SUBJECT: SDSU Swine Education and Research Facilities – Facility Program Plan

South Dakota State University requests approval of the Facility Program Plan for future construction of a multi-unit Swine Education and Research Facility at an estimated cost of $5,519,899. The Board approved the SDSU Swine Unit Improvements Preliminary Program Plan at their April 2011 meeting.

This project includes the space to conduct research as well as education areas for swine reproduction, nutrition, gestation, and farrowing. The total facility square footage of all spaces will be approximately 44,527 square feet.

The total square footage of the education facility will be 16,470 square feet which includes individualized space for Swine Reproduction, Swine Nutrition, Swine Gestation, and Swine Farrowing. The classroom space, classroom storage, entry lobby, restrooms and observation/circulation space comprise 6,327 square feet of the total noted above.

Additionally, a new Wean to Finish Research Facility will be 14,754 square feet and include spaces to produce swine, conduct research and educate in fields of swine growth, nutrition, and environment. This will be primarily a research and production facility.

The new Head Wean to Finish Barn will be 13,303 square feet and be a model swine production facility for up to 1,200 head of swine. This will be a separate facility from the research facility.

Additional details of this proposed project can be found in SDSU’s Facility Program Plan document, perspective illustrations and schematic drawings. If approved, this project will need to be added to the 2013 Legislative package for Board approval.

Funding for this project will come from donations through the SDSU Foundation. A copy of the funding commitment letter is attached.

RECOMMENDED ACTION OF THE EXECUTIVE DIRECTOR

Approve SDSU’s Facility Program Plan to construct a multi-unit Swine Education and Research Facility at an estimated cost of $5,518,899. Funding for this project will come from donations through the SDSU Foundation. If approved, this project will need to be added to the 2013 Legislative package for Board approval.
FACILITY PROGRAM PLAN
FOR
SWINE EDUCATION AND RESEARCH FACILITIES
SOUTH DAKOTA STATE UNIVERSITY
DATE: November 16, 2012

SDSU requests approval of this Facility Program Plan. We request the following actions related to the project:

1. Approval of the architectural program and schematic design of the Swine Unit Improvements.
2. We request these new Swine Unit facilities be included in 2013 legislation authorizing capital improvement projects.

The Preliminary Facility Statement (PFS) was approved at the March, 2011 Board of Regents meeting.

a. Programmatic justification for discrete spaces
To accomplish goals of improved education, research, and Extension, SDSU envisions a multiple facility project to replace existing facilities constructed in the 1930’s, 1940’s, and 1970’s. Currently, the project is divided into three facilities. The first facility will be a new Teaching and Research Facility that will contain a boar housing and semen collection center, classroom & observation area, metabolism laboratory, surgery area, farrowing rooms, and gestation areas. The existing boar station, old sow barn, and finishing barn will be demolished. The second facility will be a Wean to Finish Research Facility, and include observation areas, central working area, and nutrition mixing areas. The third facility will be a 1,200 head Wean to Finish Production Barn. Each facility is described below.

New Teaching and Research Facility – 16,470 sf
This will include spaces to conduct research and educate in fields of swine reproduction, nutrition, gestation, and farrowing. The facility will provide a hands-on education experience, so will emulate a production facility to a high degree. The program spaces required for each area of the building are as follows:

Swine reproduction
   Boar AI & lab – 734 sf
   Physiology – 720 sf
   Bio-secure circulation corridor
   *The AI spaces are a combination of production and research facilities that will include 8 boar pens and an area for semen collection, similar to many commercial production facilities. A lab would be included for viability testing and research purposes. The Physiology space is a series of pens for postsurgery monitoring of animals and also isolating animals that might compromise the biosecurity of the other animals for a time to confirm whether they can be mixed with current livestock.

Swine nutrition
   Surgery suite (surgery, pre-op, post-op, supply, scrub) – 856 sf
   Bio-secure circulation corridor
   *This is primarily research space that provides a surgery suite for tissue sampling, weighing, inserting cannules for nutrition studies, and animal surgery.
Swine gestation
  Breeding area – 1,886 sf
  Gestation pens – 2,050 sf
  Bio-secure circulation corridor
*These spaces are essentially the same as commercial swine breeding and sow gestation facilities. Crates for breeding and pens for gestation of pregnant sows are included in this portion of the building. Pen and group sizes are established to support research work.

Swine farrowing
  Farrowing pens – 4,045 sf
  Bio-secure circulation corridor
*These spaces are essentially the same as commercial swine farrowing (birthing) facilities. Pens for sows and piglets are included in this portion of the building. Pen and group sizes are established to support research work.
  *Bio-secure circulation space (1,778 sf) is needed throughout these research and production facilities. This creates a facilities requirement for shower-in/shower-out facilities, limitation of visitors, ability to clean animal areas, and ability to isolate animals as needed.

Education
  Classroom – 1,140 sf
  Classroom storage – 115 sf
  Entry Lobby – 424 sf
  Restrooms – 173 sf
  Observation/circulation – 657 sf
*This portion of the building is designed to facilitate education, extension, and outreach of people to the swine industry. It provides ready visual access to the swine gestation and farrowing facilities and limited access to all research facilities. To accommodate the bio-security requirements of swine facilities and yet promote education and visitation, a separate circulation corridor is designed that will allow observation of all breeding, gestation, and farrowing areas. Video cameras will be provided for observation and education of swine farrowing operations.

New Wean to Finish Research Facility – 14,754 sf
This will include spaces to produce swine, conduct research, and educate in fields of swine growth, nutrition, and environment. The facility is primarily a research and production facility. To accommodate the bio-security requirements of swine facilities and yet promote education and visitation, a separate circulation corridor is designed that will allow observation of all operations. The program spaces required for each area of the building are as follows:

Swine Wean to Finish
  Grow Finish Pens – 11,088 sf
  Bio-secure circulation corridor – 674 sf

Operations Support
  Restrooms, Dressing Rooms, & Laundry – 732 sf
  Observation/circulation – 290 sf
  Office Area/Instrument space – 359 sf
  Shop – 201 sf
New 1,200 Head Wean to Finish Barn – 13,303 sf
This is a model swine production facility and will be used primarily for swine production. This is planned as a separate facility from the research facility and for trials of larger sets of animals. Animals may be assigned from area producers to this facility, so it will be necessary to provide separate biosecure facilities for these larger groups of swine.

b. Gross square footage - The total estimated floor area of all facilities will be approximately 44,527 sf.

The Teaching and Research Facility would have a gross area of approximately 16,470 sf. This includes all program areas noted above, and general support space of a composting building, mechanical/electrical, and structure. Approximately 4,420 sf or 27% of the gross area will be functional education space.

The Wean to Finish Research Facility would have a gross area of approximately 14,754 sf. This includes all program areas noted above, and general support space of a mechanical/electrical and structure.

The 1,200 Head Wean to Finish Barn will have a gross area of approximately 13,303 sf. This includes all production pens and support spaces.

c. Site Analysis
An existing barn (9,391 sf), existing grow finish barn, boar semen collection facility (1,172 sf), and finishing barn (2,600 sf) will be demolished as part of the project. The other facilities to be demolished will be replaced by the new facilities. The existing barn is no longer in use, except as storage. The new education and farrowing facility will be linked to the existing farrowing facility that was constructed in 1991 and will be used for raising piglets. The link is illustrated on the attached floor plan. The two wean to finish facilities will be developed as stand-alone facilities north or west of the new teaching and research facility to ensure properly bio-security for this production and research facility.

The facilities will be developed at the existing Swine Unit. The site is quite flat and will require little grading, cut, or fill for facility development other than necessary excavation for footings, topsoil removal, and establishing a level structural base for new construction.

Animal waste produced by the swine will be stored in structures that are constructed in accordance with the requirements set forth by the South Dakota Department of Environment and Natural Resources (DENR). Those rules are set forth in SD DENR’s general water pollution control permit for Concentrated Animal Feeding Operations (CAFO). The facilities must provide storage for a minimum of 270 calendar days. The design objective will be to provide storage for 365 days of storage. This additional storage provides flexibility when implementing various nutrient management activities. The preliminary design will utilize a combination of below structure deep and shallow pit manure storage. The existing silo system will be evaluated for continued use and life.

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The existing domestic sewer service is connected to the municipal system. These facilities will be connected to this system. Domestic water service is also provided by the local municipal system. The new facilities will be connected to the existing service main. The electrical service is adequate from the transformer to the rural service grid. Service lines for new building services will be provided as part of the building development.
d. Description of key building features
New Teaching and Research Facility
The facility will combine educational, research, and swine production functions. Educational spaces will include a 75 seat classroom with support space. The classroom will include space for moving animals from the production areas to the educational classroom. Research focused spaces will include a surgery suite and intensive care unit. Production and education spaces will include boar testing and semen collection, breeding, gestation, and farrowing.

Biosecurity is a significant concern in designing and operating swine production facilities, creating shower in and shower out protocols for access and work within the facilities. A primary goal is to provide facilities that have a high degree of transparency and visibility to students, visitors, and producers. To accommodate the bio-security requirements and yet promote education and visitation, a separate circulation corridor is designed that will allow full observation of all breeding, gestation, and farrowing areas. The observation hallway in the schematic design will be elevated with numerous windows to allow observation throughout all production type facilities. Cameras and network equipment will be installed to provide remote observation and video education of activities within the facility.

New Wean to Finish Research Facility
This production and education facility will have similar design to accommodate bio-security requirements. A separate circulation corridor that acts as an observation hallway will allow observation of the grow to finish spaces. The pens and facilities will be designed to accommodate a variety of pen sizes and research group sizes.

New 1,200 Head Wean to Finish Barn
This production facility will be similar in design to the other wean to finish facility. However, due to trial size and sources of the animals, it will be a separate facility to ensure biosecurity safety between animals.

e. Illustrative floor plans
See the attached floor plans labeled Teaching and Research Facility, Wean to Finish Research Barns, and Wean to Finish 1200 Head Barn. These illustrate the functional layout of the buildings and provide a tabular summary of the functional floor areas within the building.

f. Initial cost estimates
Estimated project costs for all facilities is $5,519,899. The Teaching and Research Facility has an estimated project cost of $2,499,329. The second facility, the Wean to Finish Research Barn has an estimated project cost of $1,700,830. The third facility, the Wean to Finish 1200 Head Barn has an estimated project cost of $1,319,740. A recapitulation of project costs for the individual facilities is attached.

g. Impact to M&R
Estimated annual funding for maintenance and repair/capital renewal funding for this type of agricultural production facility should be equal to 1.5% to 2% of the project costs or the building replacement value. The annual M&R allocation should be between $83,000 and $110,398 based on the project costs for the Teaching and Research Facility.
h. Budget for ongoing operational expenses
The facility will be well ventilated and heated, but only classroom and research functions will be cooled. Utility expenses are estimated at $24,000. Utilities will be provided outside of the main campus utility system. Utility costs are not impacted by the WAPA allocation or related secondary electrical suppliers expenses because this building is on Brookings Municipal utilities and the rural electrical system, not on campus central systems.

We estimate routine maintenance expenses for this type of agricultural production facility will be approximately 1.0% to 1.5% of the project costs ($55,200 to $83,000/year). Simplicity of mechanical systems and significant use as an agricultural production facility may reduce this estimated cost.

i. Proposed funding sources for costs of
   b. Ongoing operations – Agricultural Experiment Station funds and production revenues.
   c. Maintenance and repair – Agricultural Experiment Station funds and production revenues.

<table>
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<tr>
<th>SWINE UNIT IMPROVEMENTS SCHEMATIC COST ESTIMATE</th>
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<tr>
<td>CONSTRUCTION COSTS</td>
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November 26, 2012

David L. Chicoine, Ph.D.
President, South Dakota State University
Administration Building 222
South Dakota State University
Brookings, SD 57006

Dear President Chicoine:

Thanks to generous donors and a strong partnership with the College of Agriculture and Biological Sciences, the South Dakota State University Foundation has experienced initial success in fundraising for the Swine Education and Research Facilities (SERF).

The Foundation and its leadership want to see the project move forward and will continue to actively fundraise for it. To that end, the Foundation accepts the responsibility to guarantee up to $5,500,000 -- which represents the most recent total cost estimate.

It is understood that the actual cost will not be known until bids for the project are received. The Foundation is aware that the project has been designed so it may be undertaken in a phased construction.

It is also understood that this pledge allows the University to proceed in the capital project process, including the Board of Regents' consideration at its December 2012 meeting. If acted upon favorable, the Regents will submit the SERF to the 2013 Legislature and Governor for authorization, according to South Dakota law.

Please contact us if you have any questions.

Sincerely,

Steve Enpenbach
President and CEO
SDSU Foundation

Tim Dwire
CFO
SDSU Foundation

cc: Dean Kattelmann, Assistant VP of Facilities & Services
Wes Tschetter, Vice President of Finance and Business

Copies sent 11/29/12 Dean Barry Dunn and Provost Nichols
Teaching and Research
<table>
<thead>
<tr>
<th>Room Description</th>
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<tr>
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<td>Tunnel Ventilated Barn</td>
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<td>Mechanical</td>
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</tr>
</tbody>
</table>

*Walls / Structure / Etc* 521

| 1200 Head Tunnel Ventilated Barn | 13,303 Square Feet |

7.5 s.f./pig
30 animals/pen
20 pens + 3 sick pens + 1 scale pen

Deep pit location