AECOM designs, builds, finances, operates and manages projects and programs that unlock opportunities, protect our environment and improve people’s lives.
SERVICES & EXPERIENCE

Using integrated project management and technical resources, AECOM plans, develops and executes environmental review and permitting, engineering design, procurement, construction and commissioning for projects around the world.

Concept assessments
- Site selection, siting studies
- Technology selection
- Conceptual design and system sizing
- Grid-interconnect investigations
- Risk and critical issues analysis

Techno-economic assessments
- Feasibility studies
- Alternatives evaluations
- Social impact assessments
- Cost estimates
- Financial models
- Economic benefit assessments
- Ancillary service benefits

Project management
- Construction and site management
- Permitting
- Safety, health and environmental management
- Commissioning services
- Project reporting and stakeholder management
- Contract management

Engineer-procure-construct (EPC)
- Mechanical, electrical, civil and environmental engineering
- Supervisory control and data acquisition (SCADA)
- Grid connection and integration
- Transmission and distribution
- Construction and site management
- Procurement services
- O&M schedules
- Water/landing
- Fire and safety assessments
- Operating efficiency assessments

Project planning
- Planning and permitting
- Stakeholder management
- Resource planning
- Lifecycle analysis
- Risk and hazard assessments
- Cost assessments

Environmental
- Baseline environmental surveys
- Resource studies and assessments
- Planning and permitting
- Worker awareness training
- Environmental compliance
- Public and stakeholder outreach

AECOM’s network of 87,000 engineers, scientists, technicians, management and operations specialists support businesses, governments and organizations in more than 150 countries.
AECOM’s 87,000 integrated engineers, scientists, technicians, management and operations specialists support businesses, governments and organizations in more than 150 countries.

Across North America, our offices are home to over 35,000 professionals who provide the full-range of engineering, environmental, design, management, construction and operations and maintenance services to public and private-sector clients.

This wide geographic presence allows us to apply local knowledge supported by our global network of experts to successfully address almost any project challenge, regardless of location.

Our technical capabilities continue to be recognized. The Engineering News-Record (ENR) trade magazine ranked AECOM #1 in its annual list of the Top 500 Design Firms, a spot we have held since 2010. We also hold top rankings in many specialty engineering categories, including #1 Environment, #2 Water, #3 Power and #1 Transportation, and earned #1 in Program Management, #2 in Construction Management and #5 in Top Contractors categories.

In 2017, Fortune magazine named AECOM one of the World’s Most Admired Companies for the fourth year in a row, and Military Friendly® named us a Top 100 Employer for the 18th straight year.

Taken together, AECOM is an ethical and financially stable company you can trust to deliver.

AECOM’S CORE VALUES

It is one thing to imagine a better world. AECOM was built to deliver it. Our values define who we are, how we act and what we aspire to be.

**Safeguard** We operate ethically and with integrity, while prioritizing safety and security in all that we do.

**Collaborate** We build diverse teams that connect expertise to create innovative solutions.

**Inspire** We develop and celebrate our people, and elevate the communities we touch.

**Anticipate** We understand the complexity of our clients’ challenges and help them see further.

**Deliver** We grow our business through operational excellence and flawless execution.

**Dream** We transcend the industry by re-imagining what is possible — and realizing it.
ENERGY SERVICES

AECOM strategically plans, develops, designs and constructs projects that enhance system infrastructure, reduce energy and water consumption, and generate on-site energy from traditional and renewable sources.

The growing demand for reliable electricity requires cleaner, more efficient solutions. Where others see challenges, we see opportunity.

AECOM combines superior technical capabilities with global experience to deliver solutions that enhance system infrastructure, reduce energy and water consumption, and generate on-site energy from traditional and renewable sources, providing lasting benefits to our clients and communities.

Through our integrated services, clients benefit from AECOM’s:

- **Single-point solutions**, from project development to final commissioning and project turnover, without the need to subcontract development, engineering or construction management services
- **Vendor neutrality**, delivering your best solution because we do not make, sell or promote any particular equipment or product, unlike many energy service companies (ESCOs) that require exclusive agreements
- **Robust internal technical resources**, with 100 percent of the engineering and project management delivered by in-house professionals (87,000 global employees), which helps us control the schedule, quality and budget better than other ESCOs.
- **ISO 9001 certification and a rigorous Quality Management System (QMS)** that is implemented on all of our projects to confirm quality and client satisfaction

In natural gas, we have installed more than 32,000 megawatts of combustion turbine generation, including simple cycle, combined cycle, cogeneration and repowering capacity, and covering every model in demand.

In addition, we also help our clients implement comprehensive capital retrofits of their facilities to reduce their GHG emissions footprint and help them meet their corporate sustainability goals.

Rikers Island, New York, New York, U.S.A.
Your single source for multidisciplinary engineering and management services

From market analysis, to siting and permitting, through final project development and execution, we develop, design and construct projects that enhance infrastructure, reduce energy consumption and produce on-site power (traditional and renewable).

We work closely with you to develop a holistic energy strategy that evaluates generation, storage, efficiency and conservation to deliver your best solution.

As the only global planning, engineering and construction management firm that is also an NAESCO-accredited energy services company (ESCO), we develop and execute comprehensive energy projects that improve infrastructure and efficiencies like no other.

As an engineering-based ESCO, we offer a variety of unique skills, solutions and capabilities because of our vendor-neutral perspective. Unlike most firms, we do not manufacture, sell or represent any specific equipment or technology. Instead, we focus on developing, designing and implementing cost-effective solutions that provide optimal long-term performance and exceptional results.

We do not manufacture equipment — our recommended solutions are in the clients’ best interest.

Our customers rely on us to provide complete solutions, from identifying the most appropriate technologies, to integrating the new technologies into existing systems with minimal downtime. Our team possesses the unrivaled ability to strategically plan, develop, design and construct projects to enhance system infrastructure, reduce energy and water consumption and generate on-site energy from traditional or renewable sources.

In plant performance and process, AECOM covers the life of a facility or a network, consulting on utility management, rate studies, valuation and depreciation, system planning and the technology, integration and efficiency issues of a plant’s prime movers and auxiliary equipment. We design and implement operating plant modifications and maintenance programs that keep power facilities efficient, reliable and compliant. We also support permitting efforts, such as state PUC applications, threatened and endangered species habitat assessments, cultural resource studies and mitigation negotiation/design.

In project development process. This communication provides the framework for selecting, developing and implementing high performance energy solutions that meet your goals and enhance facilities with improved functionality and performance.

For energy projects around the world, AECOM provides analysis and planning, siting and due diligence, environmental permitting and compliance, public outreach, conceptual design, detailed design, engineering, procurement, project management, construction management, and asset management.

Our integrated services framework achieves speed-to-market by bringing together a unique combination of engineers, planners, scientists, and project managers.


Paramount for a successful project is a clear understanding of your client’s goals, expectations, needs and preferences at the beginning of the project development process. This communication provides the framework for selecting, developing and implementing high performance energy solutions that meet your goals and enhance facilities with improved functionality and performance.

| ISO 9001 certified | We incorporate an extensive quality management system on all of our projects. |
| Industry leader | We are an industry leader in system-wide comprehensive energy services and NAESCO accredited — the only major professional engineering firm with this designation. |
| Technical resources | Worldwide reach-back capabilities with thousands of professional engineers on staff. |
| Single-point solution | We create the plan and take a project from initial development to final system commissioning and project turnover. |
| Vendor and fuel neutral | We do not manufacture equipment — our recommended solutions are in the clients’ best interest. |
| Pricing transparency | Our business structure and team-based approach helps us remain cost-competitive in the industry. |

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An energy savings performance contract (ESPC) provides an attractive value-based solution for our clients to leverage private funds (financing) to implement energy efficiency, renewable energy and infrastructure upgrade projects. Guaranteed energy and operational savings are used to repay the investment.

This process is enhanced through AECOM's comprehensive SSIMe process, which uses energy simulation frameworks approved by the DOE and U.S. Green Building Council along with collected meter and audit data to develop calibrated models representative of individual buildings.

Integrated energy master planning using SSIM™, AECOM’s Sustainable Systems Integration Model

SSIM is an integrated GIS-based design, planning and feasibility tool that has been developed to assist decision-makers evaluate the myriad of available alternatives for balancing social, environmental and economic priorities and impacts, while ensuring a sound assessment of costs and benefits.

The SSIM module energy vision (SSIMe™) is an extremely powerful tool for energy planning. By following our SSIMe energy analysis process, clients understand existing and proposed energy profiles across large groups of buildings and geographies to assess long-term strategies and maximize savings.

One of the primary benefits of SSIMe is its ability to help clients create a robust, long-term roadmap that optimizes the cost effectiveness of energy project deployment over time. By bridging the gap between strategy and technical viability, our process is unparalleled in the industry.

Strategic Energy and Water Planning: Energy projects are often assessed as stand-alone efforts to reduce operational costs. This narrow focus often results in sub-optimal solutions that miss the opportunity to provide broader benefit to your organization. Implementing AECOM’s strategic planning process provides for a greater understanding of your energy and water needs, as well as the optimal strategies to enhance infrastructure resiliency.

Enhanced Resiliency: Stepping beyond the building footprint allows the inherent synergies between resources to achieve cost-effective and resilient solutions.

Energy savings performance contracting uses energy savings to pay for infrastructure improvements

An energy savings performance contract (ESPC) provides an attractive value-based solution for our clients to leverage private funds (financing) to implement energy efficiency, renewable energy and infrastructure upgrade projects. Guaranteed energy and operational savings are used to repay the investment.

More than simply sorting, bundling and calculating of the overall benefit of various energy conservation measures identified through a traditional audit, this platform helps clients analyze and optimize the performance of various energy projects, both individually and as a bundled solution. In addition to calculating the energy performance benefits of a potential strategy, SSIMe allows us to assess buy-down strategies and other funding-blending approaches to provide the best benefit. We have used SSIMe to evaluate over 500 million square feet of facilities.
Following a major regional power outage impacting the New York area, AECOM was retained by the New York Power Authority’s (NYPA) and New York City Department of Corrections (NYCDOC) to evaluate building a reliable, energy efficient cogeneration microgrid facility on Rikers Island.

This initiative established a combined heat and power facility on the island that reduced annual energy costs and emissions to the environment and improved energy reliability, thereby enhancing security on Rikers Island.

The project includes a natural gas turbine power plant nominally rated at 5 kilovolt (kV) and 26.5 kV medium voltage electrical distribution system, high pressure gas compression station, and a controls room. Controls work included integration of controls with an existing industrial control system and implementation of a new microgrid controls system. AECOM completed this project as both the prime contractor and lead design/engineering firm under two separate contracts.

Annually, this $108 million project saved over $7 million in energy and operational costs, along with reducing CO₂ emissions by 25,000 tons and NOx emissions by 45 tons.

After being stalled in early development for over a year when working with another energy services company, the Salinas Valley Memorial Hospital turned to AECOM to get things back on track. We took over responsibility for all aspects of the project, delivering turnkey design-build services for a cogeneration system that improved energy efficiency and saved the hospital nearly $1 million per year.

The new cogeneration system includes four, 250 kW natural gas-fired reciprocating engine generators to support the hospital’s 450,000 square feet of space. Our highly energy efficient design incorporated the use of the waste heat from the engines to supplement the hospital’s hot water for heating, domestic hot water and laundry, which offset the natural gas expenditures by eliminating use of the inefficient boilers. Installation of the new system included significant underground piping work, which encountered many undocumented underground utilities.

Following the successful cogeneration project, officials asked AECOM to also address the hospital’s need for additional back-up generation and cooling capacity for the hospital’s future expansion. We designed and implemented a major expansion of the existing central utility plant that included two, 2,000 kW diesel-powered emergency generators, two high-efficiency centrifugal chillers, new state-of-the-art cooling towers, chiller plant auxiliaries and full digital control and remote system monitoring.

AECOM helped the U.S. Navy’s Fleet Readiness Center Southwest (FRCSW) realize major increases in energy and water efficiency that reduced costs and improved operations and comfort by:

- Upgrading aging, failing and inefficient systems with high-quality systems.
- Improving reliability and reducing operational and maintenance costs.
- Developing energy, water and operational savings that finance complete payback in just 14 years.

AECOM’s work included retrofits and upgrades to lighting, lighting controls and HVAC systems, decentralization of compressed air systems and conservation measures for the cooling tower water.

Among the noteworthy achievements of the project were the design and construction of a new calibration laboratory for the Primary Standards Division of FRCSW. This “dream lab” includes a 100 percent increase in lab space; a modern, water-saving recirculating system; a solar thermal process heating unit; a high-efficiency chiller; advanced compressors; and an energy management control system with new data cabling, lighting, and flooring. The modernized infrastructure allowed the Primary Standards Division to increase its production and accept additional contract awards.

AECOM provided detailed engineering and design services of the central utility building for a major battery manufacturing plant being constructed in the Western U.S. The scope of work included process, mechanical, electrical, plumbing, and structural engineering. Process-related systems included compressed air, water treatment, waste liquid, battery electrolyte and organic solvent storage and handling systems, including truck loading and unloading station. The metallurgy and cleanliness of the tanks, piping, and transfer pumps required careful consideration to ensure compatibility.

The compressed air system consisted of two 350-horsepower rotary screw compressors capable of delivering over 900 standard cubic feet per minute a design discharge pressure of 175 pounds per square inch gauge. Major equipment also included dryers (integral with the compressors) and receivers. AECOM was responsible for design of the compressor foundations, piping systems, pressure regulation and drops. The client required waste heat recovery be included to optimize energy efficiency.

The entire scope of work was completed on a fast-track basis to support an aggressive construction schedule.
AECOM developed, designed and managed the implementation of a multi-phase, multi-year energy efficiency project, which included a combined heat and power (CHP) plant that helped save over $4 million in energy and operational costs annually.

AECOM’s work included an ASHRAE Level 3 Audit, design engineering, PM/CM, bid package development, procurement assistance and incentive procurement. Major tasks included:

- Replacing coal plant with 1.6 MW CHP (natural gas)
- Upgrading HVAC systems, including the installation of more than 150 natural gas-fired heating systems
- Installing a building monitoring system that ties together more than 150 newly installed natural gas-fired unit heaters and make-up air units, which allows Norfolk Southern to remotely monitor natural gas usage and regulate temperature in work spaces
- Upgrading building envelopes (high efficiency windows, doors, roofs)
- Upgrading steam and hot water boilers

**COGENERATION AND ENERGY EFFICIENCY**
Juniata, Pennsylvania

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**COMPREHENSIVE ENERGY RETROFIT**
San Francisco, California

As part of Pacific Gas and Electric’s Sustainable Solutions Turley (SST) program, AECOM designed and implemented a comprehensive, design-build energy retrofit project for improvements at Sutter Health’s four California Pacific Medical Center campuses and two other regional medical facilities (more than 3.9 million square feet). The work included energy efficiency, water conservation and operational upgrades at four hospitals that saved over $1 million annually. The project was implemented in six phases and addressed a variety of energy efficiency, water conservation and operational upgrades.

With consistent attention to detail and excellent construction management, AECOM implemented a comprehensive portfolio of cost-effective solutions that met the client’s stringent payback criteria of 3.5 years. Our scope included:

- Facility-wide indoor lighting upgrades
- Air handling unit variable air volume retrofits and system optimization
- Upgrade and replacement of aging steam systems
- Optimization of chilled and hot water plants
- Retro-commissioning of lighting, heating, ventilation and air conditioning and process systems at each facility
- Measurement and verification
- Utility incentive procurement

**ENERGY SAVINGS PERFORMANCE CONTRACT**
Mountain View, California

The NASA Ames Research Center is saving nearly $1.5 million per year in energy, water and operational costs through improvements designed and implemented by AECOM. This ESPC covered 128 buildings, 2.6 million square feet and had a payback period of about 15 years. Energy conservation measures included:

- Facility-wide indoor and outdoor lighting upgrades
- Facility-wide hot water and steam boiler upgrades
- Replacement and upgrade of inefficient chillers with high-efficiency, longer-life, water-cooled chillers
- Variable flow chilled water and heating water conversions
- Conversion of steam heating systems to heating hot water systems, including retirement of aged district steam system
- Facility-wide water conservation upgrades, including bathroom equipment, kitchen equipment and cooling tower systems
- Facility-wide controls retro-commissioning and energy management and control system upgrades
- Rooftop solar photovoltaic system at new building N232
- Expansion and upgrade of the EMCS for improved control and visibility of energy consuming and mission critical systems across the facility

**ENERGY SAVINGS PERFORMANCE CONTRACT**
Colorado Springs, Colorado

Fort Carson is a major U.S. Army training facility and leader in energy management. As this is the installation’s fifth ESPC, AECOM’s efforts to achieve deep energy savings were challenging. To deliver a comprehensive ESPC program that delivers on Fort Carson’s current and future goals, our team developed a master plan using AECOM’s SSIMe, which allowed us to present various project options in a dynamic and transparent framework. This process let the team analyze various options in a live “game-board” environment.

Ultimately, Fort Carson decided on a mix of traditional energy conservation measures ─ such as lighting and heating, ventilation and air conditioning (HVAC) improvements ─ combined with advanced strategies ─ such as smart energy management control systems (EMCS) and a battery energy storage system (BESS) that manages electrical demand charges.

Savings will be achieved by charging the BESS during off-peak periods for discharge during the installation’s peak demand periods. The BESS will also produce time-of-use savings by providing demand response, time-of-use shifting, solar-firming, frequency and voltage support and microgrid support, with the BESS having the future ability to connect to the installation’s solar assets.
We help organizations solve both their most basic and toughest challenges, such as “right-sizing” and optimization of existing facilities and implementation of new technologies to address complex regulatory requirements.

Advances in manufacturing equipment and techniques impact the water requirements and wastewater characteristics for many industrial facilities. AECOM’s experience in planning, designing, and managing water systems dates back more than 100 years. Our high-level expertise in water and wastewater infrastructure, water resources, and alternative project delivery enables us to provide comprehensive solutions for our clients. We offer integrated services for total project delivery, covering everything from initial environmental planning studies to detailed design, construction management, total program delivery, operations and maintenance, and finance expertise.

With today’s focus on reduced water use, wastewater may be produced at lower volumes with higher strength. Wastewater treatment facilities constructed prior to improved manufacturing practices may be oversized, or inefficient in addressing increased wastewater concentrations. In locations where water is scarce, reuse of wastewater effluent may be necessary to sustain future manufacturing operations.

In addition, new and increasingly stringent regulatory requirements present treatment challenges that may not be addressed with conventional treatment practices. Our professionals use their understanding of manufacturing processes and broad technical expertise in the fields of process water and wastewater treatment, architecture, mechanical/HVAC, and plumbing, structural and electrical and controls, and construction engineering to design, construct, and optimize facility improvements for manufacturing clients.

Our staff has the diverse technical capabilities and resources needed to advocate for industry faced with new regulatory requirements, and bring water and wastewater projects from concept, through design, construction, and long-term operation.
Comprehensive design, build, finance and operation platforms help us deliver effective solutions to complex issues.

Along with supporting the water/wastewater needs of governments and municipalities around the world, AECOM is also a leader in helping industry. Similar to municipal systems, industry is also faced with increased regulatory requirements, aging water and wastewater infrastructure, water scarcity and operational challenges.

We offer integrated water and wastewater management solutions — allowing our clients to focus on their core business. Our key services include:

- Permitting and compliance
- Water sourcing/storage/conveyance
- Water/wastewater treatment
- Water conservation, recycle, and reuse
- Effluent disposal
- Residuals management

Our engineers, scientists, planners, and construction specialists offer:

- Technology Neutrality: Unbiased technology integrator — we do not manufacture treatment equipment or produce chemicals
- Innovation: Extensive technical practice network (TPN) with subject matter experts around the globe to bring innovative solutions to industry’s most challenging issues
- Tools and Processes: In-house and third-party tools for steady-state and dynamic process modeling, equipment sizing, design and project management, etc. for efficient and cost-effective project implementation
- Industry Knowledge: Water issues and solutions are unique for each industry sector. Our engineers, scientists, and technologists are selected for projects based on their in-depth knowledge and expertise in a particular sector.

We offer a wide array of delivery approaches to match your needs and business processes.

**STAGE GATE AND ALTERNATIVE DELIVERY* APPROACHES**

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*ALTERNATIVE DELIVERY APPROACHES

- Engineer-Procure-Construction Management
- EPCM
- EPC
- DB
- DBO
- DBFO

We provided river water treatment for cooling and boiler feed water needs as well as EPCM services for a major upgrade to this refinery’s wastewater treatment system.

Confidential Client, Gulf Coast, U.S.A.

**STAGE GATE AND ALTERNATIVE DELIVERY* APPROACHES**

Die Casting Wastewater Pretreatment System Upgrades
Fiat Chrysler Automobiles, Etobicoke, Ontario, Canada

Wastewater Treatment Plant Design-Build
Tyco Fire & Building Products, Inc., Lubbock, Texas, U.S.A.

Picklehouse Acid Tanks and Wastewater System Charter Steel, Fostoria, Ohio, U.S.A.

Water Use Reduction and Beneficial Reuse Evaluation for Biologics R&D Facility
AstraZeneca, Gaitherburg, Maryland, U.S.A.
R&D and treatability services
We offer in-house treatability testing services designed specifically to address the unique needs of individual clients and projects. Treatability testing is offered both on the bench and the pilot scale for a wide range of complex industrial wastes and wastewaters, hazardous soils and sludges, and contaminated groundwater. As an independent third party, not affiliated with vendors or products, we can provide an unbiased technical approach to meet the objectives and specifications of your projects, small or large.

We have treatability facilities in:
- Austin, Texas
- Milwaukee, Wisconsin
- Philadelphia, Pennsylvania

We provide industrial water and wastewater services to these market sectors:
- Oil & Gas
- Power
- Renewables
- Pharmaceutical
- Chemical
- General Manufacturing
- Food & Beverage
- Metal Finishing
- Pulp & Paper and Forest Products
- Mining
- Iron and Steel
- Automotive
- Gas/Pipeline
- Semiconductor/Computer
- Commercial
- Water Utilities

Technology applications
Physical/chemical processes
- Oil / Water Separation (API/IGF/DGF)
- Equalization
- Primary & Secondary Clarification
- AirSteam Stripping
- Multimedia Filtration
- Ion Exchange
- MRNF/UF/RO
- Carbon Adsorption/Chemisorption processes
- pH Control & Neutralization
- Coagulation & Flocculation
- Metals Precipitation/Co-precipitation
- Advanced Oxidation
- Thermal Evaporation/Crystallization

Biological processes
- Aerobic & Anoxic Activated Sludge Processes
- Anaerobic Treatment/Digestion
- Mechanical/Diffused Aeration
- Nitrification/Denitrification
- Moving Bed Bioreactors (MBBR)
- Membrane Bioreactors (MBR)
- Sequencing Batch Reactors
- Powdered Activated Carbon Biological Treatment

Residuals management
- Solids Thickening and Digestion
- Solids Dewatering
- Solids Handling and Disposal
- Waste to Energy Systems
- Brine Management

Emissions control
- Floating Roof Tanks
- GAC Adsorption
- Thermal Oxidizers
- Incinerators
- Flares
- Odor/Hydrogen Sulfide Control

AECOM also provides alternative delivery approaches, including engineering procurement, construction (EPC), design-build, design-build-operate, and financing schemes.
AECOM assisted the City of San Luis Obispo through Pacific Gas & Electric (PG&E) Sustainable Solution Turnkey (SST) program to implement a turnkey design-build energy efficiency retrofit project to improve the city’s Water Reclamation Facility by decreasing operating costs and reducing its GHG emissions. The scope included an extensive list of measures, some of which include:

- Upgrade/replace the existing cogeneration system to use available bio-gas and to maximize cost savings
- Upgrade existing Supervisory Control and Data Acquisition (SCADA) controls to maximize energy and operational efficiency at the various facilities
- Replace the aging and energy-inefficient head works and solids dewatering systems with new, energy-efficient systems
- Retrofit primary sludge pumps
- Implement aeration tank air pressure set-point control improvements

These improvements saved the city about $325,000 per year (more than $11 million over the 25-year equipment life) through energy efficiency savings, a reduction of operation and maintenance costs and utilization of all available utility rebates and incentives.

For Tyco Fire Products (now Johnson Controls), AECOM designed a replacement wastewater system with a state-of-the-art batch treatment system for treating various streams, including metal bearing and paint wastewater.

We conducted testing of the industrial wastewater pretreatment design, which involved completing laboratory bench-scale treatability studies on wastewater from multiple process streams. Results from studies were used to develop a wastewater pretreatment process to help the facility maintain compliance with its wastewater discharge permit, as well as to help the client identify and eliminate avoidable sources of contamination in production systems.

The system included two recipe controlled batching processes for treatment of wastewater. Batch treatment technology was chosen to match the flow characteristics of the process streams and minimize fine中文字符. We also designed an Allen Bradley PLC and operator interface using RS View HMI software.

For the same client, we also designed an ultrafiltration system to recycle parts washer fluid and floor cleaning solutions. AECOM oversaw the client’s contractors for installation of the system, which included an ultrafilter, oil-water separator, tanks, pumps, piping and concrete pads. Following installation, AECOM inspected the system, provided start-up and trained the system operator.

AECOM performed a comprehensive evaluation of an existing industrial wastewater treatment system (IWWT) at a steel mini-mill that engages in scrap processing and the manufacturing and marketing of merchant steel products and billets. The purpose of the study was to evaluate the IWWT and identify the necessary upgrades required to increase capacity of the system. The water is received from steel quenching operations and generally consists of flow equalization, coagulation, flocculation, sedimentation, and filtration with treated water discharged to Peters Creek, a tributary of the Roanoke River Basin.

Our scope of services included historic data review, analysis of existing system operations; evaluation of potential clarification and filtration technologies and other improvements; and recommendation, planning and cost estimation of proposed upgrades. Technologies evaluated included ACTIFLOW, Densadeg, CoMag, and settled sludge recycle. AECOM recommended piloting a settled sludge recycle to improve clarification performance through dense sludge interaction with the emerging floc formed through the coagulation/flocculation process. We also evaluated effluent filtration technologies to replace the existing falling pressure filter. Evaluated options included an in-kind replacement of the existing pressure filter or replacement with cloth media disk filters that provided ease of operation and saved capital costs.

AECOM helped develop a membrane filtration system to “polish” drinking water to meet Albert’s Environment’s Standards and Guidelines. Located on the banks of the Athabasca River in the foothills of the Rocky Mountains, the water treatment plant provides drinking water to the town of Hinton and is integrated with the process water supply system that serves the West Fraser Pulp Mill.

The plant has an overall rated capacity to extract 156 ML/d from the river and generally consists of:

- Chemical rapid mixing and coagulation
- Solids contact upflow clarification
- Rapid gravity filtration
- Disinfection using chlorine gas
- Fluoridation

Ninety percent of the water is destined for the pulp process and implementation of lime softening is utilized during winter months, making operation of the plant and the upset conditions during the transition period a significant challenge to maintain drinking water quality.
As a member of the joint venture team for the City of Davis’ $90 million Wastewater Improvement Program, AECOM was responsible for design-build services for the secondary and tertiary upgrade of an existing wastewater treatment plant. The upgrade involved replacing all existing Programmable Logic Controllers (PLCs), as well as integrating new PLCs (balance of plant and original equipment manufacturer) into the SCADA network.

There was remarkable consistency among team members regarding goals, priorities and decisions... I've never experienced such a seamless integration of diverse staff from two businesses into a single cohesive entity.

Michael Lindquist, PE
City of Davis, Program Manager

AECOM provided construction management services for the Groundwater Recovery Enhancement and Treatment (GREAT) program’s Advanced Water Purification Facility, for the city of Oxnard, California. The program, which is one of the largest, most prominent recycled water programs in the U.S., guarantees a sustainable and reliable water supply for the growing community. The facility can take on 6 mgd (25 mgd ultimate capacity) of wastewater and produce high-quality recycled water through the use of low-pressure membranes, high-pressure reverse osmosis desalination membranes, and advanced oxidation disinfection technology (through a combination of ultraviolet light and hydrogen peroxide). AECOM also managed 10 miles of recycled water pipeline utilizing both conventional and trenchless technologies. The pipeline conveys this water to golf courses and spreading basins so that the water can become part of the groundwater aquifer again.

As the third-party construction manager, AECOM oversaw the entire project, which includes three designers, four contractors, and pre-procured equipment from four different suppliers.

The world’s largest single-site, lead-acid battery facility faced new regulatory challenges that required substantial reductions in effluent heavy metals and the need to remove more than 95 percent of the total dissolved solids concentration. To help the facility comply, AECOM performed extensive pilot testing for various chemistries and process equipment, including membrane filtration and reverse osmosis. Regardless of the effectiveness of the metals treatment protocol, the residual TDS presented a disposal problem.

After carefully scrutinizing the technologies and operating costs, iron co-precipitation followed by clarification and filtration was selected to purify the resultant sodium sulfate brine. The purified brine was further processed using a falling film evaporator and forced-circulation crystallizer to recover distilled water and produce a pure salt cake. The salt cake was further dried to produce commercial anhydrous sodium sulfate for sale.

This facility type and size had never been constructed before. The technologies incorporated had never been combined to achieve a totally closed-loop solution. This process was awarded a patent, and remains the Best Available Technology. The treatment facility is the largest of its type in the world, producing more than 1.7 million gallons of process water per week.

AECOM provided program management services and served as the Owner’s Representative for this $63 million, award-winning Water Recycling Program. The project involved construction of a new state-of-the-art water recycling facility (WRF) under a design-build-operate approach. The new WRF uses membrane bioreactor wastewater treatment technology to improve water quality, meet environmental improvement goals and achieve the city’s projected wastewater flows of 2.4 mgd through 2028. We handled the permitting and engineering needed to convert the local community to recycled water use and oversaw the installation of over 100 miles of on-site subsurface irrigation piping at schools, parks and other sensitive community public sites. Our work included:

− Capital improvement plan program management
− Management implementation plan for procuring and managing consultants, construction management teams and contractors
− Scheduling/estimating
− Permitting, right-of-way acquisition
− Community relations planning
− Enterprise management system development and reporting
− Value engineering
− Quality assurance
− Constructability, labor resource and peer reviews

Statement of Qualifications
AECOM’s program, project and construction management (PM/CM) services have supported thousands of projects with a total construction value in the hundreds of billions. We deliver management solutions that maximize return on capital investment, unlock opportunities for clients and communities, protect our environment, and improve lives.

Clients demand cost certainty and timely delivery of their capital programs at the quality levels and scope limits that constituents and stakeholders expect.

We realize our clients’ goals and business requirements with a blend of technology, innovation, best practices, and experienced, industry leading professionals. Regardless of whether we lead a single project or multiple, concurrent projects, our primary objective is to keep you on track and within budget.

From guiding constructability and buildability during pre-construction, to providing supervision and leadership during construction and close-out, we focus on minimizing your risk and exceeding your goals. We take this stewardship seriously, with a commitment to excellence that enables us to build better communities one project at a time.

As a premier leader in program and construction management, we direct and develop projects of all sizes and scopes while ensuring our clients’ timelines, budgets, and quality needs are met.

From funding and financing, strategizing and planning, design, construction packaging, procurement, and delivery through training, operations and maintenance, and close-out, AECOM program management professionals, processes, and procedures drive clarity, collaboration and high performance throughout the entire program life cycle.

We share what we know with our client partners, which is why knowledge transfer is included in all our program management assignments. And because we understand the functions and responsibilities required during all capital program life cycle phases, we are able to seamlessly implement and deliver consistent, successful outcomes.
Tools for Success: AECOM’s Major Program Solutions (AMPS)

AMPS is a web-based system that allows multiple users to access data and project/program status. Based on Meridian Proliance and Oracle Primavera P6 software applications, AMPS provides a single solution for effective management of large capital projects. AMPS enables real-time communication and encourages collaboration with outside partners while still controlling the level of access. It is also designed to integrate at various levels with other systems, such as sharing scheduling and invoicing data.

Therefore, programs our clients already have in place can be integrated within the platform. Standard forms, templates, and tools are created to ensure documents meet all contract requirements. The AMPS system includes management dashboards to communicate complex information about the program, as well as other tools for budget and cost management; earned value management; contract, change, field, and document management; and daily reports, submittals and deficiency lists.

Tools for Success: Global Unite Indicative Design Estimator (GUIDE)

GUIDE is AECOM’s international benchmarking and project performance indicator database. A great complement to our program, cost and consultancy services, this tool helps us provide early stage construction cost and design advice based on the benchmarks of similar projects.

GUIDE is available via iPads, Android tablets and web browsers. It draws on project information in Global Unite’s data warehouse, helping us predict early stage construction costs better than any of our competitors due to the size, scale and reach of our information library. GUIDE is the only construction industry benchmarking product that covers as broad a range of data and utilizes as many projects to present its information.
CONSTRUCTION MANAGER-AT-RISK FOR BIOMEDICAL RESEARCH FACILITY
Grand Rapids, Michigan

AECOM Hunt provided construction management/CM-at-risk services for the expansion of the Van Andel Research Institute (Phase II Addition), an independent biomedical research and science education organization. The 240,000 square foot biomedical research and education facility has five levels of lab space supported by a basement, penthouse mechanical levels and one administrative level. Lab space includes the Michigan State University Human Medicine Research Laboratory, an 18,000 square foot biomedical research lab facility consisting of a BSL-2 open lab. Also included was an open “dry” lab, media prep, crystallography and vivarium expansion, which includes animal holding, necropsy, quarantine and procedure rooms. Additional work includes a 7,000 square foot vivarium build-out and a 21,000 square foot office renovation.

CONSTRUCTION MANAGER-AT-RISK FOR PHARMACEUTICAL MANUFACTURING FACILITY
Fort Worth, Texas

AECOM Hunt provided construction management/CM-at-risk services for an expansion program for Alcon at its Sterile Products Division campus. This multi-site development included a 320,000-square-foot pharmaceutical manufacturing facility with a 95,000-square-foot warehouse containing a high-bay storage rack system with fully automated storage and retrieval equipment. The campus also included a 200,000-square-foot production facility and 25,000 square feet of office and administrative space.

UNIVERSITY RESEARCH AND TEACHING LABORATORIES PROGRAM
New York, New York

AECOM provided construction management/build services for renovations to laboratories at six campuses of the City University of New York (CUNY), including three research laboratories in Steinman Hall at City College and the North Building at Hunter College and six teaching laboratories at Hunter, City, Lehman, LaGuardia, Brooklyn and Queens colleges. The renovations included asbestos abatement, demolition of existing laboratory facilities, construction of new plumbing, electric and HVAC systems, walls, ceilings, floors, doors, lab equipment and lab furniture. Our services began during pre-construction with design reviews, cost estimates, contract preparation and bid solicitation. During construction, we provided daily inspections and testing; cost and schedule control; processing of submittals, change orders, RFIs and invoices; and coordination between architect, contractors and client. All labs included extensive electrical work, such as motor starters and variable frequency drives for fan motors under five horsepower. Other notable features included a unique table top exhaust system at the LaGuardia lab and commercial kitchen equipment and furniture with a specialized fire suppression system and fume hoods at the Food Sciences lab.

PROJECT MANAGEMENT FOR BIOTHERAPEUTIC MANUFACTURING FACILITY
Hillsboro, Oregon

AECOM provided project management services for Genentech’s new biotherapeutic manufacturing facility on a 75-acre greenfield site. This 295,259-square-foot facility includes a fill/finish space, warehouse, laboratory/administration building and central utility plant. Services included:

- Project controls
- Change management
- Scheduling
- Risk management
- Cost estimating
- Value engineering

We also worked on numerous projects at the Genentech South San Francisco headquarters campus, including:

- Building 12 bio-organic chemistry laboratory renovation
- FRC II laboratory and office building
- Building 4 Phase III HVAC upgrades
- Buildings 1, 2, 4 and 15 remodel and seismic upgrades
- Building 10 laboratory
- Buena Vista laboratory fit-up, addition, and remodel
- Building S laboratory and administrative facility
As the lead joint venture partner, AECOM is providing program management services for this 20-year, $6.9 billion Sewer System Improvement Program (SSIP) for the San Francisco Public Utilities Commission. This system is comprised of three treatment plants and nearly 1,000 miles of sewer pipelines, tunnels, and transport/storage boxes.

The SSIP addresses a range of issues, including:
- Aging infrastructure and poor condition of existing facilities
- Seismic reliability
- Limited operational flexibility and lack of redundancy
- Adaptation to climate change impacts
- Ongoing need to protect the environment and public health
- Meeting existing and future regulatory challenges.

To improve and provide efficient and streamlined program delivery, AECOM established an organization and governance system early on that established clear decision making procedures, including engineering and operational liaisons so the needs of both engineering and O&M are met.

A major part of the collection system work involves assessing the city’s collection system assets. This effort includes the development of a phased condition assessment program, selective inspections, rehabilitation recommendations and program-level assessment of the state of the sewer infrastructure.

Over the last two decades, AECOM has managed a series of comprehensive upgrades involving master planning, concept design, detailed design, construction management, commissioning, and subsequent O&M training at the 390-mgd Blue Plains Advanced WWTP, the largest of its kind in the country.

For our current work, we are providing program and construction management services for a $1.5 billion upgrade. As DC Water’s program manager, AECOM developed integrated biosolids management, wet-weather management, and nutrient removal programs for Blue Plains by taking a holistic view of the facility. Our involvement began with the inception of innovative process solutions through bench scale and pilot testing. We continued with the development of design criteria and tools, such as the plant-wide BioWin process model, transitioned into the detailed design phase, and continue as we currently serve as construction manager for the 10-year construction program.

As part of New York City Department of Environmental Protection’s (NYCDEP) Wastewater Resiliency Program, AECOM is providing program and construction management for the design and construction of the $200 million upgrade for the city’s 14 WWTPs and more than 50 pumping stations located throughout five boroughs.

During Hurricane Sandy, flooding affected 10 of NYCDEP’s 14 WWTPs and 42 of its 96 wastewater pumping stations (WWPSs). A projected increase in flood risk stemming from continued sea-level rise due to climate change and more extreme storm surge events, enforces the need to harden NYCDEP’s wastewater infrastructure to reduce the probability of damage, service disruptions, and environmental impacts from surge events. A series of adaptation strategies was identified for many of the wastewater facilities, including installation of temporary and permanent barriers, flood proofing of buildings, raised elevations of critical equipment, and installation of emergency backup power.

Due to the size and complexity of this program, NYCDEP engaged AECOM as Program Manager to oversee the day-to-day implementation, communication, and management of all program phases, and the development of projects within the program. The program is schedule to be complete in December 2019.

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AECOM is managing the comprehensive modernization of the Los Angeles International Airport (LAX). The LAX master plan provides for the design and phased construction, while continuing to serve 65 million passengers a year. The implementation plan includes:
- Bradley International Terminal expansion
- New Midfield Satellite Concourse
- Relocation of south runway
- Addition of center taxiway to accommodate new large aircraft and improvement of airfield movements
- New Intermodal Transportation Center (ITC) to improve land access to the central terminal area
- Consolidated rental car facility

This multi-phased project addresses issues facing the future of Los Angeles and its surrounding areas by providing a unified, sustainable front door to the city and exemplifying the ability of design to strengthen the existing urban fabric and enhance quality of life. The enhancements will provide a new view for addressing the inevitable growth of LAX by offering design solutions that enable smart, sustainable planning while also capturing the spirit of Los Angeles, helping define the future of its major transportation nexus.

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With 87,000 employees doing business in more than 150 countries, AECOM has an office near you to provide local knowledge backed by our global network of experts and experience.

Regardless of the market or industry, we know you face tough challenges, and our staff work hard to understand and solve them better than anyone else.

With the best minds in design, architecture, engineering, economics, planning, building and project management, we’re built to create and unlock new opportunities around the world and right in your own community.

We match the complexity of your challenges with the diversity of our inhouse expertise, spanning all phases of the project life cycle — planning, design, build, finance, operate and maintain.

Through our in-house capabilities, we offer integrated services for total project delivery, covering everything from initial environmental planning studies to detailed design, construction management, total program delivery operations and maintenance, and finance expertise.

With 400 offices across the Americas, AECOM provides staff knowledgeable about the local conditions, regulations, subcontractors and more, regardless of the project location or service request.

Included on the next pages are summaries of some of the excellent staff available to support Applied Materials. These professionals represent our ability to support a wide range of projects, from energy services, to water/wastewater, to program and construction management. We also offer additional capabilities for environmental engineering, architectural design, transportation and much more.

Learn more at aecom.com or @aecom.com.
About AECOM

AECOM is built to deliver a better world. We design, build, finance and operate infrastructure assets for governments, businesses and organizations in more than 150 countries. As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges. From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM had revenue of approximately $18.2 billion during fiscal year 2017. See how we deliver what others can only imagine at aecom.com and @AECOM.

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