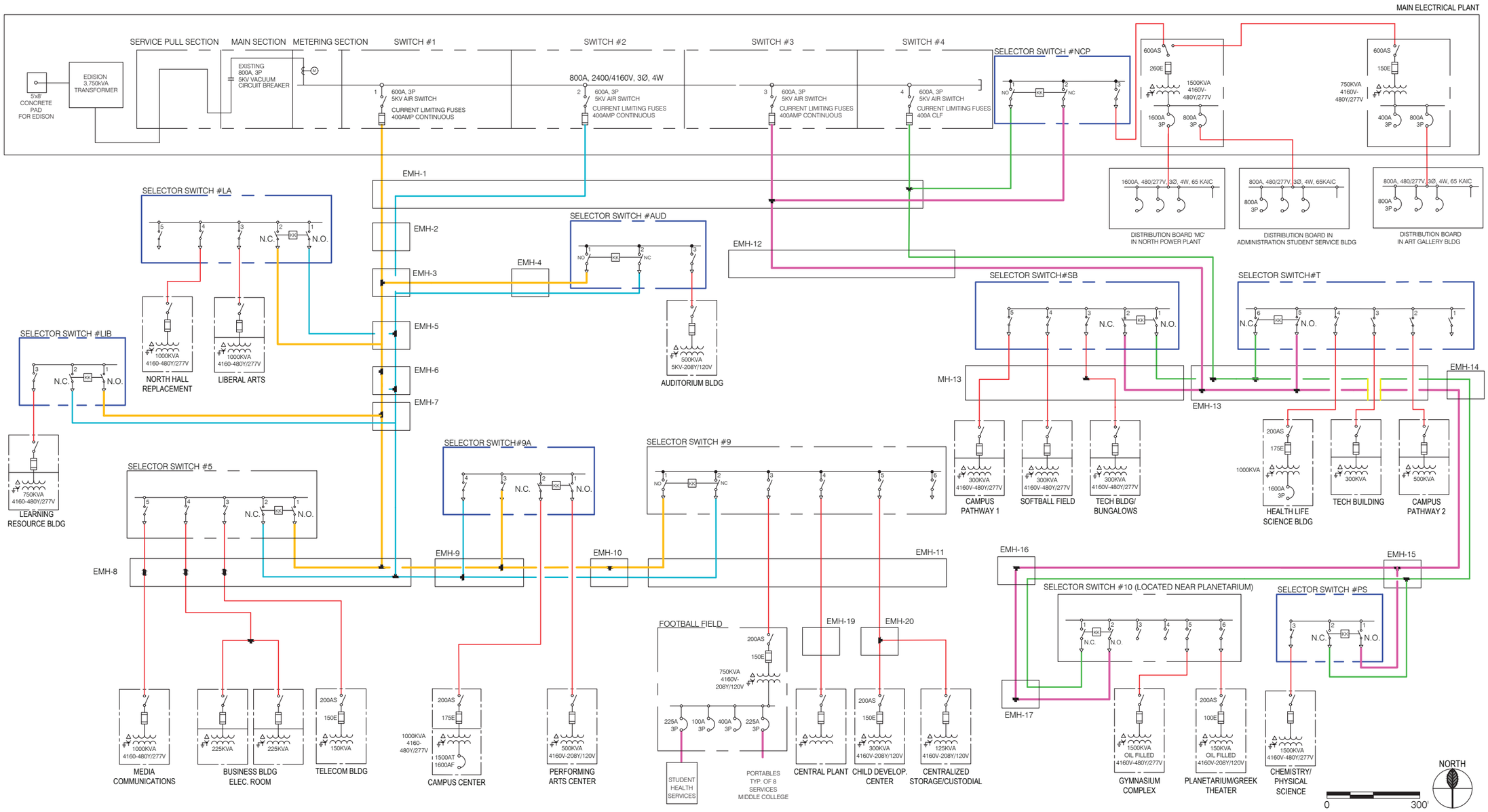
NORTH

0 300'

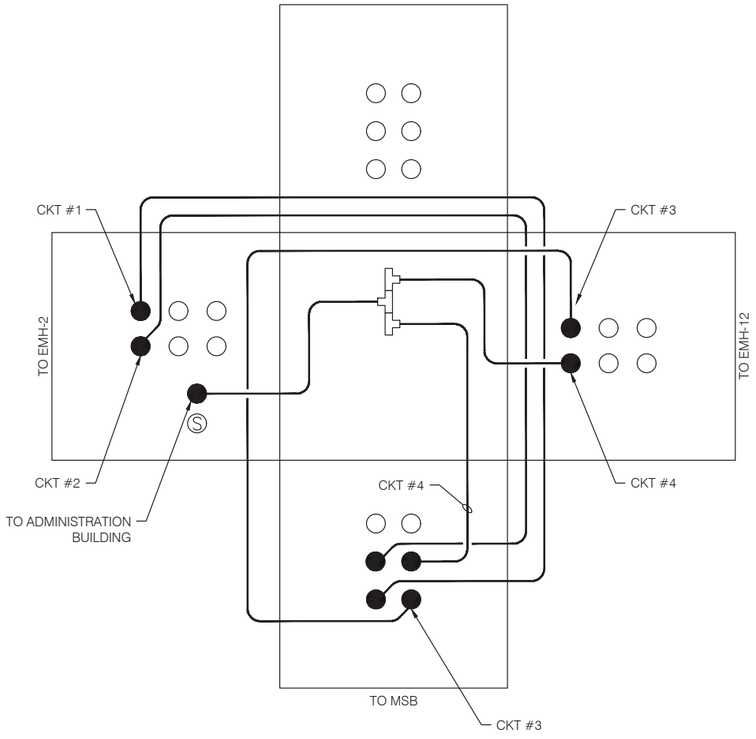
# EXISTING SINGLE LINE DIAGRAM



# PROPOSED SINGLE LINE DIAGRAM

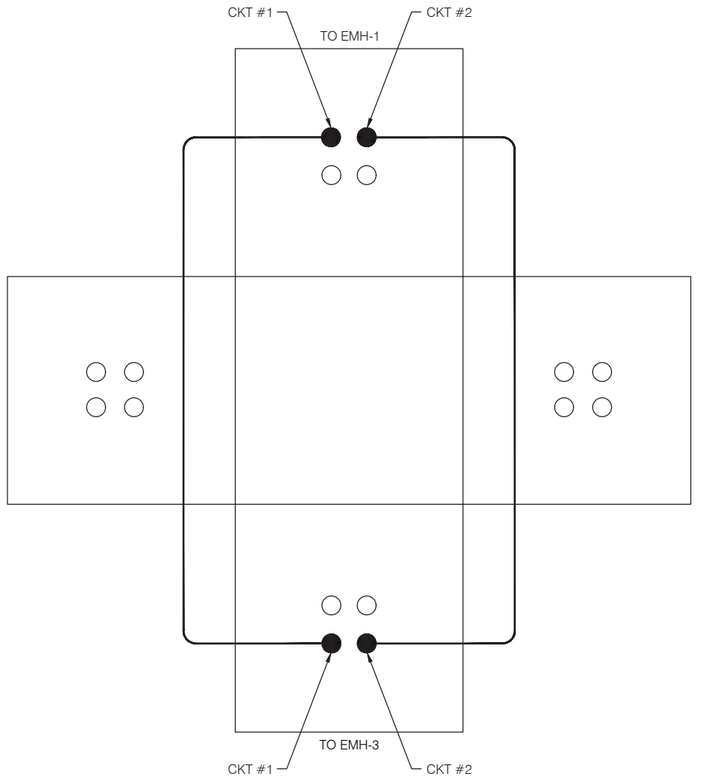


# EXISTING MANHOLE PROFILES




MANHOLE NO. 1

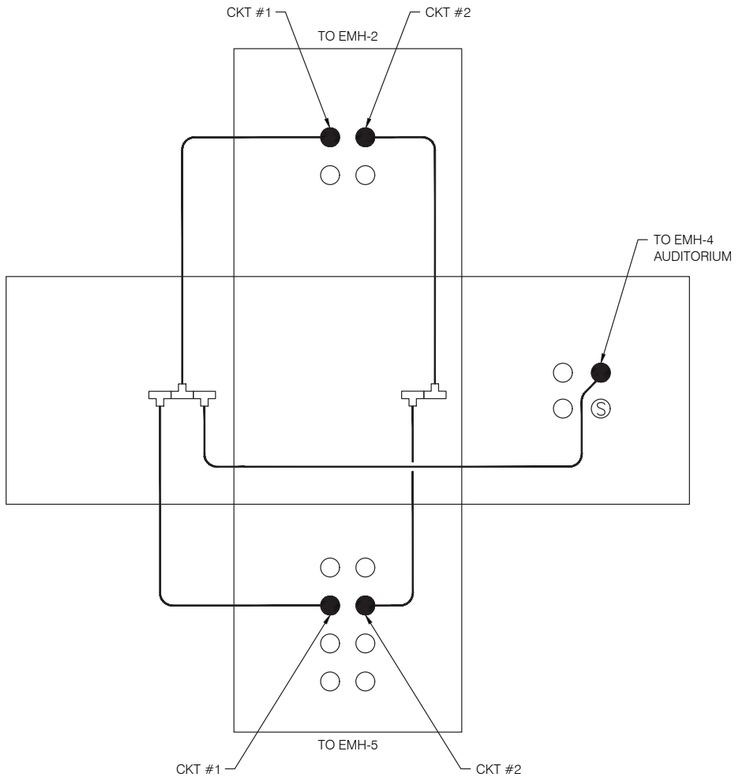
NORTH




MANHOLE NO. 2

NORTH

# EXISTING MANHOLE PROFILES




MANHOLE NO. 3

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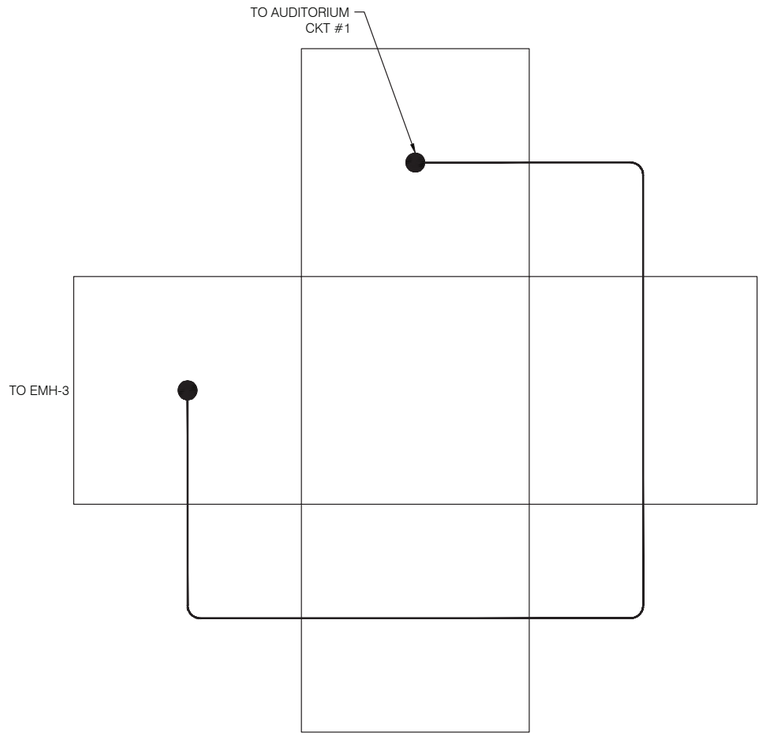
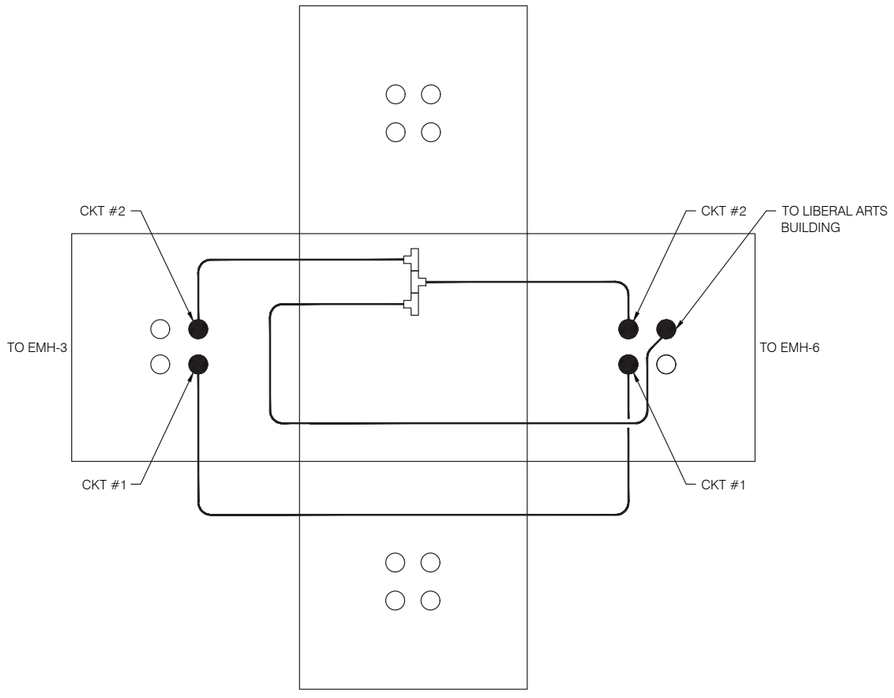



MANHOLE NO. 4

NORTH

# EXISTING MANHOLE PROFILES




MANHOLE NO. 5

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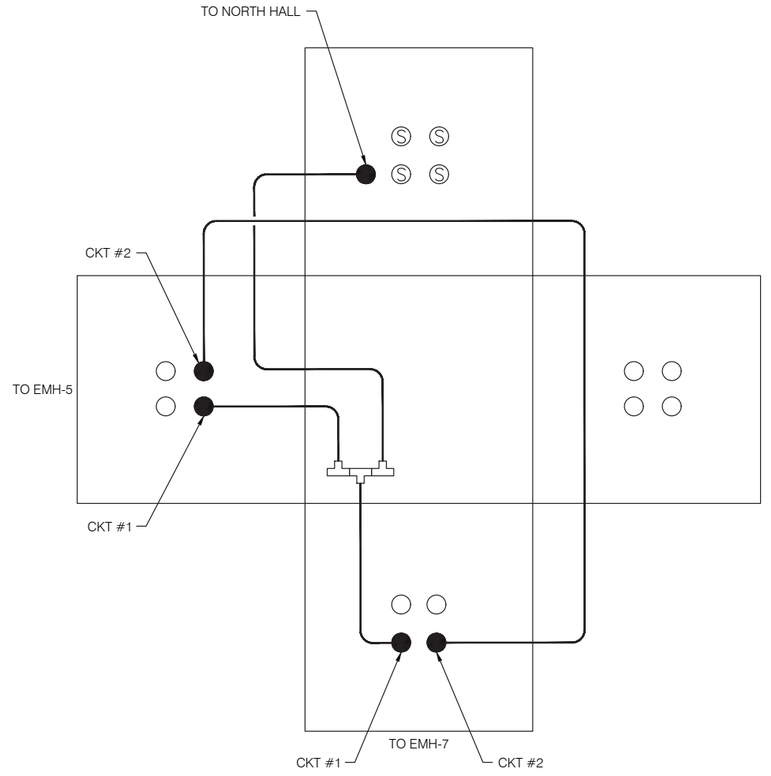
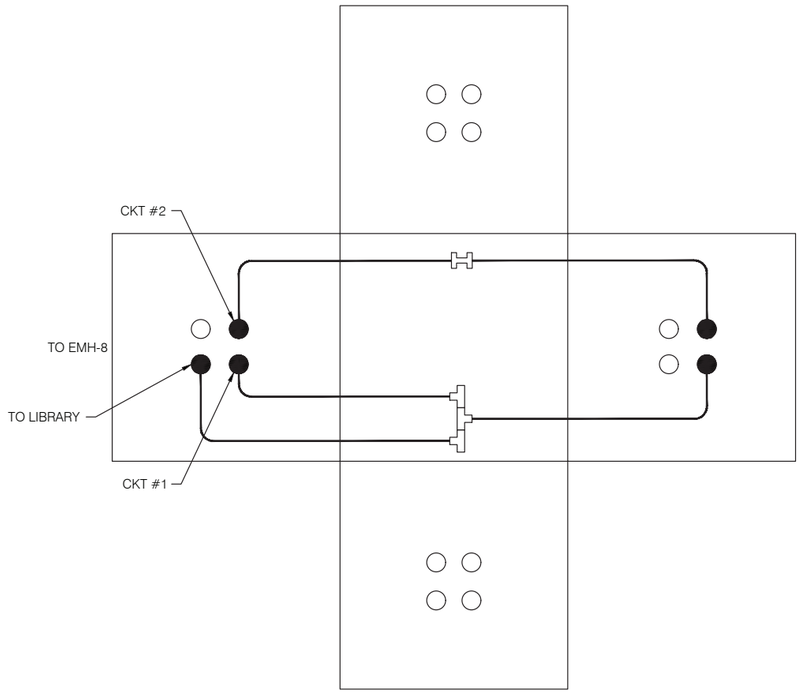



MANHOLE NO. 6

NORTH

# EXISTING MANHOLE PROFILES




MANHOLE NO. 7

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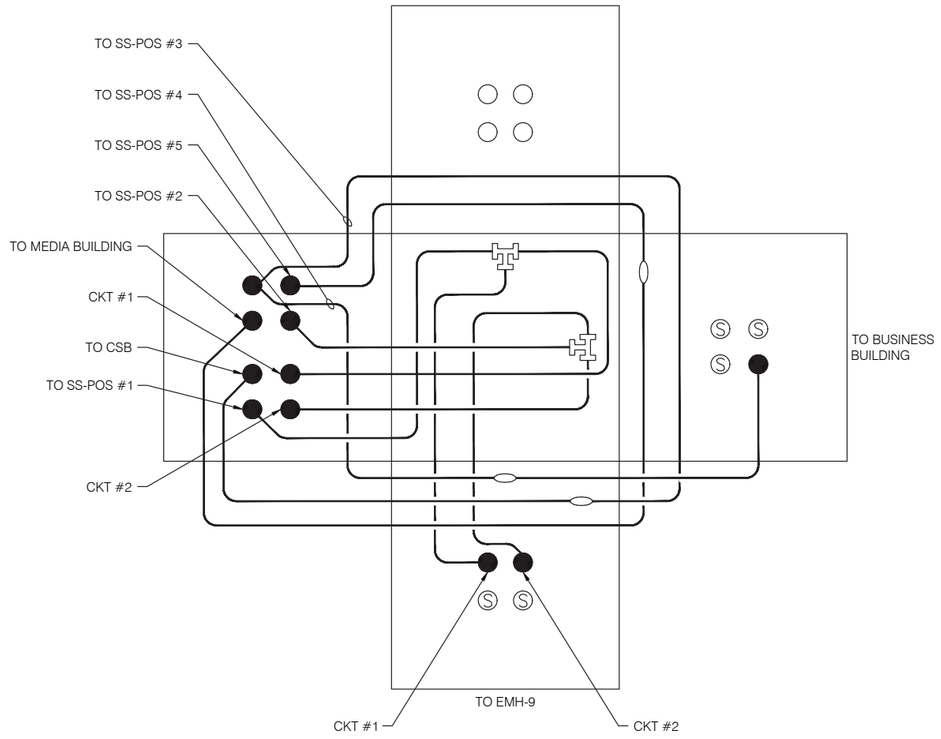
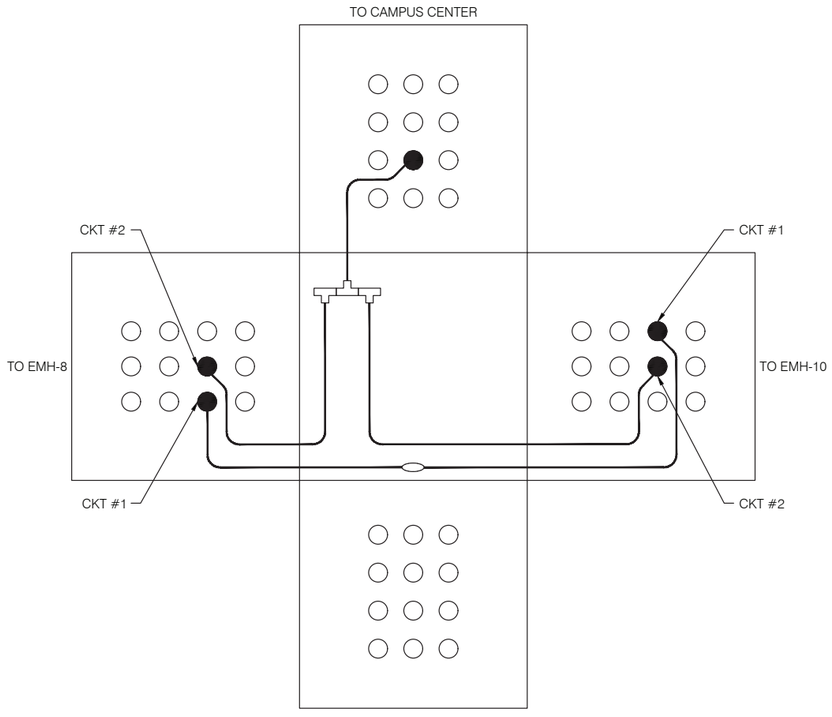



MANHOLE NO. 8

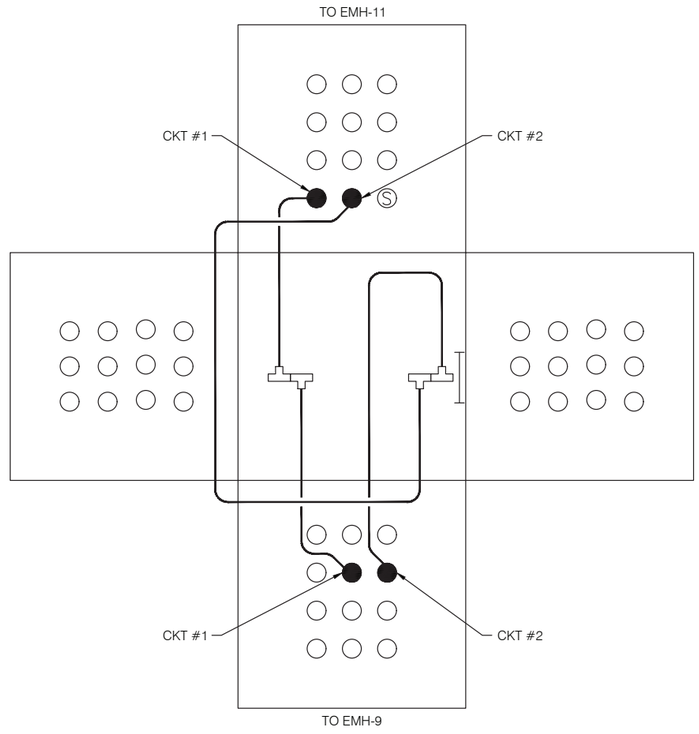
NORTH

# EXISTING MANHOLE PROFILES




MANHOLE NO. 9

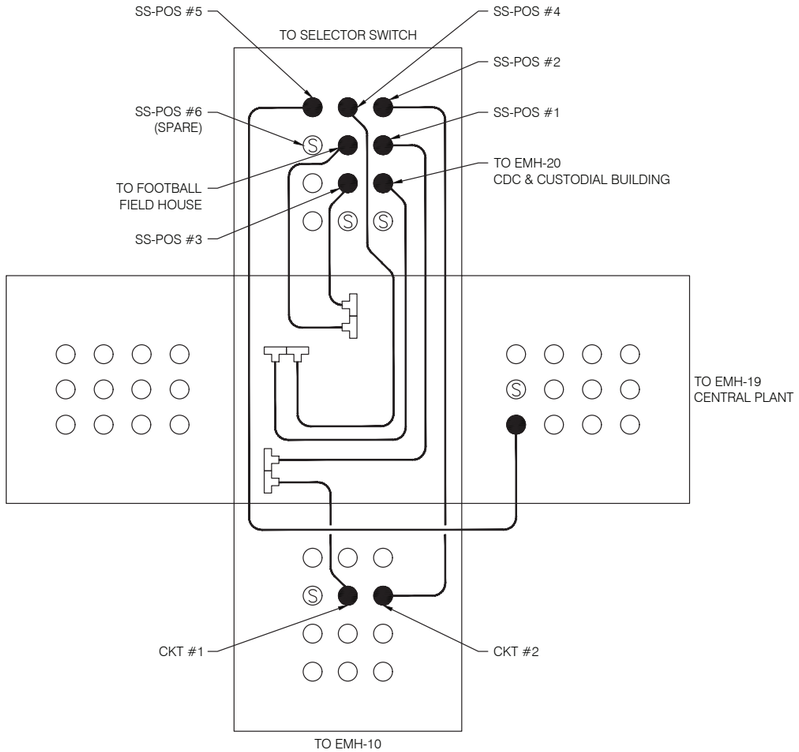
NORTH




MANHOLE NO. 10

NORTH

# EXISTING MANHOLE PROFILES




MANHOLE NO. 11

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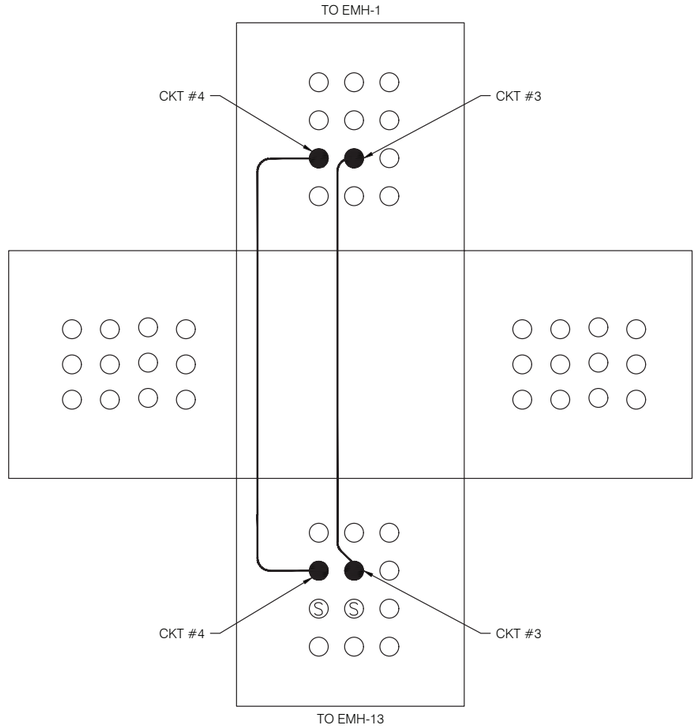
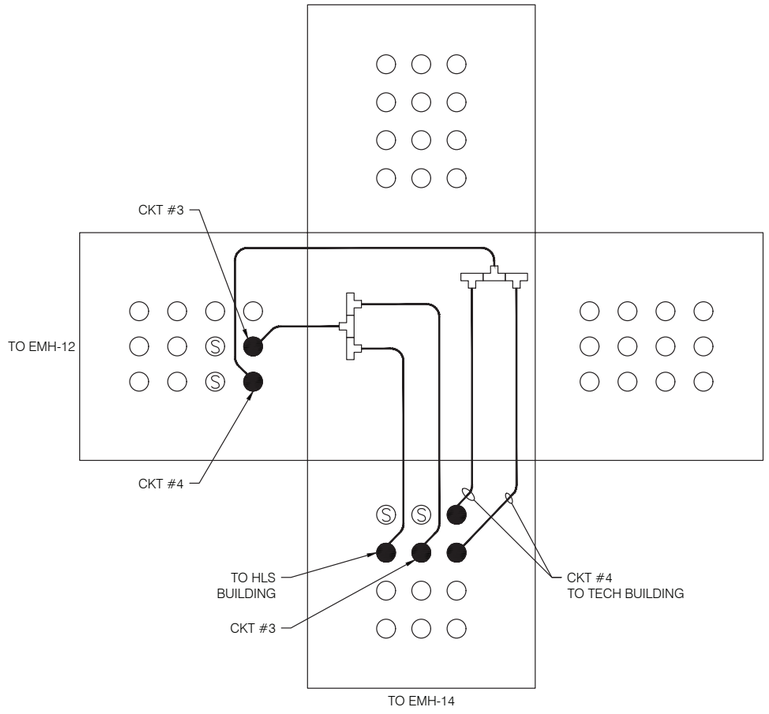



MANHOLE NO. 12

NORTH

# EXISTING MANHOLE PROFILES




MANHOLE NO. 13

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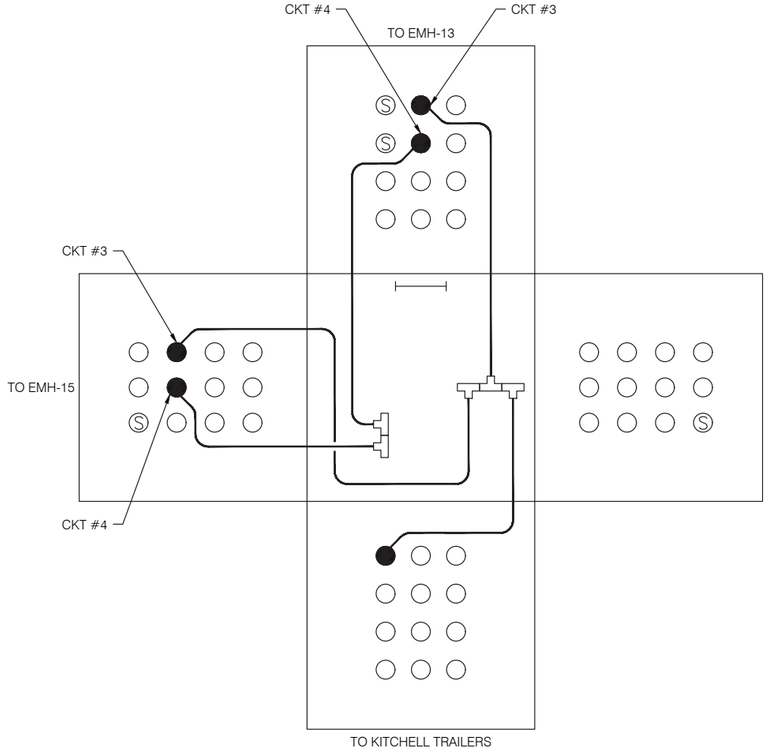
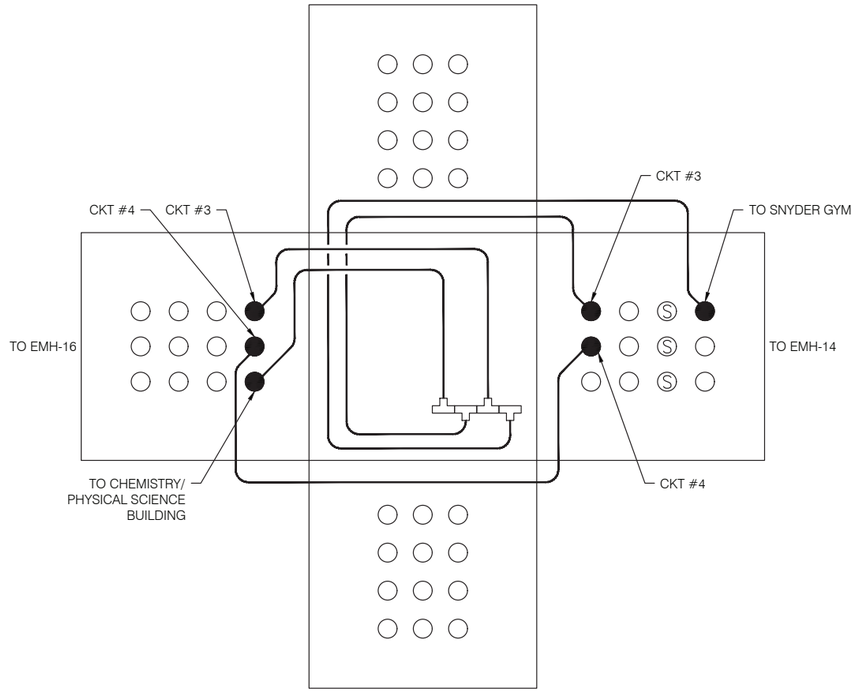



MANHOLE NO. 14

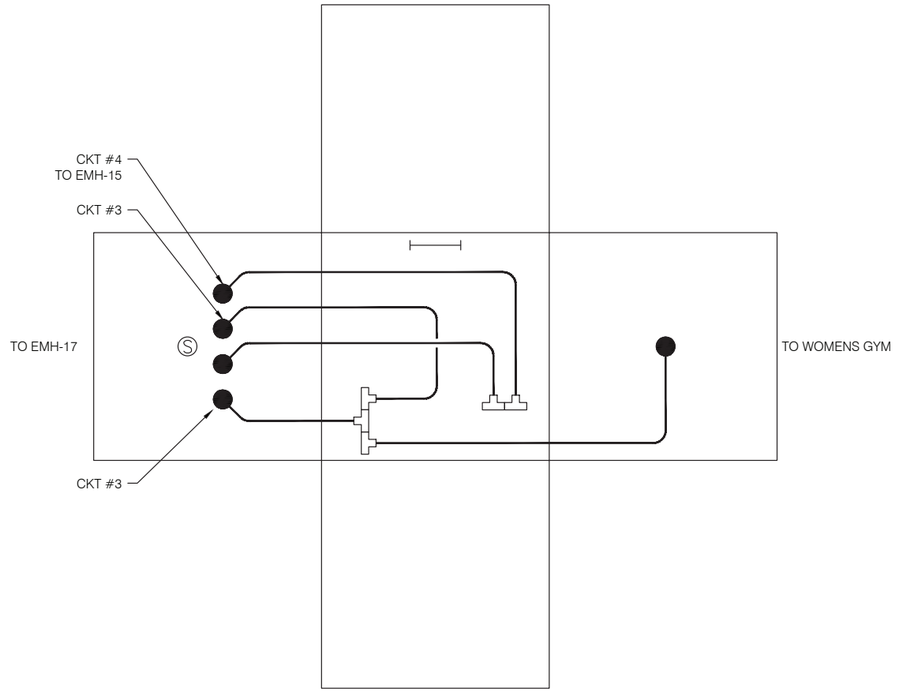
NORTH

# EXISTING MANHOLE PROFILES




MANHOLE NO. 15

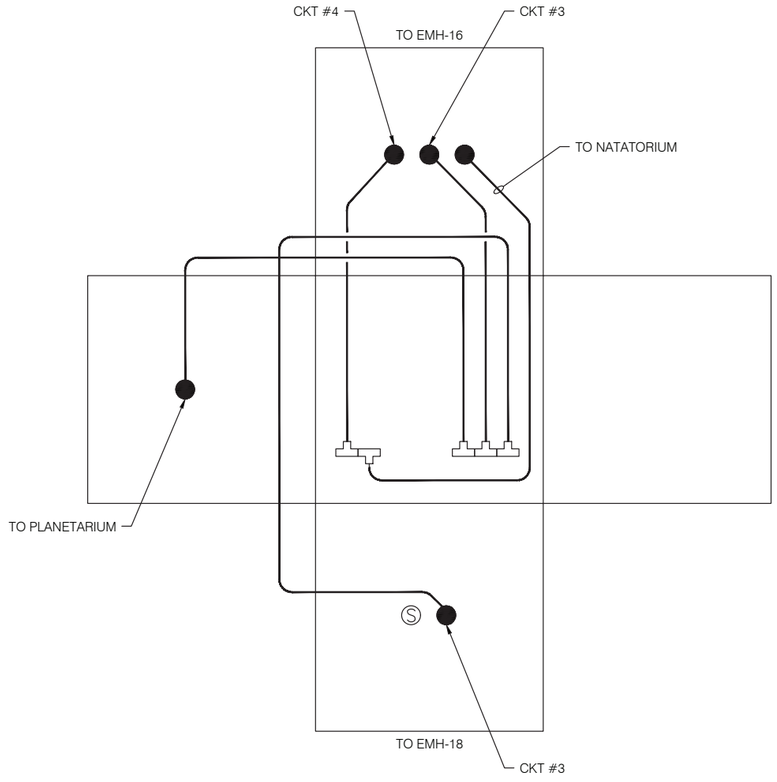
NORTH




MANHOLE NO. 16

NORTH

# EXISTING MANHOLE PROFILES




MANHOLE NO. 17

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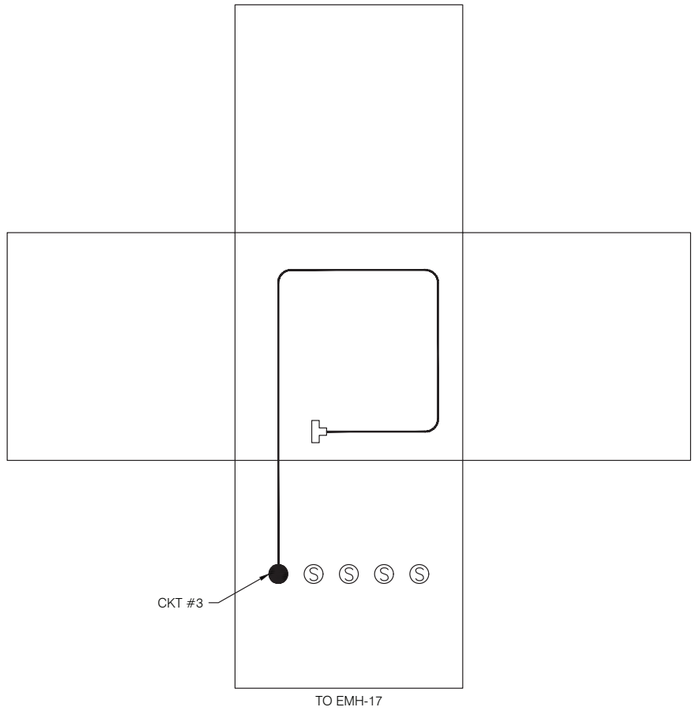


MANHOLE NO. 18

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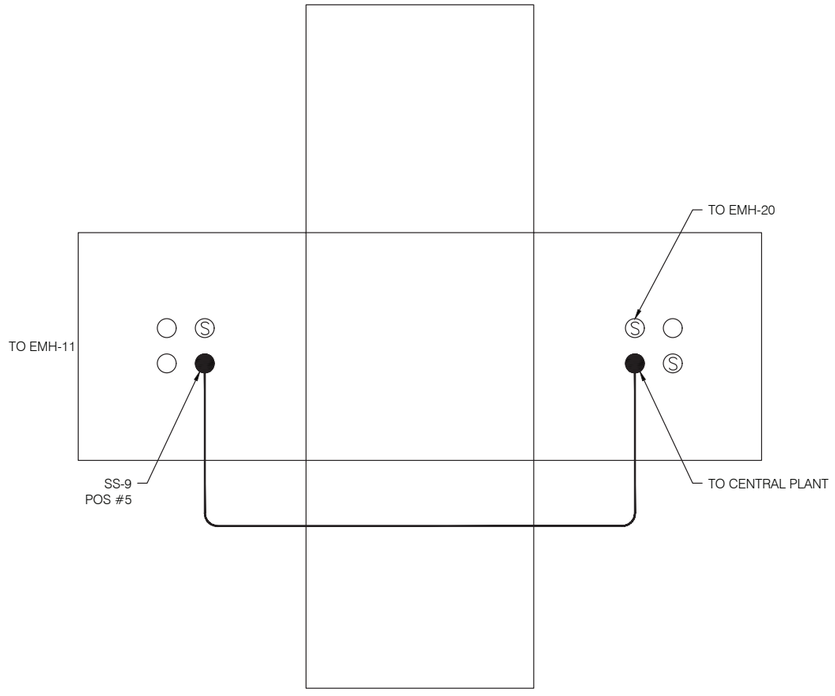
# EXISTING MANHOLE PROFILES




MANHOLE NO. 19

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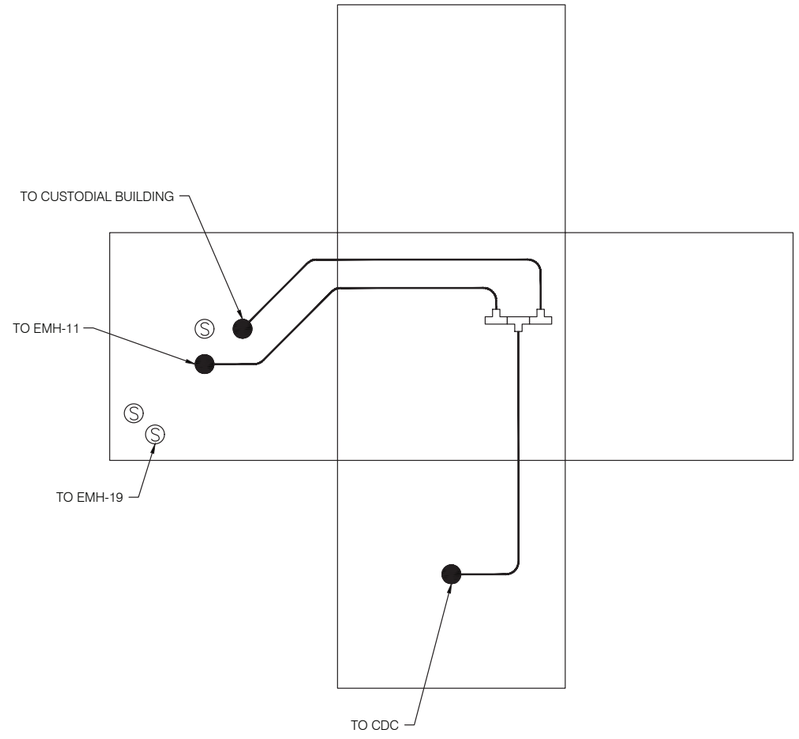



MANHOLE NO. 20

NORTH

## EXTERIOR LIGHTING SYSTEM

The campus wide exterior lighting at San Bernardino Valley College presently consists of a wide variety of exterior light fixtures equipped with a broad range of lamp sources that currently illuminate the pathways and roadways of the campus.

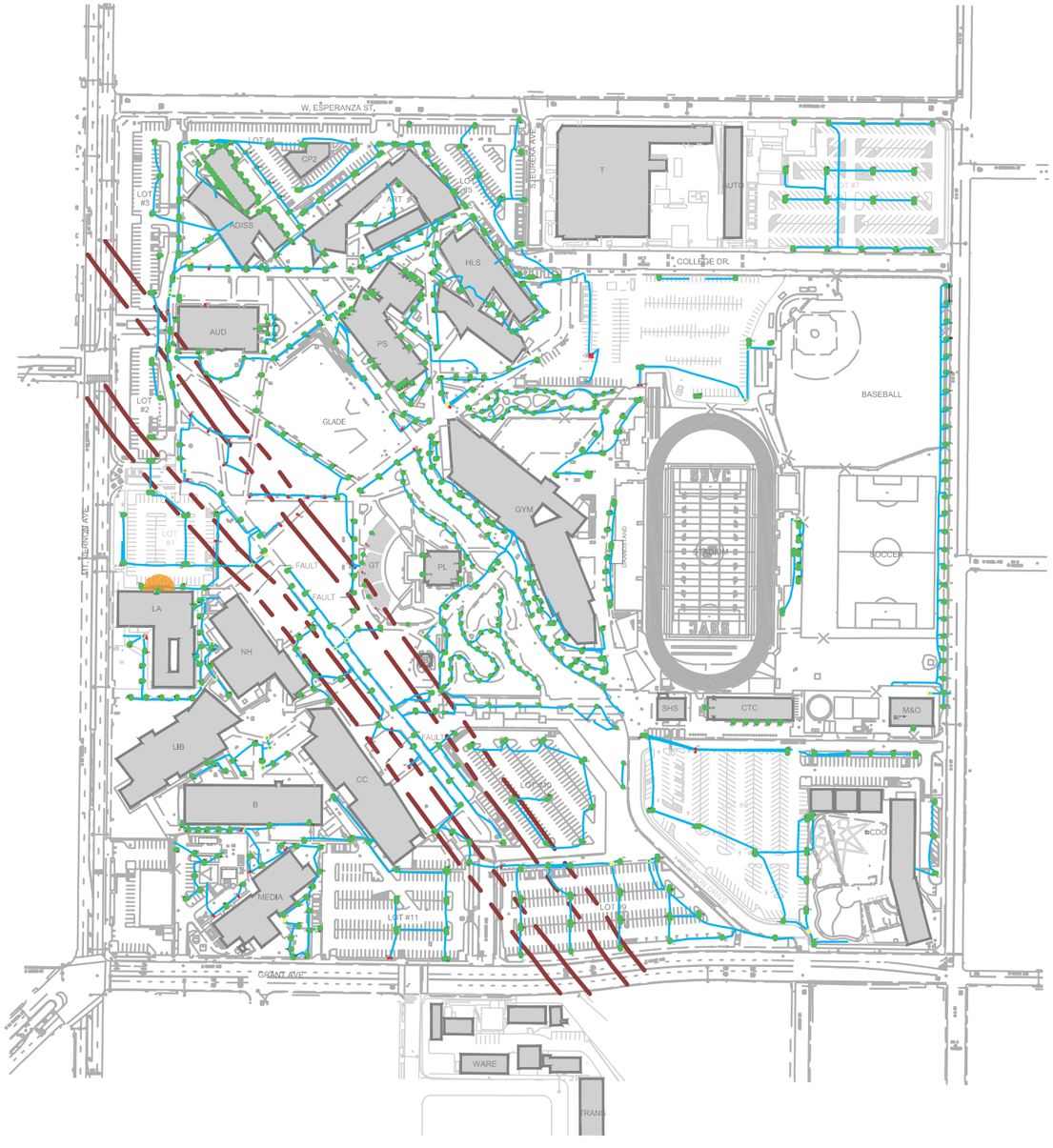
The majority of the exterior lighting fixtures illuminating the roadways are cobra head type fixtures. The fixture mounting heights and pole types vary throughout the campus. The walkways are illuminated with a combination of post tops and bollards. Light fixtures on campus are equipped with a wide variety of lamps including LED, compact fluorescent and metal halide lamps.

The lighting levels around the campus vary from as low as 0 footcandles (fc) in certain areas to as high as 34 fc in other areas, with uniformity ratios (average fc to minimum fc) in excess of 10:1. The footcandle readings were recorded using a digital light meter (model EA30 manufactured by Extech Instruments) during the month of February 2020.

The campus throughout the major areas is adequately illuminated with variety of fixtures and illumination level being consistent per IES recommended values. Few areas where the existing fixture was found to be defective and not operational, light levels were found to be inadequate which do not meet IES recommended values.

Refer to the site lighting plan at the end of this section showing the fixture layout at the campus and highlighting areas where adequate illumination is not achieved presently. Fixture schedule including the full list of light fixtures is also included at the end of this section.

# EXISTING SITE LIGHTING SYSTEM




## FACILITY LEGEND

| | |
|---|---|
| AD/SS | ADMINISTRATION / STUDENT SERVICES |
| ART | ART & GALLERY |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP | CENTRAL PLANT |
| CS | CUSTODIAL STORAGE |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LA | LIBERAL ARTS |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SHS | STUDENT HEALTH SERVICES |
| T | TECHNICAL |
| TRANS | TRANSPORTATION |
| WARE | WAREHOUSE |

## LEGEND

- EXISTING CONDUIT LINE
- PULLBOX
- JUNCTION BOX
- 'A1' POLE MOUNTED LUMINAIRE, SINGLE HEAD
- 'A2' POLE MOUNTED LUMINAIRE, DOUBLE HEAD
- 'A3' POLE MOUNTED LUMINAIRE, SINGLE HEAD
- 'B' POST TOP LUMINAIRE
- 'C' FLOOD LIGHTS
- 'D' BOLLARD LUMINAIRE
- 'L' LANDSCAPE FIXTURE
- 'S' PATHWAY LUMINAIRE
- 'W' WALL MOUNTED FIXTURE
- NON-OPERATIONAL LUMINAIRE
- AREA OF LOW FOOT CANDLES
- EARTHQUAKE FAULT LINE

## BUILDING LEGEND

EXISTING BUILDING.....

UNDER CONSTRUCTION.....

# EXISTING SITE LIGHTING SYSTEM

## LIGHT FIXTURE SCHEDULE

| SYMBOL | DESIGNATION | PHOTO | DESCRIPTION | MODEL NUMBER | CONTROL | POLE/MOUNTING HEIGHT |
|---|---|---|---|---|---|---|
| | | | | | | |
| | A1 |  | CONCRETE POLE MOUNTED LED LUMINAIRE, SINGLE HEAD | - | - | 27' |
| | A2 |  | STEEL POLE MOUNTED LED LUMINAIRE, DOUBLE HEAD | - | - | 22' |
| | A3 |  | CONCRETE POLE MOUNTED LUMINAIRE, DOUBLE HEAD | - | - | 22' |
| | A4 |  | CONCRETE POLE MOUNTED LED LUMINAIRE, SINGLE HEAD | - | - | 22' |
| | A5 |  | CONCRETE POLE MOUNTED LUMINAIRE, DOUBLE HEAD | - | - | 22' |
| | A6 |  | CONCRETE POLE MOUNTED LUMINAIRE, DOUBLE HEAD | - | - | 22' |
| | A7 |  | CONCRETE POLE MOUNTED LUMINAIRE, QUAD HEAD | - | - | 22' |
| | A8 |  | CONCRETE POLE MOUNTED LUMINAIRE, DOUBLE HEAD | - | - | 22' |
| | A9 |  | CONCRETE/STEEL POLE MOUNTED LUMINAIRE, FLAT HEAD | - | - | 10-27' |
| | A10 |  | CONCRETE POLE MOUNTED LUMINAIRE, QUAD HEAD | - | - | 19' |
| | A11 |  | CONCRETE POLE MOUNTED LUMINAIRE, DOUBLE HEAD | - | - | 20' |

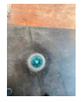
## LIGHT FIXTURE SCHEDULE

| SYMBOL | DESIGNATION | PHOTO | DESCRIPTION | MODEL NUMBER | CONTROL | POLE/MOUNTING HEIGHT |
|---|---|---|---|---|---|---|
| | | | | | | |
| | A12 |  | STEEL POLE MOUNTED LED LUMINAIRE, DOUBLE HEAD | - | - | 22' |
| | A13 |  | STEEL POLE MOUNTED LED LUMINAIRE, TRIPLE HEAD | - | - | 22' |
| | A14 |  | STEEL POLE MOUNTED LED LUMINAIRE, SINGLE HEAD | - | - | 14' |
| | A15 |  | SPORTS LIGHTING LUMINAIRE | - | - | 79' |
| | A16 |  | STEEL POLE MOUNTED LED LUMINAIRE, DOUBLE HEAD | - | - | 22' |
| | A17 |  | STEEL POLE MOUNTED LED LUMINAIRE, DOUBLE HEAD | - | - | 22' |
| | A18 |  | STEEL POLE MOUNTED LUMINAIRE, DOUBLE FLAT HEAD | - | - | 10' |
| | A19 |  | STEEL POLE MOUNTED LUMINAIRE, DOUBLE FLAT HEAD | - | - | 10' |
| | A20 |  | STEEL POLE MOUNTED LUMINAIRE, QUAD HEAD | - | - | 3' |
| | A21 |  | STEEL POLE MOUNTED LED LUMINAIRE, TRIPLE HEAD | - | - | 11' |
| | B1 |  | STEEL POST TOP LUMINAIRE, FLIP COBRA | - | - | 10' |

# LIGHT FIXTURE SCHEDULE

| SYMBOL | DESIGNATION | PHOTO | DESCRIPTION | MODEL NUMBER | CONTROL | POLE/MOUNTING HEIGHT |
|---|---|---|---|---|---|---|
| | | | | | | |
| | B2 |  | STEEL POST TOP LUMINAIRE, SINGLE HEAD | - | - | 10" |
| | B3 |  | CONCRETE POST TOP LUMINAIRE, DECORATIVE | - | - | 12' |
| | D1 |  | BOLLARD | - | - | 4' |
| | D2 |  | BOLLARD | - | - | 7' |
| | L |  | LANDSCAPE FIXTURE | - | - | 18" |
| | S1 |  | PATHWAY LUMINAIRE | - | - | 6" |
| | S2 |  | PATHWAY LUMINAIRE | - | - | - |
| | S3 |  | PATHWAY LUMINAIRE | - | - | 6" |
| | S4 |  | PATHWAY LUMINAIRE | - | - | - |
| | W1 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W2 |  | WALL MOUNTED FIXTURE | - | - | - |

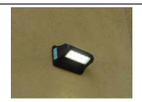
# LIGHT FIXTURE SCHEDULE

| SYMBOL | DESIGNATION | PHOTO | DESCRIPTION | MODEL NUMBER | CONTROL | POLE/MOUNTING HEIGHT |
|---|---|---|---|---|---|---|
| | | | | | | |
| | B2 |  | STEEL POST TOP LUMINAIRE, SINGLE HEAD | - | - | 10" |
| | B3 |  | CONCRETE POST TOP LUMINAIRE, DECORATIVE | - | - | 12' |
| | D1 |  | BOLLARD | - | - | 4' |
| | D2 |  | BOLLARD | - | - | 7' |
| | L |  | LANDSCAPE FIXTURE | - | - | 18" |
| | S1 |  | PATHWAY LUMINAIRE | - | - | 6" |
| | S2 |  | PATHWAY LUMINAIRE | - | - | - |
| | S3 |  | PATHWAY LUMINAIRE | - | - | 6" |
| | S4 |  | PATHWAY LUMINAIRE | - | - | - |
| | W1 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W2 |  | WALL MOUNTED FIXTURE | - | - | - |

## LIGHT FIXTURE SCHEDULE

| SYMBOL | DESIGNATION | PHOTO | DESCRIPTION | MODEL NUMBER | CONTROL | POLE/MOUNTING HEIGHT |
|---|---|---|---|---|---|---|
| | | | | | | |
| | W3 |   | WALL MOUNTED FIXTURE | - | - | 12' |
| | W4 |  | WALL MOUNTED FIXTURE | - | - | 7' |
| | W5 |  | WALL MOUNTED FIXTURE | - | - | 7' |
| | W6 |  | WALL MOUNTED FIXTURE | - | - | 7' |
| | W7 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W8 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W9 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W10 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W11 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W12 |  | WALL MOUNTED FIXTURE | - | - | - |

## LIGHT FIXTURE SCHEDULE

| SYMBOL | DESIGNATION | PHOTO | DESCRIPTION | MODEL NUMBER | CONTROL | POLE/MOUNTING HEIGHT |
|---|---|---|---|---|---|---|
| | | | | | | |
| | W13 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W14 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W15 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W16 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W17 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W18 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W19 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W20 |  | WALL MOUNTED FIXTURE | - | - | - |
| | W21 |  | WALL MOUNTED FIXTURE | - | - | - |

# CHAPTER 4
## Natural Gas System

## SYSTEM DESCRIPTION

Natural gas is distributed to campus buildings via multiple meters from the Southern California gas company. Gas enters the campus from 6 main feeds. Two feeds enter from Mt Vernon Ave, two feeds enter from Grant Ave. and two feeds enter from S K St. Gas Company main distribution lines are located in all the main streets (Mt Vernon Ave, Esperanza St., S K St. and E Grant Ave) surrounding the campus. According to the Gas Company, the system operating pressure of the gas mains range between 30-50 PSI. Majority of the buildings on campus have separate meters. There are however a few instances where multiple buildings are served via one meter. Both the Physical Sciences building and Gymnasium are served at medium pressure from a meter located north west of the Physical Sciences building. All gas lines upstream of the meters are owned and operated by the Gas Company.

The following sections provide a description of existing gas lines serving each building on campus. An existing gas distribution site plan is also provided at the end of the section for reference.

### MT Vernon Feed 1

#### ADMINISTRATION/STUDENT SERVICES (AD/SS)

The AD/SS building is fed via an 3/4" line where it is regulated and metered before entering the northeast side of the building. This line is also protected via an earthquake valve.

Gas feed with gas meter, GPR, and EQV entering AD/SS Building

#### ART CENTER (ART)

The Art Center is fed via an 1" line where it is regulated and metered before entering the northeast side of the building. This line is also protected via an earthquake valve. The entire assembly is enclosed in a locked fence.

Gas feed with gas meter, GPR, and EQV entering Art Center Building

A second building in the Art Center also has its own gas connection. It is fed via a 3/4" line that is metered and regulated before entering the northwest corner of the building. This assembly is protected by a locked enclosure. This building connection is not protected by an earthquake valve.

Gas feed with gas meter and GPR entering Art Center Building

#### AUDITORIUM (AUD)

The Auditorium is fed via a 1" line that is regulated and metered before entering the south side of the building. This building connection is not protected by an earthquake valve.

Gas feed with gas meter and GPR entering Auditorium Building

#### POWER STATION

The power station location on the northwest corner of campus is fed via a 1-1/4" line located on the southeast corner of the enclosure. This line is metered and regulated before entering the station. The power station connection is not protected by an earthquake valve.

Gas feed with gas meter and GPR entering Power Station

#### PHYSICAL SCIENCES (PS)

Gas feed with gas meter and GPR entering Physical Sciences Building

The Physical Sciences building is via a 2" line where it is regulated before entering the northwest side of the building. This buildingconnection is not protected by an earthquake valve.

### MT Vernon Feed 2

#### LIBERAL ARTS (LA)

Gas feed with gas meter and GPR entering Liberal Arts Building

The Liberal Arts building is fed via a 1" line where it is regulated and metered before entering the southwest corner of the building. This building connection is not protected by an earthquake valve.

Gas feed with gas meter, GPR and EQV entering Library Building

## LIBRARY (LIB)

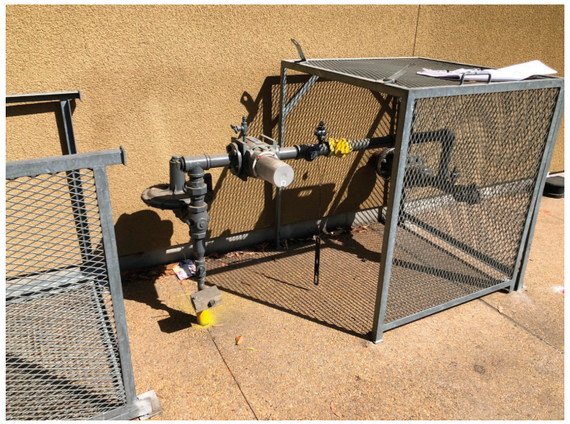
The library is fed via a 1" line where it is metered and regulated before entering the north side of the building. The line is protected by an earthquake valve.

## NORTH HALL (NH)

The North Hall building is fed via a 1" line where it is metered and regulated before entering the building on the southwest side. This feed assembly is protected by a locked enclosure.

Gas vault outside Planetarium Building

Gas vault outside Planetarium Building



Gas feed with gas meter and GPR entering North Hall

Gas feed entering Planetarium

This building connection is not protected by an earthquake valve.

## PLANETARIUM (PL)

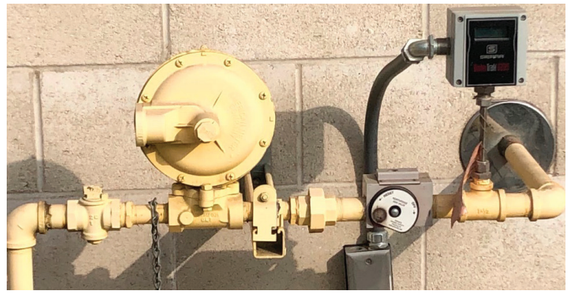
Gas feed with gas meter, GPR and EQV entering Business Building

The Planetarium is fed via a 3/4" line. This line enters several gas vaults before entering the south side of the building. This building connection is not protected by an earthquake valve.

## BUSINESS (B)

Gas feed with gas meter, GPR, and EQV entering Gymnasium

The Business building is fed via a 1-1/2" line where it is metered and regulated before entering the the north east corner of the building. This line is protected via an earthquake valve.



Gas feed with gas meter and GPR entering Football Feild Entrance Building

## GYMNASIUM (GYM)

The Gym is served by two feeds. A 3" MPG line is regulated and metered before entering the southwest side of the building. This line is protected via an earthquake valve. The second connection is a 2" MPG line that is regulated before entering the northwest side of the building.

Gas feed with gas meter, GPR, and EQV entering Media Commons Building

### FOOTBALL FIELD ENTRANCE BUILDING

This building is fed via a 2" MPG line that is regulated and metered before entering the south side of the building. This building connection is not protected by an earthquake valve.

## E Grant Ave Feed 1

Gas meter and GPR assembly outside southern side of the Campus Center

### MEDIA COMMUNICATIONS (MC)

The Media Communications building is serves via a 1" HPG

First gas feed with EQV and GPR entering Campus Center

line where it is regulated and metered before entering the south side of the building. This line is protected via an

Second gas feed with EQV and GPR entering Campus Center

earthquake valve.

## E Grant Ave Feed 2

### CAMPUS CENTER (CC) / BOOKSTORE (BOOK)

The Campus Center and Book Store are fed via two connections, both located on the southwest side of the building. HPG enter a gas meter, regulator and earthquake valve, MPG is then routed parallel to the southwest side of the building.

Gas feed with gas meter and GPR entering Applied Technologies Building

Gas feed with gas meter and GPR entering Applied Technologies Building

The first building connection is a 3" medium pressure line that enters a earthquake valve and regulator before enter the center of the building.

Gas feed with gas meter, GPR, and EQV entering Health and Life Sciences Building

The second feed is a 1-1/4" medium pressure line that also enters an earthquake valve and regulator before enter the building.

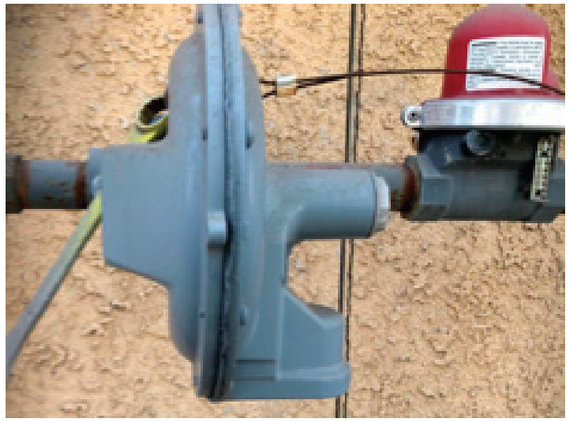
## S K Street Feed 1

### APPLIED TECHNOLOGIES (T)

The Applied Technologies building is served via a 5"

Gas feed with gas meter, GPR, and EQV entering Child Development Center

line. This line is regulated once before splitting into two feeds. The first feed enters the building. The second feed is regulated once more before entering the building. This building connection is not protected by an earthquake



Gas feed with GPR and EQV entering Child Development Center

valve.

## HEALTH & LIFE SCIENCES (HLS)

The HLS center is served by a 3/4" line is regulated and metered before entering the southwest side of the building. This line is protected via an earthquake valve.

### S K Street Feed 2

## CHILD DEVELOPMENT CENTER (CDC)

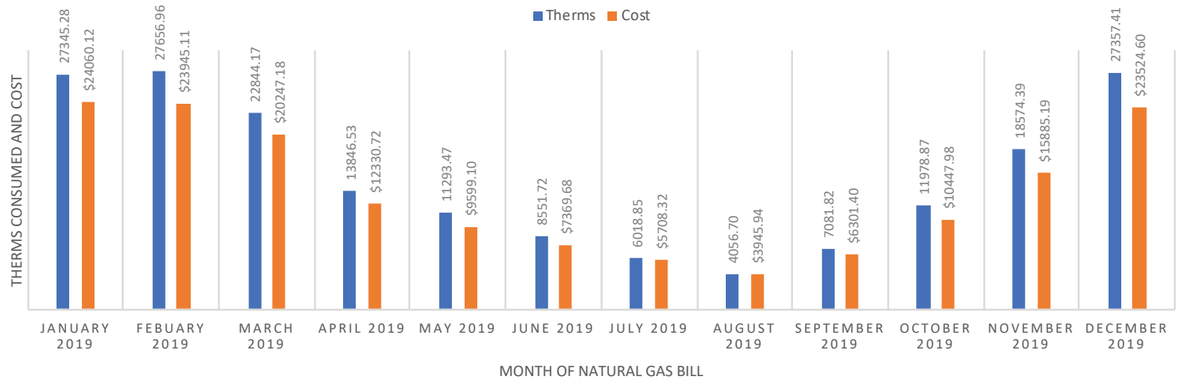
The two buildings that make up the CDC both have their own feed. The southern most building is fed via a 1" line that is metered, regulated and protected via an earthquake valve before it enters the east side of the building.

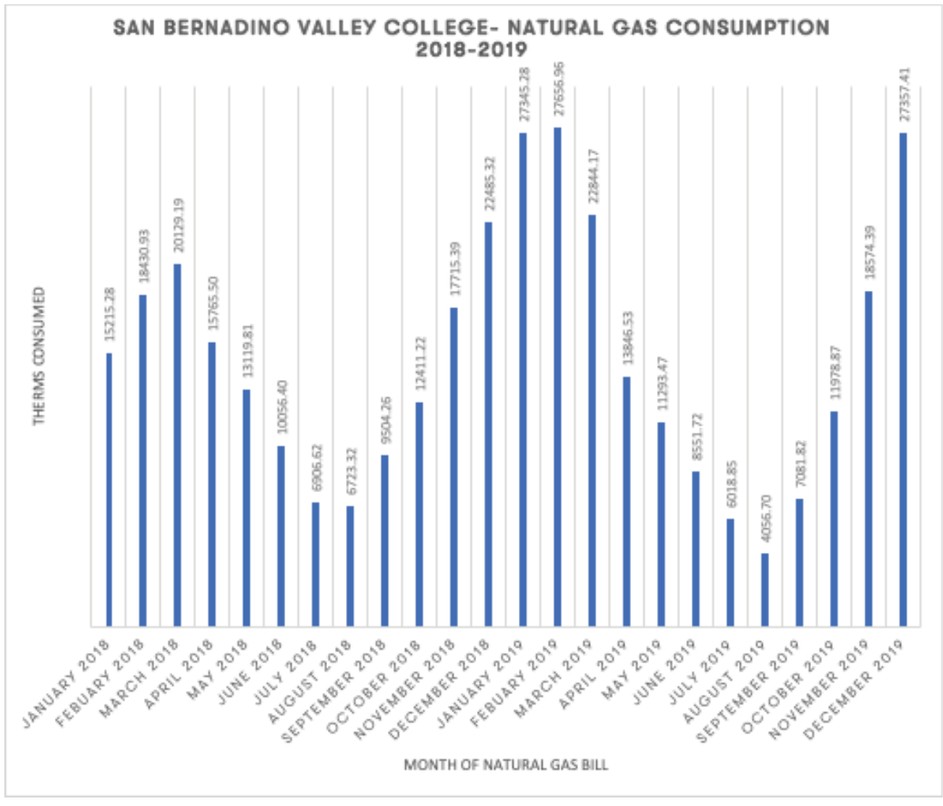
The northern most building is feed from the same line and sees a regulator before entering the building. This line is protected via an earthquake valve and is locked in a fenced enclosure before entering the east side of the building.

**EXISTING CONSUMPTION DATA**

| Month | Therms | Cost |
|---|---|---|
| January 2019 | 27345.28 | $24,060.12 |
| Febuary 2019 | 27656.96 | $23,945.11 |
| March 2019 | 22844.17 | $20,247.18 |
| April 2019 | 13846.53 | $12,330.72 |
| May 2019 | 11293.47 | $9,599.10 |
| June 2019 | 8551.72 | $7,369.68 |
| July 2019 | 6018.85 | $5,708.32 |
| August 2019 | 4056.70 | $3,945.94 |
| September 2019 | 7081.82 | $6,301.40 |
| October 2019 | 11978.87 | $10,447.98 |
| November 2019 | 18574.39 | $15,885.19 |
| December 2019 | 27357.41 | $23,524.60 |
| **2019 Total** | **186606.17** | |

**CONSUMPTION AND COST**




*Shows the actual natural gas consumed by the San Bernardino Valley College (SBVC) campus from January 2018 to December 2019. The SBVC campus consumed a total of 168,463.24 therms of gas for the 2018 calendar year and 186,606.17 therms for the 2019 calendar year.*

# ANALYSIS OF EXISTING SYSTEM

## Age and Reliability

The majority of the campus gas infrastructure was installed roughly 50 years ago. The distribution system throughout the campus has undergone extensions over the years to accommodate campus expansions and additions and comprises of a mixture of PE and steel lines.

## Redundancy and Capacity

The majority of buildings on campus are served by their own utility-owned meters. High pressure gas lines are routed throughout campus with operating pressure between 30-50 psi. This gives the campus adequate capacity to accommodate future expansion.

## Existing Natural Gas Loads

Existing gas comumption in therms for the 2019 year along with montly costs is provided in Table 1 for reference.

# ANALYSIS OF FUTURE NEEDS

An evaluation of the facilities planned as part of the master plan revealed that a net additional 161,686 square feet of buildings/spaces are planned at the campus. A review of these proposed facilities and their usage revealed that the campus would add an additional load of 16,432 CFH to the existing meter system.

The table above provides estimated heating and domestic heating load demands based on occupancy type of the building. Gas loads for future buildings are calculated on a square foot basis.

# FINDINGS AND RECOMMENDATIONS

Based on as-built drawings and field observations, a large portion of the gas distribution is steel piping. It is recommended to upgrade this piping to PE piping for extended life expectancy. Additionally, it was observed that several buildings on campus lack earthquake valves. To meet current code requirements, earthquake valves should be installed on the gas feeds serving following buildings:

- Art Center
- Auditorium
- Liberal Arts
- Planetarium
- North Hall
- Physical Sciences
- Technology
- Power Station
- Football Building

Sub-meters were noted on the majority buildings on campus but not all builds have gas submeters. It is recommended to install sub-meters on the following buildings to provide better monitoring of the campus gas loads:

- Planetarium
- Physical Sciences
- CDC
- Campus Center
- Book Store

A review of the proposed future buildings planned on campus, proposed as part of the 2017 Master Plan, require that some of the existing gas lines be relocated.

Following are our recommendations to serve the proposed buildings planned as part of the master plan.

Phase 1 of the Career Pathways buildings involves replacing the existing Technical building with PATH 1. Demolishing the existing Tech building will alleviate the demand on the 3" gas line and allow for the new loads associated with new Career Pathways buildings. Before PATH 2 is built the existing lateral serving the HLS building must be relocated so it is not in conflict with the PATH 2 building footprint. Once relocated new high-pressure gas lines can connect the PATH 2 buildings to the relocated gas lateral.

The new Performing Arts Center (PAC) is being located sit directly above the gas company owned high-pressure line that serves the Campus Center. This high-pressure line will have to be relocated to avoid the PAC building footprint. The PAC building can then be connected to the relocated high-pressure gas line.

**EXISTING LOADS ALL BUILDINGS**

| Building | Gas Load (CFH) | Gas Load (Therms/Hr) | Hours per Year | Gas Load (Therms/yr) |
|---|---|---|---|---|
| AD/SS | 1130 | 11.7 | 2400 | 28046 |
| ART | 3840 | 39.7 | 2400 | 95305 |
| AUD | 1000 | 10.3 | 2400 | 24819 |
| B | 1600 | 16.5 | 2400 | 39710 |
| CC/BOOK | 6061 | 62.7 | 2400 | 150428 |
| CDC | 975 | 10.1 | 2400 | 24199 |
| CTS | 0 | 0.0 | 2400 | 0 |
| GYM | 7110 | 73.5 | 2400 | 176463 |
| HLS | 3798 | 39.3 | 2400 | 94263 |
| LA | 2040 | 21.1 | 2400 | 50631 |
| LIB | 2900 | 30.0 | 2400 | 71975 |
| MC | 915 | 9.5 | 2400 | 22709 |
| M&O | 0 | 0.0 | 2400 | 0 |
| NH | 2125 | 22.0 | 2400 | 52740 |
| O | 0 | 0.0 | 2400 | 0 |
| PL | 8 | 0.1 | 2400 | 199 |
| PS | 5292 | 54.7 | 2400 | 131342 |
| SHS | 0 | 0.0 | 2400 | 0 |
| T | 3750 | 38.8 | 2400 | 93071 |
| **Total** | | | | **1,055,901** |

**FUTURE BUILDING LOADS**

| Building Name | Occupancy Type | Gross Area (Sq. Ft) | Heating Load Factor (BTUH/sqft) | Estimated Heating Load (CFH) | Domestic Heating Load (CFH) | Total Gas Load (CFH) |
|---|---|---|---|---|---|---|
| Student Services/ Instructional Building (SS/INST) | Classroom/Lab | 101,750 | 20 | 2035 | 1017.5 | 3052.5 |
| Career Pathways 1 (PATH1) | Classroom/Lab | 102,275 | 20 | 2045.5 | 1022.75 | 3068.25 |
| Career Pathways 2 (PATH2) | Classroom/Lab | 63,150 | 20 | 1263 | 631.5 | 1894.5 |
| Performing Arts Center* (PAC) | Public Gathering | 24,150 | 20 | 483 | 241.5 | 724.5 |
| Warehouse 1 (Ware 1) | Commercial Use | 9,100 | 20 | 182 | 91 | 273 |
| Warehouse 2 (Ware 2) | Commercial Use | 9,100 | 20 | 182 | 91 | 273 |
| **Total** | | | | | | **9285.75** |

** Square footage information is based on building footprint square footage.*

The addition of the new Student Services/Instructional building (SS/INST) will involve demolishing the existing Liberal Arts building (LA). In doing so the new SS/INST building will be in conflict with the existing high-pressure gas line that currently serves the Liberal Arts building, Library, North Hall, and Business building. This line will have to be relocated so that it is not in conflict with the proposed SS/INST building footprint. The high-pressure branch that currently serves the LA building can be demolished as this will no longer be needed. The new SS/INST building can then be served from the relocated high-pressure lateral.

The addition of the two new warehouse building will not interfere with any of the current gas infrastructure and can be connected the high-pressure lateral coming from Grant Ave.

All existing facilities that are planned to be renovated as part of the master plan will connect to existing gas service that currently serves these facilities.

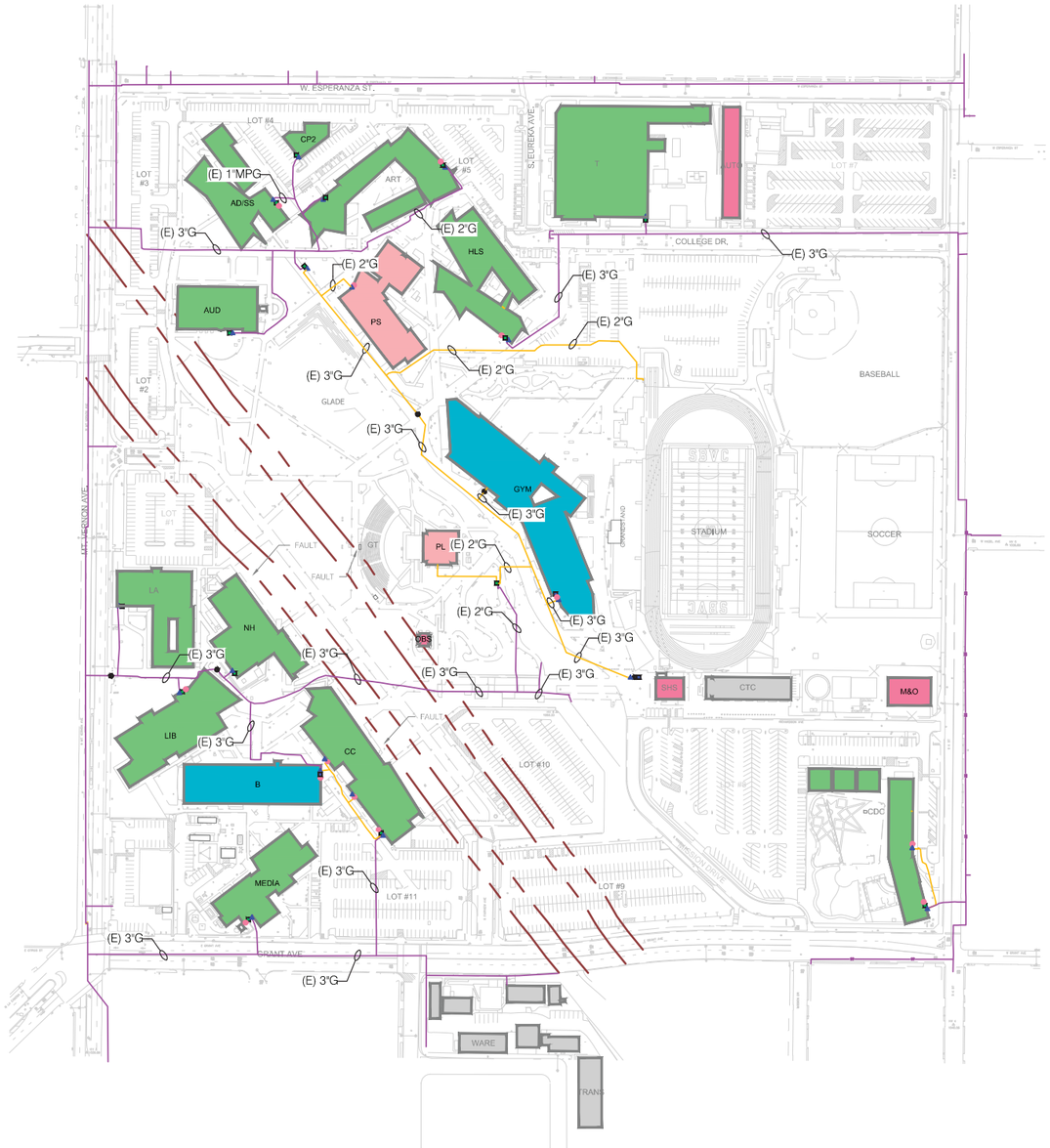
The exact capacity of the existing and extension gas lines shall be determined as part of the facility renovation/new facility project.

A proposed gas distribution plan to serve future buildings planned at the campus is provided at the end of the section.

## IMPLEMENTATION AND PHASING PLAN

The installation of new submeters and earthquake valves should be implemented at a time when classes are not in sessions.  This will minimize interruptions to the campus space heating and domestic water heating needs at the campus facilities. Since the campus has numerous gas feeds, the replacement of the steel gas lines with new PE piping can be phased and implemented in phases to minimize interruption to campus facilities.

# EXISTING NATURAL GAS DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | |
|---|---|
| AD/SS | ADMINISTRATION / STUDENT SERVICES |
| ART | ART & GALLERY |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP | CENTRAL PLANT |
| CS | CUSTODIAL STORAGE |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LA | LIBERAL ARTS |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SHS | STUDENT HEALTH SERVICES |
| T | TECHNICAL |
| TRANS | TRANSPORTATION |
| WARE | WAREHOUSE |

## LEGEND

- EXISTING GAS LINE
- UTILITY LINE
- CAPPED LINE
- ISOLATION VALVE
- EARTHQUAKE VALVE
- UTILITY METER
- CAMPUS METER
- REGULATOR
- EARTHQUAKE FAULT LINE

## BUILDING LEGEND

- NO GAS SERVICE
- UNDER CONSTRUCTION
- DIRECT UTILITY SERVICE
- CAMPUS-METERED SERVICE
- CAMPUS SERVICE

NORTH

0 300'

# PROPOSED NATURAL GAS DISTRIBUTION SYSTEM


## FACILITY LEGEND

| | |
|---|---|
| AD | ADMINISTRATION |
| ART | ART CENTER |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP1 | CENTRAL PLANT 1 |
| CP2 | CENTRAL PLANT 2 |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GRND | GROUNDS |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PAC | PERFORMING ARTS CENTER |
| PATH1 | CAREER PATHWAYS 1 |
| PATH 2 | CAREER PATHWAYS 2 |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SS/INST | STUDENT SERVICES/ INSTRUCTIONAL BUILDING |
| TRANS | TRANSPORTATION |
| TECH | TECHNOLOGY BUILDING |
| WARE | WAREHOUSE |

## LEGEND

- PROPOSED GAS LINE
- EXISTING GAS LINE
- NEW UTILITY GAS LINE
- UTILITY GAS LINE
- CAPPED LINE
- ISOLATION VALVE
- EARTHQUAKE VALVE
- UTILITY METER
- CAMPUS METER
- REGULATOR
- EARTHQUAKE FAULT LINE

## BUILDING LEGEND

- NO GAS SERVICE
- UNDER CONSTRUCTION
- DIRECT UTILITY SERVICE
- CAMPUS SERVICE
- CAMPUS METERED SERVICE
- EXISTING BUILDING
- FUTURE PARKING STRUCTURE
- FUTURE BUILDING
- BUILDING RENOVATION/EXPANSION

NORTH

0 300'

# ROUGH ORDER COST ESTIMATES

| | | | |
|---|---|---|---|
| Priority 1 | Critical - Need replacement in 0-3years | Priority 3 | Fair Condition - Need Replacement in Next 5-10 years |
| Priority 2 | Moderately Critical - Need replacement in 3-5 years | Priority 4 | Adds Value and Redundancy 5-10 years or as funding is available |

| Priority 5 | New Building Impact - Based on project schedule |
|---|---|

| Sequential Tracking # | Campus | Infrastructure Scope | Utility | Installed Year(s) | Brief Description of the Need | Priority Level (1..4) | Project Name | Brief Scope of Project | Project Category | Can the Project be Phased - Y/N | Total Construction Costs ($)[1] | Total Project Costs - Including Soft Costs ($) | Study by (Prime Consultant) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SBVC-P1 | San Bernardino Valley College | Provisions for New Earthquakes Valve | Plumbing | - | Earthquake valves need to be installed on the gas feeds entering the Art Center, Auditorium, Liberal Arts, Planetarium, North Hall, Physical Sciences, Technology, Power Station, and Football Building. (9 total) | 1 | Installation of Earthquake Valves | Installation of Earthquake Valves | REG | Y | $20,000 | $26,000 | P2S Inc |
| **Total Priority 1 Costs** | | | | | | | | | | | **$20,000** | **$26,000** | |
| SBVC-P2 | San Bernardino Valley College | Replacement of Steel Gas Lines | Plumbing | - | Replacement of roughy 2000 feet of existing steel gas lines. | 2 | Replacement of Steel Gas Lines | Replacement of Steel Gas Lines | DM | | $600,000 | $780,000 | P2S Inc |
| **Total Priority 2 Costs** | | | | | | | | | | | **$600,000** | **$780,000** | |
| SBVC-P3 | San Bernardino Valley College | Provisions for New Building Submeters | Plumbing | - | Submeters should be installed on the following builidngs for monitoring existing gas consumption - Planetarium, Physical Sciences, Child Development Center, Campus Center, and Book Store. (5 Total) | 4 | Installation of Gas Submeters | Installation of Gas Submeters | UF | Y | $25,000 | $32,500 | P2S Inc |
| **Total Priority 4 Costs** | | | | | | | | | | | **$25,000** | **$32,500** | |
| SBVC-P4 | San Bernardino Valley College | Provision of new gas lines to serve new buildings planned as part of the proposed master plan | Plumbing | - | Provision of of roughy 2000 feet of existing steel gas lines. | 5 | Extension of new gas lines | Extension of new gas lines | NC | | $150,000 | $195,000 | P2S Inc |
| **Total Priority 5 Costs** | | | | | | | | | | | **$150,000** | **$195,000** | |
| **Total Costs** | | | | | | | | | | | **$795,000** | **$1,033,500** | |

**Project Categories**

**DM** Deferred maintanance: systems or facilities that have not been maintained due to lack of staffing or funding. While operational, failure is imminent.

**EM** Emergency projects are systems or facilities that have failed or do not function as designed. Repair or replacement is required.

**UF** Projects or intiatives that would improve systems, facilities or operations on campus.

**REG** Projects related to Fire, Life, Safety; Code or OSHA compliance. Risk of harm and potential for fines or shutdown directives from regulating authorities.

**NC** New construction to support proposed buildings

[1]Refer to Appendix for breakdown of costs.

# CHAPTER 5
## Telecommunication System

## SYSTEM DESCRIPTION

The main telecommunication services are derived from both Verizon and AT&T. The incoming service runs along the MT Vernon Avenue, and enters from the Northwest side of the campus, and then transitions to Esperanza street through a series of underground vaults as it enters the campus from that side of the campus. The campus services that come in from Esperanza street then around the perimeter, via underground vaults, and then into the Main Distribution Frame (MDF) located in CSB.

CSB – Main Core

The main telecommunications services to the campus are served from a MDF or "Main Distribution Frame", located on the south side of the campus near the on-site antenna donor tower, between the Business Building and the Media Communications Building. The CSB server room/MDF consists of a mix of 4-post racks, network server cabinets, wall mounted telecommunications terminations and main core for the campus fiber distribution. The server/network racks and cabinets are laid out in two aisles and air cooled, to cover the entire room, with no dedicated "hot" and "cold" aisles. There is also a centralized battery backup/ generator system for all the network equipment located just outside of the CSB building in case of power failure. There is a VOIP phone system serving the campus and is distributed via the fber to the individual campus buildings; with the main equipment is located in the CSB building.

The following methodology was adopted in formulating our utility infrastructure master plan.

- A critical aspect in the evaluation of the existing utility systems serving a facility is a detailed and accurate field investigation of the current systems. A detailed survey of the existing utility systems that currently serve the facilities at the campus was undertaken, and existing conditions, together with potential problems, were identified. The surveyed information was verified through available record drawings and meetings with the campus facilities staff.
- Each utility system was then evaluated for capacity, functionality, reliability, ease of maintenance, age, and its ability to serve the present and future needs of the campus.
- Alterations/upgrade/modifications necessary to support new buildings, major renovations, and building replacements that form part of the proposed near-term development plan were identified.
- Costs associated with each of the required utility upgrades were then developed based on our recommendations.

Our following Utility Infrastructure Master Plan update report provides an analysis of the existing utilities currently serving the facilities, identifies alterations/upgrade/ modifications necessary to support new buildings, major renovations, and building replacements that form part of the proposed near term development plan and outlines recommended solutions and costs to implement the same.

The goal of the technology site evaluation was to document current IT room conditions, confirm vault location (compare to existing master plans), document the existing backbone cabling infrastructure (from the MPOE, to the individual IT rooms) and review the IT/Telecom support systems. In addition, we reviewed:

- Existing campus Technology / Telecom Installations – Equipment Rooms, Campus Pathways/Vaults and existing Backbone Cabling
- Vaults/Pathways – confirm locations, existing conditions, requirements to meet Master Plan changes
- Review IT/Telecom Support Systems – HVAC, Power, E Power

## ANALYSIS OF EXISTING SYSTEMS

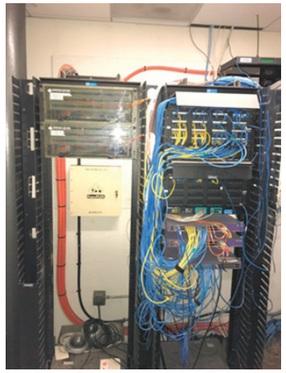
The IDF rooms located throughout the campus were reviewed during the site visit and an analysis of the same is provided at the end of the section. Each IDF room currently has (at a minimum), (1) 6 strand Single-Mode fiber and (1) 12 strand Multi-Mode fiber, terminated on the backboard in a NEMA enclosure, or directly within the server rack in a rack mounted LIU enclosure. There is a mix of Single-Mode and Multi-Mode fiber cabling to feed out to the other IDF's/ server rooms, for interconnections, back to the MDF, BDF, or dedicated network closet. There is copper feed cabling installed in each IDF and there is a minimum of (1) 25-Pair feed cable terminated on the backboard and in some instances within the server racks. It appears that most of the existing copper feed cabling that was not is use (or abandoned), was removed from the IDF backboards and IDF feed conduits, when the new air blown fiber cable infrastructure was installed. Each IDF room has a minimum of (1) 2-post server rack, or wall mounted cabinet and is supported with ladder tray from the 2-post racks, to the back wall. All of the network switch gear within the IDF/ sever rooms has been replaced over the last 5 years with Extreme Networks, Black Diamond series servers; all network switches are rack mounted in the 2-post server racks, with the exception of some of the legacy buildings that do not have a dedicated server room/closet. Some of the IDF rooms also have temperature control to make sure the room stays at a consistent temperature, with the exception of the buildings that do not have dedicated rooms/closets, that currently have no temperature control. The IDF rooms in general were clutter free and the temperature was comfortable and in compliance of industry standards; there were some exceptions in regard to temperature, with a few rooms that are located on the outside of the campus buildings.

The campus conduit infrastructure was also reviewed and assessed during the on-site utilities walk through. An existing telecommunications distribution plan has been provided  end of the section for reference. All of the direct services from Verizon, AT&T and other service providing vendors, come in from the street feed manholes and vaults that run alongside of MT. Vernon Avenue (from the Northwest), transition to Esperanza Street and into the campus underground conduit infrastructure (from North to South) through the manholes and vaults, located towards the front entrances of each parking area (alongside of MT Vernon Avenue and Esperanza Street – in the grass). Within the main campus, there is a centralized conduit infrastructure that runs through the center of campus to connect all buildings, for network and telephone services. The centralized conduit infrastructure has a minimum of (2) 4" conduits dedicated to telecommunications, and are distributed 4'x4' concrete vault (below ground), along the main thoroughfare, or within the campus landscape. All telecommunications vault and manhole locations are shared with other service cabling, such as security, fire and EMS. Upon site review, most of the telecommunications vaults and manholes were dry and accessible.

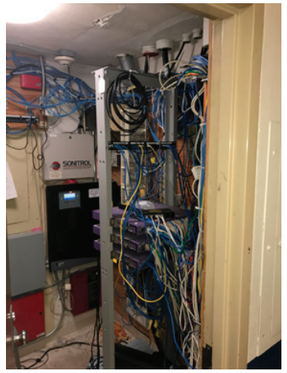
## ANALYSIS OF FUTURE NEEDS

Our analysis of future needs summary is based on the collective information taken from the overall site walks (exterior cable pathways) and IT room evaluations (each building) of the campus. Currently each IT server room has "Air Blown" fiber installed in preparation of future expansions and added campus buildings. The campus network servers have also been upgraded over the last 5 years to accommodate the network demand throughout the campus. Each IT/server room that was reviewed had the same "Black Diamond" switch gear and connectivity throughout the campus. Other future needs regarding future building additions and remodels would be the preparation of the fiber infrastructure, such as signal verification or fiber strand certification; by periodically testing the fiber strands, it will ensure the cabling is functional prior to final connection. Based on the recent analysis and site walk, some preparation is already in place for future needs of expanding the network connections throughout the campus.

Based on the overall on-site evaluation, some areas will need to be reviewed and analyzed in more detail to come up with a plan of action for future correction; Administration-#AD100F, Tech Building-#110, CTS building and CSB building, are all listed within the conclusion statement as IDF/server rooms that need additional attention. The Administration-#AD100F server room has a lot of network equipment and fire panels within, that are loosely



Administration and Student Services (AD/SS) – IDF AD100F



Technical Building (Tech) – IDF #110

connected and there appears to be a lot of abandoned low voltage cable. The Tech Building-#110 appears to have been a main distribution area at one time; this room has multiple fiber and copper feed cables that need to be identified, also redressed and protected from potential damage. The CTS has minimal cable protection and most of the station cabling is loosely supported in the ceiling. The CSB building will need to be assessed further to come up with a game plan to get the fiber splice cabling off of the floor, and into a cabinet or wall mounted enclosure; a detailed evaluation should be undertaken on all of the existing cabling within the building to make sure it is protected and identified for future expansion. At the time of the site walk review, all the existing manholes were identified and verified with the existing map. Most of the areas evaluated during the on-site were in good condition except for some of the campus legacy buildings; some of the legacy buildings IT rooms will just need some additional attention, in regard to protecting the cabling from damage by vendors accessing the rooms; some of the fiber interconnections currently have minimal protection from damage. An evaluation of individual telecommunications rooms in each of the buildings and our associated findings and recommendations is provided at the end of the section.

New conduit and media infrastructure will need to be installed from the nearest manhole to serve proposed buildings planned as part of the master plan.

## FINDINGS AND RECOMMENDATIONS

Based on the overall evaluation of the campus, a list of the individual recommendations, for each building were developed. Some of the overall recommendations include cleaning out the IT server rooms, providing additional protection for the fiber and copper infrastructure (within the racks and on the backboards) and addressing room temperature in some of the out lying rooms that do not currently have controlled temperature environments. Per discussion on site some of the fiber infrastructure has damaged or broken strands, that do not currently function as intended. A noticeable mix of fiber strands are used throughout the campus, in several of the IT server rooms, and a detailed list of tested fiber strands could help alleviate future project delays, by providing a room by room detail of good fiber strands to use. The labeling of the fiber and copper feed cabling was in place in most of the rooms, but it would also help to have the labeling verified and at the least reviewed for accuracy. Again, in general most of the IT server rooms were clean and accessible, but it is never a good idea to store overstock materials or stage excess paperwork in and around the server rooms; continual access to areas with exposed cabling can be a potential problem, not only with access to the rack/cabinet, but with network loss because of unforeseen accidents.

The campus telecommunications infrastructure has been updated within the last 5 years; a fiber infrastructure (Air Blown) has been installed to support the campus network services. Most of the existing copper cabling not in use, was removed and cleared from the server rooms and conduits feeding the server rooms when the fiber infrastructure was installed. Although a new fiber infrastructure has been installed throughout the campus, it is recommended that the fiber cable not in use, are periodically tested to ensure that they are in good working condition for all future expansion.

A recommendation for all IDF rooms and closets, would be additional cable protection around some of the main fiber distribution patch cables; innerduct or wire management can be used to better protect the fiber patch cabling going from the termination points into the network switch.

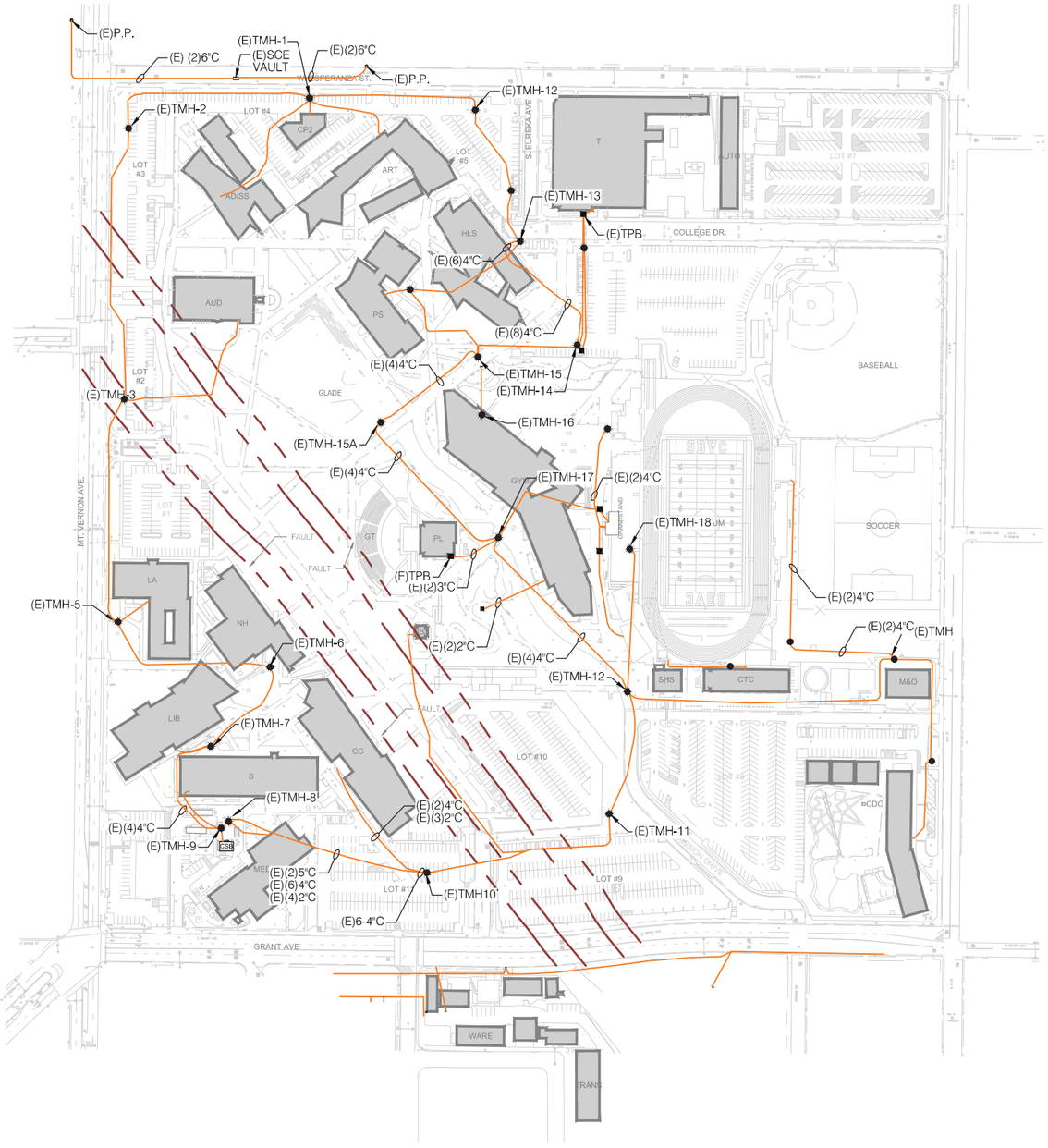
It is recommended that the vault and manholes locations be opened up and inspected for water saturation, in order to protect the cabling and avoid any complications; a yearly evaluation should be performed in order to maintain the integrity of the campus telecommunications infrastructure.

- Some of the priority rooms include the Administration - #AD100F, Tech Building - #110, CTS and CSB: all of these rooms need several items to be addressed in the near future in order to make sure the networks function as intended.
- Various server rooms need to address the fiber and copper patch cabling. Several of the closets need attention in order to protect the overall performance of the networks. Wire management with covers should help reduce some of the cluttered patching. Most closets or racks were lacking vertical wire management.
- Fiber panels in most of the rooms were labeled with a few exceptions – some of the fiber panels were missing covers – fiber dust covers were missing – some if the jumper cables outside of the wire managers need to be supported. The majority of the fiber jumpers were loosely dressed into the wire management with little to no protection.
- Most of the larger IDF's still have rack mounted UPS units; these units should be removed and disposed of if not in use.
- The new fiber infrastructure has been installed throughout the campus – Air-Blown fiber is located in every server room reviewed. Some of the fiber is not installed within an enclosure and some of the fiber is loosely installed on the backboard and in the server racks. It is recommended that each fiber location have an enclosure and fiber cable protection, in order to minimize damage.
- Some of the copper feed cabling used for interbuilding infrastructure has been abandoned and should be removed form the backboards and conduits.
- There were several server rooms that are also used for miscellaneous storage. It is recommended that all server rooms and closets be dedicated to cabling and network equipment, to avoid any unnecessary damage to the cabling and equipment.
- New conduit and media infrastructure will need to be installed from the nearest manhole to serve proposed buildings planned as part of the master plan.

## IMPLEMENTATION AND PHASING PLAN

The installation of new telecommunications support equipment and server room clean up should be implemented at a time when classes are not in session. This will minimize interruptions to the campus data network and voice communications throughout the campus facilities. Since the campus has dedicated server rooms (IDF rooms) for each of its buildings, the replacement of telecommunications support equipment and server room clean up can be phased, and implemented in phases to minimize interruption to campus facilities.

# EXISTING TELECOM DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | | | |
|---|---|---|---|
| AD/SS | ADMINISTRATION / STUDENT SERVICES | LA | LIBERAL ARTS |
| ART | ART & GALLERY | LIB | LIBRARY |
| AUD | AUDITORIUM | M&O | MAINTENANCE & OPERATIONS |
| AUTO | AUTO SHOP | MEDIA | MEDIA/COMMUNICATIONS |
| B | BUSINESS | NCP | NORTH CENTRAL PLANT |
| CC | CAMPUS CENTER | NH | NORTH HALL |
| CDC | CHILD DEVELOPMENT CENTER | OBS | OBSERVATORY |
| CP | CENTRAL PLANT | PL | PLANETARIUM |
| CS | CUSTODIAL STORAGE | PS | CHEMISTRY/PHYSICAL SCIENCES |
| CTC | COMPUTER TECHNOLOGY CENTER | SHS | STUDENT HEALTH SERVICES |
| GT | GREEK THEATER | T | TECHNICAL |
| GYM | CYMNASIUM | TRANS | TRANSPORTATION |
| HLS | HEALTH & LIFE SCIENCES | WARE | WAREHOUSE |

## LEGEND

- EXISTING CONDUIT
- EXISTING TELECOM MANHOLE
- EXISTING TELECOM PULLBOX
- EXISTING TELECOM HANDHOLD
- EARTHQUAKE FAULT LINE

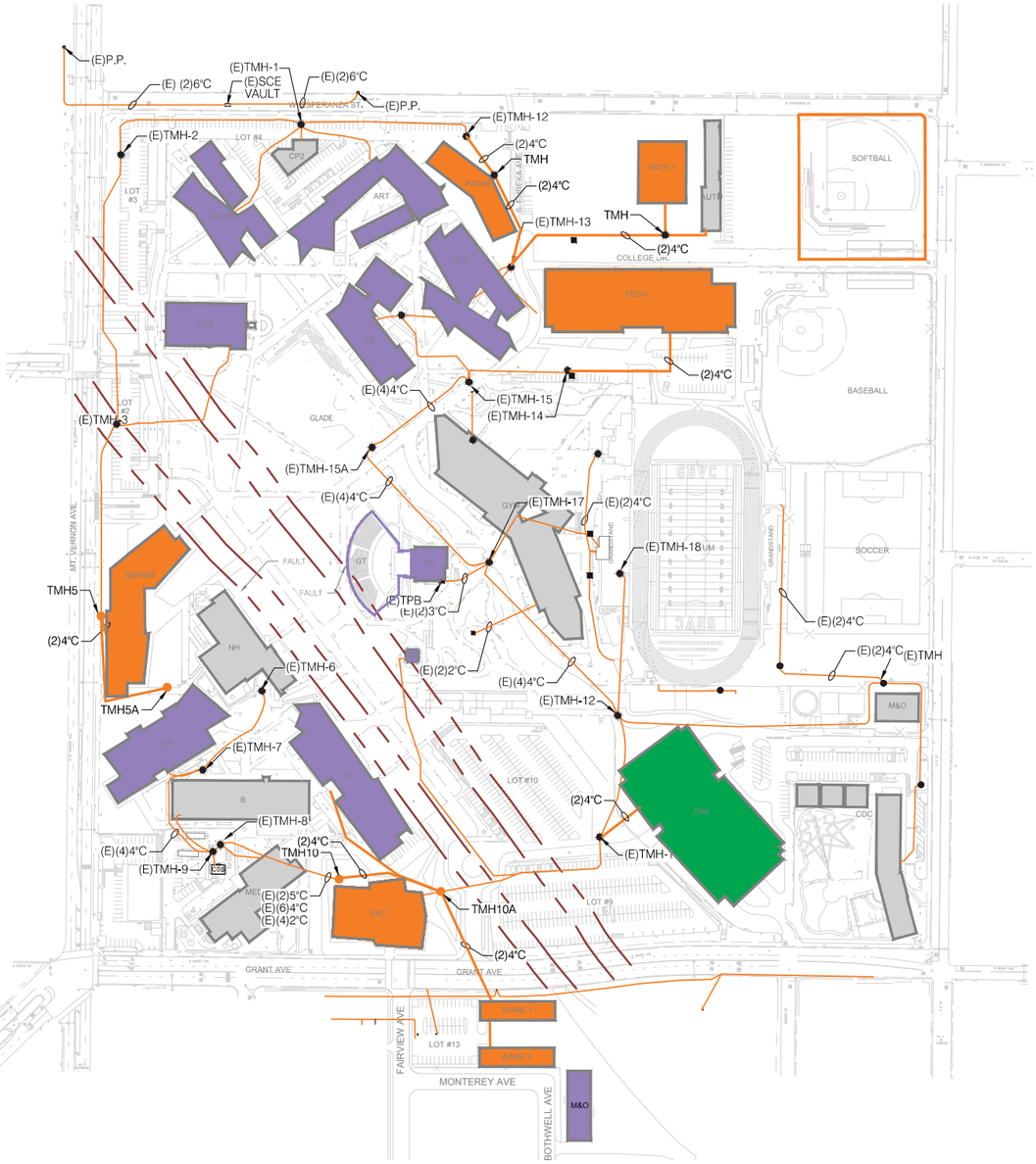
## BUILDING LEGEND

- EXISTING BUILDING
- UNDER CONSTRUCTION

NORTH

0 200'

# PROPOSED TELECOM DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | |
|---|---|
| AD | ADMINISTRATION |
| ART | ART CENTER |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP1 | CENTRAL PLANT 1 |
| CP2 | CENTRAL PLANT 2 |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GRND | GROUNDS |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PAC | PERFORMING ARTS CENTER |
| PATH1 | CAREER PATHWAYS 1 |
| PATH 2 | CAREER PATHWAYS 2 |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SS/INST | STUDENT SERVICES/ INSTRUCTIONAL BUILDING |
| TRANS | TRANSPORTATION |
| TECH | TECHNOLOGY BUILDING |
| WARE | WAREHOUSE |

## LEGEND

- PROPOSED CONDUIT
- EXISTING CONDUIT
- PROPOSED TELECOM MANHOLE
- EXISTING TELECOM MANHOLE
- EXISTING TELECOM PULLBOX
- EXISTING TELECOM HANDHOLD
- EARTHQUAKE FAULT LINE

## BUILDING LEGEND

- EXISTING BUILDING
- UNDER CONSTRUCTION
- FUTURE PARKING STRUCTURE
- FUTURE BUILDING
- BUILDING RENOVATION/EXPANSION

NORTH

0 300'

**EXISTING MEDIA (COPPER AND FIBER CABLE) INFORMATION BY BUILDING**

| | | | Single-Mode | | Multi-Mode | | Copper |
|---|---|---|---|---|---|---|---|
| BLDG | Building Name | Room | Pair Quantity | In Use | Pair Quantity | In Use | Pair Quantity |
| AD/SS | Administration and Student Services | AD 100F | 6 | 2 | 94 | 14 | 200 |
| | | AD 200C | | | 12 | 2 | 25 |
| | | AD 208A | | | 12 | 2 | 25 |
| | | AD 106A | | | 12 | 2 | 25 |
| | | AD 206E | | | 12 | 2 | 25 |
| | | AD 2.1 | | | 12 | 2 | 25 |
| | | AD 103U | | | 12 | 2 | 25 |
| | | AD 203 | | | 12 | 2 | 25 |
| ART | Art & Gallery (ART) | Photo Lab | | | 12 | 2 | 25 |
| | | MDF 116 | | | 12 | 2 | 25 |
| AUD | Auditorium | AO 15 | | | 12 | 4 | 25 |
| B | Business Building | IT 129 | 36 | 2 | 12 | 2 | 25 |
| | | IDF 209 | 12 | 2 | 6 | 4 | 25 |
| CC | Campus Center | CC 146.0 | 12 | 2 | 6 | 4 | 25 |
| | Concession Stand | IDF 103 | 12 | | 12 | 2 | 25 |
| CTS | Computer Technology Services | CTS | 12 | 2 | | | 25 |
| CSB | CSB - Main Fiber Core | CBS | ..... | ..... | ..... | ..... | ..... |
| | Field Equipment Room | | 6 | 2 | 6 | | 25 |
| GYM | GYM | IDF 138A | 24 | | 12 | 2 | 25 |
| | | IDF 3.1 | 24 | | 12 | 2 | 25 |
| | | Room 126 | 72 | | 36 | 4 | 100 |
| HLS | Health & Life Science Building | HLS 146 | 6 | 2 | 36 | 4 | 50 |
| | | HLS 133 | 12 | 2 | 18 | | 25 |
| | | HLS 128 | | | 18 | 4 | 25 |
| LA | Liberal Arts Building | 100-L | 6 | 2 | 6 | 2 | MTPL |
| | | 101 | | | 18 | 4 | ..... |
| LIB | Library | LIB 140 | 12 | 2 | 18 | 4 | 75 |
| | | Telephone | | | 6 | 2 | ..... |
| | | LIB 119 | | | 6 | 2 | 25 |
| M&O | Maintenance & Operation | M&O | | | 6 | 2 | 25 |
| | | M&O 113 | 12 | 2 | | | 25 |
| MC | Media Communications | MC 150 | 24 | 6 | 24 | 10 | 25 |

| | | | Single-Mode | | Multi-Mode | | Copper |
|---|---|---|---|---|---|---|---|
| BLDG | Building Name | Room | Pair Quantity | In Use | Pair Quantity | In Use | Pair Quantity |
| NHR | North Hall Replacement | NHR 115 | 60 | 4 | 48 | 8 | 50 |
| | | NH 213 | 24 | 2 | 24 | 2 | 50 |
| | | NH 314 | 24 | | 24 | 2 | 25 |
| SBCCD | SBCCD - Across the street | SBCCD | 12 | | | | 100 |
| Tech | Technical Building | Tech 110 | 12 | 6 | 12 | ..... | MTPL |
| | | Tech 100 | | | | | 25 |
| | | Tech 112 | | | | | 25 |
| | Aeronautics Lab | Tech Lab | | | | | 25 |
| | | T125 | | | | | 25 |
| | Tech Classroom | Class | | | | | 25 |
| | | T122 | | | | | 25 |
| Track | Track/Field (Center Field) | IDF C104 | 36 | 4 | 36 | 2 | 75 |
| PL | Planetarium | PL | 18 | 4 | | | 25 |
| SHS | Student Health Services Building | RM 110 | 12 | 4 | | | 25 |
| CDC | Child Development Center | Reception | 6 | 2 | 12 | 2 | 25 |
| | CDC Classroom | Class | 6 | 2 | | | 25 |

Following is an evaluation of individual telecommunications rooms in each of the buildiings and our associated findings and recommendations.

## Administration and Student Services (AD/ SS)

The Administration and Student Services building is a two-story building, approximately 33,300 square feet. Built in 2003.

## AD 100F

Contains (2) 2-post racks, wire management (vertical/ horizontal) and ladder tray to the wall.

Rack 1 – Contains (2) LIU chassis for Single-Mode (SM) and Multi-Mode (MM) fiber – SM fiber has 6 strands, with 2 strands in use – MM fiber has approximately 94 strands, with 14 strands in use. This is a distribution rack for the building's other telecom rooms.

Rack 2 – Contains a total of (2) 96-Port Patch Panels – roughly 50% patched.

Rack 2 – Contains a total of (3) network switches – No other equipment.

UPS equipment – Rack 1 – UPS currently unplugged.

Copper backbone – Multiple copper feeds within the room; street feed circuits and room to room.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

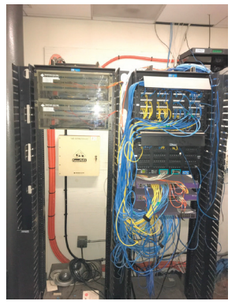
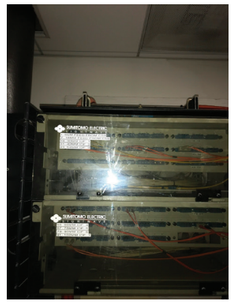
Temperature Control – Yes – the temperature was good.

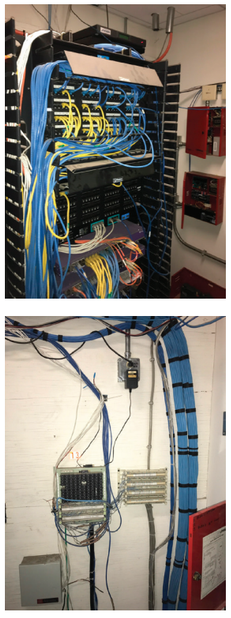
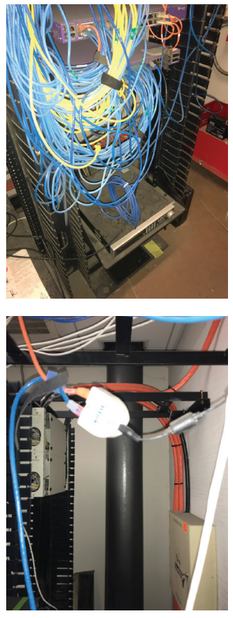
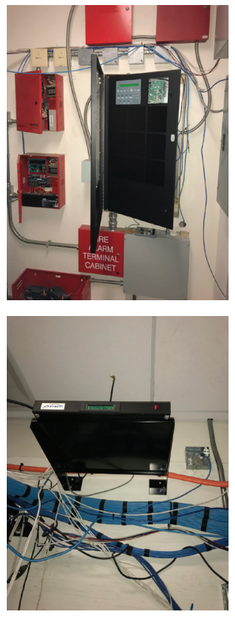
### OTHER OBSERVATIONS:

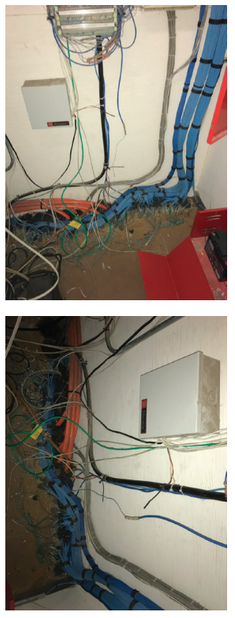
- There are some abandoned cables on the backboards.
- The room in general has some clutter and old equipment staged.
- There is no fire stop in any of the existing floor conduits.
- Fire alarm notification on the battery back module.
- Ground wiring should be reviewed in detail.

### RECOMMENDATIONS:

- Copper feed cabling should be reviewed, and abandoned cabling should be removed.
- UPS equipment not in use should be removed.
- Fiber jumper cabling should be dressed and protected within the wire management to avoid potential damage.
- Copper jumper cabling should be dressed within the wire management to avoid potential damage.
- Ground wiring should be reviewed and corrected.




## Administration and Student Services (AD/ SS) – 2nd Floor #200C

Contains (1) wall mounted rack with and wire management (horizontal).

Contains (1) LIU chassis for Multi-Mode (MM) fiber – MM fiber has 12 strands, with 2 strands in use.

Contains (1) 96-Port Patch Panels – roughly 60% patched.

Contains (1) network switch – No other equipment.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Unknown.

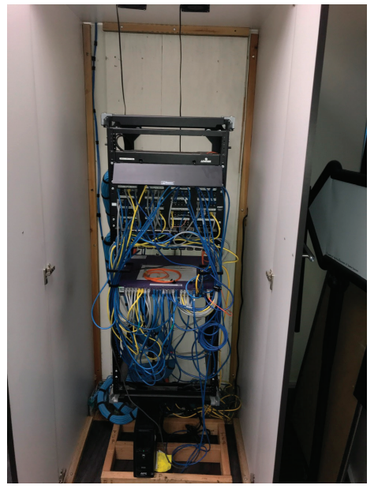
Temperature Control – Yes – the temperature was good.

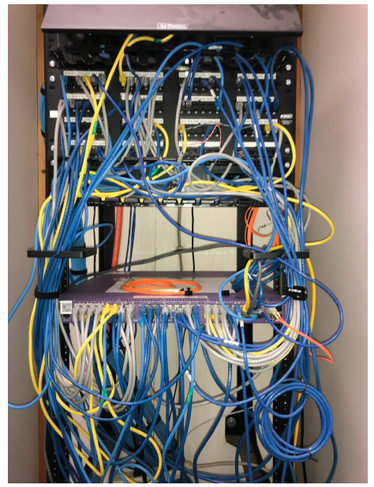
### OTHER OBSERVATIONS:

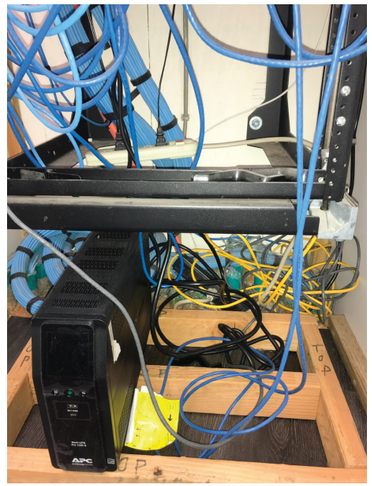
- Equipment is well protected within the cabinet.
- Cabling is well protected within the cabinet.

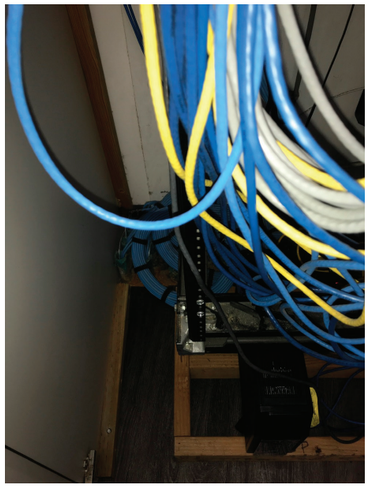
### RECOMMENDATIONS:

- Fiber jumper cabling should be dressed and protected within the wire management to avoid potential damage.
- Copper jumper cabling should be dressed within the wire management to avoid potential damage.
- Ground wiring should be reviewed and corrected.



## Administration and Student Services (AD/ SS) – 2nd Floor #208A

Contains (1) wall mounted rack with pedestal below and wire management (horizontal).

Contains (1) LIU chassis for Multi-Mode (MM) fiber – MM fiber has 12 strands, with 2 strands in use.

Contains (1) 48-Port Patch Panels – roughly 60% patched.

Contains (1) network switch – No other equipment.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Unknown.

Temperature Control – Yes – the temperature was good.

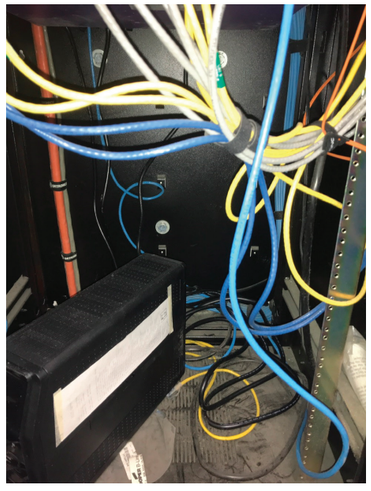
### OTHER OBSERVATIONS:

- Equipment is well protected within the cabinet.
- Cabling is well protected within the cabinet.
- The room in general has some clutter.
- There is no fire stop in any of the existing floor conduits.
- Ground wiring should be reviewed.

### RECOMMENDATIONS:

- Ground wiring should be reviewed and corrected.
- Fire stop in conduits.






## Administration and Student Services (AD/ SS) – Financial AD #106

Contains (1) wall mounted rack with pedestal below and wire management (horizontal).

Contains (1) LIU chassis for Multi-Mode (MM) fiber – MM fiber has 12 strands, with 2 strands in use.

Contains (1) 96-Port Patch Panels – roughly 60% patched.

Contains (1) network switch – No other equipment.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Unknown.

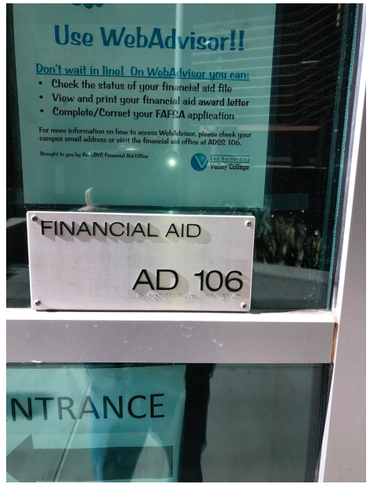
Temperature Control – Yes – the temperature was good.

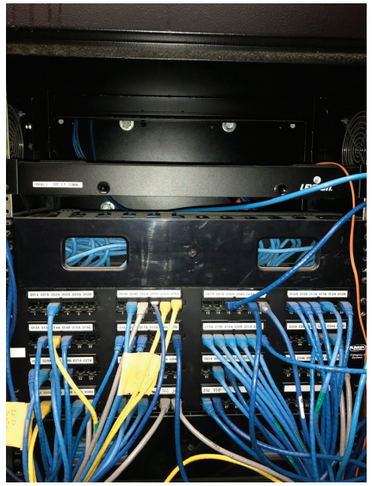
### OTHER OBSERVATIONS:

- Equipment is well protected within the cabinet.
- Cabling is well protected within the cabinet.
- The room in general has some clutter.
- There is no fire stop in any of the existing floor conduits.
- Ground wiring should be reviewed.

### RECOMMENDATIONS:

- Ground wiring should be reviewed and corrected.
- Fire stop in conduits.



## Administration and Student Services (AD/ SS) – Room #206E

Contains (1) wall mounted rack with pedestal below and wire management (horizontal).

Contains (1) LIU chassis for Multi-Mode (MM) fiber – MM fiber has 12 strands, with 2 strands in use.

Contains (1) 96-Port Patch Panels – roughly 50% patched.

Contains (1) network switch – No other equipment.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Unknown.

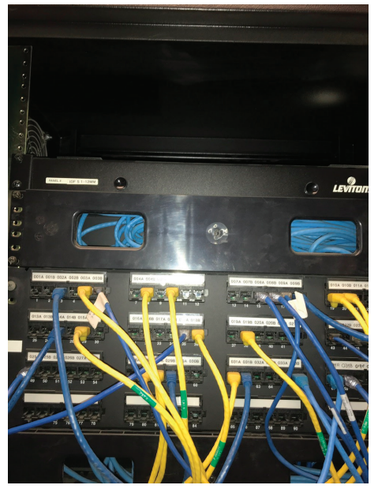
Temperature Control – Yes – the temperature was good.

### OTHER OBSERVATIONS:

- Equipment is well protected within the cabinet.
- Cabling is well protected within the cabinet.
- The room in general has some clutter.
- There is no fire stop in any of the existing floor conduits.
- Ground wiring should be reviewed.

### RECOMMENDATIONS:

- Ground wiring should be reviewed and corrected.
- Fire stop in conduits.



## Administration and Student Services (AD/ SS) – Office 2.1

Contains (1) wall mounted rack with pedestal below and wire management (horizontal).

Contains (1) LIU chassis for Multi-Mode (MM) fiber – MM fiber has 12 strands, with 2 strands in use.

Contains (1) 96-Port Patch Panels – roughly 50% patched.

Contains (1) network switch – No other equipment.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Unknown.

Temperature Control – Yes – the temperature was good.

### OTHER OBSERVATIONS:

- Equipment is well protected within the cabinet.
- Cabling is well protected within the cabinet.
- The room in general has some clutter.
- There is no fire stop in any of the existing floor conduits.
- Ground wiring should be reviewed.

### RECOMMENDATIONS:

- Ground wiring should be reviewed and corrected.
- Fire stop in conduits.

## Administration and Student Services (AD/ SS) – 103U

Contains (1) 2-Post rack, wire management (horizontal/ vertical) and ladder tray to the wall.

Contains (1) LIU chassis for Multi-Mode (MM) fiber – MM fiber has 12 strands, with 2 strands in use.

Contains (2) 96-Port Patch Panels – roughly 60% patched.

Contains (2) network switches – No other equipment.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

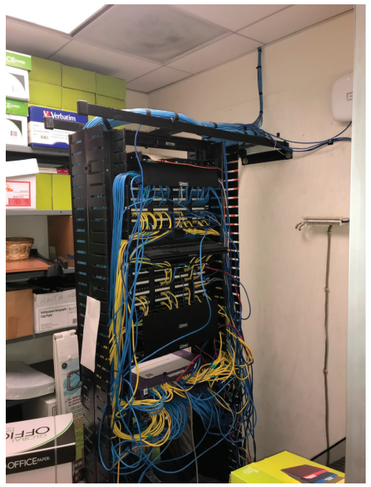
Temperature Control – Yes – the temperature was good.

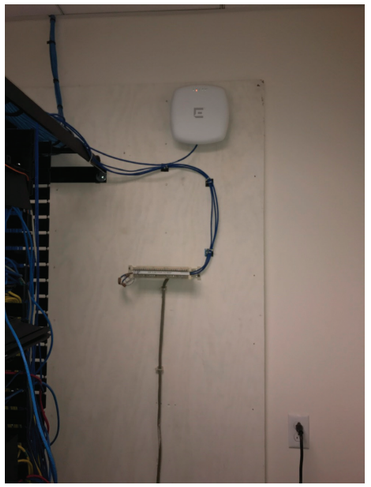
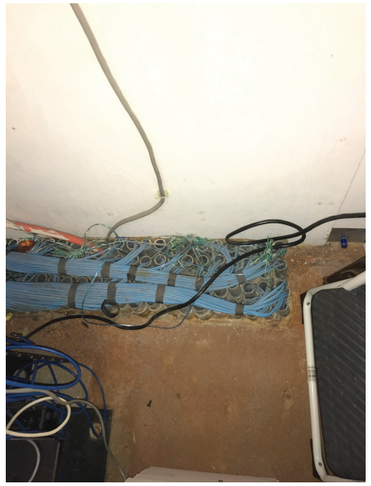
### OTHER OBSERVATIONS:

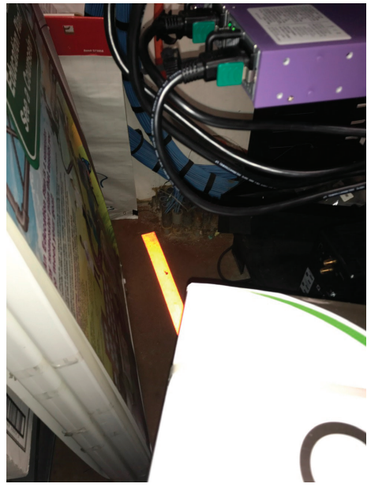
- The room has clutter in and around the 2-Post rack.
- Vertical wire managers are missing the front covers.
- There is no fire stop in any of the existing floor conduits.
- Ground wiring should be reviewed.

### RECOMMENDATIONS:

- Clutter should be removed from around the 2-Post rack to help protect the cabling.
- Fiber cabling should be protected better coming into the rack.
- Ground wiring should be reviewed and corrected.
- Fire stop in conduits.






## Administration and Student Services (AD/ SS) – 203

Contains (1) wall mounted rack with pedestal below and wire management (horizontal).

Contains (1) LIU chassis for Multi-Mode (MM) fiber – MM fiber has 12 strands, with 2 strands in use.

Contains (1) 96-Port Patch Panels – roughly 50% patched.

Contains (1) network switch – No other equipment.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – unknown.

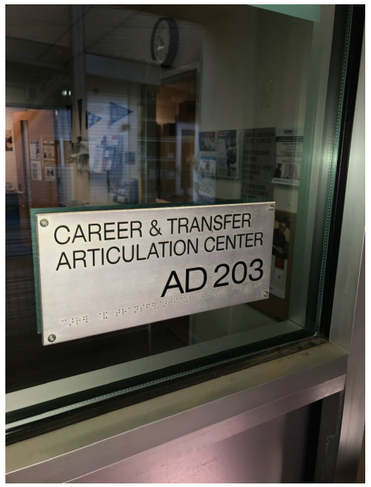
Temperature Control – Yes – the temperature was good.

### OTHER OBSERVATIONS:

- Equipment is well protected within the cabinet.
- Cabling is well protected within the cabinet.
- The room in general has some clutter.
- There is no fire stop in any of the existing floor conduits.
- Ground wiring should be reviewed.

### RECOMMENDATIONS:

- Ground wiring should be reviewed and corrected.
- Fire stop in conduits.




## Art & Gallery (ART) – Photo Lab

The Art & Gallery building is a one-story building, approximately 22,500 square feet. Built in 2004.

Contains (1) 2-Post rack, wire management (horizontal/ vertical) and ladder tray to the wall.

Contains (1) LIU chassis for Multi-Mode (MM) fiber – MM fiber has 12 strands, with 2 strands in use.

Contains (2) 96-Port Patch Panels – roughly 70% patched.

Contains (2) network switches – No other equipment.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

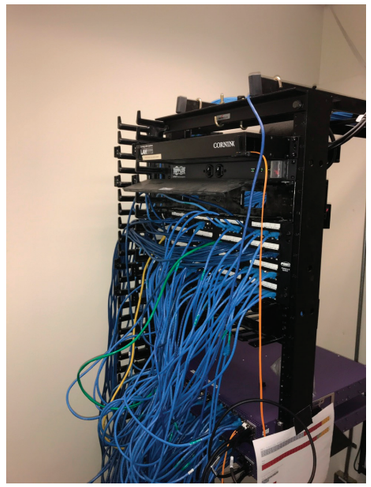
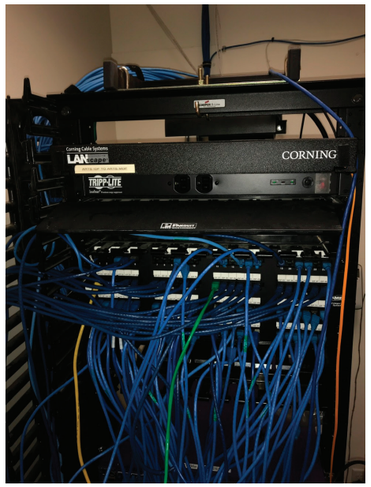
Temperature Control – Yes – the temperature was good.

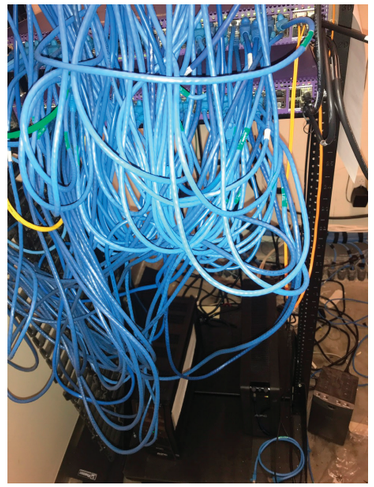
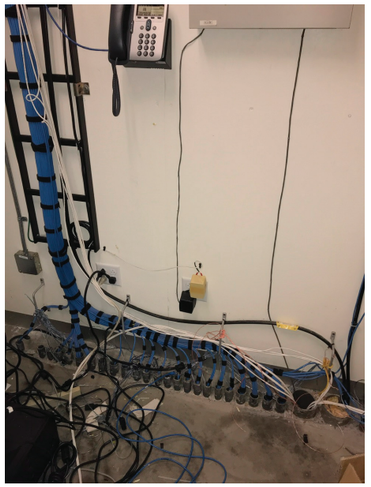
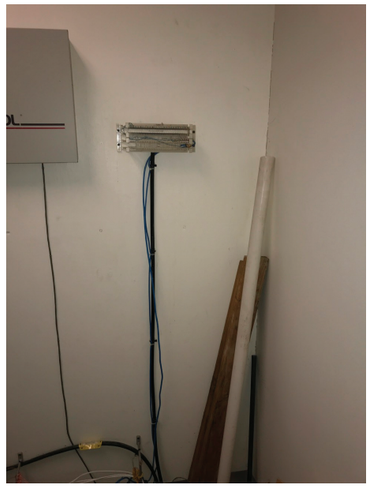
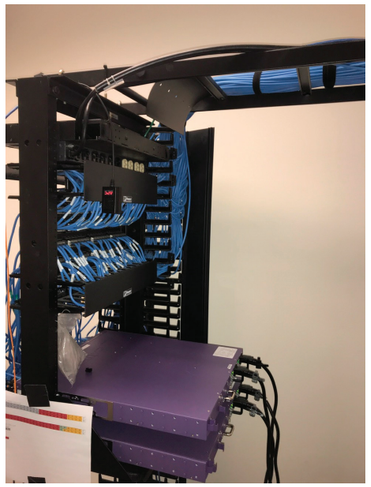
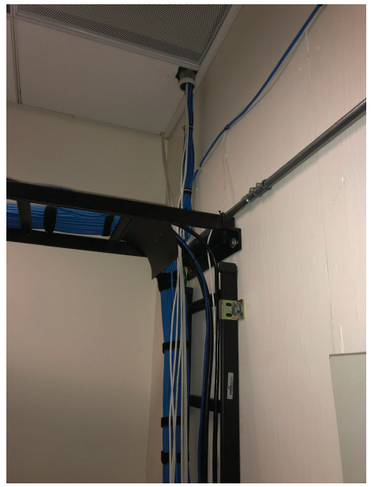
### OTHER OBSERVATIONS:

- The room has some clutter around the rack (cables).
- Vertical wire manager is missing the front cover.
- There is no fire stop in any of the existing floor conduits.
- Ground wiring should be reviewed.

### RECOMMENDATIONS:

- Fiber jumpers should be protected better within the wire management.
- Ground wiring should be reviewed and corrected.
- Fire stop in conduits.

## Art & Gallery (ART) – MDF #116

Contains (1) 2-Post rack, wire management (horizontal/ vertical) and ladder tray to the wall.

Contains (1) LIU chassis for Multi-Mode (MM) fiber – MM fiber has 12 strands, with 2 strands in use.

Contains (2) 96-Port Patch Panels – roughly 60% patched.

Contains (4) network switches, (3) in use – Camera controller.

UPS equipment – (2) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

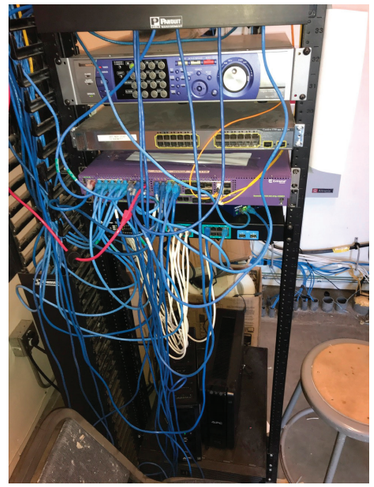
Temperature Control – Yes – the temperature was good.

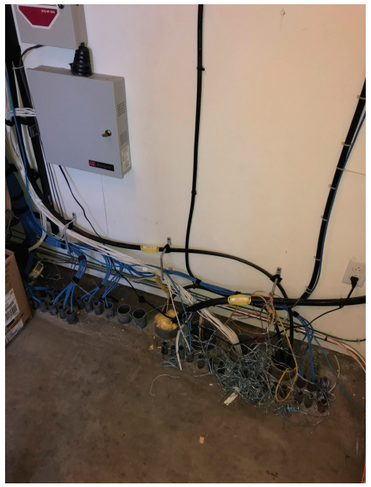
### OTHER OBSERVATIONS:

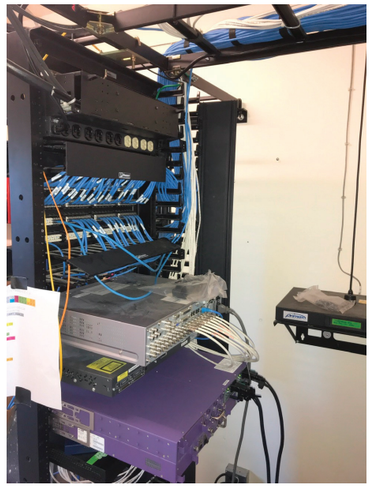
- The room has some clutter behind the rack.
- There is no fire stop in any of the existing floor conduits.
- Ground wiring should be reviewed.

### RECOMMENDATIONS:

- Fiber jumpers should be protected better within the wire management.
- UPS equipment not in use should be removed.
- The clutter behind the rack should be removed.
- Ground wiring should be reviewed and corrected.
- Fire stop in conduits.





## Auditorium Building (AUD) AO15

The Auditorium building is a multi-floor building, approximately 26,200 square feet. Built in 1965.

Contains (1) floor mounted cabinet and wire management (horizontal). There is an additional wall mounted cabinet with a network switch and (4) copper cables, no fiber.

Contains (1) wall mounted LIU chassis for Multi-Mode (MM) fiber – MM fiber has 12 strands, with 4 strands in use.

Contains (1) 96-Port Patch Panels – roughly 50% patched – (4) 24 Port Patch Panels.

Contains (1) network switch – No other equipment.

UPS equipment – (1) ups below the equipment.

Copper backbone – street feed on the backboard.

Fiber backbone – Air Blown fiber – Yes.

Grounding – unknown.

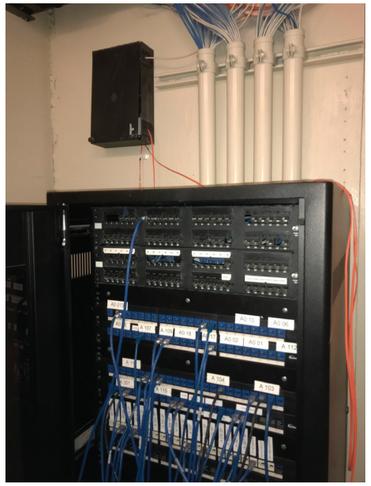
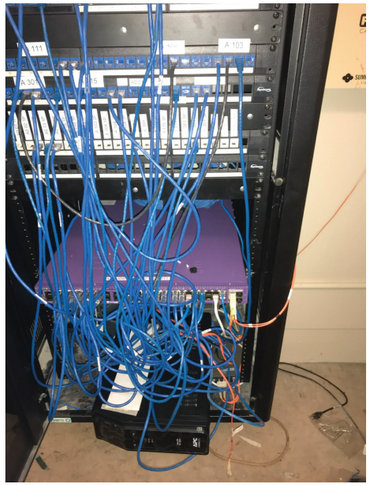
Temperature Control – Yes – the temperature was good.

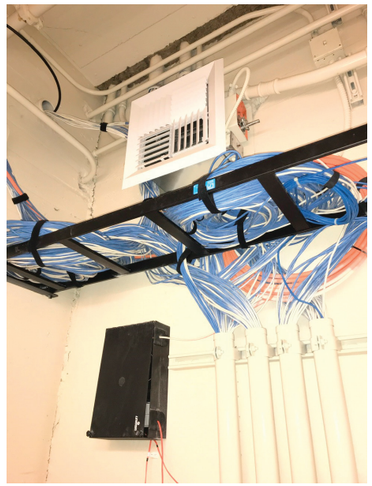
### OTHER OBSERVATIONS:

- Equipment is well protected within the cabinet.
- Cabling is well protected within the cabinet.
- The room in general has some clutter.
- There is no fire stop in any of the existing floor conduits.
- Ground wiring should be reviewed.

### RECOMMENDATIONS:

- Ground wiring should be reviewed and corrected.
- Fire stop in conduits.


## Business Building (B) – Room #129

The Business building is a multi-floor building, approximately 43,700 square feet. Built in 1960.

Contains (3) 2-Post racks, wire management (horizontal/ vertical) and ladder tray to the wall.

Rack 1 – Contains (4) 48 Port Patch Panels – roughly 40% patched.

Rack 2 – Contains (1) LIU chassis for Single-Mode and Multi-Mode (MM) fiber – SM fiber has 36 strands, with 2 stands in use – MM fiber has 12 strands, with 2 strands in use.

Rack 3 – Contains (3) 48 Port Patch Panels – roughly 30% patched, (7) network switches – roughly 90% patched and (2) rack mounted UPS units.

UPS equipment – (2) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

Temperature Control – Yes – the temperature was good.

### OTHER OBSERVATIONS:

- There is no fire stop in any of the existing floor conduits.
- Some clutter behind the racks.

### RECOMMENDATIONS:

- UPS equipment not in use should be removed.
- The clutter behind the rack should be removed.
- Ground wiring should be reviewed and corrected.
- Fire stop in conduits.

## Business Building (B) – Room #209

Contains (2) 2-Post racks, wire management (horizontal/ vertical) and ladder tray to the wall.

Rack 1 – Contains (8) 48 Port Patch Panels – roughly 40% patched – (1) UPS rack mounted.

Rack 2 – Contains (1) LIU chassis for Single-Mode and Multi-Mode (MM) fiber – SM fiber has 12 strands, with 2 stands in use – MM fiber has 6 strands, with 4 strands in use.

Rack 2 – Contains (4) 48 Port Patch Panels – roughly 30% patched and (6) network switches – roughly 90% patched.

UPS equipment – (1) ups below the equipment – Rack 1.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

Temperature Control – Yes – the temperature was good.

### OTHER OBSERVATIONS:

- There is no fire stop in any of the existing floor conduits.
- Some clutter behind the racks.

### RECOMMENDATIONS:

- The clutter behind the rack should be removed.
- Ground wiring should be reviewed and corrected.
- Fire stop conduits.






## Campus Center Building (CC) – Room #146.0

The Campus Center building is a two-story building, approximately 34,700 square feet. Built in 2003.

Contains (3) 2-Post racks, wire management (horizontal/vertical) and ladder tray to the wall.

Rack 1 – Contains (2) 96 Port Patch Panels – roughly 40% patched – Extron modules, Linksys, Nexia, Altona and other network devices.

Rack 2 – Contains (1) LIU chassis for Single-Mode and Multi-Mode (MM) fiber – SM fiber has 12 strands, with 2 stands in use – MM fiber has 6 strands, with 4 strands in use, (6) network switches – roughly 90% patched and (2) ups units.

Rack 3 – Contains (2) 96 Port Patch Panels – roughly 50% patched and camera controllers.

UPS equipment – (1) ups below the equipment – Rack 1.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

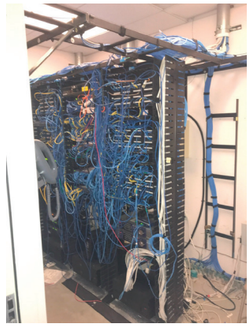
Temperature Control – Yes – the temperature was good.

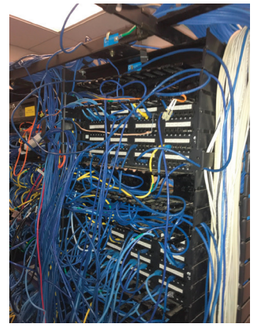
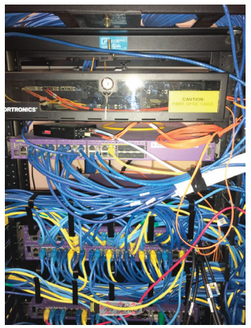
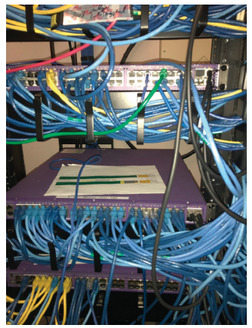
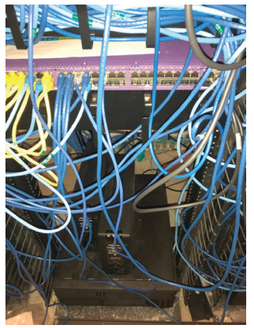
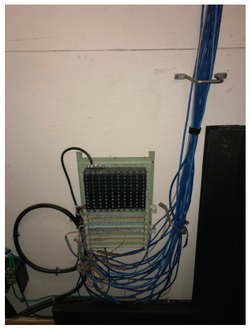
### OTHER OBSERVATIONS:

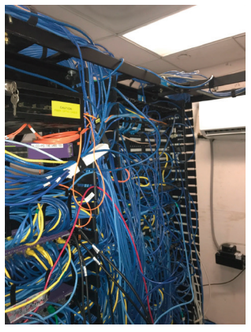
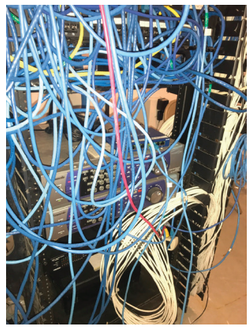
- There is no fire stop in any of the existing floor conduits.
- Some clutter in and around the racks.
- UPS units not in use in Rack 2.
- Some cabling behind the racks should be moved out of the pathway.
- Jumper cabling should be addressed, along with abandoned cables.

### RECOMMENDATIONS:

- Fire stop conduits.
- The clutter behind the rack should be removed.
- Jumper cabling dressed and abandoned cabling removed.
- UPS not in use should be removed.



## Concession Stand – Track/Field

Contains (1) wall mounted cabinet and wire management (horizontal).

Contains (1) LIU chassis for Single-Mode (SM) and Multi-Mode (MM) fiber – SM fiber has 12 strands, none in use and MM fiber has 12 strands, with 2 strands in use.

Contains (1) 48-Port Patch Panel – roughly 50% patched.

Contains (1) network switch – No other equipment.

UPS equipment – (1) ups below the equipment, on the ground.

Copper backbone – (1) 25 pair on the backboard.

Fiber backbone – Air Blown fiber – Yes.

Grounding – unknown.

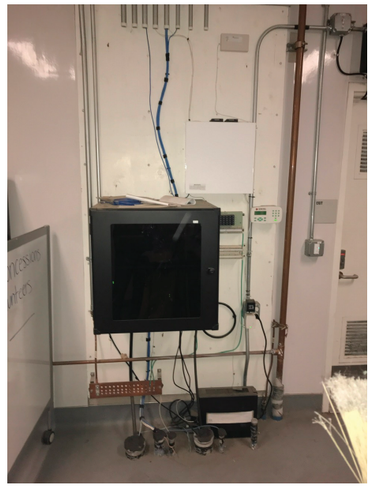
Temperature Control – Temperature was warm on the day of review.

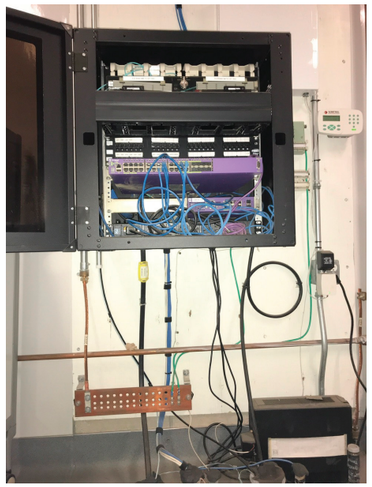
### OTHER OBSERVATIONS:

- Equipment is well protected within the cabinet.
- Cabling is well protected within the cabinet.
- The room in general has some clutter.
- There is some fire stop in the existing floor conduits.

### RECOMMENDATIONS:

- Temperature control within the room.
- Fire stop in conduits.






## Computer Technology Services (CTS)

The Computer Technology Services building is a one-story building, approximately 10,000 square feet. Year built unknown.

Contains (1) Floor mounted cabinet and wire management (horizontal).

Contains (1) LIU chassis for Single-Mode (SM) and Multi-Mode (MM) fiber – SM fiber has 12 strands, 2 in use and MM fiber is unknown at this time.

Contains (3) 48-Port Patch Panel – roughly 50% patched.

Contains (3) network switches – No other equipment.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair on the backboard.

Fiber backbone – Air Blown fiber – Yes.

Grounding – unknown.

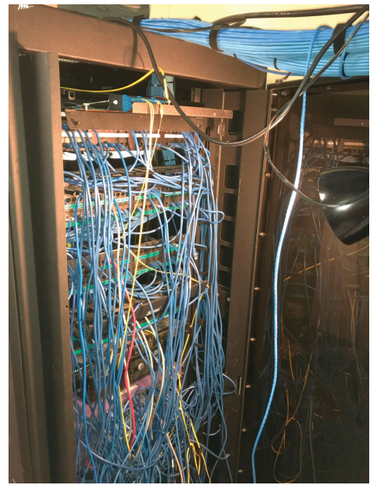
Temperature Control – Yes – the temperature was good.

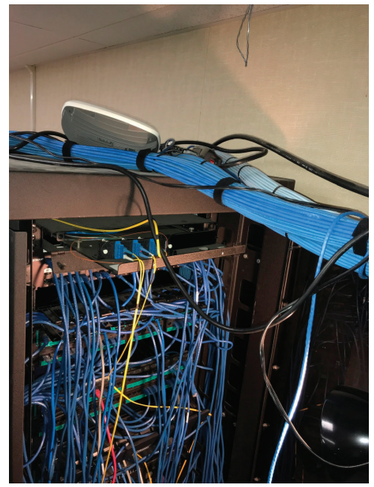
### OTHER OBSERVATIONS:

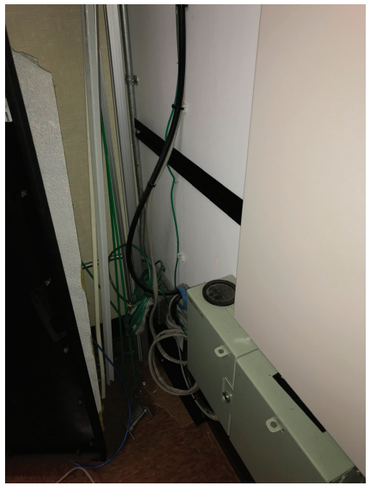
- Clutter behind the rack.
- Cabling in the ceiling needs to be supported.
- Grounding needs to be reviewed.
- There is no fire stop in the existing floor conduits.

### RECOMMENDATIONS:

- Ladder tray to support the station cabling.
- Support the ceiling station cabling.
- Protect the fiber cabling and fiber jumpers.
- Grounding needs to be reviewed and corrected.
- Fire stop in conduits.







## CSB – Main Fiber Core

Contains multiple loor mounted cabinets and 2-Post server racks the support the campus services.

Contains LIU chassis in multiple cabinets and 2-Post racks to support the Single-Mode (SM) and Multi-Mode (MM) fiber. The street feed fiber comes into this room and is distributed throughout the campus.

Contains multiple patch panel to support the services within the distribution racks.

UPS equipment – multiple ups units located below the equipment.

Copper backbone – multiple feed cabling feeding into the cabinets and 2-Post racks.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

Temperature Control – Yes – the temperature was good.

### OTHER OBSERVATIONS:

- Some of the fiber cabling coming in from the street is currently coiled on the ground.
- Some of the patch cabling is laying on the ground.
- External light sources are being used.
- Cable wire management covers are missing throughout.
- Some interconnections between the racks are outside of the wire management and ladder tray.
- Grounding needs to be reviewed.
- There is no fire stop in the existing floor conduits.

### RECOMMENDATIONS:

- Rack and cabinet assessment for distribution reference.
- Patch cabling should be dressed within the wire management.
- Protect the fiber cabling and fiber jumpers.
- Grounding needs to be reviewed and corrected.
- Fire stop in conduits.
- Improve the lighting throughout in order to better service the networks.

## Field Equipment Room

Contains (1) wall mounted cabinet and wire management (horizontal).

Contains (1) wall mounted LIU chassis for Single-Mode and Multi-Mode (MM) fiber – SM fiber has 6 strands, with 2 strands in use – MM fiber has 6 strands, with no strands in use.

Contains (1) network switch – No other equipment.

UPS equipment – (1) ups below the equipment, on the ground.

Copper backbone – street feed on the backboard.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

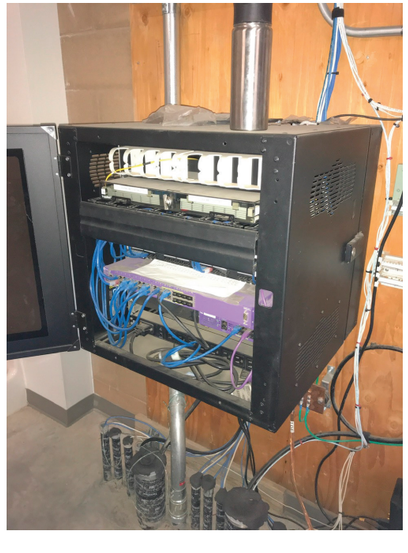
Temperature Control – Yes – the temperature was warm.

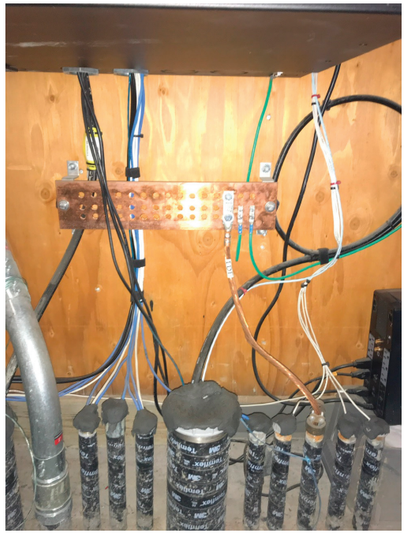
### OTHER OBSERVATIONS:

- Equipment is well protected within the cabinet.
- Cabling is well protected within the cabinet.
- The room in general has some clutter.

### RECOMMENDATIONS:

- Install a shelf for the UPS unit to get it off the ground.





## GYM Building (GYM) – IDF 138A

The GYM building is a three-story building, approximately 108,500 square feet. Built in 2016.

Contains (1) 4-Post rack and (1) 2-Post rack, wire management (horizontal/vertical) and ladder tray to the wall.

Rack 1 – Contains (1) LIU chassis for Single-Mode and Multi-Mode (MM) fiber – SM fiber has 24 strands, with no stands in use – MM fiber has 12 strands, with 2 strands in use and (1) network switch – roughly 40% patched.

Rack 2 – Contains (3) 48 Port Patch Panels – roughly 40% patched and (2) network switches.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

Temperature Control – Yes – the temperature was good.

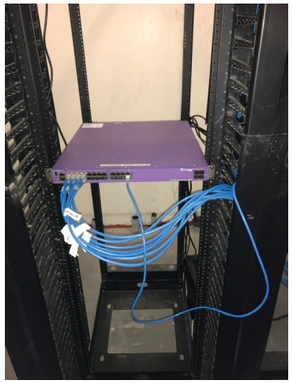
### OTHER OBSERVATIONS:

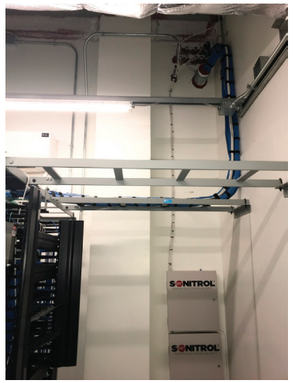
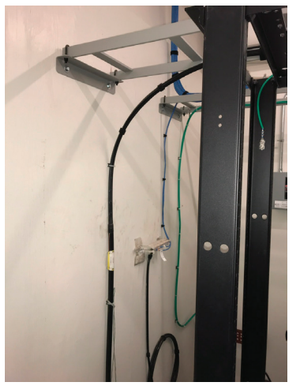
- There is no fire stop in some of the existing horizontal conduits.
- Some clutter in front the racks.

### RECOMMENDATIONS:

- Fire stop conduits.
- The clutter in front of the rack should be removed.




## GYM Building (GYM) – 2nd Floor – IDF 3.1

Contains (1) 4-Post rack and (1) 2-Post rack, wire management (horizontal/vertical) and ladder tray to the wall.

Rack 1 – Contains (1) LIU chassis for Single-Mode and Multi-Mode (MM) fiber – SM fiber has 24 strands, with no stands in use – MM fiber has 12 strands, with 2 strands in use and (1) network switch – roughly 40% patched.

Rack 2 – Contains (3) 48 Port Patch Panels – roughly 40% patched and (4) network switches.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

Temperature Control – Yes – the temperature was good..

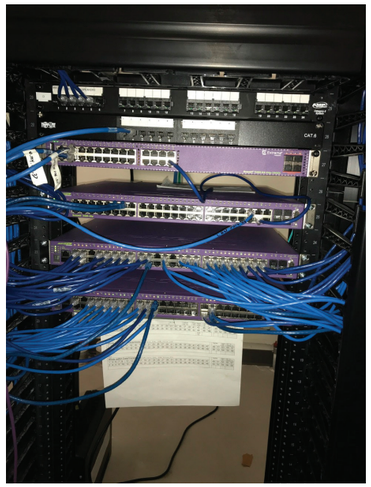
### OTHER OBSERVATIONS:

- There is no fire stop in some of the existing conduits.

### RECOMMENDATIONS:

- Fire stop conduits.








## GYM Building (GYM) – 1st Floor – Room 126

Contains (1) 4-Post rack and (2) 2-Post racks, wire management (horizontal/vertical) and ladder tray to the wall.

Rack 1 – Contains (1) 48 Port Patch Panel – roughly 5% patched.

Rack 2 – Contains (1) LIU chassis for Single-Mode and Multi-Mode (MM) fiber – SM fiber has 72 strands, with no stands in use – MM fiber has 36 strands, with 4 strands in use and (3) network switches – roughly 70% patched.

Rack 2 – Contains (3) 48 Port Patch Panels – roughly 30% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

Temperature Control – Yes – the temperature was good.

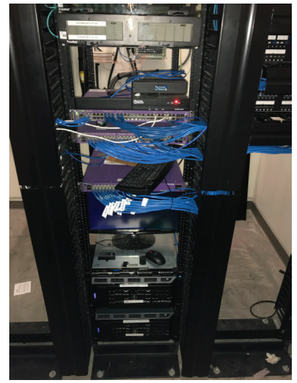
### OTHER OBSERVATIONS:

- There is no fire stop in some of the existing conduits.

### RECOMMENDATIONS:

- Fire stop conduits.



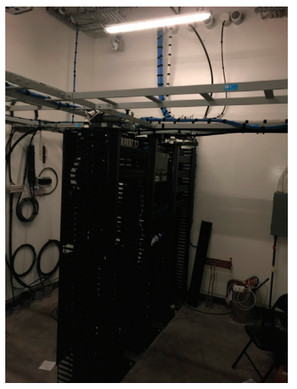












## Health & Life Science Building (HLS) Room #146

The Health & Life Science building is a two-story building, approximately 40,200 square feet. Built in 2001.

Contains (1) 4-Post rack and (2) 2-Post racks, wire management (horizontal/vertical) and ladder tray to the wall.

Rack 1 – Contains (2) 48 Port Patch Panel – roughly 50% patched.

Rack 2 – Contains (2) LIU chassis for Single-Mode and Multi-Mode (MM) fiber – SM fiber has 6 strands, with 2 strands in use – MM fiber has 36 strands, with 4 strands in use and (3) network switches – roughly 90% patched.

Rack 3 – Contains (3) 48 Port Patch Panels – roughly 30% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

Temperature Control – Yes – the temperature was good.

### OTHER OBSERVATIONS:

- There is no fire stop in some of the existing conduits.

### RECOMMENDATIONS:

- Fire stop conduits.
- Rodent issues – all openings should be sealed.

## Health & Life Science Building (HLS) Room #133

Contains (2) 2-Post racks, wire management (horizontal/ vertical) and ladder tray to the wall.

Rack 1 – Contains (2) 96 Port Patch Panel – roughly 50% patched.

Rack 1 – Contains (1) LIU chassis for Single-Mode and Multi-Mode (MM) fiber – SM fiber has 12 strands, with 2 strands in use – MM fiber has 18 strands, with no strands in use and (2) network switches – roughly 80% patched.

Rack 2 – Has no cabling or equipment.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

Temperature Control – Yes – the temperature was good.

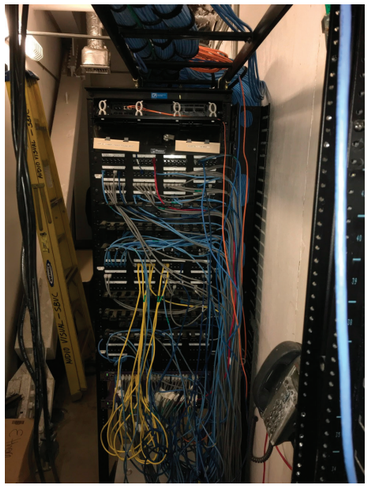
### OTHER OBSERVATIONS:

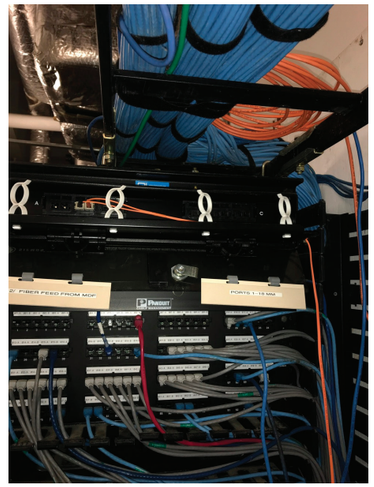
- There is no fire stop in the existing conduits.
- There has been some water damage within the room.
- No cover on the vertical wire manager.
- Some clutter and storage within the room.

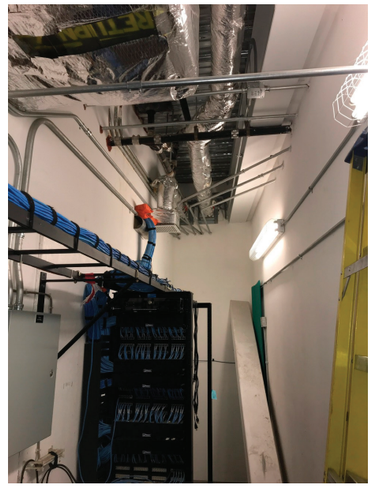
### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables into the wire management.
- Replace the vertical wire manager cover.





## Health & Life Science Building (HLS) Room #128

Contains (2) 2-Post racks, wire management (horizontal/ vertical) and ladder tray to the wall.

Rack 1 – Contains (1) LIU chassis for the Multi-Mode (MM) fiber – MM fiber has 18 strands, with 4 strands in use and (3) network switches – roughly 90% patched.

Rack 2 – Contains (2) 96 Port Patch Panel – roughly 30% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

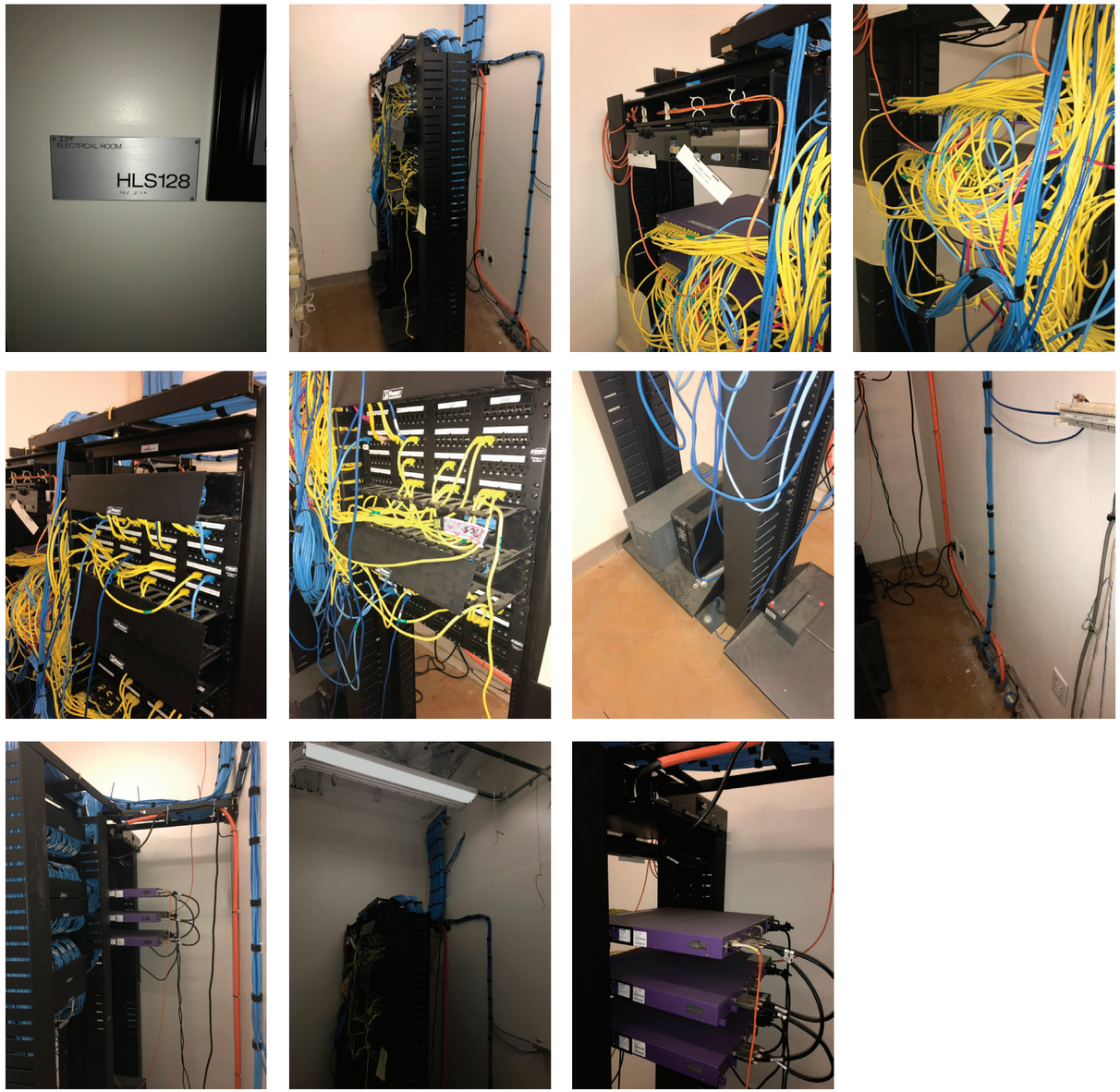
Temperature Control – Yes – the temperature was good.

### OTHER OBSERVATIONS:

- There is no fire stop in the existing conduits.
- No cover on the center vertical wire manager.
- Some clutter and storage within the room.

### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables into the wire management.
- Replace the vertical wire manager cover.



## Liberal Arts Building (LA) – Room #100

The Liberal Arts building is a two-story building, approximately 39,400 square feet. Built in 1969.

Contains (1) Wall mounted rack and wire management (horizontal).

Contains (2) 96 Port Patch Panels – roughly 10% patched and (1) network switch 10% patched.

Single-mode and Multi-mode fiber has been terminated on the backboards and is distributed throughout.

UPS equipment – (1) ups below the equipment.

Copper backbone – multiple copper feed cables.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

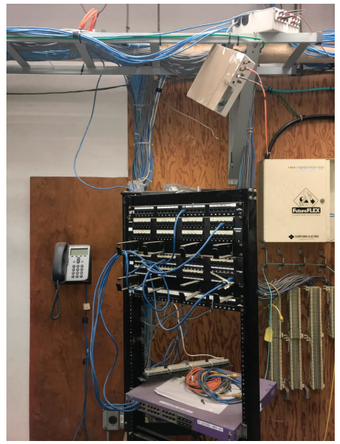
Temperature Control – Yes – the temperature is warm.

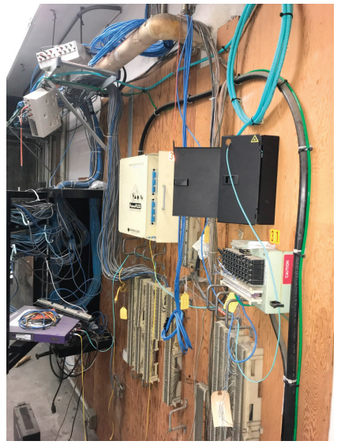
### OTHER OBSERVATIONS:

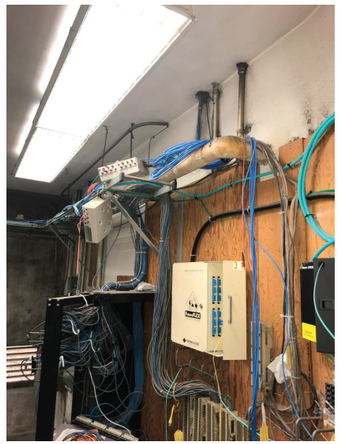
- There is no fire stop in the existing conduits.
- Fiber interconnections need to be addressed and reviewed.
- There appears to be lot of abandoned cabling on the backboard.
- Some clutter and storage within the room.

### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables within the wire management.






## Liberal Arts Building (LA) – Room #101

Contains (2) 2-Post racks, wire management (horizontal/ vertical) and ladder tray to the wall.

Rack 1 – Contains (1) LIU chassis for the Multi-Mode (MM) fiber – MM fiber has 18 strands, with 4 strands in use and (3) network switches – roughly 90% patched and (10) 48 Port Patch Panel – roughly 70% patched.

Rack 2 – Contains (7) network switches – roughly 70% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

Temperature Control – Yes – the temperature was good.

### OTHER OBSERVATIONS:

- There is no fire stop in the existing conduits.
- No cover on the center vertical wire manager.
- Some clutter behind the racks.

### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables into the wire management.
- Replace the vertical wire manager cover.

## Library Building (LIB) – Room #140

The Library building is a two-story building, approximately 40,000 square feet. Built in 2001.

Contains (2) 2-Post racks, wire management (horizontal/ vertical) and ladder tray to the wall.

Rack 1 – Contains (2) LIU chassis for Single-Mode and Multi-Mode (MM) fiber – SM fiber has 12 strands, with 2 strands in use – MM fiber has 18 strands, with 4 strands in use and (3) network switches – roughly 70% patched.

Rack 2 – Contains (3) 96 Port Patch Panels – roughly 40% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

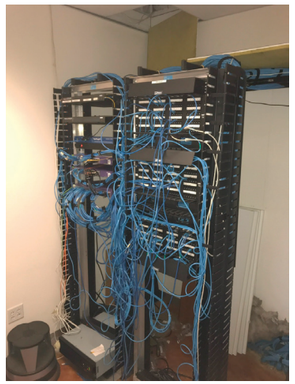
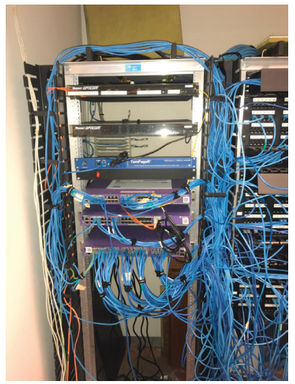
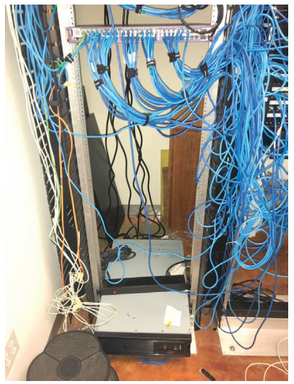
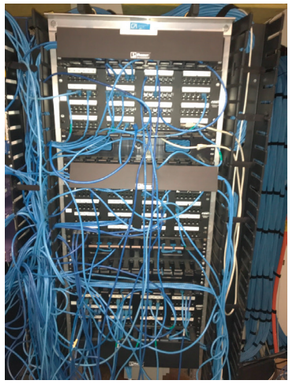
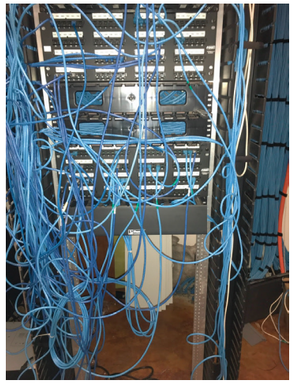
Temperature Control – Yes – the temperature was good.

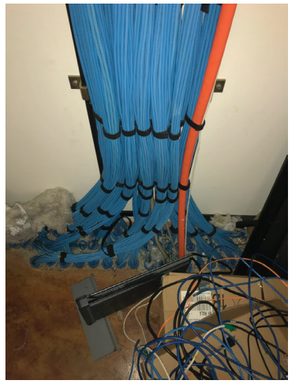
### OTHER OBSERVATIONS:

- There is no fire stop in the existing conduits.
- No cover on the center vertical wire manager.
- Some clutter behind the racks.

### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables into the wire management.
- Replace the vertical wire manager cover.

## Library Building (LIB) – Telephone Room

Contains (1) Wall mounted rack and wire management (horizontal).

Contains (1) LIU chassis for the Multi-mode fiber (MM) – MM fiber has 6 strands, with 2 strands in use, (1) 96 Port Patch Panel and (1) network switch – roughly 70% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – multiple copper feed cables.

Fiber backbone – Air Blown fiber – Yes.

Grounding – unknown.

Temperature Control – Yes – the temperature is good.

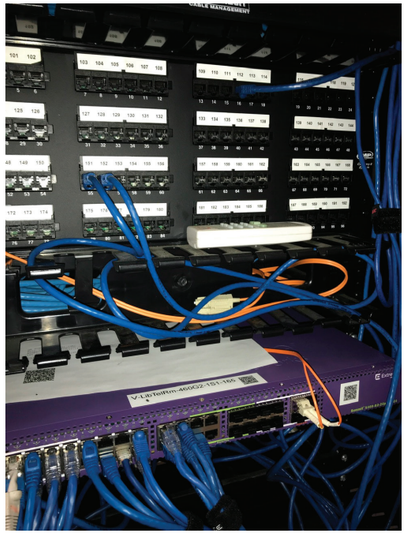
### OTHER OBSERVATIONS:

- There is no fire stop in the existing conduits.
- Some clutter and storage within the room.

### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables within the wire management.





## Library Building (LIB) – Room #119

Contains (1) 2-Post rack and wire management (horizontal/ vertical).

Contains (1) LIU chassis for the Multi-Mode (MM) fiber – MM fiber has 6 strands, with 2 strands in use, (3) 96 Port Patch Panels and (3) network switches – roughly 80% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

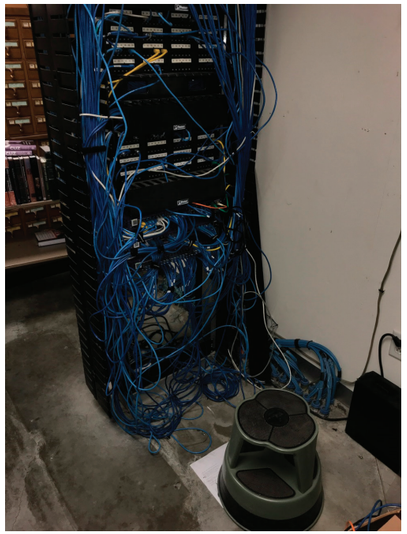
Temperature Control – Yes – the temperature was good.

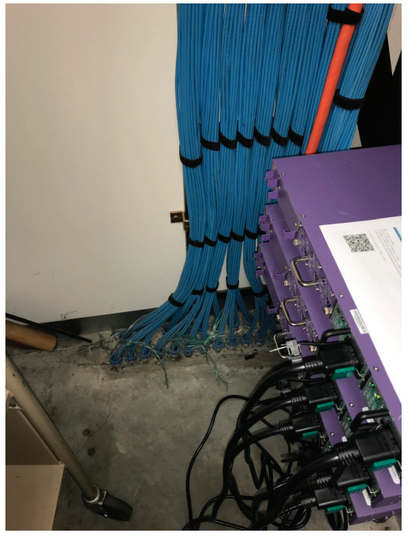
### OTHER OBSERVATIONS:

- There is no fire stop in the existing conduits.
- No covers on the vertical wire managers.
- Some clutter around the rack.

### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables into the wire management.
- Replace the vertical wire manager covers.

## Maintenance and Operation (M&O)

The Maintenance and Operation building is a two-story building, approximately 5,500 square feet. Built in 2008.

Contains (1) Wall mounted rack and wire management (horizontal), for the patch panel only.

Contains (1) LIU chassis for the Multi-mode fiber (MM) – MM fiber has 6 strands, with 2 strands in use, (1) 48 Port Patch Panel and (1) network switch – roughly 70% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – multiple copper feed cables.

Fiber backbone – Air Blown fiber – Yes.

Grounding – unknown.

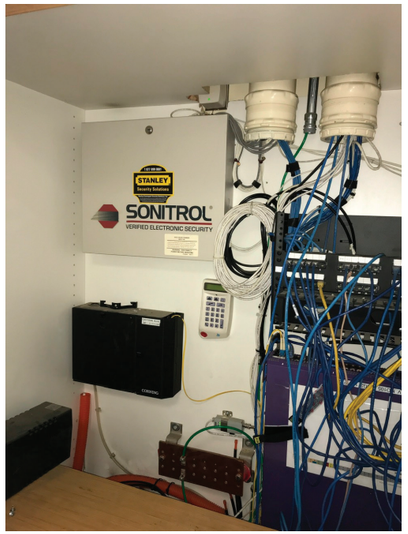
Temperature Control – Yes – the temperature is good.

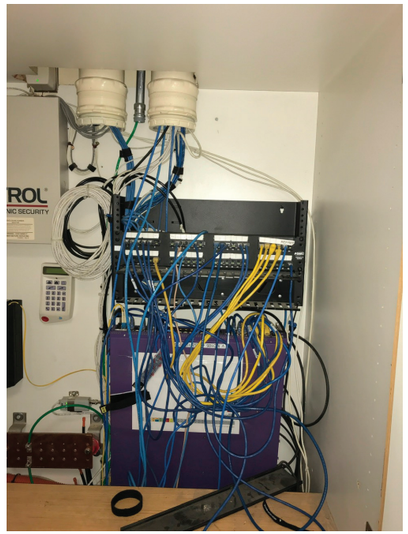
### OTHER OBSERVATIONS:

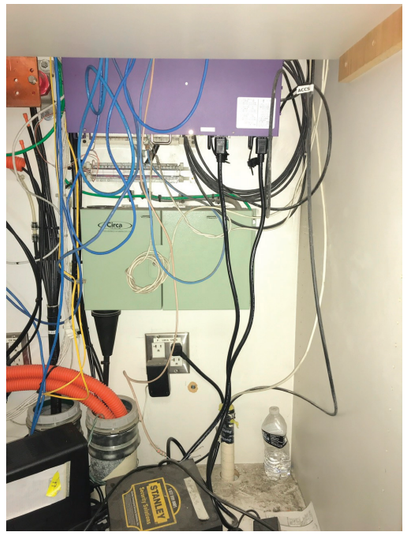
- There is no fire stop in the existing conduits.
- Some clutter and storage within the room.

### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables within the wire management.








## Maintenance and Operation (M&O) – Across the street – Room #113

Contains (1) Wall mounted rack and wire management (horizontal), for the patch panel only.

Contains (1) LIU enclosure for the Single-mode fiber (SM) – SM fiber has 12 strands, with 2 strands in use, (1) 48 Port Patch Panel and (1) network switch – roughly 70% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair feed.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

Temperature Control – Yes – the temperature is good.

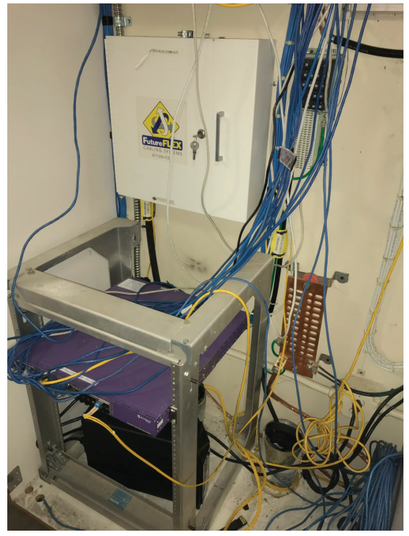
### OTHER OBSERVATIONS:

- There is no fire stop in the existing conduits.
- Some clutter within the cabinet.
- Lots of loose jumper cables.

### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables within the wire management.







## Media Communications Building (M/C) #150

The Media Communications building is a one-story building, approximately 18,300 square feet. Built in 2009.

Contains (2) 2-Post racks and wire management (horizontal/vertical).

Rack 1 – Contains network switches and various network devices.

Rack 2 – Contains (1) LIU wall mounted enclosure for the Single-Mode (SM) and Multi-Mode (MM) fiber – SM fiber has 24 strands, with 6 in use, the MM fiber has 24 strands, with 10 strands in use, (3) 48 Port Patch Panels and (3) network switches – roughly 80% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair feed cable.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

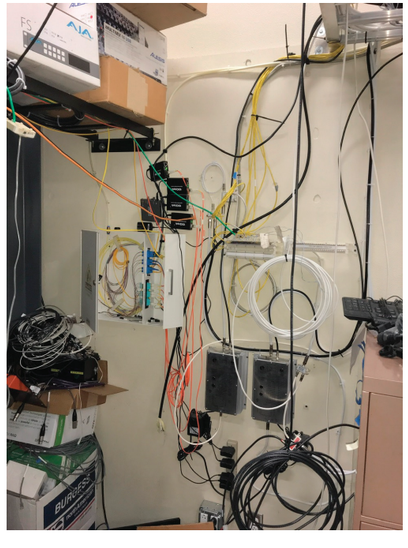
Temperature Control – Yes – the temperature was good.

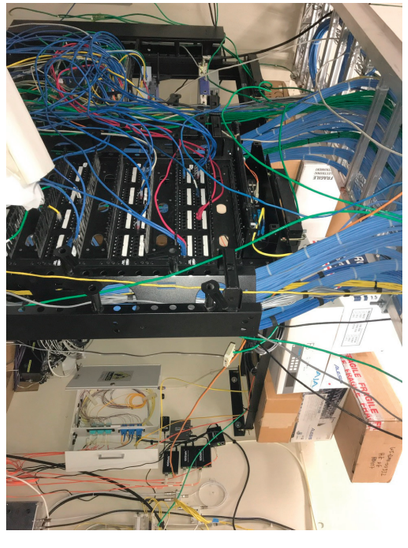
### OTHER OBSERVATIONS:

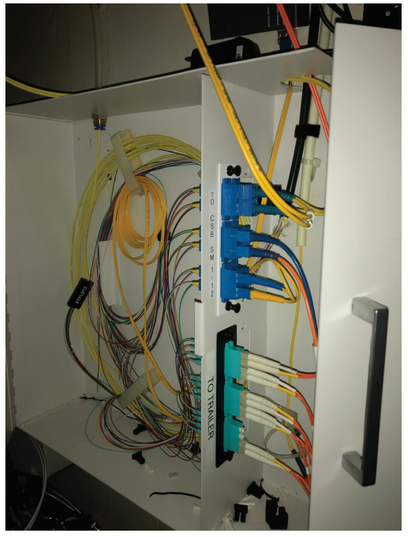
- There is no fire stop in the existing conduits.
- Jumper cables have slack in front of all the rack mounted devices.
- Multiple cables are hung loosely throughout the room.
- Lots of clutter around the rack.

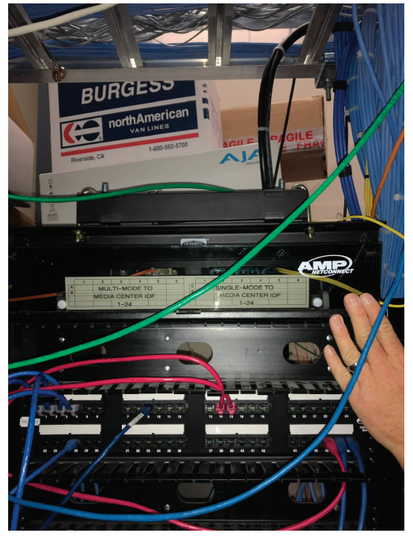
### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables into the wire management.
- Protect the fiber jumper feeding into the racks and servers.





## North Hall Replacement Building (NHR) – Room #115

The North Hall Replacement building is a three-story building, approximately 49,800 square feet. Built in 2010.

Contains (2) 2-Post racks, wire management (horizontal/ vertical) and ladder tray to the wall.

Rack 1 – Contains (3) LIU chassis for the Single-Mode (SM) and Multi-Mode (MM) fiber – SM fiber has 60 strands, with 4 strands in use, the MM fiber has 48 strands, with 8 strands in use, (4) 48 Port Patch Panels and (2) network switches – roughly 80% patched.

Rack 2 – Currently has no cabling or equipment.

UPS equipment – (1) ups below the equipment.

Copper backbone – (2) 25 pair feed cables.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

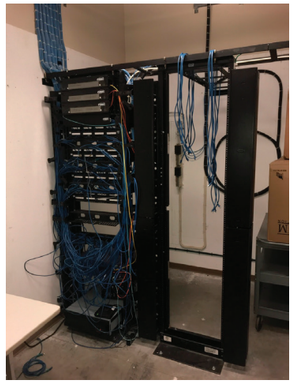
Temperature Control – Yes – the temperature was good.

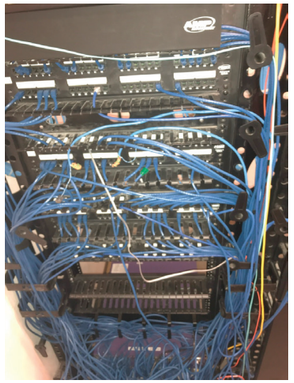
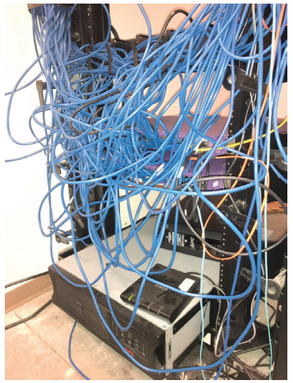
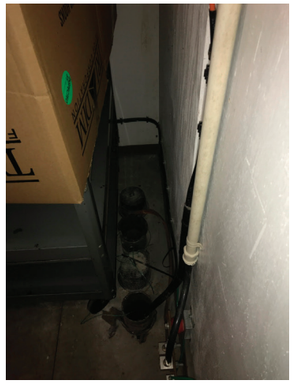
### OTHER OBSERVATIONS:

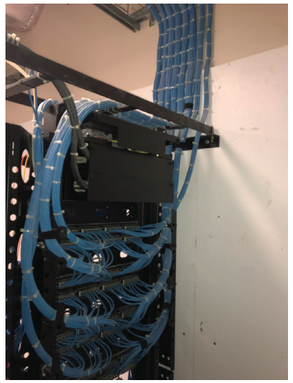
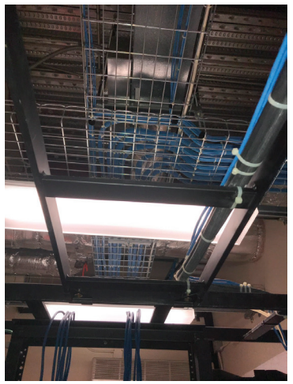
- There is no fire stop in some of the existing conduits.
- Jumper cables are loosely dressed into the wire management.
- Some clutter around the rack.

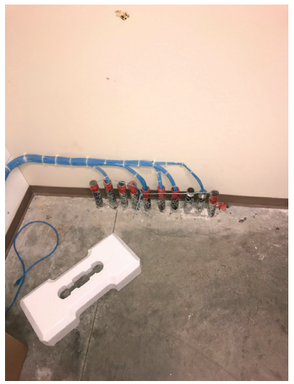
### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables into the wire management.
- Protect the fiber jumper feeding into the racks and servers.





## North Hall Replacement Building (NHR) – Room #213

Contains (2) 2-Post racks, wire management (horizontal/vertical) and ladder tray to the wall.

Rack 1 – Currently has no cabling or equipment.

Rack 2 – Contains (1) LIU chassis for the Single-Mode (SM) and Multi-Mode (MM) fiber – SM fiber has 24 strands, with 2 strands in use, the MM fiber has 24 strands, with 2 strands in use, (3) 48 Port Patch Panels and (2) network switches – roughly 80% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – (2) 25 pair feed cables.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

Temperature Control – Yes – the temperature was good.

### OTHER OBSERVATIONS:

- There is no fire stop in some of the existing conduits.
- Jumper cables are loosely dressed into the wire management.
- Some clutter around the rack.
- Tie wraps on the station cabling.

### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables into the wire management.
- Protect the fiber jumper feeding into the racks and servers.
- Remove the UPS unit not in use.
- Replace the tie wraps with Velcro.

## North Hall Replacement Building (NHR) – Room #314

Contains (2) 2-Post racks, wire management (horizontal/ vertical) and ladder tray to the wall.

Rack 1 – Currently has no cabling or equipment.

Rack 2 – Contains (1) LIU chassis for the Single-Mode (SM) and Multi-Mode (MM) fiber – SM fiber has 24 strands, with no strands in use, the MM fiber has 24 strands, with 2 strands in use, (4) 48 Port Patch Panels and (2) network switches – roughly 90% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair feed cable.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

Temperature Control – Yes – the temperature was good.

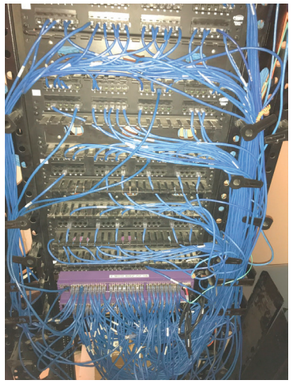
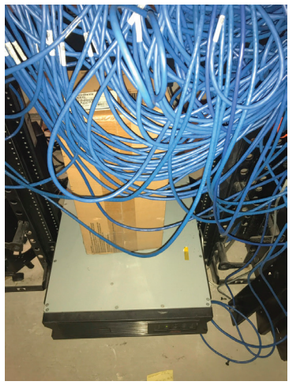
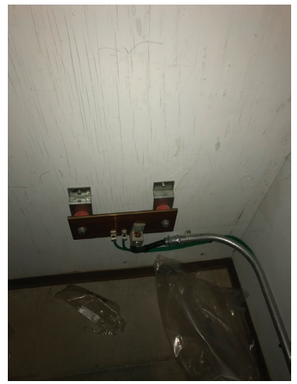
### OTHER OBSERVATIONS:

- There is no fire stop in the horizontal conduits.
- Jumper cables are loosely dressed into the wire management.
- Some clutter around the rack.
- Tie wraps on the station cabling.

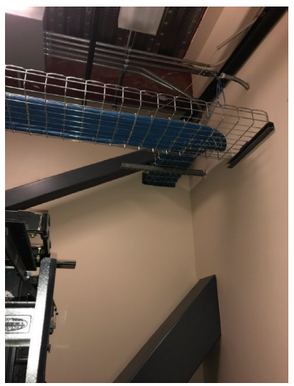
### RECOMMENDATIONS:

- Fire stop horizontal conduits.
- Dress the jumper cables into the wire management.
- Protect the fiber jumper feeding into the racks and servers.
- Remove the UPS unit not in use.
- Replace the tie wraps with Velcro.





## SBCCD – Across the street

Contains (1) Wall mounted rack, for the patch panel only.

Backboard – Contains (1) LIU enclosure for the Single-mode fiber (SM) – SM fiber has 12 strands, with no strands in use, (1) 48 Port Patch Panel and (1) network switch – roughly 70% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – Multiple copper feed cables on the backboard.

Fiber backbone – Air Blown fiber – Yes.

Grounding – unknown at this time.

Temperature Control – Yes – the temperature is good.

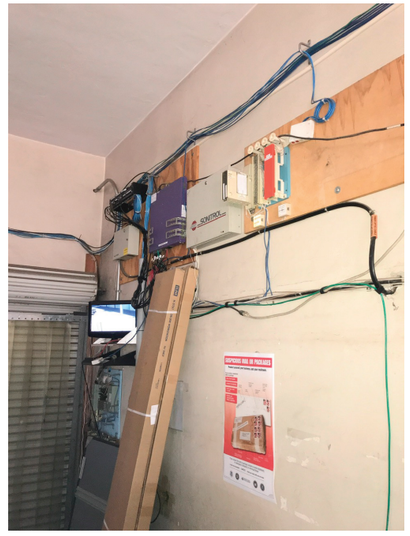
### OTHER OBSERVATIONS:

- There is no fire stop in the existing conduits.
- Some clutter below the equipment.

### RECOMMENDATIONS:

- Fire stop conduits.
- Conduit or innerduct around the cabling that is loose around the backboard.
- An enclosed cabinet would help prevent damage to the existing equipment.





## Technical Building (Tech) – Room #110

The Technical building is a one-story building, approximately 66,200 square feet. Built in 1963. Room overheats – over occupied.

Contains (1) 2-Post rack and wire management (horizontal/vertical).

Rack – (1) 24 Port Patch Panel and (3) network switches – roughly 90% patched.

Backboard – Contains (3) LIU enclosures for the Single-Mode (SM) and Multi-Mode (MM) fiber – At the time of inspections there were several fiber patch cables connecting various devices – roughly there are 12 strands of SM and MM fiber but it is unclear how many strands are good at this time. The backboard also contains fire, access control, and other support systems

UPS equipment – (1) ups below the equipment; appears that there is also a UPS that is no longer in use.

Copper backbone – Multiple copper feed cables are located on the backboard.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

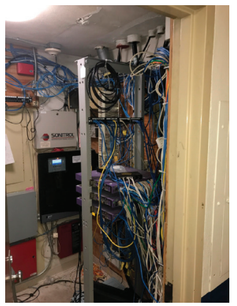
Temperature Control – Yes – the temperature was warm at the time of the assessment.

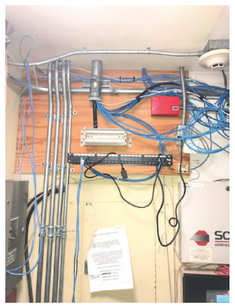
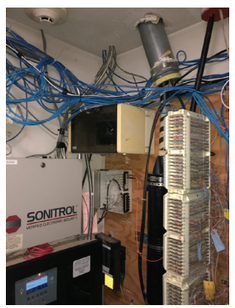
### OTHER OBSERVATIONS:

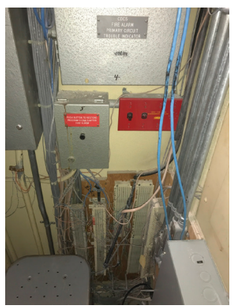
- There is some fire stop in the conduits.
- Jumper cables are loosely dressed throughout the room and into the wire management.
- Some clutter around the rack and in the room.
- Appears to be a lot of abandoned cabling.
- Appears that the fiber cabling needs to be reviewed and corrected.
- The rack in place take up the majority of the room with minimal use.
- No wire management for any of the cabling.

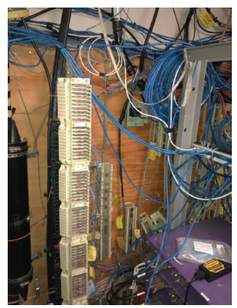
### RECOMMENDATIONS:

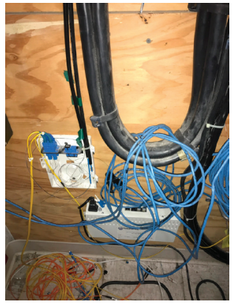
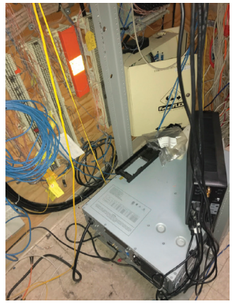
- Install and enclosed cabinet with temperature control for the network equipment.
- Fire stop horizontal conduits.
- Dress the jumper cables – wire management is needed for the existing rack and backboard.
- Protect the fiber jumper feeding into the racks and servers.
- Remove the UPS unit not in use.
- Replace the tie wraps with Velcro.
- Evaluate and remove abandoned cabling in the room – including other systems.
- Protect the service cabling feeding into the room.
- Evaluate and correct the overall temperature in the room.
- Remove the clutter from in and around the room.

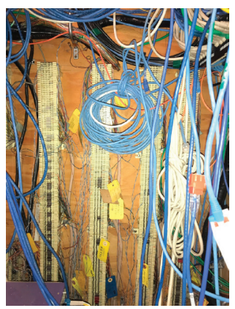










## Technical Building (Tech) – Room #100

Contains a shelf and small backboard for the network gear and telecom services.

Backboard/shelf – Contains (1) 12 Port Patch Panel and (1) network switch – roughly 70% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – Multiple copper feed cables on the backboard.

Fiber backbone – Yes, not in use.

Grounding – not at this time.

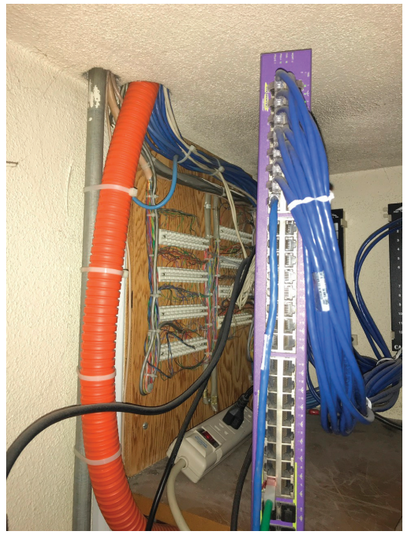
Temperature Control – Yes – the temperature is good.

### OTHER OBSERVATIONS:

- Equipment and cabling are exposed at all times; placed in an existing shelf space.
- Some clutter below the equipment.

### RECOMMENDATIONS:

- Conduit or innerduct around the cabling that is loose around the backboard.
- An enclosed cabinet would help prevent damage to the existing equipment.



## Technical Building (Tech) – Room #112

Contains (1) Wall mounted cabinet and wire management (horizontal).

Cabinet – Contains (1) 48 Port Patch Panel and (1) network switch – roughly 70% patched.

UPS equipment – (1) ups below the equipment, in the cabinet.

Copper backbone – assumed that there is (1) 25 pair feed cable.

Fiber backbone – unknown at this time.

Grounding – unknown at this time.

Temperature Control – Yes – the temperature is good.

### OTHER OBSERVATIONS:

- Equipment and cabling are protected inside the cabinet.

### RECOMMENDATIONS:

- Wire management for the inside of the cabinet to help protect the cabling.

## Technical Building (Tech) – Aeronautics Lab

Contains (1) Wall mounted frame rack and wire management (horizontal).

Rack – Contains (1) 48 Port Patch Panel and (1) network switch – roughly 70% patched.

UPS equipment – (1) ups below the equipment, in the frame rack.

Copper backbone – assumed that there is (1) 25 pair feed cable.

Fiber backbone – unknown at this time.

Grounding – unknown at this time.

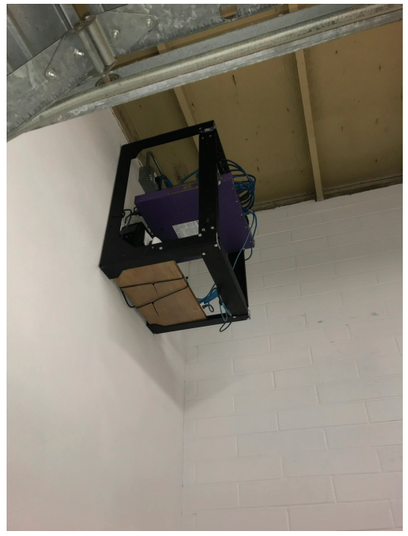
Temperature Control – Yes – the temperature is good.

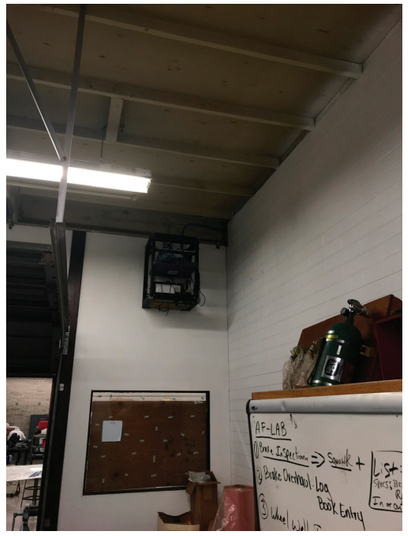
### OTHER OBSERVATIONS:

- Equipment and cabling are out of the way.

### RECOMMENDATIONS:

- Wire management for the inside of the frame rack to help protect the cabling.





## Technical Building (Tech) – Portable T125

Contains (1) Wall mounted cabinet; no door.

Cabinet – Contains (1) 48 Port Patch Panel and (1) network switch – roughly 70% patched.

UPS equipment – (1) ups below the equipment, in the cabinet.

Copper backbone – assumed that there is (1) 25 pair feed cable.

Fiber backbone – unknown at this time.

Grounding – unknown at this time.

Temperature Control – Yes – the temperature is good.

### OTHER OBSERVATIONS:

- Equipment and cabling are protected within the cabinet.

### RECOMMENDATIONS:

- Wire management for the inside of the cabinet to help protect the cabling.


## Technical Building (Tech) – Classroom (Back building)

Contains (1) Wall mounted cabinet and wire management (horizontal).

Cabinet – Contains (1) 48 Port Patch Panel and (1) network switch – roughly 50% patched.

UPS equipment – (1) ups below the equipment, in the cabinet.

Copper backbone – assumed that there is (1) 25 pair feed cable.

Fiber backbone – unknown at this time.

Grounding – unknown at this time.

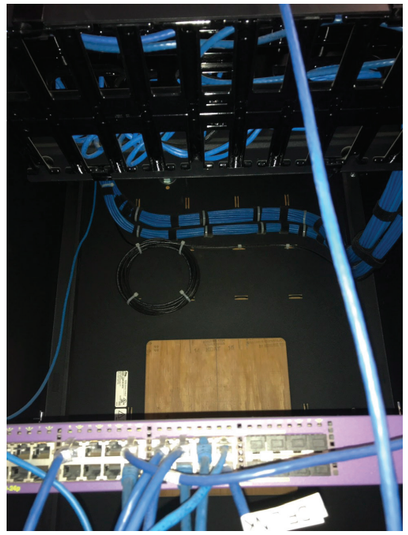
Temperature Control – Yes – the temperature is good.

### OTHER OBSERVATIONS:

- Equipment and cabling are protected within the cabinet.

### RECOMMENDATIONS:

- Dress the cabling within the cabinet.



## Technical Building (Tech) – Classroom T122

Contains (1) Wall mounted cabinet; no door.

Cabinet – Contains (1) 48 Port Patch Panel and (1) network switch – roughly 70% patched.

UPS equipment – (1) ups below the equipment, in the cabinet.

Copper backbone – assumed that there is (1) 25 pair feed cable.

Fiber backbone – unknown at this time.

Grounding – unknown at this time.

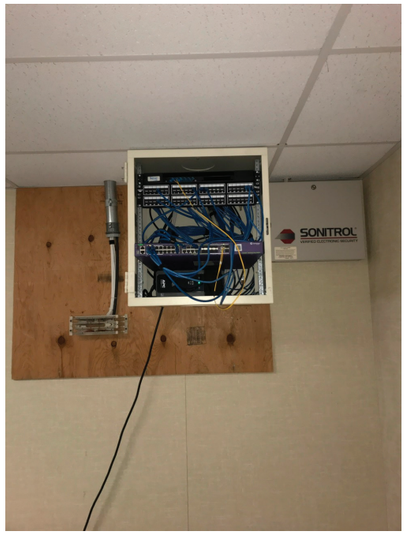
Temperature Control – Yes – the temperature is good.

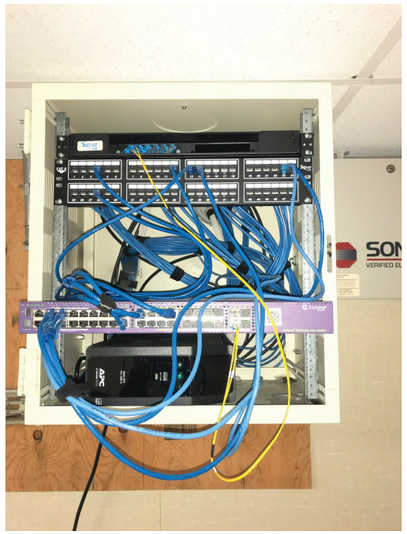
### OTHER OBSERVATIONS:

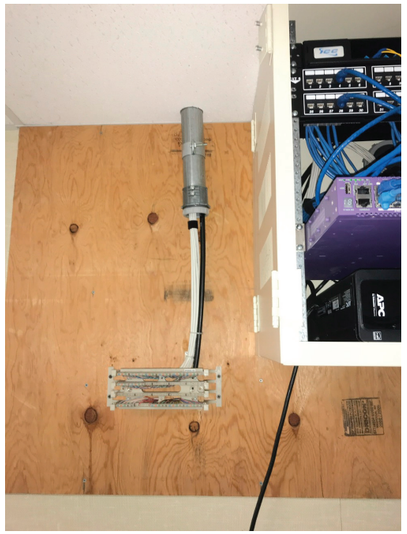
- Equipment and cabling are protected within the cabinet.

### RECOMMENDATIONS:

- Wire management for the inside of the cabinet to help protect the cabling.





## Track/Field (Center Field) IDF C104

Contains (2) 2-Post racks, wire management (horizontal/ vertical) and ladder tray to the wall.

Rack 1 – Contains (2) 48 Port Patch Panels and (1) network switch – roughly 80% patched.

Rack 2 – Contains (1) LIU chassis for the Single-Mode (SM) and Multi-Mode (MM) fiber – SM fiber has 36 strands, with 4 strands in use, the MM fiber has 36 strands, with 4 strands in use and (1) network switch – roughly 70% patched.

UPS equipment – (1) ups below the equipment.

Copper backbone – (3) 25 pair feed cables.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

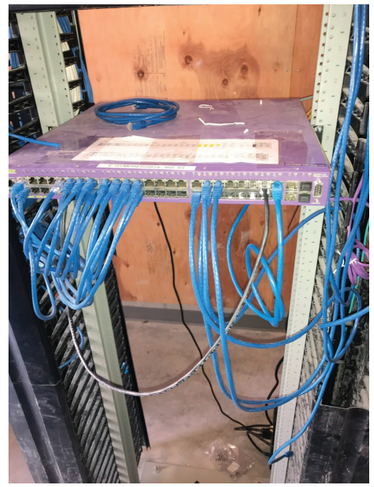
Temperature Control – Yes – the temperature was good.

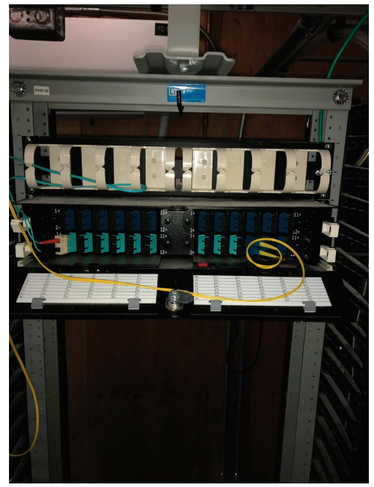
### OTHER OBSERVATIONS:

- There is some fire stop in the conduits.
- Jumper cables are loosely dressed into the wire management.

### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables into the wire management.
- Protect the fiber jumper feeding into the racks and servers.



## Planetarium Building (PL)

The Planetarium building is a two-story building, approximately 11,300 square feet. Built in 1976. Only one pair of fiber is working.

Contents are located within an existing closet, on a backboard.

Closet – Contains (3) 12 Port Patch Panels and (1) network switch – roughly 80% patched.

Closet – Contains (2) LIU chassis for the Single-Mode (SM) and Multi-Mode (MM) fiber. There is a junction point of fiber on the backboard – SM fiber has roughly 18 strands, with 4 strands in use, the MM fiber has roughly 18 strands, with 4 strands in use.

UPS equipment – (1) ups below the equipment, in the cabinet.

Copper backbone – assumed that there is (1) 25 pair feed cable.

Fiber backbone – Yes, air blown fiber.

Grounding – Yes.

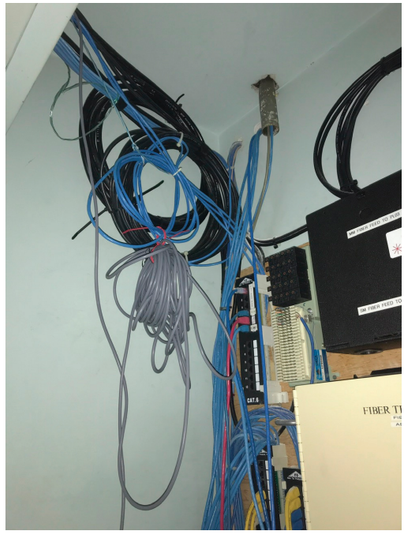
Temperature Control – Yes – the temperature is good.

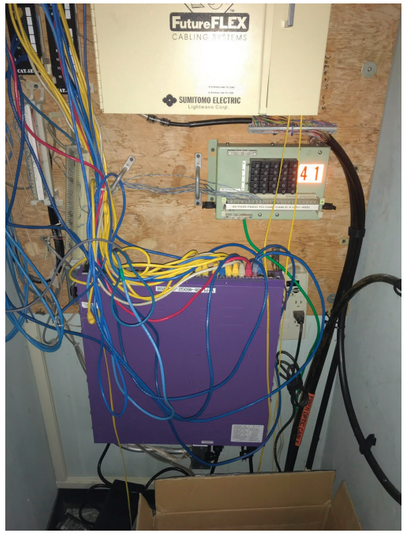
### OTHER OBSERVATIONS:

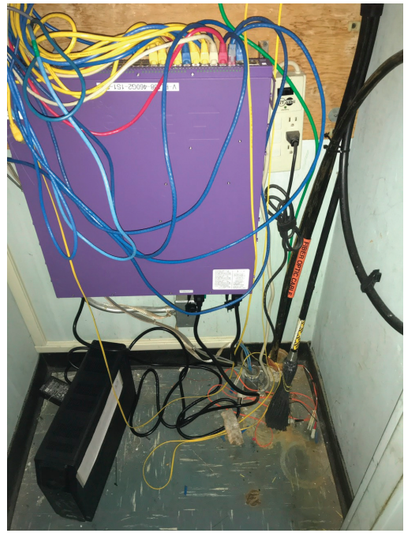
- Equipment and cabling are protected within the closet.

### RECOMMENDATIONS:

- Wire management for the inside of the closet to help protect the cabling.

## Student Health Services Building (SHS) – Room 110

The Student Health Services building is a one-story building, approximately 2,400 square feet. Built in 2008.

Contains (1) Wall mounted rack and wire management (horizontal).

Rack 1 – Contains (1) 48 Port Patch Panel, (1) 24 Port Patch Panel, (1) network switch – roughly 60% patched, (1) LIU chassis for the Single-Mode (SM) SM fiber has 12 strands, with 4 strands in use.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair feed cables.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

Temperature Control – Yes – the temperature was good.

### OTHER OBSERVATIONS:

- There is some fire stop in the conduits.
- Jumper cables are loosely dressed into the wire management.

### RECOMMENDATIONS:

- Fire stop conduits.
- Add additional wire management and dress the jumper cables into the wire management.
- Protect the fiber jumper feeding into the racks and servers.


## Child Development Center – Reception (CDC)

The Child Development Center is a one-story building, approximately 19,000 square feet. Built in 1995.

Contains (1) Wall mounted rack and wire management (horizontal).

Rack 1 – Contains (1) 96 Port Patch Panel, (1) network switch – roughly 70% patched, (1) LIU chassis for the Single-Mode (SM) and Multi-Mode fiber – SM fiber has 6 strands, with 2 strands in use and MM has 12 strands with 2 strands in use.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair feed cables.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

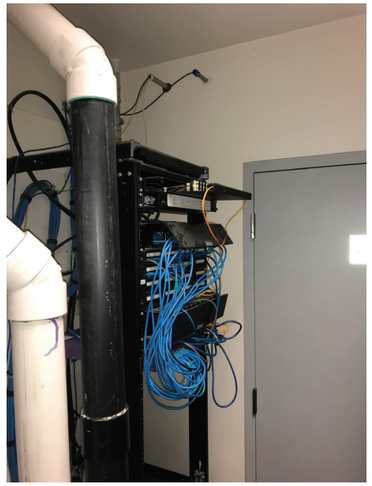
Temperature Control – Yes – the temperature was good.

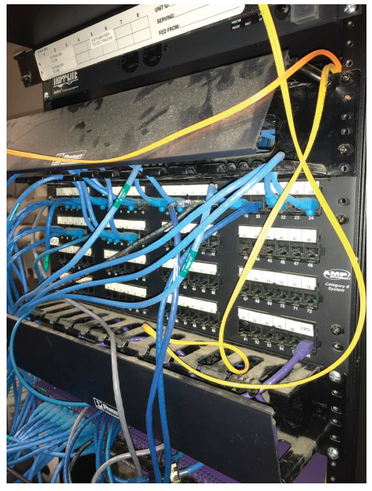
### OTHER OBSERVATIONS:

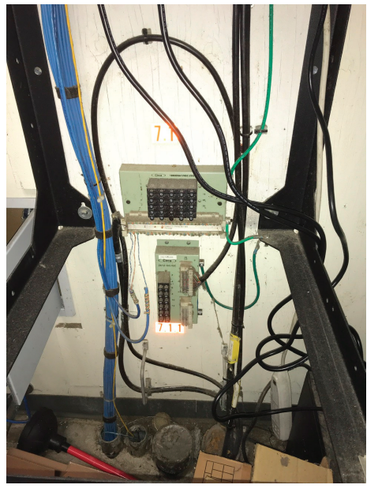
- There is some fire stop in the conduits.
- Clutter around the rack and cabling.
- Jumper cables are loosely dressed into the wire management.

### RECOMMENDATIONS:

- Fire stop conduits.
- Dress the jumper cables into the wire management.
- Protect the fiber jumper feeding into the racks and servers.





## Child Development Center – Classroom (CDC)

Contains (1) Wall mounted rack – side mounted to the backboard.

Rack 1 – Contains (1) 24 Port Patch Panel, (1) network switch – roughly 50% patched, (1) LIU chassis for the Single-Mode (SM) – SM fiber has roughly 6 strands, with 2 strands in use.

UPS equipment – (1) ups below the equipment.

Copper backbone – (1) 25 pair feed cables.

Fiber backbone – Air Blown fiber – Yes.

Grounding – Yes.

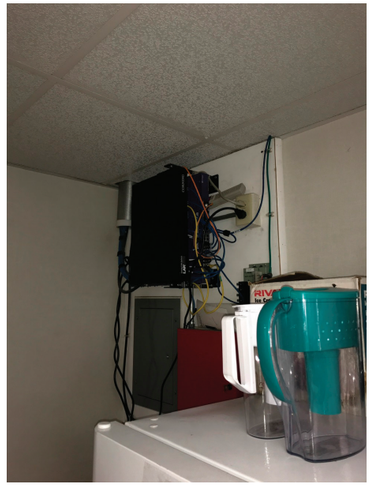
Temperature Control – Yes – the temperature was good.

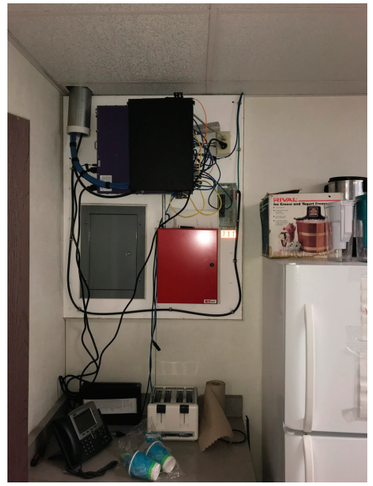
### OTHER OBSERVATIONS:

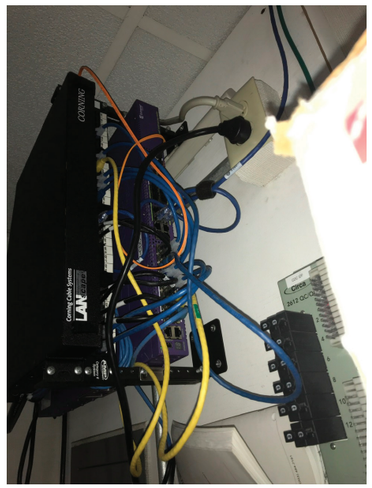
- The rack and equipment are above a work area (toaster below)
- Clutter around the rack and cabling.
- Jumper cables are loosely dressed into the wire management.
- Minimal protection from the surroundings.

### RECOMMENDATIONS:

- Replace the side mount with an enclosed cabinet.
- Dress the jumper cables.
- Protect the fiber jumper feeding into the racks and servers.







# ROUGH ORDER COST ESTIMATES

| | | | | | |
|---|---|---|---|---|---|
| Priority 1 | Critical - Need replacement in 0-3years | Priority 3 | Fair Condition - Need Replacement in Next 5-10 years | Priority 5 | New Building Impact - Based on project schedule |
| Priority 2 | Moderately Critical - Need replacement in 3-5 years | Priority 4 | Adds Value and Redundancy 5-10 years or as funding is available | | |

| IT/Server Room # | Campus | Infrastructure Scope | Utility | Installed Year(s) | Brief Description of the Need | Priority Level (1..4) | Building Name | Brief Scope of Project | Project Category | Can the Project be Phased - Y/N | Total Construction Costs ($)[1] | Total Project Costs - Including Soft Costs ($) | Study by (Prime Consultant) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SBVC-T1 | San Bernardino Valley College | New Duct Banks and Media | Technology | | Provision of new duct banks and media to new buildings. | 5 | Campus | Provision of new duct banks and media to new buildings. | NC | | $500,000 | $650,000 | P2S Inc |
| **Total Priority 5 Costs** | | | | | | | | | | | **$500,000** | **$650,000** | |

**Project Categories**

**DM** Deferred maintanance: systems or facilities that have not been maintained due to lack of staffing or funding. While operational, failure is imminent.

**EM** Emergency projects are systems or facilities that have failed or do not function as designed. Repair or replacement is required.

**UF** Projects or intiatives that would improve systems, facilities or operations on campus.

**REG** Projects related to Fire, Life, Safety; Code or OSHA compliance. Risk of harm and potential for fines or shutdown directives from regulating authorities.

**NC** New construction to support proposed buildings

[1]Refer to Appendix for breakdown of costs.

# CHAPTER 6
## Sanitary Sewer System

## SYSTEM DESCRIPTION

The San Bernardino Valley College (SBVC) sanitary sewer system is served by an 8-inch Vitrified Clay Pipe (VCP) public main located in Grant Ave. In general, sewage flows travel east and south on campus and join the public system in Grant Ave. Several of the mains and sub-mains located on campus were at one time owned and operated by the City of San Bernardino; however maintenance responsibilities of all lines within the campus have since been accepted by SBVC. The City of San Bernardino public sewer mains are points of connection within the adjacent City streets, Existing Utility map – Sanitary Sewer. This study is limited to the analysis of the on-site campus sanitary sewer system.

The Sewer System Management Plan (SSMP) prepared for San Bernardino Community College District (SBCCD) by Holmes International was also reviewed as a part of this analysis. The SSMP requires that a hydraulic analysis be performed of the existing sewer system in order to determine any system constraints that could potentially lead to sewer spills. Furthermore it requires that a Capital Improvement Plan (CIP) be established in order to provide hydraulic capacity within the campus sewer system. This report, though not created for this purpose, could satisfy the hydraulic analysis required and will also layout key system elements to be upgraded or replaced as a part of a separate CIP. An analysis was performed in 2011. Subsequent capacity analyses have been performed with each campus sewer system upgrade to provide capacity to serve the campus.

## METHODOLOGY

The City of San Bernardino Department of Public Works Sewer Policy and Procedures was reviewed with regards to average daily flow rates produced by on-site buildings. Table A of the Procedures indicates that for Junior Colleges and Universities average flows are estimated at 0.0025 cfs/AC. The design flow was calculated per the City of San Bernardino policy and procedures, division II, item 9 [Qd=3.6(Qa)0.85] where Qd is the design flow and Qa is the average flow.

This study compares the calculated design flow rates to the downstream pipe's capacity to determine whether the downstream pipe has adequate capacity. In general, sewers are considered at capacity when they are flowing half full for the design scenario. Overall the campus system has adequate capacity to serve the needs of the campus.

## ANALYSIS OF EXISTING SYSTEM

Due to the age of many of the formerly public sewer mains on campus a replacement program was initiated by the campus and as a result and by way of capital improvement projects, most of the campus sewer system has been replaced or repaired.

Table 1-1 summarizes the existing campus buildings' square footage, existing and future. Table 1-2 summarizes the flow allocation used to determine the average daily flow generated on campus.

Based upon the City of San Bernardino criteria of 0.0025 cfs/Ac for Junior Colleges and SBVC's 74-acre campus, the existing average flow rate generated from on campus buildings is calculated at 0.185 cubic feet per second (cfs), and a design flow of 0.858 cfs. These anticipated sewer flow rates were distributed equally on campus based on building square footage in order to analyze the campus network. This agrees with Table 1-2 existing building design flows. Proposed GSF increases will increase the design flow by 0.10 cfs. This is an insignificant increase and should not affect the sewer collection system. Note this assumes no sewer flow from the proposed parking structure.

The capacity of the existing system was calculated based on the material type, slope, and size of the existing sewer pipes. As stated previously many of the existing pipe sizes, material, and slopes were not included in the base maps, therefore engineering assumptions were utilized where necessary. Each of the private sanitary sewer mains corresponds to a tributary Area "A" through "C". A key map illustrating the sewer area locations is provided, Existing Sanitary Basin Sewer Map.

The capacity of each pipe is calculated Using Manning's equation.

Where the slope of the pipe was not provided in the base map, slopes meeting the minimum design guideline requirements were assumed (0.5%). For existing pipes where the material was unknown, Vitrified Clay Pipe (VCP) was assumed. Sewer analysis Figure 1d, Existing Sanitary Sewer – Pipe and Node Map correspond to the existing system model provided in Table 1-2.

## ANALYSIS OF FUTURE NEEDS

The sanitary sewer system was evaluated with the addition of the proposed buildings listed in the Campus Master Plan. Based on the future development presented and as discussed in the Executive Summary, recommendations have been made to establish a regular maintenance program, relocate, and replace various existing sanitary sewer pipe lines in order to accommodate the future development. The campus has already replaced and upgraded the deficient sewer lines on campus though various projects. This is conceptually illustrated in Future Conditions Utility Map – Sanitary Sewer. The proposed sanitary sewer alignments are the basis for the proposed system evaluation and analysis presented herein.

Based upon City of San Bernardino criteria of 0.0025 cfs/Ac for junior Colleges and SBVC's 74-acre campus, the future average flow rate generated from on campus buildings is calculated at 0.185 cubic feet per second (cfs), and a design flow of 0.858 cfs. These anticipated sewer flow rates were distributed equally on campus based on building square footage in order to analyze the campus network.

Table 1-4 includes the input and output data from the proposed sanitary sewer system model and using Manning's equation, provides a calculated flow capacity for the proposed sanitary sewer system. The average daily flow is derived from the proposed building allocation information presented in Table 1-1 and 1-2. All new pipes were assumed to be PVC and have a minimum slope of 0.5% or minimum cleansing velocity. Further description is provided in the Findings and Recommendations Section.

**TABLE 1-1**

| Construction Year | Building Name | GSF |
|---|---|---|
| 2003 | Administration/Student Services | 33,300 |
| 2004 | Art & Gallery | 22,500 |
| 1965 | Auditorium | 26,200 |
| 1960 | Business | 43,700 |
| 2003 | Campus Center | 34,700 |
| 2001 | Health & Life Sciences | 40,200 |
| 2001 | Library | 39,879 |
| 2011 | Chemistry/Physical Sciences | 57,000 |
| 2010 | North Hall | 49,800 |
| 2009 | Media/Communications | 18,300 |
| 1976 | Planetarium | 7,730 |
| 2013 | Gymnasium | 72,949 |
| | **Total GSF** | **485,658** |
| | | |
| Future | Student Services/Instructional | 59,100 |
| Future | Performing Arts Center | 30,000 |
| Future | CP1 (Aeronautics) | 22,940 |
| Future | CP2 (Allied Health) | 39,206 |
| Future | Tech Building | 100,000 |
| Future | Parking Structure | 395,000 |
| Future | Softball Field | 96,323 |
| Future | ISSB Building | 101,750 |
| Future | Administration & Campus Center Repurposing | 68,006 |
| Future | Physical Sciences & HLS | 9,026 |
| Future | Warehouse Facilities | 18,200 |
| | **Proposed GSF** | **939,551** |
| | | |
| | **GSF Net Increase** | **453,893** |

**TABLE 1-2**

| Building Name | ADF (CFS) | Design Flow (CFS) |
|---|---|---|
| Administration/Student Services | 0.01 | 0.06 |
| Art & Gallery | 0.01 | 0.04 |
| Auditorium | 0.01 | 0.05 |
| Business | 0.01 | 0.08 |
| Campus Center | 0.01 | 0.06 |
| Health & Life Sciences | 0.01 | 0.07 |
| Library | 0.01 | 0.07 |
| Chemistry/Physical Sciences | 0.01 | 0.10 |
| North Hall | 0.01 | 0.09 |
| Media/Communications | 0.00 | 0.03 |
| Planetarium | 0.00 | 0.01 |
| Gymnasium | 0.02 | 0.13 |
| **Existing Totals** | **0.12** | **0.84** |
| | | |
| Student Services/Instructional | 0.01 | 0.10 |
| Performing Arts Center | 0.01 | 0.05 |
| CP1 (Aeronautics) | 0.01 | 0.04 |
| CP2 (Allied Health) | 0.01 | 0.07 |
| Tech Building | 0.03 | 0.17 |
| Parking Structure (no flow) | 0.0 | 0.0 |
| Softball Field | 0.02 | 0.17 |
| ISSB Building | 0.03 | 0.18 |
| Administration & Campus Center Repurposing | 0.02 | 0.12 |
| Physical Sciences & HLS | 0.00 | 0.02 |
| Warehouse Facilities | 0.00 | 0.03 |
| **Future Totals** | **0.14** | **.95** |
| | | |
| **Net Increase** | **0.01** | **0.10** |

**TABLE 1-3**

| Building Name | Description of Impact to Campus Wide Utilities | Cost | Construction Schedule |
|---|---|---|---|
| Parking Structure 1 | Re-align existing 8" sewer line in conflict with future Parking Structure 1 (PS1). | $115,000 | After 2025 |
| Parking Structure 2 | Remove portions of existing sewer. This should be included in the existing Technical Building demolition work. | TBD | After 2025 |
| Technical | Install a new campus lateral from College Ave to serve the future Technical Arts building. | $50,000 | After 2025 |
| **Totals** | | **$175,000** | |

# FINDINGS AND RECOMMENDATIONS

## Findings

The campus has completed several sewer upgrades and as a result, the campus sewer collection system is functioning well and has adequate capacity to serve the campus needs.

## Recommendations

The recommendations presented herein include extension of the sanitary sewer system to serve proposed buildings presented in the Master Plan; and removal and relocation of existing sanitary sewer service mains and laterals serving existing buildings planned to be demolished to provide a clear site for future development. The recommendations have been categorized into two priority levels. Priority level 1 improvements are in need of immediate attention and should be constructed by 2025. They are listed in order of apparent greatest need however within each priority category sections can be reordered to allow of construction sequencing, etc. Priority level 2 improvements are those that are only necessary for an individual building and should be constructed in conjunction with future building projects.

The following are recommendations for improvements to the existing sanitary sewer system:

### PRIORITY 1

- Establish a regular maintenance program to regularly maintain the campus system. This could include flushing, periodic CCTV investigation, etc.

### PRIORITY 2

- Re-align existing 8" sewer line in conflict with future Parking Structure 1 (PS1).
- Install a new campus lateral from College Ave to serve the future Technical Arts building.

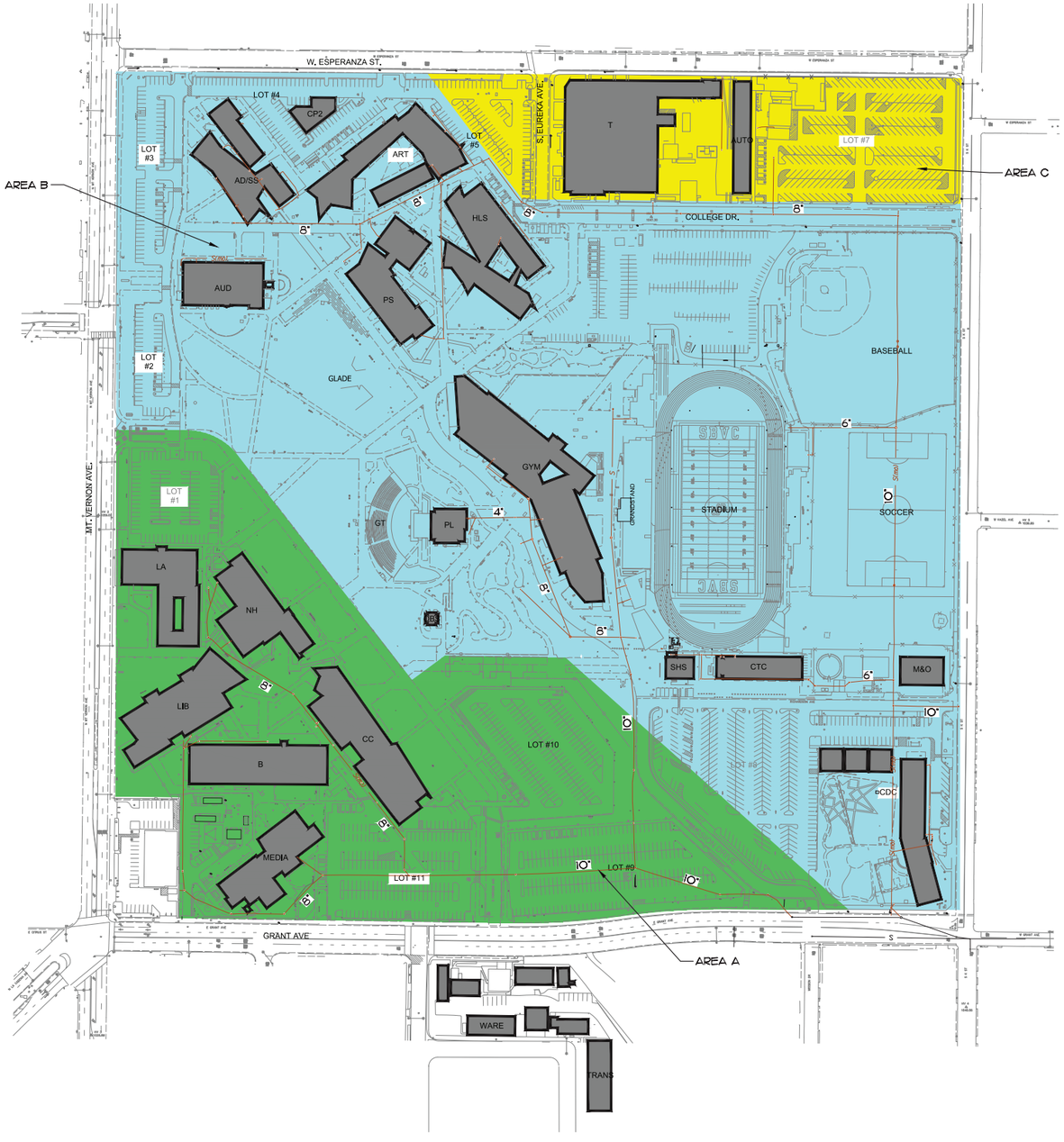
The findings and recommendations presented in this report are determined from City of San Bernardino Department of Public Works Sewer Policy and Procedures. In the case that the individual proposed building designs yield larger flow rates than presented herein, it is recommended that the college re-evaluate the data analysis and update the findings.

# COST ESTIMATE

The estimates below reflect improvements associated with individual buildings. Campus wide improvements not associated with an individual building project are listed as such. These estimates are provided as a reference and as such should be further established by an estimator.

It should be noted that the analysis assumes that the existing campus square footage will be maintained and that existing utilities are in adequate condition and maintained. In the case that the individual proposed building designs yield larger flow rates than presented herein, it is recommended that the college re-evaluate the data analysis and update the findings

# EXISTING SANITARY SEWER WATER BASINS




## FACILITY LEGEND

| | | | |
|---|---|---|---|
| AD/SS | ADMINISTRATION / STUDENT SERVICES | LA | LIBERAL ARTS |
| ART | ART & GALLERY | LIB | LIBRARY |
| AUD | AUDITORIUM | M&O | MAINTENANCE & OPERATIONS |
| AUTO | AUTO SHOP | MEDIA | MEDIA/COMMUNICATIONS |
| B | BUSINESS | NCP | NORTH CENTRAL PLANT |
| CC | CAMPUS CENTER | NH | NORTH HALL |
| CDC | CHILD DEVELOPMENT CENTER | OBS | OBSERVATORY |
| CP | CENTRAL PLANT | PL | PLANETARIUM |
| CS | CUSTODIAL STORAGE | PS | CHEMISTRY/PHYSICAL |
| CTC | COMPUTER TECHNOLOGY CENTER | SHS | SCIENCES |
| GT | GREEK THEATER | T | STUDENT HEALTH SERVICES |
| GYM | CYMNASIUM | TRANS | TECHNICAL |
| HLS | HEALTH & LIFE SCIENCES | WARE | TRANSPORTATION WAREHOUSE |

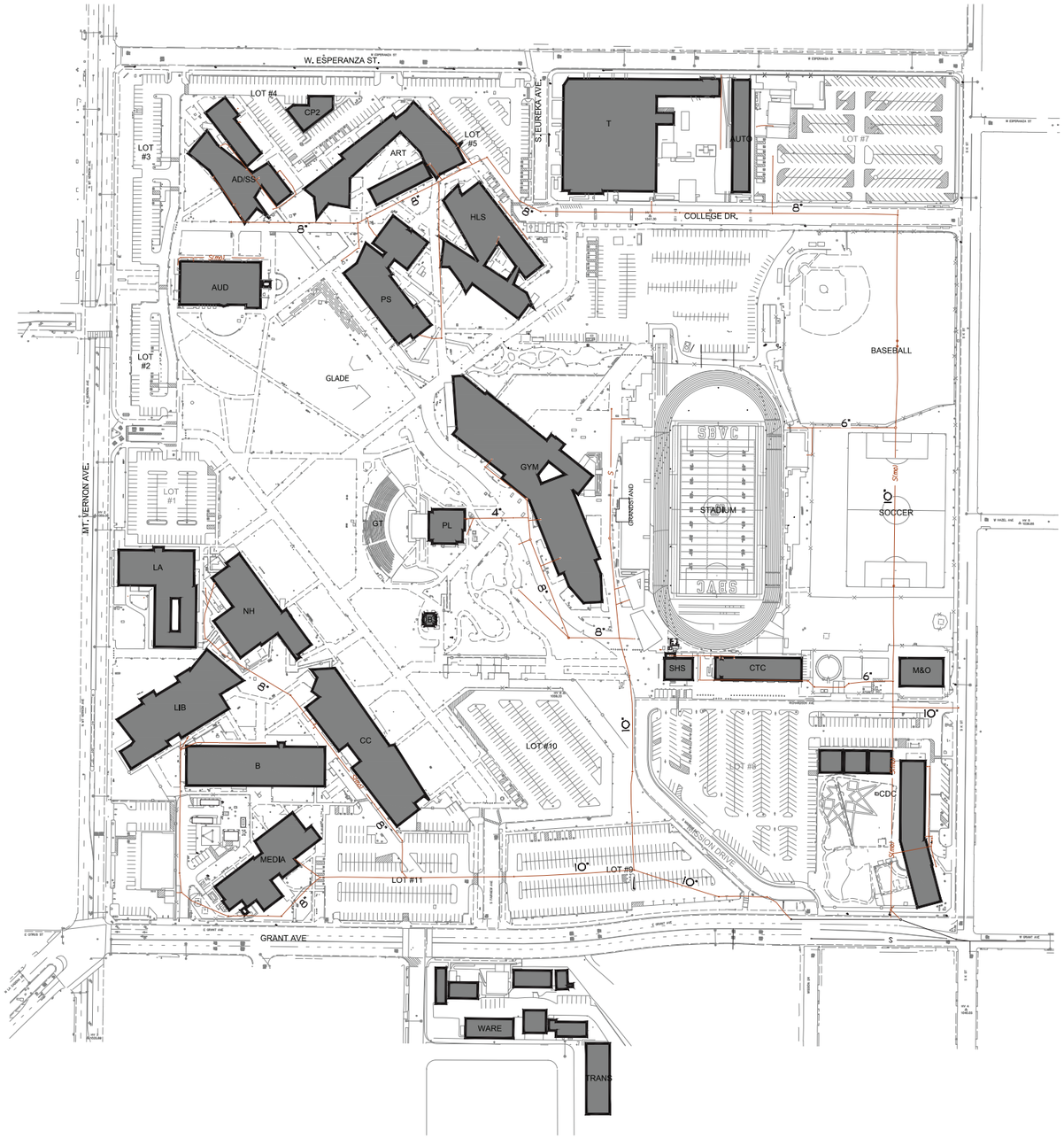
## LEGEND

- EXISTING SEWER LINE
- EXISTING BUILDING
- AREA A
- AREA B
- AREA C

N

SCALE: 1"=300'

# EXISTING SANITARY SEWER DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | |
|---|---|
| AD/SS | ADMINISTRATION / STUDENT SERVICES |
| ART | ART & GALLERY |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP | CENTRAL PLANT |
| CS | CUSTODIAL STORAGE |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GT | GREEK THEATER |
| GYM | GYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LA | LIBERAL ARTS |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SHS | STUDENT HEALTH SERVICES |
| T | TECHNICAL |
| TRANS | TRANSPORTATION |
| WARE | WAREHOUSE |

## LEGEND

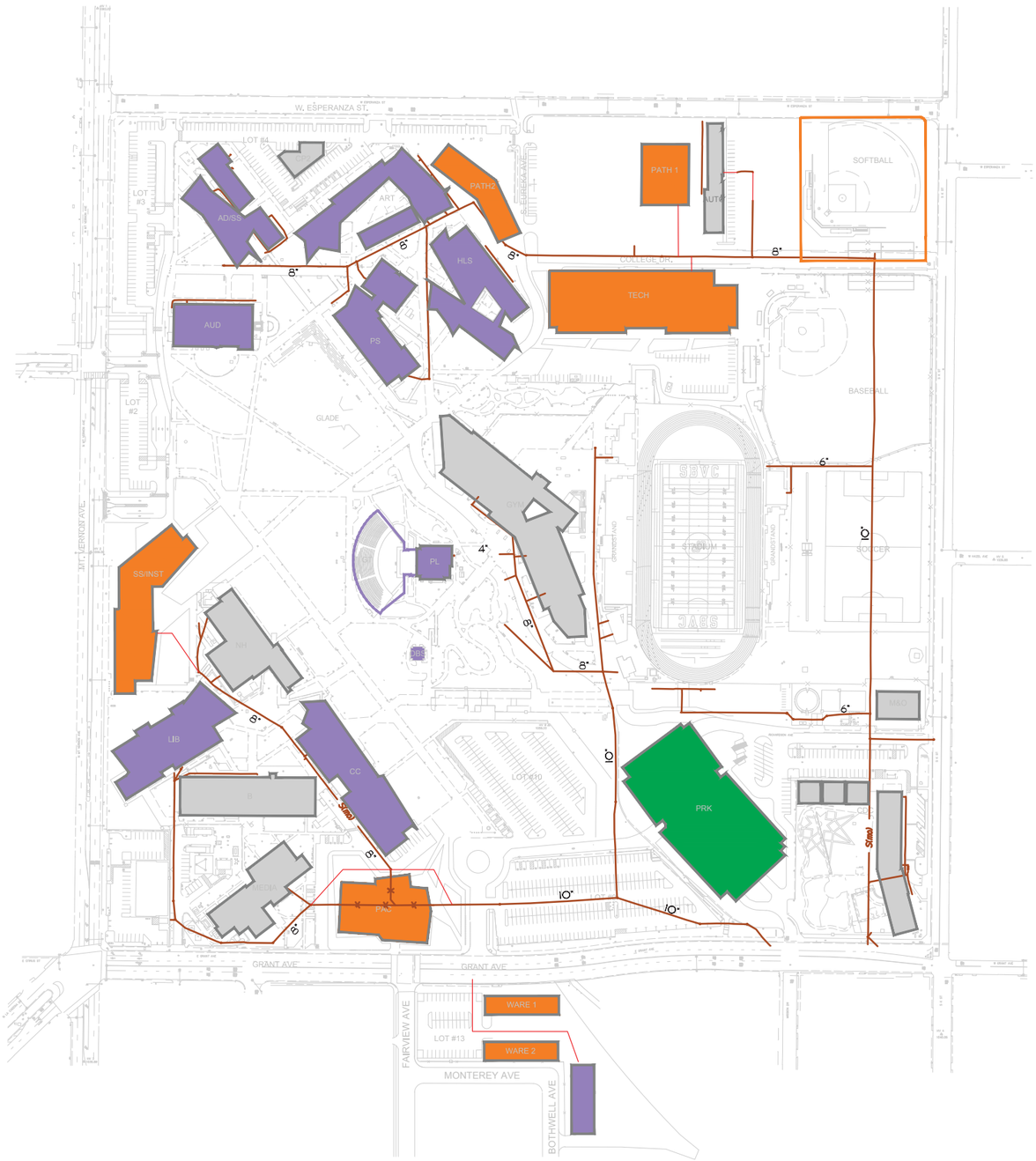
EXISTING SEWER LINE

EXISTING BUILDING

N

SCALE: 1"=200'

# PROPOSED SANITARY SEWER DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | |
|---|---|
| AD | ADMINISTRATION |
| ART | ART CENTER |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP1 | CENTRAL PLANT 1 |
| CP2 | CENTRAL PLANT 2 |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GRND | GROUNDS |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PAC | PERFORMING ARTS CENTER |
| PATH1 | CAREER PATHWAYS 1 |
| PATH 2 | CAREER PATHWAYS 2 |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SS/INST | STUDENT SERVICES/ INSTRUCTIONAL BUILDING |
| TRANS | TRANSPORTATION |
| TECH | TECHNOLOGY BUILDING |
| WARE | WAREHOUSE |

## BUILDING LEGEND

- EXISTING BUILDING
- UNDER CONSTRUCTION
- FUTURE PARKING STRUCTURE
- FUTURE BUILDING
- BUILDING RENOVATION/EXPANSION

## UTILITY LEGEND

- EXISTING SEWER LINE
- PROPOSED SEWER LINE
- PROPOSED SEWER LINE RELOCATION

NORTH

0 200

# CHAPTER 7
## Storm Drain System

## SYSTEM DESCRIPTION

The San Bernardino Valley College (SBVC) storm drain system is served by a public main located in K St. In general, drainage flows travel east and south on campus and join the public system in K St at multiple locations. Some areas in the southern portion of the campus direct drainage to Grant Ave via curb outlets and via overland flow. The City of San Bernardino public storm drain mains are identified in Figure 2a, Existing Utility map – Storm Drain. This report is limited to the analysis of the on-site campus storm drain system. The campus has made improvements to storm systems over the past several years by way of new building projects and infrastructure upgrades.

## METHODOLOGY

A previous hydrologic study was performed to analyze the existing site topography and storm drainage system in 2011. These calculations were reviewed and compared to the existing campus condition and the previous calculations continue to represent the campus condition adequately. The City and County of San Bernardino current Storm Water regulations were reviewed and compared to the analysis and found to be consistent.

Existing field conditions were reviewed, with the aid of a topographic aerial survey which was flown in October 2019, to determine general storm water flow patterns and watersheds. In order to determine the appropriate design flows to be utilized to evaluate existing drainage facilities, the tributary area was divided into appropriate sub-areas according to existing topography. The campus drainage basin, consisting of approximately 74 acres, was divided into sub-areas with similar physical characteristics, ground coverage, and discharge points. Flow rates for the storm water were generated using the Unit Hydrograph method as indicated in the San Bernardino County Hydrology Manual.

The design and construction of on-site improvements are subject to review and approval of the Department of the State Architect (DSA). DSA is the permitting jurisdiction applicable to SBVC. Typically DSA offers no review of drainage facilities and does not require hydrology, hydraulic, or water quality calculations. However since SBVC is located within the City of San Bernardino, which adheres to County standards, and discharges to City owned facilities it makes logical sense to follow the City's hydrology and hydraulic procedures.

## ANALYSIS OF EXISTING SYSTEM

Appendix B contains the previous hydrology calculations for the existing campus sub-basins, times of concentrations and corresponding flows. The existing hydrology map can be found in Figure 2a.

The capacity of the existing system was calculated based on the material type, slope, and size of the existing storm drain pipes which was almost entirely assumed. A hydraulic capacity analysis was performed for each private storm drain main (>18") on campus.

Per the County of San Bernardino Hydrology Manual, storm drain systems should be sized to carry a 100-year storm within the pipe. Hydraulic output for the existing storm drain system model can be found in Appendix B. Using Manning's equation, the capacity of the each pipe (>18") was calculated.

A utility survey was completed as a part of this study and invert elevations were obtained where possible. Where inverts were not able to be recorded, assumptions were made from upstream and downstream records. For existing pipes where the material was unknown, Reinforced Concrete Pipe (RCP) was assumed.

There are no reported maintenance issues on the campus related to inadequate collection systems. Two of the readily identifiable large diameter (>18") pipes appear to be sized adequately to accommodate the 100-year design storm event that drains to them. The remaining areas of campus which do not drain to these two storm drain pipes are assumed to drain via overland flow to the surrounding streets.

## ANALYSIS OF FUTURE NEEDS

Since future buildings are either replacing existing buildings or parking lots the future runoff is not expected to increase appreciably, since the impervious area is relatively the same.

Based on the future development identified in the campus masterplan, and as discussed in the Executive Summary, recommendations have been made to remove and replace various existing storm drain pipe lines as well as over land flow patterns in order to accommodate the future development, and as new projects come on-line they can be evaluated for current storm water regulations and compliance. This is conceptually illustrated in Figure 2b, Future Conditions Hydrology Map.

## STORM WATER REGULATORY COMPLIANCE

### Santa Ana River Hydrologic Unit

The campus is located in the Santa Ana River Hydrologic Unit, the Upper Santa Ana River Hydrologic Area and the Bunker Hill Hydrologic Sub-Area (801.52).

### San Bernardino County MS4 Permit

On January 29, 2010, the Santa Ana Regional Water Quality Control Board adopted Riverside County MS4 Permit Order No. R8-2010-0036, NPDES No. CAS 618036 specifying the Area-Wide Urban Runoff Management Program. The NPDES permit specifies discharge requirements for the San Bernardino County Flood Control District, the County of San Bernardino, and the Incorporated Cities of San Bernardino within the Santa Ana Region. The Principal Permittee is the San Bernardino County Flood Control District, which is responsible for overseeing the development and implementation of the area-wide storm water program, including development and maintenance of a model Water Quality Management Plan (WQMP) for local agency new development and significant redevelopment programs.

The model WQMP Guidance and Template provide a framework to incorporate some of the watershed protection principles into the Permittees' planning, construction and post-construction phases of priority projects. The model WQMP requires site design (including, where feasible, LID principles), source control and treatment control elements to reduce the discharge of pollutants in urban runoff. On April 30, 2004, the Regional Board approved the model WQMP Guidance and Template. The Permittees are requiring project proponents to develop and implement site-specific WQMPs.

However, the Permit requires project proponents to first consider preventative and conservation techniques (e.g., preserve and protect natural features to the maximum extent practicable) prior to considering mitigative techniques (structural treatment, such as infiltration systems). The mitigative measures should be prioritized with the highest priority for BMPs that remove storm water pollutants and reduce runoff volume, such as infiltration, then other BMPs, such as harvesting and use, evapotranspiration and bio-treatment should be considered. To the maximum extent practicable, these Low Impact Development (LID) Best Management Practices (BMPs) must be implemented at the project site. The Regional Board recognizes that site conditions, including site soils, contaminant plumes, high groundwater levels, etc., could limit the applicability of infiltration and other LID BMPs at certain project sites. Where LID BMPs are not feasible at the project site, more traditional, but equally effective control measures should be implemented. This Order provides for alternatives and in-lieu programs where the preferred LID BMPs are infeasible.

As a Co-Permittee, the City of San Bernardino requires development and redevelopment projects to submit WQMPs to minimize the detrimental effects of urbanization on the beneficial uses of receiving waters. WQMPs provide the framework for minimizing the adverse effects of development and redevelopment projects on receiving waters. These effects may be minimized through the implementation of site designs that reduce runoff and pollutant transport by minimizing impervious surfaces and maximizing onsite infiltration, source-control BMPs, and/or either on-site structural treatment control BMPs, or participation in regional or watershed-based structural treatment control BMPs. As discussed earlier in the report DSA is the permitting agency for SBVC, not the City of San Bernardino; however since DSA does not have storm water quality guidelines to aid SBVC in complying with Federal and State requirements it makes logical sense that the campus adhere to the City of San Bernardino requirements

since SBVC ultimately discharges to City of San Bernardino MS-4 facilities.

In addition to addressing post-development urban storm water quality, the WQMP includes requirements to protect environmentally sensitive areas and to address potential hydromodification issues that may result from each project. Hydromodification is defined as alterations to the hydrologic characteristics of an area which could lead to varied amounts, times, intensities, etc of runoff. The WQMP requires identification of hydrologic conditions of concern (HCOC). An HCOC exists when a site's hydrologic regime is altered and there are likely to be significant impacts on downstream channels and aquatic habitats, alone or in conjunction with impacts of other projects. Currently, new development and significant re-development projects are required to perform this assessment and incorporate appropriate BMPs to ensure existing hydrologic conditions are maintained. The new permit requires the Permittees to implement, where feasible, LID techniques to minimize HCOC and supports the implementation of in-stream hydromodification protection and/or mitigation alternatives where appropriate.

## LID Techniques

Low Impact Design (LID) techniques use integrated, implemented measures designed to manage storm water via vegetation. LID techniques aim to:

- Reduce polluted stormwater entering receiving waters
- Reduce impervious surface thereby reducing runoff and promoting infiltration
- Increase urban green space
- Reduce heat island effect
- Reduce flows to existing stormwater conveyances

Examples of LID techniques recommended by the city of San Bernardino and other adjacent municipalities include the following:

- Use bioretention cells as rain gardens in landscaped parking lot islands to reduce runoff volume and filter pollutants.
- Disconnect the downspouts from roofs and direct the flow to permeable paver areas or other vegetated infiltration / filtration practices.
- Use multi-functional open drainage systems in lieu of more conventional curb-and-gutter systems.
- Use green roofs for runoff reduction, energy savings, improved air quality, and enhanced aesthetics.
- Apply a treatment train approach to provide multiple opportunities for stormwater treatment and reduce the possibility of system failure. Consider combining a grassed swale with permeable paver overflow areas and a landscaped bioretention cell.

# FINDINGS AND RECOMMENDATIONS

## BMP Recommendations

The following BMPs are recommended:

- Each future building project should prepare a WQMP per the City of San Bernardino template in order to document all project related BMPs and mitigation measures.
- The following LID strategies should be incorporated with future development where feasible:
  - Maximize natural infiltration capacity
  - Preserve existing drainage patterns and time of concentration
  - Protect existing vegetation and sensitive areas
  - Minimize impervious areas
  - Disconnect impervious areas
  - Minimize construction footprints
  - Re-vegetate disturbed areas
  - Implement source control measures such as:
    - Using activity restrictions
    - Implementing a spill contingency plan
    - Performing regular street/parking lot sweeping
    - Utilizing efficient irrigation systems
    - Installing storm drain signage to discourage illegal dumping
    - Properly operate and design vehicle maintenance/wash areas, docks, etc.

The table below indicates the anticipated removal efficiencies for various sustainable stormwater treatment BMPs. The matrix should assist project designers in selecting appropriate BMPs for individual projects based on the potential pollutants of concern.

**TABLE 2-1: POTENTIAL POLLUTANT REMOVAL EFFICIENCIES**

| | Extended Detention Basin | Wet Ponds | Wetland Basins | Swales | Infiltration Basins & Trenches | Retention/ Irrigation Reuse | Bio-retention |
|---|---|---|---|---|---|---|---|
| Nutrients | L | M | M | L | H | H | L |
| Sediment | M | H | H | M | H | H | H |
| Metals | M | H | H | M | H | H | H |
| Pathogens | M | H | H | L | H | H | H |
| Organics | M | H | H | M | H | H | M |
| Toxicity | M | H | H | M | H | H | M |
| Trash | H | H | H | L | H | H | H |
| L= Low M= Medium H= High | | | | | | | |

With further analysis SBVC could consider treating storm water runoff from some of the future building sites in a regional fashion, such that some BMPs could be shared. A complete Storm Water Management Plan could refine the existing and future hydrology of the campus and incorporate BMPs based on the hydrology and hydraulic characteristics.

## Findings

Since all of the future buildings are either replacing existing buildings or parking lots the future runoff is not expected to increase appreciably, since the impervious area is relatively the same.

## Recommendations

### PRIORITY 1

- Each future building project should prepare a WQMP per the City of San Bernardino template in order to document all project related BMPs and mitigation measures.
- LID strategies should be incorporated with future development where feasible.
- New projects should look for ways to decrease impervious area and decrease run-off.
- The campus storm drain collection system should be inspected and cleaned on a regular maintenance schedule. This will identify potential issues and identify needs, repairs, and improvements before they become larger problems.

The findings and recommendations presented in this report The findings and recommendations presented in this report are determined from City of San Bernardino Department of Public Works Storm Drain Policy. Each new project should be evaluated for conformance to current agency requirements.

It should be noted that the analysis assumes that the existing campus square footage will be maintained and that existing utilities are in adequate condition and maintained. In the case that the individual proposed building designs yield larger flow rates than presented herein, it is recommended that the college re-evaluate the data analysis and update the findings.

# STORM DRAIN BASINS


## FACILITY LEGEND

| | |
|---|---|
| AD/SS | ADMINISTRATION / STUDENT SERVICES |
| ART | ART & GALLERY |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP | CENTRAL PLANT |
| CS | CUSTODIAL STORAGE |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GT | GREEK THEATER |
| GYM | GYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LA | LIBERAL ARTS |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SHS | STUDENT HEALTH SERVICES |
| T | TECHNICAL |
| TRANS | TRANSPORTATION |
| WARE | WAREHOUSE |

## LEGEND

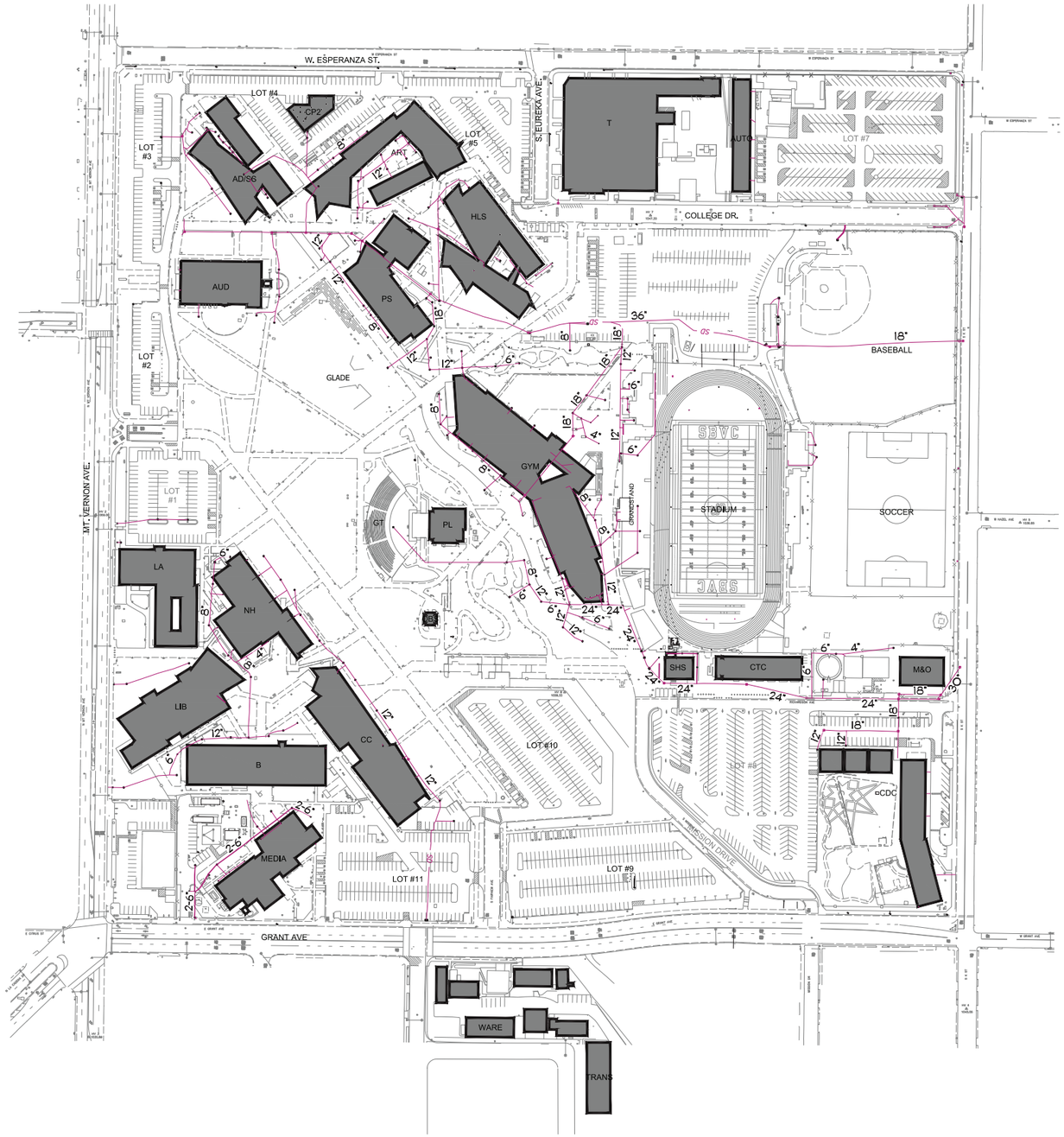
- EXISTING STORM DRAIN LINE
- EXISTING BUILDING
- AREA A
- AREA B
- AREA C
- AREA C

N

100 50 0 100 200 300

SCALE: 1"=100'

# EXISTING STORM DRAIN DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | |
|---|---|
| AD/SS | ADMINISTRATION / STUDENT SERVICES |
| ART | ART & GALLERY |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP | CENTRAL PLANT |
| CS | CUSTODIAL STORAGE |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GT | GREEK THEATER |
| GYM | GYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LA | LIBERAL ARTS |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PL | PLANETARIUM |
| PS | PHEMISTRY/PHYSICAL |
| SHS | SCIENCES |
| T | STUDENT HEALTH SERVICES |
| TRANS | TECHNICAL |
| WARE | TRANSPORTATION WAREHOUSE |

## LEGEND

EXISTING STORM DRAIN LINE

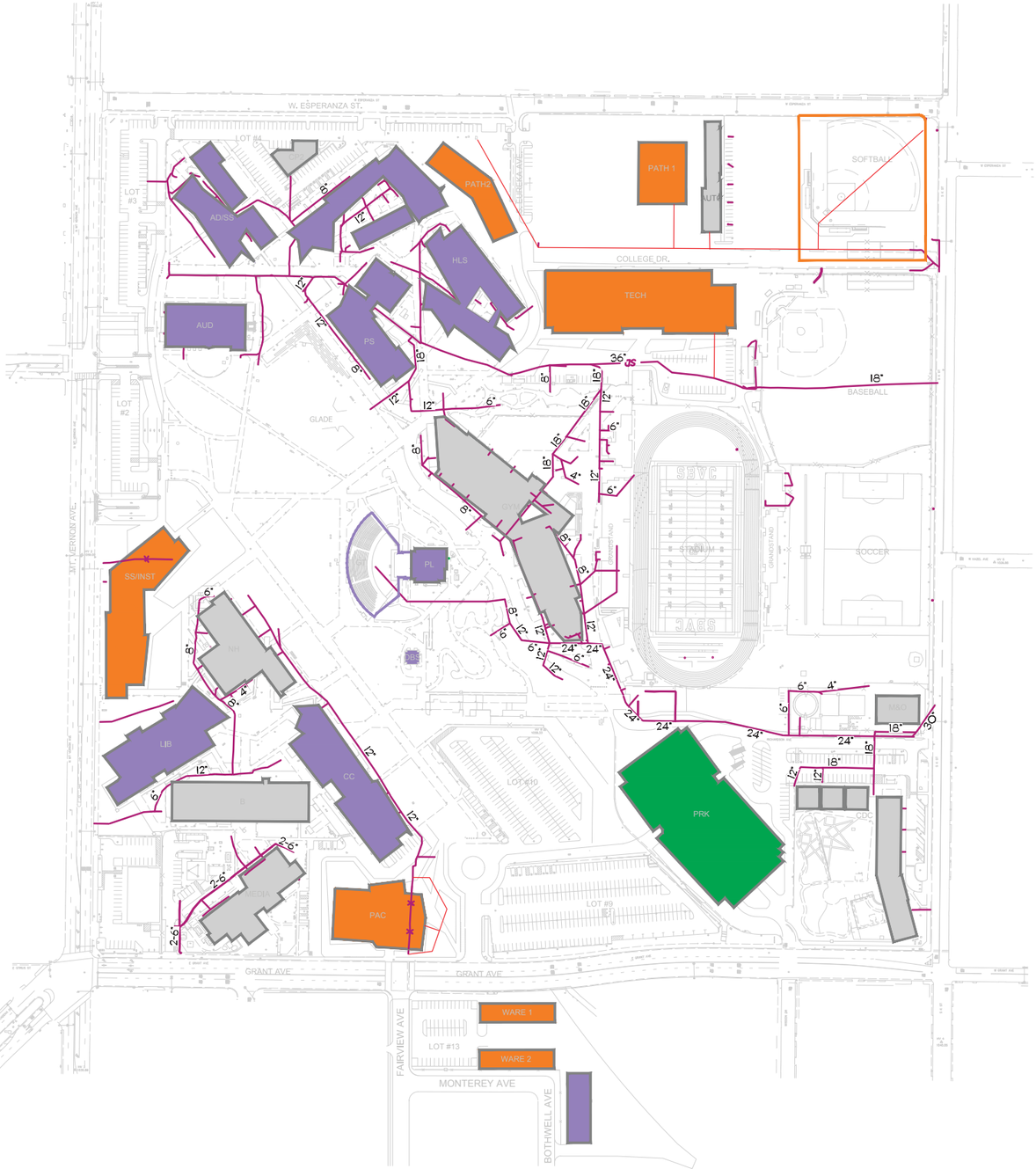
EXISTING BUILDING

N

100 50 0 100 200 300

SCALE 1"=100'

# PROPOSED STORM DRAIN DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | |
|---|---|
| AD | ADMINISTRATION |
| ART | ART CENTER |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP1 | CENTRAL PLANT 1 |
| CP2 | CENTRAL PLANT 2 |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GRND | GROUNDS |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PAC | PERFORMING ARTS CENTER |
| PATH1 | CAREER PATHWAYS 1 |
| PATH 2 | CAREER PATHWAYS 2 |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SS/INST | STUDENT SERVICES/ INSTRUCTIONAL BUILDING |
| TRANS | TRANSPORTATION |
| TECH | TECHNOLOGY BUILDING |
| WARE | WAREHOUSE |

## BUILDING LEGEND

- EXISTING BUILDING
- UNDER CONSTRUCTION
- FUTURE PARKING STRUCTURE
- FUTURE BUILDING
- BUILDING RENOVATION/EXPANSION

## UTILITY LEGEND

- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN LINE
- PROPOSED STORM DRAIN LINE RELOCATION

NORTH

# CHAPTER 8
## Domestic Water System

## SYSTEM DESCRIPTION

The existing water distribution system serving the campus is a public looped system in the surrounding streets along with some public mains bisecting the campus that reside within a public easement. All potable, fire water, and irrigation services are connected to the public system throughout the campus. Several of the potable water services include a "bull head" configuration in which a single service from the main branches into a domestic meter and an irrigation meter. However, billing information does not distinguish between the two meter types and therefore demands at each service point have been summed. The analysis in this section will analyze these combined domestic/irrigation services along with fire services however dedicated irrigation services are discussed in Section 4.

The San Bernardino Municipal Water District (SBMWD) provides domestic, irrigation and fire water services at thirty-eight locations along Mt Vernon Ave, College Dr, K St, Gant Ave, and numerous interior campus locations. Information on the locations and sizes of each water meter were obtained from SBMWD.

The campus buildings are served by separate domestic and fire water SBMWD meters, however some domestic meters are also used for irrigation. The public distribution network consists mostly of ductile iron (DI) and cast iron (CI) pipe. For larger building services (>3") pipe materials are the same or PVC C-900 for private services. For smaller building services (<3") pipe materials are to be copper or schedule 80 PVC. City information shown was provided by SBMWD which can only provide information up to the meter. Pipe sizes, alignments, materials, etc past the public meters are based upon reference drawings and as-builts.

The existing water system and locations of each SBMWD connection are illustrated on Figure 3a, Existing Utility Map – Water Distribution.

It is acknowledged that SBVC has facilities located outside of the main campus area. These facilities located on Grant Street are served by the City of Colton and are not included herein with the main campus analysis.

## METHODOLOGY

Existing domestic water demands for the campus were estimated based on an analysis of existing SBMWD meter readings. Results of this analysis are summarized in the following table. Meter readings are measured in HCF. 1 HCF = 748 gallons. Some meter noted negative readings. These meters should be investigated by SBMWD and replaced as necessary.

The SBWD readings indicated small amounts of fire water usage, as noted by zero usage. It is our assumption that these intermittent flows were for testing purposes. SBVC should consider investigating possible cross connections occurring on the fire services.

To account for the fact that the majority of the domestic water system demand occurs during the periods when school is in session, the average annual demand was assumed to be generated over eight months of the year, five days a week and eight hours a day to get the average in-session flow rates. As seen from the table above, this calculation results in an in-session, campus-wide average daily flow rate of 545 gpm. A SBMWD maximum day factor of 1.69 times average day and a peak hour factor of 2.0 times maximum day result in flow rates of 921 gpm and 1,841 gpm for in session maximum day and peak hour demands, respectively. Methods of estimating water flows and modeling water usage are based on common engineering principles and SBMWD standards.

The location of each domestic and fire water is illustrated on the Existing Utility Map – Water Distribution.

In addition to daily usage demands, the fire water systems must meet the City of San Bernardino Fire Department (SBFD) fire access and fire flow requirements. The fire water systems shall meet the following criteria for design and construction:

- Fire hydrants shall be spaced at a maximum of 300 feet along fire lanes. Buildings shall be within 300 feet of a fire hydrant approved by SBFD.
- Water system shall have a minimum fire flow of 1,500 gpm from three (3) fire hydrants flowing simultaneously.
- Water system shall have a minimum residual water pressure of 20 psi with the required 4,500 gpm flowing.

**TABLE 3-1: HISTORICAL DOMESTIC WATER USE**

| | | | | In Session Demand | | | |
|---|---|---|---|---|---|---|---|
| POC No. | Meter No. | Size | Avg Day (gpd) | Avg Day (gpd) | Avg Day (gpm) | Max Day (gpm) | Pk Hour (gpm) |
| FW | B115040702 | 6" | 0 | 0 | 0 | 0 | 0 |
| DW | B16462727 | 2" | 4,189 | 26,389 | 23 | 39 | 78 |
| LW | B16932138 | 2" | 32,039 | 201,848 | 177 | 299 | 598 |
| DW | RT61767304 | 2" | 50 | 314 | 0 | 0 | 1 |
| FW | B11504770 | 6" | 0 | 0 | 0 | 0 | 0 |
| FW | B11564429 | 4" | 0 | 0 | 0 | 0 | 0 |
| LW | B16987525 | 2" | 4,862 | 30,631 | 27 | 45 | 91 |
| DW | B16462725 | 2" | 0 | 0 | 0 | 0 | 0 |
| DW | B15482971 | 2" | 100 | 628 | 1 | 1 | 2 |
| FW | SN70917194 | 8" | 0 | 0 | 0 | 0 | 0 |
| DW | B11287082 | 4" | 2,593 | 16,336 | 14 | 24 | 48 |
| DW | B11287082 | 4" | 3,042 | 19,164 | 17 | 28 | 57 |
| FW | B11564441 | 6" | 0 | 0 | 0 | 0 | 0 |
| DW | B35736961 | 2" | 75 | 471 | 0 | 1 | 1 |
| FW | B11504701 | 6" | 0 | 0 | 0 | 0 | 0 |
| FW | B11504698 | 6" | 0 | 0 | 0 | 0 | 0 |
| DW | N70304494 | 3" | -100 | -628 | -1 | -1 | -2 |
| DW | N70304494 | 3" | -50 | -314 | 0 | 0 | -1 |
| FW | B49593682 | 6" | 0 | 0 | 0 | 0 | 0 |
| DW | O17472928 | 4" | 1,097 | 6,912 | 6 | 10 | 20 |
| DW | HN96924 | 1" | -125 | -785 | -1 | -1 | -2 |
| LW | RT65057985 | 4" | 39,170 | 246,773 | 216 | 366 | 731 |
| FW | B30130570 | 6" | 0 | 0 | 0 | 0 | 0 |
| DW | HNC77503 | 4" | -1,222 | -7,697 | -7 | -11 | -23 |
| DW | HNC77503 | 4" | -2,668 | -16,808 | -15 | -25 | -50 |
| FW | B49593684 | 4" | 0 | 0 | 0 | 0 | 0 |
| DW | HN81987 | 2" | 50 | 314 | 0 | 0 | 1 |
| FW | B11504763 | 6" | 0 | 0 | 0 | 0 | 0 |
| LW | B16987510 | 2" | 0 | 0 | 0 | 0 | 0 |
| DW | B16462730 | 2" | 299 | 1,885 | 2 | 3 | 6 |
| FW | B11504771 | 8" | 0 | 0 | 0 | 0 | 0 |
| FW | B11564453 | 4" | 0 | 0 | 0 | 0 | 0 |
| DW | B16462720 | 2" | 50 | 314 | 0 | 0 | 1 |
| DW | B11233763 | 4" | 50 | 314 | 0 | 0 | 1 |
| DW | B11233763 | 4" | 25 | 157 | 0 | 0 | 0 |
| DW | B09056904 | 4" | 14,636 | 92,206 | 81 | 137 | 273 |
| FS | P4230416 | 8" | 25 | 157 | 0 | 0 | 0 |
| DW | B15250917 | 2" | 424 | 2,670 | 2 | 4 | 8 |
| DW | B45551355 | 2" | 0 | 0 | 0 | 0 | 0 |
| **Total** | | | **98,611** | **621,251** | **545** | **921** | **1841** |

DW = Domestic Water
FW = Fire Water
LW = Landscape Water

## ANALYSIS OF EXISTING SYSTEM

A computer model was not performed as a part of this report. A previous computer model of the existing water network was created with H20Net Version 8.0 to represent the existing conditions on campus and can be found in the 2011 Infrastructure Report. The current conditions were compared to the previous conditions and deemed comparable in service supply and usage relative to campus growth.

There are combined domestic/irrigation services. This renders a conservative model since irrigation usually occurs in off peak night hours rather than daily peak hours as has been modeled here.

Saving s can be realized by separating domestic and landscape water usage as the agency charges are less for a landscape only meter as no sewer capacity fees are incurred.

## ANALYSIS OF FUTURE NEEDS

Based on the future development presented in the Master Plan as discussed in the Executive Summary, recommendations have been made to construct new water pipes, relocate and demolish various existing water lines in order to accommodate the future development. Public water mains to be relocated will require easement vacations and dedications. Figure 3b, Future Conditions Utility Map – Water Distribution illustrates the future water network.

A water study was not performed as a part of this analysis. Flow test are being performed in conjunction with current projects and it appears that the existing system is adequate to support the campus demand. Once available, current flow test will be added to the report.

## FINDINGS AND RECOMMENDATIONS

### Findings

A previous evaluation of the existing water system revealed that the existing water system adequately supports the demand for existing buildings with no significant pipe losses due to pipe size or elevation. In addition, the existing water pressures throughout the campus satisfy SBFD's minimum requirement of 20 psi as analysis. The previous report can be found in the 2011 Infrastructure Report.

New services are charged an acquisition fee based on the size of the service requested in the application. This acquisition fee is applied to securing additional water for the District to cover the new demand. The district can issue a will serve letter if desired at the time of new service application, however does not issue "will serve" letters prior to submittal of a new water service application.

### Recommendations

Recommendations include providing new services to proposed buildings and re-routing water lines that are in conflict with proposed buildings as depicted in the Master Plan. The recommendations have been categorized into two priority levels. Priority level 1 improvements are in need of immediate attention and should be considered as soon as possible. They are listed in order of apparent greatest need however within each priority category sections can be reordered to allow for construction sequencing, etc. Priority level 2 improvements are those that are only necessary for an individual building and can be constructed at the time future projects occur.

As illustrated in Figure 3b, Future Conditions Utility Map – Water Distribution, the following are recommendations for improvements to the existing water system:

#### PRIORITY 1

- Relocate a portion of the existing public 12" water main in conflict with the future Parking Structure 1 (PS1). New fire or water services shall be provided if needed.
- SBVC should coordinate with SBMWD staff to ensure that credit is given for existing water meters to be abandoned or relocated. New acquisition services charge should not be applied since some buildings are being replaced in kind, such as the gymnasiums and the technical building.
- Each future building should have a dedicated fire service and a combined domestic/irrigation service in order to minimize acquisition charges which are based on the size of the meter or service.

#### Priority 2

- Install sub-meters on any irrigation services which are cross-connected to domestic meters. Sub-metering allows SBVC staff to monitor irrigation usage and screen for any potential illicit connections. If combined usage is occurring, SBVC should consider obtaining separate irrigation meters to reduce usage costs associated with domestic meters.
- FW-3, FW-7, FW-11 and FW-13 should be investigated by SBVC facilities staff to determine if illicit cross connections have occurred from these fire services.
- Abandon POC# FW-7 and DW-13 when the existing Technical (T) building is demolished. These services shall remain if it is determined that the future Parking Structure 2 (PS2) necessitates fire or water services.

- Relocate fire water and combined domestic/irrigation services for the future Technical building (T).

## COST ESTIMATE

**CHILLED & HEATING HOT WATER SYSTEMS**

| | Description of Impact to Campus wide Utilities | Cost | Construction Schedule |
|---|---|---|---|
| Parking Structure 1 | Relocate a portion of the existing public 12" water main in conflict with the future Parking Structure 1 (PS1). | TBD | After 2020 |
| Parking Structure 2 | None | | After 2025 |
| Technical | Relocate fire water and combined domestic/irrigation services for the future Technical building (T). | TBD | After 2020 |

The estimates below reflect improvements associated with individual buildings. The water system does not require any campus wide improvements.

It should be noted that the analysis assumes that the existing campus square footage will be maintained and that existing utilities are in adequate condition and maintained. In the case that the individual proposed building designs yield larger flow rates than presented herein, it is recommended that the college re-evaluate the data analysis and update the findings

# ROUGH ORDER COST ESTIMATES

| | | | | | |
|---|---|---|---|---|---|
| Priority 1 | Critical - Need replacement in 0-3years | Priority 3 | Fair Condition - Need Replacement in Next 5-10 years | Priority 5 | New Building Impact - Based on project schedule |
| Priority 2 | Moderately Critical - Need replacement in 3-5 years | Priority 4 | Adds Value and Redundancy 5-10 years or as funding is available | | |

| Sequential Tracking # | Campus | Infrastructure Scope | Utility | Installed Year(s) | Brief Description of the Need | Priority Level (1..4) | Project Name | Brief Scope of Project | Project Category | Can the Project be Phased - Y/N | Total Construction Costs ($)[1] | Total Project Costs - Including Soft Costs ($) | Study by (Prime Consultant) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SBVC -C1 | San Bernardino Valley College | Sewer, DW and SD Relocation | Sewer, SD and DW | Varies | Need reloctation due to new building location | 5 | Sewer, SD and DW Relocation | Sewer, SD and DW Relocation | NC | N | $1,400,000 | $1,820,000 | Snipes Dye |
| SBVC -C2 | San Bernardino Valley College | Irrigation Controller Replacements | Irrigation | Varies | Upgrade of existing Irrigation Controller Replacements | 2 | Irrigation Controller Replacements | Irrigation Controller Replacements | NC | Y | $350,000 | $455,000 | Snipes Dye |
| SBVC -C3 | San Bernardino Valley College | Campus Wide ADA Upgrades | ADA | Varies | ADA Compliance | 3 | Campus Wide ADA Upgrades | Campus Wide ADA Upgrades | NC | Y | $500,000 | $650,000 | Snipes Dye |
| **Total Priority 5 Costs** | | | | | | | | | | | **$1,400,000** | **$1,820,000** | |

**Project Categories**

**DM** Deferred maintanance: systems or facilities that have not been maintained due to lack of staffing or funding. While operational, failure is imminent.

**EM** Emergency projects are systems or facilities that have failed or do not function as designed. Repair or replacement is required.

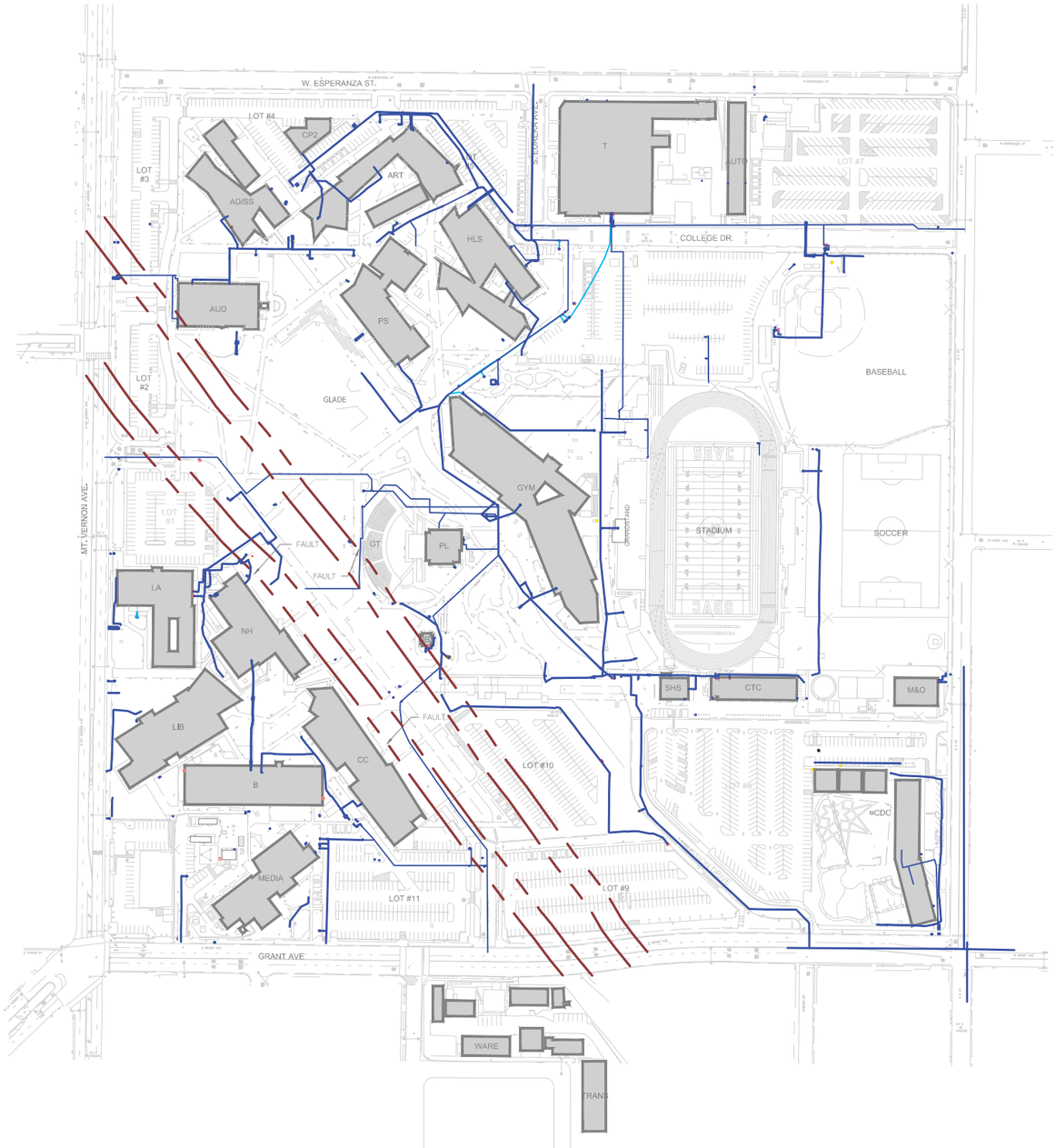
**UF** Projects or intiatives that would improve systems, facilities or operations on campus.

**REG** Projects related to Fire, Life, Safety; Code or OSHA compliance. Risk of harm and potential for fines or shutdown directives from regulating authorities.

**NC** New construction to support proposed buildings

[1]Refer to Appendix for breakdown of costs.

# EXISTING DOMESTIC WATER DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | |
|---|---|
| AD/SS | ADMINISTRATION / STUDENT SERVICES |
| ART | ART & GALLERY |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP | CENTRAL PLANT |
| CS | CUSTODIAL STORAGE |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LA | LIBERAL ARTS |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SHS | STUDENT HEALTH SERVICES |
| T | TECHNICAL |
| TRANS | TRANSPORTATION |
| WARE | WAREHOUSE |

## LEGEND

- EXISTING DOMESTIC WATER LINE
- DOMESTIC WATER VALVE
- EARTHQUAKE FAULT LINE

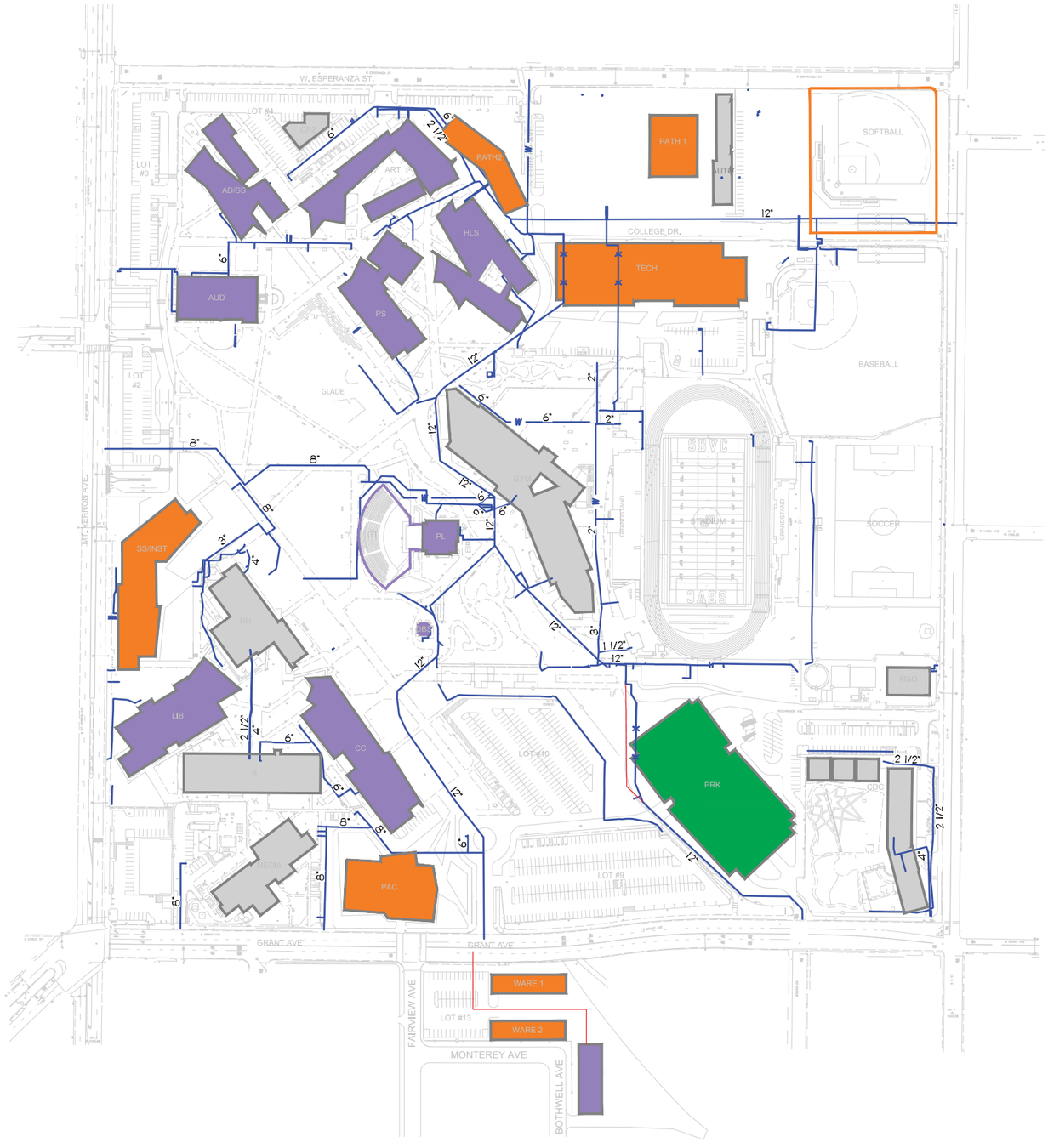
## BUILDING LEGEND

- EXISTING BUILDING
- UNDER CONSTRUCTION

NORTH

0 300'

# PROPOSED DOMESTIC WATER DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | |
|---|---|
| AD | ADMINISTRATION |
| ART | ART CENTER |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP1 | CENTRAL PLANT 1 |
| CP2 | CENTRAL PLANT 2 |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GRND | GROUNDS |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PAC | PERFORMING ARTS CENTER |
| PATH1 | CAREER PATHWAYS 1 |
| PATH 2 | CAREER PATHWAYS 2 |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SS/INST | STUDENT SERVICES/ INSTRUCTIONAL BUILDING |
| TRANS | TRANSPORTATION |
| TECH | TECHNOLOGY BUILDING |
| WARE | WAREHOUSE |

## BUILDING LEGEND

- EXISTING BUILDING
- UNDER CONSTRUCTION
- FUTURE PARKING STRUCTURE
- FUTURE BUILDING
- BUILDING RENOVATION/EXPANSION

## UTILITY LEGEND

- EXISTING WATER LINE
- PROPOSED WATER LINE
- PROPOSED WATER LINE RELOCATION

NORTH

0 200

# CHAPTER 9
## Irrigation Water System

## SYSTEM DESCRIPTION

The existing water distribution system serving the campus is a public looped system in the surrounding streets along with some public mains bisecting the campus. All potable, fire water, and irrigation services are connected to the public system throughout the campus. Several of the potable water services include a "bull head" configuration in which a single service from the main branches into a domestic meter and an irrigation meter. However, billing information does not distinguish between the two meter types and therefore demands at each service point have been summed. The analysis in this section will analyze dedicated irrigation services. Combined domestic/irrigation services along with fire services are discussed in Section 3.

The San Bernardino Municipal Water District (SBMWD) provides water to the campus irrigation system at three dedicated irrigation meter locations and multiple combined domestic/irrigation meter locations. Information on the locations and sizes of each water meter was obtained from SBMWD.

Most of the buildings on campus irrigate their surrounding landscaping through a combined domestic/irrigation service. Large, common landscape areas have dedicated irrigation services. A dedicated irrigation service at the Campus Center serves most of the common area landscaping for the central portion of campus. A dedicated irrigation service off of College Ave provides irrigation water for the athletic fields and stretches as far south as the parking lot adjacent to the Child Development Center (CDC). The third dedicated irrigation service is located at the CDC and serves the landscaping around the building.

The existing irrigation water distribution system and locations of the SBMWD connections are shown on Figure 4a, Existing Utility Map – Irrigation Water Distribution.

## METHODOLOGY

Existing irrigation water demands for the campus were estimated based on an analysis of existing SBMWD water meter readings over a recent twenty month period of the three dedicated irrigation meters. Results of this analysis are summarized in the following table.

**TABLE 4-1: HISTORICAL IRRIGATION WATER USE**

| Historical Irrigation Water Use (2008-2010) | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Pk Months | 8 Hour Irrigation | |
| POC No. | Meter No. | Size | Avg Day (gpd) | Avg Day (gpd) | Avg Use (gpm) | Pk Use (gpm) |
| IRR-1 | RT65057985 | 4" | 29,048 | 36,009 | 75 | 150 |
| IRR-2 | RT64462592 | 2" | 5,146 | 6,348 | 13 | 26 |
| IRR-3 | H2096020 | 4" | 31,409 | 40,762 | 85 | 170 |
| **Total** | | | **65,603** | **83,119** | **173** | **346** |

The first average day column is the average annual amounts divided by 365 days. The peak month average day considers only the higher meter readings for the dry months between June and November. To account for the fact that irrigation is typically performed between 10pm and 6am, seven days per week, the peak month amounts were divided by 480 to get the 8 Hour Irrigation Average Use. The last column labeled 8 Hour Irrigation Peak Use is twice the previous column to account for the maximum day during those summer months and the fact that the irrigation water system cannot be fine-tuned to completely average out the demands over an eight-hour period.

## ANALYSIS OF EXISTING SYSTEM

A computer model of the existing irrigation water network was created with H20Net Version 8.0 to represent the existing conditions on campus. The calculated 8-hour peak use demands for the campus, as calculated in Table 4-1, were applied to the appropriate nodes of the irrigation water model. Table 4-2 summarizes the results of the computer model for the existing irrigation water system. Figure 4B, Existing Irrigation Water Distribution – Pipe and Node Map corresponds to the existing system model provided in Table 4-2.

## ANALYSIS OF FUTURE NEEDS

Since no new large landscape areas are proposed in the ultimate build out condition it is assumed that the irrigation demand in the future scenario at the dedicated irrigation services will be approximately the same as the existing condition. The landscaping surrounding future buildings has been accounted for in the future analysis in Section 3.

Recycled water was not evaluated as a possible alternative for campus irrigation as a part of this study. SBMWD is in the very early stages of considering expanding their existing water reclamation facility. No plans currently exist regarding possible distribution main sizes or locations. SBVC may consider future analysis of converting to recycled water once information becomes available from SBMWD. Onsite water reclamation was not evaluated as part of this study.

## FINDINGS AND RECOMMENDATIONS

### Findings

An evaluation of the existing irrigation water system revealed that the existing dedicated irrigation water services adequately supports the demand of existing buildings and landscape areas with no significant pipe losses due to pipe size or elevation. The existing dedicated irrigation water services can also adequately support the demand for proposed buildings and landscape areas as depicted in the Master Plan.

### Recommendations

Recommendations include providing new services to landscape areas proposed in the Master Plan and re-routing irrigation water lines that are in conflict with proposed buildings. The recommendations have been categorized into two priority levels. Descriptions of each priority level are provided in the executive summary of this report.

It is recommended that the future landscape areas are provided irrigation water service from dual domestic/irrigation services from the existing public campus distribution system. Dedicated irrigation services are only required for large landscape areas such as the athletic fields and the large common area in the central portion of campus.

The following are recommendations for improvements to the existing irrigation water system:

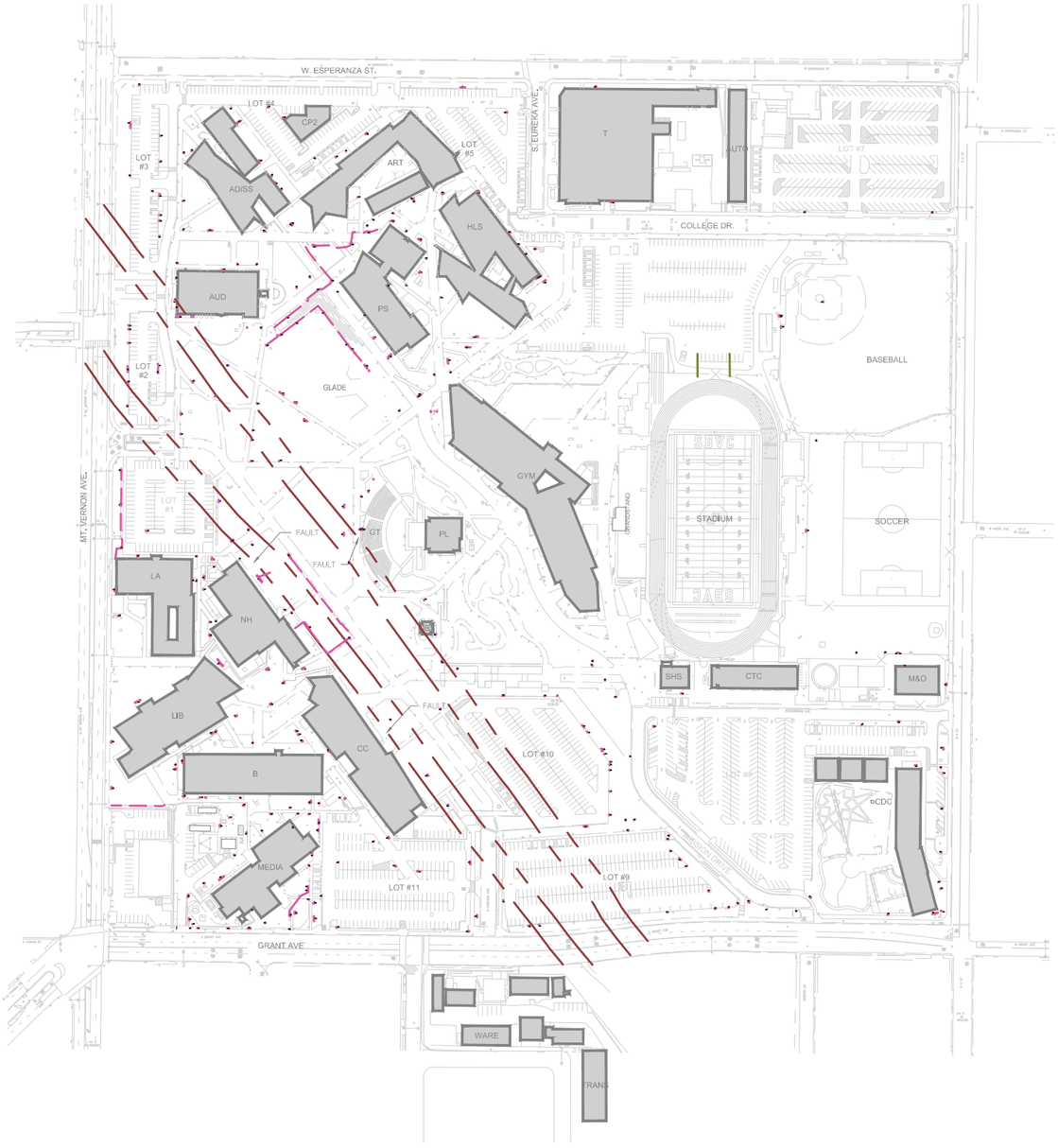
#### PRIORITY 1

- Relocate minor (<3") irrigation lines that are in conflict with future buildings.

## COST ESTIMATE

Since no new dedicated irrigation services are anticipated for the future, no costs have been included here. Public mains as well as combined domestic/irrigation services which will require relocation have been included in Section 3. Some minor irrigation systems will need to be demolished as a part of individual buildings which are in conflict with existing distribution systems. The cost for these should be included with individual building demolition budgets.

# EXISTING IRRIGATION WATER DISTRIBUTION SYSTEM




## FACILITY LEGEND

| | |
|---|---|
| AD/SS | ADMINISTRATION / STUDENT SERVICES |
| ART | ART & GALLERY |
| AUD | AUDITORIUM |
| AUTO | AUTO SHOP |
| B | BUSINESS |
| CC | CAMPUS CENTER |
| CDC | CHILD DEVELOPMENT CENTER |
| CP | CENTRAL PLANT |
| CS | CUSTODIAL STORAGE |
| CTC | COMPUTER TECHNOLOGY CENTER |
| GT | GREEK THEATER |
| GYM | CYMNASIUM |
| HLS | HEALTH & LIFE SCIENCES |
| LA | LIBERAL ARTS |
| LIB | LIBRARY |
| M&O | MAINTENANCE & OPERATIONS |
| MEDIA | MEDIA/COMMUNICATIONS |
| NCP | NORTH CENTRAL PLANT |
| NH | NORTH HALL |
| OBS | OBSERVATORY |
| PL | PLANETARIUM |
| PS | CHEMISTRY/PHYSICAL SCIENCES |
| SHS | STUDENT HEALTH SERVICES |
| T | TECHNICAL |
| TRANS | TRANSPORTATION |
| WARE | WAREHOUSE |

## LEGEND

- EXISTING IRRIGATION LINE
- IRRIGATION VALVE
- EARTHQUAKE FAULT LINE

## BUILDING LEGEND

EXISTING BUILDING.....

UNDER CONSTRUCTION.....

NORTH

0 300'

# CHAPTER 10
## Appendix

### CHILLED & HEATING HOT WATER SYSTEMS

| Description | Qty | Unit | Cost/Unit | Total Costs |
|---|---|---|---|---|
| Secondary Chilled Water pumps/Booster pumps | 1 | LS | $100,000 | $100,000 |
| Replacement of existing boilers B1 and B2 (1.275 MMBtu and 880MBtu) in north central plant | 2 | LF | $100,000 | $200,000 |
| Extension of chilled water lines to new facilities (200ft each for5 facilities) | 1000 | LF | 2000 | $2,000,000 |
| Soft Costs @ 30% | | | | $690,000 |
| | | | | |
| **Total Costs** | | | | **$2,990,000** |

### ELECTRICAL SYSTEM

| Description | Qty | Unit | Cost/Unit | Total Costs |
|---|---|---|---|---|
| Provision of new electrical duct banks | 2000 | LF | $300 | $600,000 |
| Provision of new MV Selector Switches | 7 | Ea | $150,000 | $1,050,000 |
| Provision of new MV Cables | 25000 | LF | $30 | $750,000 |
| Provision of new metering | 40 | LF | $10,000 | $400,000 |
| Soft Costs @ 30% | | | | $840,000 |
| | | | | |
| **Total Costs** | | | | **$3,640,000** |

### NATURAL GAS SYSTEM

| Description | Qty | Unit | Cost/Unit | Total Costs |
|---|---|---|---|---|
| Provision of new PE gas lines including demoltion of existing steel gas lines and new isolation valves | 4000 | LF | $110 | $440,000 |
| Provision of new gas submeters | 5 | Ea | $5,000 | $25,000 |
| Provision of new earthquake valves | 9 | Ea | $2,200 | $19,800 |
| Soft Costs @ 30% | | | | $145,440.00 |
| | | | | |
| **Total Costs** | | | | **$630,240** |

### TELECOMMUNICATIONS SYSTEM

| Description | Qty | Unit | Cost/Unit | Total Costs |
|---|---|---|---|---|
| Provision of new telecom duct banks | 1600 | LF | $300 | $480,000 |
| Soft Costs @ 30% | | | | $144,000 |
| | | | | |
| **Total Costs** | | | | **$624,000** |

# REFERENCE STORM WATER CALCULATIONS 2010

San Bernardino Valley College
Hydrology Study - 100 yr Storm

CN for turf areas =33
CN for School Areas

Date 9/29/2010

Storm Frequency = 100-yr
Antecedent Moisture Condition (AMC) = 3

Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) Subarea | Area (acres) Total | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A-11 | 12 | 1.5 | 1.5 | A | School | | 10.0 | 1.56 | 0.695 | 0.355 | 0.355 | 1.6 | 355 | 0.012 | | Initial subarea |
| **Total** | | | **1.5** | | | | | | | | | **1.6** | | | | |



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CN for School Areas

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Fm=Ap*Fp
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Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) Subarea | Area (acres) Total | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B-11 | 12 | 1.7 | 1.7 | A | School | | 12.3 | 1.54 | 0.692 | 0.355 | 0.355 | 1.8 | 518 | 0.009 | | Initial subarea |
| | | | | | | 4.6 | | | | | | | 585 | 0.012 | 2.1 | 18" Gutter |
| B-12 | 13 | 1.7 | 3.4 | A | School | | 16.9 | 1.49 | 0.685 | 0.355 | 0.355 | 3.5 | | | | |
| | | | | | | 5.5 | | | | | | | 660 | 0.007 | 2 | 18" Gutter |
| B-13 | 14 | 2 | 5.4 | A | School | | 22.4 | 1.46 | 0.681 | 0.355 | 0.355 | 5.4 | | | | |
| | | | | | | 1.1 | | | | | | | 195 | 0.015 | 2.98 | 18" Gutter |
| B-14 | 13 | 2.5 | 7.9 | A | School | | 23.5 | 1.45 | 0.680 | 0.355 | 0.355 | 7.8 | | | | |
| **Total** | | | **7.9** | | | | | | | | | **7.8** | | | | |

San Bernardino Valley College
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Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) Subarea | Area (acres) Total | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T-11 | 12 | 1.8 | 1.8 | A | School | | 14.5 | 1.51 | 0.688 | 0.355 | 0.355 | 1.9 | 1000 | 0.013 | | Initial subarea |
| **Total** | | **1.8** | | | | | | | | | | **1.9** | | | | |

San Bernardino Valley College
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CN for School Areas

Date 9/29/2010

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Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) Subarea | Area (acres) Total | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C-11 | 12 | 1.1 | 1.1 | A | School | | 11.5 | 1.55 | 0.694 | 0.355 | 0.355 | 1.2 | 580 | 0.014 | | Initial subarea |
| | | | | | | 2.3 | | | | | | | 387 | 0.004 | 2.75 | 24" RCP pipe* |
| C-12 | 13 | 1.2 | 2.3 | A | School | | 13.8 | 1.54 | 0.693 | 0.355 | 0.355 | 2.5 | | | | |
| | | | | | | | | | | | | | | | | |
| C-21 | 22 | 1.3 | 1.3 | A | School | | 8.3 | 1.47 | 0.683 | 0.355 | 0.355 | 1.3 | 300 | 0.023 | | Initial Subarea |
| | | | | | | 0.8 | | | | | | | 175 | 0.019 | 3.87 | 30" wide Trench Drain |
| C-22 | 13 | 1.1 | 2.4 | A | School | | 9.0 | 1.47 | 0.682 | 0.355 | 0.355 | 2.4 | | | | |
| | **13** | | **10.2** | | | | **13.8** | | | | | **5.0** | | | | **Confluence** |
| | | | | | | 3.0 | | | | | | | 745 | 0.008 | 4.15 | 24" RCP pipe* |
| C-13 | 14 | 5.5 | 15.7 | A | School | | 16.8 | 1.49 | 0.686 | 0.355 | 0.355 | 16.0 | | | | |
| | | | | | | 1.2 | | | | | | | 300 | 0.008333 | 4.28 | 24" RCP pipe* |
| C-14 | 15 | 0 | 15.7 | A | School | | 18.0 | | - | - | 0.355 | 16.0 | | | | |
| | | | | | | | | | | | | | | | | |
| C-31 | 32 | 3 | 3 | A | School | | 10.0 | 1.56 | 0.695 | 0.355 | 0.355 | 3.3 | 545 | 0.029 | | Initial Subarea |
| | | | | | | 3.5 | | | | | | | 690 | 0.005 | 3.25 | 36" wide Trench Drain |
| C-32 | 33 | 3.5 | 6.5 | A | School | | 13.5 | 1.52 | 0.690 | 0.355 | 0.355 | 6.8 | | | | |
| | | | | | | 0.4 | | | | | | | 120 | 0.005 | 4.77 | 18" RCP** |
| C-14 | 15 | 0 | 6.5 | A | School | | 14.0 | | - | - | 0.355 | 6.8 | | | | |
| | **15** | | **22.2** | | | | | | | | | **22.7** | | | | **Confluence** |
| **Total** | | | **22.2** | | | | | | | | | **22.7** | | | | |

San Bernardino Valley College
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CN for School Areas

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Catchment Maximum Loss Rate

Fm=Ap*Fp

where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Slope= 0.6
Intensity, I = **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| D-11 | 12 | 10 | 10 | A | School | | 14.5 | 1.52 | 0.689 | 0.355 | 0.355 | 10.4 | 925 | 0.001 | | Initial subarea |
| **Total** | | | **10** | | | | | | | | | **10.4** | | | | |

San Bernardino Valley College
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Date 9/29/2010

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Catchment Maximum Loss Rate

Fm=Ap*Fp

where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Slope= 0.6
Intensity, I = **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| E-11 | 12 | 3.4 | 3.4 | A | School | | 12.0 | 1.54 | 0.693 | 0.355 | 0.355 | 3.6 | 285 | 0.005 | | Initial subarea |
| **Total** | | | **3.4** | | | | | | | | | **3.6** | | | | |

San Bernardino Valley College
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Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**
C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| F-11 | 12 | 2.5 | 2.5 | A | School | | 11.5 | 1.55 | 0.693 | 0.355 | 0.355 | 2.7 | 712 | 0.02 | | Initial subarea |
| | | | | | | 8.0 | | | | | | | 905 | 0.007 | 1.89 | 18" Gutter |
| F-12 | 13 | 4.7 | 7.2 | A | School | | 19.5 | 1.47 | 0.683 | 0.355 | 0.355 | 7.2 | | | | |
| **Total** | | | **7.2** | | | | | | | | | **7.2** | | | | |

San Bernardino Valley College
Hydrology Study - 100 yr Storm

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CN for School Areas

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Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**
C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| G-11 | 12 | 3 | 3 | A | School | | 12.5 | 1.83 | 0.725 | 0.355 | 0.355 | 4.0 | 515 | 0.006 | | Initial subarea |
| | | | | | | 0.5 | | | | | | | 125 | 0.005 | 4.28 | 18" RCP** |
| G-12 | 13 | 0.5 | 3.5 | A | School | | 13.0 | 1.78 | 0.720 | 0.355 | 0.355 | 4.5 | | | | |
| **Total** | | | **3.5** | | | | | | | | | **4.5** | | | | |

San Bernardino Valley College
Hydrology Study - 100 yr Storm

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CN for School Areas

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Storm Frequency = 100-yr
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Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| H-11 | 12 | 0.6 | 0.6 | A | School | | 9.0 | 1.59 | 0.698 | 0.355 | 0.355 | 0.7 | 246 | 0.01 | | Initial subarea |
| **Total** | | | **0.6** | | | | | | | | | **0.7** | | | | |

San Bernardino Valley College
Hydrology Study - 100 yr Storm

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CN for School Areas

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Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| I-11 | 12 | 0.1 | 0.1 | A | School | | 5.0 | 1.72 | 0.714 | 0.355 | 0.355 | 0.1 | 65 | 0.023 | | Initial subarea |
| **Total** | | | **0.1** | | | | | | | | | **0.1** | | | | |

San Bernardino Valley College
Hydrology Study - 100 yr Storm

CN for turf areas =33
CN for School Areas

Date 9/29/2010

Storm Frequency = 100-yr
Antecedent Moisture Condition (AMC) = 3

Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| J-11 | 12 | 1.6 | 1.6 | A | School | | 13.5 | 1.52 | 0.689 | 0.355 | 0.355 | 1.7 | 628 | 0.016 | | Initial subarea |
| **Total** | | | **1.6** | | | | | | | | | **1.7** | | | | |

San Bernardino Valley College
Hydrology Study - 100 yr Storm

CN for turf areas =33
CN for School Areas

Date 9/29/2010

Storm Frequency = 100-yr
Antecedent Moisture Condition (AMC) = 3

Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| K-11 | 12 | 3.8 | 3.8 | A | School | | 11.0 | 1.55 | 0.694 | 0.355 | 0.355 | 4.1 | 690 | 0.016 | | Initial subarea |
| **Total** | | | **3.8** | | | | | | | | | **4.1** | | | | |

San Bernardino Valley College
Hydrology Study - 100 yr Storm
Date 9/29/2010

CN for turf areas =33
CN for School Areas

Storm Frequency = 100-yr
Antecedent Moisture Condition (AMC) = 3

Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**
C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| L-11 | 12 | 4.6 | 4.6 | A | School | | 13.5 | 1.54 | 0.693 | 0.355 | 0.355 | 4.9 | 898 | 0.015 | | Initial subarea |
| | | | | | | 0.5 | | | | | | | 260 | 0.035 | 9.24 | 18" RCP** |
| L-12 | 13 | 2.3 | 6.9 | A | School | | 14.0 | 1.52 | 0.690 | 0.355 | 0.355 | 7.2 | | | | |
| **Total** | | | **6.9** | | | | | | | | | **7.2** | | | | |

San Bernardino Valley College
Hydrology Study - 100 yr Storm
By: Cesar Moran, P.E.
Date 9/29/2010

CN for turf areas =33
CN for School Areas

Storm Frequency = 100-yr
Antecedent Moisture Condition (AMC) = 3

Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**
C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| M-11 | 12 | 2.4 | 2.4 | A | School | | 11.5 | 1.55 | 0.693 | 0.355 | 0.355 | 2.6 | 560 | 0.015 | | Initial subarea |
| **Total** | | | **2.4** | | | | | | | | | **2.6** | | | | |

San Bernardino Valley College
Hydrology Study - 100 yr Storm

CN for turf areas =33
CN for School Areas

Date 9/29/2010

Storm Frequency = 100-yr
Antecedent Moisture Condition (AMC) = 3

Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**
C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) Subarea | Area (acres) Total | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N-11 | 12 | 0.9 | 0.9 | A | School | | 5.5 | 1.70 | 0.712 | 0.355 | 0.355 | 1.1 | 560 | 0.015 | | Initial subarea |
| **Total** | | **0.9** | | | | | | | | | | **1.1** | | | | |

San Bernardino Valley College
Hydrology Study - 100 yr Storm

CN for turf areas =33
CN for School Areas

Date 9/29/2010

Storm Frequency = 100-yr
Antecedent Moisture Condition (AMC) = 3

Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**
C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) Subarea | Area (acres) Total | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O-11 | 12 | 2.3 | 2.3 | A | School | | 9.5 | 1.58 | 0.697 | 0.355 | 0.355 | 2.5 | 536 | 0.038 | | Initial subarea |
| | | | | | | | | | | | | | | | | |
| O-12 | 13 | 0.2 | 0.2 | A | School | | 5.0 | 1.72 | 0.714 | 0.355 | 4.438 | 0.2 | 110 | 0.107 | | |
| **Total** | | **2.5** | | | | | | | | | | **2.8** | | | | |

San Bernardino Valley College
Hydrology Study - 100 yr Storm

CN for turf areas =33
CN for School Areas

Date 9/29/2010

Storm Frequency = 100-yr
Antecedent Moisture Condition (AMC) = 3

Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| P-11 | 12 | 1.8 | 1.8 | A | School | | 7.0 | 1.64 | 0.705 | 0.355 | 0.355 | 2.1 | 256 | 0.055 | | Initial subarea |
| **Total** | | | **1.8** | | | | | | | | | **2.1** | | | | |

San Bernardino Valley College
Hydrology Study - 100 yr Storm

CN for turf areas =33
CN for School Areas

Date 9/29/2010

Storm Frequency = 100-yr
Antecedent Moisture Condition (AMC) = 3

Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| Q-11 | 12 | 1.2 | 1.2 | A | School | | 7.0 | 1.64 | 0.705 | 0.355 | 0.355 | 1.4 | 185 | 0.022 | | Initial subarea |
| **Total** | | | **1.2** | | | | | | | | | **1.4** | | | | |

San Bernardino Valley College
Hydrology Study - 100 yr Storm

CN for turf areas =33
CN for School Areas

Date 9/29/2010

Storm Frequency = 100-yr
Antecedent Moisture Condition (AMC) = 3

Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| R-11 | 12 | 0.2 | 0.2 | A | School | | 7.0 | 1.64 | 0.705 | 0.355 | 0.355 | 0.2 | 215 | 0.020 | | Initial subarea |
| **Total** | | | **0.2** | | | | | | | | | **0.2** | | | | |

San Bernardino Valley College
Hydrology Study - 100 yr Storm

CN for turf areas =33
CN for School Areas

Date 9/29/2010

Storm Frequency = 100-yr
Antecedent Moisture Condition (AMC) = 3

Catchment Maximum Loss Rate

Fm=Ap*Fp
where Ap= 0.5 [1-Ai]
Ai= 0.5 Figure (C-4)
and Fp= 0.71 (Figure C-6)

Fm= **0.355**

100-yr, 1 Hr. Isohyet= 1.275
10-yr, 1 Hr. Isohyet= 0.85

Log-Log Sl 0.6
Intensity, I **See Figure D-3**

C=.90*[Ai+(I-Fp)*Ap/I] ; when I>Fp
C=.90*Ai ;when I<Fp

| Subarea | Concentration Point | Area (acres) | | Soil Type | Dev. Type | Tt min. | Tc min. | $I_{100}$ in/hr | C | Fm in/hr | Fm avg. | Q total | Flow Path Length (ft.) | Slope ft/ft | V ft/sec | Hydraulics and Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Subarea | Total | | | | | | | | | | | | | |
| S-11 | 12 | 0.2 | 0.2 | A | School | | 15.0 | 1.51 | 0.688 | 0.355 | 0.355 | 0.2 | 760 | 0.006 | | Initial subarea |
| **Total** | | | **0.2** | | | | | | | | | **0.2** | | | | |

## Cross Section for Line "A-1"

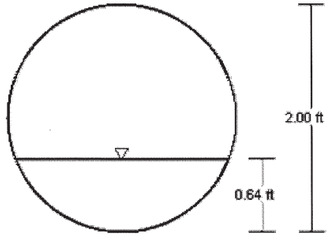
### Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

### Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.013 | |
| Channel Slope | 0.01000 | ft/ft |
| Normal Depth | 0.64 | ft |
| Diameter | 2.00 | ft |
| Discharge | 5.00 | ft³/s |

### Cross Section Image






## Cross Section for Line "A-2"

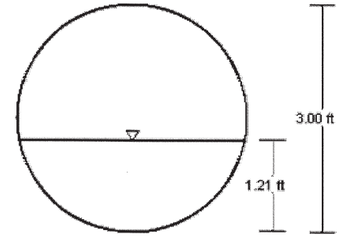
### Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

### Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.013 | |
| Channel Slope | 0.01000 | ft/ft |
| Normal Depth | 1.21 | ft |
| Diameter | 3.00 | ft |
| Discharge | 22.70 | ft³/s |

### Cross Section Image



## Cross Section for Line "B"

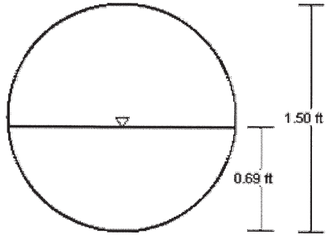
### Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

### Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.013 | |
| Channel Slope | 0.01000 | ft/ft |
| Normal Depth | 0.69 | ft |
| Diameter | 1.50 | ft |
| Discharge | 4.50 | ft³/s |

### Cross Section Image



[2/7]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 129241-93136 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE | |
| Service Address | 701 S MT VERNON AVE 5 | |
| Previous Balance | | **$1187.86** |
| Payment Received | | **$-1187.86** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$2443.28** |

**Total Amount Due** **$2443.28**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.00 |
| WATER | WATER COMMODITY CHG | 2 | $2.30 |
| WATER | ZONE 1 ELEVATION CHG | 2 | $0.22 |
| WATER | MINIMUM MONTHLY CHG | 0 | $105.52 |
| WATER | REPLENISHMENT CHARGE | 2 | $0.34 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | 2 | $1.74 |
| LANDSCAPE IRRIGATION | WATER COMMODITY CHG | 1285 | $1477.75 |
| LANDSCAPE IRRIGATION | ZONE 1 ELEVATION CHG | 1285 | $141.35 |
| LANDSCAPE IRRIGATION | MINIMUM MONTHLY CHG | 0 | $88.32 |
| LANDSCAPE IRRIGATION | CONSERVATION CHARGE | 840 | $411.60 |
| LANDSCAPE IRRIGATION | REPLENISHMENT CHARGE | 1285 | $179.90 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | 2 | $2.66 |
| STORM DRAIN | USAGE FEE | 1285 | $18.63 |
| **New Charge Total** | | | **$2,443.28** |

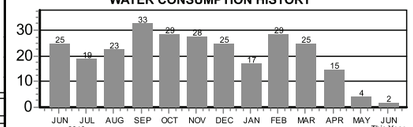
Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| LS | 2" | B16932138 | 16958 | 18243 | 1285 |
| WA | 2" | RT61767304 | 13847 | 13849 | 2 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| LS | 44.79 | 1343.85 |
| WA | 0.68 | 20.40 |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **129241-93136** |
| **Service Address** | **701 S MT VERNON AVE 5** |
| ***Current Charges due by 06/23/2020** | **$2443.28** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$2443.28** |
| **Amount Enclosed** | **$** |

☐ **Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000021 3/2

SB COMM COLLEGE
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

00012924100009313600000024432B5

[3/7]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 129241-93138 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE | |
| Service Address | 701 S MT VERNON AVE 6 | |
| Previous Balance | | **$36.57** |
| Payment Received | | **$-36.57** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$36.57** |

**Total Amount Due** **$36.57**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $32.24 |
| **New Charge Total** | | | **$36.57** |

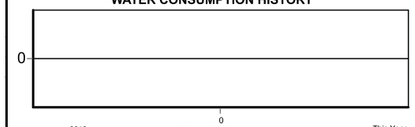
Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 6" | B11504770 | 0 | 0 | 0 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| | | |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **129241-93138** |
| **Service Address** | **701 S MT VERNON AVE 6** |
| ***Current Charges due by 06/23/2020** | **$36.57** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$36.57** |
| **Amount Enclosed** | **$** |

☐ **Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000022 3/3

SB COMM COLLEGE
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

00012924100009313800000000036572

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 129241-95002 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE | |
| Service Address | 701 S MT VERNON AVE 10 | |
| Previous Balance | | **$25.82** |
| Payment Received | | **$-25.82** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$25.82** |

**Total Amount Due** **$25.82**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $21.49 |
| **New Charge Total** | | | **$25.82** |

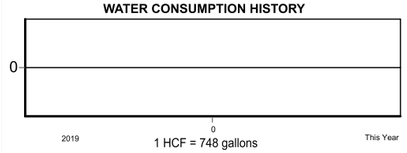
Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 4" | B11564429 | 0 | 0 | 0 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| | | |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **129241-95002** |
| **Service Address** | **701 S MT VERNON AVE 10** |
| ***Current Charges due by 06/23/2020** | **$25.82** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$25.82** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000023 3/4

SB COMM COLLEGE
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

00012924100009500200000025820



**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 129241-95004 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE | |
| Service Address | 701 S MT VERNON AVE 11 | |
| Previous Balance | | **$336.68** |
| Payment Received | | **$-336.68** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$477.79** |

**Total Amount Due** **$477.79**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| WATER | MINIMUM MONTHLY CHG | 0 | $105.52 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| LANDSCAPE IRRIGATION | WATER COMMODITY CHG | 195 | $224.25 |
| LANDSCAPE IRRIGATION | ZONE 1 ELEVATION CHG | 195 | $21.45 |
| LANDSCAPE IRRIGATION | MINIMUM MONTHLY CHG | 0 | $88.32 |
| LANDSCAPE IRRIGATION | REPLENISHMENT CHARGE | 195 | $27.30 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| **New Charge Total** | | | **$477.79** |

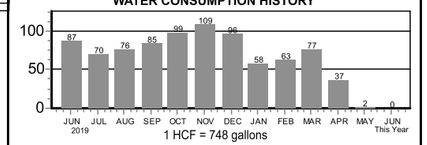
Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| LS | 2" | B16987525 | 4682 | 4877 | 195 |
| WA | 2" | B16462725 | 2265 | 2265 | 0 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| LS | 9.54 | 286.45 |
| WA | 2.18 | 65.45 |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **129241-95004** |
| **Service Address** | **701 S MT VERNON AVE 11** |
| ***Current Charges due by 06/23/2020** | **$477.79** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$477.79** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000024 3/5

SB COMM COLLEGE
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

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[6/7]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

## Account Summary

| | | |
|---|---|---|
| Account Number | 129241-97210 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE | |
| Service Address | 701 S MT VERNON AVE 20 | |
| Previous Balance | | **$136.18** |
| Payment Received | | **$0.00** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$136.18** |
| ***Current Charges Due 06/23/2020** | | **$128.89** |
| **Total Amount Due** | | **$265.07** |

**Messages**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.17 |
| WATER | WATER COMMODITY CHG | 4 | $4.60 |
| WATER | ZONE 1 ELEVATION CHG | 4 | $0.44 |
| WATER | MINIMUM MONTHLY CHG | 0 | $105.52 |
| WATER | REPLENISHMENT CHARGE | 4 | $0.68 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | 4 | $3.48 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | 4 | $5.32 |
| STORM DRAIN | USAGE FEE | 4 | $0.06 |
| **New Charge Total** | | | **$128.89** |

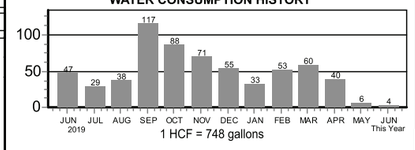
***REMINDER***
YOUR ACCOUNT HAS A PAST DUE BALANCE. PLEASE MAKE PAYMENT IMMEDIATELY TO AVOID DELINQUENCY ACTION. THANK YOU.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| WA | 2" | B15482971 | 3098 | 3102 | 4 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| WA | 0.68 | 20.40 |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **129241-97210** |
| **Service Address** | **701 S MT VERNON AVE 20** |
| ***Current Charges due by 06/23/2020** | **$128.89** |
| **Past Due Amount** | **$136.18** |
| **Total Amount Due** | **$265.07** |
| **Amount Enclosed** | **$** |

☐ **Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000025 3/6

SB COMM COLLEGE
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

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*[7/7]*

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

## Account Summary

| | | |
|---|---|---|
| Account Number | 129241-97212 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE | |
| Service Address | 701 S MT VERNON AVE 21 | |
| Previous Balance | | **$47.32** |
| Payment Received | | **$-47.32** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$47.32** |
| **Total Amount Due** | | **$47.32** |

**Messages**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $42.99 |
| **New Charge Total** | | | **$47.32** |

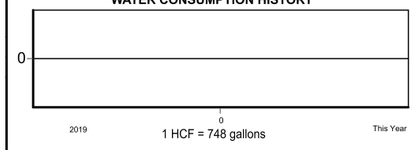
Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 8" | SN70917194 | 0 | 0 | 0 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| | | |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **129241-97212** |
| **Service Address** | **701 S MT VERNON AVE 21** |
| ***Current Charges due by 06/23/2020** | **$47.32** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$47.32** |
| **Amount Enclosed** | **$** |

☐ **Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000026 3/7

**SB COMM COLLEGE**
**550 E HOSPITALITY LN #200**
**SAN BERNARDINO CA 92408**

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

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[2/4]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1867-113192 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 25 | |
| Previous Balance | | **$896.76** |
| Payment Received | | **$-896.76** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$1119.08** |

**Total Amount Due** **$1119.08**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.17 |
| WATER | WATER COMMODITY CHG | 226 | $259.90 |
| WATER | ZONE 1 ELEVATION CHG | 226 | $24.86 |
| WATER | MINIMUM MONTHLY CHG | 0 | $286.63 |
| WATER | REPLENISHMENT CHARGE | 226 | $38.42 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | 226 | $196.62 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | 226 | $300.58 |
| STORM DRAIN | USAGE FEE | 226 | $3.28 |
| **New Charge Total** | | | **$1,119.08** |

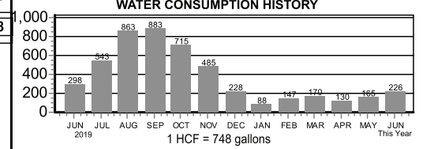
Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| WA | 4" | B11287082 | 359 | 463 | 104 |
| WA | 4" | B11287082 | 31918 | 32040 | 122 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| WA | 12.69 | 380.80 |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1867-113192** |
| **Service Address** | **701 S MT VERNON AVE 25** |
| ***Current Charges due by 06/23/2020** | **$1119.08** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$1119.08** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A 716 2 AV 0.389
7000000730 00.0003.0116 716/2

SB COMM COLLEGE DIST
550 E HOSPITALITY LANE #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

00000186700011319200000111908 7

[3/4]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1867-113302 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 8B | |
| Previous Balance | | **$165.46** |
| Payment Received | | **$-165.46** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$161.81** |

**Total Amount Due** **$161.81**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.17 |
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| WATER | WATER COMMODITY CHG | 3 | $3.45 |
| WATER | ZONE 1 ELEVATION CHG | 3 | $0.33 |
| WATER | MINIMUM MONTHLY CHG | 0 | $105.52 |
| WATER | REPLENISHMENT CHARGE | 3 | $0.51 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | 3 | $2.61 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $32.24 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | 3 | $3.99 |
| STORM DRAIN | USAGE FEE | 3 | $0.04 |
| **New Charge Total** | | | **$161.81** |

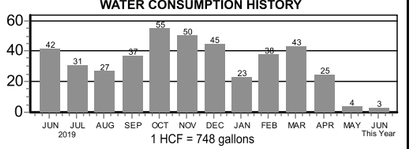
Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 6" | B11564441 | 0 | 0 | 0 |
| WA | 2" | B35736961 | 4806 | 4809 | 3 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| WA | 0.93 | 28.05 |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1867-113302** |
| **Service Address** | **701 S MT VERNON AVE 8B** |
| ***Current Charges due by 06/23/2020** | **$161.81** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$161.81** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A 716 2 AV 0.389
7000000731 00.0003.0116 716/3

SB COMM COLLEGE DIST
550 E HOSPITALITY LANE #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

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*[4/4]*

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1867-113500 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 26 | |
| Previous Balance | | **$36.57** |
| Payment Received | | **$-36.57** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$36.57** |

**Total Amount Due** **$36.57**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $32.24 |
| **New Charge Total** | | | **$36.57** |

Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 6" | B11504701 | 0 | 0 | 0 |

**WATER CONSUMPTION HISTORY**


1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| | | |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1867-113500** |
| **Service Address** | **701 S MT VERNON AVE 26** |
| ***Current Charges due by 06/23/2020** | **$36.57** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$36.57** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A 716 2 AV 0.389
7000000732 00.0003.0116 716/4

**SB COMM COLLEGE DIST**
**550 E HOSPITALITY LANE #200**
**SAN BERNARDINO CA 92408**

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

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[1/4]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1867-93870 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 9 | |
| Previous Balance | | **$36.57** |
| Payment Received | | **$-36.57** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$36.57** |

**Total Amount Due** **$36.57**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $32.24 |
| **New Charge Total** | | | **$36.57** |

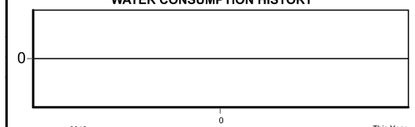
Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 6" | B11504698 | 0 | 0 | 0 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| | | |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1867-93870** |
| **Service Address** | **701 S MT VERNON AVE 9** |
| ***Current Charges due by 06/23/2020** | **$36.57** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$36.57** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

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SB COMM COLLEGE DIST
550 E HOSPITALITY LN STE 200
SAN BERNARDINO CA 92408-4205

CITY OF SAN BERNARDINO
PO BOX 710
SAN BERNARDINO, CA 92402-0710

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[7/11]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1869-113864 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 29 | |
| Previous Balance | | **$36.57** |
| Payment Received | | **$-36.57** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$36.57** |

**Total Amount Due** **$36.57**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $32.24 |
| **New Charge Total** | | | **$36.57** |

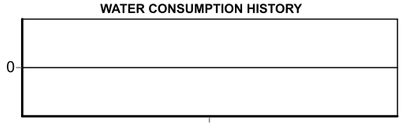
Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 6" | B49593682 | 0 | 0 | 0 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| | | |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1869-113864** |
| **Service Address** | **701 S MT VERNON AVE 29** |
| ***Current Charges due by 06/23/2020** | **$36.57** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$36.57** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000007 1/7

SB COMM COLLEGE DIST
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

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[2/11]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1869-93850 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 8 | |
| Previous Balance | | **$503.16** |
| Payment Received | | **$-503.16** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$455.78** |

**Total Amount Due** **$455.78**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.17 |
| WATER | WATER COMMODITY CHG | 44 | $50.60 |
| WATER | ZONE 1 ELEVATION CHG | 44 | $4.84 |
| WATER | MINIMUM MONTHLY CHG | 0 | $286.63 |
| WATER | REPLENISHMENT CHARGE | 44 | $7.48 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | 44 | $38.28 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | 44 | $58.52 |
| STORM DRAIN | USAGE FEE | 44 | $0.64 |
| **New Charge Total** | | | **$455.78** |

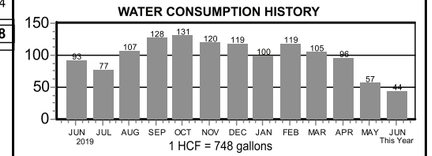
Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| WA | 4" | O17472928 | 2405 | 2449 | 44 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| LS | 4.59 | 137.70 |
| WA | 10.46 | 313.85 |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1869-93850** |
| **Service Address** | **701 S MT VERNON AVE 8** |
| ***Current Charges due by 06/23/2020** | **$455.78** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$455.78** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000002 1/2

SB COMM COLLEGE DIST
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

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[3/11]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1869-96272 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 16 | |
| Previous Balance | | **$198.44** |
| Payment Received | | **$-198.44** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$147.42** |

**Total Amount Due** **$147.42**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

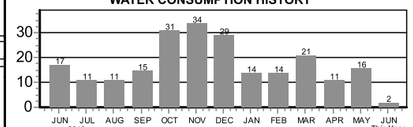
| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.17 |
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| WATER | WATER COMMODITY CHG | 2 | $2.30 |
| WATER | ZONE 1 ELEVATION CHG | 2 | $0.22 |
| WATER | MINIMUM MONTHLY CHG | 0 | $105.52 |
| WATER | REPLENISHMENT CHARGE | 2 | $0.34 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | 2 | $1.74 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $21.49 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | 2 | $2.66 |
| STORM DRAIN | USAGE FEE | 2 | $0.03 |
| **New Charge Total** | | | **$147.42** |

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 4" | B49593684 | 1 | 1 | 0 |
| WA | 2" | HN81957 | 3486 | 3488 | 2 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| LS | 15.07 | 452.37 |
| WA | 0.36 | 11.05 |

Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1869-96272** |
| **Service Address** | **701 S MT VERNON AVE 16** |
| ***Current Charges due by 06/23/2020** | **$147.42** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$147.42** |
| **Amount Enclosed** | **$** |

☐ **Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000003 1/3

SB COMM COLLEGE DIST
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

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[4/11]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1869-96274 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 17 | |
| Previous Balance | | **$610.69** |
| Payment Received | | **$-281.78** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$328.91** |
| ***Current Charges Due 06/23/2020** | | **$285.45** |

**Total Amount Due** **$614.36**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

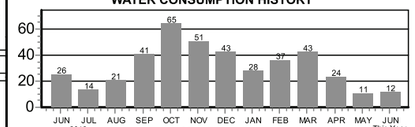
| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| WATER | WATER COMMODITY CHG | 12 | $13.80 |
| WATER | ZONE 4 ELEVATION CHG | 12 | $1.68 |
| WATER | MINIMUM MONTHLY CHG | 0 | $105.52 |
| WATER | REPLENISHMENT CHARGE | 12 | $2.04 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | 12 | $10.44 |
| LANDSCAPE IRRIGATION | MINIMUM MONTHLY CHG | 0 | $88.32 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $32.24 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | 12 | $15.96 |
| STORM DRAIN | USAGE FEE | 12 | $0.17 |
| **New Charge Total** | | | **$285.45** |

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 6" | B11504763 | 5 | 5 | 0 |
| LS | 2" | B16987510 | 0 | 0 | 0 |
| WA | 2" | B16462730 | 1080 | 1092 | 12 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| LS | 6.77 | 203.15 |
| WA | 0.59 | 17.85 |

***REMINDER***
YOUR ACCOUNT HAS A PAST DUE BALANCE. PLEASE MAKE PAYMENT IMMEDIATELY TO AVOID DELINQUENCY ACTION. THANK YOU.

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1869-96274** |
| **Service Address** | **701 S MT VERNON AVE 17** |
| ***Current Charges due by 06/23/2020** | **$285.45** |
| **Past Due Amount** | **$328.91** |
| **Total Amount Due** | **$614.36** |
| **Amount Enclosed** | **$** |

☐ **Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000004 1/4

SB COMM COLLEGE DIST
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

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[5/11]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1869-97196 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 19 | |
| Previous Balance | | **$21.83** |
| Payment Received | | **$-21.83** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$47.32** |

**Total Amount Due** **$47.32**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $42.99 |
| **New Charge Total** | | | **$47.32** |

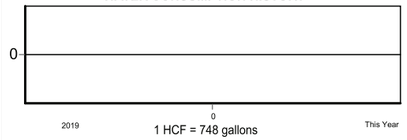
Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 8" | B11504771 | 0 | 0 | 0 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| | | |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1869-97196** |
| **Service Address** | **701 S MT VERNON AVE 19** |
| ***Current Charges due by 06/23/2020** | **$47.32** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$47.32** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000005 1/5

SB COMM COLLEGE DIST
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

00000186900009719600000047325

[8/11]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1871-97194 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 18 | |
| Previous Balance | | **$329.60** |
| Payment Received | | **$-154.72** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$174.88** |
| ***Current Charges Due 06/23/2020** | | **$149.86** |

**Total Amount Due** **$324.74**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.17 |
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| WATER | WATER COMMODITY CHG | 2 | $2.30 |
| WATER | ZONE 1 ELEVATION CHG | 2 | $0.22 |
| WATER | MINIMUM MONTHLY CHG | 0 | $105.52 |
| WATER | REPLENISHMENT CHARGE | 2 | $0.34 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | 2 | $1.74 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $21.49 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | 2 | $5.10 |
| STORM DRAIN | USAGE FEE | 2 | $0.03 |
| **New Charge Total** | | | **$149.86** |

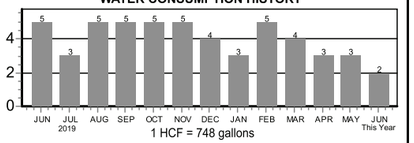
***REMINDER***
YOUR ACCOUNT HAS A PAST DUE BALANCE. PLEASE MAKE PAYMENT IMMEDIATELY TO AVOID DELINQUENCY ACTION. THANK YOU.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 4" | B11564453 | 0 | 0 | 0 |
| WA | 2" | B16462720 | 132 | 134 | 2 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| WA | 0.08 | 2.55 |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1871-97194** |
| **Service Address** | **701 S MT VERNON AVE 18** |
| ***Current Charges due by 06/23/2020** | **$149.86** |
| **Past Due Amount** | **$174.88** |
| **Total Amount Due** | **$324.74** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000008 1/8

SB COMM COLLEGE DIST
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

00000187100009719400000003247 49

[9/11]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1873-1692 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 699 S MT VERNON AVE | |
| Previous Balance | | **$609.12** |
| Payment Received | | **$-302.94** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$306.18** |
| ***Current Charges Due 06/23/2020** | | **$306.81** |

**Total Amount Due $612.99**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.17 |
| WATER | WATER COMMODITY CHG | 3 | $3.45 |
| WATER | ZONE 1 ELEVATION CHG | 3 | $0.33 |
| WATER | MINIMUM MONTHLY CHG | 0 | $286.63 |
| WATER | REPLENISHMENT CHARGE | 3 | $0.51 |
| WATER | STAGE2A - EXCESS CON | 2 | $0.46 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | 3 | $2.61 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | 3 | $3.99 |
| STORM DRAIN | USAGE FEE | 3 | $0.04 |
| **New Charge Total** | | | **$306.81** |

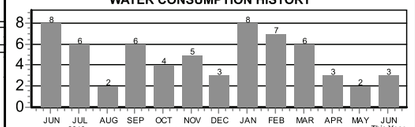
***REMINDER***
YOUR ACCOUNT HAS A PAST DUE BALANCE. PLEASE MAKE PAYMENT IMMEDIATELY TO AVOID DELINQUENCY ACTION. THANK YOU.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| WA | 4" | B11233763 | 868 | 870 | 2 |
| WA | 4" | B11233763 | 121 | 122 | 1 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| WA | 10.46 | 313.85 |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1873-1692** |
| **Service Address** | **699 S MT VERNON AVE** |
| ***Current Charges due by 06/23/2020** | **$306.81** |
| **Past Due Amount** | **$306.18** |
| **Total Amount Due** | **$612.99** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000009 1/9

SB COMM COLLEGE DIST
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

0000018730000016920000006129 97

[10/11]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1877-1696 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 1137 COLLEGE DR | |
| Previous Balance | | **$1592.38** |
| Payment Received | | **$-858.15** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$734.23** |
| ***Current Charges Due 06/23/2020** | | **$2432.57** |

**Total Amount Due $3166.80**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| WATER | WATER COMMODITY CHG | 587 | $675.05 |
| WATER | ZONE 1 ELEVATION CHG | 587 | $64.57 |
| WATER | MINIMUM MONTHLY CHG | 0 | $286.63 |
| WATER | REPLENISHMENT CHARGE | 587 | $99.79 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | 587 | $510.69 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | 587 | $780.71 |
| STORM DRAIN | USAGE FEE | 587 | $8.51 |
| **New Charge Total** | | | **$2,432.57** |

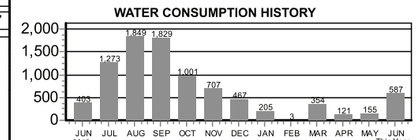
***REMINDER***
YOUR ACCOUNT HAS A PAST DUE BALANCE. PLEASE MAKE PAYMENT IMMEDIATELY TO AVOID DELINQUENCY ACTION. THANK YOU.

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| WA | 4" | B09056904 | 22164 | 22751 | 587 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| WA | 75.76 | 2272.90 |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1877-1696** |
| **Service Address** | **1137 COLLEGE DR** |
| ***Current Charges due by 06/23/2020** | **$2432.57** |
| **Past Due Amount** | **$734.23** |
| **Total Amount Due** | **$3166.80** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000010 1/10

SB COMM COLLEGE DIST
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

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*[11/11]*

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1881-1700 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 1190 COLLEGE DR | |
| Previous Balance | | **$398.29** |
| Payment Received | | **$-194.28** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$204.01** |
| ***Current Charges Due 06/23/2020** | | **$218.49** |

**Total Amount Due $422.50**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

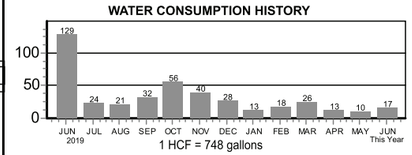
| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| WATER | WATER COMMODITY CHG | 17 | $19.55 |
| WATER | ZONE 1 ELEVATION CHG | 17 | $1.87 |
| WATER | MINIMUM MONTHLY CHG | 0 | $105.52 |
| WATER | REPLENISHMENT CHARGE | 17 | $2.89 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | 17 | $14.79 |
| FIRE SERVICE | WATER COMMODITY CHG | 1 | $1.15 |
| FIRE SERVICE | ZONE 1 ELEVATION CHG | 1 | $0.11 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $42.99 |
| FIRE SERVICE | REPLENISHMENT CHARGE | 1 | $0.14 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | 17 | $22.61 |
| STORM DRAIN | USAGE FEE | 17 | $0.25 |
| **New Charge Total** | | | **$218.49** |

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 8" | P4230416 | 757 | 758 | 1 |
| WA | 2" | B15250917 | 1403 | 1420 | 17 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| WA | 1.30 | 39.10 |
| | | |

***REMINDER***
YOUR ACCOUNT HAS A PAST DUE BALANCE. PLEASE MAKE PAYMENT IMMEDIATELY TO AVOID DELINQUENCY ACTION. THANK YOU.

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1881-1700** |
| **Service Address** | **1190 COLLEGE DR** |
| ***Current Charges due by 06/23/2020** | **$218.49** |
| **Past Due Amount** | **$204.01** |
| **Total Amount Due** | **$422.50** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000011 1/11

**SB COMM COLLEGE DIST**
**550 E HOSPITALITY LN #200**
**SAN BERNARDINO CA 92408**

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

00000188100000170000000422505

*[11/11]*

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 226127-113836 | Bill Date:6/4/2020 |
| Customer Name | S B VALLEY COLLEGE | |
| Service Address | 701 S MT VERNON AVE 27 | |
| Previous Balance | | **$235.73** |
| Payment Received | | **$-117.95** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$117.78** |
| ***Current Charges Due 06/23/2020** | | **$114.31** |

**Total Amount Due $232.09**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

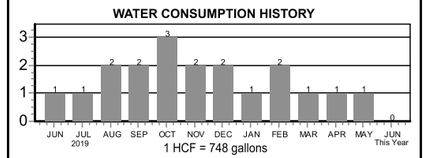
| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.17 |
| WATER | MINIMUM MONTHLY CHG | 0 | $105.52 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| **New Charge Total** | | | **$114.31** |

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| WA | 2" | B45551355 | 142 | 142 | 0 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| WA | 1.95 | 58.73 |
| | | |

***REMINDER***
YOUR ACCOUNT HAS A PAST DUE BALANCE. PLEASE MAKE PAYMENT IMMEDIATELY TO AVOID DELINQUENCY ACTION. THANK YOU.

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **226127-113836** |
| **Service Address** | **701 S MT VERNON AVE 27** |
| ***Current Charges due by 06/23/2020** | **$114.31** |
| **Past Due Amount** | **$117.78** |
| **Total Amount Due** | **$232.09** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A 717 1 AV 0.389
7000000733 00.0003.0117 717/1

S B VALLEY COLLEGE
550 E HOSPITALITY LN STE 200
SAN BERNARDINO CA 92408-4205

CITY OF SAN BERNARDINO
PO BOX 710
SAN BERNARDINO, CA 92402-0710

00022612700011383600000232091

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 129241-92842 | Bill Date:6/4/2020 |
| Customer Name | SB COMM COLLEGE | |
| Service Address | 701 S MT VERNON AVE 3 | |
| Previous Balance | | **$449.73** |
| Payment Received | | **$-449.73** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/23/2020** | | **$763.16** |

**Total Amount Due** **$763.16**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

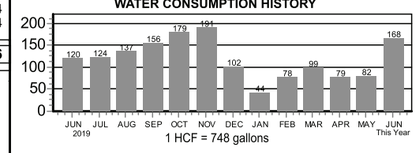
| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.17 |
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| WATER | WATER COMMODITY CHG | 168 | $193.20 |
| WATER | ZONE 1 ELEVATION CHG | 168 | $18.48 |
| WATER | MINIMUM MONTHLY CHG | 0 | $105.52 |
| WATER | REPLENISHMENT CHARGE | 168 | $28.56 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | 168 | $146.16 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $32.24 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | 168 | $223.44 |
| STORM DRAIN | USAGE FEE | 168 | $2.44 |
| **New Charge Total** | | | **$763.16** |

## Meter Reading Details

Service Period: 05/04/2020 to 06/02/2020 Days: 29

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 6" | B11504702 | 0 | 0 | 0 |
| WA | 2" | B16462727 | 4309 | 4477 | 168 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| WA | 8.33 | 249.90 |
| | | |

Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **129241-92842** |
| **Service Address** | **701 S MT VERNON AVE 3** |
| ***Current Charges due by 06/23/2020** | **$763.16** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$763.16** |
| **Amount Enclosed** | **$** |

☐ **Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0604A
2000000020 3/1

SB COMM COLLEGE
550 E HOSPITALITY LN STE 200
SAN BERNARDINO CA 92408-4205

CITY OF SAN BERNARDINO
PO BOX 710
SAN BERNARDINO, CA 92402-0710

00012924100009284200000763169


Available online starting

## July 1, 2020

This report features information about the drinking water delivered to your home during 2019.

The Consumer Confidence Report contains information that includes details about the quality of your drinking water, where it comes from and how we are working to protect this precious resource.

To view your 2019 Consumer Confidence Report and learn more about your drinking water, please visit: **WWW.SBMWD.ORG/CCR2019** starting July 1, 2020.

Paper copies will be available upon request. For copies, please call SBMWD Customer Service at (909) 384-5141.

*[5/5]*

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1869-113838 | Bill Date:6/5/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 28 | |
| Previous Balance | | **$218.32** |
| Payment Received | | **$0.00** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$218.32** |
| ***Current Charges Due 06/24/2020** | | **$174.58** |

## Total Amount Due $392.90

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.17 |
| WATER | WATER COMMODITY CHG | -6 | $-6.90 |
| WATER | ZONE 1 ELEVATION CHG | -6 | $-0.66 |
| WATER | MINIMUM MONTHLY CHG | 0 | $187.66 |
| WATER | REPLENISHMENT CHARGE | -6 | $-1.02 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | -6 | $-5.22 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | -6 | $-7.98 |
| STORM DRAIN | USAGE FEE | -6 | $-0.09 |
| **New Charge Total** | | | **$174.58** |

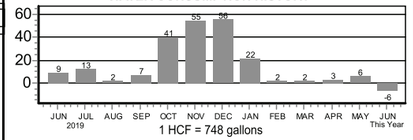
***REMINDER***
YOUR ACCOUNT HAS A PAST DUE BALANCE. PLEASE MAKE PAYMENT IMMEDIATELY TO AVOID DELINQUENCY ACTION. THANK YOU.

## Meter Reading Details

Service Period: 05/04/2020 to 06/03/2020 Days: 30

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| WA | 3" | N70304494 | 468 | 464 | -4 |
| WA | 3" | N70304494 | 126 | 124 | -2 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| WA | 8.39 | 251.90 |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1869-113838** |
| **Service Address** | **701 S MT VERNON AVE 28** |
| ***Current Charges due by 06/24/2020** | **$174.58** |
| **Past Due Amount** | **$218.32** |
| **Total Amount Due** | **$392.90** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0605A
2000000099 8/5

**SB COMM COLLEGE DIST**
**550 E HOSPITALITY LN #200**
**SAN BERNARDINO CA 92408**

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

00000186900011383800000392902

[3/5]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1869-95076 | Bill Date:6/5/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 12 | |
| Previous Balance | | **$67.99** |
| Payment Received | | **$-67.99** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/24/2020** | | **$31.55** |

## Total Amount Due $31.55

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.17 |
| WATER | WATER COMMODITY CHG | -5 | $-5.75 |
| WATER | ZONE 1 ELEVATION CHG | -5 | $-0.55 |
| WATER | MINIMUM MONTHLY CHG | 0 | $40.98 |
| WATER | REPLENISHMENT CHARGE | -5 | $-0.85 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | -5 | $-4.35 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | -5 | $-6.65 |
| STORM DRAIN | USAGE FEE | -5 | $-0.07 |
| **New Charge Total** | | | **$31.55** |

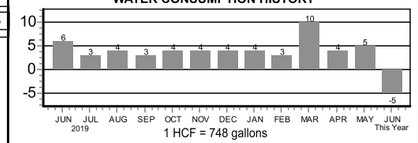
Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/03/2020 Days: 30

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| WA | 1" | HN96924 | 1941 | 1936 | -5 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| WA | 0.02 | 0.85 |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1869-95076** |
| **Service Address** | **701 S MT VERNON AVE 12** |
| ***Current Charges due by 06/24/2020** | **$31.55** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$31.55** |
| **Amount Enclosed** | **$** |

**Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0605A
2000000097 8/3

SB COMM COLLEGE DIST
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

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[1/5]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1869-95078 | Bill Date:6/5/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 13 | |
| Previous Balance | | **$2805.65** |
| Payment Received | | **$-2805.65** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/24/2020** | | **$2492.71** |

**Total Amount Due** **$2492.71**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

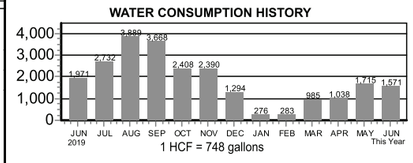
| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.17 |
| LANDSCAPE IRRIGATION | WATER COMMODITY CHG | 1571 | $1806.65 |
| LANDSCAPE IRRIGATION | ZONE 1 ELEVATION CHG | 1571 | $172.81 |
| LANDSCAPE IRRIGATION | MINIMUM MONTHLY CHG | 0 | $240.07 |
| LANDSCAPE IRRIGATION | REPLENISHMENT CHARGE | 1571 | $219.94 |
| LANDSCAPE IRRIGATION | STAGE2A - EXCESS CON | 123 | $28.29 |
| STORM DRAIN | USAGE FEE | 1571 | $22.78 |
| **New Charge Total** | | | **$2,492.71** |

## Meter Reading Details

Service Period: 05/04/2020 to 06/03/2020 Days: 30

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| LS | 4" | RT65057985 | 237496 | 239067 | 1571 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| LS | 48.11 | 1443.30 |
| | | |

Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1869-95078** |
| **Service Address** | **701 S MT VERNON AVE 13** |
| ***Current Charges due by 06/24/2020** | **$2492.71** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$2492.71** |
| **Amount Enclosed** | **$** |

☐ **Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0605A
2000000095 8/1

SB COMM COLLEGE DIST
550 E HOSPITALITY LN STE 200
SAN BERNARDINO CA 92408-4205

CITY OF SAN BERNARDINO
PO BOX 710
SAN BERNARDINO, CA 92402-0710

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[2/5]

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1869-95488 | Bill Date:6/5/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 14 | |
| Previous Balance | | **$36.57** |
| Payment Received | | **$-36.57** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/24/2020** | | **$36.57** |

**Total Amount Due** **$36.57**

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

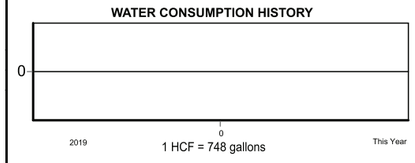
| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $4.33 |
| FIRE SERVICE | MINIMUM MONTHLY CHG | 0 | $32.24 |
| **New Charge Total** | | | **$36.57** |

## Meter Reading Details

Service Period: 05/04/2020 to 06/03/2020 Days: 30

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| FS | 6" | B30130570 | 28 | 28 | 0 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| | | |
| | | |

Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1869-95488** |
| **Service Address** | **701 S MT VERNON AVE 14** |
| ***Current Charges due by 06/24/2020** | **$36.57** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$36.57** |
| **Amount Enclosed** | **$** |

☐ **Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0605A
2000000096 8/2

SB COMM COLLEGE DIST
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

00000186900009548800000000036571

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

MONDAY-THURSDAY 8:00 A.M. to 5:00 P.M.
FRIDAY 8:00 A.M. to 4:30 P.M.
CUSTOMER SERVICE (909) 384-5095
AFTER HOURS (909) 384-5141
WWW.SBMWD.ORG

**Messages**

## Account Summary

| | | |
|---|---|---|
| Account Number | 1869-95490 | Bill Date:6/5/2020 |
| Customer Name | SB COMM COLLEGE DIST | |
| Service Address | 701 S MT VERNON AVE 15 | |
| Previous Balance | | **$884.33** |
| Payment Received | | **$-884.33** |
| Adjustments | | **$0.00** |
| **Past Due Amount** | | **$0.00** |
| ***Current Charges Due 06/24/2020** | | **$-273.12** |

## Total Amount Due $ - 273.12

To make a payment or view your account online please visit https://www.onlinebiller.com/sbmwd/ or call 1-877-238-6048

Follow us on Twitter and Facebook @sbcitywater.

## Detail of New Charges

| Service | Rate Component Description | HCF | Charge |
|---|---|---|---|
| BACKFLOW SERVICE | BACKFLOW DEVICE | 0 | $2.17 |
| WATER | WATER COMMODITY CHG | -156 | $-179.40 |
| WATER | ZONE 1 ELEVATION CHG | -156 | $-17.16 |
| WATER | MINIMUM MONTHLY CHG | 0 | $286.63 |
| WATER | REPLENISHMENT CHARGE | -156 | $-26.52 |
| COLLECTION SYSTEM | SEWER COLLECTION MIN | 0 | $3.10 |
| COLLECTION SYSTEM | SEWER COLLECTION USE | -156 | $-135.72 |
| SEWER SERVICE | SEWER TREATMENT MIN | 0 | $3.52 |
| SEWER SERVICE | SEWER TREATMENT USE | -156 | $-207.48 |
| STORM DRAIN | USAGE FEE | -156 | $-2.26 |
| **New Charge Total** | | | **$-273.12** |

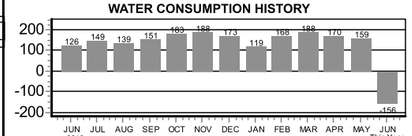
Please utilize the consumption chart and allocation to the right to meet your next month's water conservation goal. Visit www.sbmwd.org for more information.

## Meter Reading Details

Service Period: 05/04/2020 to 06/03/2020 Days: 30

| Service Type | Meter Size | Meter Serial Number | Previous Reading | Current Reading | Usage (HCF) |
|---|---|---|---|---|---|
| WA | 4" | HNC77503 | 4512 | 4463 | -49 |
| WA | 4" | HNC77503 | 12899 | 12792 | -107 |

**WATER CONSUMPTION HISTORY**




1 HCF = 748 gallons

**YOUR NEXT MONTH'S ESTIMATED CONSUMPTION ALLOCATION IS:**

| Service | Daily Water Allocation (HCF) | 30 Day Projected Budget (HCF) |
|---|---|---|
| WA | 1.53 | 45.90 |
| | | |

Return this portion with your payment.

**CITY OF SAN BERNARDINO**
**MUNICIPAL WATER DEPARTMENT**
**1350 S "E" STREET**
**SAN BERNARDINO, CA 92408**

| | |
|---|---|
| **Account Number** | **1869-95490** |
| **Service Address** | **701 S MT VERNON AVE 15** |
| ***Current Charges due by 06/24/2020** | **$-273.12** |
| **Past Due Amount** | **$0.00** |
| **Total Amount Due** | **$ - 273.12** |
| **Amount Enclosed** | **$** Credit Balance - Do Not Pay |

☐ **Please check the box to indicate phone number, mailing, or email address changes listed on the reverse side.**

***THIS DUE DATE DOES NOT SUPERSEDE, EXTEND OR STOP ANY DELINQUENCY ACTION PENDING ON ANY PAST DUE AMOUNT.**

BER0605A
2000000098 8/4

SB COMM COLLEGE DIST
550 E HOSPITALITY LN #200
SAN BERNARDINO CA 92408

CITY OF SAN BERNARDINO
P.O. BOX 710
SAN BERNARDINO, CA 92402-0710

00000186900009549000000000000007