

Engineering & Project Management: Core Functions and the Value Added to Cornell

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Engineering & Project Management Mission: To provide engineering and project management leadership for planning, designing, constructing, and maintaining the university’s facilities and infrastructure needs for learning, discovery, and engagement. To achieve this, the Engineering and Project Management team is structured around the following core functions:

- **Facilities Engineering**
 - Engineering & Architectural Design Services
 - Technical Stewardship
- **Project Management**
 - Capital Project Management
 - *Pre-Design Phase*
 - *Design Phase*
 - *Bid Phase*
 - *Construction Phase*
 - *Closeout Phase*
 - Centralized Project Management Leadership and Mastery
- **eBuilder Project Management System**

Facilities Engineering

Engineering & Architectural Design Services	Value to Cornell
<p>Full range of in-house architectural and engineering design and consulting services: building assessments, feasibility studies, code analyses, biddable construction documents, construction support, Cornell trade shops design; new facility hire office and lab design.</p> <p>80 to 100 projects representing over \$2M in design fees and \$20M in construction</p>	<p><i>Faster, more efficient, less costly, more consistent (lower long-term cost) design for Cornell academic and research needs; simpler and more direct procurement processes; better coordination with unit facility managers; direct access to facility information leading to data-driven design decisions; design team “profit” stays within Cornell.</i></p>
Technical Stewardship	Value to Cornell
<p>University engineering leadership: best design & construction practices; analysis of latest technologies and Standards</p>	<p><i>Highest life-cycle value; lower maintenance and replacement costs based on proven experience; in-house code review avoids consultant costs and reduces claims</i></p>

Hands-on response to facility emergencies, fast condition assessments, and efficient repair/maintenance support response	<i>Quick technical consultations, smooth coordination with campus unit facilities, efficient determination of problems without consultant travel costs and expense; direct access to long-term maintenance records improves outcomes.</i>
Maintenance Planning Technical Support, Program Data Management, and Life Cycle Value Analysis	<i>Partner with Facilities Management using data-driven ROI and LCV analyses to support “best use of next dollar” – Bridges, Parking Structures, Generators, Fire Protection, Roads, Sidewalks, Electrical Gear, Exterior Lighting, Etc.</i>
Facilities/academic collaborations; grant acquisition and management	<i>Staff includes academic course leaders; guest lecturers; student team mentors; judges for student competitions. Staff also prepare, write, negotiate, and manage grants for facilities/academic collaborations; FE-led efforts netted over \$3M in outside grants for Cornell projects (Roosevelt Island; Central Energy Plant; Energy Conservation; Earth Source Heat) in past five years; currently pursuing \$7.5M+.</i>
Technical Consultant Selection and Evaluation	<i>Maintain consultant evaluation database to minimize design problems and related cost overruns</i>
Energy and Environmental Analysis & Energy Use Intensity Goals	<i>Analyze building data and energy models to keep energy needs and costs low; avoid unneeded new utilities capital construction; simplify environmental compliance.</i>
Site Environmental Clean-Up Oversight	<i>Project in-house confidential support for environmental clean-up at lowest cost; protecting Cornell from liability</i>
Green Building Program Support	<i>Efficient in-house carbon accounting and LEED Program management saves millions in specialty consultant fees</i>
Capital Project Design Review and Design and Construction Standards	<i>Technical “eyes on” all significant Cornell projects (135 reviews in FY19) to ensure compliance with standards and designs specifically focused on the University’s interests (best ROI, quality at fair cost)</i>
Utility Mapping & Locating	<i>Curate comprehensive Utility Maps and administer Dig Safely New York (Mark out Utilities) in-house, protecting worker and public safety and Cornell assets</i>

Project Management

Capital Project Management	Value to Cornell
Manage Project Success Criteria (Scope, Schedule and Budget)	<i>Project managers provide comprehensive project management services for University Capital projects. They are responsible for managing and balancing the project success criteria; scope, schedule and budget. They facilitate decision making for university partners and stakeholders utilizing an analytical and consensus driven approach that seeks to provide best value to the university.</i>
Project Communications and Reporting	<i>Facilitate communications within large and complex project teams comprised of internal campus partners and stakeholders and external architects, engineers, consultants and contractors. Serve as single point of contact to ensure clear direction on decisions is provided to the project team, expectations are clearly defined and communicated. Provide status updates and project schedules in eBuilder as well as frequent executive level updates.</i>
Adherence to University Policy and Procedures	<i>Expertise in delivering projects in compliance with university and municipal policy and procedures. Provide risk assessments to aligning project goals and expectations within university policy and procedures. Provide auditable record of project activities and decision making.</i>
Contract Management and Administration Architect/Engineer Agreements Testing Agency Contracts Specialty Consultants Pre-Construction Contracts Contractor Contracts SUCF & Cornell Funded Contract Requirements Purchase orders and AV Procurement	<i>Project Manager serves as steward and advocate for the University, responsible for managing risk and relationships associated with contracts.</i>
Pre-Design Phase Management	
Define and confirm project goals	<i>Utilizes a project charter to confirm and update success criteria to ensure that client goals and expectations are in alignment.</i>
Lead consultant selection process	<i>Determines consultant procurement strategy and leads selection process from start to finish to ensure consultant fit, compliance, best value, consensus, and timeliness.</i>
Design Phase Management	
Leads design process and facilitates project development and decision making	<i>As the single point of contact, lead complex teams of stakeholders and consultants, coordinate and lead design</i>

	<i>meetings, manage project schedules, budget, reporting, etc.</i>
Project stewardship during design phase	<i>Ensure project meets stakeholder programmatic goals in balance with Cornell stewardship responsibilities (sustainability, energy, life-cycle cost, maintainability, compliance with design standards, and aesthetics/visual impact in consultation with OUA)</i>
Coordinate multiple consultants and stakeholders	<i>Leads procurement and integration of design effort with all stakeholders and extended consultant teams (Commissioning agents, pre-construction services, furniture, A/V design, signage and wayfinding, hazmat, etc...). Develops and maintains a communication plan.</i>
Navigate projects through municipal approval processes	<i>Facilitate project success by obtaining consensus, approvals, variances, and other reviews in a sequential and timely manner.</i>
Orchestrates design review process	<i>Manages formal design reviews and ensures that key stakeholder project comments are resolved and integrated. Reduces errors/omissions and coordination issues in project execution. Ensures design meets success criteria.</i>
Bid Phase Management	
Bid Document Preparation	<i>Bid document preparation and development of front-end documents. Quality assurance review of consultant document submissions ensures better bid pricing.</i>
Procurement and Bid Award Strategy	<i>Develop list of bidders, develop alternates and unit pricing, conduct descope meetings. Provides oversight of bidding process to ensure that policy and procedures are being followed. Leverage bid information for future project planning and estimating.</i>
Construction Phase Management	
Construction Stewardship and Quality Assurance	<i>Contractual management ensures the highest quality afforded by the design documents, on time and within the approved budget.</i>
Financial Stewardship \$493M currently in active construction contracts \$8-10M in monthly construction billings \$49M in combined project contingencies	<i>Responsibility and oversight for overall project budget and construction contracts. Reviews and approves all project related expenses, change orders and contractual commitments to ensure highest value for the University.</i>
University Advocate 900+ proposed change orders negotiated annually 10-20% change order reductions	<i>Sole University advocate on capital construction projects protecting the Universities position on contractual disagreements, financial commitments-expenditures, and achieving project objectives.</i>
Critical Construction Communications 100 - 150 active construction projects on campus at any one point in time	<i>Provides a single point of contact and communication for all construction activities; and acts as a liaison between the construction contractor and the greater Cornell community coordinating day to day activities and impacts on Campus operations.</i>

Closeout Phase Management	
Facilities Management Turnover	<i>Provides current/accurate data for building systems and operations. Utilize RedZone turnover checklist in collaboration with Facilities Management Group to ensure successful transition to maintenance and operations.</i>
Documentation for Archiving	<i>Assemble consultant/contractor record document submissions and other required documentation for submission to Facilities Inventory Group for Archiving for future projects, maintenance work and operations.</i>
Financial Closeout 109 Projects returned \$9.3M FY20	<i>Lead process for returning unspent funds to the Sponsoring College/Unit in a timely manner to capitalize assets. Ensure that all contractual commitments are closed out.</i>
Centralized Project Management Leadership and Mastery	Value to Cornell
Leadership in Project Management	<i>University project management center provides leadership and guidance to E&PM as well as satellite project management groups located in Colleges and Units. The E&PM team authors and publishes the PM Checklists & Resources in collaboration with key stakeholders. Provide Construction Management Subject Matter Expertise on university policies and procedures. Set consistent PM service standards. Proven benefits and cost savings of centralized leadership include efficiencies associated with optimized bidding, project bundling, acquisition planning, reduced errors & omissions, streamlined processes and improve efficiencies within university policy.</i>
Knowledge Management and Information Sharing Project Management Checklists: 63 Checklists 69 Guidance Documents	<i>Curate lessons learned, best practices, checklists and guidance documents to provide project managers the tools necessary to deliver high quality and consistent project management services. This leads to constant improvement and mastery of the craft of project management.</i>
Training and Professional Development PMPD Monthly Training Sessions: Avg. 60 Attendees/Session; (Peak 111) Over 15 Colleges & Units Represented 50 topics covered (40hrs of training) 13 PDH's administered (AIA & PE)	<i>Host and develop content for the monthly Project Management Professional Development (PMPD) training series. Provides learning units for professional licensing continuing education requirements.</i>

e-Builder Project Management System

eBuilder	Value to Cornell
Cloud Based Project Management System	<i>The University-wide system captures all project information in one cloud-based project management system, ensures enforcement of University policy and business rules relative to project authorizations (PARs), provides consistent filing system for project documentation, meets construction process audit requirements, and standardizes reporting. E-Builder provides transparency to all project stakeholders and University executives by providing standardized management tools that track project budgets and design/construction management processes from project start to closeout.</i>
System Administration/Maintenance 300 projects set up annually 2300 total users 62 roles 1000 companies managed 1,850 contacts managed 9 KFS integrations managed daily 1 Maximo integration managed monthly	<i>Projects are set up in a timely manner with the proper budget template, users/roles templates, and documents templates based on the type of project (capital, small, stand-alone or blanket contract). The right people are in the right roles/authorities on the right projects with the proper security accesses and permissions. Guarantees timely budget tracking/reporting.</i>
User Training, Communication & Support 667 Internal Cornell Staff 1,694 External Consultant/Contract Users Support all users	<i>Promotes successful and consistent use of the system that results in quality of data capture; allows ease of use by all parties and increases availability of high-quality status and decision-making reporting.</i>
Reporting & Business Analytics 610 global reports 106 administrator reports 103 custom report subscriptions On demand ad hoc reports	<i>Provides oversight for design/development of custom reports and dashboards ensures quality of data in reporting for critical decision making as well as for use in execution of functional/position responsibilities across campus for both system users and non-users.</i>
Streamline Processes & Modules 50 process workflows	<i>Ensures modifications to workflows and modules result in added efficiencies or effectiveness, such as fewer process steps or additional quality data collection for better reporting or ease of carrying out user functional responsibilities. Ensures configurations continue to align with policy as business needs evolve.</i>
Implement Modules & Functionality 10 modules implemented	<i>Promotes new or underutilized modules/functions that offer cost savings, process streamlining or untapped transparency. Provides implementation of those that align with University stakeholder goals or business needs and</i>

	<i>ensures that configurations align with University policy as business requirements change.</i>
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