UWRF is projecting that the two proposed engineering programs combined will provide equivalent enrollments to that of the AET program (roughly 80 additional students split between the two engineering programs) and necessitate, when fully mature, yet another tenure track or full-time faculty member within the department (bringing the complement to seven FTE if and when both programs are authorized) and some additional instructional academic staff (preferably with industry experience) to provide curricular support and teaching capacity (roughly $40,000 to cover ten sections over the course of the academic year). UWRF expects that additional hires would bring expertise in basic/general engineering, agricultural/mechanical, and systems/precision. At the same time the university projects that the ongoing S&E budget would be multiplied by a factor of 2.5 yielding an additional $65,000 in S&E by year three of implementation and upwards of 3.5 yielding nearly an additional $92,000 to the department’s operating budget by the fifth year (this is exclusive of capital equipment purchases, which get handled through a centralized budgeting process at UWRF). However, it should be noted that the most current and conservative pricing structure would yield more than $610,000/annum in Wisconsin tuition/fees and exclusive of any lab/course/program fees for up to 80 additional students distributed between Agricultural Engineering and Environmental Engineering.

The relative incremental increase is based on the presence of some existing curricular resources, four existing faculty members, and existing facilities (albeit with need for renovation and upgrading—the university has already identified $1.2 million for this facility and renovation upgrade to the 13,000 square feet of lab and production space within the Agricultural Engineering Annex associated with UWRF’s Agricultural Science building and a separate, largely privately funded, upgrade to the university pilot plants).
The $1.2 million allocation was noted in the university's 2014 fund balance report to UW System Administration. The existing facilities to be renovated would be, in part, necessary to sustain the existing high quality Agricultural Engineering Technology major and would include enhancements to house a clean/test engineering and fabrication lab, a design studio, and an upgraded testing, instrumentation, and fabrication space. Because of the existing AET program the current faculty can also leverage existing lower-division courses in engineering technology. The Agricultural Engineering curriculum plan delivers a major that runs to about 133 semester credits. However, there are plans to modify the scale and structure of the university's general education curriculum independent of the discussions regarding engineering programs at UWRF.

The AET faculty, despite a formal UW System moratorium on program development, has continued to assess the state of its curriculum and to address how courses would need to be developed, redesigned, and pedagogically rethought in order to deliver a high quality program that would enhance the current offering (the AET major) and provide a platform to assure that the programs could secure ABET (Accreditation Board for Engineering and Technology) accreditation and, equally important, create a learning environment that would provide an appropriate intellectual and professional platform for UWRF undergraduate students interested in engineering. The AET faculty members have consulted with campus colleagues and examined how a responsive and rigorous curriculum can be deployed at UWRF in the near term and Table 3 provides an indication of the existing, developing, and to be developed courses to support the Agricultural Engineering major.
Table 3: Agricultural Engineering: Machinery emphasis
(Color coding refers to courses in development [blue]; redesign [green]; or need to be developed [grey])

| Semester 1 | Math 166 Calc 1 4 cr | Physics 161 Gen Physics 1 4 cr | Physics 166 Gen Physics Lab 1 1 cr | Engl 367 Tech Writing 3 cr | GENG 121 Engr Drawing 3 cr | ENGR 1 Introduction to Engineering 2 cr |
| Semester 2 | Math 167 Calc 2 4 cr | Physics 162 Gen Physics 1 4 cr | Physics 167 Gen Physics 1 1 cr | COMS 116 Business & Professional Comm 3 cr | GENG 261 Engr Drawing 3 cr | ENGR 2 Programming for Engineers 2 cr |
| Semester 3 | Math 266 Calc 3 3 cr | Math 226 Statistics 3 cr | Physics 311 Electronic Circuits 4 cr | Physics 250/GENG 251 Statics 3 cr | Soils 120 Intro to Soils 3 cr | X |
| Semester 5 | Math 351 Diff Eq 3 cr | ENGR 3 Engineering Thermodynamics 1 3 cr | ENGR 4 Fluid Mechanics 1 3 cr | ENGR 5 Machine Design 1 3 cr | AGEN 561 Power & Machinery 3 cr | PhyEd 2 cr |
| Semester 6 | Physics 361 Math of Physics & Engineering 1 3 cr | ENGR 6 Heat Transfer 1 3 cr | ENGR 7 Thermofluid Measurements Lab 2 cr | ENGR 8 Machine Design 2 3 cr | ENGR 9 Off-Road Machinery Design 3 cr | ENGR 10 Ethics & Citizenship for Engineers 2 cr |
| Semester 7 | ENGR 11 Senior Design 1 3 cr | ENGR 12 Finite Element Analysis and Computational Fluid Dynamics 3 cr | AGEN 465 Intro to Fluid Power 3 cr | ENGR 13 Intro to Dynamic Systems 3 cr | ENGR 14 Instrumentation Systems in Ag. Machinery 3 cr | GEN-ED Elective 3 cr |
| Semester 8 | ENGR 15 Senior Design 2 3 cr | GENG 450 Project Management 3 cr | AGEN 320 IC Engines 3 cr | GEN-ED Elective 3 cr | GEN-ED Elective 3 cr |

Total projected faculty resources, existing and new, to support the current Agricultural Engineering Technology degree and the proposed degree in Agricultural Engineering (and Environmental Engineering) would therefore be seven tenure-track faculty members (calculated at an average of $75,000/faculty) and one full-time Instructional Academic Staff (or equivalent thereof) for implementation of the Agricultural Engineering program (by year five). The instructional cost is therefore projected at $500,000/annum by year five of implementation. The additional faculty member(s) necessary to sustain an Environmental Engineering degree, with the associated incremental increase in new courses needed for the major, are captured in the additional tenure track faculty member listed in Table 2. In addition UWRF would expect to add more
courses/sections led by instructional academic staff as needed. Under current projections the ratio of existing AET majors plus the addition of 40 students for each of the two engineering programs divided by the tenure track faculty members would be 22/1, considerably better than many of the university's existing major/faculty ratios.

**Partnerships and Consortium Relationships**

Beyond the university, UWRF has connected its engineering efforts, through the Northwest Wisconsin Engineering Consortium, with those of UW-Stubt and UW-Eau Claire to assure collaboration, cooperation, and a rational approach to developing engineering programs in this region of Wisconsin. All three universities are very focused on engineering as means toward enhanced workforce and regional economic development. UWRF has proposed its engineering degree options as part of the Northwest Wisconsin Engineering Consortium (NWEC), which is described in the accompanying document previously distributed to UW System Administration and members of the Board of Regents. The consortium currently comprises three UW comprehensive institutions that are also pursuing collaborations with appropriate technical colleges and UW colleges. Each of the institutions has ongoing relationships with regional high schools and collectively have delineated the ways in which the three schools can share curricular resources (when appropriate), open facilities to each partner institution, engage in student recruitment and advising, connect with employers on internships and cooperative learning, and leverage focused job fairs. The intention and direction of the NWEC collaboration, as specified in previous documents submitted to UW System Administration, is to have an ongoing collaboration involving UW-Eau Claire, UWRF, and UW-Stubt to promote, manage, and develop engineering options and connections in the Northwest region of Wisconsin.
Within the collaboration UWRF would contribute its brand strength and relevancy to the region and state’s agricultural industries. The Agricultural Engineering Technology department has had longstanding connections with various regional industry partners—Cargill Kitchen Solutions, Oxbo, Case IH, Toro Machinery, Parker Hannifin—that have received UWRF interns and hired UWRF graduates of the existing Agricultural Engineering Technology program and are keen to extend their partnership with a fully developed engineering program (that would seek ABET accreditation). These strengths in agriculture are part of the university’s historical mission and identity and thus serve as a complement to the program array and missions of UW-Eau Claire and UW-Stout and their proposed engineering programs. By continuing to partner with the agriculture and agricultural machinery industries, UWRF is well positioned to offer a valuable, albeit relatively small, Agricultural Engineering (and if also approved, Environmental Engineering) program that is responsive to industry and attracts talented student and faculty who would work with industry to build a viable workforce and partner on research and development projects.

**Attracting Student Talent**

UWRF has a strong regional appeal. The university draws more than 70% of its students from within a 100-mile radius of the River Falls campus. The UWRF unit that is an exception is the College of Agriculture, Food and Environmental Sciences—because of its program array, accessibility, size, and reputation—which attracts students from every corner of Wisconsin (and beyond). UWRF prides itself on providing access to many first-generation, non-traditional, and low-income students. UWRF is intentional in its efforts to attract additional highly academically qualified students through an enhanced Honors program and scholarship programs such as Falcon Scholars. The university has strong