UNIVERSITY OF SOUTH ALABAMA

2015 UTILITIES MASTER PLAN

SUMMARY REPORT

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I. INTRODUCTION

During 2015 the University of South Alabama (USA) Facilities Management Staff led a master planning process to provide guidance for improvements to the utility systems on the USA Main Campus. The improvements which were identified are necessary to appropriately serve both the existing USA facilities and support anticipated expansion of programs on campus. The utility systems included in this planning effort are:

- Electric Power Distribution System
- Communication System
- Chilled & Hot Water Systems
- Sanitary Sewer System
- Storm Drainage System
- Potable Water System
- Natural Gas System

Three engineering firms (the "Consultants") were engaged by USA to provide technical support for the planning process and to prepare individual utility system master plan reports. The Consultants and their respective utility systems are as follows:

- Burns & McDonnell Engineering Company, Inc.
    - Chilled & Hot Water Systems
- Hays Cheatwood Consulting, Inc.
    - Electric Power Distribution System
    - Communication System
- Krebs Engineering, Inc.
    - Sanitary Sewer System
    - Storm Drainage System
    - Potable Water System
    - Natural Gas System

Krebs Engineering also served as Project Director for the technical aspects of the planning effort.

While the Consultants in consultation with USA Facilities Staff evaluated each utility system and prepared reports for each system, these separate reviews were executed as part of a combined master planning process. The combined process provided the Consultants similar information concerning the existing needs on campus and anticipated new facilities expected within approximately the next 10 years. A concerted effort was made to coordinate the recommendations of the individual utility system plans including the interrelated needs of the systems. For example, when a new chilled & hot water central plant was recommended, the electric power, natural gas, potable water, sanitary sewer, and communication plans also included appropriate provisions to support the new central plant.

This summary provides an overview of the information used as the basis for all of the planning effort along with a brief discussion of the format for the final recommendations. The individual utility system master planning reports which follow this summary include detailed discussions of

the rationale for the recommended utility system improvements and estimated construction costs for each improvement.

II. BASIS FOR MASTER PLANNING

The USA Facilities Staff provided each Consultant with basic information concerning the existing utility systems and the historic demands/loads the existing facilities have imposed on the systems. To the extent information about anticipated projects was available, USA also provided scope and schedule estimates for various future new facilities or modifications to existing facilities. Finally, the Consultants were given a list of buildings which housed activities or services which were deemed by the University to be critical to either campus operations or the safety of students, faculty, staff, and campus visitors. These three types of information were the starting points used by the Consultants for the technical evaluations of each utility system. Additional explanations of this information are provided below.

A. Baseline Information

Baseline information consisted of CAD files, GIS files, Excel spreadsheets, and Word documents which included the following:

- General arrangement maps of each utility system
- Campus base maps (buildings, roads, and topographic features)
- Campus aerial photography
- Inventories of existing buildings (square footage, ages, and renovation dates)
- Inventory of existing chillers (capacities, ages, and locations)
- General design guidelines for electrical, telecommunications, and data systems
- Utility usage history (potable water, natural gas, and electric power)

As described in the individual system master plan reports, in some cases USA Facilities Staff and the Consultants also performed field reviews to gather additional information concerning existing conditions within utility systems.

B. Future Projects List

A list of 24 potential future projects was provided which included new buildings, renovations to existing building renovations, and site/grounds modifications (such as new traffic circle and paving of parking areas). The list included, to the extent such information was available, the approximate size (gross square feet) and schedule (completion year) for potential projects the University anticipated completing within the next 10 years.

One item on the list of future projects was the construction of a football stadium facility. Since it was early in the planning for this facility the only project scope information which was available included an approximate range of seating capacity (25,000 to 40,000) and the playing field lighting

would be sufficient to allow night games to be televised. Such a facility is likely to impose a significant impact on the University's utility infrastructure; however, more detailed information about the characteristics of the stadium project was needed to allow the Consultants to develop appropriate estimates of utility demands/loads. For this reason the Consultants and USA Facilities Staff developed a list of assumed project characteristics for the stadium facility. The Consultants used these assumed project characteristics to develop the estimates of utility demands/loads used in the technical analysis for the individual utility master plans. The assumed stadium characteristics should be compared to the actual stadium program when it becomes available to determine whether any of the recommendations included in the individual system master plans should be modified.

C. Critical Service Buildings

Selected buildings and facilities were identified by USA Facilities Staff as being critical to safety and basic operations within the campus. Buildings and facilities on the critical service list include:

- Dormitories and dining facilities
- Utility/Communication/Data centers
- Campus Police facility
- Athletic venues

Consultants were directed to include in their analysis and planning of improvements to utility systems the need to provide uninterrupted service to the critical service buildings.

III. RECOMMENDED IMPROVEMENTS

Recommended improvements for each utility system are described in the individual master plan reports along with the rationale for those improvements. Most of the recommended improvements are necessary to correct existing deficiencies or meet the anticipated growth in demands resulting from general expansion of campus facilities. Other utility system improvements are required to serve specific future facilities anticipated to be constructed on campus within the next 10 years.

A. General Utility Improvements

Numerous general utility improvements are necessary to allow the utility systems to provide adequate service to meet existing campus needs and for continued service into the future. General utility improvements include a wide variety of repairs and replacements in each utility system and include the types of work listed below.

- Repair/replace defective or inoperable systems and appurtenances, for example:
    - Replace inoperable fire hydrants

  - Repair leaks in storm drainage junction boxes which are causing sinkholes /subsidence
  - Replace 15kV power cable which has reached the end of its operational life
  - Replace broken vitrified clay sanitary sewer lines
  - Replace inoperable natural gas system valves
  - Replace Quazite communication system pull boxes which are damaged
  - Replace Chilled Water and Hot Water branch lines to Bookstore, Student Union, Seaman's Bethel, and Cafeteria
- Replace/reinforce systems and appurtenances with insufficient capacity to meet existing needs, for example:
  - New water service meter in west side of campus to improve residual pressures
  - Increase diameter of storm drain in Gamma parking area
  - New natural gas service meter along Old Shell Road to improve residual pressures
  - Replace copper communication system cable with single mode fiber
  - New electric power duct bank to provide space for additional conductors
  - New Hot Water line to Faculty Court South
  - New Chilled Water line to Nursing Building
- Modifications which improve the reliability of service, for example:
  - New electric power substation in west campus
  - Complete communications fiber cable loop around campus
  - New Hot Water distribution loop near Marx Library
  - Replace existing 60" corrugated metal culvert with 72" reinforced concrete pipe under North University Drive.
  - New potable water supply to Central Plant and complete central campus loop
- Modifications which allow effective/efficient maintenance and operation, for example:
  - Replace electrical oil switches
  - Modifications to Lower Pond outlet structure
  - Sanitary sewer evaluation study
  - Replace faulty water system valves
  - New Hot Water header from South Drive to New Hall

Approximately 90 individual general utility projects have been identified in the utility system master plan reports. As utility systems age the need for general improvements will continuously occur; therefore, it is prudent to anticipate such projects will be identified and must be completed to ensure the USA utility systems continue to provide reliable service.

B. Four Year Infrastructure Finance Plan

In response to the large number of general utility improvement projects which were identified, the USA Facilities Staff and USA Administrators decided to immediately pursue the completion of the most pressing improvements within a four year period starting during the fall of 2015 and extending through the summer of 2019. USA Facilities Staff and the Consultants then selected the general utility improvement projects to be completed during this four year period. The selected

projects where assigned to specific years as needed to simultaneously correct the most serious utility needs and meet the anticipated schedule of facility changes on campus. Another factor in the selection and order for the improvements included in the four year period was ensuring the estimated construction costs for each year and the total overall costs were consistent with the University's overall fiscal capacity. The completed list of projects and costs were combined in what was referred to as the Combined Project Schedule for Infrastructure Finance Plan (Infrastructure Finance Plan, or the Plan).

In addition to the general utility improvement projects, the Infrastructure Finance Plan included many of the other general improvements which have been identified in the individual utility master plans under the heading of "Project Continued beyond Year 4". While these projects were not selected for inclusion in the initial four year period of the Plan, they should be pursued by the University when schedules and finances allow.

At the same time as the utility infrastructure master planning effort was underway; the USA Facilities Staff was also engaged in evaluating the condition of campus building roofs. As a result of the investigation of building roofs the most critical repairs and replacements to roofing systems were identified and arranged in a four year schedule similar to that described above for the general utility improvements. This schedule of roofing work and estimated costs were added to the Infrastructure Finance Plan to provide the University administration a comprehensive schedule of utility and roofing improvements to be completed during the four year period.

C. Project Specific Improvements

The general utility improvement projects identified for the Electric Power, Storm Drainage, Sanitary Sewer, Potable Water, and Natural Gas systems are intended provide the basic infrastructure to serve the anticipated needs within existing campus buildings; however, additional improvements will be necessary for these systems to provide adequate service to some of the future facilities projects contemplated by the University. These additional improvements are listed in the Infrastructure Finance Plan under the heading "Project Specific Costs". The specific project utility improvements were developed under the assumption that the identified general utility improvements will be in service when the project specific projects are needed. Future projects which will require specific utility improvements include, but are not necessarily limited to:

- New Central (Hot & Chilled Water) Plant
- New Dormitories
- Band Practice Field Upgrades
- Intramural Field Relocation
- Football Stadium
- Paving Mitchell Center Parking Lot
- Ravine Elimination

The general utility improvement projects identified for the Communications, Hot Water, and Chilled Water systems should allow these systems to appropriately serve the anticipated needs of both the

existing campus facilities and the future projects identified for consideration in this utilities master planning effort. For this reason specific project improvements were not identified for these systems.

In the future the natural evolution of needs and priorities within the University could result in changes in the list of future projects. These changes could include adjustments in the scope, size, location, or schedule of the listed projects; the inclusion of new projects; or the elimination of items which are currently envisioned. If changes such as those just mentioned are pursued by the University, USA Facilities Staff should carefully evaluate the recommendations included in the utility master plans to ensure the recommendations are consistent with the campus utility needs which exist at that time.

IV. ESTIMATED CONSTRUCTION COSTS

Estimates of probable construction cost (2015 dollars) were developed for each of the recommended utility system improvements and are included in the individual utility master plan reports. These estimates are based upon estimated quantities of work since detailed topographic surveys and detailed designs were not prepared during the master planning process. These figures are strictly opinions of the costs related to construction and do not include allowances for administration, permit acquisition, design, or preparation of detailed plans and specifications.

Many of the individual estimates include a contingency percentage added by the Consultant to account for uncertainty with the quantities, materials, or installation costs which could only be defined during detailed design and preparation of plans and specifications. The specific work items, total quantities, unit prices, and contingency percentage incorporated into cost estimates for the recommended improvements are shown in spreadsheets included in the individual utility master plan reports.

When it was not possible to reasonably estimate the quantities or scope of a recommended utility system improvement a cost estimate spreadsheet was not included. In these situations an allowance (for example, number of dollars per year for the replacement of defective water or gas system valves) was included to provide USA Facilities Staff a value to use for planning purposes. The basis for these allowances was described within the cost estimate section in the utility master plan reports. USA Facilities may wish to refine these allowances as more definitive information becomes available.