Founded in 1987, Larson Binkley, Inc. provides mechanical, electrical and plumbing engineering design services nationwide for retail stores, restaurants, schools, offices, data centers, laboratories, and other high performance buildings. Larson Binkley is known for its wide use of innovative technologies for HVAC, indoor air quality and water efficiency. Many projects spend only a few days in our office which requires extraordinary organization, efficiency, technical competence, and commitment to the business of our clients.

**Project management assisted by technology**
Larson BInkley has developed custom Internet-based project management software in-house to control a large volume of projects and deadlines, including multiple projects for national clients. Project managers can easily access information on the status of each project currently in the office. They receive automated alerts as the project passes from one phase or discipline to another. Clients can call at any time and expect to receive prompt updates on the status of their projects.

**Quality control enhanced by field experience**
Integrated into the project management system is a formal quality control process. Drawings are thoroughly checked at several stages by senior principals with field experience in construction trades in addition to 25-30 years in engineering design. Several of our principals have worked as pipe fitters, electricians, sheet metal workers or HVAC service technicians. This practical experience contributes to our change order percentage being well below industry standards which is critical to keeping projects on schedule and within budget.

**Professional registration in 50 states**
Engineers registered in 50 states with thorough knowledge of codes and design criteria in multiple jurisdictions give Larson Binkley the ability to expedite projects through local approval and permitting processes. This makes Larson Binkley a valuable design team member for prototype development and site-adapting existing prototype designs to a variety of locations and conditions.

**Innovative and environmentally responsible design solutions**
Larson Binkley has vast experience in the design of several innovative, alternative technologies for HVAC, indoor air quality, and water efficiency. We also incorporate environmentally responsible design principles into all of our projects. We actively participate in organizations that promote sustainable design, including the U.S. Green Building Council, ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers) and the Center for the Built Environment. The firm has completed several LEED® certified and LEED® registered projects.

**Industry leadership**
Key leaders of Larson Binkley speak nationally on a variety of topics relevant to our clients. Recent presentation topics at national conferences include prototype development, lighting and energy code compliance, and dual path airway systems. Articles authored by Larson Binkley engineers on similar topics have appeared in industry trade publications.
Our Services

Mechanical Design Services

- Construction documents
- Prototype plan development
- Sustainable design strategies
- Building envelope load calculations
- Energy simulations based on system type and fuel source
- Life cycle cost estimation for heating, cooling and ventilation systems
- Engineering construction cost estimation
- Construction phase services
- System commissioning
- System design
  - Air handling equipment for heating and cooling
  - Duct systems – all types (CAV, VAV, and of various pressures)
  - Chilled and hot water piping and pumping schemes
  - Boiler application, boiler plants and boiler plant control
  - Water chilling unit applications
  - Central plant design, central plant controls, and plant optimization
  - Geothermal systems
  - Water source systems – heat pumps and heat rejection
  - Building smoke evacuation systems
  - Building pressurization systems
  - Building automation systems and energy monitoring
  - Systems integration – combining multiple protocols on a common net
  - Ventilation schemes – outdoor air, energy recovery, natural ventilation
  - Clean room design
  - Controls validation
  - HVAC energy calculations for all model energy codes and California Title 24
  - Building envelope energy calculations for all model energy codes and Title 24
  - Computational fluid dynamics – airflow effectiveness and smoke plumes

Electrical Design Services

- Construction documents
- Prototype power system development
- Sustainable design strategies
- Construction phase services
- System design
  - Building electrical service entry and power distribution
  - Emergency, standby power and UPS
  - Branch circuit power distribution to appliances and equipment
  - Fire alarm systems
  - Grounding and lightning protection
  - 24/7 power distribution systems
  - Photovoltaics
  - Voice and data network cable design and infrastructure
  - Digital security system implementation

Plumbing Design Services

- Construction documents
- Prototype plan development
- Sustainable design strategies
- Construction phase services
- System design
  - Building storm drainage systems
  - Waste and vent piping systems
  - Domestic water systems
  - Energy conserving plumbing equipment
  - Solar water heating
  - All forms of kitchen facility plumbing including grease waste and interceptor design
  - Natural gas and propane piping systems

Lighting Design Services

- Construction documents
- Prototype lighting development
- Sustainable design strategies
- Specialty lighting aiming plans and elevations
- Energy calculations for all model energy codes and California Title 24
- System design
  - Optimization and maximization of code lighting allowances
  - Room footcandle calculations
  - Exterior site lighting footcandle calculations
  - Special venue lighting
  - Lighting power distribution
  - High efficiency lighting design application with daylight harvesting
  - Digital automated lighting controls

Sustainable Design

- Retail sustainability strategies
- LEED® MEP documentation
- LEED® accredited professionals
- USGBC LEED® for Retail
- USGBC LEED® Volume certification
- Building energy optimization
- Building envelope performance optimization
- Energy modeling
- Utility optimization
- LEED® Commissioning
Awards

2007
Construction Specifications Institute – Kansas City Chapter
Excellence in Engineering Award
Embarq Prototype Retail Store

2006
Retail Construction Magazine - Industry Achievement Awards
2006 Engineering Firm of the Year
The Industry Achievement Awards are given annually to firms and individuals who have helped advance the retail industry.

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Technology Award
First Place - Chapter and Regional awards (2006) – Existing Institutional Building
Overland Trail Middle School – Overland Park, KS
Technology awards are earned for outstanding achievement in the application of heating, refrigerating and air-conditioning technology.

2005
U. S. Department of Energy - Rebuild America
Allied Industry Partner
One of 24 companies named a premier allied industry partner of the Department of Energy's Rebuild America program which seeks to reduce the costs and consumption of energy in buildings through the use of proven energy efficiency and renewable energy technologies and practices.

Retail Construction Magazine - Industry Achievement Awards
2005 Engineer of the Year
Awarded to Chris Larson. The Industry Achievement Awards are given annually to individuals who have helped advance the retail industry.

Illuminating Engineering Society of North America (IESNA) - Heart of America section
Outstanding Achievement in Lighting Design
Heartland Operations Center, Dubuque Bank & Trust – Dubuque, IA

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) TEGA Award for Technology
First Place - Chapter and Regional awards (2004)
Honorable Mention - National Award (2005)
Blue Valley North High School – Overland Park, KS
TEGA awards are given for outstanding achievement in the application of heating, refrigerating and air-conditioning technology.

Publications
Megerson, James E. “Dual Path Airway System shows promise to avoid complications.”

Larson, Christopher R. and Megerson, James E. “Certain flexible prototype aspects needed for timely store building.”
Retail Construction. March/April, 2005.

Larson, Christopher R. and Megerson, James E. “Designers, engineers need to work to comply with ever-changing codes.”
Retail Construction. September/October, 2005.

Megerson, James E. and Torline, Christopher. “Strategies for Improving IAQ.”

Torline, Christopher and Megerson, James E. “Savings from efficient energy use fall straight to retailers’ bottom line.”
Retail Construction. March/April, 2006.

Torline, Christopher “Effective building control system can have big impact on energy bills.”
Process

Larson Binkley uses a multiple tier, six-step process that begins with pre-design meetings. We gather all disciplines together to discuss the scope of the work, keeping in mind our client's needs, budget and design constraints.

Our QC process is woven throughout the project and is enacted prior to each milestone date, which assures quality via an open review forum. The project is cross-examined by project engineers/designers and QC managers. The principal-in-charge (PIC) monitors the project during weekly design review meetings with the project manager (PM) and team members. The PIC’s presence on the job is defined by the scope of work.

Documentation

Step 1
At critical design points, engineers/designers review their own work to verify that their designs are coordinated and documented as completely as possible to that point. They then submit their work to the PM for review.

Step 2
The PM reviews the work for schedule compliance according to the client’s goals and expectations. The PM also validates that the owner's requests and standards are being adhered to. The PM then notifies each department’s QC manager that the drawings are ready for their review.

Step 3
Each QC manager reviews the design documents and specifications for technical competency, adherence to Larson Binkley design standards, coordination and content. The work is also reviewed for constructability and compliance issues. When the departmental reviews are complete, the PM is notified and the drawings are ready for final QC.

Step 4
The PM assembles all drawings and notifies the PIC that the project is ready for final review. The PIC then completes a cross-discipline review – checking each drawing for coordination across all designs. At the completion of this step, the PM is notified that the final review is complete.

Step 5
The PIC reviews comments with the PM and the entire team or individual team members, whichever is deemed necessary; all necessary corrections are then made.

Step 6
After the engineer/designer reviews their work to confirm corrections have been made, the PM performs a final check before notifying the PIC that drawings are complete and ready to be signed and sealed for distribution to code officials and/or contractors for bidding.

Depending on a project’s size, this process may be performed multiple times.
Maximizing the Life Cycle

Our firm believes in optimizing our approach to design. That requires that the systems we select balance the overall first cost, materials used, energy consumption, maintainability, visible and audible characteristics, and durability. In addition, we must consider the suitability of the systems for the utility area, the climate, and the client. A successful approach to choosing the best system requires an assessment of the people who will operate and maintain the systems we design and our ability to design systems that balance the need for sustainability, affordability and maintainability.

Experience has shown us that one of the most important variables in the selection and design of building systems is operations and maintenance. It is critical that the operations and maintenance staff understands and embraces the systems we design in order for all efficiency and cost savings to be realized. Larson Binkley collaborates with operations and maintenance staff to ensure that they are a participant in the decision associated with all systems selection.

We routinely follow up with operations and maintenance after the building has been functioning to ensure that the systems we design are operating as planned. We can review utility bills and indoor air sample data to make sure the systems are performing as intended. Should there be something that appears to be wrong, we investigate and work with the owner to take corrective action.

High Efficiency Lighting

The newly adopted lighting codes can be challenging to interpret and implement. We have embraced the new codes and developed innovative designs to accommodate the codes while producing better lighting more efficiently. We recently reduced one client's lighting consumption by 7000 watts which is about the same amount as the electrical usage of a medium-size home. This also avoids 50,000 pounds of CO2 production per year by electrical power plants.

Displacement Ventilation

Larson Binkley is one of the nation's pioneers in displacement ventilation and under floor air conditioning. We have designed more than 2 million square feet of space using these technologies, including two school projects that won ASHRAE Technology awards. Another project we recently completed using both displacement ventilation and under floor air has been certified as USGBC LEED® Gold.

Participation in “Green” Organizations

In 2005, Larson Binkley was one of 24 companies named a premier allied industry partner by the U.S. Department of Energy's Rebuild America program which seeks to reduce the costs and consumption of energy in buildings through the use of proven energy efficiency and renewable energy technologies and practices. Larson Binkley earned industry partner status by providing speakers on underfloor air conditioning and displacement ventilation for Rebuild America-sponsored seminars in addition to organizing our own local seminar.

We are active members of the United States Green Building Council (USGBC), an Energy Star Partner, and a partner in the EnergySmart Schools initiative of the Department of Energy's Rebuild America program. We have designed several high performance buildings and, as mentioned above, have recently received notice of our first LEED® Gold certified project. We are confident in saying that our design philosophy has long been driven by energy conservation and environmental responsibility.

Sustainable Staff

Larson Binkley has several team members that are LEED® accredited professionals. We encourage participation in sustainable organizations on local and national levels. We have representatives on USGBC committees and are a founding member of the Greater Kansas City USGBC Chapter.
Since the founding of our firm, Larson Binkley, Inc. has incorporated environmentally responsible design principles into every building system we design. Conserving and protecting resources has always been important to us as engineers, and we are now seeing a tremendous increase in demand from our clients to help them achieve healthier, more efficient and lower impact work environments.

In designing high performance building systems, we help our clients consider a balance of ecological objectives with their overall economic goals. We evaluate initial cost, material selection, energy consumption, maintainability, aesthetics, and durability. In addition, we consider the suitability of the systems for the utility area, the climate, the applicable energy codes, and the people who will operate and maintain the systems.

We are active members of internationally recognized organizations that promote sustainability, such as the United States Green Building Council (USGBC) and the American Society of Heating, Refrigerating and Air-Conditioning Engineers. We have a team of LEED® accredited professionals, and our staff has completed several LEED® certified projects.

**Sustainable Systems and Strategies**

- Variable primary pumping central chilled water cooling plants
- Variable primary pumping central hydronic heating plants
- High efficiency boiler systems
- Displacement ventilation
- Underfloor air conditioning
- Ice storage
- Water side economizers
- Evaporative condensers
- Evaporative cooling
- Energy recovery
- Low temperature cooling
- Geothermal heat pumps
- Water source heat pumps
- Modified dual duct variable air volume
- Outside air monitoring systems
- Demand ventilation controls
- High efficiency lighting
- Building automation systems
- Condensate collection systems
- Rainwater collection systems
- High efficiency plumbing fixtures
**USGBC LEED® Projects**

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- 5 Gold certified
- 4 Silver certified
- 3 certified
- 15 Registered
Your customers’ experience must be positive to capture return sales. Our innovative engineering solutions increase customer comfort, decrease maintenance and reduce energy costs without compromising your bottom line.

Many engineers have policies to forego tenant design modifications to an existing mall space. At Larson Binkley, we embrace these challenges and develop unique design processes to support our clients as they expand into these facilities.

We know that owners expect a finished project with functional and simple operation. For an inexperienced consultant, fulfilling these requirements can be a daunting task.

Your products cannot be sold if there is no venue for delivery to the market. Our first step toward getting a project built on time is procuring a building permit. We pride ourselves on our timely turn around of inevitable code comments when they arrive, but are most proud when we receive no comments in the first place.

Larson Binkley’s remarkably low change order percentage sets us apart from our competitors. Our track record of less than one-tenth of one percent of construction cost for change orders is well below the industry standard. We believe our success in preventing change orders starts with our employees’ extensive construction experience and our company’s comprehensive quality control program.
Retail
- 84 Lumber
- Aeropostale
- Banana Republic
- Banana Republic Outlet
- Bass Pro Shops
- Bath & Body Works
- CSK Auto
- Discovery Zone
- Embarq
- Forth & Towne
- Gap
- Gap Baby
- Gap Body
- Gap Kids
- Gap Outlet
- Hallmark Creations
- Hatworld
- Helzberg Jewelers
- Jewelry 3
- Kohl’s Department Stores
- Lids
- Old Navy
- Payless Cashways
- Quik Trip
- Quik Trip Travel Center
- Short Stop
- SOHO 119 Shoppes
- Sunset Tan
- Toyota
- Urban Outfitters

Restaurant
- Back Yard Burgers
- Boston Chicken
- Boston Market
- Briazz
- Canyon Café
- Cosi

Other
- Sprint Data/Telecom Switch Facilities
- Washington Mutual
- Intellicenter Office Building

Schools
- Blue Valley Schools New Elementary
- LaPetite Academy
- Nobel Elementary
- Nobel Schools Preschool

Einstein Brothers
- Haagen Dazs
- Houlihan’s
- Jack in the Box
- Krispy Kreme
- Lone Star Steakhouse
- Luby’s Cafeteria
- Maggie Moo’s
- Noodles
- Panda Express
- Ponderosa
- Razzoo’s
- Red Robin
- Taco Del Mar
- Texaco Prototype Review
- Texas Land & Cattle
- Tony Roma’s

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The Green Circle Shopping Center is the vision of two young Springfield, MO siblings who wanted to prove that sustainability and profitability are not mutually exclusive in retail development. Their goal was to create an entire shopping center designed to achieve a LEED® Platinum rating, the highest level possible, by using recycled materials, renewable energy, and energy- and water-efficient building systems.

The site is at the intersection of two major arterial streets in a commercial area of Springfield. The 26,000 SF building was positioned to save most of the 40 trees on the site and to maximize daylighting opportunities in the design of the building. A geothermal heating system with more than 40 wells located beneath the parking lot is used for heating and cooling. The geothermal system, along with energy recovery ventilators and heavily insulated walls and floors, improves energy efficiency by 50%, compared to the typical systems used in similar shopping centers.

Lighting controls, efficient lighting fixtures, and extensive daylighting help reduce electrical energy consumption. Photovoltaic panels that convert solar energy into electricity will eventually be located on the roof and south façade. These will produce several kW of energy for use in the building.

The building has a large green roof planted with indigenous species which is partially used for restaurant seating and a learning space by tenants. In addition to protecting the roof membrane from the heat of the sun and providing additional insulation for the building, the green roof slows down and reduces rainwater runoff. The remaining rainwater is collected in a large cistern and reused for irrigation and toilet flushing. Water efficient fixtures and dual-flush toilets are used throughout the shopping center. The parking lot is paved with porous material allowing water to percolate into the earth, delaying run-off and diverting excess to be naturally treated through bioswales. Green Circle uses about 80% less water than a typical commercial building with similar tenants.

Owners of Green Circle have been very particular in their tenant selection. Tenant finish guidelines have been established which emphasize the importance of sustainability and require green housekeeping methods. Although tenants may pay a little higher rent than their neighbors, the 54% reduction in overall utility costs should compensate.
Distribution Centers

- Kohl's Distribution Center – Macon, GA
  Mechanical and plumbing design for new 559,000 SF distribution center

- Kohl's Distribution Center – Patterson, CA
  Mechanical, electrical and plumbing design for new 450,700 SF distribution center

- Kohl's Distribution Center – Monroe, OH
  Mechanical, electrical and plumbing services for 413,000 SF expansion of existing E-Commerce distribution facility

- Kohl's Distribution Center – Ottawa, IL
  Mechanical, electrical and plumbing services for new 475,000 SF distribution center

- Discount Tire Regional Offices and Warehouses – Sumner, WA
  Mechanical, electrical and plumbing services for a new 12,483 SF regional office/warehouse discount project

- Discount Tire Regional Offices and Warehouses – Huntersville, NC
  Mechanical, electrical and plumbing services for a new 16,800 SF office/warehouse

- Discount Tire Regional Offices and Warehouses – Houston, TX
  Mechanical, electrical and plumbing services for a new 10,000 SF regional office/warehouse

- FedEx Facility at Kansas City International Airport – Kansas City, MO
  Heating, ventilating and air conditioning design services for a new design/build 94,000 SF sort facility, office building, and vehicle maintenance facility

- Fleming Foods Distribution Center – Kansas City, KS
  Heating and ventilating design services for 131,000 SF addition to distribution center

- Caremark Pharmaceutical Fulfillment Facility – Miramar, FL
  Mechanical, electrical, plumbing, and data technology infrastructure design services for 92,000 SF pharmaceutical facilities with offices, a call center and pharmaceutical fulfillment and distribution space
Restaurant Experience

At Larson Binkley, we know the challenges associated with designing restaurants. Owners need a building that is functional and easy to operate and maintain, without a higher initial investment. In addition, a customer’s experience must be positive to capture return sales, and that for us means a quality indoor environment.

Our years of experience have provided familiarity with every kitchen ventilation system known to the market. Larson Binkley works with equipment manufacturers to research and develop new ventilation products that exceed current industry standards and code compliance. Our work has resulted in solutions to increase customer comfort, and reduce maintenance and energy costs without compromising the bottom line. Larson Binkley is truly setting the standard for restaurant ventilation performance.

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Office and Commercial Building Experience

- 8101 East Prentice, 150,000 sq. ft. – Denver, CO
- Allied Signal/Honeywell, 478,000 sq. ft. manufacturing and office facility – Olathe, Kansas
- American Academy of Family Physicians – Leawood, KS
- American National Bank, a 100,000 sq. ft. office building – St. Joseph, MO
- Anchor Center, 1,000,000 sq. ft., multiple buildings – Phoenix, AZ
- Aries Power Plant – Pleasant Hill, MO
- Blue Valley School District Office, 36,000 sq. ft. renovation – Overland Park, KS
- Boatman’s Bank – various locations
- BVDO RTU Replacement – Stanley, KS
- Chevron Regional Headquarters - Covington, LA
- City Center Square, a 400,000 sq. ft. office building – Kansas City, MO
- Commerce Bank, 5,000 sq. ft. – Raytown, MO
- Discovery Zone Office Space
- Eastland Mall Office
- Farmland Corporate Headquarters – Kansas City, MO
- Farmland Industries Training Center
- First National Center Cooling Plant Remodel
- GSA Building #6
- Hayden Park Office Complex, 10 buildings, 110,000 sq. ft. – Scottsdale, AZ
- Huntington Center, 38 story office building and garage – Columbus, OH
- KCPL, Latan Plant, office design
- Lab One – Lenexa, KS
- Marion Labs Corporate Headquarters – Kansas City, MO
- Mays Office Building – Columbia, MO
- Michigan State University Credit Union - East Lansing, MI
- Missouri Employers Mutual Insurance - Columbia, MO
- Mortgage Lenders Network - Wallingford, CT
- North Kansas City School District Offices, 7,500 sq. ft. – North Kansas City, MO
- Numerous office buildings and shopping centers for Kroh Brothers, an Executive Hills Kansas City Developer
- Payless Cashways Corporate Headquarters – Springfield, MO; Collierville, TN
- Plaza West Office Building
- Prentice Point Office Building, a 300,000 sq. ft. office building with chilled water storage and smoke control system – Denver, CO
- Quivira Medical Plaza, office building – Overland Park, KS
- Smith-St. John remodel
- Southeast Financial Center, 1,200,000 sq. ft. – Miami, FL
- Sprint Corporate Headquarters, 210,000 sq. ft. – Kansas City, MO
- Sprint Corporation, Lenexa, telemarketing center – Lenexa, KS
- United Bank Center, 51-story office building – Denver, CO
- United States Department of Agriculture – Kansas City, MO
- USDA, Main Office Building, 335,000 sq. ft. – Kansas City, MO
- Ward Parkway Shopping Center, renovation – Kansas City, MO
- Water Park III, 110,000 sq. ft. – Aurora, IL
- Water Park Place, 150,000 sq. ft. – Aurora, CO
- Wolf Creek, office remodel – Burlington, KS
Modern financial institutions face many challenges in providing secure, reliable services to customers with a wide range of needs and expectations. Larson Binkley equips banks with advanced systems designed to safeguard nearly every aspect of their business while also responding to retail oriented, technology-savvy customers who expect a multitude of services, 24-hour access, and a state-of-the-art retail environment.

Larson Binkley’s experience includes the design of branch bank rollouts ranging in size from 2,000 to 20,000 square feet. Branch banking facilities are being designed as retail centers with an increased emphasis on branding. Internet stations, plasma TVs, fireplaces and coffee bars draw customers in and entice them to stay longer. A relationship-based environment exists for the more traditional customer, while a self-serve environment is available for the more technologically progressive customer. Teller transactions are decreasing as ATMs and remote teller systems (RTS) become more common. These interactive, two-way video kiosks allow customers to speak with a bank employee in a back office and can be used to send and receive cash and deposits. In addition to providing added security, an RTS allows fewer employees to service more customers more efficiently.

Larson Binkley’s experience in the banking industry also includes mission critical systems design for disaster recovery sites and data backup facilities. Disaster recovery sites ensure that banking operations remain online during the event of a natural disaster or terrorist attack. These alternate sites are located remotely from the primary facility and are outfitted to duplicate its functions. Larson Binkley is experienced in the technologies and processes that allow our clients’ facilities to transfer operations seamlessly from one building to the next.

Data backup facilities are essential to the cataloging and protection of digital banking information. A well-engineered space to house the backup equipment is needed to ensure that the information and hardware are preserved. Adequate cooling protects data backup equipment from the heat it produces, while uninterruptible power provides round-the-clock accessibility to information. Larson Binkley’s experience includes the design and implementation of raised floor air systems that provide proper cooling of computer and data equipment.
Data Centers

Larson Binkley has extensive experience in data center design. We develop advanced systems designed to safeguard nearly every aspect of our clients’ businesses. Our experience and expertise includes critical system design for data centers.

Data backup facilities are essential to the cataloging and protection of digital information. A well-engineered space to house the backup equipment is needed to ensure that the information and hardware are preserved. Adequate cooling protects data backup equipment from the heat it produces, while uninterruptible power provides round-the-clock accessibility to information.

Larson Binkley’s experience also includes the design and implementation of raised floor air systems that provide proper cooling of computer and data equipment. A dependable and solid foundation is created for our clients’ businesses when all of these systems work together properly.

The words “energy efficiency” and “data center” are rarely used in the same sentence. However, there may be some solutions that would allow reliability and energy efficiency to co-exist. Using innovative technologies, Larson Binkley designs secure, functional and comfortable facilities that consistently outperform typical building designs.

Critical Environments

Backup power for a company’s telecommunications or data network to prevent downtime can be a client’s greatest concern. Larson Binkley has experience phasing new backup power systems into existing networks or designing new backup power systems from the ground up. Larson Binkley’s extensive backup power experience includes on-site standby or emergency generators, UPS (Uninterruptible Power Supply) systems, battery farms, and inclusion of redundant building electrical feeds for projects such as data centers, points of presence telecommunications facilities, and telephone switching facilities.

Redundant and isolated cooling and ventilations systems must also be evaluated for each critical environment. Allowing telecommunication rooms to overheat can be as costly as losing power. Not only can downtime be experienced, but also damage to sensitive equipment.