

Lu Engineers was founded in 1980 for the purpose of providing consultant services in the fields of civil and environmental engineering to government, private companies, utilities, developers, and the general public.



Lu Engineers office, Penfield, NY

Our services range from project inception (investigative studies and planning) through the design/development of construction drawings (plans, specifications, construction estimates, and construction bid documents) and construction phase services (bid phase, construction administration, monitoring and inspection, quality assurance, and project close-out/start-up).

Our staff of over 55 professionals, engineers, environmental scientists, surveyors, geologists, technicians, and administrative specialists provides a broad range of experience. Areas of experience include:

- Transportation
- Construction Support Services
- Structures
- Water Distribution and Treatment
- Wastewater Collection, Conveyance and Treatment
- Site Development
- Surveys
- Environmental Assessment
- Environmental Remedial Services
- Facilities

SERVICES PROVIDED

Specialties:

- *Airports*
- *Brownfields*
- *Highways and Streets*
- *Bridges*
- *Traffic*
- *Pipelines*
- *Pumping Stations*
- *Industrial Pretreatment*
- *Agricultural Waste*
- *Infiltration and Inflow*
- *Grading and Drainage*
- *Utility Services*
- *Buildings*
- *Tunnels*
- *Asbestos Abatement*
- *Air Quality*
- *Noise Monitoring*
- *Wetland Delineation*
- *Hazardous Waste*
- *EAS & EIS*
- *Permitting*
- *Health and Safety*

SELECTED LIST OF CLIENTS

Federal

Department of the Air Force
Department of the Army
Department of Veterans Affairs
United States Postal Service
Air National Guard

State

NYS Department of Environmental Conservation
NYS Department of Transportation
NYS Office of General Services
NYS Facilities Development Corporation
State University Construction Fund (SUCF)
NYS Office of Parks, Recreation & Historic Preservation

Authorities

NYS Thruway Authority
Dormitory Authority of the State of New York
Monroe County Water Authority
Rochester-Genesee Regional Transportation Authority
Niagara Frontier Transportation Authority
Northumberland County Airport Authority

County

Monroe County Department of Engineering/Planning
Monroe County Department of Transportation
Cattaraugus County Highway Department
St. Lawrence County Highway Department

Municipal

City of Rochester	Town of Henrietta
City of Corning	City of Ogdensburg
Village of Newark	City of Batavia
Town of Chili	Village of Penn Yan

Industry

Griffith Energy	ENI
Barclay & Fowler	Mobil Oil Corp.
Townsend Oil	Lyons Asphalt Products
Unisource	Ultralife Batteries
Wegmans	Tyco Plastics

Developers

Mark IV Construction
Philippone Associates
The Nichols Team

LANDFILLS

Newport Research Facility, Rome Research Site, Rome, NY

Lu Engineers conducted the removal of hazardous and petroleum contaminated wastes in this abandoned landfill. Closure of this landfill is being coordinated with the NYSDEC. Lu Engineers is also installing and operating an in-site total fluids extraction remediation system at this site.



Site Investigations

Permitting

Landfill Design

Landfill Closure, Post-Closure and Site Reuse

Construction Management



Rush Landfill, Rush, NY

Lu Engineers provides inspection and monitoring services for NYS Office of General Services. Biweekly site inspections of the landfill and surrounding areas are conducted. All monitoring is conducted in accordance with NYCRR Part 360 regulations for baseline parameters.

Wellsville-Andover Landfill, Remedial Investigation, Allegany County, New York

Lu Engineers provided oversight for drilling activities on a Phase II remedial investigation at this NYSDEC Superfund site underwent. As part of the study, 25 groundwater monitoring wells and piezometers were installed at and around the site. Our services included securing bids, overseeing installation of wells and piezometers and providing field program reports entailing geological boring logs, well as-bults, well specification and other relevant drilling information.



Phase I and II Environmental Baseline Survey, Rome, NY

The US Air Force Research Site/ IFOVC contracted Lu Engineers to conduct an Environmental Baseline Survey of each of its properties located at the former Griffiss AFB. This project included seven parcels of land that contain a total of 15 occupied buildings. Lu Engineers completed an innovative, modular format for the survey to facilitate future sale of portions of the Griffiss property. The EBS included both Phase I research inspections and screening as well as sampling/ testing and remedial design and implementation.



Environmental Baseline Surveys

Environmental Assessments

Sampling & Analysis

Asbestos and Lead Surveys

Remedial Design

Design/Build



Phase I and II Environmental Baseline Survey, Youngstown Research Facility, Porter, NY

Lu Engineers conducted an EBS on a 98 acre former Nike missile base including underground missile silo facilities, underground petroleum storage tanks, hazardous substances and non-hazardous waste disposal. The EBS included sampling and analysis of groundwater, soils and other media. Lu Engineers designed and implemented multiple remediation projects to bring the facility into environmental compliance for property transfer. Design/build remediation of investigation derived wastes was also conducted under this contract.

Phase II Environmental Baseline Survey, Newport Research Facility

Lu Engineers prepared a Phase II Environmental Baseline Survey for the Air Force Research Laboratory at the Newport Research Facility. The facility consists of two parcels of property at Tanner Hill and Irish Hill in the town of Newport, Herkimer County, New York. Newport is an active facility currently used to gather antenna pattern and coverage on small tactical aircraft. The scope of services included identification of contaminants in structure, soil, and groundwater, list of compliance issues and corrective actions, developed cost estimates for correction alternatives, and prepared recommendations. The potential presence of lead based paint and radon gas was also assessed.



**Northeastern Security Services,
Investigation & Remediation,
Rochester, NY**

Lu Engineers conducted a Phase I and II environmental assessment of this former commercial office and vehicle pool headquarters. Lu personnel observed significant contamination upon removal of gasoline dispenser underground gasoline storage tank and installed soil vapor extraction system. We provided all necessary system operation and maintenance services, as well as sampling and emissions data compilation and evaluation. Lu Engineers was able to close this spill with NYSDEC concurrence within 3 months. The site was redeveloped for use as a



Environmental remediation

Underground Tank Removal

Monitoring Well Installation

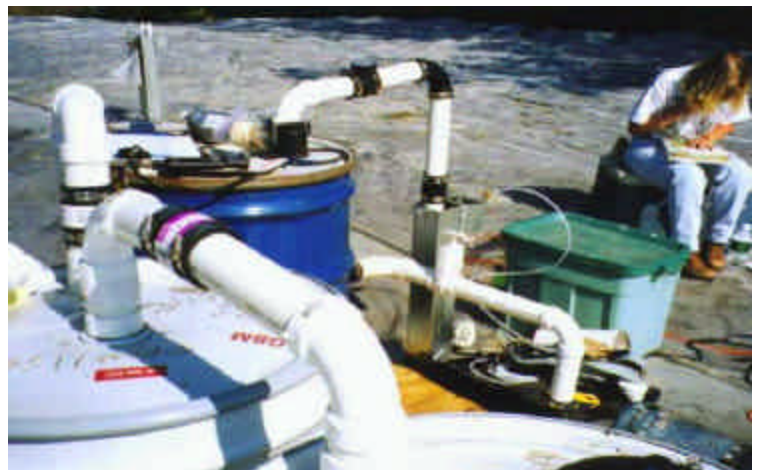
**Site Assessment, Remediation and
Tank Closure, Ruby Property,
Ontario County, NY**

Lu Engineers was retained by a private developer to assure that fuel oil and gasoline tanks were closed according to State regulations. The property was originally an abandoned gasoline service station and trailer park. The project required location, identification and removal of four underground storage tanks and associated piping. Direct push and drilling was used to evaluate off-site migration of gasoline contamination from an adjacent contaminated site. Lu Engineers also sampled septic system sludge and leach fields to determine potential contamination and closure of an inactive potable water supply well.



**Soil Vapor Extraction Pilot Test, Dearcop Farm
Inactive Hazardous West Site, Gates, New York,
NYSDEC Division of Hazardous Waste Remediation**

Lu Engineers designed and conducted pilot study for environmental remediation of this site by soil vapor extraction. The project involved the installation of monitoring wells, nested piezometers and an impermeable barrier at the subject site. Testing was conducted using Lu Engineers' own portable vapor extraction unit. Soil vapor containing chlorinated solvents was sampled and tested on site. System parameters including temperature, vacuum level, flowrate, water elevations and containment levels were monitored constantly to determine ideal operating conditions.



Cultural Resources Management Plan for Air Force Research Laboratory facilities at Rome, Verona and Newport, NY

Lu Engineers developed a Cultural Resources Management Plan for the AFRL facilities at Rome, Verona and Newport. The scope of services included a cultural resources inventory of prehistoric, historic and mapping resources, development of compliance procedures and preservation/mitigation strategies, creation of a Standard Operating Procedure for Cultural Resources Management and report preparation.



Entrance to Youngstown Research Facility – a former Nike Missile Base

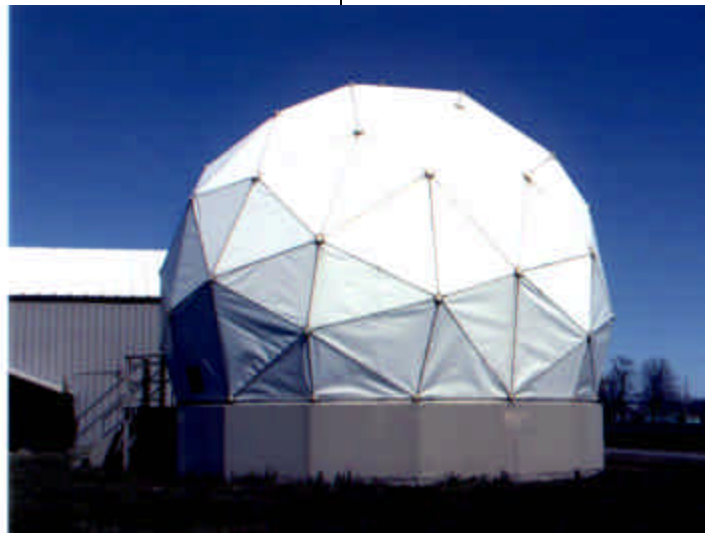
Cultural Property Survey , Stockbridge Research Facility, NY

Lu Engineers provided consultation for the determination of traditional/cultural concerns at Stockbridge Research facility as expressed by the Oneida Indian Nation. The goal of the study was to open up a constructive avenue of communications with the Oneida Nation and determine the existence or absence of traditional/cultural properties located at the facility using historical data, cultural anthropology and folklore. Lu Engineers prepared a work plan for an ethnographic study of the facility, and initiated contact with the Oneida Indian Nation for discussions regarding the project.



Archaeological Survey, Mapping and Records, Geographically separated units, NY - Air Force Research Laboratory

Rome Laboratory, formerly Griffiss Air Force Base, retained Lu Engineers to develop a comprehensive program for “locating, inventorying and nominating” cultural resources for listing in the National Register of Historic Places to comply with the National Historic Preservation Act. Specific work tasks included a detailed background/records search, site inspection, development of a methodology/ sensitivity assessment for the following GSU sites: Ava, Verona, Tanner Hill, Irish Hill, Stockbridge, Forestport, and Tummonds Hill.



Cultural
resources/
Archeologic studies

**US Air Force Research Site
Asbestos Survey, Management
and Operations Plan, Asbestos
Survey, Rome, New York**

Lu Engineers was retained by the US Air Force Research Site to conduct a survey of 47 buildings for the presence of asbestos and hazardous materials. We prepared an Asbestos Management Plan and an Operation and Maintenance Plan for the former Griffiss Air Force Base. The work scope included a room by room inspection of impacted areas, collection of nearly 400 building material samples for asbestos analysis and review of record drawings.



Rome Research Site, Aerial View

**Asbestos and
lead based paint**

Site Inspection

Site Assessment

Materials Sampling

Asbestos Abatement Design

Construction Specifications

Specific Variance Requests

Air Sampling

**Asbestos/Lead Removal
Monitoring**



**Renovation of Dental Service and Clinical
Laboratory, VA Medical Center,
Canandaigua, NY**

Renovations on the third floor of Building 1 required that an asbestos survey, collection of bulk samples for asbestos content determination, and abatement design be completed. Primary asbestos impacts were pipe wrap above plaster ceilings on the second and third floor, and floor tile on the third floor. Additional area impacts were on the basement level and the crawl space below. Phased removal design was a priority to allow for relocation of personnel in the Clinical Laboratory, Dental Service and Medical Managed Care offices. Abatement design included plan and specification development as well as cost estimates during design submission stages.

**Monroe County Hall of Justice, Rochester,
New York**

The Hall of Justice building is a multi-story concrete block building located above a below grade multi level parking garage. Lu Engineers performed an inspection of the facility for hazardous substances, including lead based paint and PCBs. Services performed on this \$14 million project included asbestos assessments, collection of building materials, record drawing review, development of plans, specifications and construction cost estimates, development of specific variances, construction administration and project monitoring and inspection. Lu Engineers also presented informational seminars and produced handouts for the building's occupants.

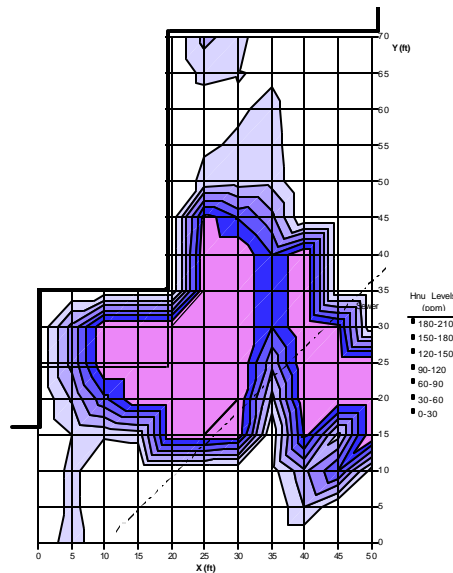


BROWNFIELD INVESTIGATIONS

Voluntary Cleanup of NYSDEC IHWDS, Ontario County, New York

This project began with a standard Phase I Environmental Site Assessment that led to a limited Phase II investigation. The initial Phase II work included sampling of surface soils and on-site pond sediments. Results from this investigation showed elevated levels of several heavy metals and volatile organic compounds (VOCs). The findings were reported to the NYSDEC and a workplan for a Remedial Investigation/Feasibility Study was prepared. The workplan was approved and an Administrative Consent Order issued. The Remedial Investigation (RI) included:

- *Completion of a grid based soil boring program to identify the vertical and horizontal extent of compound migration*
- *Identification of soil concentrations using an on-site mobile laboratory*
- *Installation of eleven groundwater monitoring wells*
- *Aquifer testing*
- *Residential well sampling*
- *A risk assessment*
- *Fish and wildlife impact analysis*



Color graphics are used to provide readers with a virtual concept of existing site conditions

A Feasibility Study (FS) was completed to determine the most appropriate remediation options for each area of the site. During this part of the project numerous remediation technologies were evaluated using an objective scoring matrix system established by the NYSDEC. Based on the findings of the FS, remedial alternatives were selected for each area. The NYSDEC approved of the options and a public meeting was held to discuss public concerns with the program. After final approvals from all parties were received, the remediation systems were designed and installed.

Land Use Planning

Site Investigation & Cleanup

- Phase I & II Site assessments
- Hazardous Materials Surveys (Asbestos, PCBs, Lead Mold)
- Hydrogeologic Investigations
- Voluntary Cleanup Action Plans
- Interim/Final Remedial Design
- Groundwater Containment
- Total Fluids Extraction
- Operation and Maintenance
- Construction Quality Assurance

Site Restoration

- Site Development
- Construction Administration
- Construction Inspection
- Feasibility Studies
- Foundation Design
- Site Lighting / Utilities
- Storm Water Drainage
- Surveying
- Wetland Delineation/ Mitigation

**Investigation and Cleanup Under Stipulation Agreement,
Livingston County, New York**

A Phase I ESA was completed to facilitate the development of a former automobile service facility and gasoline station in Conesus, New York. The prospective purchaser proposed to develop the property into a Marina. Phase I findings indicated the presence of four underground storage tanks and an on-site drywell that reportedly received waste oil. A Phase II Investigation was completed to determine potential impacts on site soils and groundwater.

Phase II tasks included:

- Removal of four underground gasoline and diesel fuel tanks that were determined to be leaking
- Closure of the drywell
- Delineation of the horizontal and vertical extent of subsurface petroleum migration
- Preparation of a workplan that was approved by the NYSDEC for the on-site bio-remediation of impacted soils



Bio-Pile Construction, Conesus Auto Service Facility

After the workplan was approved and a stipulation agreement was negotiated, the bio-remediation system was designed and two large bio-piles were constructed on the property. The construction included the installation of double liners, a soil ventilation system, and soil nitrate enhancement. Over time the bio-piles were turned and additional nitrates were added to facilitate hydrocarbon breakdown. Approximately one year later the piles were approved for closure by the NYSDEC and a no further action letter has been issued.

Regional Traffic Operations Center (RTOC), Rochester, Monroe County, NY

Lu Engineers was retained by Monroe County to evaluate potential environmental concerns associated with redevelopment of this property. The RTOC was constructed on lands previously used as an asphalt plant, metal finishing facility, automobile transmission maintenance facility and an above ground fuel storage depot. The former presence of industrial operations warranted subsurface investigation including over fifty soil borings and multiple groundwater monitoring wells.

Environmental investigations concluded a Phase II environmental assessment was required. Site remediation activities included establishment of a sample grid and performance of an electronic magnetic survey to determine the location of buried features; performing soil-vapor surveys; providing samples for laboratory testing; laboratory analysis; providing recommendations for design abatement; development of construction abatement drawings; coordination with NYS Department of Environmental Conservation; and monitoring of the construction activities.

XLI Corporation, City of Rochester, NY

XLI Corporation, located in Rochester, planned to invest \$4.3 million to transform an undeveloped brownfield into a new, 31,800-square-foot headquarters and manufacturing facility in the City of Rochester's Empire Zone. Lu Engineers staff completed a development plan for this property located within the boundaries of a landfill on the NYS List of Inactive Hazardous Waste Disposal Sites.

The project included:

- The engineering design services included site layout for parking, pedestrian access, site access, building location, vehicular traffic, utilities, and storm water collection and conveyance along with storm water retention/detention facility.
- Topographic surveying services including base mapping.
- A review of site specific environmental investigations and soil management plan to identify the potential construction concerns.
- Review and input on a health and safety plan for the project.
- Developing a plan for the removal and relocation of landfill materials present on the site.

BROWNFIELD PROJECTS



Former Frink America property, Town and Village of Clayton, NY

The former Frink America property is currently undergoing a Site Investigation under the NYSDEC Environmental Restoration Program. The newly developed property after remediation will house residences, public boat docks, a riverwalk, office space and a marina while creating new park areas and deep water port space along the St. Lawrence River.

The goal of the project is to identify the vertical and horizontal extent of contamination located on site in order to establish an appropriate cleanup alternative for the property. As a result of the information from previous environmental investigations, discussions with NYSDEC Region 6 staff in Watertown, NY and client objectives, a two-phased approach was developed to satisfy Environmental Restoration Program requirements.

Phase I of the project will consist of additional investigation to fill in gaps in existing data and identify the horizontal and vertical extent of contamination on the site. The following will be completed during Phase I.

- Surface soil sampling will be conducted in targeted areas of the property to evaluate direct contact as a potential exposure pathway. Historical information will be gathered through interviewing previous employees, viewing Sanborn maps, and aerial photographs in order to focus sampling efforts. Samples will be analyzed for metals, PCBs, semi-volatile organics, and volatile organics.
- Additional borings to delineate the horizontal extent of migration. During the borings, samples will be taken for waste profiles to confirm the waste is non-hazardous.
- Sampling of the on-site cinders and black ash to determine appropriate disposal options.
- Two existing underground tanks will be removed and surrounding soils evaluated to determine if soils removal is necessary.
- The fluid in the existing transformers will be sampled to determine if they contain PCBs.
- A report (RI/FS) identifying the vertical/horizontal extent of contaminant migration and evaluating appropriate remedial alternatives will be completed.

After the investigation phase is complete, the Town will seek additional ERP funding to complete remedial measures (Phase II) for the site. A cleanup Work Plan will be developed to address known impacted areas to satisfy established remedial action goals. The Work Plan will be implemented immediately upon NYSDEC approval.

BROWNFIELD PROJECTS



Former Waste Water Treatment Plant, 100 Karenlee Drive, Town of Henrietta, NY

Lu Engineers is currently working with the -Town of Henrietta to complete and implement a Work Plan for the former Waste Water Treatment Plant at 100 Karenlee Drive in the Town of Henrietta in accordance with the New York State Department of Environmental Conservation (NYSDEC) Voluntary Cleanup Program. The work is based on information provided in previous environmental investigations for the site, discussions with staff at the NYSDEC Region 8 office in Avon, New York and the objectives specified by the Town.

Lu Engineers summarized existing data and created a site plan that shows the results of previous investigations and identifies the proposed boundaries of the intended investigation. This site plan will be incorporated into the Voluntary Cleanup Work Plan for the property. This Work Plan offers an effective approach to determining the extent and concentration of suspected environmental contamination.

Installation of five monitoring wells, the collection of subsurface soil samples during the well installation, the collection of one set of water samples from the installed wells and eight surface soil samples was also completed. Groundwater samples were analyzed for semivolatiles, volatiles, and RCRA metals using ASP 2000 (CLP) methods.

Battery Manufacturing Company, Newark, NY

Lu Engineers conducted a Site Investigation at a large Newark, New York manufacturing facility under the NYSDEC's Voluntary Cleanup Program. This work determined the nature and extent of documented organic and inorganic subsurface contamination at the facility associated with past site operations. The project included the installation of approximately 15 soil borings and monitoring wells. Sampling and testing was used to determine surface and subsurface soil, surface water, and groundwater conditions at the site to allow determinations to be made as to appropriate remedial actions. All sampling and laboratory analyses were conducted in accordance with NYSDEC IHWS guidance and ASP protocols. Aquifer testing

VOLUNTARY CLEANUP PROJECTS



Almor Facility Remedial Investigation, Wyoming County, NY

The former Almor property was used for industrial purposes (elevator manufacturing) from at least the early 1900's until approximately 1993 when the building was vacated. The property consists of a 2.38 acre parcel of land that formerly housed approximately 82,000 square feet of manufacturing space. The facility has used paints and thinners, cleaning solvents, maintenance fluids, metal parts fabrication and welding in its operations. Lu Engineers commenced an investigation for the Wyoming County Industrial Development Agency under the NYSDEC Voluntary Cleanup Program. Extensive research was conducted during the remedial investigation in order to determine the nature and extent of the wastes and contamination associated with the property.

A qualitative risk assessment to determine potential alternative-specific impacts was conducted as part of this project. Up front capital costs were evaluated as well as long-term sampling/testing and O&M fees. A no further action alternative was recommended based on the property's location and end use, and the levels of contaminants remaining. With residual contaminants remaining, a recommendation to restrict the property's future use through deed restrictions was also submitted.

The project consisted of the following:

Completion of 45 PowerProbe[®] subsurface soil test points and collection/analytical testing of 19 subsurface soil samples.

Installation of groundwater monitoring wells.

Two rounds of sampling at the installed groundwater monitoring wells and an on-site water supply well (artesian well).

Collection of 14 soil samples along the bank of Oatka Creek which runs along the eastern property boundary.

Investigation of discharge points for known drain lines.

Sampling of environmental media for this project included groundwater, soils and surface water. Various field instrumentation was also used for the remedial investigation including a photoionization detector, a geo-probe, turbidity meter, pH meter, conductivity meter and colorimetric detection methods. A site-specific health and safety plan was developed for this project, which included all phases of remedial investigation work. A "Voluntary Cleanup Investigation" report was prepared for the remedial investigation.

VOLUNTARY CLEANUP PROJECTS



**US Air Force Research Site
Asbestos Survey, Management
and Operations Plan, Asbestos
Survey, Rome, New York**

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Brighton-Henrietta Town Line Rd. Reconstruction, Monroe County DOT, Rochester, NY

Lu Engineers designed two stormwater management/wetland mitigation basins totaling 3 acres in area to replace the loss of approximately 1 acre of federal jurisdictional wetlands due to the realignment of Brighton Henrietta Town Line Road. Hydrologic analyses and planting plans were developed to meet twin criteria of water quality improvement and stormwater retention. This \$3.8 million roadway rehabilitation project was nationally recognized by the Federal Highway Administration in 2001 for Environmental Excellence for successfully integrating the needs of the community while protecting the environment.



Ava Research Facility, NY – US Air Force Research Site

At the Ava Research Site, Lu Engineers delineated federal wetland boundaries on a 297 acre subsidiary of the former Griffiss Air Force Base near Boonville, NY. Use of GPS methods was limited on this site due to heavy coniferous and deciduous vegetation cover. Wetland boundary data was acquired using a combination of traditional survey and GPS methods.

WETLANDS

Wetland Delineation

- Regulatory review
- Boundary determinations
- Mitigation planning
- Restoration planning
- Hydrologic studies

Wetland Mitigation

- Mitigation wetland design
- Wetland enhancements design
- Post-construction monitoring

Wetland Permitting

- U.S. Army Corps permitting
- Section 404 Water quality
- Watershed management plans

New York Route 37 and Route 37C Bridges over the Raquette and St. Regis Rivers, St. Regis Mohawk-Akwesasne Indian Reservation, Franklin County, NY – NYS Department of Transportation, Region 7

Lu Engineers delineated federal jurisdictional wetlands and NYS freshwater wetlands at two bridge locations in this culturally sensitive area using a combination of the Routine On-Site Wetland Determination Method for sites less than 5 acres and the Atypical Situation Method for filled areas. The wetland delineation required close coordination with reservation officials and NYS Department of Transportation and Environmental Conservation staff. Elements of the bridge design were reviewed by tribal representatives prior to final completion to assure preservation of significant cultural resources within and adjacent to the bridge site.



Water and Wastewater



Van Lare Wastewater Treatment Plant , Rochester, New York

Lu Engineers has provided numerous services at this treatment plant including a noise study, site drainage inspection, asbestos abatement of roofing materials and geotechnical and soil investigations. Recently, Lu Engineers provided resident construction inspection services for the demolition of two Solids Handling Building Smoke Stacks. The scope of work included enforcement of contract provisions, site coordination meetings, completion of daily site inspection reports and submission of quantity estimates and payment quantities.

State/Mt. Hope Tunnel System, Combined Sewer Overflow Abatement Program, Monroe County, NY

Lu Engineers provided engineering services for six surface overflow structures. These structures receive storm water overflows from a variety of combined sewers. Lu Engineers designed the site location, geometric layout and hydraulic characteristics of each overflow structure and airflow chamber. This included sizing of the overflow weirs, flow control devices, emergency weirs, underground structures, sluice gates, vertical drop shafts, surge structures, shallow tunnels and interconnecting piping.



RAILROADS

Father Baker Bridge, over Union Ship Canal, Buffalo & Lackawanna, Erie County, NY

Lu Engineers supplied design services for the demolition of the old Father Baker Bridge and construction of a new bridge over the Conrail railroad bed in Buffalo, New York. The existing structure, 5,800 feet long and over 120 feet high, required extensive design cost estimates and analysis to determine proper demolition.



Route 104 over Kodak Access, Roadway and Railroad, Rochester, Monroe County, NY

Lu Engineers provided preliminary and final design phases for the rehabilitation of a single-span, composite steel girder bridge over a Kodak access roadway and railroad. The scope of work included design mapping, soil stakeout, survey and mapping update, environmental compliance audit, asbestos assessment, design studies and a design report. In addition to the road and railroad there were numerous steam transmission lines and utilities slung under the bridge that required close coordination with Eastman Kodak staff.

Brighton-Henrietta Town Line Road, Rochester, NY

This roadway project involved two new "at grade" railroad crossings for Conrail/CSX and Livonia, Lakeville and Avon Railroads. Lu Engineers coordinated design, permit applications, an administrative law hearing and construction with the railroads. The reconstructed railroad crossing included an additional traffic signal that was installed at the roadway and railroad track intersection. Coordinated traffic signal pre-emption timings were necessary for the slower Livonia, Lakeville and Avon Railroad (10 mph) to the faster CSX trains (55 mph).



Veterans Memorial Bridge over Genesee River, Monroe County, NY

This project involved the rehabilitation of the Veterans Memorial Bridge. The structure, 973 ft. long and 106 feet wide, is a seven-span, concrete spandrel arch which supports a reinforced concrete framing system enclosed by stone masonry. The scope of work included in-depth inspection, detailed rehabilitation analysis, BRPR, 4(f) evaluation, deck evaluation, asbestos assessment, survey and mapping, preliminary design, advanced detail plans, specifications and cost estimates.



Route 104 over Irondequoit Bay, Monroe County, New York

This project provided for preliminary and final design services for the rehabilitation of the Irondequoit Bay Bridge. Lu Engineers' responsibilities included in-depth inspection, bridge deck evaluation, seismic vulnerability evaluation, and preparation of the Bridge Rehabilitation Project Report. Lu Engineers coordinated and performed the in-depth inspection for the entire structure.

BRIDGES

BRIDGE DESIGN

- Preliminary - final design
- Feasibility studies
- Bridge repair/rehabilitation/replacement
- Replacement/rehabilitation of historic structures
- Retaining Wall Design
- Construction Services
- Seismic analysis and design

BRIDGE INSPECTION

- Structural inspections
- Underwater inspections
- Scour inspections / analysis
- Hydrologic and Hydraulic Studies
- Load ratings
- Non-destructive testing
- Deck repair / replacement
- Seismic investigation

Route 77/Route 237 Bridge over NY State Thruway, Genesee County, NY

Lu Engineers provided design services for the Route 237 bridge and Route 77 bridge over the NYS Thruway in Genesee County. The existing Route 237 bridge, consisting of five simple spans totaling 291', and the existing Route 77 bridge, consisting of four simple spans totaling 278', were each replaced with new seismic designed, two-span continuous steel structures. The design included an in-depth inspection and bridge deck condition survey, load rating, structure inspection, and preparation of a deck evaluation report. An on-site detour was designed by Lu Engineers utilizing staged construction and traffic signals at each end of the project. Preliminary structure plans, project report and advanced detail plans were prepared, along with final plans, specifications and cost estimates.



AIRPORTS

Greater Rochester International Airport, Rochester, NY

Lu Engineers has completed numerous projects at this airport including the airport terminal, parking garage roadways, taxiways, aprons and runways. Services have included planning, design, construction inspection and environmental studies and compliance auditing.



Northumberland County Airport, Shamokin, PA

Lu Engineers has a term agreement to provide airport design and construction inspection services to this general aviation airport in northern Pennsylvania. Typical services provided have included planning, hangar development, apron and taxiway rehabilitations, obstruction removals, terminal building improvements, grant administration and design of an automated weather observation system (pictured left).



Terminal Project D5 –Roads/Apron/2 Tier Roadway, Greater Buffalo International Airport, Buffalo, N Y

This project involved design and construction for multiple projects in support of a multi-phased construction program comprising \$24 million of airside and landside improvements to serve the new passenger terminal. Program components included a two-tiered frontage road system to the terminal, aircraft aprons and taxiways, airfield signage, lighting and markings and jet blast deflectors. Fire and domestic water services, sanitary sewers, stormwater management systems with oil/water separators, a high pressure fire loop system, power and communication ductbanks, and an at-gate deicing fluid collection and diversion system were provided. Designs accommodated the continued use of portions of both the east and west terminals during the construction of the new terminal by providing temporary utility service connections as well as temporary taxilanes and apron positions.



Access Road Design

Fire Training Facilities

Airport Site Plan Design

Airport Survey

Capital and budget planning

Deicing Facilities

Environmental Assessments and Impact Statements

Fuel storage/handling

Grants administration

Pavement Management

Signs and Markings

HIGHWAYS AND ROADWAYS

Community Participation

Computer-Aided Drafting
Corridor/Design Studies

Maintenance & Protection of
Traffic

Noise & Air Quality Analysis

Pavement Evaluation

Pedestrian/Bike Path Design

Right-of-Way Plans

Roadway & Intersections

Roadway Reconstruction

Site Plans

Storm Water Management

Utility Design & Coordination

Inner Loop, Rochester, NY

This \$9.4 million project involved preliminary and final bridge and highway design on the Rochester Inner Loop mainline and ramps. Lu Engineers' services included survey and mapping, environmental, bridge inspection and load rating, maintenance and protection of traffic, final highway and bridge design and signal design. We also provided construction inspection services for the entire project.



Reconstruction of Route 153, Washington St.-Linden to Commercial, Monroe County, NY

Lu Engineers provided preliminary and final design services for the reconstruction of Route 153. In addition to approximately 1 km of highway reconstruction and resurfacing, the project involved design of sidewalk reconstruction/repairs and upgrades to street lighting and traffic signals. Air quality analysis was also conducted.



Route I-490 from the Erie Canal to the Genesee River, Rochester, Monroe County, NY

Lu Engineers provided preliminary and final design services as a subconsultant on this \$87 million project. The scope of the project entailed reconstruction of a 5.7-km section of Interstate 490 and the rehabilitation of 19 bridges in the City of Rochester, Monroe County, NY. Existing corridor deficiencies, alternative solutions, environmental impacts and mitigation measures were investigated. The project included the replacement of the Troup-Howell Bridge over the Genesee River with a "signature" steel arch structure that provides a "Gateway to the City" from the south.



MUNICIPAL

Municipal Engineering Services, Town of Chili, NY

Lu Engineers has been the Town Engineer for the Town of Chili since the mid-1980's. In that time, Lu Engineers has completed over 200 projects for subdivisions, roadways, drainage, recreational facilities, watermains, permitting, planning and ADA compliance.



Keuka Lake Park, Penn Yan

Municipal Engineering Services, Village of Penn Yan, NY

Lu Engineers provides municipal engineering services to the Village of Penn Yan on a term contract/as-needed basis. These services have included water main replacements, wastewater treatment plant designs and upgrades, planning and zoning assistance, sanitary sewer design, environmental assessments and general civil engineering design of culverts and roadways.

Municipal Engineering Services, Town of Henrietta, NY

Lu Engineers has provided a variety of environmental and civil engineering services to the Town of Henrietta. These projects have included environmental site assessments, water distribution studies, watermain, sewer and drainage improvement design, boundary surveys, tank removals, asbestos and hazardous waste assessments.



Department of Public Works Garage, Henrietta, NY

Frontier Field, Civil Engineering/Site Design, Rochester, New York

Lu Engineers was a member of the design team responsible for design and construction of a \$30 million outdoor sports facility located in downtown Rochester. Lu Engineer's responsibilities included design of the on-site utilities and parking lots. This included construction of new and abandonment of existing storm and sanitary sewers, water mains, and underground electric. Also included was pavement design for parking lots and service roads.



Farmbrook Office Park, Farmington, New York

Lu Engineers provided complete site design for this office park development involving eight buildings, with 45,000 SF of office space. Services included: utility design; roadway, grading, erosion control; specifications, quantities, and cost estimates; Planning Board approval; and permit applications.



Candlewood Park Subdivision, Webster, NY

Complete concept and preliminary plans for 117-lot subdivision on a 71-acre parcel. The proposed development will employ cluster development concepts, reduced impact development practices and storm water management preserving a 40 percent open space park-like setting with hiking trails along Four Mile Creek in the Town of Webster.



SITE DESIGN

- Environmental Assessments
- Facility Management (GIS)
- Feasibility Studies
- Flood Plain Analysis
- Parking Lots and Ramps
- Permitting Requirements
- Public Participation
- Site Development
- Site Lighting / Utilities
- Storm Water Drainage
- Surveying
- Topographic Mapping
- Transportation Planning
- Traffic & Signal Analysis
- Wastewater Treatment
- Water Distribution Systems
- Wetland Delineation

INDUSTRIAL and Manufacturing

ENI, Compliance Assistance Program, Rochester, New York

Lu Engineers is performing general compliance assistance to this manufacturing facility including regulatory plans, audits of waste treatment facilities, training for in-house personnel, completion of a corporate annual environmental audit and day-to-day regulatory compliance assistance. Compliance issues ranged from an air emissions inventory to the handling of hazardous wastes.



Gleason Works, Emergency Response Plan, Rochester, New York

Lu Engineers performed an emergency response plan in accordance with EPA and NYSDEC spill response regulations at Gleason Works, a manufacturing facility in Rochester, NY. We prepared an Integrated Contingency Plan including a Spill Prevention Control and Countermeasures (SPCC) plan, Hazardous Waste Contingency Plan, OSHA Hazardous Waste Operations and Emergency Response Plan and Chemical Bulk Storage Tank Spill Prevention Report.



Industrial Pretreatment Program, City of Ogdensburg, New York

Lu Engineers provided engineering services associated with revisions to the local sewer use law to meet state and federal requirements, industrial waste inventory, industrial discharge permitting functions, collection and distribution of pretreatment information, industrial self-monitoring and program compliance. Responsibilities have included interfacing with the NYSDEC and USEPA, preparing annual pretreatment compliance reports, meeting with Standard Industrial Users, coordinating and assisting with Publicly Operated Treatment Works and surveillance monitoring.



Cherry Street Pump Station, Village of Penn Yan, NY

Lu Engineers performed study, design and soon construction inspection services for the this pump station in Penn Yan, NY. Originally constructed in 1983, the Cherry Street Pump Station lifts the entire wastewater flow stream to the relocated treatment facility. The pump station included comminution, a divided wet well, three variable speed pumps (2 duty, 1 standby), a manual overflow to Keuka Outlet and a 14-inch diameter forcemain.



Several equipment and O&M problems plagued the pump station including:

- Wide range of flow (0.2 to 6.2 MGD)
- Comminutor flooding
- Excessive pump maintenance and shaft vibrations (the pumps are driven with 18 foot long drive shafts).
- Variable speed drives are antiquated technology and parts are hard to obtain (only one of the existing two drives works)
- Small wet wells which could not be isolated.

Upon investigating the problems at the pump station, Lu Engineers recommended the replacement of two of the existing pumps with dry pit submersible pumps along with new dedicated AFC drives for each pump. One of the existing pumps will be used as a constant speed standby pump. Based on the results of vibration testing, interim corrective measures were made to reduce operational problems until new equipment could be installed. We found that shaft vibrational problems were caused by many factors, some of which included bad bearings, improper alignment and poor mid support structures.

As part of the project, it was necessary to change the emergency generator and control equipment. The comminutor was replaced by a hydraulically driven channel grinder and provisions were made to isolate each wet well for cleaning.

PUMP STATIONS

Pump Station Upgrades, Northwest Quadrant Facilities Modifications, Buttonwood Creek, Flynn Road and Island Cottage, Monroe County, Rochester, NY



Lu Engineers provided planning, engineering design, construction administration and construction inspection

services for the pump station modifications. The initial work involved an assessment of the existing pump station conditions regarding building, equipment, pump capacity, secondary power supply, etc. We recommended various improvements to the stations and prepared contract documents.

The project's preliminary design included an assessment of the pump station's existing pumps and drives for pumping the current and future wastewater flow volumes. The existing pumps were centrifugal pumps with remote motors, drive shafts and liquid rheostat variable speed drives. We found that the existing pumps and drives needed to be retrofitted or replaced. The second stage in the preliminary design included an evaluation of the pump and variable speed drive alternatives.

The dry pit submersible pumps with adjustable frequency drives were the recommended alternative ultimately selected by the County. The work includes the removal of nine existing pumps and the installation of ten new dry pit submersible pumps. Pump motor sizes ranged from 300-500 HP with individual pumping capacities ranging from 15000-22000 GPM.

The other work in these pump stations included the following:

- Installation of new Channel Monster grinders in place of the existing comminutors.
- Installation of deep bed carbon units for wet well odor control.
- Replacement of the existing welded steel discharge headers at Flynn Road and Island Cottage. The existing headers had been installed in the wet wells and were severely corroded. Existing ball check valve actuators were also replaced.
- Installation of new electrical substations and transformers. Secondary RG&E power feeds are being brought to Flynn Road and Island Cottage to replace the existing standby generators.
- General building upgrades and repairs including new walkway gratings, new roofs and piping and valve modifications.

This project was a 2001 winner of the Consulting Engineers Council Gold Award for water and wastewater design excellence.

Water District No. 2, Marilla, Erie County, NY

Lu Engineers surveyed, designed and inspected the installation of 108,000 feet (21 miles) of 8" and 12" diameter PVC watermain along state, county and town roads to service over 800 residences and business. The project included



highway, stream, wetland, and large gas pipeline crossings. The project also included the design of a 700 gpm Booster Pump Station and a 1 million gallon, 100 foot tall, welded steel standpipe. The pump station and standpipe are located over two miles apart and they communicate through Remote Radio Transmitting Units that are hooked into the Erie County Water Authority's SCADA system. The water authority controls the pump station remotely from its central office. Lu Engineers prepared the Map, Plan and Report for the Benefit Are Formation, the Type I Environmental Assessment Form, the Agricultural Notices of Intent, and the Water Supply Permit Application.

Water / Wastewater

Chemung County Wastewater Treatment Facility, Elmira, NY

Lu Engineers was part of a team of consultants retained for the design and inspection of the Chemung County Wastewater Treatment Facility. Our staff provided design of the chlorination system, sludge treatment system and pumping station. The design included several large, cast-in-place concrete tanks. We also reviewed all design calculations, prepared the Operation and Maintenance Manual and provided inspection services for the new 12-1/2 MGD facility. The use of trickling filters followed by a solids contact process was classified as an innovative alternative technology allowing additional funding for the project.



Chili Water District Extension and Watermain Design, Town of Chili, NY

The project included the creation of two extensions to the existing Chili Water District and the engineering design of the new watermains with the extensions. The engineering design included survey, base mapping, water main design and layout; including, hydrants, valves, air releases, stream crossings, road crossings, and borings connection to existing watermains, specifications, and cost estimates. Bidding phase and construction services were also provided along with inspection.



Castile Water Supply, System Upgrades, Castile, NY

Lu Engineers studied the Village water supply needs considering consumption, storage and distribution. We developed recommended actions to ensure Village compliance with SWDA regulations. Designed improvements included the installation of new supply well, abandonment of some existing supply sources, enhancement of the distribution systems to the reservoir and chlorination.



South Chili Water Benefit Area #1, Chili, NY

Lu Engineers designed the formation of the South Chili Water Benefit Area. We prepared the Benefit Area Formation Report, Agricultural Notices of Intent, NYSDEC Environmental Assessment Form, and a Construction Cost Estimate. Additionally, Lu Engineers performed design of approximately 71,000 LF of 8", 12" and 16" ductile-iron pipe water main. Following the design, Lu Engineers performed construction administration and inspection.



Henrietta Sewer Imp. Study, Ext. 37, Sewer District #1, Town of Henrietta, NY

Lu Engineers was retained by the Town of Henrietta to study a portion of the Town's sanitary sewer system. The study objectives were to determine capacity improvements to the sanitary sewer system and recommend commercial and



industrial financing for the improvements. Lu Engineers analyzed current usage and the effect of potential development in accordance with the Town's Comprehensive Master Plan, and current zoning requirements. The study further analyzed the capacity of the south-central portion of the system which

conveys flows to the Pure Waters pumping station on John Street. Based on the study results, Lu Engineers recommended improvements to the existing system.

Sewer System Evaluations, Village of Canton, St. Lawrence County, NY

Lu Engineers was contracted by the Village of Canton to conduct a Sewer System Evaluation Survey. The sewer system involved approximately 90,000 feet of various size, type and age of sanitary sewer. The scope of services included above ground inspection, flow monitoring and rainfall simulation, data analysis, corrective alternatives, cost-effective analysis, and final report. The survey was conducted according to the guidelines and approval of the DEC and EPA.

Revitalize Storm Sewer System, Niagara Falls ANG Base, Niagara Falls Airport

Lu Engineers provided a study of the storm sewer network at the base and existing storm sewer system. We provided recommendations for upgrades to the storm sewer system and performed detailed field survey and engineering design for installation of 21,370 feet of new CMP and polyethylene storm sewers (including catch basins, manholes and outlet structures) ranging in size from 12" to 29" x 42" arch pipe to replace and/or supplement the existing storm sewers.



Canandaigau DVAMC, Boundary Survey, Canandaigua, NY

Lu Engineers provided a boundary survey for the entire Department of Veterans Affairs Medical Center campus in Canandaigua, NY. The area is approximately 165 acres. Horizontal and vertical datum were provided; traversed and located existing monuments to determine the position of property lines; located fence, walls and major structures that are within four feet of perimeter boundary; placed corner points, rebar or magnails at missing angle point locations; and provided vertical elevations on selected benchmark locations.



Term Contract, NYS Dept. of Environmental Conservation, Surveying & Mapping

Lu Engineers was retained by Ecology and Environment within a term contract to do all aspects of surveying and mapping with the Department of Conservation as the lead agency for Hazardous Waste Industrial Facilities. Lu Engineers has surveyed and mapped approximately 25 to 150 project sites ranging from 1 acre to 150 acres in size.



Former Davidson's Collison, Lancaster, NY

Lu Engineers performed property line determinations, planimetric topographical survey, map/parcel numbers and overall alignment of all proposed easements were provided. A Health and Safety Plan for the site was also prepared.



surveying

LAND SURVEYING SERVICES

- Boundary surveys
- Planimetric & topographic surveys
- Horizontal and vertical control
- As-built surveys
- Right-of-way surveys
- Mapping of environmentally regulated areas
- Base, utility and easement mapping
- GIS
- Subdivision development mapping
- Wetland boundary mapping
- Drainage surveys