

# PATRICK ENGINEERING INC.

## CAPABILITIES OVERVIEW

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Patrick has over 30 years of proven leadership and expertise in project management, specializing in the fields of engineering, planning, technology consulting and construction management. The Engineering News Record (ENR) has included Patrick in its ENR Top 500 for 16 consecutive years; and we've earned numerous industry design awards for the consistent quality of our work. Our expanding client roster includes key government agencies, public utilities and major corporations in a broad range of industries. Patrick has grown to employ more than 400 professionals in ten offices located throughout the Midwest, Pennsylvania, and Florida.



### Engineering Procurement & Construction Management

- Preconstruction Services
- Design/Build
- General Contracting
- Turnkey Project Management
- Project Controls
- Estimating & Scheduling
- Constructability Reviews
- Value Engineering
- Procurement
- Contract Bidding & Negotiations

### Transportation

- Highway/Railroad/Bridge Design
- Traffic Studies & Signal Design
- Railroad Crossing Studies
- Intermodal Facility Design
- Roadway Improvements
- Airfield Improvements
- Resident Engineering

### Civil/Structural Engineering

- Analysis & Design
- Stormwater Management
- Pump Stations
- Docks/Marine Structures
- Utilities/Water Supply/Wastewater
- Pipeline Design
- Grading & Drainage/Pavement
- Best Management Practices
- Permitting

### Geographic Information Systems (GIS)

- Web- and Field-Based Applications
- Database Design
- GIS Software Training
- Organizational Development
- Data Integration & Conversion
- Needs Assessments

### Mining

- Development Planning
- Infrastructure Design
- Permitting
- Reclamation Planning
- Post Mining Development

### Environmental

- Hydrogeologic Investigations
- Brownfield Remediation/RI/FS
- UST/LUST Management
- Solid Waste Management
- Stormwater/Groundwater Management
- Landfill Services
- Spill Plans/SPCC/SWPP
- Environmental Impact/Volume Statements

### Geotechnical

- Soil Investigations
- Foundation Design
- Retaining Structure Design
- Slope Stability/Stabilization
- Ground Improvement
- Sediment Investigation/Dredging
- Materials Management

### Surveying & Mapping

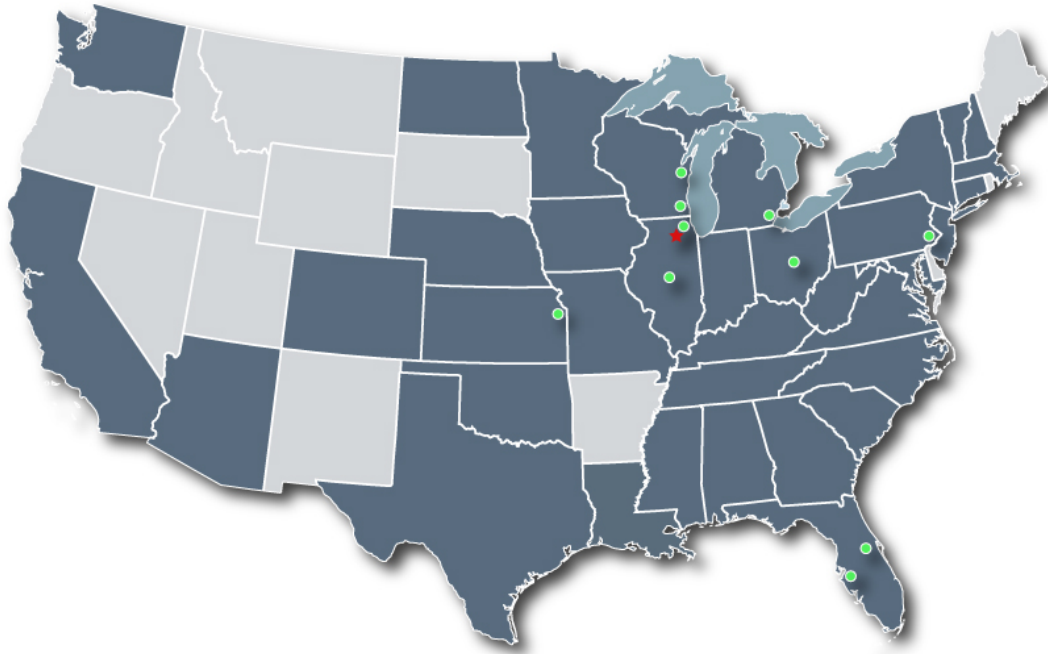
- GPS Control Surveys
- Geodetic Leveling Surveys
- Bathymetric Wetland Surveys
- Boundary/ALTA Surveys
- Wide-Area Monument Networks
- Easement Descriptions & Plats
- Topographic Mapping
- Height Modernization

### Electrical Engineering

- Arc Flash Analyses
- Short-Circuit Analyses
- Power Distribution Design
- Motor Studies & Controls
- Electrical Generator Sizing & Design
- Substation Design
- SCADA/Controls
- Energy Efficiency Studies

## OFFICE LOCATIONS

Patrick has locations nationwide to better serve our wide range of clients. **Below is a map indicating our office locations throughout the United States. States shaded blue indicate where Patrick has performed work.**



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### Illinois

4970 Varsity Drive  
Lisle, Illinois 60532-4101  
Phone: 630-795-7200 Fax: 630-724-1681

55 East Monroe, Suite 3450  
Chicago, Illinois 60603-5710  
Phone: 312-201-7900 Fax: 312-220-0722

300 W. Edwards Street, Suite 200  
Springfield, Illinois 62704-1907  
Phone: 217-525-7050 Fax: 217-525-7053

### Michigan

39500 Orchard Hill Place, Suite 200  
Novi, Michigan 48375  
Phone: 248-319-0690 Fax: 248-319-0691

### Ohio

4200 Regent Street, Suite 200  
Columbus, Ohio 43219  
Phone: 614-470-9750 Fax: 614-470-9054

### Pennsylvania

1285 Drummers Lane, Suite 200  
Wayne, Pennsylvania 19087  
Phone: 610-994-0865 Fax: 610-994-0866

### Florida

111 Second Avenue N.E., Suite 317  
St. Petersburg, Florida 33701  
Phone: 727-342-5800 Fax: 727-342-5801

801 International Parkway, Suite 500  
Lake Mary, FL 32746  
Phone: 407-573-0350 Fax: 407-573-0351

### Kansas

7500 College Boulevard, Suite 500  
Overland Park, Kansas 66210  
Phone: 913-279-9185 Fax: 913-279-9186

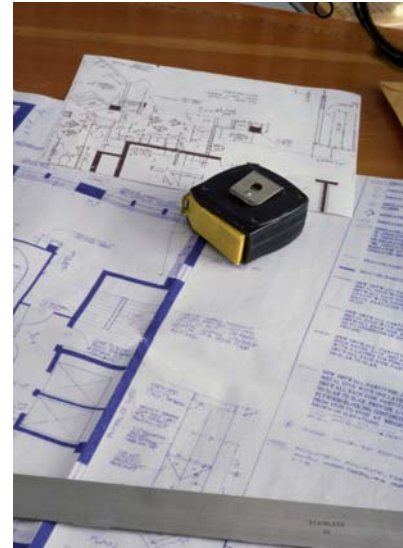
### Wisconsin

10101 Innovation Drive, Suite 450  
Milwaukee, Wisconsin 53226  
Phone: 414-771-0264 Fax: 414-771-0418

480 Pilgrim Way, Suite 1250  
Ashwaubenon, WI 54304  
Phone: 920-321-2330 Fax: 920-321-2331

## ENGINEERING/PROCUREMENT CONSTRUCTION MANAGEMENT CAPABILITIES

Patrick provides a full range of project management, planning, design, engineering and construction management services. Patrick typically serves process, as well as coordinating the efforts of specialty engineers and contractors. Patrick can provide various approaches to projects from traditional design/bid/build to design build including variations such as General Contractor with the owner or Patrick holding the contracts. Our experienced staff facilitates communication between all parties involved, resulting in an efficient and cost-effective turnkey project process. Projects are planned from initiation to leverage the experience of design professionals, construction managers and contractors. This produces reliable project cost estimates and schedules; and provides quality projects expeditiously at a reasonable cost.



### Preconstruction Consulting

- Define Project Requirements
- Document Review
- Value Engineering
- Construction Cost Estimating
- Schedule Preparation

### Engineering Design

- Planning
- Due diligence
- Preliminary
- Final

### Project Administration

- Coordinate Bid Process
- Project Documentation
- Coordinate Submittals
- Construction Cost Monitoring
- Schedule Maintenance
- Subcontractor Payments
- Change Order Review
- Progress Reporting

### General Contractor

- Contractor Coordination
- Material Procurement
- Construction Sequencing
- Project Safety Programs
- Material testing

### Post Construction Services

- Record Drawings
- Operation & Maintenance Manuals
- Warranty follow up

### Infrastructure

- Roadways
- Bridges
- Utilities
- Communication Systems
- Power Distribution Systems
- Power Generation

### Facilities

- Rail Yards
- Bulk Transfer Facilities
- Intermodal Facilities
- Airports
- Marinas
- Manufacturing Facilities
- Water & Wastewater Treatment

### Buildings

- Offices
- Garages
- Storage
- Multi-use

## TRANSPORTATION CAPABILITIES

Patrick is a premier provider of engineering services designed to meet a broad range of client needs. Our experienced team of professionals can target it all, from turnkey project implementation to highly dependable planning, design, procurement, management and construction services. We've applied our industry-proven expertise to customized project analyses; award-winning roadway and bikeway improvements; and rail yard terminal enhancements. Whether you're designing new infrastructure or enhancing an existing system, our results-driven combination of training, insight and dedication delivers safe, effective solutions.



### Highway & Bridge

- Bridge & Retaining Wall Design
- Roadway Improvements
- Intersection/Interchange Design
- Facility Planning & Design
- Feasibility Studies
- Traffic Studies
- Structural Inspections & Analyses
- Railroad Crossing Studies
- Intelligent Transportation Systems (ITS) Design

### Railroad

- Track & Layout Design
- Capacity Improvements
- Grade Separation Designs
- Railroad Crossing Improvements
- Support & Shop Facility Design
- Intermodal Facility Design
- Embankment Stability
- Bridge & Retaining Wall Design

### Project Support & Maintenance

- Drainage Studies
- Environmental Studies
- Material Inspection & Testing
- Inspections
- Permitting
- Structural Inspections & Analyses
- Building Design
- GIS and IT Services
- Electrical Engineering & Lighting Design

### Project Management & Planning

- Turnkey Project Management
- Seamless Coordination of Multiple Services & Specialties
- Planning & Procurement
- Construction Management

### Airports

- Airfields – Civil Engineering
- Airfields – Surveying

### Awards

- ACEC-Illinois Engineering Excellence Merit Award, 2007 (Reconstruction and Widening of Ronald Reagan Memorial Tollway)
- Illinois Roadbuilders Association Project of the Year, 2000 (I-90/Fox River to Kennedy Expressway)

## CIVIL ENGINEERING CAPABILITIES

Patrick offers a full range of geotechnical, environmental, and site development services including construction management and operations planning. Specific services include facility siting and design, Brownfield redevelopment, water management, and project permitting.



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### Geotechnical Investigations

- Soil Borings/Rock Core Analysis
- Subsurface Exploration
- Soil Strength Testing
- Slope Stability Analysis

### Foundations and Earth Retention Systems

- Soil Structure Interaction Analysis
- Seepage and Settlement Analysis
- Foundation Design
- Slope Stability

### Site Development

- Site Permitting
- Site Planning and Design
- Utility Layout

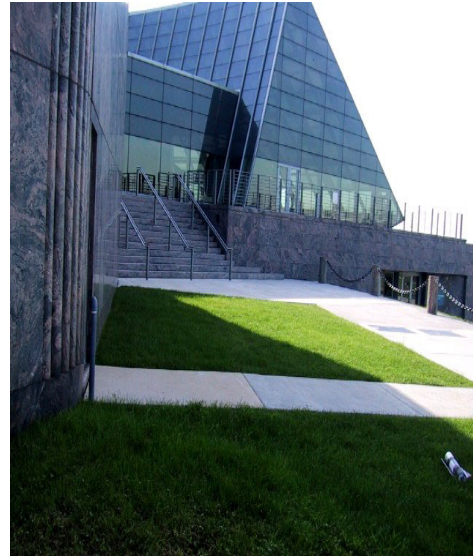
### Environmental Engineering

- Site Assessments and Remediation
- Design of Remedial Action Plans
- UST/LUST Management
- Feasibility Studies
- Risk Assessments



## STRUCTURAL ENGINEERING CAPABILITIES

Patrick's structural expertise is extremely diverse. Our professional staff provides a complete range of services to both the public and private sector, including city, county, state, and federal agencies and commercial, retail, recreational, and industrial clients. Patrick's structural team is dedicated to providing professional services that enable projects to be completed on time, within budget and in accordance with client expectations.



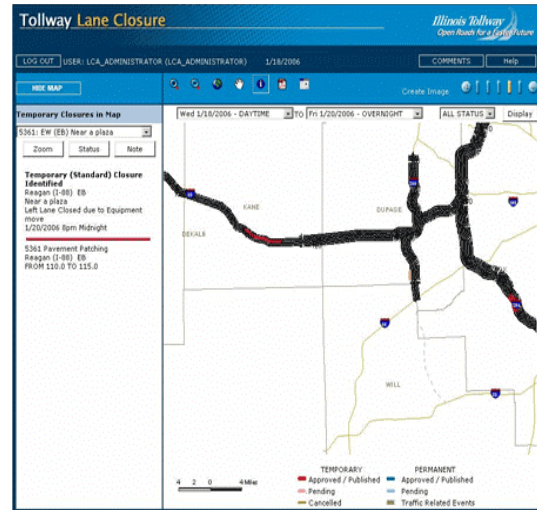
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- Bidding Assistance and Analysis
  - Bridges/Culverts Design
  - Building and Building System Analysis/Evaluation
  - Code Analysis
  - Construction Administration and Observation
  - Construction Document Preparation
  - Due Diligence Reports
  - Field Investigations, Code Inspection and Review
  - Power Distribution Facilities
  - Rehabilitation, Adaptive Reuse, and Historic Restoration
  - Retaining Walls
  - Survey Documentation of Existing Conditions

### Facilities Served

- Bridges
- Parks and Recreational Facilities
- Municipal
- Educational
- Transportation
- Historic Preservation
- Laboratories
- Office Buildings
- Renovation Projects
- Distribution Centers
- Retail Projects
- Manufacturing/Processing Facilities
- Maintenance Facilities

## GEOGRAPHIC INFORMATION SYSTEMS (GIS) CAPABILITIES

Patrick's highly experienced GIS team includes accomplished programmer/analysts, database design experts and computer scientists with a proven track record of success. With certified SQL Server and Oracle professionals and as an ESRI Business Partner, we can deliver a broad array of customized, cost-effective data collection/management solutions; database development services; GIS software training; Web-based application development; or all of the above – for a seamless solution that will help to make your business more effective.



### Specialized Services Include

- Business Oriented GIS Solutions
- Service Oriented Architecture Design and Integration
- Server-based Applications: ArcGIS Server®, ArcIMS®
- Distributed GIS Services: ArcWeb Services®, Web Services
- ArcSDE® (SQL Server, Oracle, DB2) Implementation Services
- GeoDatabase Design and Implementation
- Field Based GIS Applications
- Enterprise GIS Needs Assessments and Organizational Development
- Data Services (Conversion, Creation, Quality Control)
- GIS Software Training
- Intelligent Transportation Systems (ITS) Design



## ENVIRONMENTAL ENGINEERING & GEOSCIENCES CAPABILITIES

Patrick offers a full range of geotechnical, environmental, and site development services including construction management and operations planning. Specific services include facility siting and design, Brownfield redevelopment, water management, and project permitting.



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### Geotechnical Investigations

- Soil Borings/Rock Core Analysis
- Subsurface Exploration
- Soil Strength Testing
- Slope Stability Analysis

### Foundations and Earth

#### Retention Systems

- Soil Structure Interaction Analysis
- Seepage and Settlement Analysis
- Foundation Design
- Slope Stability

### Water Resource Management

- Reservoir System Analysis
- Design of Dams, Dikes, and Trenches
- Erosion/Sediment Control
- Groundwater Management
- Aquifer Computer Modeling and Yield Analysis
- Stormwater Design & Permitting
- Sanitary and Water Utility Systems Design

### Site Development

- Site Permitting
- Site Planning and Design
- Utility Layout

### Environmental Engineering

- Site Assessments and Remediation
- Design of Remedial Action Plans
- UST/LUST Management
- Feasibility Studies
- Risk Assessments
- Brownfield Remediation

### Solid Waste Management

- Construction Quality Assurance
- Landfill Design
- Gas System and Leachate Collection System Design

## GEOTECHNICAL ENGINEERING CAPABILITIES

Patrick provides geotechnical engineering services to owners, designers and contractors to include identifying site soil conditions and providing solutions to difficult soil interaction problems. Our team of engineers and technicians provide innovative, cost effective solutions and recommendations for a wide range of improvements and provide construction administration and testing services through project completion.



### Investigation Capabilities

- Exploration Programs
- Soil Surveys
- Soil Borings
- Test Pits
- Bulk Soil Sampling
- Rock Coring
- Sediment Sampling
- Laboratory Testing

### Engineering Analysis & Design

- Due Diligence Studies
- Bearing Capacity Analysis
- Settlement Evaluation
- Pile & Caisson Foundations
- Slope Stability Analysis
- Seepage Analysis
- Ground Modification and Improvement Design
- Bridge Foundation Studies
- Earth Retaining Structures
- Underground Tunnels
- Dams and Reservoirs
- Horizontal Drilling Analysis
- Groundwater Cutoff Walls

### Industries Served

- Roads and Highways
- Railroads
- Power Plant/Substation
- Refineries and Pipelines
- Mining
- Site Development
- Manufacturing Facilities

### Instrumentation

- Physical Monument Survey
- Settlement Monitors
- Inclinerometers
- Pressure Testing
- Packer Testing
- Piezometers
- Pump Testing
- Groundwater Observation Wells
- Load Testing

### Materials Inspecting & Testing

- Soil Density Testing
- Subgrade Soil Inspection
- Proof Rolling of Subgrades
- Inspection of Drilled Piers and Caissons
- Pile Installation Inspection
- Concrete Materials Testing and Inspection
- Asphalt Density Testing
- Batch Plant Inspections
- Inspection of Reinforcing Steel
- Masonry Testing
- Steel Bolt and Weld Connections

## SURVEY & MAPPING CAPABILITIES

Patrick's survey and mapping services are conducted by accomplished professional land surveyors, geodetic surveyors and OSHA-certified personnel who deliver dependable data on even the most complex projects. We have immediate access to multiple sets of the most modern equipment, including First-Order levels, GPS receivers and Robotic Total Stations. This helps us provide a balanced combination of specialized knowledge, resources and expertise, leading to effective solutions that help keep our clients on the map.



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### Specialized Services Include

- Geodetic Leveling Surveys
- GPS Control Surveys
- Boundary/Alta Surveys
- Aerial Mapping Control Surveys
- Bathymetric Wetland and Archaeological Surveys
- Right-of-Way Surveys
- Easement Descriptions
- Plats of Easements
- Land Boundary Expert Witness Services
- Construction Layout Surveys
- Wide-Area Monument Networks
- Topographic Mapping

## ELECTRICAL ENGINEERING SERVICES CAPABILITIES

Patrick offers a wide range of electrical system services including power distribution, lighting, and special systems for commercial/industrial office buildings, educational facilities, healthcare facilities, and laboratories. We also specialize in large industrial design including on-site generation, switchgear design, on-site substation design, and power system studies associated with industrial facilities.



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### Power Distribution Design

- Service Entrance Sizing and Design
- Power Panel and Lighting Panel Design
- Transfer Switch and Equipment Grounding Design
- Emergency Generator Design
- Energy Management Systems

### Lighting System Design

- Facility Lighting for All Building Types
- Parking Lot/Structure Lighting
- Architectural Lighting
- Lighting Design and Photometric Calculations
- Dimming Systems and Special Lighting Systems
- Emergency Lighting
- 3-D Rendering

### Building Systems Design

- Fire Detection and Alarm Systems
- Security Systems
- CCTV and Nurse Call Systems
- Structured Cabling Design

### Large Industrial Design

- Medium and Low-Voltage Distribution
- Switchgear Design and Layout
- Protective Relaying and Breaker Coordination
- Motor Control Design
- Variable Frequency Drive Design
- On-Site Generation
- On-Site Substation Design

### Power System Studies

- Short-Circuit Studies per ANSI standards
- Protective Device Coordination
- On-Site Substation Ground Grid Analysis
- Harmonic Analysis and Filter Design
- Motor Starting and Acceleration Studies
- Power Flow Studies

### Emergency/Back-Up Systems Design

- Uninterruptible Power Systems
- Stationary Battery Sizing
- Central Inverter Systems

## Ronald Reagan Memorial Tollway (I-88) Mainline Roadway Widening and Reconstruction Illinois Tollway



### Services Provided

- Roadway Engineering
- Structural Engineering
- Drainage Engineering
- Environmental Investigation
- Geotechnical Investigation
- Surveying

Illinois Tollway retained Patrick Engineering Inc. (Patrick) for the design and preparation of a Pre-Concept and Concept Report (Phase I) and contract plans and documents (Phase II) for the Ronald Reagan Memorial Tollway (I-88) from M.P. 123.4 (Illinois Route 59) to M.P. 127.5 (Naperville Road). Work included the addition of one mainline lane in each direction, plus auxiliary lanes where required from Illinois Route 59 to Naperville Road; interchange ramp modifications at the Winfield and Illinois Route 59 interchanges; widening of the structures over Winfield Road and the West Branch of the DuPage River and replacement of the Mill Street cross-road structure.

Phase I and Phase II engineering services provided by Patrick included the development and preparation of a Pre-Concept and Concept Report, which involved mainline and interchange capacity analysis; operational and accident analysis; development of proposed geometrics; drainage report, drainage design, hydraulic analysis and report, and public involvement and preparation of contract plans and documents.

Other services included environmental evaluation, survey, geotechnical investigations, and preparation of lighting plans and traffic signals plans.



## County Farm Road/Union Pacific Railroad Grade Separation DuPage County Division of Transportation



### Services Provided

- Construction Services
- Railroad Engineering
- Transportation Engineering
- Bridge Design

Patrick Engineering Inc. was retained to assist DuPage County in reducing motorist delays and railroad crossing safety concerns by eliminating the at-grade railroad crossing with the construction of a railroad underpass structure at County Farm Road and the Union Pacific Railroad crossing. The project included construction of a temporary roadway runaround, and a railroad shoofly with a temporary bridge structure to maintain both roadway and railway traffic during construction and eliminate the need for a second month of road closures. Construction included new railroad underpass structure and approach retaining walls, as well as a pump station, retention ponds, and the reconstruction of ½ mile of County Farm Road.



## Joliet Intermodal Facility Union Pacific Railroad



### Services Provided

- Owners Representative
- Construction Services

Patrick Engineering Inc. is providing engineering support to the Union Pacific Railroad and serving as the Owners Representative, assisting with the construction management for the construction of a new major Intermodal Terminal on a 780 acre site in Joliet, Illinois. The facility will include container/trailer loading/unloading strip tracks, support yard, administration office building, automated gates for truck processing, maintenance facilities, site lighting and utilities. The services provided by Patrick include observation of mass grading by site developer, construction observation and assistance with construction management, review contractor pay requests, scheduling, documentation, and plan reviews.

## Wisconsin Height Modernization Wisconsin Department of Transportation



### Services Provided

- Precise Geodetic Leveling
- Report Submittal to NGS

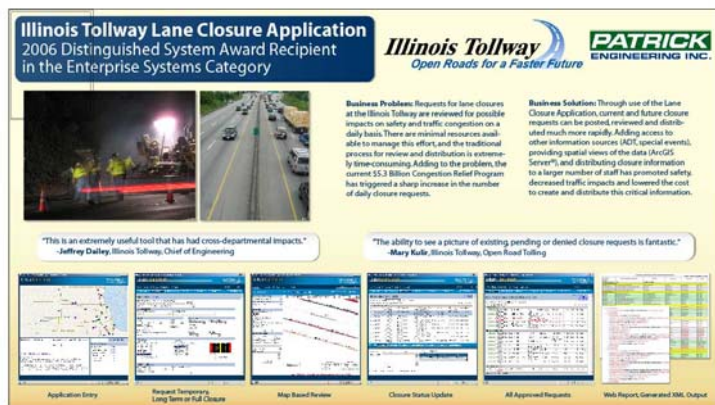
The State of Wisconsin is currently performing a Height Modernization program over the entire state. This program is being managed by the Wisconsin Department of Transportation (WisDOT). The ultimate goal of Height Modernization is to allow GPS technology to derive elevations as accurate as conventional terrestrial surveys. The Height Modernization is expected to benefit federal and state agencies as well the general public. Patrick Engineering Inc. was retained by WisDOT to provide geodetic leveling for Phases Four, Five, and Six of the program. The State is currently in its sixth year of a projected 10 year program.

Precise geodetic leveling was performed along over 4,500 double-run kilometers. All-terrain vehicles were used to perform motorized leveling to expedite production. Over 2,000 existing and new monuments were surveyed.

Leveling was performed according to Federal Geodetic Control Committee (FGCC) Standards and Specifications for Second Order, Class I leveling. This involved section misclosures not to exceed 6 mm per the square root of the distance in km.

Patrick also created level line reports that will be submitted to National Geodetic Survey (NGS) to be included in the National Spatial Reference System (NSRS).

## Lane Closure Tracking Application Illinois Tollway



**Winner of the 2007 ACEC-Illinois Engineering Excellence Merit Award**

**Winner of the 2006 URISA Exemplary Systems in Government Distinguished Systems Award**

### Services Provided

- System Requirement Specification Creation
- ArcGIS Server Web-Application Development
- Application Training and Implementation
- Active Directory Security Integration
- Application Design Documentation
- Database Design
- GIS Data Creation
- Custom Web-Based Transportable

Lane closures allow the Illinois Tollway to perform maintenance and provide improvements to the Tollway infrastructure in a safe and efficient manner. The processes of lane closures were handled in a time consuming, labor intensive, paper-based process. The automation of the lane closure system was motivated by three factors: the need to manage a larger number of closures (due to Illinois Open Road Tolling Projects), the desire to distribute the workload among Tollway personnel, and the need to create a system with fewer limitations on request submission requirements.

Patrick Engineering Inc. (Patrick) developed the lane closure tracking application to offer automated and spatial analytical (GIS) system capable of managing lane closures. The application also provides approval of requested lane closures within the Illinois Tollway. In addition, the lane closure tracking application distributes the workload for closure approvals.

Patrick's team conducted research into the required length of roadway to be viewed in order to determine closure viability, the average screen size and resolution of the Tollway user, and basic directional shifts in the Tollway to determine a fictitious view of Tollway lanes within the applications mapping component.

Patrick delivered the project and implemented changes requested orderly and quickly. The ability for the Tollway to produce a daily lane closure report in less than half the time previously taken was a large cost savings. Implementation of the electronic output created by the lane closures application will save 3-6 hours a day for TIMS (Traffic and Incident Management System) operators.

### 36-inch-diameter Gas Transmission Line Elgin to Volo and Troy Grove Northern Illinois Gas



#### Services Provided

- Hydrogeologic Investigation
- Stormwater Analysis

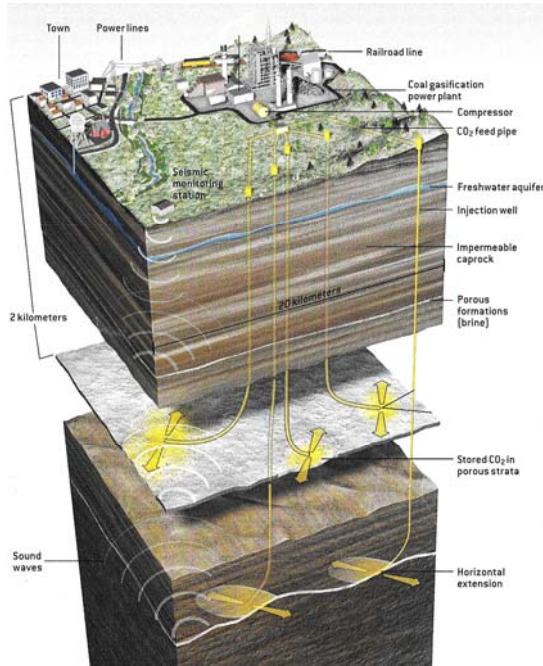
Patrick provided design and construction phase services for this two-part, \$65-million project. Hydrogeologic investigations during the design phase provided the client with engineering data to verify that the trenching operations during construction would not sever any pervious soil layers and consequently drain any of the project's 26 jurisdictional wetlands. This information was used to obtain the project's individual 404 Permit from the U.S. Army Corps of Engineers. The combined 44 miles of pipeline in the two projects required an Illinois Environmental Protection Agency NPDES Storm Water Permit for construction site activities.

Additionally, Patrick prepared Storm Water Pollution Prevention Plans for each of the two sites; performed on-site inspection services to assure Contractor adherence to the Plans; and, assisted the client in quality assurance, quantity measurements, Agency communication and on-site civil engineering design services.



## Future Site Characterization for FutureGen

### Illinois Department of Commerce and Economic Opportunity & Illinois Clean Coal Institute



#### Services Provided

- Coordinated ALL written submittals to the USDOE
- Analyzed FutureGen Industrial Alliance (Alliance) Request for Proposal
- Evaluated 33 sites in Illinois based on qualifying and scoring criteria
- Geographic Information Systems (GIS)
- Site Proposal Preparation (4 sites)
- Prepared Environmental Information Volume (EIV) for floodplain, seismic stability, cultural resources, threatened and endangered species, water, air, and land for two finalist sites.
- Railroad Economic Analyses
- Rail Loop Design
- Site Plans
- Cost Estimates

Patrick Engineering Inc. (Patrick) worked with the State of Illinois staff to evaluate potential sites for the \$1 billion FutureGen project, an initiative to build the world's first coal-based, zero-emissions electric power plant and hydrogen production facility, capable of generating 275 megawatt. FutureGen will capture carbon dioxide emissions and sequester it permanently deep underground.

Patrick compiled technical and geographic information into coherent site summaries that were submitted to the U.S. Department of Energy (USDOE) and the Alliance. Patrick coordinated the evaluation of numerous criteria including seismic activity, endangered species, highway access, rights-of-way, water resources, air pollution, attainment areas, electric transmission capability, and most importantly, each area's potential to sequester carbon dioxide 5,500 to 8,500 feet below ground in porous and saline-saturated sandstone formations. Patrick and State staff worked closely together preparing final reports for the four sites in east central Illinois under a very tight timeframe to meet Alliance RFP requirements. Patrick coordinated the preparation of the EIV, which was used by the USDOE to prepare an Environmental Impact Statement (EIS). For the EIV, Patrick staff conducted field studies and prepared reports on soils, air quality, climate and meteorology, ground and surface waters, wetlands, aquatic and terrestrial ecologies, cultural and visual resources, noise, non-potable water supplies, electrical transmission load capacity and waste management. Patrick also assisted the Illinois State Geological Survey in preparing the subsurface geology sections by developing a CO<sub>2</sub> Release Mitigation Program Plan and contracting for a seismic line analysis at each site. To complete the EIV, Patrick conducted an archeological field study and an analysis of the seismic line data.

In the "best value" phase, Patrick initiated an electric transmission network interconnection study through MISO (Midwest Independent Systems Operators) to determine the requirements and cost to connect FutureGen to the utility network at both sites. Patrick also prepared preliminary site designs, reservoir analyses, stormwater analyses, railroad analyses, and preliminary cost estimates for site development. Patrick managed site studies including aerial photography and topography, surveying, and geotechnical investigations. Prepared the appropriate studies for the power plants and the utility corridors, including gas, water, and Co<sub>2</sub> pipelines, and electric transmission lines.

## Indiana Harbor CDF South Cutoff Wall Investigation U.S. Army Corps of Engineers



### Services Provided

- Geotechnical
- Surveying
- Drilling
- Sediment Sampling

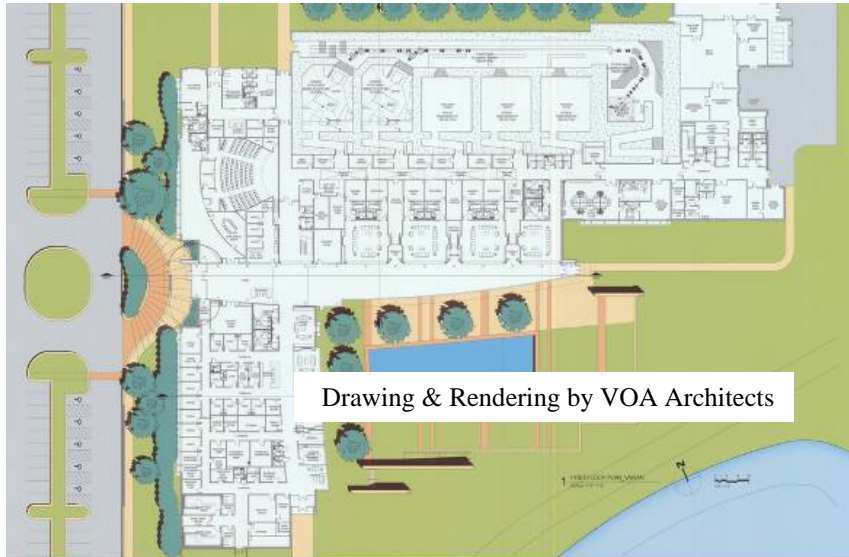
Patrick Engineering Inc. (Patrick) performed a geotechnical investigation to characterize subsurface soil conditions for the installation of a 4,000 l.f. Waterloo Barrier at the Indiana Harbor and Canal Confined Disposal Facility (CDF) in East Chicago, Indiana. When complete, the 168-acre CDF will be used to safely contain contaminated materials dredged from the nearby Indiana Harbor and Canal. Patrick's scope of services included the preparation of investigation work plans, surveying, drilling and sediment sampling, disposal of Investigation-Derived Wastes, and preparation of a comprehensive Investigation Report. Information obtained will be used to develop plans and specifications for the construction of the CDF south cutoff wall.

A total of 29 soil borings were made in the canal along the proposed cut off wall alignment. Twelve of the borings were made using a specially equipped drill rig using hollow stem augers. The drill rig was equipped with a work platform that allowed the boring to be drilled in the canal. Seventeen borings were drilled using Eijkelkamp hand augers and piston sampler from a pontoon boat. These borings were drilled and sampled to depths of 15 to 31 feet below water surface. Soil samples were obtained from both methods for geotechnical and analytical laboratory testing.



## NIU Proton Therapy Center-DNTP Centerpoint properties

LEED Certified Project-Silver Rating Target



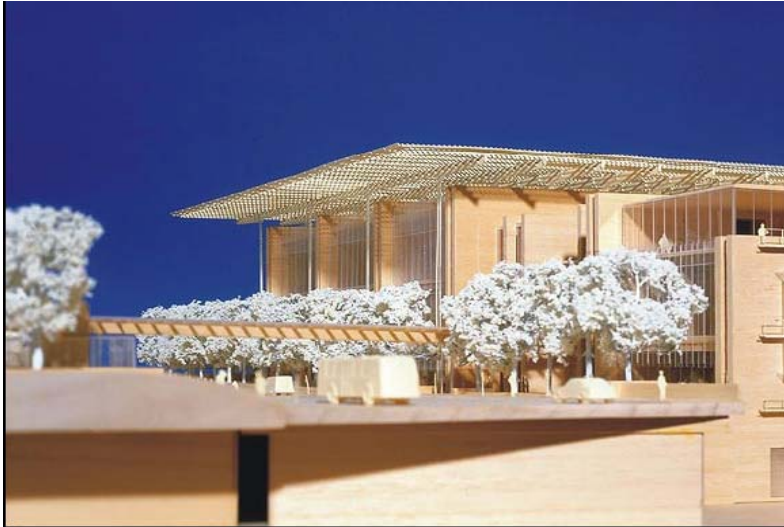
### Services Provided

- Stormwater Runoff and Control
- Storm Sewer Systems
- Soil Erosion and Sediment Control
- Lighting Plan
- Permitting
- Mass Grading Plan
- Pavement Parking Design
- Site Surveying
- Site Development
- Bridge Design

Patrick is part of the project team with the architect and owner developing the Northern Illinois University (NIU) Proton Therapy building. The Proton Therapy building is the first of its kind in the state of Illinois and will be located in the DuPage National Technology Park in West Chicago, Illinois. The facility will boast 110,000 s.f. of space including areas for research, training, and education.

Patrick provided site survey, civil engineering design services, and design for a pre-cast arch bridge while adhering to a highly aggressive project schedule, mandated by strict governmental requirements. In addition to the civil engineering services Patrick provided, Patrick and the owner coordinated with multiple regulatory agencies for approval of the project.

## Civil Engineering Services for North Wing Addition The Art Institute of Chicago



### Services Provided

- Civil Site Design
- Structural Engineering
- Transportation
- Engineering
- Electrical Engineering
- Stormwater Management

Patrick Engineering Inc. (Patrick) is providing civil engineering services for the 230,000-s.f. north wing addition to the Art Institute of Chicago designed by Renzo Piano Building Workshop. This complex project involves providing new infrastructure to feed the new building and the existing Art Institute campus. The international project team includes 5 architectural and engineering firms utilizing a web page production system. Patrick created design and construction documents for the \$200,000,000 project. Construction of the new addition is scheduled to begin in June 2005 with completion and occupancy targeted for the fall of 2009.

## Power Systems Study BP Products North America



### Services Provided

- Short circuit and coordination for 30+ power distribution centers (PDC's)
- Relay Settings (preparation of detailed electronic relay setting files)
- Arc Flash studies for the PDC's
- Review of protection and control circuits
- Coordination of other subconsultants and management of consistent protection philosophy
- Large motor starting studies and consultation on starting methods
- Generator protection settings and interface to existing power system

Patrick Engineering Inc. (Patrick) is the lead analytical engineer and relay study coordinator for the BP Whiting refinery expansion encompassing over 200MW of site load. This \$4.8 billion refinery upgrade project is the largest of its kind. This work includes coordinating all sub-consultants and electrical protection for the new process units and 138kV ring bus expansion.

Patrick continues to provide the critical protection settings and recommendations for implementation by the refinery. The relationship that has been built is based on trust knowing that Patrick provides recommendations that have the best interest of the refinery in mind. The service that Patrick provides requires a unique understanding of the power system including the operational constraints of a large complex facility. Our ability to understand and recognize the issues that affect the recommendations we provide sets us apart from the competition. The solutions need to be tailored to increasing the reliability of the protection system while still being practical to implement. The size of the refinery requires Patrick to plan and schedule the possible solutions during routing maintenance periods that may be as far as 6 to 12 months in the future. This adds extreme complexity to the management and implementation of these recommendations