Ames Laboratory Ten Year Site Plan
FY2009 – FY2018

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Date

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A. Executive Summary

The U.S. Department of Energy's Ames Laboratory is a Government-owned, contractor-operated facility located on the campus of, and operated by, Iowa State University (ISU) in Ames, Iowa. The Laboratory is strategically positioned to provide the Department of Energy a cost-effective facility to do world-class research. The Office of Science Program-Dedicated Laboratory operates in approximately 330,000 gross square feet of government-owned buildings with a total operating budget of $33 million in FY2006. Ames Laboratory's vision is to excel as an interdisciplinary world-class materials research laboratory with an international reputation, and to build on our core areas of excellence opening new frontiers in materials research. To achieve this vision, our aim is to provide key advances in materials and chemical science research, especially in materials theory, synthesis, and characterization, to benefit DOE missions. Ames' goal is to utilize the results of these advances to design and develop novel magnetic, structural, optical, catalytic, and bio-inspired materials.

The Laboratory is integrated into the ISU campus through a symbiotic relationship that provides a very flexible, dynamic, efficient, and powerful structure. The Laboratory is situated on land under long-term lease to the Federal Government from Iowa State University. The lease has been and will be adjusted as necessary to accommodate the facility needs of the Laboratory. The Land Use Plan for the Laboratory is incorporated into the Ten Year Site Plan as Section D3. Operating on the university campus within the city of Ames allows the Laboratory to enjoy the benefits of the university/municipal infrastructure and operations without the responsibility for its capital investment or maintenance. This infrastructure includes such things as steam plant, chiller plant, water treatment plant, sewage system, landscaping, telecommunications, and roads. This allows the Laboratory to focus its efforts on maintaining and operating core facilities that have direct impact on the research effort. The relationship with ISU also enables the Laboratory to use available space in University–owned buildings through a space usage agreement which enhances the ability to utilize research resources across the ISU campus and perform interdisciplinary collaborations with ISU research staff.

In order to achieve our vision, the condition of our facility infrastructure is of utmost importance. Both the facility infrastructure and operations are managed with a philosophy of long-term stewardship in mind. Because this philosophy has been a part of the heritage of the Ames Laboratory from its inception 60 years ago, the buildings have been well maintained over their lifetimes and remain in excellent condition even though the research buildings have been occupied for a half century. The overall Asset Condition Index is 0.975 and continues to improve. This result has been accomplished by funding facility sustainment at a Maintenance Investment Index (MII) of approximately 1.8%. Capital improvement funds have been used judiciously to make improvements to the facility and upgrade the condition of aging systems. Many of the high maintenance utility generation and distribution systems are provided and maintained as part of the contractor's campus infrastructure. Laboratory management will not mortgage the long-term condition of the facilities to achieve short-term output. The proposed plan will result in an Asset Condition Index of 0.992 at the end of the ten years. The Laboratory already meets the OECM target ACI for FY2007 and is close to meeting the long-term targets.

The excellent condition of the building assets, however, does not equate to modern, mission-relevant facilities. Laboratory Management has presented plans to DOE in response to the Office of Science SLI Modernization Initiative that will upgrade Laboratory facilities through a systematic process.

The Laboratory's modernization strategy, incorporated in this plan, calls for the replacement of one research building and the upgrade of two other research buildings. The goal is to utilize SLI funding to replace the Metals Development Building which has become dysfunctional in supporting the mission of the Laboratory and utilize GPP funding and overhead cost savings to fund the upgrades to the other two research buildings. These projects, once completed, will accomplish the vision of the Office of Science and Ames Laboratory to operate in thoroughly modernized facilities by FY2018. This modernization will enhance our researchers' ability to pursue the team approach to meeting the DOE missions and will provide specialized space for modern instrumentation such as high resolution electron microscopes.

The Secretary of Energy has laid out the vision for the Department to exceed the goals of EO13423 by leading in the area of energy conservation. This plan is responsive to this vision and provides a roadmap for meeting these ambitious goals. Key components in the Laboratory's strategy are:

- FEMP Expert Energy Efficiency Evaluation team will perform an evaluation of Ames Laboratory facilities to identify operational improvements and cost effective modifications.
- Replace the Metals Development Building using LEED standards.
- Apply LEED principles to other modernization projects in existing buildings.

With the continued support of the Office of Science through initiatives such as the SLI Modernization Initiative and the Basic Energy Sciences program, the vision and goals embodied in this plan are attainable. All of these elements combined will provide Ames Laboratory with world-class facilities to enable its world-class research.

B. Overview of Site F&I

The U.S. Department of Energy's Ames Laboratory is a Government-owned, contractor-operated facility located on the campus of and operated by Iowa State University (ISU) in Ames, Iowa. It is one of the Program-Dedicated Laboratories within the DOE Complex operating under the Office of Science. The total FY2006 operating budget of the Laboratory was $33 Million. In FY2006, there were approximately 640 people on staff representing a full-time equivalent staff of 313. The number of people actively involved in operations is greater than the full-time equivalents because a significant number of people have less than full-time appointments. This includes graduate students, research associates, and staff with split appointments with corresponding University Departments. Iowa State University of Science and Technology is a land-grant university chartered in 1858. The campus includes nearly 2,000 acres and more than 160 buildings. Iowa State University is a recognized leader in many areas of science and technology, including material sciences, analytical chemistry, physics, plant and animal genomics, behavioral studies, and many areas of engineering.

The organization that ultimately became the Ames Laboratory originated as a part of the Office of Scientific Research and Development in the early days of the Atomic Energy Program. The initial work at Ames was carried out at Iowa State University in 1942 and involved the development of a process for the production of uranium metal in large quantities. Following the successful development of the most efficient process to produce high-purity uranium metal in large quantities for atomic energy, and with the creation of the Atomic Energy Commission (AEC), the Ames Laboratory was formally established as one of the AEC multi-program laboratories in 1947, to be

operated by Iowa State University. In 1949, the University funded and built a three-story, 30,000 gross square foot building to contain the new Institute and Laboratory. Expansion of the Ames Laboratory was accommodated in new buildings funded by the Atomic Energy Commission. The first federally-owned building was designed for laboratory occupancy and was constructed in 1949. Additional laboratory occupancy buildings were completed in 1953 and 1961. One of the research buildings had additions constructed in 1967, 1984 and 1988 with General Plant Project (GPP) funds. Several small auxiliary buildings were constructed with GPP funds during the 1960's. The last major addition was the construction of the Technical and Administrative Services Building in 1994 that houses most of the management, administrative, and technical support groups of the Laboratory. The Laboratory continues to be operated by Iowa State University.

Located in the heart of central Iowa, approximately 35 miles north of Des Moines, Ames Laboratory facilities occupy approximately 10 acres of land on the north edge of the Iowa State University campus in Ames, Iowa. The land on which the Government-owned buildings are located is under long-term, no cost lease to the Federal Government from the University. The lease line has been adjusted over the years to accommodate the facility needs of the Laboratory and the University is willing to adjust the lease as needed to accommodate new Laboratory facilities in the future. Figure 1 shows an aerial fiew of the main Ames Laboratory buildings and the surrounding campus. The ISU Campus Map (Attachment 2, Figure 1) shows the Ames Laboratory site relative to the rest of the campus and the Ames Laboratory Site Plan (Attachment 2, Figure 2) shows the individual Laboratory Buildings and how they are located within the University Campus. The integration of the Ames Laboratory site with the ISU campus is significant and generally beneficial. Some aspects of facilities management and maintenance are provided by ISU and are paid through contract overhead fees or on a direct-charge basis. Examples of areas maintained by ISU are streets and street lighting, parking and traffic control, most landscaping and grounds work, telecommunications, ordinary waste disposal, and primary utility distribution lines. The Laboratory purchases steam and chilled water from the University district heating/cooling system, therefore, the Laboratory does not have to maintain large chillers or boiler plants.

The Ames Laboratory has 12 buildings and two real property assets categorized as Other Structures and Facilities (OSF). The buildings include three laboratory buildings, one office building, three shop buildings and five storage buildings. The OSF assets include an electrical switch pit and parking area. The average age of the buildings is 38 years. When pro-rated by the amount of space, the average age of space at the Laboratory is 44 years. The average age of the three research buildings is 53 years. Figure 2 shows the breakout of the age of space at the Laboratory and Figure 3 shows the percentage of space by function.

While the average age of space is relatively old, the buildings were well designed and constructed for long-term stewardship. Historically, the Laboratory has placed a high priority on maintaining the assets under its stewardship. As a result, even though the buildings are old they remain in good condition. The Asset Condition Index for the Laboratory facilities is 97.5% or a rating of "good" according to the Summary Condition field in FIMS. The three research buildings are rated in either the "excellent" or "good" categories, and in fact, only 6% of the building area is less than "good" and they are shop facilities that are rated "adequate". The Office of Science's goal is that all "Mission Critical" facilities be rated "good" (ACI equals 0.95) or better in the FIMS system and all "Mission-Dependent, not Critical" facilities be rated "adequate" (ACI equals 0.90) or better. The Laboratory

already meets and exceeds this goal. However, even though the FCI for our research facilities indicates that they have been maintained in good to excellent condition, it is important to note that all three buildings are of such an age that it is imperative that these buildings are upgraded to meet DOE's future needs. In fact, this plan propses a strategy to modernize our facilities under DOE's SLI Modernization Initiative that is discussed in later sections.

Because of the relationship with the University, Laboratory operations can also use space in University-owned buildings adjacent to the Laboratory through a space rental agreement. This is not a lease arrangement where the Laboratory commits to using a building for an extended period of time. The arrangement is recognition of the collaborative efforts between the Laboratory and the University in individual spaces that allows both parties to leverage their effectiveness, flexibility, and capabilities through sharing resources. It enables the Laboratory to utilize additional space on a short-term basis without investing in permanent space. It also supports collaborative efforts with University personnel on new or short-term initiatives without modifying permanent space for it. The arrangement tracks the collaborative space used in Laboratory and University buildings and calculates a net amount used. The Laboratory makes at least partial use of approximately 55,000 square feet of University space. When this space is pro-rated for partial use and credit is taken for University supported activity in Ames Laboratory space, the net usage is projected to be 4,858 square feet in FY2007.

KEY: A. Spedding Hall
B. Metals Development Building
C. Harley Wilhelm Hall
D. Technical & Administrative Support Facility

Figure 1. Ames Laboratory Aerial View

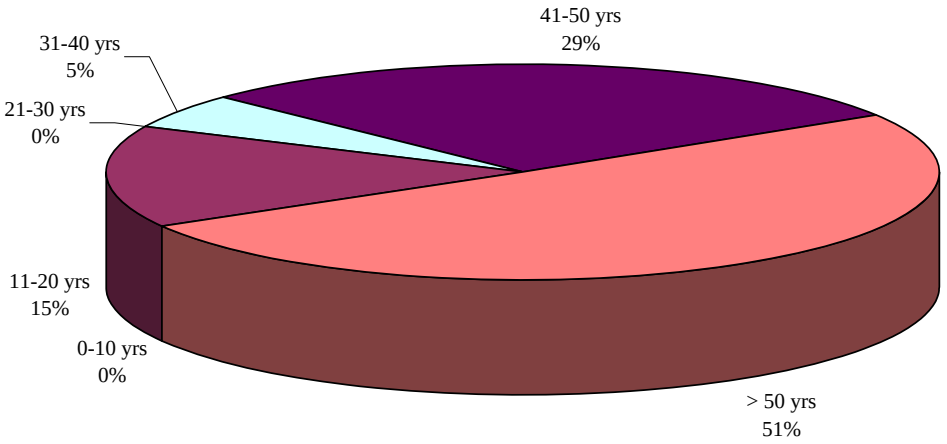

Figure 2. Facility Age (% total gsf)

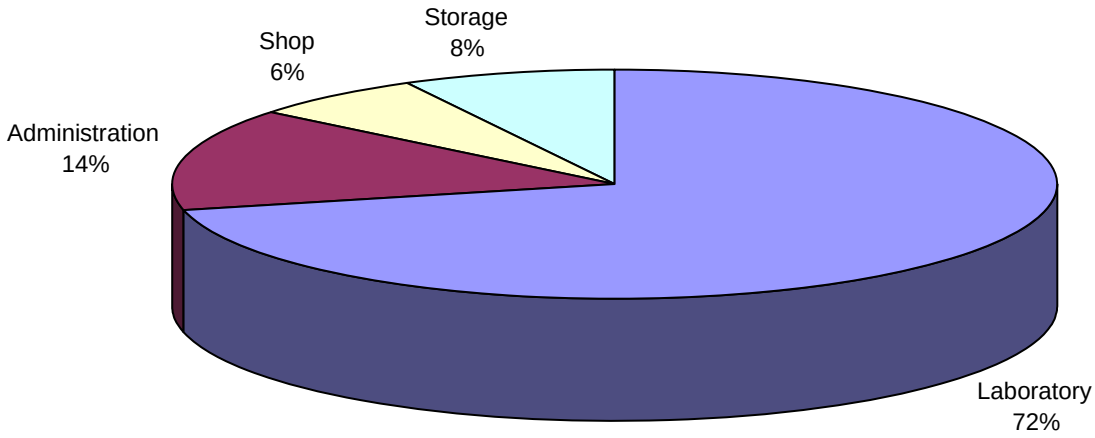

Figure 3. Laboratory Space Distribution

C. Current & Future Missions for the Site

The Ames Laboratory's mission is to provide key advances in materials and chemical science research, especially in materials theory, synthesis, and characterization, of benefit to DOE missions. Important to the success of the Laboratory's mission is its Materials Preparation Center, which provides the highest purity materials to the research community, for catalytic science and for development of pioneering analytical instrumentation and techniques. These efforts contribute to achieving the Department of Energy's Strategic Plan[1]; more specifically, to increase the general levels of scientific knowledge and capabilities, prepare engineering and physical sciences students for

[1] U.S. Department of Energy Strategic Plan can be found at http://www.energy.gov/about/strategicplan.htm.

future scientific endeavors, and initiate nascent technologies and practical applications arising from our basic scientific programs.

Vision for the Future

Our vision for the Ames Laboratory is that of an interdisciplinary world-leading materials research laboratory. Ames will make extensive use of DOE's user facilities, train the next generation of physical and chemical scientists, and open new frontiers in materials research. New opportunities for the design and control of nanoscale structures and interdisciplinary partnerships with life (plant) scientists will help guide new synthesis routes to bio-inspired materials and bio-molecular energy sources.

In addition to this, Ames has proposed new initiatives in Materials Discovery, Synthesis and Processing, Bio-inspired Materials, and in Applied Mathematics and Computational Sciences. Materials have long been the strength of Ames Laboratory. In order to compete with foreign countries, in the materials field, the Laboratory proposes to improve the Nation's standing in critical areas such as efforts in crystal growing, and by providing well-characterized and high quality crystalline samples for facilities including DOE's synchrotron and neutron sources. Ames Laboratory is committed to enhancing the physical and intellectual infrastructure needed to maintain and grow a world class materials effort. Further realignment of the existing Materials Engineering Physics program to meet future demands for new materials has begun. Incorporated within this initiative are plans to grow the Materials Preparation Center into a major world class user facility for the characterization and preparation of research materials. We envision that the MPC will be key in developing new materials to meet DOE's missions of energy security, including energy efficiency and conversion, and economic competitiveness.

In addition to our traditional strengths in the discovery, synthesis, and characterization of rare-earth and intermetallic materials, we have proposed to expand significantly into the area of bio-inspired materials, the synthesis and characterization of novel materials that mimic living systems. These materials possess the ability to switch among several states in response to the environment (pH, temperature), self-assemble and build complex structures hierarchically, and serve as directed templates for such synthetic processes as biomineralization/biometallization. The plan is to grow the bio-inspired materials initiative in modules of approximately $400 - $500K per year through the structured submission of proposals to the relevant divisions of Basic Energy Sciences. The Laboratory has submitted a proposal to the Office of Science for review on the study of bio-membranes which hold the promise to lead to new applications of membranes as smart materials.

Imperative for meeting the DOE mission is new analytical and computational capabilities. The complexity of new materials and processing, particularly in the nano- and bio- regimes has compelled theory and computation to become an essential partner with experiment. The explosion in computational capability and networking is enabling unprecedented design, prediction, and control of new materials with optimized functionality; this is a strength of the Ames Laboratory. Ames is ideally suited to increase funding in this area through the Applied Mathematics and Computational Sciences program, the Scalable Computation Laboratory (SCL), and ISU's Center for Physical and Computational Mathematics by submitting additional proposals in response to DOE solicitations, such as SciDAC, through the Office of Advanced Scientific Computing Research.

Roles

Ames Laboratory's primary role within DOE's Office of Science, Basic Energy Sciences mission is to perform research within the materials, chemical, and biological sciences "to provide the scientific knowledge and tools to achieve energy independence" and "to provide the biological and environmental discoveries necessary to clean and protect our environment, offer new energy alternatives, and fundamentally alter the future of medical care and human health."[2] To this end, the Laboratory's main goal is to deliver the scientific knowledge and discoveries in the basic energy sciences that underpin DOE missions in energy, national security and environmental quality, as well as technologies to improve human health and safety.

Ames Laboratory's scientific component is organized into 9 research programs:

- Applied Mathematics and Computational Sciences
- Biorenewable Resources Consortium
- Chemical and Biological Sciences
- Condensed Matter Physics
- Environmental and Protection Sciences
- Materials Chemistry and Biomolecular Materials
- Materials and Engineering Physics
- Nondestructive Evaluation (NDE)
- Simulation, Modeling, and Decision Science

Each uniquely contributes to the mission of the DOE. The following paragraphs give a brief synopsis of the mission of each of these Laboratory programs.

The Applied Mathematics and Computational Sciences focuses on issues of development, use and performance of advanced computer architectures with emphasis on application of parallel computers that scale to massive numbers of processors. The program addresses problems arising in science and engineering, software development to provide a suite of software tools to manage the software installation, maintenance and resource allocation systems on large-scale parallel computers, and the development of tools to enable high performance applications on scalable architectures. Embedded within the program is the Scalable Computing Laboratory (SCL). They focus on high performance computing with attention given to looking at how to make a range of machines solve a range of problems with a range of performance tradeoffs, so that the computational research that is done has lasting scientific value.

The Biorenewable Resources Consortium (BRC) is dedicated to the development and utilization of agriculturally derived alternatives to petrochemicals and other non-renewable fossil resources as a means to address the nation's dependency on non-renewable resources. Over the long-term, the research thrusts of the BRC will change and evolve in parallel with the challenges and opportunities presented by the development of biorenewable industries.

The Chemical and Biological Sciences Program focuses on research spanning fundamental and applied projects to provide a fundamental understanding of the variety of processes that are basic to

[2] Department of Energy, Office of Science *Strategic Plan*, February 2004, p. 12.

energy conversion, with application to the development of new energy technologies. Research is focused on the structure, bonding, reaction mechanisms, and dynamics of chemically reactive systems in terms of their fundamental atomic, molecular, and electronic constituents, with special emphasis on catalytic transformations.

The Condensed Matter Physics (CMP) program's emphasis is on discovery and understanding the basic science underpinning the development and optimization of novel materials; many with prospective uses in energy technologies. Interdisciplinary teams have made tremendous contributions in quasicrystals, photonics, spin dynamics, surface phenomena, superconductivity, rare earth nickel borocarbides (exhibiting simultaneous magnetism and superconductivity), and in a host of other areas.

It is the mission of the Environmental and Protection Sciences Program to exploit expertise and developing science for the application of analytical science to problems in environmental characterization and monitoring, nonproliferation of weapons of mass destruction, homeland security, and forensic science.

The Materials Chemistry and Bio-molecular Materials Program works to extend the basic scientific knowledge of materials, with efforts to discover and synthesize new, complex materials and develop an understanding of the factors that stabilize those materials.

An overarching theme of the research conducted within the Materials and Engineering Physics Program is to advance fundamental understanding of the complex linkages between the synthesis, structure, properties and performance of novel and advanced materials. Ultimately, the materials research in the Materials and Engineering Physics Program seeks to establish new tools and paradigms that enable the development of novel materials and structures with desired properties for improved performance, life span, and maintainability.

The Nondestructive Evaluation program at Ames Laboratory is at the forefront of research efforts to develop noninvasive measurement techniques for detecting and characterizing defects and mechanical properties of structural components.

Lastly, the newest program within in the Laboratory, Simulation, Modeling and Decision Science's aim is to create computer applications that convert large 3-D data sets into virtual models that perform just like real-world versions enabling engineers to view and interact with the models on their computer screens or in a virtual-reality room.

In addition to the above scientific programs, two additional areas are expected to increase funding over the next 10 years; The Materials Preparation Center and the Education Program. The Materials Preparation Center (MPC) is a DOE Office of Science User Facility. The MPC is recognized throughout the international research community for its unique capabilities in the preparation, purification, and characterization of rare earth, alkaline earth, and refractory metal materials for preparing ultra high-purity and well-characterized metals, alloys, compounds, and single crystals. The MPC continues to make these materials available to DOE Laboratories, other federal agencies, universities, and the private sector. Ames also anticipates growing the funding for educational programs outreach over the planning period, including adding additional students to the Science

Undergraduate Laboratory Internships (SULI) program and increasing middle school teacher participation in the DOE Academies Creating Teacher Scientists (ACTS) program.

Table 1. Summary of Expected Program Funding and Staffing

(Dollars in Thousands)	FY06	Est. FY07	Est. FY08	Est. FY09	Est. FY10	Est. FY11	Est. FY12	Est. FY13	Est. FY14	Est. FY15	Est. FY16	Est. FY17	Est. FY18
Funding:													
SC – BES	21,300	20,330	24,500	26,500	27,955	29,690	31,450	33,225	35,025	36,845	38,685	40,550	42,435
SC – HEP													
SC – BER													
SC – NP													
SC – ASCR	1,450	1,303	2,270	2,355	2,415	2,480	2,545	2,615	2,680	2,750	2,825	2,900	2,980
SC – SC Lab Infrastructure	150												
SC – WDTS	65	237	660	1,180	1,210	1,245	1,275	1,310	1,345	1,380	1,415	1,455	1,490
SC – S&S Science	581	920	670	735	755	775	795	815	840	860	880	905	930
SC – Fusion													
Total SC	23,546	22,790	28,100	30,770	32,335	34,190	36,065	37,965	39,890	41,835	43,805	45,810	47,835
Other DOE	2,327	2,580	2,570	2,640	2,710	2,780	2,855	2,930	3,005	3,085	3,170	3,250	3,335
Work for Others	2,481	2,900	4,580	4,700	4,825	4,955	5,085	5,220	5,355	5,495	5,640	5,790	5,940
Total $: (Required)	28,354	28,270	35,250	38,110	39,870	41,925	44,005	46,115	48,250	50,415	52,615	54,850	57,110
Total Staffing: (FTE's Req'd)	313	322	344	351	355	361	367	373	379	385	391	397	403

There is significant growth potential in the research initiatives being pursued by the Laboratory. While it is not possible to predict with certainty the growth of any of these initiatives, it is possible to plan for flexibility and the capability to support growth in these initiatives. The Laboratory has a unique resource in its ability to utilize space in University-owned buildings adjacent to the Laboratory through a space utilization agreement. It enables collaborative efforts between the Laboratory and the University in individual spaces that allows both parties to leverage their effectiveness, flexibility, and capabilities through sharing resources. This is ideal for cost effective support of ongoing research as well as new initiatives. If the research initiatives grow beyond these resources then new facilities will be proposed. The campus master plan provides space for Laboratory expansion adjacent to existing Laboratory buildings. This area of campus is slated for major research facilities.

In general, resources throughout the Laboratory are allocated to maximize the overall mission effectiveness. This philosophy is applied across all departments and functions not just with respect to infrastructure maintenance and improvement. Maintenance and improvement expenditures are reviewed and approved on a project specific level based on the effect each project or activity has on the mission. The Laboratory evaluated its assets using the Office of Science procedure to rate them as "Mission Critical", "Mission Dependent, Not Critical", and "Not Mission Dependent". All of the assets are either "Mission Critical" or "Mission Dependent, Not Critical (See Attachment 2, Table 1). Assets that have a direct effect on the research activity are designated "Mission Critical". Those that have an indirect but significant effect are designated "Mission Dependent, Not Critical". With the

small size of the facility, decisions on the allocation of resources are made on a case by case basis. As a result, more resources are directed at the "Mission Critical" assets to maintain mission readiness. The effectiveness of this approach is validated by the results of Condition Assessment Surveys that show the "Mission Critical" facilities have a higher Asset Condition Index than the "Mission Dependent, Not Critical" assets.

D. Meeting F&I Performance Requirements

D1. Vision, Goals, & Strategy (VGS) for F&I

The overall mission of the Ames Laboratory as stated in the previous section is "to provide key advances in materials and chemical science research, especially in materials theory, synthesis, and characterization, of benefit to DOE missions." The Ames Laboratory is dedicated to providing facilities and infrastructure that will effectively enable and support this mission. The Ames Laboratory will also strive to be an effective steward of the DOE assets entrusted to it. The Laboratory will manage the assets with a long-term view which is quality driven, takes into account the life cycle of the assets, utilizes best industry practice, and is commensurate with the value and importance of the asset. This management will take a corporate-wide, holistic, and performance-based approach to real property asset management that links real property asset planning, programming, budgeting, and evaluation to program mission projections and performance outcomes. This requires that resources applied to facilities and infrastructure must be evaluated and set in the context of the overall needs and operation of the Laboratory to carry out its mission.

The Office of Science is embarking on an ambitious initiative to modernize the facilities and infrastructure at its ten national laboratories. The goal is that all of the SC laboratories will be operating thoroughly modernized complexes by the end of the ten-year period (FY2009-FY2018). Modernized facilities will encompass the following characteristics:

- Safe, Secure, and Environmentally Sound Infrastructure
- A Highly Productive Working Environment.
- Efficient Operations and Maintenance.

The Ames Laboratory embraces this initiative and the characteristics of modernized facilities articulated within. Ames Laboratory facilities will be safe, secure, and environmentally responsible. The facility will be managed to maximize effectiveness and efficiency, building on the strengths of the unique partnership with ISU, in order to provide the greatest value possible for the investment that DOE is making here. The Laboratory is committed to a long-term perspective toward maintaining the facilities, thus avoiding decisions with short-term benefits that have long-term consequences. The facility will be maintained in excellent to outstanding condition as described by the Asset Condition Index. While one of the goals is excellence in maintaining existing facilities, this strategy by itself is inadequate. It would result in trying to do 21st century research in 1950's space. Therefore, the Laboratory embraces the goal to modernize its facilities within the ten-year time span. Infrastructure improvements will be done to keep pace with advancing technology and new paradigms of scientific collaboration so the research efforts are not restricted. The facility and facility management activities must be flexible and adaptable to enable research programs to respond

efficiently to new developments and changing priorities in the increasingly dynamic research environment.

As a single purpose laboratory under the Office of Science, the Laboratory operates under a single "landlord." All facilities are managed centrally. With a small site, Laboratory Management is actively involved in Facilities and Infrastructure issues at a very detailed level. There are no cross-program issues. In developing the strategy for this plan the following assumptions were used:

- The existing research activities as organized in the nine research programs within the Laboratory will continue on a stable funding path as described in Section B. The core competencies of the Laboratory will continue to be vital to the DOE.
- In keeping with the vision of the Laboratory, the Laboratory will continue to extend its capabilities in a variety of new directions where it has a competitive advantage. New program initiatives in Materials Discovery, Synthesis and Processing, Bio-inspired Materials and in Applied Mathematics and Computational Sciences will be critically important paths for the Laboratory's continuing success in meeting the DOE's missions and goals. The initial development of these new initiatives will occur in existing facilities. As these initiatives grow, increased funding will help support the related facility and infrastructure needs. If they grow beyond the capacity of existing facilities, program support will be sought for the needed facilities.
- The Office of Science SLI Infrastructure Modernization Initiative will proceed in accordance with its planning assumptions.

The strategy to accomplish this ambitious vision at Ames Laboratory has several components:

- F&I sustainment funding will be maintained at the level that continues to improve the condition of the facilities and reduce deferred maintenance. Facilities support services will continue to be very responsive to mission needs.
- Replace Metals Development Building (SLI Modernization Initiative): A line item project is proposed to replace the Metals Development Building (~70,000 gsf). The original building was built in 1961 and three additions added to it over the years. The original program for the building was pilot plant operations with large open areas. As research activities changed incrementally over its lifetime these areas were subdivided creating a piecemeal layout of spaces. Given the age of the building, its condition, and the limitations of modernizing an occupied building, replacement of the building is the preferred option. It will allow research in the existing building to continue until the new space is completed. It will enable the Laboratory to incorporate functions that are currently not available and could not be done within the existing space.
- Focus capital improvements (GPP) on modernization and improvement projects, particularly in the remaining laboratory research buildings.
- Replacing the Metals Development Building will generate savings in operations and energy consumption. These savings will enable the Laboratory to do additional space rehabilitation and modernization in the other laboratory research buildings.

D2. Process for Identifying F&I Needs & Development of Plans to Meet the VGS

The development of the Ten Year Site Plan is a reflection and expression of the overall planning process for the infrastructure needs of the Laboratory as described in the Ames Laboratory Real Property Asset Management Plan. The planning process has the following broad objectives.

- Assess the current real property assets with respect to program mission needs and projections.
- Identify the specific real property asset projects and activities required to meet the program mission requirements.

The Laboratory Executive Management has approved the Ten Year Site Plan as a roadmap for meeting the infrastructure needs of the Laboratory enabling it to best carry out its research mission in helping to achieve the Department of Energy's Missions and Goals.

Projects are defined based on Condition Assessment Survey (CAS) results, FSG personnel's knowledge of the facility, and input from program directors, the Laboratory Executive Management and current occupants. The Business Plan lays out the long-term goals and strategic plans of the Laboratory. Laboratory personnel have regular interaction with facility and planning staff of the University to coordinate the plans and changes on the broader University campus that may affect the Laboratory. Input from the broader Laboratory community occurs through both formal and informal processes. Informal input is very effective given the size and nature of the Laboratory. Facility management and needs assessment are not compartmentalized in separate facilities or organizational units. Personnel within the scientific programs, support departments and Executive Council interact extensively with the Facilities Services Group. Facility needs are routinely communicated among these groups and individuals within the groups. A formal process also exists to ensure the opportunity for input and communication. A call for input for the Environment, Safety, Health and Infrastructure (ESH&I) Management Plan is sent annually to Laboratory Directors and Program Directors. Program Directors meet with the FSG Manager to review and discuss infrastructure needs and priorities. That input is incorporated into existing plans and reviewed with the Executive Council for inclusion in the Ten Year Site Plan and the Field Budget Request process. Activity Data Sheets are developed for each capital improvement project. A scoring committee uses the Risk-Based Priority Model to score projects based on six categories—Public Safety and Health, Site Personnel Safety and Health, Compliance, Mission Impact, Cost Effective Risk Management and Environmental Protection. The scores and priorities are reviewed and adjusted by Laboratory Executive Management in accordance with budgetary constraints, resource limitations, external stakeholder issues, strategic goals and other considerations. The results of this planning are then captured in the Ten Year Site Plan. Individual sections were drafted by the subject matter experts and reviewed by the appropriate stakeholders.

The Laboratory maintains real property assets in a manner that promotes operational safety, worker health, environmental compliance, property preservation and cost-effectiveness while meeting the program missions. The combination of good process and quality people provide the foundation for the effective maintenance management program. The process includes a Condition Assessment Survey (CAS) program that provides a detailed description of facility condition and deficiencies. It provides a foundation for measuring performance, managing maintenance activities, and directing resources. The people are key because the Facilities Services Group and Laboratory Management both understand the condition and needs of the facility very well. Because the site is small and the

in-house workforces are long-term employees, in many cases, systems are installed and maintained by the same people. The FSG crafts and engineering personnel have excellent knowledge of the conditions and infrastructure needs of the entire site. Individual elements of the facility are also inspected periodically; i.e., weekly, quarterly, annually, etc., as part of the preventive maintenance program.

This knowledge provides a strong foundation for the systematic, comprehensive process of Condition Assessment Surveys. CAS is done on each building on a three-year cycle. Approximately one third of the space is surveyed each year. In-house personnel do most of the inspection work. Outside consultants are retained as needed to do supplementary inspections of specific systems or types of equipment on a site-wide basis. Consultants have been utilized for elevators, fire safety systems, and electrical systems. The condition assessment survey process is organized around four main building segments. These segments are areas, systems, infrastructure and exterior. Area inspections include all spaces used in accomplishing the Ames Laboratory mission or areas used to support the mission. Examples of these spaces are offices, research space, mechanical/utility and custodial space, and common or public use space. Inspection of these spaces includes examination of all finish surfaces; all utilities within the area including lighting, plumbing, piping, etc.; doors; hardware; HVAC and all permanent furniture; e.g., lab furniture within each area. Utility chases both within work areas and in common areas are included in the area inspection. System inspections include all utilities distributed within the building from the building entrance to the work area entrance. Infrastructure inspections examine the structural aspects of the building. Exterior inspections assess the condition of the exterior skin of the building including the immediate grounds outside the building such as steps, areaways and shipping docks.

All recorded deficiencies are classified into six ratings categories, ESH&A Critical, ESH&A Affected, Mission Critical, Mission Affected, Cost Preventative, and Aesthetics. ESH&A Critical designates a deficiency that creates a serious or potentially serious safety or health problem that should be corrected immediately. ESH&A Affected covers deficiencies that could create a serious or potentially serious safety or health problem that should be corrected in a reasonable time frame. Mission Critical pertains to deficiencies that seriously curtail research or operations. Mission Affected deals with items that hamper or encumber research or operations. Cost Preventative is a corrective action that is used to designate older features that are not cost effective when compared to currently available components. Aesthetics are corrective actions used to create a more pleasing surrounding. All six ratings are included in the CAS inspections and surveys, but the Cost Preventative and Aesthetic items are not considered deferred maintenance items.

The three-year reinspection of all buildings also includes a thorough review of the previous inspection data to insure that any deferred maintenance items that have been corrected within that three-year period are closed in the database. Many maintenance items cited in the inspections may be corrected as part of upgrade or program remodel projects. Because of this, renovation projects are reviewed upon completion and “matched” with previously identified maintenance items within their scope of work. These items are then closed within the deferred maintenance database.

In addition to the exhaustive inspection process, all identified maintenance items that have an estimated cost of $8,000 or greater are subject to a validation review. The validation process is designed to address several aspects of the inspection procedure. First, validation is used to verify that

the deficiencies identified qualify as deferred maintenance items. Second, once the deficiency has been properly identified, the validation review confirms that the proposed corrective action is the best solution available. This confirmation may include a comparison of the proposed corrective action with other suitable solutions. The comparison would evaluate the costs, suitability, and value of several possible actions, implementing the best one. Third, the validation reviews the estimated cost of the corrective action. At that point, to more accurately reflect actual deferred maintenance costs, a 7% engineering contingency is added to all items estimated at $8,000 or greater. The costs of project design, management and support are absorbed in this contingency.

D3. Land Use Plans

The Laboratory supports the Department of Energy policy to manage all of its land and facilities as valuable national resources and takes this stewardship seriously. The land on which the Government-owned buildings sit is under long-term lease to the Federal Government from Iowa State University and is located wholly on the campus of the University (See Attachment 2, Figure 1). There is no federally-owned real estate at the Ames Laboratory. There is no undeveloped area within the lease line or adjacent to the leases (See Attachment 2, Figure 2). The area is developed with buildings, sidewalks, drives, parking, railroad right-of-way, and landscaping. The lease line has been adjusted over the years to accommodate the facility needs of the Laboratory, and the University is willing to adjust the lease as needed to accommodate new Laboratory facilities in the future. According to the Master Plan for the University, the area of campus near the Ames Laboratory is being reserved for major research facilities. Because of this unique partnership, the Laboratory and the University work together regarding site development issues around the lease area of the Laboratory. The Laboratory's interests in the University's overall site-planning considerations are represented by the interactions of Laboratory officers and senior staff members with the major University committees and bodies that are responsible for campus planning, physical facilities, long-range development, and space utilization. Also, the Ames Laboratory Chief Operations Officer, the Facilities Services Group (FSG) Manager and other FSG engineers meet with campus planning personnel from ISU's Facilities Planning and Management (FP&M) on a periodic basis. These meetings are used to discuss the status of the Campus Master Plan, facility and utility developments on campus, and provide for the real estate needs of the Laboratory. Laboratory executive management is briefed on significant developments by the Chief Operations Officer who is a member of the Executive Council.

Discussions have been initiated with ISU personnel regarding the land use needs associated with a Line Item project to replace the Metals Development Building. The project is proposed as part of the SLI Infrastructure Modernization Initiative. The preliminary plans propose that the new building will be built on land adjacent to current Ames Laboratory facilities. Once the new building is occupied, the existing Metals Development Building will be demolished. Lease lines will be adjusted as necessary to accomplish this.

Responsible stewardship also addresses other land and facility use issues. There is no historic preservation or cultural asset issues at the site. National Environmental Policy Act (NEPA) evaluations are submitted and approval received on all capital improvement projects at the Laboratory prior to construction. Landscaping and grounds maintenance is the responsibility of the University not the Laboratory. Plantings are selected and ground maintenance is accomplished

without using irrigation other than for establishing new plantings. Assets will be managed to serve the ongoing research mission of the Laboratory into the foreseeable future. No reuse of the site for other purposes is projected for the duration of this plan.

Prior documentation specifically related to land use was the Site Development Plan, 1996. There were no subsequent calls for updating the Site Development Plan. Applying a tailored approach to the local site conditions, this section of the Ten Year Site Plan will continue to serve as the Land Use Plan of the Laboratory.

D4. Excess Real Property

Asset Utilization

Facilities Management, Space Management and Utilization is managed centrally rather than distributed. The Executive Laboratory Management is the center of these responsibilities with support from the Facilities Services Group. The Deputy Director is responsible for making space assignments. Space is assigned on a room by room basis to one of the nine research programs in the Science and Technology Division or to one of the administrative departments. Research Program Directors and administrative Department Managers have responsibility over the space assigned to them regarding its use within their organization; e.g., specific office or lab assignments and room access (keying). Space vacated due to changes in research or operations reverts back to an unassigned status for reassignment by the Deputy Director. The Deputy Director may also reassign and redistribute space from one program or department to another based on changing programmatic or operational needs. Laboratory Executive Management is well informed on the research and operations activities and the associated space needs and assignments. Members of the Executive Council participate in the annual safety walk-throughs that inspect every space in all of the buildings each year. They review resource needs of each program area and department through the annual budget review and approval process. The Deputy Director personally reviews the areas involved with space assignments and deals directly with the stakeholders.

The Laboratory Associate Director's office provides support for space management activities through the management of the Space Utilization Agreement with the University. As mentioned earlier, many of our researchers share joint appointments between the Laboratory and the University. Because of these joint appointments, shared space is tracked room by room (both University occupied Ames Laboratory space and that utilized by the Laboratory in University buildings), based upon the percent of use and time (number of months) of use for determining the net use of shared space between the Laboratory and University. The Office has developed and currently maintains a space database. The Facilities Services Group maintains updated floor plans of all facilities. The Office of Sponsored Research Administration also manages the Facility Information Management System (FIMS) which is the "corporate" database for real property data within DOE. The Office is responsible for participating in various FIMS teleconferences and training conferences, and for populating, maintaining, and auditing the FIMS database. Data is provided by the appropriate source departments; e.g., Facilities Services Group and Accounting.

The Laboratory does not have a space charge system. Space is assigned and unassigned on a need basis as described above. All maintenance, utilities, custodial, and other services associated with space are funded from indirect overhead funds.

The Asset Utilization Index is calculated on a net usable basis. It can be calculated on a building by building basis or rolled up to a site-wide number. Since net usable space is assigned on a room by room basis, the net assigned space is divided by the total net usable space to determine the Asset Utilization Index in each building. The net areas from each building are then rolled up to calculate the site-wide number. The current Asset Utilization Index for the site is 0.987.

The Department's Three Year Rolling Timeline (TYRT) identifies Asset Utilization Index (AUI) targets by year for various types of facilities. The table below gives the interim and long-term targets as well as the current values for Ames Laboratory.

Table 2. AUI targets

Asset Utilization Index			
	FY07 Target AUI	Long-Term Target AUI	Ames Laboratory FY06 AUI
Office	0.935	0.950	1.000
Warehouse	0.885	0.890	1.000
Laboratory	0.860	0.900	0.980
Shop	N.A.	N.A.	1.000
Overall	N.A.	N.A.	0.987

Facilities Supporting Mission Activities

The Laboratory operates under a single executive management structure to carry out the mission as described in Section C. There are no separate laboratory "directorates" based on program support, facilities assigned, location, or any other designation. All of the facilities are managed centrally. The Laboratory Executive Management has the responsibility to fund, operate, and manage all of the Laboratory facilities to accomplish the DOE program mission activities of the nine research programs in the Science and Technology Division with the assistance of the administrative departments. This responsibility extends from the Laboratory Executive Management through the Ames Site Office to the Office of Science, in particular, the Lead Program Secretarial Officer.

Disposition

All of the Laboratory facilities are operating facilities. There are no facilities on the site that are managed by EM. There is one disposition action that is projected in this plan. The Replacement of the Metals Development Building is proposed for the SLI Modernization Initiative. Funding is proposed to start in FY2011 with completion of the project in FY2014. Once the new building is completed and occupied, the project will include funds for demolition of the old building. Since disposition of property is rare, the Real Property Asset Management Plan (Plan 46300.002) states, "In accordance with the Graded Approach, no Ames Laboratory process for the disposition of Real Property assets will be defined now. If the Laboratory needs to dispose of property in the future, specific processes and procedures will be developed for the disposal and submitted to the Ames Site Office for review and approval utilizing a DOE Certified Realty Specialist." As part of the planning

process for this project, a specific disposition plan will be developed with assistance from DOE CH personnel in accordance with the current regulations and guidance.

D5. Long term Stewardship

There are no long term stewardship activities at Ames.

D6. Replacement Plant Value (RPV) Estimates

Replacement Plant Values are Contractor generated using a current plant value method. The values were traditionally updated in September of each year and entered into FIMS. Beginning in FY2007, the update is being done in February per guidance from Office of Science to match the schedule of updates in the FIMS system. The RPV of each building is adjusted for capital improvements that change the current plant value basis such as building additions. They are also escalated using escalation factors based on Whitestone Research Construction Index Data provided by the DOE Chicago Office. The escalation factors are based on the most recent year of actual construction cost escalation. Estimates of future RPV values are shown in Table 3. An annual escalation factor of 2.3% is used to project the values per guidance from the Office of Science. The total Replacement Plant Value is adjusted over the plan period by any dispositions or new construction.

Table 3. Replacement Plant Values Estimates

	RPV Value Brought Forward From Previous Year	Estimated Additions in FY	Escalation (2.3%)	RPV at End of the FY
FY04				**$52,987,900**
FY05				**$54,693,350**
FY06				**$57,920,300**
FY07				**$58,755,510**
FY08	$58,755,510	$0	$1,351,377	**$60,106,887**
FY09	$60,106,887	$0	$1,382,458	**$61,489,345**
FY10	$61,489,345	$0	$1,414,255	**$62,903,600**
FY11	$62,903,600	$0	$1,446,783	**$64,350,383**
FY12	$64,350,383	$0	$1,480,059	**$65,830,442**
FY13	$65,830,442	$0	$1,514,100	**$67,344,542**
FY14	$67,344,542	$20,060,325 *	$1,548,924	**$88,953,792**
FY15	$88,953,792	$0	$2,045,937	**$90,999,729**
FY16	$90,999,729	$0	$2,092,994	**$93,092,722**
FY17	$93,092,722	$0	$2,141,133	**$95,233,855**
FY18	$95,233,855	$0	$2,190,379	**$97,424,234**

* The increase in the RPV is due to the Replacement of the Metals Development Building. The plant value of the new building is greater due to the modern features and capabilities as compared to what is being replaced.

D7. Maintenance

Sustainment consists of maintenance and repair activities necessary to keep an existing inventory of facilities in good working order and extend their service lives. It includes regularly scheduled maintenance, corrective repairs, and periodic replacement of components over the service life of the facility. The facility management, engineering, documentation, and oversight required to carry out these functions are also included. Historically, the facilities have been well maintained so that the service lives of the buildings have been extended. The average age of the research buildings is 53 years. The Laboratory continues to work toward reducing deferred maintenance levels. The historical data shows that the Laboratory has been able to control and slightly reduce deferred maintenance levels with modest levels of indirect funded maintenance, allowing Ames to operate with a 1.8% target Maintenance Investment Index.

Table 4. Maintenance Expenditures

	RPV Basis for MII	SC Goal (1.8% RPV)	Planned Indirect Funded Maintenance in FY	MII Calculation
FY07	$52,987,900		$963,000	1.82%
FY08	$54,693,350		$997,000	1.82%
FY09	$57,920,300	$1,042,565	$1,031,000	1.78%
FY10	$58,755,510	$1,057,599	$1,066,000	1.81%
FY11	$60,106,887	$1,081,924	$1,104,000	1.84%
FY12	$61,489,345	$1,106,808	$1,147,000	1.87%
FY13	$62,903,600	$1,132,265	$1,192,000	1.89%
FY14	$64,350,383	$1,158,307	$1,226,000	1.91%
FY15	$65,830,442	$1,184,948	$1,561,000	2.37%
FY16	$67,344,542	$1,212,202	$1,605,000	2.38%
FY17	$88,953,792	$1,601,168	$1,657,000	1.86%
FY18	$90,999,729	$1,637,995	$1,698,000	1.87%

Laboratory Executive Management takes an active and detailed role in balancing the priorities of all facets of Laboratory operations in setting budgets for maintenance activities. Facilities staff prepares budget requests for the core functions and tasks for sustainment of the facilities and infrastructure. These core tasks are activities that are ongoing from year to year and are budgeted using historical data, knowledge of changing conditions, or requirements and experience. Individual maintenance projects are defined and budgeted based on Condition Assessment (deferred maintenance) results, knowledge of facility needs, and input from Laboratory research and administrative staff. The priority of each overhead-funded maintenance project is evaluated with respect to other activities and its impact to the overall mission of the Laboratory. Resources are applied so that infrastructure meets the needs of the research efforts and building occupants.

Historical experience shows that the current levels of expenditures have been adequate to maintain the facilities. Therefore, future maintenance funding levels are projected by escalating the maintenance budget to continue this level of effort. It is escalated using the labor and material escalation rates supplied by the Budget Office. When projecting maintenance expenditures, management makes adjustments for unique short-term requirements or projects. For example, the purchase and implementation efforts on a new CMMS system boosted the required maintenance expenditures in FY2005 and FY2006, but it does not require that level of funding to continue. The funding level projections also utilize the input from Laboratory Executive Management. Deferred maintenance results, first hand knowledge of the facilities, and feedback (both formal and informal) from Laboratory personnel provide additional checks on the adequacy of maintenance funding levels.

D8. Deferred Maintenance Reduction (DMR)

As stewards of DOE resources, Ames Laboratory strives to "right size" the sustainment activities to keep the real property assets in good condition and to make the best use of the operating dollars used for sustainment and operations. Facility management practices have maintained the facilities over their lifetimes so that deferred maintenance levels have not been a problem. Maintaining this balance maximizes the mission performance both now and in the future. The Office of Science has established ACI goals of 0.98 for "Mission Critical" assets, 0.95 for "Mission Dependent" assets, and 0.85 for "Not Mission Dependent" assets. The Office of Science has set deferred maintenance reduction funding targets for sites that fall significantly below these targets. No funding targets have been set for Ames Laboratory because the assets are in good condition as is shown in Table 5.

Table 5. ACI Targets and Actuals

	Office of Science Target ACI	FY2006 ACI for Ames Facilities
Mission Critical Assets	0.980	0.976
Mission Dependent Assets	0.950	0.959
Not Mission Dependent Assets	0.850	N.A.

While deferred maintenance is not a significant problem, efforts continue to further reduce deferred maintenance and improve the Asset Condition Index of the facilities. Typically, each year deferred maintenance deficiencies are corrected through indirect funded maintenance activities and as a result of GPP projects. New deficiencies are identified through the Condition Assessment Survey program which, if not corrected during the fiscal year, adds to the deferred maintenance. Deferred maintenance estimates are escalated as they are carried into the next year. The net result of this has been a slight decrease in deferred maintenance totals (dollars) and an improvement in the ACI as is shown in Table 6.

The projected Asset Condition Index projects that a modest amount of deferred maintenance items will continue to be corrected at the current level of indirect funded sustainment. The deferred maintenance reduction from the proposed GPP projects is also factored into the projection. When these reductions are balanced against new deficiencies identified in the CAS process, there is still a general downward trend in the deferred maintenance backlog. The large drop in deferred maintenance in FY2014 is the result of the line item project to replace the Metals Development Building as part of the SLI Modernization Initiative. Over the life of this plan, the ACI of Ames Laboratory will significantly exceed the targets set by the Office of Science.

Table 6. Deferred Maintenance Dollars and ACI by Year

FY	Deferred Maintenance ($000)	Asset Condition Index
2001	$1,573.2	0.9685
2002	$1,537.1	0.9695
2003	$1,567.8	0.9696
2004	$1,382.9	0.9739
2005	$1,453.7	0.9734
2006	$1,445.8	0.9750
2007	$1,448.0	0.9754
2008	$1,429.6	0.9762
2009	$1,410.7	0.9771
2010	$1,380.9	0.9780
2011	$1,376.0	0.9786
2012	$1,317.4	0.9800
2013	$1,306.4	0.9806
2014	$830.6	0.9907
2015	$824.7	0.9909
2016	$818.5	0.9912
2017	$812.2	0.9915
2018	$805.6	0.9917

D9. Recapitalization & Modernization

Recapitalization projects are major renovations or reconstruction activities, including facility replacements, needed to keep existing facilities modern and relevant in an environment of changing standards and missions. It is not a static target, but rather one that continues to evolve over time as research, technology, and standards progress. It includes the restoration and modernization of existing facilities, but not the acquisition of new facilities for new program initiatives. Over the past 45 years, recapitalization is funded primarily by GPP funds since the scale of the recapitalization projects fall below thresholds for line item funding. The only line item project of any type at the Laboratory over that time period was construction of the TASF building completed in 1995. That project provided a new facility for administrative services freeing up research space in existing laboratory buildings. Technically, even that project would not be considered recapitalization since it was not a facility replacement. The level of capital reinvestment can be measured by the *Capital Reinvestment Index* which is defined as the capital funding divided by the replacement plant value (similar to the maintenance investment index). Over this time period, the capital reinvestment index for Ames Laboratory has been typically around 1% of replacement plant value. This is well below the recommended level of 2%. This level of reinvestment has been inadequate to carry out large modernization projects.

The SLI Modernization Initiative called on each of the Office of Science laboratories to put together a plan identifying the general support infrastructure needs to achieve the vision and goal operating in thoroughly modernized facilities by FY2018. It was determined that the best strategy is to replace the Metals Development Building with a new building. This allows the plan to proceed while normal research activities continue in the existing facilities. Once the new building is complete, the research activities can be relocated into the new building with a minimum of disruption. Trying to modernize within the existing footprint within this timeframe would cause extensive disruption of research activities or displacing 25% of the research activity for the duration of the work. This approach also allows for reprogramming research activities to co-locate research functions into the new building to maximize collaboration and efficiency and provide the necessary environments for the operation of cutting-edge technical equipment. With a line item project to replace the Metals Development Building, the normal capital improvement funding can be focused on the modernization needs of the other research buildings.

D9a. IGPP

IGPP funding is not used because Ames Laboratory is a program dedicated not a multiprogram laboratory.

D9b. Line Items

Project Title:	Metals Development Building Replacement			
Estimated Cost ($K)	$37,000			
Gross Square Feet Added	66,500			
Gross Square Feet Removed	69,663			
Project Description & Justification:	The project will replace the Metals Development Building (MD). The original building was built in 1961 and three additions were added to it over the years. The original program for the building was pilot plant operations which resulted in large open areas. As research activities changed incrementally over its lifetime, these areas were subdivided creating a piecemeal layout of spaces. Given the age of the building, its condition, research displacement problems and difficulty to modernize, replacement is proposed. It will consolidate the Lab's core materials design, synthesis and characterization into a good spatial relationship. Space will be designed specifically for the specialized needs of sensitive research instruments such as electron microscopes. It will also reflect current research paradigms that are highly flexible and adaptable in order to support changing needs and new initiatives, and provide additional functions to the Laboratory; functions which are now limited by current infrastructure, such as low vibration floors. MD will be used as staging space while research activities are consolidated in the new building and then demolished.			
Funding Profile:	**FY11**	**FY12**	**FY13**	**FY14**
Expenditure ($K)	$2,600	$5,200	$24,000	$5,200

D9c. GPP

The recapitalization plan for GPP funding for the Laboratory is detailed in the Summary of Resource Needs, Attachment 4. Individual projects are shown out through FY2018. The capital investment index from the GPP funding will remain at approximately 1% (0.84 – 1.1%) throughout the duration of this plan.

D10. Site Space Bank Analysis

The only space addition and removal anticipated during the plan period is associated with the line item project to replace the Metals Development Building.

Table 7. Space Banking

Fiscal Year	Expected Additions (sf)	Expected Removals (sf)	Net Change (sf)	Available Offsetting Space
FY 06				0
FY 07				0
FY 08				0
FY 09				0
FY 10				0
FY 11				0
FY 12				0
FY 13				0
FY 14	66,500	69,663	(3,163)	3,163
FY 15				3,163
FY 16				3,163
FY 17				3,163
FY 18				3,163

D11. Performance Indicators & Measures

Performance measures will be utilized to link performance of program goals and budgets to outputs and outcomes. Various performance measurements are formalized to track the performance in asset management. Efforts are made to utilize broad-based measures so a small number of results can provide a high level, integrated grasp of the stewardship of DOE assets at the Ames Laboratory. Measures and metrics are defined in O430.1B, Real Property Asset Management (RPAM) and in Appendix B of the operating contract. While there is some commonality in the measures, the metrics do not necessarily align. The measures and metrics associated with the Appendix B of the operating contract will be reported through the self- assessment report. The DOE corporate wide measures specific to RPAM, the Asset Condition Index and the Asset Utilization Index are reported directly through FIMS as well as being incorporated in the Laboratory Self-Assessment.

The Contract Performance Measures are reported on a fiscal year basis. The Contractor Performance Evaluation and Measurement Plan (PEMP) went through a revolutionary change between FY2005 and FY2006. Many of the measures have remained the same, but the metrics have changed from a five step rating of Poor, Fair, Adequate, Good, or Excellent, to a 0-4.3 scale with letter grades from F to A+. Additional measures were added. The PEMP has undergone only minor change between FY2006 and FY2007. This will allow the Laboratory and DOE management to resume effective trending of F&I performance from a new baseline. The FY2007 Performance Evaluation Measurement Plan (PEMP) and the proposed FY2008 PEMP is provided in Attachment 3.

The Laboratory will continue to work with the Ames Site Office to implement meaningful real property asset performance measures over the ten-year planning period that is commensurate with Ames Laboratory's duties and responsibilities. It is expected that the DOE Office of Science Lead Program Secretarial Officer (LPSO) will establish annual performance targets for the Office of Science real property assets and state their expected performance outputs and outcomes in their annual direction and guidance. The Ames Laboratory will work with the Ames Site Office to develop site-specific measures to assess the level to which the LPSO-established outputs and outcomes have been attained. Typically these measures will be incorporated into the operating contract.

D12. Energy & "Sustainability" Management

Ames Laboratory takes a proactive approach to Energy Management by constantly looking for cost effective ways to save energy while reviewing the energy that is used to ensure that resources are used in an efficient manner to support the mission of the Laboratory. Ames Laboratory meets all energy reporting requirements set by DOE Order 430.2a and the Energy Policy Act of 2005 and strives to achieve the conservation goals set by those documents as well as the goals established in Executive Order 13423.

Ames Laboratory does not have a dedicated Energy Management Group. All energy management functions are the responsibility of the Facilities Services Group, which is charged with maintaining the entire facility. Energy efficiency and conservation considerations are incorporated into facility and infrastructure maintenance and improvements seamlessly by having the Energy Management and Facility Management responsibilities handled within one department. The Facilities Services Group is responsible for the development, implementation and coordination of the Energy Management Plan, and for leading the Laboratory's effort to meet DOE's energy reduction goals. The energy management activities that impact the overall Environmental Management System are coordinated with counterparts in the Environment, Safety, Health and Assurance Department.

Annually, the Ames Laboratory sets performance agreements in Energy Management with the Ames Site Office and sets internal conservation goals via a site In-House Energy Management Plan. The In-House Energy Management Plan and the performance agreements together form the plan to meet the conservation goals established by DOE Order 430.2a and the Energy Policy Act of 2005. In addition to setting specific goals for the current and next fiscal years the Ames Laboratory In-House Energy Management Plan sets long term goals through 2010. The next revision of the Ames Laboratory In-House Energy Management Plan will include conservation goals out through 2015 as well as incorporate requirements of Executive Order 13423.

Table 8. Energy Consumption

Performance Measures	Baseline	Actual	Target				Achieve Target
	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Long Term	
Operating Costs - Energy Consumption (BTU/SF). 2005 Energy Policy Act. 20% reduction from 2003 baseline.	FY 2003 Baseline 246,000	247,556	236,160	231,240	226,320	196,800	2015
Operating Costs - Energy Consumption (BTU/SF). EO 13423 3% annual reduction or 30% reduction.	FY 2003 Baseline 246,000	247,556	231,240	223,860	216,480	172,200	2015

The stated goals for energy efficiency are not impossible to achieve. However, practical methods and the means of achieving the 30% reduction in energy consumption remain uncertain given budget and mission constraints. Major components of the strategy to achieve the energy reduction goals include the following items:

- A FEMP Expert Energy Efficiency Evaluation (E4) team is scheduled to perform an evaluation of Ames Laboratory facilities during FY2007. FEMP provides the E4 teams to visit Federal facilities providing an evaluation of potential energy and dollar savings opportunities through improved operations and maintenance of buildings, equipment, controls, and other low cost/no cost means. The teams will perform preliminary interviews and data collection prior to the site visit, perform an on-site evaluation, and prepare a report with the opportunities for savings. While their focus is on low cost/no cost O&M opportunities, they will also identify facility modifications and upgrades to further reduce energy consumption. Based on the past experience of the E4 teams, no cost and low cost changes typically achieve 10% savings. More extensive conservation upgrade projects identified by the E4 team will be budgeted and implemented on a cost effective basis. These projects will be incorporated into the plan to be developed by December 2007 defining how this goal will be achieved.
- Minimize exhaust air from fume hood systems through system upgrades and operational changes.
- Replace the Metals Development Building. The Office of Science infrastructure modernization initiative establishes a goal that all of the SC laboratories will be operating thoroughly modernized complexes by the end of FY2019. A key component of the Ames Laboratory plan is to replace the Metals Development Building with a new building slated for funding in FY2011. Once the new building is occupied, the existing building will be demolished. The proposed facility construction will be designed and constructed to achieve LEED Gold certification. Obviously, energy efficiency will be a high priority in the new facility. References indicate that Gold Certification typically results in energy savings of 50 to 60%. Value management will be utilized to evaluate and incorporate energy conserving technologies such as ground source heat pumps, solar energy, and day lighting systems. The existing Metals Development Building is 46

years old and cannot achieve the energy efficiency of a new facility. The facility replacement will contribute significantly to the overall reduction of energy use at the site.

In addition, several GPP projects scheduled between now and 2018 will not only upgrade critical systems and areas for improved functionality, but also for increased energy efficiency.

- Upgrade Exhaust Stacks & Blowers, Spedding Hall and Metals Development. This project upgrades the fume hood systems of two buildings to a variable volume system and seeks to seal the fume hood stacks of Spedding Hall in an effort to reduce the amount of excess air being exhausted reducing heating and cooling needs and reducing the fan horsepower required.
- Upgrade HVAC System, Spedding Hall. This project upgrades the existing zoned, constant volume system to a variable volume system with climate control for each bay. This project will reduce the amount of heating/cooling required by eliminating reheat and reduce the horsepower required to move the air.
- Upgrade Windows, Spedding Hall. The current windows in Spedding Hall date back to the original construction of the building over 50 years ago and are a major source of energy loss in the building. This project upgrades the windows to current technology, energy efficient windows which will reduce the heating and cooling required in the building and increase occupant comfort.
- Systematic Space Renovation. While the major thrust of this project involves the modernization of lab space to provide state-of-the-art research facilities, the process does involve upgrading systems to more energy efficient states. The primary example involves the upgrade of space lighting. During the renovation older and less efficient light fixtures are replaced with new fixtures that utilize energy efficient electronic ballasts and higher efficiency lamps.

Ames Laboratory routinely addresses energy efficiency in the indirect funded sustainment and operations of the facilities. For example, a FY2007 project to replace the worn out roof of the Receiving Warehouse will install a roof that is more energy efficient than the old roof thereby reducing heating and cooling costs associated with the building. The insulation will be increased and a light colored roof membrane will be more reflective. As additional examples, motor replacements are all premium efficiency and all replacement light ballasts are energy efficient electronic ballasts.

D13. Leasing & Third Party/Non-Federal Funded Construction of New Buildings

There are currently no leased facilities and there are no plans to lease any facilities in the foreseeable future. The plan does not include any non-federal funded construction of new buildings. However, the unique relationship with Iowa State University and integration of the site within the campus allows the Ames Laboratory access to facilities and utility services without capital investment. Because of this relationship, and as discussed in an earlier section, the Laboratory can use available space in University-owned buildings adjacent to the Laboratory through a space rental agreement. This is not a lease arrangement where the Laboratory commits to using a building for an extended period of time. The arrangement is recognition of the collaborative efforts between the Laboratory and the University in individual spaces that allows both parties to leverage their effectiveness, flexibility, and capabilities through sharing resources. It enables the Laboratory to utilize additional space on a short-term basis without investing in permanent space. It also supports collaborative efforts with University personnel on new or short-term initiatives without modifying permanent space

for it. The arrangement tracks the collaborative space used in Laboratory and University buildings and calculates a net amount used. The Laboratory makes at least partial use of approximately 55,000 square feet of University space. When this space is pro-rated for partial use and credit is taken for University supported activity in Ames Laboratory space, the net usage is projected to be 4,858 square feet in FY2007.

The integration of the Ames Laboratory site with the University campus enables the Laboratory to utilize the utility infrastructure of the campus. The University provides potable water and sewer, ordinary waste disposal, natural gas to the research buildings, streets, most of the parking, street lighting, traffic control, compressed air, telecommunications, steam and chilled water. Some of these are provided through contract fees and some are purchased on a direct-charge basis. The Laboratory avoids the capital investment, management, maintenance, operating expense, and recapitalization that these systems require. Of particular benefit is the fact that the Laboratory does not require large chillers or boiler plants, items that have high maintenance demands. In effect, it is a form of third party financing as the University funds the infrastructure that serves the Laboratory and the campus. For example, the University recently built a $13 million chiller plant to serve the north part of campus where the Laboratory facilities are located.

D14. Operating Costs for Sustainment and Operations

As stewards of DOE resources, Ames Laboratory strives to “right size” the sustainment activities to keep the real property assets in good condition and to make the best use of the operating dollars used for sustainment and operations. Maintaining this balance maximizes the mission performance both now and in the future. The success of achieving this balance can be seen in the condition of the assets with a modest level of sustainment costs. The DOE Three Year Rolling Timeline; Implementing the Goals and Objectives of Asset Management Plan (Prepared by OECM, January 16, 2007) provides real property targets and desired outcomes. The interim and long term targets for asset condition (Asset Condition Index, ACI) and the asset condition of Ames Laboratory facilities are shown in the following table.

Table 9. Interim and Long Term Targets for ACI

	FY2007 Target ACI	Long Term Target ACI	FY2006 ACI for Ames Facilities
Asset Condition Index for Mission Critical Assets	0.962	0.980 By 2015	0.976
Asset Condition Index for Mission Dependent Assets	0.947	0.950 By 2010	0.959
Asset Condition Index Department Wide	0.959	0.965 By 2014	0.975

As is shown in the above table, Ames Laboratory already exceeds the FY2007 targets and the Long Term Targets in aggregate for all assets and mission dependent assets. The mission critical assets are close to the long term target. This plan provides a roadmap that will meet this target by the target year.

Sustainment consists of maintenance and repair activities necessary to keep the existing inventory of facilities in good working order. It includes regularly scheduled maintenance, corrective repairs and periodic replacement of components over the service life of the facility. The facility management, engineering, documentation and oversight required to carry out these functions are also included. Because of the condition of the facilities, Ames is not required to have mandated deferred maintenance reduction funding levels. In the course of normal sustainment and improvement activities, deferred maintenance is reduced. Operating costs in the table below includes such activities as custodial services, refuse, snow removal, pest control, grounds maintenance but does not include facility maintenance or energy costs.

Table 10. Operating Costs for Sustainment and Operations

Performance Measures	Baseline	Actual	Target			
	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Long Term
Operating Costs- Sustainment and DM Reduction ($/SF)	$3.12	$3.44	$2.91	$3.00	$3.18	$3.54 (FY2014)
Operating Costs – Operations ($/SF) (includes grounds, janitorial, pest control, refuse, recycling and snow removal but does not include energy cost)	$1.00	$1.04	$1.08	$1.11	$1.11	$1.11 (FY2008)

The target values from the Three Year Rolling Timeline document represent department wide values based on generalized inputs for plant value and maintenance costs. They do not necessarily translate well to an individual site, especially a small one. The target values for sustainment investment at Ames represent a MII of 1.8% of the RPV expressed in dollars per square foot. The condition of the facilities provides validation that this level of maintenance funding is adequacy. Since the three year rolling timeline is new, Ames Laboratory will work with the Ames Site Office and DOE subject matter experts to review the OECM targets and develop specific targets for Ames.

E. Attachments

Attachment 1 Land Use Plan

See Section D3. Ames Laboratory does not have a separate Land Use Plan. Section D3 of the TYSP serves as the land use plan for the Laboratory.

Attachment 2 Inventory and Maps of Buildings

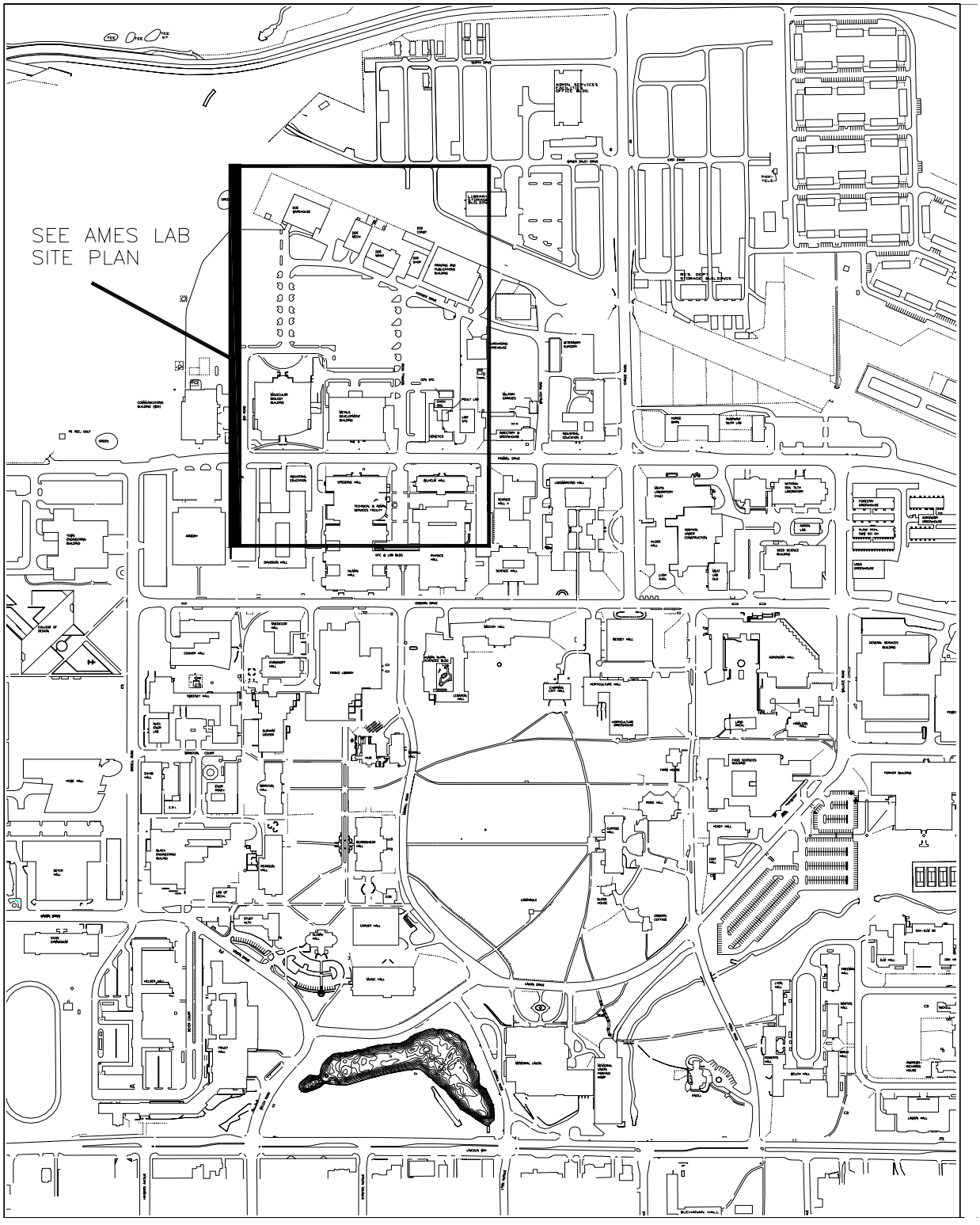

Figure 1. Iowa State University Central Campus Map

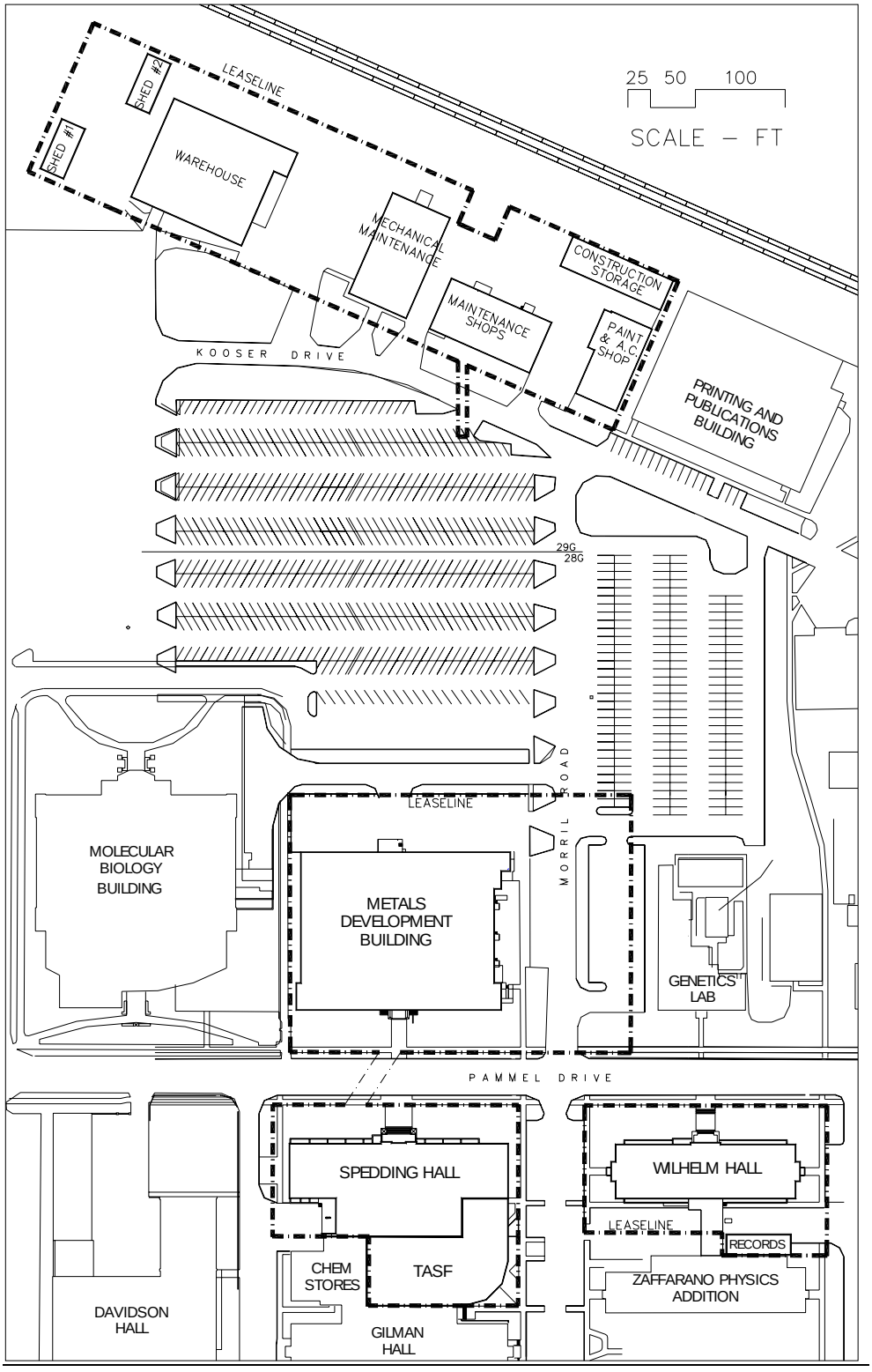

Figure 2. Ames Laboratory Site Plan

Table 1. Real Property Assets

Assets	FIMS usage code	Facility use	Gross S/F	Year Built	RPV ($000)	Mission Dependency	ACI	Construction Type
Buildings								
Campus Warehouse	400	General Storage	16,506	1966	1,169.6	Mission Dependent Not Critical	0.981	Steel Light Frame
Construction Storage Shed	400	General Storage	4,440	1967	90.1	Mission Dependent Not Critical	0.951	Steel Light Frame
Maintenance Shops Building	601	Maintenance Shops, Gen.	7,503	1967	766.6	Mission Dependent Not Critical	0.928	Steel Light Frame
Mechanical Maintenance Building	601	Maintenance Shops, Gen.	8,540	1964	651.9	Mission Dependent Not Critical	0.904	Steel Light Frame
Metals Development Building	791	Laboratory, General (Non-nuclear)	69,663	1961	11,248.8	Mission Critical	0.955	Concrete Moment Frame
Paint and Air Conditioning Building	601	Maintenance Shops, Gen	4,998	1968	721.8	Mission Dependent Not Critical	0.949	Concrete Moment Frame
Records Storage Facility	400	General Storage	1,689	1948	254.2	Mission Dependent Not Critical	0.992	Reinforced Masonry Bear Walls/Metal Deck
Shed 1	400	General Storage	1,461	1990	19.7	Mission Dependent Not Critical	1.00	Wood Commercial & Industrial
Shed 2	400	General Storage	1,702	1991	25.8	Mission Dependent Not Critical	1.00	Wood Commercial & Industrial
Spedding Hall	791	Laboratory, General (Non-nuclear)	107,630	1953	21,541.5	Mission Critical	0.974	Concrete Moment Frame
Technical and Administrative Service Facility	101	Office	46,991	1995	7,132.1	Mission Critical	0.999	Concrete Moment Frame
Wilhelm Hall	791	Laboratory, General (Non-nuclear)	56,541	1949	14,376.4	Mission Critical	0.986	Concrete Moment Frame
OSF								
Parking Areas	1789			1971	563.5	Mission Dependent Not Critical	1.00	
Power Switch Pit	8909			1971	193.49	Mission Critical	1.00	
TOTALS			327,664		58,755.5		0.975	

Attachment 3 Inventory and Maps of Infrastructure/Site Utility Systems

See Attachment 2

Attachment 4 Updated Integrated Facilities and Infrastructure (IFI) Crosscut Budget Submission

Integrated Facilities and Infrastructure Budget Data Sheet (IFI) (SC Version)	Deferred Maintenance Reduction	Gross Building Area Added	Gross Building Area Removed	FY 07 Approp. ($000)	FY 08 to Congress ($000)	FY 09 ($000)	FY 10 ($000)	FY 11 ($000)	FY 12 ($000)	FY 13 ($000)	FY 14 ($000)	FY 15 ($000)	FY 16 ($000)	FY 17 ($000)	FY 18 ($000)
SITE NAME: Ames Laboratory															
PROGRAM: Office of Science (BES)															
1.0 Capital Line Item															
1.1 New Infrastructure Construction (facilities and additions)															
Replace Metals Development Building	500	66,500	69,663					2,600	5,200	24,000	5,200				
Subtotal 1.1	500	66,500	69,663					2,600	5,200	24,000	5,200				
1.2 All Other Infrastructure Projects (recap)															
None															
Subtotal 1.2															
Total Infrastructure Line Items (1.1 + 1.2)	500	66,500	69,663	0	0	0	0	2,600	5,200	24,000	5,200	0	0	0	0
1.3 Programmatic Line Items that Add Space															
None															
Subtotal 1.3															
Subtotal Line Item Projects (1.1 +1.2+1.3)	500	66,500	69,663	0	0	0	0	2,600	5,200	24,000	5,200	0	0	0	0
2.0 General Plant Project (GPP) (Include project number; funding program and whether it is programamtic or not))															
2.1 New Construction (facilities and additions)															
None															
Subtotal 2.1 New Construction GPP															
2.2 All Other GPP Projects															
KC-03 GPP Upgrade Exhaust Stacks & Blowers, Spedding				330											
KC-03 GPP Upgrade HVAC System, Spedding Hall	57			163	597	621	616								
KC-03 GPP Upgrade HWH Exit Doors	10						42								
KC-03 GPP Record Storage Facility								190							
KC-03 GPP Upgrade Access Control System	50							507	475						
KC-03 GPP Upgrade Windows, Spedding Hall									222	315					
KC-03 GPP Upgrade Handicapped Access										238					
KC-03 GPP Fire Sprinkler, Maintenance Shop Bldg.										116					
KC-03 GPP Systematic Space Modernization										70	220	530	560	600	630
KC-03 GPP Upgrade Electrical Distribution, Spedding Hall											560				
KC-03 GPP Misc. Small Projects												300	320	330	360
Subtotal 2.2 All Other (recap) GPP				493	597	621	658	697	697	739	780	830	880	930	990
Subtotal GPP (2.1 + 2.2)		0	0	493	597	621	658	697	697	739	780	830	880	930	990
3.0 Institutional General Plant Project (IGPP)															
Not applicable															
Subtotal IGPP Projects															
4.0 Operating/Expense for Excess Elimination and Other															
4.1 Excess Elimination (demolition, sale, lease, transfer) Show area eliminated in Gross Area column															
None															
4.1 Subtotal															
4.2 All Other (List direct O&E maintenance under 5.1)															
Provide project level detail															
4.2 Subtotal															
Subtotal 4.0 Operating/Expense Projects (4.1 + 4.2)															
TOTAL Capital & Operating Investment:		66,500	69,663	493	597	621	658	3,297	5,897	24,739	5,980	830	880	930	990
TOTAL Overhead Investments (IGPP)		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Integrated Facilities and Infrastructure Budget Data Sheet (IFI) (SC Version)	Gross Sq Ft	FY 07 Approp. ($000)	FY 08 to Congress ($000)	FY 09 ($000)	FY 10 ($000)	FY 11 ($000)	FY 12 ($000)	FY 13 ($000)	FY 14 ($000)	FY 15 ($000)	FY 16 ($000)	FY 17 ($000)	FY 18 ($000)
SITE NAME: Ames Laboratory													
PROGRAM: Office of Science (BES)													
5.0 Maintenance & Repair													
5.1 Direct Funded (by HQ or Site Program)*													
List direct O/E maintenance projects >$500,000													
Subtotal 5.1 Total Direct Maintenance & Repair													
5.2 Indirect (from Overhead or Space Charges)													
Include indirect O/E maintenance projects > $500,000													
Maintenance, repair & rehab		963	997	1,031	1,066	1,104	1,147	1,192	1,226	1,561	1,605	1,657	1,698
Subtotal 5.2 Total Indirect Maintenance & Repair		963	997	1,031	1,066	1,104	1,147	1,192	1,226	1,561	1,605	1,657	1,698
Subtotal Total Maintenance & Repair (5.1 + 5.2)		963	997	1,031	1,066	1,104	1,147	1,192	1,226	1,561	1,605	1,657	1,698
5.3 Hqs Direct Funded Deferred Maintenance Reduction													
Subtotal 5.3 Total Direct Deferred Maintenance													
5.4 Indirect Funded Deferred Maintenance Reduction (from Overhead or Space Charges)													
Include indirect O/E maintenance projects > $500,000													
Subtotal 5.4 Total Indirect Deferred Maintenance													
Total Deferred Maintenance (5.3 + 5.4)		0	0	0	0	0	0	0	0	0	0	0	0
Total Maintenance (5.1 + 5.2 +5.3 +5.4)		963	997	1,031	1,066	1,104	1,147	1,192	1,226	1,561	1,605	1,657	1,698
6.0 Indirect O&E													
6.1 Excess Elimination (demolition, sale, lease, transfer) funded from indirect funds. Show area eliminated in Gross Area column													
6.1 Total Indirect Excess Elimination													
6.2 Other Indirect Funded (includes modifications, additions, improvements, etc. that does not qualify as GPP or maintenance)													
6.2 Total Other Indirect O&E													
6.0 Total Indirect O&E													

Integrated Facilities and Infrastructure Budget Data Sheet (IFI) (SC Version)																
SITE NAME: Ames Laboratory																
PROGRAM: Office of Science (BES)																
7.0 Summary of Area Added & Eliminated by Year																
7.1 Total Area to be Eliminated Each Year (List of projects, by type of funding, with project number, and AREA eliminated by fiscal year accomplished).	Project Number	Gross SF Removed	FY 06 Sq Ft	FY 07 Sq Ft	FY 08 Sq Ft	FY 09 Sq Ft	FY 10 Sq Ft	FY 11 Sq Ft	FY 12 Sq Ft	FY 13 Sq Ft	FY 14 Sq Ft	FY 15 Sq Ft	FY 16 Sq Ft	FY 17 Sq Ft	FY 18 Sq Ft
Line Item from Block 1 (show each that removes space)																
Replace Metals Development Building	L002	69,663									69,663				
Subtotal Line Items		69,663	0	0	0	0	0	0	0	0	69,663	0	0	0	0
GPP from Block 2 (show each that removes space)																
Subtotal GPP																
IGPP from Block 3 (show each that removes space)																
Subtotal IGPP																
Operations/Expense from Block 4.1 (show each that removes space)																
Subtotal Block 4.1																
Indirect Operations/ Expense from Block 6.1 (show each that removes space)																
Subtotal Block 6.1																
Transfer by sale or lease, or transfer to an outside federal agency																
Provide detail																
Subtotal Transfer or Lease																
Subtotal 7.1 Sapce Removed		69,663	0	0	0	0	0	0	0	0	69,663	0	0	0	0
7.2 Total Area to be Added by GPP, IGPP, and LI Construction (List of projects, by type of funding, with project number, and AREA add by fiscal year accomplished).		Gross SF Added	FY 06 Sq Ft	FY 07 Sq Ft	FY 08 Sq Ft	FY 09 Sq Ft	FY 10 Sq Ft	FY 11 Sq Ft	FY 12 Sq Ft	FY 13 Sq Ft	FY 14 Sq Ft	FY 15 Sq Ft	FY 16 Sq Ft	FY 17 Sq Ft	FY 18 Sq Ft
Line Item (list)																
Replace Metals Development Building	L002	66,500									#####				
Subtotal Line Items																
GPP (List)																
Subtotal GPP																
IGPP (List)																
Subtotal IGPP																
Subtotal 7.2 Area Added		66,500	0	0	0	0	0	0	0	0	66,500	0	0	0	0

Attachment 5 Detail Information for Line Item Projects

Title: Replace Metals Development Building
Ames Laboratory

Total Estimated Cost: $37,000,000

Funding Schedule:

	FY11	FY12	FY13	FY14
Expenditure, $K	$2,600	$5,200	$24,000	$5,200

Building Area: 66,500 gross square feet

Project Description:
This project will build a new, state of the art research building that will replace the existing Metals Development Building. The new building will be approximately 66,500 gsf. The building will contain a combination of general use laboratory space, specialized space for sensitive instruments, office space, and support space. The design layout will incorporate features that will enhance collaborative interactions. The communications and information infrastructure will provide connectivity that will support worker productivity and effective interactions with collaborators. The general laboratory space will be flexible and easily reconfigured to support changing research activities quickly and economically. Features like overhead service modules for utilities, re-locatable casework, raised floors, de-mountable partitions, mobile work stations, and mobile storage units will be evaluated for incorporation into the design. The Laboratory's core activities in materials design, synthesis and characterization will be consolidated in the new building in a spatial relationship that will enhance the research efficiency. The building will be designed and constructed in accordance with Leadership in Energy and Environmental Design (LEED) principles in order to achieve a level of performance equivalent to LEED Gold Certification. The human environment of the new building will provide the preferred work environment that helps attract and retain high quality staff and that increases staff satisfaction and productivity.

Justification:
This project will replace the existing Metals Development Building (MD) with a new research building. The existing building is currently used as a general-purpose research facility. It is a one and two story masonry structure built in 1961. Three small additions were added to it over the years. The architectural program for the original building was pilot plant operations for material production. As a result, the original layout of the building had large open areas for relatively large scale activities. The building structure, systems, utilities, and controls were designed around these functions which were not particularly sensitive. The research activities did not have the exacting requirements that characterize the sensitive cutting edge instrumentation needed for current research. As the activity in the building shifted away from pilot plant operations and research activities changed the building was modified to try to serve the changing needs. Because these modifications were done incrementally in response to specific needs, there was no "master plan" to follow to transform the building for the new function. As a result, the large open areas were subdivided creating a piecemeal layout of smaller spaces that do not relate well functionally. It has created a building that is very inflexible and that does not provide a "preferred" environment for cutting edge research. A project to fully modernize the existing building would require the building to be vacated, gutted and reconfigured. There is no

surge space available to relocate the research activities in order to accomplish this. The final result would still be compromised by the overall layout of the structure. Given the age of the building, its condition, the current set of research displacement problems associated with it, and the difficulty to modernize it, the preferred solution is to build a new facility rather than trying to modernize a dysfunctional building.

The facilities of the Ames Laboratory have basically been managed under a philosophy of evolutionary improvement since the Metals Development Building was completed. GPP and operations funds have been used to maintain, update and extend the useful lives of the three research buildings of the Laboratory; however there are limits to what can be done to 50 year old buildings. It delays obsolescence, but does not prevent it. There are several significant reasons why the quantum infrastructure change of building a new building is justified.

The Office of Science is embarking on an ambitious initiative to modernize the facilities and infrastructure at the ten Office of Science national laboratories. It is the goal that by the end of the ten-year period (FY2009-FY2018), all of the SC laboratories will be operating thoroughly modernized complexes. Modernized facilities will encompass the following characteristics:

- Safe, Secure, and Environmentally Sound Infrastructure.
- A Highly Productive Working Environment.
- Efficient Operations and Maintenance.

The laboratories were asked to put together plans identifying the general support infrastructure needs to achieve the goal. As of result, Ames Laboratory determined that it will not be able to reach the goal by continuing to operate under the status quo. Constructing this building will provide the cornerstone for achieving this goal at Ames Laboratory. This one project, by itself, will bring 30% of the research space up to cutting edge standards. It will enable other resources to be focused and directed to modernizing the remaining facilities. The new building will create energy and other operating cost savings that will be available to fund additional modernization in the remaining facilities.

Completing and occupying the new building before disposing of the old one minimizes the disruption to existing research activity. Once the building is complete, the research activities to be housed in the space will move once. Otherwise, research groups would have to move into temporary space and/or suspend some activities for the duration of modernization work and then move back into renovated space. It also provides the surge space needed to “re-arrange” and consolidate research activities into logical locations relative to one another based on functional relationships determined through architectural programming.

The Secretary of Energy has laid out the vision for the Department to not just meet the goals of Executive Order 13423, but to exceed them by leading in the area of energy conservation. This project is a key component in Ames Laboratory’s pursuit of these goals. Among other things, the executive order calls for a 30% reduction in energy use on a per square foot basis. The proposed facility construction will be designed and constructed to achieve LEED Gold certification. Obviously, energy efficiency will be a high priority in the new facility. References indicate that Gold Certification typically results in energy savings of 50 to 60%. Value management will be utilized to evaluate and incorporate energy conserving technologies such as ground source heat pumps, solar energy, and day lighting systems. The existing Metals Development Building is 46 years old and

cannot achieve the energy efficiency of a new facility. The facility replacement will contribute significantly to the overall reduction of energy use at the site, reducing total energy consumption up to 15%.

The ability to create new space that provides flexibility and also create specialized instrument space is a great advantage. Applying current principles and technology to the design of the new building will create a more efficient building with less wasted or inefficient space. The new building will enable the Laboratory to reduce its footprint. The new building will be smaller than the one it replaces by approximately 5%. It will also allow activities currently housed in rented space to be incorporated into owned space. It is estimated that rented space will decrease by approximately 3,500 square feet which is 13% of the total. Activities currently housed in the Metals Development Building will be able to operate in a smaller space in the new building. Activities that will most benefit from new cutting edge space will be pulled into the new building. Less critical or demanding activities currently housed in the Metals Development building may be housed in other buildings. Another advantage of the project is the opportunity to create specialized space for the sensitive research instruments, such as electron microscopes, that are being used increasingly in cutting edge research. The space for this instrumentation typically has more stringent requirements for temperature, humidity, vibration specifications, access control, etc. As instruments continue to get more sensitive, the Laboratory will be unable to provide suitable space in existing buildings.

The Office of Science continues to emphasize improvement of facility condition and decreasing deferred maintenance throughout the complex. While Ames facilities are in relatively good condition, further improvement is desirable and possible. The Metals Development Building has the lowest Asset Condition Index (ACI) of any of the Mission Critical Assets. This project will eliminate over 1/3 of the current backlog of deferred maintenance.

The contractor's, Iowa State University (ISU), commitment to this project would include land and project planning assistance. As with the current building, the new building will be sited on the ISU campus, so the University would necessarily have to participate with the real estate associated with a new facility. They are willing to provide a building site adjacent to current Ames Laboratory Facilities for the new building. Lease lines would be modified accordingly. These land leases are no cost to the DOE. Because building sites are a limited resource on a university campus, it is not known how long a site directly adjacent will be available. The ISU Facilities Planning & Management (FP&M) department manages annual capital construction of eight to ten million dollars and has a very well developed and skilled construction management staff. Resources within FP&M will be utilized in the development and construction of the proposed facility. In addition to land and project planning, ISU has indicated that funds for new research equipment for the new facility will be made available if the project is started by the 2011/2012 time frame. Demand for research equipment is high around the Institution, therefore, the University can justify the availability of such equipment funds only for a limited time.

Attachment 6 List of Excess Facilities

There are no excess facilities and none in process.

Attachment 7 Performance Indicators and Measures

FY2007 Performance Evaluation Measurement Plan

7.0 Sustain Excellence in Operating, Maintaining, and Renewing the Facility and Infrastructure Portfolio to Meet Laboratory Needs

The Contractor provides appropriate planning for, construction and management of Laboratory facilities and infrastructures required to efficiently and effectively carry out current and future S&T programs.

The Sustain Excellence in Operating, Maintaining, and Renewing the Facility and Infrastructure Portfolio to Meet Laboratory Needs Goal shall measure the overall effectiveness and performance of the Contractor in planning for, delivering, and operations of Laboratory facilities and equipment needed to ensure required capabilities are present to meet today's and tomorrow's complex challenges.

7.1 Manage Facilities and Infrastructure in an Efficient and Effective Manner that Optimizes Usage and Minimizes Life Cycle Costs

In measuring the performance of this Objective the DOE evaluator(s) shall consider the following:

- The management of real property assets to maintain effective operational safety, worker health, environmental protection and compliance, property preservation, and cost effectiveness while meeting program missions, through effective facility utilization, maintenance and budget execution;
- The day-to-day management and utilization of space in the active portfolio;
- The maintenance and renewal of building systems, structures and components associated with the Laboratory's facility and land assets; and
- The management of energy use and conservation practices.

The overall performance (outcomes/results) of the following set of measures (tasks, activities, requirements, accomplishments, and/or milestones) shall be utilized by evaluators as the primary measure of the Contractor's success in meeting this Objective and for determining the numerical score awarded. The evaluation of this Objective may also consider other tasks, activities, requirements, accomplishments, and/or milestones not otherwise identified below but that provide evidence to the effectiveness/performance of the Contractor in meeting this Objective. The weight of this Objective is 80%.

7.1.1 The Maintenance Investment Index (MII) for the fiscal year associated with the performance period.

The MII, expressed as a percentage, is defined as the Actual OE funded Maintenance and Repair (M&R) Expenditures (at the end of the fiscal year associated with the performance period) divided by the Replacement Plant Value (RPV).

$$MII = \frac{\text{Actual Maintenance Expenditures}}{\text{RPV(\$)}}$$

7.1.1.1 MII Target for FY2007

Target
B+ = 1.8

7.1.2 The Facility Condition Index (FCI).

The FCI, expressed as a percentage, is defined as the Total Needed OE funded Maintenance and Repair (M&R) Deficiencies (at the end of the fiscal year associated with the performance period) divided by the Replacement Plant Value (RPV).

$$FCI = \frac{TotalNeededM\ \&\ RDeficiencies(\$)}{RPV(\$)}$$

7.1.2.1 FCI Target for FY2007

Target
B+ = 1.9-2.5

7.1.3 Effective execution of the goals within the Energy Performance management Agreement.

7.1.3.1 Target
To meet the target (B+) 75% of the Energy requirements scheduled to be accomplished during the Fiscal Year in accordance with the Comprehensive Energy Management Plan (CEMP) are completed.

7.1.3.2 Target
To meet the target (B+) energy use per gross square foot is 2% less than the previous year.

7.1.3.3 Target
To meet the target (B+) demonstrate commitment to purchase of energy efficient products, including products with low standby power devices. [Note: A list of device types and specific products within the type having recommended low standby levels can be found at http://oahu.Ibl.gov/.]

Target	Energy Efficient Products
B+	7-9

7.1.4 Establish a Site Metering Plan that identifies meters to be installed in accordance with the guidelines of the DOE Metering Plan.

7.1.4.1 Target
To meet the Target (B+) submit the Site Metering Plan by August 31, 2007.

7.2 Provide Planning for and Acquire the Facilities and Infrastructure Required to Support Future Laboratory Programs

In measuring the performance of this Objective the DOE evaluator(s) shall consider the following:

- Integration and alignment of the Ten Year Site Plan to the Laboratory's comprehensive strategic plan;
- The facility planning, forecasting, and acquisition for effective translation of business needs into comprehensive and integrated facility site plans;
- The effectiveness in producing quality site and facility planning documents as required;
- The involvement of relevant stakeholders in all appropriate aspects of facility planning and preparation of required documentation;
- Overall responsiveness to customer mission needs; and
- Efficiency in meeting Cost and Schedule Performance Index for construction projects (when appropriate).

The overall performance (outcomes/results) of the following set of measures (tasks, activities, requirements, accomplishments, and/or milestones) shall be utilized by DOE evaluators as the primary measure of the Contractor's success in meeting this Objective and for determining the numerical score awarded. The evaluation of this Objective may also consider other tasks, activities, requirements, accomplishments, and/or milestones not otherwise identified below but that provide evidence to the effectiveness/performance of the Contractor in meeting this Objective. The weight of this Objective is 20%.

7.2.1 Establish and maintain a program that provides for planning and acquiring the facilities and infrastructure required to support future laboratory programs.

Meet the B+ Target

7.2.1.1 Implement Facility planning, forecasting, and acquisition activities accurately, translate needs and facility condition information into useful strategic plans;

7.2.1.2 The Ten Year Site Plan and the IFI Budget are submitted according to the required schedule and demonstrate effective and realistic facility planning; and,
7.2.1.3 The management information systems development projects are executed in accordance with acceptable project management practices.

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FY2008 Performance Evaluation Measurement Plan

The FY2008 PEMP is currently under review and development. The FY2007 measurement plan is the starting point for this review and development. FY2008 measures are expected to be very similar to the FY2007 measures.