

ELEMENT 10 – UTILITIES

UTILITIES ELEMENT (CHILLED WATER SUB-ELEMENT)

Goal 1: DEVELOP AN ENERGY EFFICIENT, ENVIRONMENTALLY SAFE CENTRAL CHILLED WATER PRODUCTION SYSTEM SUFFICIENT TO ACCOMMODATE LONG RANGE GROWTH AND DEVELOPMENT.

Objective 1A

Continue development of the chilled water capacity for the academic buildings, within the central utility plant (CUP), and Satellite Utility Plant (SUP) to allow for system capacity increases to meet future demands of the master plan. As the campus expands in later phases, with research laboratories, etc., the need and justification for redundancy and reliability increases due to the use of 100-percent outside air HVAC systems for these types of facilities.

Policy 1A-1

Organize primary piping arrangement and space allocation within the CUP and SUP to allow for future expansion, without interrupting service. Future expansion includes additional chillers, or replacement of existing chillers with larger chillers.

Policy 1A-2

Develop a coordinated chilled water production and distribution scheme between the CUP and SUP to allow their combined capacity to service the academic facilities campus-wide to increase system reliability.

Policy 1A-3

Develop economic chiller sizes; consider low load conditions during winter nighttime operation, large loads during summer daytime periods, and for critical loads associated with animal care areas which require operation during power outages, the impact of chiller size on emergency power sources. Size larger chillers with reliability constraint to meet critical cooling loads with one chiller out of service to existing facilities.

Policy 1A-4

Develop cooling tower arrangement with cells matched for chiller module sizes to provide reliability constraint to meet critical cooling loads with one cooling tower cell out of service.

Policy 1A-5

Design chillers that utilize the most environmentally safe refrigerants available.

Policy 1A-6

Design energy plant equipment with high efficiency ratings to minimize electrical consumption.

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Policy 1A-7

Design the academic facilities chiller plant to allow for future adaptation of the system to a thermal energy storage system. Each Facility Expansion phase shall include a Life Cycle Cost Analysis to study the use of thermal energy storage technology to minimize electricity costs by utilizing lower off-peak rates, and thus qualify for Florida Power and Light rebates.

Policy 1A-8

Establish an internal project development process that reviews short range central energy plant development in the context of long range infrastructure requirements.

Policy 1A-9

The central utility plant (CUP) and Satellite Utility Plant (SUP) shall provide the campus with chilled water. The system shall be maintained by the University's maintenance engineers, who shall be instructed by the manufacturer, in the proper procedures for maintenance.

Policy 1A-10

The University shall adopt the following procedures, whenever possible, to reduce energy consumption:

- Specify high efficiency water cooled chillers in the CUP and SUP
- Specify premium efficiency electrical motors
- Use variable air volume systems for cooling
- Provide night set back temperatures set points (85 degrees) for air conditioning
- Monitor the energy management system monthly to optimize energy consumption
- Specify high thermal resistance values for wall and roof insulation
- Provide thermal storage system at the CUP when funding is available
- Provide insulated glass with a low shading coefficient value
- Provide overhangs on windows
- Set a goal to eliminate or greatly reduce heating
- Monitor air quality which should reduce the requirement for outside air

Policy 1A-11

The space allocated for the CUP is adequate for limited future expansion and additional buildings can be added next to the original plant. The Satellite Utility Plant (SUP) may be expanded to the north to provide additional space for mechanical equipment. There is sufficient room to add one (1) new chiller bay without encroachment into the existing air cooled chiller plant.

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Policy 1A-12

Expand the Satellite Utility Plant (SUP) to allow for replacement of the existing air cooled plant serving the first phase of the FAU/Scripps Joint Use Facility to improve efficiency and increase system reliability.

Policy 1A-13

Continue development of the underground chilled water piping distribution system and provide for strategically located valve boxes and properly sized piping run-outs for future facilities. Piping mains are oversized and will support future campus growth, however, selected branch piping is at full capacity.

Objective 1B

Develop chiller plant for the student housing facilities, to meet the immediate capacity requirements, and to allow for system capacity increases to meet the demand of the master plan, i.e. a total of 500 beds for the Honors College.

Policy 1B-1

Allow for the expansion of chilled water capacity to the final residence halls at the existing Residence chilled water plant and connect through the existing 8” chilled water main already stubbed out for this purpose.

Policy 1B-2

As the campus matures and funds allow, convert the existing residential air cooled chilled water plant to a water cooled plant or connect the residential chilled water system to the Central or Satellite loop.

Goal 2: DEVELOP A CENTRAL CHILLED WATER DISTRIBUTION SYSTEM SUFFICIENT TO ACCOMMODATE LONG RANGE GROWTH AND DEVELOPMENT.

Objective 2A

Development of a chilled water distribution system. Provide a primary chilled water distribution system within the central utility plant (CUP) and Satellite Utility Plant (SUP), secondary distribution system throughout the campus and tertiary distribution within each facility.

Policy 2A-1

Size primary and secondary distribution system to allow for future expansion without interruption of service to existing facilities. The primary loops shall be integrated yet separated with at least one primary valve to offer some flexibility in the crossover or shared use of the capacities from each.

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Policy 2A-2

Develop chilled and condenser water pumping arrangement with a redundant pump available for back-up of each size pump.

Policy 2A-3

Size tertiary distribution system to allow for future expansion of facility without interruption of service.

Policy 2A-4

Establish easements for installation of underground secondary distribution system coordinated with other utilities.

Policy 2A-5

Design routing of underground secondary distribution system to utilize common utility trenches.

Policy 2A-6

Utilize pre-insulated piping with welded steel carrier pipe to provide reliable chilled water service.

Policy 2A-7

Establish an internal project development process that reviews short range primary, secondary and tertiary distribution systems in the context of long range infrastructure requirements.

Policy 2A-8

Develop a pumping/control strategy that will allow the main underground piping isolation valves separating the plants to be opened once separate metering of Scripps is no longer required, improving system reliability.

Policy 2A-9

Develop a piping arrangement for connection of future buildings that is compatible with the chilled water distribution scheme.

Goal 3: DEVELOP AN ENERGY EFFICIENT CENTRAL HOT WATER PRODUCTION SYSTEM SUFFICIENT TO ACCOMMODATE LONG RANGE GROWTH AND DEVELOPMENT WITHIN THE SATELLITE PLANT.

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Objective 1A

Develop a hot water boiler plant for the research laboratories and future academic buildings, within the satellite plant, to meet the immediate capacity requirements and future system capacity increases to meet the demand of the current master plan.

Policy 1A-1

Organize primary piping arrangement and space allocation within the satellite plant to allow for future expansion, without interrupting service. Future expansion would include additional boilers, or replacement of existing boilers with larger boilers.

Policy 1A-2

Develop a hot water system with the production and distribution capacity to service the academic facilities.

Policy 1A-3

Design hot water plant equipment with high efficiency ratings.

Policy 1A-4

Establish an internal project development process that reviews short range hot water system satellite plant development in the context of long range infrastructure requirements.

Policy 1A-5

The satellite plant shall provide the campus with reheat hot water. The facility shall be installed by the mechanical contractor and the equipment manufacturers shall insure a proper start up. The system shall be maintained by the University's maintenance engineers, who shall be instructed by the manufacturer, the proper procedures for maintenance.

Policy 1A-6

The University shall adopt the following procedures, whenever possible, to reduce energy consumption:

- Specify premium efficiency electrical motors
- Use primary, secondary, tertiary variable flow hot water pumping system
- Provide night set back temperatures set points (85 degrees) for air conditioning
- Monitor the energy management system monthly to optimize energy consumption
- Specify high thermal resistance values for wall and roof insulation
- Provide insulated glass with a low shading coefficient value
- Provide overhangs on windows

Policy 1A-7

The space allocated for the satellite plant shall be adequate for future expansion and additional buildings may be added next to the original plant. The underground piping shall

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be oversized and strategically located valve boxes must be included for the anticipated growth of the campus.

Policy 1A-8

The capacity should allow for existing hot water boiler capabilities at Scripps I and II to be consolidated at the satellite plant once the existing equipment has reached the end of its useful life.

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UTILITIES ELEMENT (ELECTRICAL SUB-ELEMENT)

Goal 1: PROVIDE AN ELECTRICAL POWER SOURCE TO MEET THE DEMAND FOR FUTURE GROWTH OF THE UNIVERSITY.

Objective 1A

Expand Florida Power and Light's (FPL's) power grid to provide service to the campus and maintain a highly dependable source of power.

Policy 1A-1

Coordinate with FPL to evaluate the capacity of the existing source (Ross Substation).

Policy 1A-1

Coordinate design of on site power distribution with FPL to ensure that they can meet projected service demand consistent with the University's projected population and growth. Assist the FPL Engineer in estimating the projected load of the campus in its final state, to provide accurate data to utilize in planning capacity of the utility's infrastructure.

Policy 1A-3

Consult with FPL to develop a second source (substation) to provide 100% redundancy to the campus.

Policy 1A-4

Provide second independent primary power feeders to the University's campus to improve reliability of service, configure as 'loop' feed with throw-over capability.

Policy 1A-5

Develop the power distribution network on campus in continuous loops to achieve a higher degree of reliability.

Policy 1A-6

Coordinate construction phasing with FPL to provide uninterrupted power consistent with the University's plans for growth and development.

Policy 1A-7

Establish an internal project development process that reviews short-range development in the context of long range development to assure future expansions will qualify for more favorable large demand power rates.

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Policy 1A-8

As campus expands toward build-out, coordinate with FPL to continue loop-feed design philosophy.

Goal 2: PROVIDE AN ELECTRICAL DISTRIBUTION SYSTEM SUFFICIENT TO ACCOMMODATE LONG RANGE GROWTH AND DEVELOPMENT.

Objective 2A

Provide a high voltage primary service Right of Way for FPL easements throughout campus.

Policy 2A-1

Wherever possible, easements shall be routed along planned roadways, and shall avoid being routed through future building sites.

Policy 2A-2

All primary distribution cables shall be routed in underground ducts – overhead lines shall not be considered.

Policy 2A-3

FPL shall own and maintain the underground primary distribution system.

Policy 2A-4

Pad mounted transformers shall be utilized to provide secondary service at 277/480v, 3-phase, 4-wire, at each building. FPL shall own and maintain the transformers.

Policy 2A-5

Establish a policy to provide spare conduits for future feeds from pad mounted transformers, to buildings and structures.

Policy 2A-6

Continually coordinate with FPL for phasing/timing of primary network expansion to ensure on-time delivery of new buildings or facilities.

Goal 3: TO MINIMIZE THE OPERATIONAL COSTS OF ENERGY CONSUMPTION.

Objective 3A

Implement policies and procedures to promote energy conservation.

Policy 3A-1

Coordinate with FPL to ensure that the University is receiving the optimum metering rate. Consideration must be given to the University's operation, personnel and maintenance costs for the different types of service.

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Policy 3A-2

Each building shall be secondarily metered at the pad mounted transformers, during the short-term.

Policy 3A-3

Coordinate with FPL to consider 'totalization' of accounts for large demand user rate, when load qualifies.

Policy 3A-4

Consider primary meter rate at total build-out with FPL retaining ownership of primary network and transformers.

Policy 3A-5

The University shall adopt the following procedures, whenever possible, to reduce energy consumption:

- Specify high efficiency water cooled chillers in the CUP and SUP
- Set a goal of 1 watt per square foot for lighting design criteria
- Limit the use of incandescent lighting
- Provide high set points (78 degrees) for air conditioning
- Provide low set points (68 degrees) for heating
- Monitor the energy management system monthly to optimize energy consumption
- Specify high thermal resistance values for wall and roof insulation
- Provide thermal storage system at the CUP when funding is available
- Provide glass with a low U factor and high shading coefficient
- Set a goal to eliminate or greatly reduce heating
- Monitor air quality which should reduce the requirement for outside air

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UTILITIES ELEMENT (TELECOMMUNICATIONS SUB-ELEMENT)

Goal 1: PROVIDE MODERN COMMUNICATIONS CONNECTIONS FROM THE LOCAL TELEPHONE COMPANY AND LOCAL EXCHANGE CARRIERS, (LECS) TO MEET THE DEMAND FOR DATA, VOICE AND VIDEO SERVICE TO THE UNIVERSITY'S BUILDINGS AND STRUCTURES.

Objective 1A

Expand communication service to the campus.

Policy 1A-1

Coordinate final design of on site distribution with LECs to ensure that they have sufficient capacity to meet projected service demand consistent with the University's projected population and growth.

Policy 1A-2

Establish easements for installation of LECs underground cables coordinated with other utilities.

Policy 1A-3

Coordinate construction phasing with LECs to provide uninterrupted service consistent with the University's plans for growth and development.

Policy 1A-4

Seek to provide two independent fiber optic service entrance cables feed from separate central offices to ensure highly dependable service.

Policy 1A-5

Develop the distribution system to allow the running of category 5E or 6 unshielded twisted pairs from the central switch to every telephone jack. Each building should be provided with space for a Satellite Distribution Frame (SDF).

Policy 1A-6

Assure future expansions will migrate toward newer emerging technologies.

Policy 1A-7

Coordinate final design with LEC to ensure that future expansions can incorporate a university operated switch in conjunction with the LEC service.

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Goal 2: DEVELOP A TELECOMMUNICATIONS DISTRIBUTION SYSTEM SUFFICIENT TO ACCOMMODATE LONG RANGE GROWTH AND DEVELOPMENT.

Objective 2A

Develop a telecommunications distribution network to accommodate high speed voice and data transfer on and off campus.

Policy 2A-1

Provide a system for a high speed fiber optic backbone.

Policy 2A-2

Develop a structured cable network for intra building and inter building connectivity consistent with the University's projected population and growth.

Policy 2A-3

Assure future compatibility with new emerging technologies for distribution networks.

Policy 2A-4

Establish a manhole and ductbank system which will provide for the remote locations to facilitate distant learning.

Policy 2A-5

Provide a distribution network which operates at high data transmission rates and simultaneously interfaces dissimilar topologies.

Policy 2A-6

Develop a manhole and ductbank system that could handle campus wide data highway that provides connectivity to building automation systems. Each building should be connected to a manhole with 2-4" conduits for voice and 2-2" conduits for data, or as required.

Policy 2A-7

Standardize the surge suppression required for telecommunications cables.

Objective 2B

To provide adequate facility capacity to meet future needs of the University.

Policy 2B-1

Size and/or increase size of main telecommunications room in the Central Utility Plant with adequate room to accommodate the current requirements and the future expansion of the university. Provide adequate space for battery backup for the telephone switch which will ultimately service the entire university.

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Policy 2B-2

Size the manhole and ductbank system to accommodate the final build out of the university. Partial installation of ductbank can be made during the different phases of the build out but these installations should always consider the final build out.

Policy 2B-3

Provide adequate conduits from the telecommunications manholes to each of the buildings it serves.

Policy 2B-4

The following procedures shall be adopted to ensure that future telecommunications systems capacity and capital improvements required to meet future University needs are provided when required, based on needs identified in other master plan elements:

- IRM Project Management shall be notified of all new facilities being planned
- IRM Project Management shall be notified of all facilities modifications
- The telephone company shall be notified of all new facilities being planned
- The telephone company shall be notified of all facilities modifications
- The capacity for future growth of the main telephone switch shall be evaluated yearly
- The capacity for future growth of the data network shall be evaluated yearly
- The capacity for future growth of the energy management system shall be evaluated yearly
- The capacity for future growth of the fire alarm system shall be evaluated yearly
- The capacity for future growth of the security system shall be evaluated yearly

Policy 2B-5

The master plan indicates that all the buildings and the CUP will be tied together via a telecommunications manhole and ductbank system. This system initially will run from the CUP north to pick up all the Phase 1 buildings. As each additional facility is added to the campus, the telecommunications manhole and ductbank system must be evaluated to determine if it must be extended to pick up the additional facility. The master plan for the telecommunications manhole and ductbank system should be evaluated at each stage of the master plan. This would be in the years 2004 and 2009.

Objective 2C

To provide reconfigurable high speed data and video paths between individual face plates and central locations. The systems shall provide an organized and efficient means of data distribution to a large number of users.

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Policy 2C-1

Fully review the data requirements of new structures and determine the impact on the ductbank system and the existing data backbone and routing system.

Policy 2C-2

Provide an adequate number of single mode and multimode fiber optic cable based on current capacity and projected needs.

Objective 2D

Standardize the horizontal and vertical building cable and termination techniques, outlet configuration and communication room sizes for new buildings.

Policy 2D-1

Horizontal and vertical building cable and termination techniques shall comply with EIA/TIA 568 and 569 standards.

Policy 2D-2

The minimum communications room size at the Main Distribution Frame and Intermediate Distribution frames shall be in accordance with the IRM Specification. Dedicated (IRM) rooms should be centrally located and provided on each floor of every building.

Policy 2D-3

Vertical riser pair counts shall be based on floor square footage and/or occupancy count.

Policy 2D-4

Horizontal cable runs shall not exceed 100 meters and shall be at least 3 -4 pair, category 5E/6 cable with 2-strand fiber optic cables run in a star configuration to every communications outlet.

Policy 2D-5

Communication outlets shall be modular and contain at least two voice jacks (RJ-11) and two data jacks which terminate cables on equipment consistent with the IRM Specification.

Objective 2E

To provide for increasing demands of large bi-directional digital data transfers generated by the availability of multimedia applications and the growth of instructional television and video teleconferencing.

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Policy 2E-1

Fully review the backbone transport capacity to determine if adequate bandwidth is available and to expand the bandwidth by the addition of fiber paths and/or a change in transport system protocols.

Objective 2F

Standardize the site fiber cable and building termination methods.

Policy 2F-1

Site fiber optic cables shall be duct rated multi or single mode, in accordance with the IRM Specification, loose tube type, terminated on rack mounted fiber optic distribution frames using “SC/SL” style connectors.

Objective 2G

Standardize the horizontal and vertical building fiber optic cable and termination techniques and outlet configuration.

Policy 2G-1

Vertical risers shall be job appropriate fiber cable configured in a star or collapsed backbone arrangement with all routing equipment in a central location. Riser fiber shall terminate on rack mounted fiber optic distribution frames using “SC/SL” style connectors.

Policy 2G-2

Horizontal cable runs shall not exceed 100 meters and shall be at least 3 pair, category 5E/6 copper cables and 2 strand fiber optic cables run in a star configuration. Category 5E/6 copper cables shall terminate on IRM approved connectors and patch panels as specified in the IRM Specification.

Policy 2G-3

Data communications jacks shall share the same outlet as the voice jacks and contain modular RJ-45 jacks and fiber optic connectors as specified in the IRM Specification.

Policy 2G-4

No longer used.

Objective 2H

To provide a central campus location for all the telecommunications services which are distributed throughout the campus.

Policy 2H-1

Provide space in the CUP for the main electronic equipment for the following systems:

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Telephone
Data
Energy Management
Cable TV
Fire Alarm
Security
Video Conferencing
Distance Learning

Policy 2H-2

Provide office and maintenance space for the following personnel and systems:

IRM Voice/data/video
Security

Goal 3: STANDARDIZE THE SITE CABLE DEMARCATION/TERMINATION METHOD AND THE TYPE OF SURGE PROTECTION REQUIRED IN ACCORDANCE WITH THE IRM SPECIFICATION.

Objective 3A

To provide a uniform method for terminating the University's voice and data cable and to provide surge protection on all incoming telecommunication cables in accordance with the IRM Specification.

Policy 3A-1

Ensure that the standards are maintained for placement of the demark point (first floor with outside entrance), the expected conduit entrance size and number of conduits, the type of termination as specified in the IRM Specification, and the protection type (solid state, gas tube or carbon block) and clamping voltage.

Goal 4: DETERMINE VOICE/DATA/FIRE ALARM REQUIREMENTS FOR THE HOUSING PORTION OF THE PROJECT.

Objective 4A

Provide state of the art telecommunications services to the dormitory rooms in the housing buildings.

Policy 4A-1

Provide data communications outlets with good conduit access in all the dormitory rooms which are connected to the campus data network.

Policy 4A-2

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Connect the housing to the campus wide fire alarm system.

Policy 4A-3

It has been determined that housing should be connected to the campus telephone switch.

Policy 4A-4

Connect fire alarm system to Jupiter Police station.

Goal 5: TO PROVIDE BUILDING HVAC, LIGHTING, POWER AND DOMESTIC WATER HEATING SYSTEMS AND CENTRAL PLANT CHILLER, WATER, HEATING AND ELECTRICAL DISTRIBUTION SYSTEMS WHICH ARE DESIGNED FOR MAXIMUM ENERGY EFFICIENCY CONSISTENT WITH APPROPRIATE LONG TERM LIFE CYCLE COSTS.

Objective 5A

To ensure that new buildings and campus systems meet the energy efficiency standards required by the Board of Trustees, the Engineering & Utilities Department, and appropriate codes and standards.