PRESENTATIONS OF THE SCHEMATIC DESIGNS FOR THE WEST CAMPUS CHILLED WATER PLANT DEVELOPMENT/EXPANSION – PHASE 1B PROJECT, AND THE PHASE 1 EXTERIOR FOR THE IOWA MEMORIAL UNION RENOVATION PROJECT, WILL TAKE PLACE AT THE JUNE MEETING

P&F 8a

COMMITTEE MEMORANDUM

TO: Property and Facilities Committee Members
Board of Regents, State of Iowa

FROM: Sheila Doyle

DATE: June 1, 2005 GSN

SUBJ: Register of University of Iowa Capital Improvement Business Transactions

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Recommended Actions:

Review and recommend to the Board the following actions for the major capital projects, as defined by Board policy.

1. **West Chilled Water Plant Development/Expansion – Phase 1B** (expansion) project (see pages 3 through 8).

   a. Acknowledge receipt of the University's final submission of information for the project to address the Board's capital project evaluation criteria (page 8);

   b. Accept the Board Office recommendation that the project meets the necessary criteria for Board consideration; and

   c. Consider the schematic design, project description and budget ($24,150,000) and engineering agreement with Stanley Consultants, Muscatine, Iowa ($1,671,575) with the understanding that approval would constitute final Board approval and authorization to proceed with construction.

2. **Iowa Memorial Union Renovation** (IMU) project (see pages 9 and 10).

   Consider the Phase 1 revised exterior schematic design options presented by the University with the understanding that approval of an option would constitute final Board approval and authorization to proceed with construction.

Executive Summary:

Requested Approvals

Schematic design, project description and budget ($24,150,000) and engineering agreement with Stanley Consultants, Muscatine, Iowa ($1,671,575) for the **West Chilled Water Plant Development/ Expansion – Phase 1B** (expansion) project which would expand the existing West Campus Chilled Water Plant by installing two 4,000 ton chillers within a building addition on the north end of the existing plant (see page 3).

- The schematic design booklet is included with the Board's materials.

Phase 1 revised exterior schematic design for the **Iowa Memorial Union Renovation** (IMU) project which modifies the exterior design of the three-story addition to be constructed at the east terrace entrance area in response to Board concerns raised during presentation of the initial exterior design (Option A) at the May 2005 meeting (see page 9).

- The University is presenting two new design alternatives (Options B and C), which would incorporate new exterior features consistent with the adjacent 1925 IMU structure, each with a slight variation in the window wall design.

- The schematic design booklet is included with the Board's materials.

Background and Analysis:

West Campus Chilled Water Plant Development/Expansion – Phase 1B (Expansion)

Project Summary

	Amount	Date	Board Action
Initial Review and Consideration of Capital Project Evaluation Criteria		Dec. 2004	Received Report
Permission to Proceed		Dec. 2004	Approved
Engineering Agreement—Engineering Services Through Schematic Design (Stanley Consultants, Muscatine, IA)	$ 210,000	Dec. 2004	Approved
Final Review and Consideration of Capital Project Evaluation Criteria		June 2005	Receive Report
Schematic Design		June 2005	Requested
Project Description and Total Budget	24,150,000	June 2005	Requested
Engineering Agreement—Design Development Through Construction (Stanley Consultants, Muscatine, IA)	1,671,575	June 2005	Requested

Background

The University of Iowa chilled water system consists of two independent chilled water production and distribution systems, one on each side of the Iowa River.

- On the west campus, the West Campus Chilled Water Plant (with a chilled water capacity of 16,000 tons) is located within UIHC Parking Ramp Three immediately north of Kinnick Stadium; the Northwest Campus Chilled Water Plant (with a chilled water capacity of 6,735 tons) is located within the Newton Road Parking facility across from the Medical Education and Biomedical Research Facility.

- On the east campus, the North Campus Chilled Water Plant (with a chilled water capacity of 7,000 tons) is located in the North Campus Parking Facility adjacent to the Chemistry Building and Burge Residence Hall.

A map of the campus chilled water system, which indicates the location of the chilled water plants and their distribution systems, is included as Figure 1 (page 2) of the design booklet.

The University wishes to upgrade and expand its campus chilled water system, particularly for the west campus, to increase chilled water production capacity in response to recent and projected campus growth, and to address an aging infrastructure and the need for improved system reliability.

The University completed the upgrade and relocation of site utilities north of the West Campus Chilled Water Plant in preparation for expansion of the plant; the cost of this work (Phase 1A) was $1.9 million.

Comprehensive Planning Study

In December 2004, the University presented to the Board a Comprehensive Planning Study of the campus chilled water system which was undertaken to evaluate alternatives for expansion of the system, including facility improvements and expansion locations.

According to the Study, increased chilled water loads on both campuses necessitate immediate chilled water plant improvements; chilled water demand on the west and east campuses is projected to exceed existing production capacity in 2006 and 2007, respectively.

The Comprehensive Study recommended a three-phase approach to meeting chilled water cooling capacity demands through 2011:

1. Expansion of the West Campus Chilled Water Plant Capacity (Phase 1B)

    - This project would expand the existing West Campus Chilled Water Plant with the installation of two 4,000 ton chillers within a building addition on the north end of the existing plant, at an estimated cost of $25 million; the chillers would be on line for the 2007 cooling season.

2. Renovation/Modernization of the West Campus Chilled Water Plant (Phase 2A)

    - This project would install two 3,000 ton chillers to replace the oldest and least efficient chillers at the West Campus Chilled Water Plant, at an estimated project cost of $15.7 million; the chillers would be on line for the 2006 cooling season.

        - The University received Board approval of the project description and budget ($15,700,000) in December 2004; this will allow the University to first proceed with the modernization of the existing plant components to improve reliability and increase chilled water production capacity to better respond to immediate demand requirements.

        - The University anticipates commencing construction of the Phase 2A project in June 2005.

3. Construction of a New East Campus Chilled Water Plant (Phase 3)

    - This project would construct a new 8,000 ton chilled water plant on the east side of the Iowa River, adjacent to the University Power Plant, at an estimated project cost of $29 million; the chillers would be on line for the 2007 cooling season.

    - The University received permission to proceed with the project in December 2004.

The following table summarizes the Comprehensive Study recommendations.

Phase	Estimated Project Cost	Construction Start	Construction Completion (chillers on line)	Expansion/ Replacement Capacity
West Campus 1B	$25.0 million	Jan. 2006	2007 cooling season	8,000 tons (new)
West Campus 2A	$15.7 million	June 2005	2006 cooling season	6,000 tons (replacement)
East Campus 3	$29.0 million	Late 2005	2007 cooling season	8,000 tons (new)
Total Cost	$69.7 million			

The overall project cost for the chilled water system improvements is estimated at $71.6 million (including the $1.9 million cost for the completed Phase 1A utility project).

The recommended approach would meet the east and west campus short-term chilled water load growth (through 2011) with the lowest initial capital investment and without the requirement for a river crossing.

The Study also identifies future projects to address longer term reliability and capacity issues beyond 2011.

- Included are three additional sub-phases to replace and upgrade a total of 12,000 tons of chilled water capacity in the West Campus Chilled Water Plant.

- Other future identified improvements include construction of north and south Iowa River crossings to link the east and west chilled water distribution systems. The river crossings would provide increased usable capacity for the entire campus as well as add redundancy to the system.

The University is also exploring the implementation of new energy conservation measures in an effort to reduce chilled water consumption in academic, athletic and research facilities, and at UIHC. The efficiency gains may lower anticipated peak chilled water loads and could potentially postpone chilled water system improvements planned for 2011 or later.

Phase 1B Project Scope

Consistent with the Comprehensive Study recommendations, expansion of the capacity of the West Campus Chilled Water Plant would meet the increasing chilled water demands of the west campus facilities and ensure the future availability of adequate chilled water service.

The project would construct an addition of 36,693 gross square feet to the West Campus Chilled Water Plant to house two 4,000 ton steam turbine driven centrifugal chillers and associated support systems. The proposed 8,000 ton expansion would increase the Plant's total chilled water capacity to 24,000 tons, with no future expansion capacity.

The addition would also house a steam-driven electrical generator which would supplement the existing campus electrical system to allow UIHC chilled water equipment to remain operational in the event of an electrical power interruption.

Phase 1B Site Plan

The chilled water plant addition would be constructed as a north extension to the existing West Campus Chilled Water Plant and Hospital Parking Ramp #3. (The site plan is included as Figure 3 (page 4) of the design booklet.)

A surface parking lot, proposed to accommodate 106 vehicles, would be constructed directly to the north of the addition.

Phase 1B Schematic Design

The following are highlights of the **exterior design**:

Given the visibility of this location, the addition has been designed to minimize its impact on the surrounding area.

- The addition would be set back from Hawkins Drive to the east to preserve the existing landscape buffer to the north and east of the site.
- The addition would also be recessed into the existing site grade to soften the building lines and increase the distance from Hawkins Drive.
- The four cooling towers would be constructed on the roof to minimize the building footprint.
- The roof of the addition would align with the second level of Hospital Parking Ramp #3.
- The exterior would be constructed of brick to match the exterior of Parking Ramp #3; the exterior would also feature glass block for the windows and air intake louvers.

Cooling Towers

- The four cooling towers would be constructed in a two by two configuration on the roof of the addition and would extend approximately 54 feet above the roof; this is approximately 17 feet taller than the parapet wall surrounding the top level of the adjacent Hospital Parking Ramp #3.

- The towers would be constructed primarily of concrete with brick at the corners to complement the adjacent Hospital Parking Ramp #3 architecture.

- The University reports that the size of the four towers would require relatively small fans for the operation of each tower; with the proposed fan size, the University anticipates that tower noise would be maintained at a reasonable level.

The following are highlights of the **interior design**:

The building would consist of three levels:

- The basement level would house chilled water pumping equipment and expansion tanks.

- The operating level above would house the two chillers, a turbine generator, chemical storage room, water analysis laboratory, electrical room, control room, additional mechanical and electrical equipment and support facilities.

- The mezzanine level above would house a general storage area, chemical storage area, and electrical room.

Funding — Utility System Revenue Bonds.

Project Budget

Construction	$ 18,800,000
Design, Inspection, and Administration	
Consultants	2,070,000
Design and Construction Services	1,400,000
Contingencies	1,880,000
TOTAL	$ 24,150,000

Schedule — The University anticipates beginning construction in January 2006 so that the chillers would be on line for the 2007 cooling season.

Design Services — The agreement with Stanley Consultants, Muscatine, Iowa, would provide design development through construction phase services for a fee of $1,671,575, including reimbursables.

Evaluation Criteria	Since the project meets the Board's definition of a major capital project, the University has provided the following information in response to the Board's evaluation criteria.
Institutional Mission/Strategic Plan	This project supports the institution's mission and strategic plan by supporting all facilities on the West Campus of the University with an efficient and adequate source of chilled water. Centralized chilled water systems are substantially more efficient than smaller, building-specific cooling equipment. This new (expanded) west campus central chilled water facility will serve increased demand on the west campus.
Other Alternatives Explored	Other alternatives explored included a larger facility and facilities that were placed or configured differently on the project site. This alternative was selected because of its minimal use of the site, and to provide large green space buffers as well as pleasing architecture at an important entrance to the University. This smaller chilled water plant addition fits the requirements of the campus chilled water system comprehensive study requirements and, in conjunction with Phase 2A (existing west plant renovation) and the new East Campus Chilled Water Plant, will efficiently serve increasing chilled water capacity requirements until approximately the year 2011.
Impact on Other Facilities and Square Footage	When this project is complete, no facilities will be abandoned, transferred or demolished. However, the overall reliance on central cooling systems will increase and will continue to replace smaller building-based air conditioning.
Financial Resources for Construction Project	The project will be funded by University of Iowa utility revenue bonds. The University of Iowa chilled water utility enterprise fund will provide the cash flow to repay the bonds through the sale of chilled water units (MMBTUs) to the customers of the Utility. The University distributes approximately 1.1 MMBTU of cooling and charges its users $14.9 million, annually.
Financial Resources for Operations and Maintenance	The source of O&M funds will be the University of Iowa Chilled Water Utility Enterprise which is replenished by collecting revenue from the customers of the utility. The customers include the UIHC, general fund buildings, Athletics, Residence Services, and others.
External Forces	Peak loads on the west campus central chilled water system have reached the limit of system capacity and will continue to increase. Further, some of the existing west campus chilled water production units not being replaced as part of the project Phase 2A (Renovation) can no longer provide the reliability required by a chilled water system operating at maximum capacity to satisfy peak demand load. The new chiller units will improve energy efficiency and will reduce unit O&M costs. In addition, the new chiller units will improve the chilled water supply reliability by providing firm capacity (firm capacity = total capacity minus largest single chiller capacity.)

Iowa Memorial Union Renovation

Project Summary

	Amount	Date	Board Action
Permission to Proceed		Jan. 2003	Approved
Architectural Selection (OPN Architects, Cedar Rapids, IA)		April 2003	Approved
Acceptance of Evaluation Criteria		July 2003	Approved
Architectural Agreement—Master Planning and Programming Services (OPN Architects, Cedar Rapids, IA)	$ 279,610	July 2003	Approved
Master Plan for Student Services		Sept. 2004	Received Report
Iowa Memorial Union Master Plan Presentation		Nov. 2004	Received Report
Interim Review and Consideration of Capital Project Evaluation Criteria		Nov. 2004	Received Report
Phase 1 Program Statement		Nov. 2004	Approved
Architectural Agreement—Phase 1 Schematic Design Through Construction Administration (OPN Architects, Cedar Rapids, IA)	909,000	Dec. 2004	Not Required*
Final Review and Consideration of Capital Project Evaluation Criteria		May 2005	Received Report
Phase 1 Schematic Design		May 2005	Deferred
Phase 1 Project Description and Total Budget	9,900,000	May 2005	Approved
Phase 1 Revised Schematic Design		June 2005	Requested

* Approved by Executive Director in accordance with Board procedures.

Background

The Iowa Memorial Union (IMU) was constructed in 1925; additions to and renovations of the facility were completed in 1927, 1955, 1965, and 1988.

The University wishes to undertake a major renovation of the IMU to upgrade the facility, consistent with student expectations.

The Phase 1 project would construct a three-story entrance addition at the existing east terrace entrance area; renovate the existing book store space below the east terrace to support the addition and renovate other space to accommodate the addition; construct a river terrace area immediately west of the IMU; address deferred maintenance deficiencies; and provide circulation and accessibility improvements.

The Phase 1 project budget of $9,900,000 was approved by the Board in May 2005.

May 2005 Schematic Design

The schematic design for the Phase 1 project was first presented to the Board at the May 2005 meeting (Option A).

At that time, Board members expressed concerns with the exterior design of the east terrace addition, which would create a new east façade and entry feature to connect the original 1925 structure to the north and the 1960s addition to the south.

- The University agreed to return to the Board with a re-design of the addition exterior with the goal of providing an architectural style more consistent with the features of the 1925 structure.

- Board members also questioned the safety and energy efficiency of the glass façade on the second and third floors of the addition.

June 2005 Revised Exterior Designs

The University presents for Board consideration two new exterior design alternatives, Options B and C; Option B is the University's preferred option.

- The elevations of the two design options are included on pages 4 through 7 of the design booklet.

Options B and C both maintain the use of brick interior columns and the window wall on the second and third levels adjacent to the 1925 structure, as well as the original entrance area design, as presented with Option A at the May meeting.

- Options B and C would both incorporate new exterior features to better match the 1925 building to the north.

    - Changes include modifying the brick on the first level of the addition to be consistent with the existing brick on the first level of the 1925 building, incorporating limestone keystones above the first level windows, and adding a stone cornice at the roof line.

- The only difference between Options B and C is a slight design variation in the window wall that extends beyond the brick columns at the second and third levels.

    - Option B maintains the curved feature of the window wall as presented in the Option A design.

    - Option C would construct the window wall without the curved feature.

Additional Information

The University will be prepared to provide additional information at the June Board meeting in response to other design questions that were raised at the May Board meeting.
