



University of California, Riverside
Detailed Project Program

June, 2002



UCR Project No. 950403

UNIVERSITY OF CALIFORNIA, RIVERSIDE
EAST CAMPUS INFRASTRUCTURE
PROJECT NO. 950403

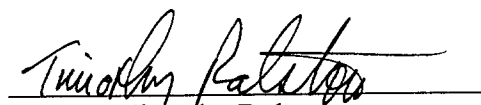
SIGNATURE PAGE

REVIEWED BY:

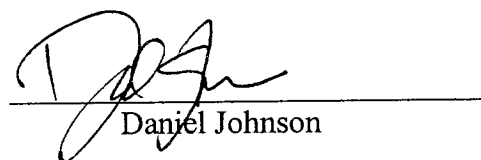
Assistant Vice Chancellor, Physical Plant


Mike Miller

Assistant Vice Chancellor, Capital & Physical Planning

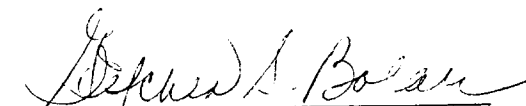

Timothy Ralston

Assistant Vice Chancellor, Design and Construction


Daniel Johnson

APPROVED BY:

Vice Chancellor, Academic Planning and Budget


Gretchen S. Bolar

Vice Chancellor, Administration



C. Michael Webster

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1.0 EXECUTIVE SUMMARY	1-1
2.0 DESCRIPTION OF CAMPUS	2-1
2.1 Current Campus	2-1
2.2 Future Campus – 2015	2-1
3.0 CHILLED WATER SUPPLY AND DISTRIBUTION SYSTEM	3-1
3.1 Existing System	3-1
3.2 Analysis Assumptions and Methodology	3-2
3.3 Growth Requirements	3-6
3.4 Infrastructure Projects (2002 – 2005)	3-6
3.5 Infrastructure Projects (2006 – 2010)	3-7
3.6 Infrastructure projects (2011 – 2015)	3-7
4.0 STEAM SUPPLY AND CONDENSATE RETURN SYSTEMS	4-1
4.1 Existing System	4-1
4.2 Analysis Assumptions and methodology	4-2
4.3 Growth Requirements	4-7
4.4 Infrastructure Projects (2002 – 2005)	4-7
4.5 Infrastructure Projects (2006 – 2010)	4-8
4.6 Infrastructure Projects (2011 – 2015)	4-8
5.0 DOMESTIC WATER SYSTEM	5-1
5.1 Existing System	5-1
5.2 Analysis Assumptions and Methodology	5-2
5.3 Growth Requirements	5-8
5.4 Infrastructure Projects (2002 – 2005)	5-8
5.5 Infrastructure Projects (2006 – 2010)	5-9
5.6 Infrastructure Projects (2011 – 2015)	5-9
6.0 SANITARY SEWER SYSTEM	6-1
6.1 Existing System	6-1
6.2 Analysis Assumptions and Methodology	6-2
6.3 Growth Requirements	6-7
6.4 Infrastructure Projects (2002 – 2005)	6-7
6.5 Infrastructure Projects (2006-2010)	6-8
6.6 Infrastructure Projects (2011 – 2015)	6-9
7.0 ELECTRICAL SUPPLY AND DISTRIBUTION SYSTEM	7-1
7.1 Existing System	7-1
7.1.1 System Description	7-1
7.1.2 System Condition	7-1

University of California, Riverside
Detailed Project Program

7.2	Analysis Assumptions and Methodology	7-2
7.3	Growth Requirements	7-3
7.4	Infrastructure Projects (2002 – 2005)	7-8
7.4.1	EL-11	7-8
7.4.2	EL-12	7-8
7.4.3	EL-13	7-9
7.5	Infrastructure Projects (2006 – 2010)	7-9
7.5.1	EL-21	7-9
7.5.2	EL-22	7-10
7.5.3	EL-23	7-10
7.6	Infrastructure Projects (2011 – 2015)	7-10
7.6.1	EL-31	7-10
7.6.2	EL-32	7-11
7.6.3	EL-33	7-11
7.6.4	EL-34	7-11
7.6.5	EL-35	7-11
7.6.6	EL-36	7-12
7.6.7	EL-37	7-12
8.0	NATURAL GAS SUPPLY AND DISTRIBUTION SYSTEM	8-1
8.1	Existing System	8-1
8.2	Analysis Assumptions and Methodology	8-1
9.0	STORM DRAIN SYSTEM	9-1
9.1	Existing System	9-1
9.2	Analysis Assumptions and Methodology	9-2
9.3	Growth Requirements	9-8

University of California, Riverside
Detailed Project Program

<u>Tables</u>	<u>Page</u>	
Table 2.1	Existing Building Square Footage	2-2
Table 2.2	Future Building Square Footage	2-4
Table 3.1	Existing (2002) Building Peak Cooling Loads and Chilled Water Demand	3-3
Table 3.2	Future Building Peak Cooling Loads and Chilled Water Demand	3-4
Table 4.1	Existing Building Steam and Condensate Return Loads	4-4
Table 4.2	Future Building Steam and Condensate Return Loads	4-5
Table 5.1	Existing Building Water Demand	5-4
Table 5.2	Future Building Water Demand	5-6
Table 6.1	Existing Building Sewer Load	6-3
Table 6.2	Future Building Sewer Load	6-5
Table 7.1	Existing Building Loads and Future Building Loads	7-4
Table 9.1	Existing Building Roof Drainage	9-4
Table 9.2	Future Building Roof Drainage	9-6

Drawings

M-00S	Existing Site Map – South
M-00N	Existing Site Map – North
M-10S	Site 2002 – 2005 Map South
M-10N	Site 2002 – 2005 Map North
M-20S	Site 2006 – 2010 Map South
M-20N	Site 2006 – 2010 Map North
M-30S	Site 2011 – 2015 Map South
M-30N	Site 2011 – 2015 Map North
CH-00	Chilled Water Existing
CH-10	Chilled Water - 2002 – 2005
CH-20	Chilled Water - 2006 – 2010
CH-30	Chilled Water - 2011 – 2015
ST-00	Steam Existing
ST-10	Steam - 2002 – 2005
ST-20	Steam - 2006 – 2010
ST-30	Steam - 2011-2015
CR-00	Condensate Return – Existing
CR-10	Condensate Return – 2002 – 2005
CR-20	Condensate Return – 2006 – 2010
CR-30	Condensate Return – 2011 – 2015
W-00S	Plumbing Existing Site Water - South

University of California, Riverside
Detailed Project Program

W-00N	Plumbing Existing Site Water – North
W-10S	Plumbing Site 2002 – 2005 Water South
W-10N	Plumbing Site 2006 – 2010 Water North
W-20S	Plumbing Site 2006 – 2010 Water South
W-20N	Plumbing Site 2006 – 2010 Water North
W-30S	Plumbing Site 2011 – 2015 Water South
W-30N	Plumbing Site 2011 – 2015 Water North
SS-00S	Plumbing Existing Site Sewer – South
SS-00N	Plumbing Existing Site Sewer – North
SS-10S	Plumbing Site 2002 – 2005 Sewer South
SS-10N	Plumbing Site 2002 – 2005 Sewer North
SS-20S	Plumbing Site 2006 – 2010 Sewer South
SS-20N	Plumbing Site 2006 – 2010 Sewer North
SS-30S	Plumbing Site 2011 – 2015 sewer South
SS-30N	Plumbing Site 2011 – 2015 Sewer North
E-00S	Electrical Existing Site – South
E-00N	Electrical Existing Site – North
E-10S	Electrical Site 2002 – 2005 South
E-10N	Electrical Site 2002 – 2005 North
E-20S	Electrical Site 2006 – 2010 South
E-20N	Electrical Site 2006 – 2010 North
E-30S	Electrical Site 2011 – 2015 South
E-30N	Electrical Site 2011 – 2015 North
G-00S	Plumbing Existing Gas – South
G-00N	Plumbing Existing Gas – North
SD-00S	Plumbing Existing Site Storm Drain – South
SD-00N	Plumbing Existing site Storm Drain – North

Appendices

- Appendix A: Chilled Water
- Appendix B: Steam and Condensate
- Appendix C: Domestic Water
- Appendix D: Sanitary Sewer
- Appendix E: Electrical Distribution

SECTION 1.0

EXECUTIVE SUMMARY

The University of California, Riverside Campus currently consists of 14,000 undergraduate and graduate students. The Campus is projected to grow to a total of 25,000 undergraduate and graduate students along with 15,000 faculty and staff members by the year 2015.

It is the purpose of this study to examine and document the impact of this projected growth on the east campus utility infrastructure systems. The following systems will be addressed:

1. Chilled Water
2. Steam and Condensate
3. Domestic Water
4. Sanitary Sewer
5. Electrical Distribution
6. Natural Gas
7. Storm Drain

Each of the above utility systems was investigated, and any existing deficiencies were noted. Each utility system was studied to determine their existing capabilities. The Office of Academic Planning and Budget provided proposed new building sizes, locations, and construction time periods. For purposes of this study, campus growth was broken down into three time periods, 2002-2005, 2006-2010, and 2011-2015. As projected campus growth is scheduled to occur, the existing infrastructure systems were analyzed for their capacity to meet these future load conditions.

Infrastructure projects were developed based on meeting these needs. The following table summarizes the total present day project costs for each utility and for each time period.

EAST CAMPUS INFRASTRUCTURE PROJECT SUMMARY

UTILITY				TOTAL
	2002-2005	2006-2010	2011-2015	
Chilled Water	\$ 2,277,000	\$ 8,225,000	\$ 1,249,000	\$ 11,751,000
Steam	\$ 434,000	\$ 3,896,000	\$ 3,713,000	\$ 8,043,000
Condensate Return	\$ -	\$ 149,000	\$ 212,000	\$ 361,000
Water	\$ 1,155,000	\$ 1,889,000	\$ 5,109,000	\$ 8,153,000
Sewer	\$ 1,854,000	\$ 2,888,000	\$ 909,000	\$ 5,651,000
Electric	\$ 1,275,000	\$ 2,044,000	\$ 12,263,000	\$ 15,582,000
All Utilities	\$ 6,995,000	\$ 19,091,000	\$ 23,455,000	\$ 49,541,000

1.1 Chilled Water Supply and Return System

The existing Central Plant consists of five electric centrifugal chillers that are capable of a combined output of approximately 4,600 tons. During the summer of 2001, the Central Plant struggled to maintain cooling throughout the campus. Chillers and HVAC equipment ran continuously in order to prepare for peak afternoon loads.

In light of the addition of the new Insectary Quarantine Building and the Entomology Seismic Replacement Building, the situation is predicted to worsen. For this reason, an urgent project to enhance the operation of the existing Central Plant is recommended. The new satellite plant is scheduled to be operational by the fall of 2003. Once the 4,000-ton plant is on line, contributing to the campus chilled water loop, peak cooling loads will be able to be met.

The time period 2002-2005 includes two urgent projects (CH-11, CH-12) totaling \$1.4 million (urgent projects are further detailed in Section 1 on page 1-7). The remainder of the 2002-2005 chilled water projects consist of replacing chiller #1 (CH-12A), repiping tertiary pumps (CH-13), an extension of the existing 20" main starting north of the Student Center and running west to the edge of the Surge Building and then running north (CH-14), and finally an interconnection between the 12" existing lines in tunnel vault (TV-8A) due south of Computer Statistics and the new 24" mains running north on East Campus Drive (CH-15). These projects are also detailed in Section 1 on page 1-7. The cost for these four projects is \$1.6 million.

The campus loop will eventually be interconnected on the north side of the east campus to close the loop, which will improve flow characteristics. This will be fully accomplished during the 2006-2010 time period, which has three infrastructure projects (CH-21, 22 & 23) totaling \$8.2 million (see detailed project outlines in Section 1, page 1-10). The majority of the project cost for this period involves the installation of additional chillers and an additional Thermal Energy Storage Tank (TES) to meet the increasing cooling cost of the campus (CH-23).

There are three main infrastructure projects (CH-31, 32 & 33) for the final time period, 2011-2015, and they will occur in the future building development in parking lot 6 area to the south and the Science cluster to the south east. The total cost associated with this time period is \$1.2 million (see detailed project outlines in Section 1, page 1-13).

1.2 Steam Supply and Condensate Return System

The Central Steam plant consists of four high pressure steam boilers that have a total capacity of 132,000 lb/hr. The majority of the steam and condensate pipe is located in underground utility tunnels. Pipe sizes range from 1 ½" to 8". The overall integrity of the steam and condensate piping system is good.

The boiler feed water line running from the deareator to the boilers along with boiler feed water pumps need to be increased in size in order to handle future load conditions, and buried steam and condensate lines must be run from the tunnel

location TV-8A across East Campus Drive to Physical Sciences #1. These projects are recommended for the 2002-2005 time period, and result in a total project cost for the three projects (ST-11, 12 & CR-11) of \$0.3 million (see detailed project outlines in Section 1, page 1-7). In the 2006-2010 time period, two projects (ST-21, 22) are recommended to provide steam and condensate from the existing tunnel network to new buildings. Also, Central Plant upgrades of the existing steam header system (ST-23) and the installation of a 50,000 lb/hr. boiler (ST-24) will occur. In all, there are six infrastructure projects (ST-21 through ST-24, CR-21, 22) totaling \$4.0 million (see detailed project outlines in Section 1, page 1-10).

The final time period, 2011-2015, consists of seven projects. Six projects (ST-31 through ST-33 & CR-31 through CR-33) extend steam and condensate piping to administration buildings and a science building in the northwest and northeast areas of the campus as well as the future building development in parking lot 6 to the south. The seventh project (ST-34) installs another 50,000 lb/hr. boiler increasing the total plant capacity to 174,000 lb/hr. These projects have a total cost of \$3.9 million (see detailed project outlines in Section 1, pages 1-13, 14).

1.3 Domestic Water System

The current domestic water system infrastructure adequately accommodates the existing east campus load conditions. Water is supplied to the campus from a 5 million gallon city reservoir. The pumping station for campus distribution can either supply buildings directly or feed the two water storage (1.05 million gallons total) tanks located at a high elevation on the southeast side of campus. Fire protection water is also provided by the domestic water system.

There is also a backup source of water supply on the north side of campus. A 12" city water line provides redundancy for fire protection water flow and can be tapped into to serve the entire water needs of the campus.

During the first time period, 2002-2005, most new buildings are located toward the center of the campus. There are three projects (W-11, 12 & 13) that are designed to complete system loops and make interconnections, thereby increasing the capacity of the overall system. A fourth infrastructure project (W-14) that should be completed as soon as possible involves increasing the capacity of the pump station to meet the California Fire Code minimum fire flow requirements. All projects in this period total \$1.15 million (see detailed project outlines in Section 1, page 1-8).

A total of three domestic water infrastructure projects (W-21, 22 & 23) will occur during the 2006-2010 time period. These projects mainly expand into undeveloped areas and extend water to new buildings. The total cost for all projects during this period is \$1.9 million (see detailed project outlines in Section 1, page 1-10, 11).

As significant housing growth occurs on the north side of campus along with the future building development in parking lot 6 to the south, six projects (W-31 through W-36) will address the needs of these new building areas in the time period, 2011-2015. Included in these projects, which total \$5.1 million (see detailed project

outlines in Section 1, pages 1-14, 15), is the installation of a new 2 million gallon storage tank (W-31).

1.4 Sanitary Sewer System

The existing campus sanitary sewer system consists of three major arteries. It was reported that there are several trouble spots throughout the campus that experience blockages on a regular basis. The 15" sewer main (line D) which runs along North Campus Drive was recently tested and debris was found in the line.

This line was initially slated for replacement immediately based on a visual inspection at peak flow. In light of the new findings, this project (SS-21) has been moved to the 2006-2010 time period. In addition, this line is city owned and the City of Riverside will need notification by the University as to when a larger line will need to be installed based on sewer flows. We estimate that with proper maintenance, this line will be adequate until 2006-2010.

There are nine infrastructure projects that will occur in the 2002-2005 time period. The largest is the replacement of the 8" sewer main that runs along Eucalyptus Drive north to University Avenue (SS-11). The other eight smaller projects (SS-12 through SS-19) address the above mentioned trouble spots. The total cost for these projects is \$1.8 million (see detailed project outlines in Section 1, page 1-8, 9).

In the time period, 2006-2010, there are three recommended projects. The replacement of the above mentioned 15" sewer main along North Campus Drive (SS-21), the replacement of an 8" sewer main running on the North side of Linden Avenue to accommodate new housing buildings (SS-22), and the extension of the 8" sewer main known as the B line to serve a new building to the south of the campus (SS-23). Also, the sewer mains on University Avenue and Canyon Crest Drive need to be evaluated for increased capacity. Since this is a city of Riverside line it is recommended that the University contact the city to discuss potential future demands on this line. These three infrastructure projects total \$2.9 million (see detailed project outlines in Section 1, page 1-11, 12).

The final time period, 2011-2015, has two projects totaling \$0.9 million (see detailed project outlines in Section 1, page 1-15). These projects increase line size to serve the Science cluster (SS-31), and extend the 8" B line to serve the future building development in parking lot 6 (SS-32).

1.5 Electrical Distribution System

The campus electrical distribution consists of a 4.16kV and 12kV system. The City of Riverside has two 69kV feeders to the main substation located at the West Side of Interstate 215/60. The main substation has a total capacity of 48 MW.

Portions of the 4.16kV system are approximately 50 years old and deteriorating. The University has made an effort to transfer some of the loads from the 4.16kV system to the sewer 12kV system as well as replace select equipment.

The projected growth for the campus results in a final estimated load of 49.6MW in 2015. Considering this growth, it is recommended that the University extend the existing 12kV system infrastructure to serve future buildings, and phase out the 4.16kV system.

The time period 2002-2005 includes one urgent project (EL-11), and this project totals \$0.7 million (this urgent project is further detailed in Section 1 on page 1-9). The remainder of the 2002-2005 period consists of two projects (EL-12, 13) totaling \$0.6 million (see detailed project outlines in Section 1, page 1-9). These projects provide 12kV service for several existing buildings and one new building. Time period 2006-2010 consists of three projects (EL-21, 22 & 23) that provide 12kV service for future buildings located on the west side of campus, in the northwest corner of the campus, and for future housing buildings to the northeast. These projects have a total cost of \$2.0 million (see detailed project outlines in Section 1, page 1-12).

The final time period, 2011-2015, recommends seven projects in total with an associated cost of \$12.3 million (see detailed project outlines in Section 1, page 1-16, 17). Five of these projects (EL-31 through EL-35) involve new 12kV services to the future building development in parking lot 6, the Science Cluster to the south and north, Administration buildings to the northwest, and the future housing off of Linden Street. The final two projects (EL-36, 37) involve the removal of the 5kV system and an upgrade to 12kV.

1.6 Natural Gas System

Southern California Gas Company provides Natural gas service to the campus at a pressure of 25 psi. Gas is delivered to the Central Plant and then is distributed throughout the campus at 5 psi. Housing buildings and non-academic buildings have their own gas service and are not served by the campus loop.

The existing distribution system is in good condition and is a mix of buried pipe and pipe inside the tunnel network. As buildings are added to the East Campus, gas service is tied into the existing 5 psi distribution system. No analysis was performed by Bechard Long to determine the capability of the existing lines to accommodate the added capacity.

It is anticipated that, another consultant will perform the analysis of the future growth of the natural gas demand, and Bechard Long awaits these planning documents for review. Peak hour natural gas demands have been developed for future buildings and these projections can be seen in Table 8-2.

1.7 Storm Drain System

The Phillip Williams & Associates (PWA) report titled, "University Arroyo Flood Control and Enhancement Plan", dated 10/9/2001 was reviewed and studied. The results of this review can be seen in Section 9.

The purpose of the study was to determine the overall ability of the storm drain system to handle the 3-hour, 6-hour, and 24-hour duration of a 100-year storm. This study found that the existing storm drain system is not sufficient, recognized the system deficiencies, and provided several regional and on-campus alternatives to solve these problems.

Currently under serious consideration are one regional alternative and one on-campus alternative. Either alternative, if implemented, would improve the storm drain system infrastructure, and should adequately accommodate the planned building construction through 2015. These alternatives are discussed in Section 9. Also, future building roof drainage flows can be seen in Table 9.2

1.8 Project Summary

The following is a list of the utility identification that is used throughout this study.

<u>Project I.D. Key</u>	<u>Infrastructure System</u>
CH-XX	Chilled Water
ST-XX	Steam
CR-XX	Condensate Return
W-XX	Domestic Water
SS-XX	Sanitary Sewer
EL-XX	Electrical Distribution
NG-XX	Natural Gas
SD-XX	Storm Drain

The following Table 1.1 summarizes the infrastructure projects for all utilities. They are broken down by time period.

Peak load information, field conditions and findings for all utilities can be seen in Appendix A.

**UCR Utility Infrastructure Project
Table 1.1 Capital Project Summary**

Time Period	Building Number	Campus Location	Project ID Tag	Project Description	Present Cost (\$)
2002-2005	24	Citrus Drive Chilled Water Line Upgrade	CH-11	Demolish and remove direct buried 6" mains from Central Plant. Replace with direct buried 10" mains and connect to existing 8" lines for building 24 and reconnect to existing 6" direct buried mains continuing south.	\$ 220,000
2002-2005	17	Central Plant	CH-12	The installation of new primary pumps and a bypass line for chiller #3 that will allow for chillers #3, 4 and 5 to be run in parallel. Replace existing 14" return line.	\$ 443,000
2002-2005	17	Central Plant	CH-12A	Replace chiller #1 with 1240 Ton chiller	\$ 905,000
2002-2005	1 22 7A	Hinderacker Bachelor Humanities	CH-13	Repipe tertiary pumps	\$ 148,000
2002-2005	59	Alumni Visitor Center	CH-14	Connect to existing 20" direct buried chilled water piping with 20" mains. Extend West and North with 4" valved stubs for 59 and 20" capped connections.	\$ 369,000
2002-2005	-	South of Stat. Comp.	CH-15	Connect to 24" mains down East Campus Drive North: 12" CHWS & CHWR connection from 24" mains West and connect to existing 12" mains in TV 8A with valved connections, 6" valved stubs for 67 and 8" valved stubs for 68. Provides additional connection to campus chilled water loop system.	\$ 192,000
2002-2005	68	Physical Science #1	ST-11	At West corner of the tunnel containing 8" HPS to 21 (Statistics-Computer Bldg), connect and run 6" from tunnel direct buried across East Campus Drive with 6" capped connection and North with 4" valved stub for 68. Cost Included in building project cost.	\$ -
2002-2005	17	Central Plant	ST-12	Increase feedwater system capacity. Provide new feedwater pumps, associated piping and valves and electrical wiring.	\$ 434,000
2002-2005	68	Physical Science #1	CR-11	At West corner of the tunnel containing 4" condensate return from 21 (Statistics-Computer Bldg), connect to and run 3" from tunnel direct buried across East Campus Drive with 3" capped connection and North with 2" valved stub for 68	\$ -

URGENT PROJECTS SHOWN IN RED - these projects are recommended to be completed as soon as possible, and chilled water projects are to be completed before the summer of 2002.

UCR Utility Infrastructure Project
Table 1.1 Capital Project Summary

Time Period	Building Number	Campus Location	Project ID Tag	Project Description	Present Cost (\$)
2002-2005	65 69	East Carillon Mall	W-11	Install direct buried 6" main south connecting the end of the existing north-south 6" main that runs between 19 (Webber) and 16B (Spieth) to the east-west 12" transite main that runs down Eucalyptus, east of 66 (Biological Sciences). Install direct buried 6" main west connecting the end of the existing 6" east-west main north of Greenhouses 6-10 to the new 6" main above.	\$ 255,000
2002-2005	59	Alumni/ Visitor Center	W-12	Install direct buried 8" main west connecting the existing 8" main running along North Campus Drive to the existing 8" north-south main running on the west side of Canyon Crest. Install 2 fire hydrants equally spaced along North Campus Drive. New fire hydrant cost to be included in building cost.	\$ 155,000
2002-2005	65 69	West Carillon Mall	W-13	Install direct buried 6" main west connecting the end of the existing east-west 6" main running through Carillon Mall to the north-south 12" transite main, north of 7A (Humanities). Install direct buried 6" main north connecting the end of the existing 6" north-south main that runs between 10 and 7 (Barn Group) to the new 6" main above.	\$ 231,000
2002-2005	-	Pump Station	W-14	Replace all 4 pumps w/ 4 new 300 HP, 2,750 GPM @ 315 FT head pumps, for a total pumping capacity to 8,250 GPM, plus an additional 2,750 GPM back-up pump. Install VFD on two pumps, one for back-up.	\$ 514,000
2002-2005	-	West Campus Drive, Eucalyptus Drive	SS-11	Replace existing 8" underground main in West Campus Drive and Eucalyptus between manholes A1 and A13 with 12" PVC pipe. Slope line at 1/8" per foot.	\$ 1,306,000
2002-2005	-	Eucalyptus Drive	SS-12	Replace existing 8" sewer line between manholes A15 and A17.	\$ 78,000
2002-2005	16A	Life Sciences	SS-13	Replace existing 6" sewer line between manholes A13c and A13d.	\$ 39,000
2002-2005	16, 16B	Life Sciences	SS-14	Replace existing 8" sewer line between manholes A13c2 and A13c3.	\$ 53,000
2002-2005	26A	Boyden Lab Building	SS-15	Replace existing 8" sewer line between manholes A18 and A18a	\$ 53,000
2002-2005	13, 69	West of Pierce Hall	SS-16	Replace existing 8" sewer branch between manholes D4 and D4a.	\$ 78,000
2002-2005	13	Pierce Hall	SS-17	Replace existing 8" sewer from manhole D4c south to Pierce	\$ 53,000

**UCR Utility Infrastructure Project
Table 1.1 Capital Project Summary**

Time Period	Building Number	Campus Location	Project ID Tag	Project Description	Present Cost (\$)
2002-2005	32	Student Service Center	SS-18	Replace existing 8" sewer line between manholes D6 and D6b	\$ 78,000
2002-2005	43	Environmental Health and Safety	SS-19	Replace existing 4" sewer line between manholes A15i and A15k with new 6" line.	\$ 116,000
2002-2005	32,34	Veitch Student Center, Corporation Yard	EL-11	<p>At the Veitch Student Center, extend 12kV circuits 2A-B from Vault V-24 to a new transformer pad located adjacent to the building. Provide cable in concrete encased ducts. Construct transformer pad and cut over the existing loads. Demolish existing substation serving the building.</p> <p>At the Corporate Yard, extend 12kV circuits 2A-B from Vault V-23 to a new transformer pad located adjacent to the existing substation. Provide cable in concrete encased ducts. Construct transformer pad and cut over the existing loads. Demolish existing substation serving the Corporate Yard.</p> <p>Disconnect and remove 5kV circuit number 4. Demolish all cabling, exposed conduits in utility tunnels, and all associated switches upon demolition of substations at the Veitch Student Center and the Corporate Yard.</p>	\$ 717,000
2002-2005	19,20,21	Webber Hall, Boyce Hall, Computer/Statistics	EL-12	Extend existing 12kV circuit 2A-B from Vault V-13 (East Campus Drive) west to Webber Hall. Provide cable in concrete encased ducts, and manholes at approximately 300' intervals. Provide 12kV connections to Computer/Statistics and Boyce Hall for service at 12kV. At each building, utilize existing load interrupter switches and convert existing dual rated transformers for use at 12kV. Disconnect and remove 5kV service for Webber Hall, Computer/Statistics, and Boyce Hall. Demolish all cabling, exposed conduits in utility tunnels, and all associated switches upon cut over to 12kV.	\$ 374,000
2002-2005	74	CHASS 2	EL-13	Extend existing 12kV circuit 1A-B, and 2A-B from Vault V-8 (north of the Central Plant) south along Citrus Drive. Provide cable in concrete encased ducts, and manholes at approximately 300' intervals.	\$ 184,000
2002-2005	Period Total				\$ 6,995,000

URGENT PROJECTS SHOWN IN RED - these projects are recommended to be completed as soon as possible.

2002-2005 Reference Dwgs- Ch Water- CH-10; Stm/Cond- ST-10, CR-10; Water- W-10S, W-10N; Sewer- SS-10S, SS-10N; Elec- E-10S, E-10N

UCR Utility Infrastructure Project
Table 1.1 Capital Project Summary

Time Period	Building Number	Campus Location	Project ID Tag	Project Description	Present Cost (\$)
2006-2010	75 78	Engineering Unit #3 Performing Arts	CH-21	Extend 20" mains from 20" capped connections in CH-12 North to North Campus Drive. Extend 24" mains from existing 24" capped connections to new 20" mains and connect to complete CHW loop. Include in new 24" mains, 6" valved stubs for 75. Continue piping West from new CHW loop connection with new 8" mains to 8" valved stubs for 78 and 6" capped connections.	\$ 1,346,000
2006-2010	74	CHASS #2	CH-22	Demo and remove existing 6" mains in tunnel from central plant to TV-12. Replace with 12" mains, and extend mains South to 4" valved stubs for 74 and 10" capped connections.	\$ 265,000
2006-2010	-	Satellite Plant	CH-23	Install (2) 2000 Ton chillers and TES Tank #3.	\$ 6,614,000
2006-2010	75 78	Engineering Unit #3 Performing Arts	ST-21	At North corner of the tunnel containing 6" HPS to 58 (Fine Arts), connect new 6" steam to run from tunnel North and East with 4" valved stubs for 75 & 78	\$ 631,000
2006-2010	74	CHASS Building #2	ST-22	At South corner of the TV-12 containing 6" HPS , connect and run 6" from tunnel direct buried steam service with 4" valved stub for 76 and 6" capped connection.	\$ 86,000
2006-2010	17	Central Plant	ST-23	Demolish existing steam header system at Central Plant and install new larger capacity header and distribution from Plant to accommodate increasing loads	\$ 656,000
2006-2010	17	Central Plant	ST-24	Replace existing 1958 30,000 Lb/hr steam boiler with new 50,000 Lb/hr steam boiler and associated accessories	\$ 2,523,000
2006-2010	75 78	Engineering Unit #3 Performing Arts	CR-21	At North corner of the tunnel containing 3" condensate return from 58 (Fine Arts), connect new 3" condensate return to run from tunnel near 59, with 1-1/2" valved stub for 59 and 3" capped connectionExtend direct buried 2" condensate return North and East from 3" capped connection in CR-11 to 2" valved stubs for 75 & 78	\$ 130,000
2006-2010	74	CHASS Building #2	CR-22	At South corner of the TV-12 containing 4" condensate return, connect and run 3" from tunnel direct buried condensate return to 2" valved stub for 76 and 3" capped connection	\$ 19,000

UCR Utility Infrastructure Project
Table 1.1 Capital Project Summary

Time Period	Building Number	Campus Location	Project ID Tag	Project Description	Present Cost (\$)
2006-2010	74	CHASS Building #2	W-21	Install direct buried 6" main west from the end of the existing 6" east-west main south of 17 (Central Plant) to the western edge of 74. Install 2 fire hydrants, one at each end of the above new 6" main. New fire hydrant cost to be included in building cost.	\$ 79,000
2006-2010	75 78 80 81	Engineering Unit #3 Performing Arts Housing Unit #4 Housing Unit #5	W-22	Install direct buried 8" main south connecting the end of the existing 6" north-south main on the east side of Aberdeen to the existing 8" east-west main at the corner of North Campus Drive and Aberdeen. Install direct buried 8" main east connecting the existing north-south main running along the east side of Canyon Crest to the intersection of the 8" mains in W-11 , near 70. Interconnect the above 2 new 8" mains at their intersection, on the east side of Aberdeen. Install 2 fire hydrants, one on the east side of Canyon Crest, and one on the west side of Aberdeen.	\$ 805,000
2006-2010	70 71 72	Pentland Hills #2 Housing Unit #2 Housing Unit #3	W-23	Install direct buried 8" main east between 70 and 61 (Pentland Hills) from existing north-south 8" main to the west side of Valencia Hill. Continue 8" main north up the west side of Valencia Hill to the south side Linden. Continue west down the south side of Linden with a 8" main connecting to the end of the existing Linden 8" main across from 53 (Parking Services). Install 5 fire hydrants equally spaced along Linden and Valencia Hill. New fire hydrant cost to be included in building cost.	\$ 1,005,000
2006-2010	-	North Campus Drive	SS-21	Notify the City of Riverside that the existing 15" city owned sewer main from D1 to D6 needs to be evaluated for increased sewer capacity. The City of Riverside and the University need to negotiate fiscal responsibility for improvements to this line. It is recommended a new 18" line parallel to the existing 15" underground main in North Campus Drive be installed.	\$ 996,000
2006-2010	71 72 80 81	Housing Unit #2 Housing Unit #3 Housing Unit #4 Housing Unit #5	SS-22	Replace existing 8" sewer main down the north side of Linden Street with a 12" pipe. Extend 12" pipe east to Watkins Drive, to serve Building 72, Housing Unit #3. Slope line at 1/4" per foot. Reuse existing manholes and fill voids created by re-alignment. Cost of connection to building from main is to be included in the cost of the building.	\$ 1,741,000

**UCR Utility Infrastructure Project
Table 1.1 Capital Project Summary**

Time Period	Building Number	Campus Location	Project ID Tag	Project Description	Present Cost (\$)
2006-2010	-	Canyon Crest Drive, University Avenue	-	Notify the City of Riverside that the existing 15" sewer main from D1 west down the north side of University Avenue needs to be evaluated for increased capacity. Notify the City of Riverside that the existing 8" sewer main from G1 to D1 needs to be evaluated for increased capacity.	\$ -
2006-2010	74	CHASS #2	SS-23	Install new 8" underground sewer pipe from CHASS #2 west to existing B Line between manholes B9 and B10.	\$ 151,000
2006-2010	22,77	Batchelor Hall, Genomics	EL-21	Extend existing 12kV circuit 2A-B from Vault V-10 along the east side of Batchelor Hall. Provide cable in concrete encased ducts, and manholes at approximately 300' intervals. Provide transformer pads at Batchelor Hall for 12kV service. Disconnect and remove 5kV feeder. Demolish all cabling, exposed conduits in utility tunnels, and all associated switches upon cut over to 12kV.	\$ 571,000
2006-2010	71,72,80,81,110	Housing Units #2, 3, 4, 5, 13	EL-22	Extend existing 12kV circuit 2A-B from Vault V-25 east along Linden Street. Provide cable in concrete encased ducts, and manholes at approximately 300' intervals.	\$ 303,000
2006-2010	59,73,75,78,84,85	Alumni Center, CHASS 1, Engineering Unit #3, Performing Arts, Student/Admin #3 & 4, Play Field, Pump Station	EL-23	Extend existing 12kV circuit 3A-B from Vault V-4C north to North Campus Drive. Reroute circuit along the north side of CHASS Building 1 to refeed Vault 4E. Provide cable in concrete encased ducts, and manholes at approximately 300' intervals. Provide transformer pad at the Underground Pump Station and Field House for 12kV service. Disconnect and remove 5kV feeder. Demolish all cabling, exposed conduits in utility tunnels, and all associated switches upon cut over to 12kV.	\$ 1,170,000
2006-2010	Period Total				\$ 19,091,000

2006-2010 Reference Dwgs- Ch Water- CH-20; Stm/Cond- ST-20, CR-20; Water- W-20S, W-20N; Sewer- SS-20S, SS-20N; Elec- E-20S, E-20N

UCR Utility Infrastructure Project
Table 1.1 Capital Project Summary

Time Period	Building Number	Campus Location	Project ID Tag	Project Description	Present Cost (\$)
2011-2015	95 96	Physical Science #3 Science Building #11	CH-31	Install direct buried 8" mains East from 24" mains in East Campus Drive with 8" valved stubs for 95. Continue East with 6" valved stubs for 96.	\$ 305,000
2011-2015	82 83	Student Admin. #1 Student Admin. #2	CH-32	Install direct buried 6" mains west from capped mains in CH-21 with 4" valved stubs for 83. Continue piping West with 4" valved stubs for 82.	\$ 276,000
2011-2015	97 98 99 100 101 102	Lot 6 Devlpmnt #1 Lot 6 Devlpmnt #2 Lot 6 Devlpmnt #3 Lot 6 Devlpmnt #4 Lot 6 Devlpmnt #5 Lot 6 Devlpmnt #6	CH-33	Install direct buried 10" mains from capped 10" mains in CH-22 West and South with 6" valved stubs for 97 & 98. Continue 10" mains South with 4" valved stubs for 99. Continue 8" mains South with 4" valved stubs for 100. Continue 8" mains South with 6" valved stubs for 101. Continue piping South and East with 4" valved stubs for 102.	\$ 603,000
2011-2015	89 94	Science Building #4 Science Building #9	CH-34	Connect to 24" mains in East Campus Drive with 8" direct buried mains. Extend mains South with 8" valved stubs for 94 and 6" valved stubs for 89.	\$ 65,000
2011-2015	82 83	Student Admin. #1 Student Admin. #2	ST-31	Extend direct buried 4" main West from 6" capped connection in ST-21 to 4" valved stubs for 82 & 83	\$ 243,000
2011-2015	95 96	Physical Science #3 Science Building #11	ST-32	Extend direct buried 4" main East from 6" capped connection in ST-11 to 4" valved stub for 95 and 3" valved stub for 96.	\$ 279,000
2011-2015	97 98 99 100 101 102	Lot 6 Devlpmnt #1 Lot 6 Devlpmnt #2 Lot 6 Devlpmnt #3 Lot 6 Devlpmnt #4 Lot 6 Devlpmnt #5 Lot 6 Devlpmnt #6	ST-33	Connect 6" direct buried main from 6" capped connection in ST-22 West and South to 4" valved stub for 97 & 98. Continue South with 4" direct buried main to 3" valved stub for 99. Continue South with 4" direct buried main to 3" valved stub for 100. Continue South with 4" direct buried main to 4" valved stub for 101. Continue South and East with 3" direct buried main to 3" valved stub for 102.	\$ 668,000
2011-2015	17	Central Plant	ST-34	Replace existing 1958 30,000 Lb/hr steam boiler with new 50,000 Lb/hr steam boiler and associated accessories	\$ 2,523,000
2011-2015	82 83	Student Admin. #1 Student Admin. #2	CR-31	Extend direct buried 2" condensate return West from 3" capped connection in CR-21 to 2" valved stubs for 82 & 83.	\$ 44,000
2011-2015	95 96	Physical Science #3 Science Building #11	CR-32	Extend direct buried 2" condensate return East from 3" capped connection in CR-11 to 2" valved stub for 95 and 1-1/2" valved stub for 96.	\$ 49,000

UCR Utility Infrastructure Project
Table 1.1 Capital Project Summary

Time Period	Building Number	Campus Location	Project ID Tag	Project Description	Present Cost (\$)
2011-2015	97 98 99 100 101 102	Lot 6 Devlpmnt #1 Lot 6 Devlpmnt #2 Lot 6 Devlpmnt #3 Lot 6 Devlpmnt #4 Lot 6 Devlpmnt #5 Lot 6 Devlpmnt #6	CR-33	Install 3" direct buried condensate return main from 3" capped connection in CR-22 West and South to 2" valved stub for 97 & 98. Continue South with 2" direct buried main to 1-1/2" valved stub for 99. Continue South with 2" direct buried main to 1-1/2" valved stub for 100. Continue South with 2" direct buried main to 2" valved stub for 101. Continue South and East with 1-1/2" direct buried main to 1-1/2" valved stub for 102.	\$ 119,000
2011-2015	-	N/A	W-31	Install new 2,000,000 gallon storage tank, and associated 12" piping to interconnect to existing tanks.	\$ 1,137,000
2011-2015	87 88 89 90 91 92 93 94	Science Building #2 Science Building #3 Science Building #4 Science Building #5 Science Building #6 Science Building #7 Science Building #8 Science Building #9	W-32	Install a new 8" direct buried main originating at the new tank and connection piping in W-31 to run parallel to the existing 8" main, down East Campus Drive, and connecting to the 8" line running down East Campus Drive in front of 87. Also interconnect this new 8" main to the 12" transite main at the corner of Eucalyptus and East Campus Drive. New fire hydrant cost to be included in building cost.	\$ 533,000
2011-2015	97 98 99 100 101 102	Lot 6 Devlpmnt #1 Lot 6 Devlpmnt #2 Lot 6 Devlpmnt #3 Lot 6 Devlpmnt #4 Lot 6 Devlpmnt #5 Lot 6 Devlpmnt #6	W-33	Install a new 8" direct buried main originating at the new tank and connection piping in W-31 to run parallel to the existing 6" main, down to South Campus Drive, south to West Campus Drive and north up West Campus Drive and connecting to the 12" transite main running down Eucalyptus in front of 10. Also interconnect this new 8" main to the 6" main from W-21 . Install 5 new fire hydrants equally spaced along West Campus Drive. New fire hydrant cost to be included in building cost.	\$ 987,000
2011-2015	95 96 111 112	Physical Science #3 Science Building #11 Housing Unit #14 Housing Unit #15	W-34	Install a new 8" direct buried main east on the north side of Big Springs, from the 8" main at the corner of East Campus Drive and Big Springs to the corner of Big Springs and Valencia Hill. Continue 8" main north along the west side of Valencia Hill, and connect to existing 8" from W-11 . Install direct buried 8" main south crossing Big Springs in between 95 and 96 to serve 95 and 96. New fire hydrant cost to be included in building cost.	\$ 789,000

**UCR Utility Infrastructure Project
Table 1.1 Capital Project Summary**

Time Period	Building Number	Campus Location	Project ID Tag	Project Description	Present Cost (\$)
2011-2015	103 104 105 106 107 108 109	Housing Unit #6 Housing Unit #7 Housing Unit #8 Housing Unit #9 Housing Unit #10 Housing Unit #11 Housing Unit #12	W-35	Demolish and remove existing direct buried piping as needed for new building construction (cost to be included in new building site prep cost). Replace existing direct buried 6" east-west main along Linden with a new direct buried 8" main to be connected with 8" piping to existing meter and 12" city main. Install 2 new north-south direct buried mains from the above new 8" east-west main, one along the west side of Canyon Crest north to the existing 6" main along Blaine, and one along the western side of 107-109, north to the existing 6" main along Blaine. Extend the existing north-south direct buried 6" main along the eastern side of 104 and 105 with new 6" direct buried pipe north to the 6" main along Blaine, and south with new 6" direct buried pipe to the new 8" main above. New fire hydrant cost to be included in building cost.	\$ 1,405,000
2011-2015	82 83	Student/ Admin. #1 Student/ Admin. #2	W-36	Install a new 8" direct buried main west from the existing 8" north-south main on the east side of Canyon Crest. Route piping across Canyon Crest, to run along the north side of University, terminating at the west side of 82. New fire hydrant cost to be included in building cost.	\$ 258,000
2011-2015	87 88 89 90 91 92 93 94	Science Building #2 Science Building #3 Science Building #4 Science Building #5 Science Building #6 Science Building #7 Science Building #8 Science Building #9	SS-31	Replace existing 8" and 6" underground sewer main in East Campus Drive with 12" pipe from manhole D8 to Building 89. Cost of connection to building from main is to be included in the cost of the building.	\$ 535,000
2011-2015	97 98 99 100 101	Lot 6 Devlpmnt #1 Lot 6 Devlpmnt #2 Lot 6 Devlpmnt #3 Lot 6 Devlpmnt #4 Lot 6 Devlpmnt #5	SS-32	Install new 8" underground sewer main from existing manhole B11 to Building 101 to serve new buildings listed. Cost of connection to building from main is to be included in the cost of the building.	\$ 374,000

UCR Utility Infrastructure Project
Table 1.1 Capital Project Summary

Time Period	Building Number	Campus Location	Project ID Tag	Project Description	Present Cost (\$)
2011-2015	11, 11A, 12, 97, 98, 99, 100, 101, 102	Olmstead Hall, Humanities-2, Theater, Art Annex, Lot 6 Devlpmnt #1, 2, 3, 4, 5, 6	EL-31	Extend existing 12kV circuit 3A-B from Vault V-4 southeast along West Campus Drive. Provide cable in concrete encased ducts, and manholes at approximately 300' intervals. Provide transformer pads at the Humanities 2 building for 12kV service. Disconnect and remove 5kV feeder. Demolish all cabling, exposed conduits in utility tunnels, and all associated switches upon cut over to 12kV.	\$ 1,297,000
2011-2015	14, 86	Geology, Science Cluster Building #1	EL-32	Reroute circuit outside of building footprint. Provide cable in concrete encased ducts. Provide transformer pads at Pierce Hall for 12kV service. At the Geology Building, utilize existing load interrupter switches and convert existing dual rated transformers for use at 12kV. Disconnect and remove 5kV feeder. Demolish all cabling, exposed conduits in utility tunnels, and all associated switches upon cut over to 12kV.	\$ 683,000
2011-2015	82, 83	Student/Admin #1 &2	EL-33	Extend existing 12kV circuit 3A-B from Alumni Center west along University Ave. Provide cable in concrete encased ducts, and manholes at approximately 300' intervals.	\$ 184,000
2011-2015	95, 96, 111, 112	Physical Science #3, Classroom Building #11, Housing Units #14 &15	EL-34	Extend existing 12kV circuit 2A-B from Vault V-15 east along Big Springs Road. Provide cable in concrete encased ducts, and manholes at approximately 300' intervals.	\$ 487,000
2011-2015	103, 104, 105, 106	Housing Units #6, 7, 8, 9, 10, 11, 12	EL-35	Extend existing 12kV circuit 2A-B from Vault V-27 north to the Housing Units #6 through 12 site. Provide cable in concrete encased ducts, and manholes at approximately 300' intervals.	\$ 671,000
2011-2015		Various	EL-36	Repair 5kV System Phase I - Demolish 4.16kV distribution system originating from the main substation located west of Interstate 215. Upgrade buildings/loads to receive primary service at 12kV. Replace all transformers and switchgear rated at 5kV with equipment rated for use at 12kV. Extend substructure and existing circuits 2A, 2B, 3A, & 3B. At selected locations, combine loads to reduce the number of substations/transformers, specially at buildings with multiple services.	\$ 5,449,000

**UCR Utility Infrastructure Project
Table 1.1 Capital Project Summary**

Time Period	Building Number	Campus Location	Project ID Tag	Project Description	Present Cost (\$)
2011-2015		Various	EL-37	Repair 5kV System Phase II - Demolish 4.16kV distribution system originating from the Central Power Plant. Upgrade buildings/loads to receive primary service at 12kV. Replace all transformers and switchgear rated at 5kV with equipment rated for use at 12kV. Extend substructure and existing circuits 1A, & 1B. At selected locations, combine loads to reduce the number of substations/transformers, specially at buildings with multiple services.	\$ 3,492,000
2011-2015	Period Total				\$ 23,455,000
2011-2015 Reference Dwgs- Ch Water- CH-30; Stm/Cond- ST-30, CR-30; Water- W-30S, W-30N; Sewer- SS-30S, SS-30N; Elec- E-30S, E-30N					
2002-2015	Grand Total				\$ 49,541,000

SECTION 2.0

DESCRIPTION OF CAMPUS

2.1 Current Campus

The University of California, Riverside is located 3 miles east of the downtown Riverside area. Interstate 215/60 splits the West Campus and the East Campus. This infrastructure study addresses only the East Campus. Most of the campus instructional and research space is accommodated on the East Campus, while the West Campus is primarily used for agricultural teaching and research.

The current campus enrollment is approximately 14,000 students (headcount). The campus contains approximately 50 major buildings comprising over 3.3 million overall gross square feet (OGSF). The existing buildings can be seen on the drawings M-00S and M-00N at the end of this section. The academic campus core is centered southeast of the intersection of University Avenue and Interstate 215/60. The two student centers and residence halls are situated north of this area. The key growth areas for the future are the south and east portions of the academic campus, north of North Campus Drive as well as east along North Campus Drive and University Avenue and west along Big Springs Road. Table 2-1 lists the existing building OGSF.

2.2 Future Campus to 2015

The campus is projected to grow from 14,000 to 25,000 students by the year 2015. This projected growth will require the addition of approximately 8.1 million square feet to the campus. The total OGSF will be over 8.1 million square feet. Table 2-1 and 2-2 (found in Section 2, pages 2-2 through 2-5) lists existing and future buildings and their GSF.

The drawings at the end of this section outline the projected growth by time period out to 2015; M-10S & M-10N (2002-2005), M-20S & M-20N (2006-2010), M-30S & M-30N (2011-2015).

Table 2.1: Existing Building Square Footage

Building	No.		O.G.S.F.
Aberdeen Hall	33		133,435
Administration - Hinderaker Hall	1		46,490
Anderson Hall	27B & C		See 27A
Art Annex	12A		2,645
Barn Group	7		5,600
Batchelor Hall (North & South)	22		114,860
Bookstore	48		33,400
Bourns Hall	54		145,309
Boyce Hall	20		109,932
Boyden Lab Building	26A		6,396
Campus Modular Building			21,960
Canyon Crest Student Family Housing	62		197,266
Carillon Tower	5		4,774
Central Power Plant	17		19,437
Chapman Hall -Soils & Plant Nutrition	27A		51,941
Chemical Sciences	13A		See 13
Child Development Center	51		12,000
College Building North & South	42		17,944
Commons	4		86,004
Computer Statistics	21		42,096
Corporation Yard	34		45,000
Costo	3		See 4
Custodial			7,446
Entomology	26		32,444
Entomology Annex	23		16,664
Entomology Research Museum	26B		8,988
Environmental Health and Safety	43		6,334
Fawcett Lab	28		20,997
Fine Arts	58		100,371
Geology	14		103,095
Greenhouse 11-13A	30		17,500
Greenhouse 1-3	30		15,000
Greenhouse 15-17	30		15,000
Greenhouse 18-21	30		20,000
Greenhouse 6-10	30		25,000
Humanities-1	7A		111,180
Humanities-2	11A		See 12
Insectary	26D		8,783
Lath House #1			5,000
Lath House #2			5,000
Life Sciences	16		150,994
Life Sciences	16A		See 16
Lothian Hall	31		163,250
Mobile Trailer Facilities	29		15,691
Olmstead Hall (Humanities-2)	12		141,049

Table 2.1: Existing Building Square Footage

Building	No.		O.G.S.F.
Parking Services	53		5,612
Pentland Hills	61		134,544
Physical Education	2		65,346
Physics	18		94,808
Physics 2000	18A		See 18
Pierce Hall (North & South)	13		139,912
Police Facility	36		9,320
Rivera Library	15		230,013
Science Library	60		167,358
Speith Hall -Life Sciences	16B		See 16
Sproul Hall	9		78,870
Student Recreation Center	55		80,000
Surge Building	64		84,375
Sweeney Art Gallery	39A		720
Telephone Building	40		2,584
Terrace Conference	47		4,880
Theatre	11		See 12
University Cottage	8		1,025
University Lab	25A		11,803
University Offices	25		19,650
USDA Salinity Lab	46		
Veitch Student Center	32		24,180
Watkins Hall	10		63,913
Webber Hall	19		50,801
<i>SUBTOTAL</i>			3,355,989

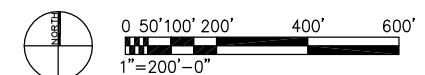
Table 2.2: Future Building Square Footage

Building	No.		G.S.F.
2002 - 2005			
Alumni/ Visitor Center	59		25,890
Biological Science	66		55,071
Boiler Plant (additional load)			
Commons Expansion	69		186,004
Demo Commons	4		(86,004)
Engineering Unit #2	67		152,010
Entomology	24		67,139
Insectory & Quarantine	26C		31,523
Physical Science #1	68		129,417
Satellite Central Plant			7,000
Science Lab #1	65		44,138
Pentland Hills #2	70		67,500
Housing Unit #2	71		60,000
Housing Unit #3	72		60,000
SUBTOTAL			799,688
CUMULATIVE TOTAL			4,155,677
2006 -2010			
CHASS Bldg 1	73		115,000
CHASS Bldg 2	74		85,000
Boiler Plant (additional load)			
Demo Art Annex	12A		(2,645)
Engineering Unit #3	75		150,000
Entomology #2	76		100,000
Demo Entomology Annex	23		(16,664)
Genomics	77		120,000
Performing Arts	78		75,000
Physical Science #2	79		130,000
Satellite Plant Expansion			0
Housing Unit #4	80		93,750
Housing Unit #5	81		93,750
SUBTOTAL			943,191
CUMULATIVE TOTAL			5,098,868
2011 -2015			
<u>Student/ Administration Cluster:</u>			
Boiler Plant (additional load)			
Building 1	82		100,000
Building 2	83		100,000
Building 3	84		120,000
Building 4	85		50,000
<u>Science Cluster:</u>			
Building 1 (lab)	86		100,000
Demo 20% of Pierce Hall	13		(27,982)
Building 2 (classroom)	87		100,000

Table 2.2: Future Building Square Footage

Building	No.		G.S.F.
Science Bldg. (lab)	88		100,000
Demo Greenhouse 15-17	30		(15,000)
Building 4 (classroom)	89		100,000
Demo Custodial			(7,446)
Demo Entomology	26		(32,444)
Demo Insectary	26D		(8,783)
Building 5 (lab)	90		100,000
Demo Greenhouse 11- 13A	30		(17,500)
Building 6 (classroom)	91		100,000
Demo Lath House #1			(5,000)
Building 7 (lab)	92		100,000
Demo Lath House #2			(5,000)
Building 8 (classroom)	93		120,000
Demo Greenhouse 18-21	30		(20,000)
Building 9 (lab)	94		120,000
Physical Science #3	95		130,000
Building 11 (classroom)	96		100,000
<u>Future Bldg Devlpmnt in Prkg Lot 6:</u>			
Building 1	97		100,000
Building 2	98		50,000
Building 3	99		75,000
Building 4	100		50,000
Building 5	101		150,000
Building 6	102		75,000
Housing Unit #6	103		112,500
Housing Unit #7	104		112,500
Housing Unit #8	105		112,500
Housing Unit #9	106		112,500
Housing Unit #10	107		112,500
Housing Unit #11	108		112,500
Housing Unit #12	109		112,500
Housing Unit #13	110		112,500
Housing Unit #14	111		112,500
Housing Unit #15	112		112,500
<i>SUBTOTAL</i>			3,025,845
<i>GRAND TOTAL</i>			8,124,713

- NO. BUILDING NAME**
- 33 ABERDEEN-INVERNESS HALL
 - 27B ANDERSON HALL
 - 27C ANDERSON HALL
 - 12A ART ANNEX
 - 7 BARN GROUP
 - 22 BACHELOR HALL
 - 48 BOOKSTORE
 - 54 BOURNS HALL
 - 20 BOYCE HALL
 - 26A BOYDEN LABS
 - CAMPUS MODULAR BUILDING
 - 5 CARILLION TOWER
 - 27A CHAPMAN HALL
 - 42 COLLEGE BUILDING NORTH & SOUTH
 - 4 COMMONS
 - 34 CORPORATE YARD
 - 3 COSTO HALL
 - CUSTODIAL BUILDING
 - 23 ENTOMOLOGY ANNEX
 - 26 ENTOMOLOGY BUILDING
 - 26 ENTOMOLOGY RESEARCH MUSEUM
 - 43 ENVIRONMENTAL HEALTH AND SAFETY
 - 28 FAWCETT LABS
 - 58 FINE ARTS BUILDING
 - 14 GEOLOGY BUILDING
 - 30 GREENHOUSES
 - 49 HIGHLANDER HALL
 - 1 HINDERAKER HALL
 - 7A HUMANITIES BUILDING
 - 26D INSECTORY BUILDING
 - 16 LIFE SCIENCES BUILDING
 - 16A LIFE SCIENCES 1500
 - 31 LOTHIAN HALL
 - 29 MOBILE TRAILER FACILITIES
 - 12 OLMSTED HALL
 - 53 PARKING SERVICES
 - 61 PENTALND HILLS
 - 2 PHYSICAL EDUCATION BUILDING
 - 18 PHYSICS BUILDING
 - 18A PHYSICS 2000
 - 13 PIERCE HALL
 - 36 POLICE FACILITY
 - 15 RIVERA LIBRARY
 - 60 SCIENCE BUILDING
 - 16B SPIETH HALL
 - 9 SPROUL HALL
 - 21 STATISTICS-COMPUTER BUILDING
 - 17 CENTRAL PLANT
 - 55 STUDENT REC. BUILDING
 - 11A STUDIO THEATRE
 - 64 SURGE BUILDING
 - 39A SWEENEY ART GALLERY
 - 47 TERRACE CONFERENCE ROOMS
 - 11 THEATRE
 - 8 UNIVERSITY COTTAGE
 - 25A UNIVERSITY LABS
 - 25 UNIVERSITY OFFICE BUILDING
 - 46 USDA SALINITY LABS
 - 32 VIETCH STUDENT CENTER
 - 10 WATKINS HALL
 - 10A WATKINS RECITAL HALL
 - 19 WEBBER HALL



EXISTING SITE MAP SOUTH



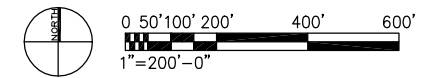
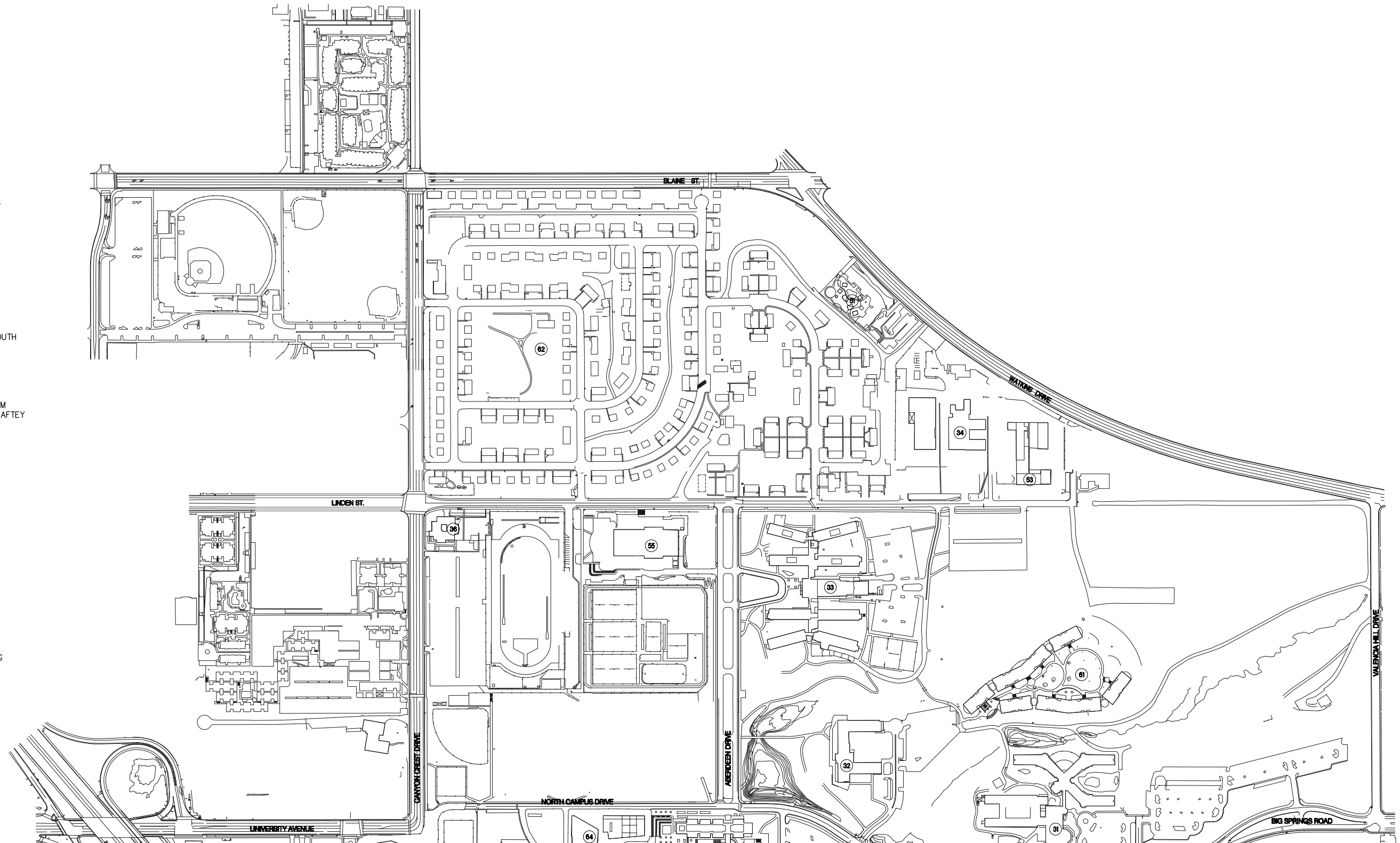
10670 Trevena Street
 Suite 208
 San Diego
 CA 92131-2437
 (858) 578-8861
 FAX (858) 578-8865
 E-MAIL: sd@bechl.com

PROJECT NO:
01897
 DATE:
01/28/01

SHEET NO:
M-00S

NO. BUILDING NAME

- 33 ABERDEEN-INVERNESS HALL
- 27B ANDERSON HALL
- 27C ANDERSON HALL
- 12A ART ANNEX
- 7 BARN GROUP
- 22 BACHELOR HALL
- 48 BOOKSTORE
- 54 BOURNS HALL
- 20 BOYCE HALL
- 26A BOYDEN LABS
- CAMPUS MODULAR BUILDING
- 5 CARILLION TOWER
- 27A CHAPMAN HALL
- 42 COLLEGE BUILDING NORTH & SOUTH
- 4 COMMONS
- 34 CORPORATE YARD
- 3 COSTO HALL
- CUSTODIAL BUILDING
- 23 ENTOMOLOGY ANNEX
- 26 ENTOMOLOGY BUILDING
- 26 ENTOMOLOGY RESEARCH MUSEUM
- 43 ENVIRONMENTAL HEALTH AND SAFETY
- 28 FAWCETT LABS
- 58 FINE ARTS BUILDING
- 14 GEOLOGY BUILDING
- 30 GREENHOUSES
- 49 HIGHLANDER HALL
- 1 HINDERAKER HALL
- 7A HUMANITIES BUILDING
- 26D INSECTORY BUILDING
- 16 LIFE SCIENCES BUILDING
- 16A LIFE SCIENCES 1500
- 31 LOTHIAN HALL
- 29 MOBILE TRAILER FACILITIES
- 12 OLMSTED HALL
- 53 PARKING SERVICES
- 61 PENTALND HILLS
- 2 PHYSICAL EDUCATION BUILDING
- 18 PHYSICS BUILDING
- 18A PHYSICS 2000
- 13 PIERCE HALL
- 36 POLICE FACILITY
- 15 RIVERA LIBRARY
- 60 SCIENCE BUILDING
- 16B SPIETH HALL
- 9 SPROUL HALL
- 21 STATISTICS-COMPUTER BUILDING
- 17 CENTRAL PLANT
- 55 STUDENT REC. BUILDING
- 11A STUDIO THEATRE
- 64 SURGE BUILDING
- 39A SWEENEY ART GALLERY
- 47 TERRACE CONFERENCE ROOMS
- 11 THEATRE
- 8 UNIVERSITY COTTAGE
- 25A UNIVERSITY LABS
- 25 UNIVERSITY OFFICE BUILDING
- 46 USDA SALINITY LABS
- 32 VIETCH STUDENT CENTER
- 10 WATKINS HALL
- 10A WATKINS RECITAL HALL
- 19 WEBBER HALL



EXISTING SITE MAP NORTH

Bechard Long & Associates, Inc.
MECHANICAL AND ELECTRICAL
CONSULTING ENGINEERS

10670 Trevena Street
Suite 208
San Diego
CA 92131-2437
(858) 578-8861
FAX (858) 578-8865
E-MAIL: sd@bech.com

PROJECT NO:
01897
DATE:
01/28/01

SHEET NO:
M-00N

