

OREGON INSTITUTE OF TECHNOLOGY

MASTER PLAN UPDATE STUDY

SECOND DRAFT – JANUARY 16, 2006



Aerial Photo of Existing Campus

S O D E R S T R O M A R C H I T E C T S

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INTRODUCTION

During the summer and fall of 2005, Soderstrom Architects assisted the Oregon Institute of Technology in updating their master plan. The effort began with a meeting between the consultants and OIT representatives to:

- Review the previous master planning documents.
- Identify changes to be documented.
- Outline the contents of the master plan update report.
- Determine a protocol for exchanging information.

Following the initial meeting, Soderstrom Architects toured the campus and gathered campus plans, building plans, and copies of previous studies and reports. From these items several drafts of the master plan update report were prepared. Each draft was reviewed and suggestions offered by the OIT representatives.

A final report was prepared and endorsed by the OIT representatives on [insert date]. The report was presented to and approved by the Institute's Board of Trustees on [insert date].

DATA GATHERING AND RESEARCH

The following documents were used to prepare this master plan update report:

- October 1995 Campus Growth Plan - Prepared by Soderstrom Architects
- March 1977 Master Plan Study - Prepared by Soderstrom Architects
- June 2000 Facilities Assessment - Prepared by Architecture International
- February 2004 Presentation to the Governor's Staff - Titled "Center for Health Professions"
- The President's Report
- OIT Strategic Plan for 2002-2007 - Titled "Blue Print for Success"
- Fact Book 2004-2005 – Prepared by the OIT office of Institutional Research

October 1995 Campus Growth Plan

This study took into account the original campus planning guidelines which included:

- Terracing building pads up the sloped campus to allow westerly views from OIT buildings.
- Locating vehicular parking along the campuses perimeter.
- Defining interior pedestrian circulation paths and gathering places.

Process (continued)

The report recommends future expansions of the campus address and follow these guidelines with care.

Properties surrounding the OIT campus were reviewed and evaluated to determine their value in accommodating future campus growth. A diagram of an Extended Campus was included in the report as a vision of the campus as it may expand beyond its perimeter roadway.

The study made the following conclusions and recommendations regarding the placement of new facilities:

- The overriding criteria for locating any new facility on the campus should be the campuses existing activity zones.
- Making like uses adjacent and functional for users (students, faculty, staff and visitors) should be the primary location determiner.

The master plan update, documented in this report, evaluated recent projects implemented at OIT in regards to how well they followed the planning guidelines define in this 1995 campus growth study.

March 1997 Master Plan Study

The effort to prepare this study included:

- A visual tour of the existing campus.
- The review of recent drawings and documents.
- Several open discussions with faculty, staff and students.
- Interviews with selected OIT representatives.
- Formal presentation to the OIT Board of Trustees on April 30, 1996.
- Revisions to the final report addressing OIT Board of Trustees comments.

This study focused on anticipating future facility and infrastructure needs to support the mission statement and strategic plan of OIT at the time. The study identified what had been working well and pointed out what was not regarding facilities and infrastructure. The study contained critiques on:

- Campus access, circulation, and parking
- Campus lighting and signage
- Water and geothermal systems
- Storm water and sanitary sewer systems
- Electrical systems

- Low voltage systems such as fire protection, data, and communication.

The study drew the following conclusions:

- Maintenance work, including upgrades to existing systems, were determined to be vital to the well-being of the campus, and budgeting on an on-going basis was a must.
- Adaptive reuse of existing physical assets is more cost effective than building a new building, such as the remodeling of Cornett Hall, remodeling of Snell Hall, expansion of the student union, and expansion of the Physical Education Building.
- New infrastructure is required in certain circumstances where there exists an entirely new need, such as a day-care facility, new student dormitories, and a new classroom/lab building to house the Allied Health Professional programs of Dental Hygiene and Medical Imaging.

Proposed construction projects were identified and listed in approximate order of perceived priority under the funding headings of General Fund and Auxiliary Fund.

The master plan update documented in this report evaluated the list of construction projects of the 1997 Master Plan in terms of:

- What projects have been completed and how well have they performed?
- What projects were not implemented and are they still needed?

June 2000 Facilities Assessment

This study was intended to be an update of the 1997 Master Plan and followed its basic format. However, this study focused a bit more on the existing buildings and graded each building on its ability to support the building's occupants.

A classroom utilization study determined some efficiency might be gained by looking at scheduling patterns and remodeling selected rooms to meet preferred classroom size.

The study also proposed the creation of a one-stop service center for new and continuing students. The consolidation of student services was predicted to generate a hub of activity that the campus was perceived to be lacking at the time. Proposed occupants of the one-stop student center were to contain the offices of Financial Aid, Student Health Services, office of the Registrar, Admissions, Counseling and testing, and other offices having direct contact with students. If implemented, the campus benefits would:

- Provide relief of overcrowded conditions in Snell Hall and Semon Hall.
- Allow for redistribution of space returning the union to student use and returning classroom space to academic use.
- Provide an opportunity to create a new welcoming environment that might improve the identity of the Institute.

The master plan update documented in this report evaluated the recommendations of the 2000 Facility Assessment in terms of:

Process (continued)

- Was classroom scheduling patterns changed and how have those changes affected utilization?
- Where any classroom sizes modified and how did the modifications affect utilization?
- Did the expanded student union meet the Institutes expectations regarding the generation of an activity hub?
- Has the expanded student union relieved over crowding?
- What reallocations of space have resulted from consolidating student services to the new union?

February 2004 Presentation to the Governor's Staff

This presentation identified a growing need for healthcare workers and demonstrated how OIT might fill the gap with a new Center for Health Professionals. The presentation also showed how the Center could be financed and how it may become self-sustaining.

Building on OITs mission and tradition of healthcare excellence, the new Center for Health Professionals will create a premier center of excellence within the northwest, help further partnerships with community colleges and the health industry, and create brand excitement as "the place to be" in health care education. Programs within the new facility will include Dental Hygiene, Health Sciences, Medical Imaging Technologies, Nursing, Clinical Laboratory Science, and Emergency Medical Technologies.

Most of the building funding has been secured and planning for this new Center for Health Professionals is currently underway.

The master plan update documented in this report evaluated the recommendations of the 2004 Presentation to the Governor's Office in terms of:

- What growth will be generated by the new Center for Health Professions, i.e. student volume, and can the campus accommodate that growth?
- What vacancies will be created in the existing buildings and how might these vacancies be best used to support the initiatives of the campus?

President's Report

[Insert narrative]

OIT Strategic Plan for 2002-2007

[Insert Narrative]

Fact Book 2004-2005

This publication is prepared yearly by the OIT office of Institutional Research and is designed to provide an annual portrait or 'snap shot' of reliable information to the OIT community and

its constituencies. The electronic version found on the OIT Institutional Research website at <http://www.oit.edu/ir> was used as a source for this Master Plan Update report.

Fact Book 2004-2005 is comprised of eight sections:

- General Information
- Students
- Financial Aid
- Faculty and Staff
- Finance
- Facilities
- Support Organizations
- Highlights of Institutional Studies and Research

Sections of particular interest to the Master Plan Update included: Students, Faculty and Staff, and Facilities.

- The information offered in the Student section assisted the Master Plan Update process in forming a baseline to project future enrollment, which will be used to verify facility capacities.
- The Faculty and Staff section assisted the Master Plan Update process in forming a baseline for projecting faculty and staff. These are often connected to enrollment projections in terms of student to faculty ratios.
- The Facilities section contains a list of existing buildings and their square footage areas, which assisted the Master Plan Update process in determining facility capacities.

Process (continued)

This section summarizes the reports gathered and findings made to create a baseline of understanding prior to drawing conclusions or making recommendations. The section has been divided into the following headings:

- Mission Statement
- Strategic Plan
- Facility Conditions
- Enrollment

MISSION STATEMENT

As the Oregon University System (OUS) institution with a focused mission to deliver technology education statewide, Oregon Institute of Technology (OIT) develops and maintains partnerships with public and private institutions, businesses and industries, health care organizations and government agencies to ensure quality programs that meet the needs of students and the organizations that employ them. Increasingly, OIT is participating in initiatives to increase access to its technology programs by sharing facilities and human resources with other OUS institutions and community colleges throughout the state.

OIT Mission and Objectives

Oregon Institute of Technology, the only public institute of technology in the Pacific Northwest, provides degree programs in engineering and health technologies, management, communications, and applied sciences that prepare students to be effective participants in their professional, public and international communities.

Six objectives are central to our mission:

- Provide degree programs that enable graduates to obtain the knowledge and skills necessary for immediate employment.
- Enable students to be effective communicators, responsible citizens, and life-long learners by assisting them in the development of critical thinking and problem solving skills, and ethical and cultural awareness.
- Offer continuing and distance education and advanced professional studies to meet the emerging needs of today's citizens.
- Provide informational and technical expertise to regional, state, national, and global publics in applied research.
- Develop and maintain partnerships with public and private institutions, business and industry, and government agencies to ensure quality programs that meet the needs of students and the organizations that employ them.
- Provide statewide access to address the needs of the Oregon workforce.

Initiatives (continued)

This statement of mission and objectives for OIT was approved by the State Board of Higher Education on December 19, 1999.

OIT Facilities Services Mission Statement

The Facilities Services department is a support organization responsible for the general operation, maintenance, repair, construction, building renovations, grounds, utility systems, and facility master planning for the Oregon Institute of Technology campus in Klamath Falls and Portland.

Facilities Services departments include:

- Carpentry
- Custodial
- Grounds and Heavy Equipment
- Mechanical, Electrical, and Plumbing
- Shipping and Receiving
- Warehouse
- Painting and Engraving
- General Maintenance

Our goal and mission, of the Facilities and Services department, is to provide a safe, comfortable, and attractive environment, conducive to learning, teaching, and professional development. This objective is achieved while minimizing the use of non-renewable natural resources, using sustainable practices during planning and construction, and implementing energy conservation measures.

This department is responsible for the physical environment of over 3000 students and approximately 800 Faculty and Staff.

OIT strive to provide quality services to promote the educational experience of our students.

STRATEGIC PLAN

The vision of Oregon Institute of Technology is to continue the journey from good to great with our faculty, staff, and students to meet the challenging changes in the technologies for the workplace and society. The mission is to deliver technology education throughout the state and Pacific Northwest is enhanced through the vision and strategic objectives of the plan, Blueprint for Success 2002-2007.

The goals of this plan continue our focus on students first with objectives under the categories of:

- Access
- Excellence and Quality

- Partnerships
- Workplace Development and Economic Opportunities
- Fiscal and Operational Efficiency
- Academic and Student Facilities Enhancement

The following list of actions highlights the initiatives that are planned for under each objective:

Access

OIT will offer its programs to a wider range of students. To accomplish this objective, OIT will:

- Develop existing and new academic programs and offer them wherever they are needed.
- Use appropriate alternative instructional delivery methods.
- Enhance the diversity of the student body with special emphasis on programs and minority students in all programs.
- Increase the retention and graduation of international students.
- Develop graduate degrees.
- Expand the number of community college partnerships to support access activities.

During the 2003-2004 fiscal years, the following actions were implemented regarding the objective of Access:

- Three new academic degree programs were developed and approved:
 - o A.S. and B.S. Respiratory Care in partnership with Rogue Community College (27 students enrolled fall 2004).
 - o B.S. in Renewable Energy Systems to be delivered collaboratively with Clackamas Community College.
 - o M.S. in Manufacturing Engineering Technology (6 students enrolled at Klamath Falls) fall 2004. Program will be available at Boeing in Seattle and Portland campus.
- A unique partnership with Oregon Dental Services and Eastern Oregon University to deliver the OIT Dental Hygiene program in La Grande. Pre-dental hygiene students are being accepted by EOU this fall. The professional courses will be offered fall 2005. OIT will have a director and faculty in La Grande.
- The Distance Education program was revamped to improve efficiency and grow enrollment. OIT is the only university in the Pacific Northwest to offer web-based degree-completion programs in the high-demand health technologies. This niche allows registered professionals in Dental Hygiene, Echocardiography, Radiologic Science,

Initiatives (continued)

Vascular Technology, and Respiratory Care to complete Bachelor of Science degrees while working full-time. Currently professionals in 31 states are enrolled in distance education programs.

- Participation in our Pre-College programs increased to a record 1,006. These programs include Advanced Credit (ACP), High School Transition (HST), and workshops, camps and competitions which are held on campus for elementary, middle school and high school students.
- To enhance capacity and improve quality for dental hygiene and medical imaging, Semon Hall was renovated.
- Emphasis on alumni involvement and marketing is a strategic objective to assist in increasing enrollment and providing access and outreach. This objective is also important to the goals for private fund-raising and elevating the visibility of OIT throughout the region.

In 2003-04 OIT set a goal of increasing alumni engagement in marketing, recruitment, and fund-raising. Overall, OIT increased alumni involvement by 29% through the following initiatives:

- Created a new position in the Admissions office to assist with alumni involvement in recruiting.
- Provided \$20,000 to fund alumni outreach proposals.
- Started a Northwest Alumni Chapter in Portland/Vancouver area. This chapter has already funded an annual scholarship.

OIT's strategic plan seeks to increase enrollment through access to the campus and outreach by 15% between 2001 (3,088) and 2005. This fall the headcount is at 3,376. To reach certain targets, which do include individual department and program goals, OIT took the following steps toward laying the groundwork for an integrated marketing plan:

- Implemented an Enrollment Management/Marketing Workgroup to refine a brand portfolio.
- Funded four \$10,000 targeted marketing proposals for Geomatics, Distance Education, Information Technology, and Management. These have been renewed for the second year.
- Hired a Publications Director to focus on our printed and web-based communications and develop a new graphic identity.
- Produced a new series of quality publications with the theme, Prepare Yourself for a World of Change.
- Created a Web Oversight Committee with broad representation.

Excellence and Quality

OIT is committed to program excellence and student-centered service. To accomplish this objective, OIT will:

- Set appropriate admissions standards.
- Increase student success, retention and graduation.
- Assess all academic programs periodically to maintain accreditation and licensure standards and to validate relevance and financial viability.
- Recruit and retain faculty and staff by offering competitive compensation and professional development opportunities.
- Provide faculty development opportunities to improve student learning.
- Increase incentives and rewards for faculty and staff participation in applied research and other professional scholarship activities outside the classroom.

During the 2003-2004 fiscal years, the following actions were implemented regarding the objective of Excellence and Quality:

- OIT created partnerships with the healthcare industry and community colleges to continue the development of the Center for Health Professions. The goal is to build a state-of-the-art facility to house the allied health programs, nursing, and related sciences.
- OIT received support from the Oregon University System board for our statewide initiative to support the healthcare workforce needs in Oregon. This includes a policy package for operational funds and a capital project request which will go to the Governor and legislature as funding recommendations.
- The Center for Health Professions initiative also falls under the goal of Workforce Development and Economic Opportunities.
- Professional development for faculty and staff is also key to excellence and quality goals. Even though OIT could not provide compensation increases due to the salary freeze, opportunities for professional development and continuing education were provided with the allocation of funds to each department. A priority objective, which is continuing this year, is the development of a faculty and administrator compensation plan to be implemented during the next biennium.
- The Oregon Renewable Energy Center has made significant progress. A new director was hired in the summer and several student/faculty research projects are underway.

Workforce Development and Economic Opportunities

OIT will continue to be a community and statewide leader in integrating technology education with economic development. To accomplish this objective, OIT will:

- Engage with the community to develop a workforce and economic strategy for the Klamath Basin.

Initiatives (continued)

- Become involved with statewide economic development issues that involve OIT areas of expertise.
- Lead the OUS system in graduate employment success rate.
- Increase the number of faculty and staff who are involved in economic development initiatives.
- Strengthen OITs response to the educational needs of industry.
- Build community engagement and commitment as a resource to the regional community.

Fiscal and Operational Efficiency

OIT will emphasize continuing fiscal and operational efficiency. To accomplish this objective, OIT will:

- Implement a process mapping improvement plan.
- Maximize private support and sponsored programs.
- Provide leadership in the development of a small university allocation model.
- Work with OUS and the Board to develop "the new partnership with Oregon" for more autonomy and flexibility in higher education administration.
- Assess the recently reorganized academic and administrative structures.
- Optimize the condition and utilization of academic facilities.
- Develop innovative (public/private) business plans.

During the 2003-2004 fiscal years, the following actions were implemented regarding the objective of Fiscal and Operational Efficiency:

- The Fiscal Operations Advisory Council continued to develop a budget process, department and unit review evaluation/procedures, and general oversight recommendations for alignment with the strategic goals and objectives last year. Their recommendations were used to allocate dollars for key initiatives as well as efficient management of all resources. This activity will continue during the next biennium and is proving to be extremely important in the planning process.
- Developing and Launching a Scholarship Campaign: Increasingly, OIT students are faced with rising education costs and dwindling government support for financial aid. Most of OIT students now must help finance their own educations through outside employment and personal loans. It is not uncommon for graduates to leave OIT with more than \$25,000 in student loans.
- To forestall the escalating burden of student indebtedness and improve our competitiveness in recruiting, the Oregon Tech Foundation launched a campaign in 2003-04 to secure by June 03, 2007, private gifts in the equivalent of \$3 million for

endowed scholarship. Another \$3 million will annually yield \$135,000 for donor-provided financial aid, to supplement the \$225,000 now awarded each year. As of June 30, 2004, the close of our fiscal year, the campaign had raised \$320,821 in gifts and pledges.

Partnerships

OIT will develop and maintain partnerships with business and industry, government agencies, and other public and private entities. To accomplish this objective, OIT will:

- Implement marketing and communication plans.
- Focus on Klamath Community College, Pre-College, Center for Health Professions (CHP), and Oregon Renewable Energy Center (OREC) partnerships.
- Enhance OIT connections with business and industry.
- Develop and implement an identity and "visibility" strategy.

Academic and Student Facilities Enhancement

OIT will develop academic and student services facilities that exemplify a premier institute of technology. To accomplish this objective, OIT will review and revise the Master Plan to include:

- A Cornett Hall Plan.
- Completion of the College Union renovation.
- A review of Library facilities.
- An investigation of how to proceed for a new residence hall.
- Center for health Professions.

During the 2003-2004 fiscal years, the following actions were implemented regarding the objective of Academic and Student Facilities Enhancement:

- The college Union renovation was completed. According to the "Strategic Post", students are very pleased with the outcome and the community is excited to host more events at OIT.
- Planning began for a new 80,000 square foot Center for Health Professionals building.
- Planning began for a new residence hall which will be a net-zero energy use building.

Looking Ahead to 2004-2005

As OIT moves forward into this academic year, the strategies for 2004-2005 will continue in the following areas:

- Creating professional development opportunities and a compensation plan for faculty/administrators.

Initiatives (continued)

- Development of a campaign and organizational structure for the Center for Health Professions (\$22 million project)
- Emphasizing opportunities in OREC for applied research.
- Continuing the scholarship campaign to reach the goal of \$3 million by 2007.
- Emphasizing alumni involvement.
- Continuing to assess fiscal and operational efficiencies aligned with the strategic plan.
- Developing strategic directions by each department to align with the mission and goals of OIT.

ENROLLMENT PROJECTIONS

OIT is building for a future student head count of 3,500 students in Klamath Falls and 500 students at the Portland Metro Campus.

The Klamath Falls OIT campus was designed initially for the enrollment of 800 full time equivalent (FTE) students. An enrollment limit of 2,000 FTE was established in the mid 1970's by the State Board of Higher Education. In 1983, the State Board increased the enrollment limitation to 2,500 FTE. The State's more recent funding model creates an imperative for growth at OIT beyond its current limits.

Actual enrollment at the Klamath Falls campus suffered a period of slow decline during the 1908's and early 1990's. In 1981, the FTE enrollment at OIT was approximately 2,500 students. By the fall term of 1995, the FTE of OIT had dropped to 1,850 students and that number included 100 students at the Portland Metro campus.

Since then, OIT has seen a steady increase in enrollment credited to changes in strategic planning which has capitalized on anticipated changes in workforce demand. The 2004 headcount enrollment of 3,373 was nearly a 10% increase over the 2001 enrollment of 3,088. The following table shows a breakdown of student FTE enrollment for the fall of 2004.

2004 OIT Student Enrollment

Klamath Falls Campus	2,031.0	FTE
Portland Metro Campus	190.1	FTE
Outreach Locations	188.4	FTE
Total	2,409.5	FTE

Source: *Fact Book 2004-2005*

OIT is expecting about a 1% growth in all programs with the exception of engineering and health related sciences over the next five to ten years.

- Job market analysis indicators are showing a 15% increased need for engineers in the Northwest, primarily civil engineers. There is also a temporary spike of 25% needed nationwide. However, OIT leadership believes this increase will be balanced by an

increasing trend to shed projects offshore. Therefore, OIT will assume a conservative 1% growth in engineering program enrollment over the next five to ten years.

- In health related programs, OIT currently has approximately 653 students in the Klamath Falls campus, about at the Portland Metro campus, and about 41 students in outreach locations. This totals about 763 students in medical related programs. OIT is expecting an increase of approximately 750 students over the next several years generated by the new Center for Health Professions building. Assuming the new building will be built in two phases of about 40,000 square feet each, OIT should see an increase of 350 health professional students in the next five years.

On the Klamath Falls campus for 2004 the headcount enrollment was 3,373 students and the FTE was 2,031. This equates to a 0.825 average conversion to translate student headcounts into FTE. Using this methodology, the following table has been created to project the number of headcount and FTE students for the next five and ten years on the Klamath Falls campus:

Programs	2004-2005	Projected Growth	2009-2010	2014-2015
Non Medical Related Programs	1,809	1% per Year	1,901.28	1,998.26
Medical Related Programs	653	350 each 5 Years	1,003.00	1,353.00
Total Headcount	2,462		2,904.28	3,351.26

Programs	2004-2005	Projected Growth	2009-2010	2014-2015
Non Medical Related Programs	1,492.00	1% per Year	1,568.11	1,648.10
Medical Related Programs	539.86	288.75 FTE each 5 Years	828.61	1,117.36
Total FTE	2,031.86		2,396.72	2,765.46

FACULTY PROJECTIONS

In the fall of 2004, OIT's Klamath Falls campus had 2,054.97 FTE students being educated by 134.39 FTE faculty. This equates to an average student to faculty ratio of approximately 15.3:1. This is a slight reduction from fall 2003, which saw a student to faculty ratio of 16.3:1. The fall 2004 student to faculty ratio at OIT facilities outside Klamath Falls was approximately 8.4:1 with 14.5 FTE faculty educating 121.40 FTE students. The institution as a whole has a faculty to student ratio of about 13.7:1. These figures were extracted from the Fact Book 2004-2005.

OIT leadership is optimistic that the student to faculty ratio on the Klamath Falls campus may one day be a more efficient and economical ratio of 20:1. However, for the purposes of this study a student to faculty ratio of 16:1 will be used for projecting faculty needs on the Klamath Falls campus.

OIT leadership is expecting a need for 20 or more new faculty positions over the next five years driven by the additional students attracted to the new Center for Health Professions building.

Initiatives (continued)

Another 20 or more positions may become available with the completion of the building's second phase. The following table projects the faculty needed on the Klamath Falls campus based on projected student enrollments:

Programs	2009-2010 FTE Students	2009-2010 FTE Faculty	2014-2015 FTE Students	2014-2015 FTE Faculty
Non Medical Related Students	1,568.11	98.00	1,648.10	103.01
Medical Related Programs	828.61	51.79	1,117.36	69.84
Total FTE	2,396.72	149.79	2,765.46	172.85

CAMPUS ACCESS, CIRCULATION AND PARKING

Access

OIT's Klamath Falls campus continues to experience pressure on its borders as adjacent properties are developed into commercial and residential uses. In the past, OIT's Klamath Falls campus was relatively isolated and OIT did not have to deal with the increasing urbanization of the neighborhood. As the neighborhood evolves, the OIT Klamath Falls campus will most likely continue to be an automobile commuter college into the foreseeable future.

The existing access to the campus is primarily by way of Campus Drive. Campus Drive approaches the OIT Klamath Falls campus from the south and transitions eastward onto a loop service road that encircles most of the Campus' properties. The route currently lacks a formal gateway to receive visitors. At first glance Campus Drive appears to lead nowhere, lacking a visual terminus to help visitors enter the campus.

Vehicular Circulation

Commercial development to the west of Campus Drive and the continued expansion of the community's hospital to the east of Campus Drive has generated a growing amount of traffic congestion around the OIT campus entry. At the time of the 1997 Master Plan, speculation about mitigation options to relieve the congestion predicted Dan O'Brien Way would at sometime become a major site access road to the OIT campus. Various improvements to Dan O'Brien Way were offered including improvements to signage, intersections, lighting, walkways, and paving were suggested. This has not occurred and Campus Drive continues to serve as the main access route to the OIT campus.

The loop road is comprised of:

- East College Way, which runs along the eastern campus edge.
- College Way, which runs along the northern campus edge.
- Industrial Park Drive, which runs along the western campus edge.
- Dan O'Brien Way, which shares the southern campus edge with Campus Drive.

This loop road has been very beneficial in helping divert traffic around to the north and east edges of the campus. Increased use of the perimeter road is something future project may promote. To date, this road remains under utilized. More use will require heavier maintenance and additional traffic control.

Parking

A planning precept from the initial 1964 design criteria for the OIT Klamath Falls campus was to limit parking to the campus perimeter. Placing the parking at the perimeter creates a safe and homogeneous pedestrian environment within the campus center. The majority of the Campus' parking is located along Campus Drive and Industrial Park Drive. There are also several smaller lots sprinkled around the campus.

Conditions and Recommendations (continued)

- The parking along Campus Drive includes four interconnected parking lots: Institutional Advancement Lot, Residence Hall Lot, Snell Hall Lot, and Owens Hall Lot. These lots combine for a total of 723 parking stalls. These include three handicap parking stalls recently added near Boivin Hall and 10 new handicap parking stalls recently added near Semon Hall.
- The parking along Industrial Park Drive includes the Purvine Lot, which has 248 parking stalls.
- Parking around Cornett Hall includes three parking lots: Cornett West Lot with 196 paved parking stalls and 175 gravel parking stalls; Cornett North Lot with 97 paved parking stalls and 96 gravel parking stalls; and, the Cornett North Annex with 16 paved parking spaces. These lots combine for a total of 580 parking stalls. The Cornett North lot has recently been expanded and improved. The Cornett West Lot and Cornett North lot contain some gravel parking stalls. The graveled portion of the Cornett North Lot is scheduled for improvement in 2006.
- The Facility Services Lot contains 24 parking stalls associated with the Facility Services building located in the northwest corner of the campus.
- The Stadium Lot is located on the north side of College Way near the John F. Moehl Stadium and contains 200 gravel parking stalls.
- The Learning Resources Center Lot located near the Library has been recently expanded and contains 98 parking stalls with access from College Way.
- The Tech Fit Lot is a small parking lot located on the north side of the Gymnasium and Fitness Center building and contains 24 parking stalls.
- There are two parking lots associated with the recently expanded and remodeled College Union: College Union East Lot with ___ parking stalls and College Union North Lot with 20 parking stalls. These lots total ___ parking stalls.
- The Information Booth Lot is a small parking lot associated with the Campus' information booth located on the south side of Campus Drive. This modest lot contains ___ parking stalls.

In total, the campus currently has ___ parking stalls.

Use of parking on the campus is controlled by permitting. Permits fall into the following categories:

- Public access parking which includes Visitor, Handicap and Motorcycle designations.
- Issued parking which includes Resident, Commuter, Faculty and Staff designations.
- Service parking which includes Tech Fit designation.
- Short Term Parking which include Tech Fit designation.
- Limited Purchased Parking which includes green, red and yellow permits. These are issued on a first come first serve basis.

Conditions and Recommendations (continued)

There are also several parking spaces, specifically the Cornett West Lot and the Purvine Hall Lot, which allow all permits. The distribution and issuing of permits are assessed yearly to assure appropriate distribution of parking use with each academic year.

Adding parking lots near specific building located on the east and west sides of the campus have improved access to accessible parking.

Since there are usually open parking stalls year round, the total parking count appears to accommodate the current student, faculty and staff counts with some additional capacity. As student enrollment increases, the overall demand for parking will increase as well. Concurrently, if the ratio of dorm residents to commuter students shifts, the need for parking may also change. Therefore, an assessment of parking capacity should be conducted periodically.

Pedestrian Circulation

Initial 1964 design criteria for the OIT Klamath Falls campus incorporated spectacular views to the west of the lake and mountains. The low buildings on a terraced landscape make these views available to all campus buildings. However, when the perimeter parking is combined with a terraced landscape, pedestrian ways often become a series of paths interrupted by stairs. This condition demands creative design to keep all points of the campus accessible.

The 1997 Master Plan recommended several pedestrian circulation upgrades:

- Pedestrian access should be developed, enhanced and encouraged along an east-west spine from Purvine Hall to the College Union. Changes have been made to make this route more aesthetic and attractive, as well as easier to travel.
- Build an elevator to transition from the central campus fountain plaza up to the College Union and Library. The College Union has been renovated and expanded, but the transition from its upper plaza to the lower central campus plaza remains by stairway. However, under-slab heating has been added to make these stairs safer during winter months.

The extreme temperature range of Klamath Falls has proven a heavy toll on paving and landscape furnishings. Spalling concrete and loose pavers are found in various areas throughout the campus. With yearly freezing and thawing, much of this damage may not be prevented. However, repairing the damaged areas must to be an on-going summer maintenance activity to keep these areas from becoming an eyesore or a safety hazard.

There are several points around the Campus' central pedestrian plaza, which extends from Purvine Hall to the College Union, that lack definition. In particular is the plaza's termination, or lack of termination, at the Cornett Parking Lot. To promote a sense of place and security, consider defining the plaza boundaries with the use of markers such as kiosks, archways and/or signage monuments.

Expand the campuses emergency call light kiosks along the pedestrian plaza, within or near all parking areas, and over time to more remote campus locations.

Conditions and Recommendations (continued)



Campus Drive Looking East



Entry Drive Looking Toward Snell



Cornett West Lot

Conditions and Recommendations (continued)



Cornett North Lot



Pedestrian Circulation

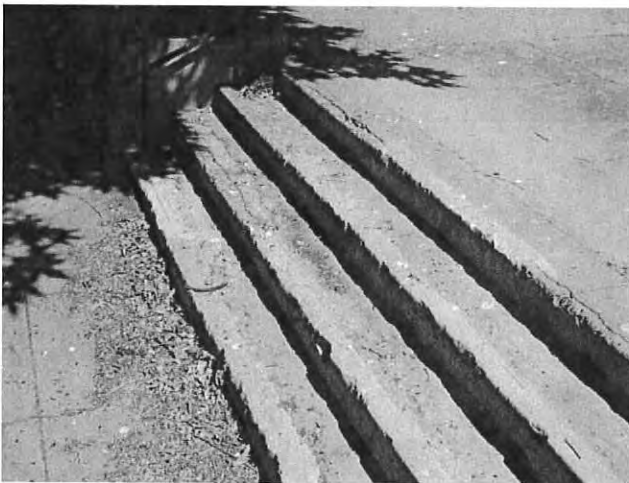


Pedestrian Circulation

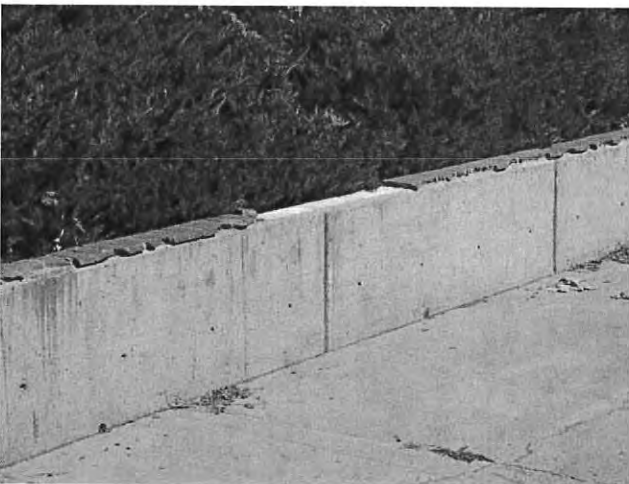
Conditions and Recommendations (continued)



Paving Showing Stress



Paved Steps Showing Stress



Pavers Showing Stress

Recommendations

- Establish markers using kiosks and/or signage monuments to celebrate, designate, and define significant campus entry points.
- Continue yearly assessments of parking capacity and permit distribution.
- Consider the installation of a two-stop elevator as a solution to make the transition between the upper plaza surrounding the Library and College Union accessible to the central campus fountain plaza below.
- Continue on-going maintenance to repair paving, stairs, railings, and other items damaged by yearly freezing and thawing.
- Continue to install under-slab heating as appropriate to minimize damage caused by freezing and thawing as well as to promote safety by reducing accidental falls.
- Establish markers using kiosks and/or signage monuments to celebrate, designate, and define significant entry points of the pedestrian plaza.
- Install additional emergency call kiosks to promote pedestrian safety.

Conditions and Recommendations (continued)

[Insert Campus Access, Circulation and Parking Plan]

CAMPUS LIGHTING AND SIGNAGE

Lighting

Much of the OIT Klamath Falls campus is lighted by high-mast, high-pressure mercury vapor light fixtures. Several new high mast fixtures have been recently added along the north edge of the Purvine Hall Parking Lot. These are efficient and cost effective, but not very aesthetic. They do not provide good, even, or adequate light levels and, because of their height, they create glare and cast light out far beyond the campus onto neighboring properties where the light may not be wanted. Although shorter poles have a reputation of being hit by the campus snow plow, they are the preferred fixture on today's college campuses. It is recommended that these high mast light fixtures be replaced with new short pole light fixtures when possible, especially those lighting the interior campus. Since it may take several shorter fixtures to replace one of the high mast fixture, perhaps the replacement lights may be tied to building projects as a means to offset their costs.

The Cornett West Lot has been recently expanded and improved with new light fixtures, which was recommended in the 1997 Master Plan. The Purvine Hall Lot has also been improved with new light fixtures. In addition to improving safety, lighting of these lots has helped encourage entry to the campus from the west, which may have mitigated some traffic congestion on Campus Drive. However, there are other parking lots that remain under or poorly lit. Existing light poles in the parking lots along the south campus are in need of new circuits and controls. Perhaps their improvement costs may be tied to the new Center for Health Professions building, which will be displacing one or more of the parking lots. For safety reasons, it is very important that lighting improvements in parking areas continue.

Light fixtures in the Residence Hall, Snell Hall, and Owens Hall parking lots have circuits with direct bury wire, which needs to be replaced with new wiring in conduit. These fixtures are mercury vapor fixtures and should be replaced with sodium fixtures for improved energy efficiency.

Building exterior light fixtures serve a multiple purposes of aesthetics in lighting the building, function in directing users to entry ways, and safety in lighting open areas and pathways. Soffit fixtures at Owens Hall, Semon Hall and Boivin Hall serve to meet these purposes, however, the use of incandescent fixtures is simply too expensive to operate and maintain. The 1997 Master Plan recommended these fixtures be replaced with efficient and cost effective sodium fixtures. The recommendation is being implemented.

A pole light fixture recently added near the Advanced Placement Building lacks aesthetic value and may be considered for replacement.

T8 fixtures have been installed in all building interiors where standard ceiling heights occur. In areas with high ceilings, T5 fixtures have been installed. There are no T12 fixtures remaining except in the utility tunnels, Stadium Building, Learning Resource Center, and Boivin's basement.

Lighting landscaping elements of interest, such as the fountain and various sculptures in the pedestrian plaza, not only allow for these elements to be seen at night but also add to campus safety. These points of interests are often used as navigational landmarks for pedestrians traveling about the campus and having them lighted allows safe navigation when the sun has gone down. It is recommended that lighting be added to existing elements that may not be lit and to provide lighting with new elements as they are placed on the grounds.

Signage

Signage provides two valuable functions in supporting a safe and friendly campus. The first is informational, providing simple easy to read and understand directions. The second is symbolic in promoting a positive institutional image to the public and users of the campus. The OIT Klamath Falls campus has an opportunity to improve its image by providing appropriately placed, adequately lit, easily readable, and coordinated signage. There are five general signage types to consider: Arrival, Regulatory, Directional, Building, and Informational.

- Arrival signage, used to define campus entries, is lacking. These entry points provide the visitor with a first impression of the OIT campus. The most logical location for an arrival sign is where Campus Drive turns to become part of the Campus' perimeter loop road. There is a monument sign near this location but it is often over looked because its size and distance from the road gives it little prominence. Secondary arrival locations may be where Dan O'Brien Drive meets the campus loop road and at the intersection of Industrial Park Drive and College Way. The design of these arrival signs may be a kiosk on each side of the road, an archway, a sizeable monument, or ceremonial gate. Whatever form the arrival signage takes it must be:
 - o Unique and reflect OITs mission and pride.
 - o Visible in daylight and at night.
 - o Classic in appearance to stand the test of time as a symbol of OIT.
- Regulatory signs, such as Do Not Enter, No Parking, One-Way, etc. are stock signs that dominate the campus perimeter and parking areas. They may be appropriately placed from a legal stance, but their cheap and disheveled or faded appearance does nothing to help OITs image. Since these are regulatory, there are some limitations to changing their intuitive and internationally understood appearance. However, there are some things OIT can do:
 - o Providing these signs with straight, easily repairable, breakaway poles is essential to overcome their disheveled appearance.
 - o Modifying the housing of these regulatory signs to match the other campus signs can take there out of place appearance and make them as part of the campus signage system.
- Directional signs, to help navigate visitors to the campus as well as navigate the campus loop road, appear to be lacking and vary from location to location. The inconsistency of these signs does nothing to help OITs image. All directional signage from Highway 97, up Campus Drive or up Dan O'Brien Way, around the perimeter loop road, and into each parking location should be evaluated and coordinated. For example, additional signs are needed to help visitors get from the south parking lots to the Fitness Center during events, specifically basketball and volleyball games.
- Building signs, designating each of the Campus' buildings, lack prominence and lack consistency. These signs are symbols of pride for the occupants within each building and for the benefactors who have contributed to the construction or renovation of each

Conditions and Recommendations (continued)

building. Therefore, the signs must be strong and retain some uniqueness. They must also have similarities to promote a unified campus image. Each of the Campus' building signs should be evaluated for proper placement, presence, and appearance.

- A new informational sign is planned along side Campus Drive near the information booth. However, the Campus' informational signs, plaques, and kiosks located along the pedestrian way remain inconsistent and some are disheveled in appearance.
 - o The information booth located on the south side of Campus Drive is often missed. If it were relocated to the other side of Campus Drive it would have more prominence and would improve the campus image by reducing visitor stress.
 - o Unmanned kiosks often have building names and events of interest. The appearance of these varies from kiosk to kiosk. It is important that the appearances of informational kiosks are consistent for them to be easily discerned and to promote a strong campus image.
 - o The posting of flyers on kiosks is very important to student life. However, their placement on kiosks needs some control and oversight to maintain a neat appearance.
 - o Informational kiosks should be lit so they may be seen at night as well as the day.
 - o There are a few places where adding a kiosk would be helpful, such as the west terminus of the pedestrian plaza near Purvine Hall and Cornett Hall. Another prominent location that would benefit from an informational kiosk is in front of Snell Hall. Perhaps the cost of this kiosk may part of the Snell Renovation Project.

Conditions and Recommendations (continued)



Ceremonial Kiosk



Informational Kiosk

Conditions and Recommendations (continued)



Directional Signage



Informational Signage



Entry Monument

Conditions and Recommendations (continued)



New High Mast Lights at Cornett West Lot



High Mast Light at Central Campus

Recommendations

- Add photo cells to exterior lighting when appropriate to reduce energy consumption.
- Continue to improve parking lot and site lighting.
- Improve pedestrian lighting within the campus interior using low pole, high pressure sodium fixtures.
- Continue to convert soffit lights to sodium fixtures on the Campus' older buildings.
- Replace direct burial cable with conduit as feasible.
- Create arrival signs in the form of an archway, prominent monument, or ceremonial gateway at campus entry points.
- Reevaluate the placement and appearance of regulatory signs.
- Evaluate and redefine directional signage from Highway 97 to each of the Campus' parking lots.
- Reevaluate building signs for uniqueness, prominence, and consistency with OIT image.
- Reevaluate kiosk locations and appearance.

Conditions and Recommendations (continued)

[Insert Lighting and Signage Plan]

CAMPUS LANDSCAPING

The following recommendations are general in scope. Each landscaped area of the campus needs to be closely reviewed periodically on an individual basis to describe detailed maintenance, mow strip, irrigation, and planting choices.

Slope Plantings

Existing Conditions

- In areas north of Snell Hall, areas west of the College Union on the bank near the fountain, and the area north of the fountain most of the existing plants are large, overgrown junipers.

Slope Planting Recommendations

- Continue removing the existing junipers and replace with Kinnikinnick /Arctostaphylos uva-ursi, Cinquefoil / Potentilla cinerea, Blue Carpet Juniper /Juniperus horixontalis 'Wiltonii', Juniperus Sabina 'Buffalo', and Juniperus horizontalis 'Blue Chip'. These continued changes will give a cleaner visual access to the fountain area.
- Continue to add color and variety in the plantings.
- Continue review and monitoring of irrigation requirements for conservation of water.

Foundation Plantings

Existing Conditions

- Each building has some type of foundation planting.

Foundation Planting Recommendations

- Continue to look at each building individually in detail and strive to keep the building visually accessible and easily maintained, while continuing to add color and interest to each building.
- Where possible, continue to add mow strips and landscape designs that will enhance the character and architecture of each individual building by varying plant sizes and types at window and wall areas.

Parking Lot Plantings

Existing Conditions

- The main parking lot on the south edge of the campus has been improved by reducing the amount of mature trees with the addition of more color and tree varieties. This change yields fall and spring colors while providing better solar access for snow removal during the winter. However, many parking lots have only mature trees or lack landscaping plants.

Conditions and Recommendations (continued)

Parking Lot Planting Recommendations

- Evergreen trees are very important to the landscape, but a wider variety of color, texture and scale would provide a richer and more robust campus. Continue to supplement mature trees with the addition of other planting of more color and variety of texture and scale. This may be accomplished with the continued introduction of O.G. Red Maple / Acer rubrum 'October Glory', R.S. Red Maple / Acer rubrum 'Red Sunset', S.Q. Silver Maple / Acer saccharinum 'Silver Queen', European White Birch / Betula pendula, and P.S. English Hawthorne / Crataegus laevigata 'Pauls Scarlet'.
- As new parking lots are added, their designs should be incorporated with the same changes recommended for existing parking lots.

Fountain Area

Existing Conditions

- The fountain area may be designed to be friendlier, more inviting to use, view and enjoy.

Foundation Area Recommendations

- Transform the fountain into a main social and academic center of the campus:
 - o Providing better seating.
 - o Consider taking advantage of the elevations at adjacent sloped plantings by removing existing junipers on the slope and creating a terraced stepped amphitheater. In addition to creating a place to view the fountain, an amphitheater would offer opportunities for performances, ceremonies and outdoor instruction.
 - o Consider changing the fountain flow patterns and adding colored lighting to add focal interest.

Raised Planters

Existing Conditions

- Portions of the raised planting areas have overgrown plantings.

Raised Planter Recommendations

- Continue removal of existing planting materials where appropriate and replace with Kinnikinnick, Potentilla / Cinquefoil, Festuca / Tall & Sheep Fescue, Smaller Barberry, and Cotoneaster. These provide color and ease of maintenance to planters.

Open Spaces

Existing Conditions

- Most of the open spaces on the campus remain undeveloped.

Conditions and Recommendations (continued)

Open Space Recommendations

- As improvements take place, open space areas should be irrigated and planted with lawn.
- Definition of open spaces may be enhanced by introducing tree plantings. Consider a wider variety of tree plantings to add interest, but keep a common thread of trees to create campus continuity, such as Aspens, Maples, Hawthorn, Birch, Ash, and some evergreens.
- The open area in front of Purvine Hall needs some special attention to transform it from a desolate zone of campus into a vibrant multi-use open space. This space should be zoned and planted to accommodate both active and passive recreational activities. Rather than having one large formal space, consider creating multiple zones within the larger zone by adding smaller nodes of less formal space to accommodate smaller groups or individuals seeking a passive retreat for study.
- Consider adding benches within the aspen grove located in front of Owens Hall. Adding benches will convert this area from a simple passage into usable space for passive retreat or study. Further changes may be considered, like creating a raised area or replacing aging trees, may also be considered to further enhance the use of this open area.
- Coordinate landscape changes with changes in signage and lighting throughout the campus to elevate the overall quality of the OIT campus environment. A coordination of these improvements can be a marketing tool to establish OIT's identity and for promoting the campus to welcome incoming students and parents, to help recruit new students, and to nurture continuing students.

Conditions and Recommendations (continued)



Unfinished Plaza Area



Plaza at Boivin and Semon



Fountain Area

Conditions and Recommendations (continued)



Sloped Planting at M/E Building



Planting at Pedestrian Way



Raised Planting Area at College Union Looking Toward Campus Drive

Conditions and Recommendations (continued)



Raised Planting Area at College Union



Planting at Parking



Plaza at Purvine Hall

Conditions and Recommendations (continued)

[Insert Landscaping Plan]

CAMPUS UTILITIES

The purpose of this report section is to note observations and make recommendations for improvements to meet campus utility needs for the immediate future regarding the following systems:

- Potable water system
- Geothermal water system
- Storm water system
- Sanitary water system
- Natural Gas Systems
- Electrical systems
- Campus Management and Energy Conservation System
- Fire protection and Alarm Systems
- Security and Clock Systems
- Telephone, Data, and Cable TV Systems

A meeting was held with campus facilities staff to discuss conditions of these utility systems. The anticipated campus utility needs over the next ten years were also discussed. This meeting was followed up with individual meetings with utility systems representatives.

Data shown on drawings of these utility systems were taken from various drawings and, therefore, locations of manholes and tunnels can be relied upon only through site verification.

Conditions and Recommendations (continued)

Potable Water System

Observations

OIT is dependent upon its own water production for drinking water, fire protection, and irrigation. All three services are routed through the same water mains. The campus system consists of two wells (Well #1 and Well #4) and a 250,000 gallon storage tank.

- Well #1 is the Campus' main well. Water from this well is pumped directly into the storage tank and is controlled by tank level switches.
- Well #4 is the Campus' back up well and is used during periods of high usage (when the storage tank is below 1/3 full). The water from this well is pumped directly into the main campus water supply pipe and is also controlled by a level switch. The pump serving Well #4 is located in a pit below grade and has not been removed for maintenance since it was originally installed around the 1960's.
- The storage tank is located approximately 1,600 feet east of the Physical Education Building and is about 310 feet above the campus.

Fire hydrant tests run in 1978 by the City of Klamath Falls indicated that the storage tank will flow approximately 1,500 gallons per minute (gpm) to the campus at 115 pounds per square inch (psi). Today, the well pumps at Well #1 produce about 300 gpm and the well pumps at Well #4 produce about 250 gpm.

Regulations on public water systems are becoming increasingly stringent, resulting in additional man-hours used to test, upgrade, and demonstrate code compliance. Tests on water purity (includes detection of copper, lead, and other contaminate levels), metering, and pumps are complex tasks which often requires outside labor. During the 1997 Master Plan, suggestions were made to extricate OIT from the burdens of producing its own water by discussing the possibility of the City taking over the wells and storage tank or the possibility of the City supplying water to OIT from their storage tank located northeast of the campus. After much discussion and debate, tying into the City's water supply was determined not cost effective for OIT.

Presence of Arsenic

Arsenic levels were found to be above allowed parameters in the Campus' drinking water. The College has been working with the Environmental Protection Agency (EPA) on this issue. The EPA is providing funding for filtering approximately one half of the Campus' water volume, OIT will need to provide the funding for the remaining filter system.

Arsenic levels are 28 parts per billion at Well #1 and 38 parts per billion at Well #4.

Point-of-use filters are planned for installation. These filters will utilize ferrous oxide material to collect arsenic residue. The expended filters can be deposited safely into the City's landfill. Central building filter systems are planned for the new dormitory and new Center for Health Professions building.

Conditions and Recommendations (continued)

Pump Assemblies

Pump assembly inspections check for evidence of corrosion, splits, encrustation on the columns and check leading vanes for signs of wear. If the assemblies are in unsatisfactory condition, they should be replaced.

Pump assemblies at Well #1 were pulled, disassembled, inspected and repaired soon after the 1997 Master Plan in 1998. This pump assembly is due again for similar maintenance in 2006.

The pump assembly at Well #4 has never been serviced, since it was installed in the 1960's, because it is located below grade. Due to its age, this equipment needs to be pulled, disassembled, inspected and repaired. Ideally, this pump assembly should be relocated to an above ground facility to better facilitate future inspections and maintenance.

Water Metering

Water meters are required by Oregon Administrative Rules (333-061-0050(2)(a)(J)(i)) at each well to determine the well's output volume. Constant metering was added to Well #1 as part of its upgrade in 1998 and it tied to the Campus' "Metasys" management system. Well #4 has hourly metering only and is also tied to the Campus' "Metasys" management system.

Chlorination System

The Campus has two compressed gas chlorinating systems located at Well #1 and Well #4 which are served by five chlorine cylinders. There are safety and liability concerns when using chlorine gas that include accidental leakage and intentional leakage. Consider moving to a safer hydro-chlorite generating system, UV, or other disinfecting system.

Fire Protection

Summer irrigation has resulted in the storage tank being emptied occasionally. This is of concern because the tank is also used for fire protection. There is a connection to City Water at the southeast corner of the campus that can be utilized in cases of emergency. The City water tank serving this connection also serves the local hospital and nursing home located just south of the campus. During periods of high water demand in the adjacent facilities, water supply from the City may be reduced. The valve isolating the City water from the OIT system is padlocked shut, and if a responsible member of the staff is not present when the storage tank empties, adequate fire protection for OIT may be difficult to obtain.

As a result of the above, a level monitor in the OIT storage tank is recommended. The level monitor should annunciate a signal at the Facilities Services Building whenever the storage tank drops below 1/2 full. According to the 1997 Master Plan, previous conversations with the local Deputy State Fire Marshal resulted in a recommendation that 62,500 gallons be held in reserve at all times for campus fire fighting.

There are many types of level sensors. The 1997 Master Plan suggested installing a simple single mercury bulb float alarm by lowering the bulb into the tank on a weighted

Conditions and Recommendations (continued)

line to hold the bulb at the correct depth. However, the use of mercury should be avoided when part of a drinking water system. Non-mercury sensor gauges are a bit more expensive, but they can be used to provide more information.

Fire Hydrants

Fire hydrants are located throughout the campus. A review by the Authority Having Jurisdiction (local fire marshal) of the entire campus hydrant layout is recommended to verify adequacy of facility coverage. NFPA 24 says...Hydrants shall be provided in sufficient number and located in a manner that will enable the needed water flow to be delivered through the hose lines to all exterior sides of any important structure. Hydrants shall be spaced in accordance with the authority having jurisdiction. Hydrants are to be located no closer than 40 feet from a building and, as construction proceeds over the campus, this guideline may be exceeded. Each time a new building is added to the campus, site plans and building plans must be submitted to the City and State fire marshals for approval. During this review, fire marshals make determinations regarding the number and location of fire hydrants around buildings in conformance with NFPA Chapter 24. This is subject to interpretation of the fire marshal, so if there has been a personnel change in the fire marshal's office, then there may also be a change in requirements.

Backflow preventers are needed to assure discharged water does not find its way back into the Campus' water supply. The use of backflow preventers should be verified at each hydrant and added if missing.

Irrigation Water

OIT has recently automated the Campus' irrigation systems with time clocks. This has nearly eliminated over-watering and has minimized the number of times the storage tank has been critically drained as well as the number of times Well #4 cycles.

Adding ground moisture sensors might be considered to further automate the Campus' irrigation system. However, the large areas requiring irrigation may make moisture sensors cost prohibitive.

Water Piping

Although no longer produced, transite pipe (made of asbestos cement) has been used extensively on the campus for potable water mains. Transite piping is installed in water systems throughout the world and does not pose a health hazard to the population. However, removing or replacing the piping does. To remove the pipe, a pipe cutter similar to a rigid 246 should be used with the pipe wetted to prevent dust exposure. Whenever possible, pipe should be removed in the largest sections possible and transported to an authorized disposal site.

The Campus has also had problems with PVC piping installations. For example, an eight inch main extends from the 250,000 gallon water tank to the Campus Union. During the summer of 2005, this line suffered a failure near a Tee connection. It was only a crack in the casing and was repaired quickly. Had this been a total failure, it would have been disastrous. A total failure would have drained the water tank contents along with 300 gpm from Well Pump #1 and 350 gpm from Well Pump #4 into the basement of the College Union. If left undetected, the water might extend into the utility tunnels connecting the College Union with the chiller plant and Snell Hall mechanical room. At

Conditions and Recommendations (continued)

125 psi, PVC is not a good material for piping in open spaces and these installations are not allowed by the Uniform Plumbing Code.

Potable Water System Recommendations

- Install water level monitor in the campus storage tank.
- Continue to coordinate with State and County Departments of Health regarding arsenic monitoring.
- Continue to install point of building connection and point of use arsenic filters as appropriate. As new buildings are constructed and existing buildings are renovated, consider centralized building filter systems.
- Conduct maintenance of pump assemblies as scheduled.
- Upgrade Well #4 by relocating pump assembly to an above ground position, replace oil turbine with sump pump, and add flow metering.
- Conduct a hydrant layout review with local and state fire marshals to verify appropriate fire protection coverage.
- Verify presence of backflow preventers at fire hydrants and install if missing.
- Inspect and tighten irrigation piping to prevent water loss.
- Add backflow preventers to irrigation system.
- Consider adding pressure reducing valves to reduce main pressure and help prevent breakage of irrigation lines.
- Consider adding ground moisture sensors in selected irrigation areas to further water conservation.
- Observe safety protocols when repairing or removing campus water main piping that may consist of transite pipe.
- Remove gas chlorination system and replace with a safer hydro-chlorite generating system, UV, or other disinfecting system.

Conditions and Recommendations (continued)

[Insert Potable Water Systems Plan]

Geothermal Water System

Observations

The OIT geothermal system, originated in 1963, consists of three wells discharging into a storage tank and water distributed from there to the buildings on the campus. At each building the water is routed through a plate heat exchanger, into a collection system, and then to an injection well. Purvine Hall, heated by the return water from the other buildings, is an exception.

The three geothermal wells (identified as Well #2, Well #5 and Well #6) originally pumped 980 gpm in total (#2 about 130 gpm, #5 about 500 gpm and #6 about 350 gpm). Around the time of the 1997 Master Plan, a local well-drilling contractor said that in the winter of 1994 he measured the campus outflow using an orifice meter when each well was running alone. His readings showed 220 gpm from Well #2, 230 gpm from Well #5, and 220 gpm from Well #6 totaling about 670 gpm. This was 310 gpm less than what the wells originally produced. New bowls, column, impeller and pump were installed in Well #5. As a result its production increased from 320 gpm to about 500 gpm at full flow.

More recent measurements have the three wells producing about 945 gpm in total with Well #2 producing about 220 gpm at start up with about 140 gpm after drawdown. These measurements more closely resemble volumes originally produced by the three geothermal wells.

Existing Pump Assemblies Replaced

Since the 1997 Master Plan, the three wells have had their hydraulic drives and couplers replaced with digitally controlled frequency drive motors. Today, the outflows total 945 gpm with the outflow of each well is as follows:

- Well #2 140 gpm
- Well #5 460 gpm
- Well #6 345 gpm

System Water Metering

The 1997 Master Plan recommended adding water meters into the piping at each pump and meters have since been added to the three pump assemblies. The Data Industries paddle wheel meter is located at the storage tank in the Heat Exchange Building which is downstream of the three geothermal wells. This meter is tied to the Campus' Metasys management system and provides total campus flow information. This meter should be replaced with a vortex Foxboro flow meter for improved monitoring.

Water Metering at Each Building

Installing water meters at each building will provide Facilities Services with records on individual building energy usage and, after a data base on each building's thermal use is compiled, it will also alert Facilities Services to possible problems. The records can establish where money should best be spent on energy conservation and whether additional buildings in the future are possible without expanding the geothermal well

Conditions and Recommendations (continued)

system. The Campus' older buildings, which lack DDC controls, have no way to determine if comfort complaints from building occupants are the result of low geothermal flow or problems in the heating system mechanics. The meters are necessary as both a monitoring and a troubleshooting tool. Therefore, adding geothermal water meters to each building is recommended.

Geothermal Snow Melt Systems

Portions of the Campus' pedestrian system are heated with geothermal supply water. These areas include a stairway in the central campus and the exterior ramps and stairs near the newly remodeled Student Union. Extending this snow melt will add to pedestrian safety and may minimize seasonal damage to concrete walks and stairs.

Campus Energy Management System

Since the 1997 Master Plan, variable frequency drives, meters, and digital controls have been added to the Heat Exchange Building and the three geothermal well pump assemblies. The new drives are more energy efficient than the old hydraulic drives. As part of the Campus' Metasys management system, the new meters and digital controls help verify temperatures, pressures, pump operation, and automatic valve operation. This has not yet been implemented.

There are several levels of sophistication that can be accommodated by tying the hot well meters, pumps, and valves with sensors at each building to the Campus' Metasys management system. The system cost is a sum of the central computer monitoring equipment and the number of monitoring and control points along the system network. If each building is monitored for geothermal and heating water entering and leaving temperatures, each building will require four sensor points. An analysis by Johnson Controls is recommended to determine cost and verify the practicality of the approach.

Another control strategy is to index the heating water temperature to the outside temperature, which is already being done at the Campus Union, Boivin Hall and Snell Hall. This approach will reduce the use of geothermal water during the off season.

Many of the Campus' buildings have changed over the years and require an analysis of their heating and ventilating systems based on current use. Buildings once used for shops, welding or repair may have outside air loads associated with exhaust systems no longer in use. Rebalancing these air quantities have energy savings potential not addressed in master studies.

Regulatory

Other than Klamath Falls, the Oregon Water Resources Department (WRD) is the primary agency for well construction, permitting and water rights issues. The Oregon Department of Environmental Quality is the primary agency for disposal of water in either surface or injection wells. Since OIT is within the Klamath Falls geothermal water resource area, permitting is by local authorities.

Regardless of the energy management strategy employed, the geothermal injection fluid temperature may have a required minimum temperature based on OIT's injection permit. OIT should verify parameters or restrictions that may have been set forth by the original geothermal use permit or later amendments to that permit. If there is a minimum injection

Conditions and Recommendations (continued)

temperature requirement, it may limit the energy that can be obtained from the Campus' three geothermal wells.

Geothermal Water System Recommendations

- Rebuild Well #5 pump assembly and casing.
- Add geothermal water meters to each of the Campus' buildings to monitor usage and troubleshoot potential problems.
- Continue implementing exterior sidewalk and stair snow melt heating using geothermal supply water for safety and to reduce seasonal damage to the concrete pedestrian system. Consider using geothermal return water for snow melt to reduce consumption
- Add building geothermal meters, pumps and valve controls to Central Energy Management System.
- Obtain a copy of the geothermal use permit to verify any possible restrictions of use, such as limits to daily volume extracted, minimum injection temperature, or other water testing and treatment requirements prior to injection.

Conditions and Recommendations (continued)

[Insert Geothermal Water Systems Plan]

Storm Water Systems

Observations:

Galvanized corrugated metal pipe (CMP) storm sewer mains were originally installed on the 1963 campus during its later additions. One of the campus storm mains begins at a manhole approximately 220 feet north of Residence Hall, routes west, collecting the surface drainage from almost all of the campus buildings, and discharges into an open ditch southwest of Cornett Hall. The other main begins southeast of Residence Hall, routes west, collecting surface runoff from the main parking lots and streets, and discharges into a 48 inch main in the street to the south of Boivin Hall.

The northernmost storm piping was used for surface drainage and for disposal of spent geothermal effluent. Visual inspections of the piping around construction projects during the 1997 Master Plan revealed that the geothermal water had corroded the pipe beyond its usefulness. The total extent of the damage could not be verified without a camera inspection. During 1985-1986, the geothermal water piping of Residence Hall, Student Union, Library, and Snell Hall was separated from the storm water piping. A collection system for the rest of the campus was installed in 1989. Although this effectively isolated the storm water from the corrosion of the geothermal water, many parts of the storm water system remain in need of repair.

Once the storm water piping has been photographed and problems identified, decisions can be made as to the extent of replacement or repair and the materials to be used. Storm water piping under buildings cannot simply be replaced. These sections of pipe might instead be relined or have a smaller diameter pipe routed through them. Most other pipe on the campus can be excavated and replaced as needed.

Areas around the OIT campus are being developed and plans may be made to use some of the Institute's utilities, notably the storm water system. At the time of the 1997 Master Plan, the Engineer for the City of Klamath Falls said the City had not addressed the surface water runoff for the areas around the OIT campus. He said the City was attempting to coordinate a program with civil engineering professors and students that would result in obtaining enough information about the area to begin a storm water drainage master plan. He also said that until he had the information, any solutions he proposed then would be speculative. Therefore, OIT should meet with City's Engineer to determine the progress of their storm water drainage master plan and how it might impact OIT.

Retention ponds are planned for the new Residence Hall buildings and the new Center for Health Professions building to mitigate storm water runoff.

Storm Water System Recommendations:

- Inspect and document the condition of storm water mains with photographs and/or videotape.
- Repair and/or replace any damaged storm water piping as determined from the photograph and videotape inspections.
- Meet with City's Engineer to determine the progress of the City's storm water drainage master plan and how it might impact OIT.

Sanitary Waste System

Observations

At the time of the 1997 Master Plan, the existing sanitary waste system had been changed from a pumped system to a gravity flow system draining into the City's sewage system. There have been no problems with the system.

The 12 inch waste main is oversized for the campus, assuming a current load of 2,400 students on campus and 500 to 700 residents housed in Residence Hall. There is adequate capacity for the next 10 years if the enrollment increases to 3,000 students and another residence hall is added. An analysis of the waste system should be made prior to locating any new buildings because, although the main will accept increase in waste, branch lines may not.

Sanitary Water System Recommendations

- Conduct an analysis of the Campus' waste system before locating any new buildings to verify branch line capacity.

Conditions and Recommendations (continued)

[Insert Storm Water and Sanitary Sewer Systems Plan]

Natural Gas

Observations

There is not much use for natural gas since most of the campus heating is provided by extracting hot water from geothermal wells. Natural gas use is limited to laboratory use and as a backup fuel for emergency generators.

[Other observations or concerns]

Recommendations

- [Insert recommendations here]

Conditions and Recommendations (continued)

[Insert Natural Gas Systems Plan]

Electrical Power – Primary and Secondary Systems

Observations

fed
The current primary distribution system is a conventional medium voltage (12,500 volt, 3-phase) radial system that is feed from a single drop provided by Pacific Power & Light. The service is underground from the utility drop pole on the south side of the south side of Campus Way to the primary switchboard in the Mechanical/Electrical Building.

Primary power is distributed through the campus underground with three separate branch circuits from three fused disconnects at the Mechanical/Electrical Building switchboard. These three circuit branches serve a series of sectionalizing switches in a loop configuration. For most of the campus, these sectionalizing cabinets allow the feeding of transformers from a choice of two feeders. This allows the campus to isolate any individual loop feeder and maintain service to campus buildings.

Voltage is stepped down to utilization level (480/277V or 208/120V) at individual buildings, generally through pad mounted transformers.

The rated amperage of the primary distribution system is adequate for existing and foreseeable electrical loads.

According to the 1997 Master Plan, the primary distribution system was partially upgraded during the summer of 1994 with the following improvements:

- New primary switchboard at the Mechanical/Electrical Building.
- Pad mounted primary sectionalizing switches (S&C PMH Series) adjacent to Cornett Hall and Gymnasium Building with underground feeder (4 PVC C, 3-#2 15 KV Power Cable) between switches.
- Underground primary feeder between Semon Hall transformer (TR2) and Cornett Hall primary switches.

These modifications improved both the integrity and versatility. Integrity by way of new equipment and feeders and versatility with the sectionalizing switches and connection between Cornett Hall and Gymnasium Building and Feeders #2 and #3 backing each other up.

Two problems still exist with the primary distribution system and need to be addressed:

- Old interlocked armored cable needs to be replaced. As part of the 1994 upgrade, all existing older primary feeders (#2-3 conductor, 15KV interlocked armor cable) were high potential tested to verify cable integrity. The feeder between Semon Hall and Cornett Hall failed during the test and had to be replaced. Testing was discontinued due to the concern that testing may result in the failure of another feeder and require replacement. Original armored cable still exists between the following locations:
 - o Mechanical/Electrical Building's switchboard to Gymnasium Building's primary switch.

Conditions and Recommendations (continued)

- Gymnasium Building's Primary switch to Pump House (TR6) and Heat Exchanger Building (TR7). This conduit has been made inactive with a new more direct line extending from the Heat Exchange building (TR7) to Pump House (TR6). However, the old cabling has not been removed.
 - Mechanical/Electrical Building primary switch to Semon Hall's transformer (TR2).
 - Semon Hall's secondary service from transformer (TR2).
 - The primary service from transformer (TR2) to transformer (TR8) and the secondary service from transformer (TR8) to Boivin Hall are direct bury lines that need replacement.
- To increase the reliability of the distribution system, a secondary primary service drop has recently been provided at the Heat Exchange Building adjacent to transformer 7. The second service extends the campus primary loop distribution system so no single fault anywhere on the system could interrupt service to more than a small part of the system load.
 - Portions of the existing primary distribution system within individual buildings are operating at or above capacity. This is particularly true of the secondary dry type transformers, primary 480 volts, secondary 208/120 volts and 208/120 volt branch panels which predominately serve receptacle loads. The problem appears to be more acute in Owens Hall, Cornett Hall, Snell Hall, Learning Resource Center, and the Physical Plant.

Primary and Secondary Power Recommendations

- Remove all older direct buried primary cable and replace with new conduit and cable. The cable between Mechanical/Electrical Building and Semon Hall (TR2) and the cable between the Mechanical/Electrical Building and the Student Union (TR5) are an integral part of the sectionalizing scheme for the campus and should also have priority for replacement.
- Evaluate existing and future loading on individual buildings to determine if existing primary transformers, secondary feeders, service entrance switchboards, secondary transformers, and secondary branch panels are adequately sized.

Electrical Power – Emergency Generators

Observations

Emergency Generators are located at the following buildings:

- Physical Education (Gymnasium) Building
- Boivin and Semon Hall
- Owens Hall
- Purvine Hall
- Residence Hall
- Snell Hall
- College Union

Conditions and Recommendations (continued)

These generators predominately feed emergency lighting and fire alarm panels.

The generator serving the Residence Hall has been replaced with a new generator located outside the building in a separate structure. The new generator may have the capacity to serve a second Residence Hall.

Emergency Generator Recommendations

- Consider adding an emergency generator to serve the pump assemblies of the three geothermal wells. If this proves too costly, consider providing a larger geothermal storage tank at the Heat Exchange building.

Conditions and Recommendations (continued)

[Insert Electrical Distribution Plan]

