

**Dams and Reservoirs**

# **Sustainable and Secure Water**

Enabling Safe, Sustainable Water Supplies and Flood Protection





We are an international leader in dams and reservoirs. We have a comprehensive, global team of specialists who work across the full project life cycle — delivering solutions to the world’s most complex problems.

**Diamond Valley Lake Dam**  
Riverside County, California, USA



# Dam and Reservoir Capabilities

With more than 85 years in the industry, we are recognized as an expert in dam, reservoir and hydropower engineering, having worked on tens of thousands of dams and water resources projects around the globe. We offer solutions in every facet of dam engineering from planning and feasibility through design and construction, commissioning, operation, ongoing dam safety monitoring, maintenance, rehabilitation and decommissioning.

Our team has extensive experience in delivering dam engineering projects for public- and private-sector clients. We combine our connected expertise across multiple disciplines to solve our clients most complex challenges. This integrated approach allows us to pair local knowledge with global expertise to deliver the best project outcomes for our clients.

We develop specialized procedures and computer models that simulate past, present and future water system operations. Our high-caliber engineers and specialists excel in simulating surface and groundwater supply options, complex reservoir operations and instream flow requirements.

We assess and analyze alternative water resource management strategies. Our water resource specialists understand the complex institutional and regulatory aspects of federal and state-issued permits and water rights, and their interaction with environmental permitting and adaptive management programs.

We work across the entire project life cycle — on both traditional and alternative project delivery options such as design-build, design-build-operate and public-private-partnerships. Our projects are varied and include greenfield projects as well as dam upgrade and augmentation projects. As a leader in upgrading and rehabilitating major dams, we have completed projects across the globe that reflect our global reach. Dedicated to delivering dependable, transformative projects, we come together to solve complex challenges.

Areas of expertise:

- Dam safety
- Embankment dams
- Concrete dams
- Structures
- Mechanical and electrical
- Hydrology and hydraulics
- Geotechnical and geology
- Seismic hazard analysis
- Fish passage
- Construction
- Monitoring
- Decommissioning

We continue to successfully deliver award-winning dam engineering services that are innovative and cost-effective, and are ranked **No. 2 in Dams and Reservoirs** in the *Engineering News-Record (ENR) Top 500 Design Firms* list for 2020.



**ENR2021**

TOP 500 WATER

- 1 Dams and Reservoirs
- 1 Water Treatment Lines
- 2 Water
- 2 Water Supply
- 2 Wastewater Treatment
- 3 Water Treatment, Desalination
- 3 Sewer and Waste

Cover image:  
**Lake Casitas Dam**  
Ventura County, California, USA

# Dam Safety



## **Echo Dam**

Summit County, Utah, USA

*Analyses conducted for the dam identified potential dam safety deficiencies related to the performance of the embankment and spillway during the design earthquake. Our support to the Bureau of Reclamation throughout the project included seismic deformation analyses, risk assessment and a Corrective Action Study to evaluate various alternatives and design of modifications to address dam safety issues.*

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**Our experienced team has the specialized knowledge to deliver leading-edge dam safety risk analysis and prioritized risk management strategies while actively working to preserve and enhance the safe and cost-effective management of dams, worldwide.**

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We've worked with federal agencies to pioneer and improve the application of risk assessment techniques on dam safety projects. Our team of industry-recognized professionals provides comprehensive evaluations that incorporate dam inspections, development and implementation of surveillance and monitoring programs and risk analyses — including identification of failure modes, quantification of failure probabilities, and estimation of consequences. We've been actively involved in dam risk management since risk-guided prioritization decision methodologies were initiated.





**Hinze Dam**  
Queensland, Australia

A thorough understanding of each dam owner's requirements is fundamental to the successful delivery of a risk-based dam safety management program; it allows us to focus the outputs from our risk models and communicate real dam safety liabilities to audiences with a range of technical capabilities, from owners and operators, to dam engineers and safety regulators.

We offer clients access to state-of-the-art tools and analysis techniques ranging from inventory-wide risk prioritization screening to risk analysis workshops for estimating dam failure

probabilities. We have developed effective new risk assessment toolboxes for seepage, piping, and spillway erosion, as well as the most advanced probabilistic models to assess the risk of seismic induced dam failure.

Our team has the skills, expertise and software required to deliver a comprehensive dam safety assessment that includes the potential for loss of life and economic and environmental consequences.

Our key skills include:

- Dam safety risk analyses, including detailed and portfolio
- Project-specific internal erosion risk analyses
- Flooding, dam break and consequence assessments
- Seismic-related failure modes identification for embankment and concrete dams
- Risk reduction alternative development and evaluation
- Operations and maintenance and emergency planning
- Dam safety surveillance and monitoring program development

# Embankment Dams



## **Diamond Valley Lake Dam**

Riverside County, California, USA

*We were the principal dam designer for one of the largest embankment dam projects constructed in the United States. We also provided on-site engineering services during construction. The key features creating the 800,000 acre-foot Diamond Valley Lake project are three rockfill dams, 130-285 feet in height (190- to 375-foot structural height), comprising 110 million cubic yards of material with a combined crest length of 4 miles.*

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**We have internationally recognized experience in the design and upgrade of embankment dams and levees for flood management and water storage. Our experience also includes the assessment of suitable construction materials, the design of seepage controls, foundation treatments and design of embankment zoning.**

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Our experts use risk informed decision making where appropriate, implementing defensive design measures within the embankments and foundations that are appropriate for the risk classification. Our embankment designers work corroboratively with our geotechnical specialists to manage geohazards and geological engineering risks.

Our professionals have acclaimed expertise within a broad range of specialized geotechnical defensive design measures including:

- The evaluation and design of engineered filter zones, one of the critical defensive design measures for modern embankment dams
- Seepage control measures including foundation barrier walls
- Foundation treatment measures including stone columns, deep soil

mixing and grouting to improve the performance of poor foundations

- The evaluation and design of engineered filter zones, one of the critical defensive design measures for modern embankment dams

Our key skills include:

- Site selection
- Embankment zoning and filter design
- Material selection and characterization
- Internal erosion risk analysis
- Slope stability modeling
- Seepage analyses
- Foundation treatment
- Erosion protection
- Deformation assessment
- Instrumentation
- Constructability reviews
- Inspections



# Concrete Dams



## **Toker Dam**

Eritrea, Africa

*The new Toker Dam, an RCC dam, was a desperately needed component of the water supply system of Asmara, the capital city of Eritrea, Africa. The project consists of a 240-foot-high RCC dam, with a volume of 260,000 cubic yards. Appurtenant structures include a spillway over the top of the dam and a gated, multiple-level outlet works.*

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**Our professionals are internationally recognized for the design of new concrete dams and safety improvements to existing concrete dams for water storage, power generation, flood mitigation and recreation. We specialize in the structural evaluation of gravity, arch and buttress dams using state-of-the-practice finite element analysis and engineering design tools that support new construction and rehabilitation measures, such as the installation of post-tensioned anchors and the construction of concrete buttresses.**

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Our experience includes roller compacted concrete (RCC), which, today, is a commonly preferred material for concrete dam construction due to:

- Rapid construction time
- Reduced volume of cementitious materials
- Integral dam and spillway where suitable foundation conditions exist

We are a leader in the development of RCC design practices for dam applications as a result of our RCC projects over the past 30 years. Our RCC specialists are involved in the development of RCC design standards issued by the American Concrete Institute and Portland Cement Association. We also have extensive experience in developing RCC mix designs for use on dam projects.

We specialize in structural evaluation of new and existing concrete dam projects and have used innovative numerical modeling techniques to help our clients achieve significant benefits such as:

- Eliminating or reducing anticipated rehabilitation measures by taking advantage of three-dimensional structural interaction to demonstrate adequate performance under these conditions
- Performing progressive structural evaluations starting with simple analyses and conservative assumptions and refining the analyses only when the simpler approach indicates marginal structural response

- Reducing overall costs through design optimization by using more sophisticated models where warranted
- Providing a basis for structural detailing and required methods for placement of concrete to control thermal cracking during and after construction
- Providing a basis for evaluating instrumentation and monitoring data for dam safety compliance during construction and throughout the life of the project

# Structures



## **Prado Dam, Gates and Control Tower Replacement**

Riverside County, California, USA

*We provided services to the US Army Corps of Engineers (USACE) to raise the dam by 65 feet, and to replace the gates and control tower at the Prado Dam. The improved storage and release capacities of the dam that were achieved through this project enabled USACE to take full advantage of the improved channel capacity downstream. The improvements greatly increased the level of flood protection to the communities of Orange County in the Santa Ana River floodplain.*

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**We have significant experience in assessment, remediation and design of structural components of dams and hydraulic structures. Our assessment capabilities range from simple analysis techniques to complex 3D finite element analyses. We also have key experience in mass concrete and roller compacted concrete mix design and thermal assessment.**

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We specialize in structural review and assessment of new and existing structures including concrete gravity dams, concrete arch dams, spillways, intake towers, retaining walls, outlet works, parapet walls, conduits, bridges and other appurtenant structures.

Our assessments are undertaken based on the extensive experience of our engineers and range from simple analyses to state-of-the-art computer modeling to suit the complexity of the structure and project, including 3D finite element analyses using programs such as ANSYS.





Left and above:  
**Rocky Pen Run Reservoir**  
 Stafford County, Virginia, USA  
*We provided engineering and construction services for the design of the Rocky Pen Run Reservoir project. The project consists of a 5.3-billion-gallon, pumped-storage, raw water supply reservoir and pump station adjacent to the Rappahannock River. Components include the main dam, spillway, outlet works, saddle dike, pump station, pipeline and access roads.*

Through our in-depth understanding of the performance of these structures, we have delivered innovative designs that have led to significant savings in capital costs during construction.

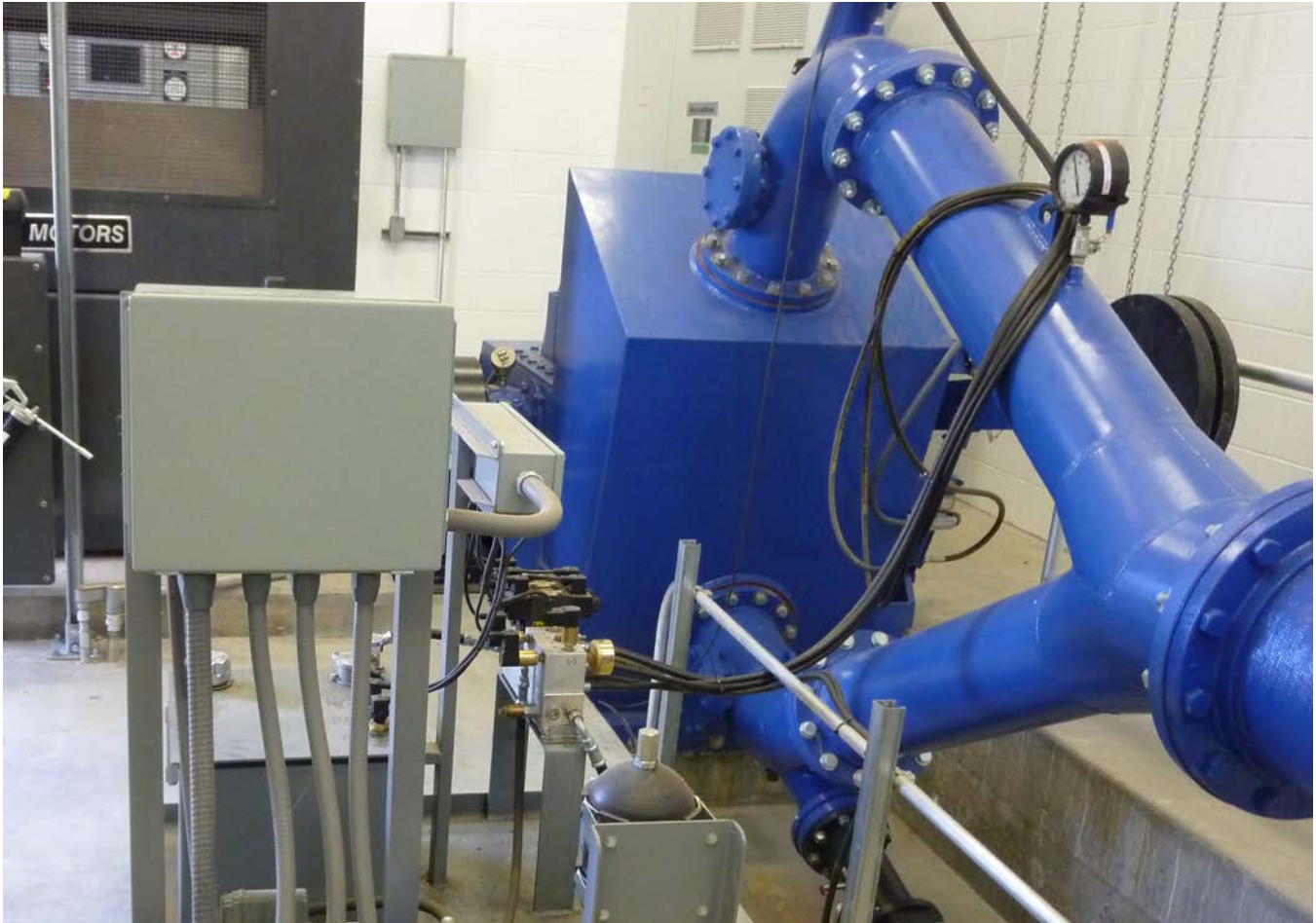
Of particular importance is our ability to not just deliver on the detailed designs, but to work with our clients and their contractors during the construction stage of the works. Our engineers have significant experience in current material specifications, such as concrete mix designs. We are leaders in construction supervision and have a deep understanding of advanced industry construction techniques. This provides substantial benefits as we deliver our projects.

Our key skills include:

- Hydraulic structure design
- Spillway buttress design
- Outlet works design
- Finite element modeling
- Intake tower strengthening
- Parapet wall design
- Mass concrete mix design
- RCC applications
- Bridge design



# Mechanical and Electrical



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Our team has a wealth of experience in design, specifications, investigation and inspection of mechanical and electrical elements associated with dam appurtenant works. We have led new facilities development as well as existing facilities' upgrades.

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Our team of mechanical and electrical engineers has considerable experience in the works associated with dams. This includes the mechanical and electrical aspects of comprehensive inspections of large dams consistent with international dam safety guidelines. We have carried out detailed analysis and condition reporting on critical mechanical systems, such as guard valves, scour piping and spillway

gate hoisting systems. We have also undertaken upgrades to outlet and intake pipework, and have worked with our structural team to assess potential seismic issues. We have experience in the preparation and review of detailed operations and maintenance (O&M) manuals and standard operating procedures (SOPs), with a focus on the safety and longevity of the asset.

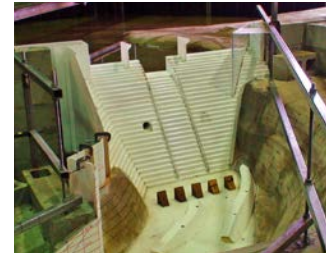
We typically work on such assets as spillway gates, gate locking systems, gate hoisting, intake and outlet pipework, large-diameter valves, raw water pump stations, toe drains, maintenance cranes, personnel lifts, ventilation and transient analysis, high voltage (HV) and low voltage (LV) power distribution and backup systems, electrical drives, instrumentation, control systems and communications.

Our key skills include:

- Outlet works mechanical design
- Pipe stress analysis
- Design and specification of spillway and fish passage gates
- Design, troubleshooting and specification of pump stations
- Hoist drive train analysis
- Speciation of cranes and lifts
- Drainage pumping
- Condition assessment and reporting
- Gate electrical and control system design
- Electrical services design
- Instrumentation, control and communications
- Development of O&M manuals and SOPs



# Hydrology and Hydraulics



Left and above:  
**Hinze Dam**  
Queensland, Australia  
*Raising the Hinze Dam for additional water storage was a key component of the Gold Coast Waterfuture Strategy. The risk-informed upgrade design raised the dam embankment 50 feet, from 310 feet above sea level, to 360 feet and extended the saddle of the dam by 2,600 feet. The complex foundation conditions at the right abutment required treatment that included the construction of a plastic concrete barrier wall to depths of up to 165 feet.*

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We have extensive experience in hydrologic and hydraulic evaluations for water resources projects around the world. Our engineers have been responsible for solving problems ranging from simple spillway design to the complex hydraulic routing of dam break flood waves.

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We specialize in hydrologic and hydraulic assessment and design of river basins, reservoir systems and flood management projects. This includes modeling of extreme rainfall events; sizing and optimizing hydraulic structures to permit safe passage of flows, including spillways, outlet structures and appurtenant works such as energy dissipation, flow training and

erosion protection features; upstream and downstream fish passage; and hypothetical dam failures.

Our assessments are undertaken based on the expert experience of our engineers and by using an array of state-of-the-art computer programs and assessment techniques. These include the use of complex numerical modeling software, such as 1D and 2D hydrodynamic modeling and computational fluid dynamics (CFD), as well as physical hydraulic modeling techniques. Through our knowledge, understanding and experience of industry leading assessment techniques, we have delivered innovative designs that have led to significant savings in capital costs during the construction and operation of client facilities.

Our in-depth knowledge of dam safety rules and requirements across the world allows us to offer clients comprehensive hydrological and hydraulic design solutions through all stages of the project life cycle, using skills and techniques that are appropriate to the size and complexity of the project.

Our key skills include:

- Extreme flood hydrology
- Computational fluid dynamics modeling
- Physical hydraulic model investigations
- Hydraulic structure design
- Spillway optimization
- Spillway erosion assessment
- Outlet works design
- Environmental flow releases
- Modeling (HEC Suite, etc.)



# Geotechnical and Geology



## **Elkhead Reservoir Enlargement**

Moffat and Routt Counties,  
Colorado, USA

*We have provided design services for Elkhead Reservoir since 1993. The services we provided for this multidisciplinary reservoir enlargement project upgraded the facilities, increased storage capacity, improved habitat for endangered native fish species in the Yampa River and provided extra capacity for future growth.*

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Geological conditions and the constraints they impose are a critical aspect of dam design, construction and performance. Whether the project involves design of a new dam, or investigating the performance of an existing dam, understanding the geological conditions and engineering performance of the materials is a specialty of our geologists, hydrogeologists and geotechnical engineers.

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Our team of geologists, hydrogeologists and geotechnical engineers are highly skilled and experienced in the geological conditions of a wide geography, with knowledge covering an extensive range of geological processes from active faulting, landslides and deeply weathered foundations to glaciation. Our in-depth understanding of these processes allows us to identify potential failure modes and risks at an early stage and to target specific investigations to quantify and manage these risks.

Our geology/geotechnical team works seamlessly with our experts in dam safety, embankment design, hydraulics and structures, delivering the inputs required for risk analysis and design of embankments, their





Left and above:  
**San Roque Dam**  
 Luzon, Philippines  
*Under an Engineering, Procurement, Construction (EPC) contract AECOM designed and built one of the largest hydroelectric, flood-control and irrigation projects in Asian history. Its major feature is a 650-foot-high rock-fill dam with a concrete chute spillway. The project reduces flooding, provides irrigation to more than 200,000 acres of land, and supplies clean hydroelectric power for commercial and industrial use to a region that desperately needs it. The spillway design required accommodating the Probable Maximum Flood (PMF) of 452,000 cfs.*

foundations, spillways and outlet works. We develop models ranging from simple close-form equations to complex 3D numerical models.

The geologic and geotechnical engineering expertise we have developed forms the basis for safely executing technically challenging upgrades including designing for seismic faulting through dam foundations, deep excavations and crest raising. Our targeted investigations have contributed to providing justification for owners to avert the need for costly upgrades. These solutions and outcomes have delivered exceptional value for our clients.

Our key skills include:

- Geological mapping of dam foundations and regional geohazards (faults)
- Scoping and supervising geophysical (non-intrusive) investigations
- Scoping and supervising testpitting, trenching, and drilling investigations and laboratory testing programs
- Developing 2D and 3D geological models
- Characterizing the engineering performance of foundation and embankment materials
- Developing upgrade options
- Evaluating options

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**Sustainable water supplies require integrated solutions. We collaborate with clients and stakeholders to create innovative dam and reservoir systems.**

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# Seismic Hazard Analysis



**Lake Isabella Dam**  
Kern County, California, USA  
*We performed seismic hazard evaluation for two embankment dams at Lake Isabella Reservoir.*

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**We have considerable experience in the field of seismic evaluation of dams, levees, slopes, and foundations in areas of high seismicity around the world.**

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We are a world leader in the field of seismic hazards evaluation, which requires an integrated approach in the disciplines of geology, seismology, geophysics and earthquake engineering. Seismic hazards include ground shaking and fault rupture, which are directly caused by earthquakes and their secondary effects such as liquefaction, landsliding and tsunamis. A seismic

hazards analysis attempts to assess the level of hazards by:

- Identifying the active faults that can cause earthquakes.
- Assessing the maximum earthquakes and the rate of earthquakes for each fault.
- Characterizing the ground motions that can be generated by each seismic source through ground motion prediction models or numerical ground motion modeling.
- Quantifying the hazard using the approaches of probabilistic seismic hazard analysis or deterministic seismic hazard analysis.





Our seismic hazards staff have evaluated seismic safety or developed the seismic design ground motions for more dams than any other firm in the world. We have worked on some of the most significant and largest dams in the world including the Aswan Dam in Egypt and Shasta and Auburn Dams in the USA.

Our seismic hazards staff has pioneered the development of many of the field techniques, analytical procedures and computer models that are widely used by the geological, seismological and engineering professions. Our staff has developed advanced methods for the computer modeling of seismic source characteristics and seismic wave propagation, and uses these

capabilities to estimate the strong ground shaking in locations where suitably recorded data are sparse.

We have contributed to the rigorous development of methods for analysis of site response. In addition, we have an extensive library of computer programs for static and dynamic soil-structure interaction and foundation analysis, including: SHAKE, QUAD4M, SAP-2000, NONSAP, Q-FLUSH, FLAC7 and PLAXIS.

Our key skills include:

- Development of procedures for seismic analyses
- Liquefaction potential evaluations
- Site response analyses
- Dynamic slope stability analyses
- Soil structure interaction
- Deformation analyses

**Santiago Creek Dam**

Orange County, California, USA  
 160-foot exploratory fault trench to investigate the Terrace Fault.



# Fish Passage



## **Baker River Hydroelectric Project, Puget Sound Energy**

Washington, USA

*In its first year of operation in 2008, the AECOM-designed Floating Surface collector generated the highest out-migration rate on record for juvenile Baker River sockeye salmon. The project received the National Hydropower Association's 2009 "Outstanding Stewards of America's Waters" award.*

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We are experienced designers of fish passage solutions that enable the safe upstream and downstream passage of fish past dams and weirs. Our engineers have designed a range of different fishway types, each of which suit the particular biological and engineering requirements of the site.

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Historically, the construction of riverine dams, weirs and banks has prevented freshwater fish from traveling upstream and, as such, has resulted in a decline in fish populations. Fishways enable fish to migrate upriver past a dam or weir and provide an increase in fish biodiversity.

Our engineers specialize in the design of fish passage solutions at riverine structures and work corroboratively with industry renowned freshwater fish specialists to identify the most appropriate solution for each situation.

Integrating the biological requirements of the target fish species, our designs consider the complexities of providing fish passage at each particular location, including new or existing dams, weirs or banks. Where required, our engineers undertake or direct numerical and/or physical hydraulic modeling investigations to demonstrate that operational requirements will not be adversely affected by the proposed fishway design.





Retrofitting fishways into existing regulating structures is challenging and requires an understanding of the structure and its foundations. Our designs include geotechnical investigations and structural evaluations, providing designs that are constructible, while enabling the regulating structure to maintain functionality during the construction period.

Our designers consider safe downstream passage at existing and new structures, which can include the design of overshot gate systems, fishlocks, and vertical slot gate and valve systems.

Our key skills include:

- Developing design criteria to achieve biological objectives.
- Design of a range of fishway types including vertical slot fishways, Denil fishways, fishlocks, trap and haul systems and rock ramp fishways.
- Design to retrofit fishways into existing regulating and dam structures.
- Geotechnical, hydraulic, civil, structural, mechanical and electrical designs of fishways.
- Regulating gate designs.

**Alameda Creek Diversion Dam**  
Sunol, California, USA

*Feasibility studies and design of fish passage facilities to support restoration of steelhead trout to the Alameda Creek watershed. AECOM also acquired the environmental permits and managed the environmental compliance during construction.*



# Construction



## **Carter Lake Outlet Works**

Larimer County, Colorado, USA

*We completed design and construction phase engineering support for a new outlet works addition at Carter Lake Reservoir. The new outlet works is on the right abutment of the dam and parallels the existing outlet. The new outlet has a design capacity of 250 cfs and consists of a multiple-level, gated intake tower that is approximately 107-foot-high; a 6-foot diameter tunnel that is steel-lined, concrete encased and 800 feet long; a 300-foot connecting steel penstock; and a reinforced concrete valve structure housing a 42-inch sleeve valve and energy dissipation structure.*

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**We play an active role in implementing a broad range of significant dam and reservoir projects. Our services extend from preparing contract documentation, assisting clients with the tendering process and providing design support, to performing the management, monitoring and quality assurance role on site during construction through project completion.**

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We know the accurate translation of detailed designs into industry standard specifications and drawings is important to avoid errors on site and potential contract claims. For major dam projects, we use a specification format based on the Construction Specifications Institute standard specifications. Alternatively, where clients have a standard format for specifications, we customize our specifications to suit.

Maintaining design intent throughout construction is important to us and our clients, to give the best possible chance that the works will operate as designed and achieve the required design life. Our site personnel have a strong understanding of design





**Olmsted Dam and Locks**  
Ohio River, Illinois and Kentucky, USA

intent and construction practicalities to provide continuity from design through construction. Our designers also remain an integral part of the team throughout construction so that design changes or unforeseen conditions can be addressed quickly and efficiently with minimum effect on the project.

We have operated within a number of different types of project delivery systems, including traditional design-bid-build, design-construct, direct forces construction, target cost contracts, alliances and early contractor involvement. In all types of delivery systems, we have had active involvement during construction, working closely with the clients and contractors.

We are unique in that we also provide full construction of dams and related structures. Our perspective as a builder is reflected in our designs as we focus on constructability.

Our key skills include:

- Constructability assessments
- Construction risk assessments, including construction flood risk
- A strong understanding of contract documents, specifications and measurement and payment provisions
- Tender processes, including tender evaluation
- Cost estimating and programming
- Construction supervision and contract management
- Construction
- Design-build



**Olmsted Dam and Locks**  
Ohio River, Illinois and Kentucky, USA  
*We are the lead partner to construct this 2,700-foot-long concrete dam across the Lower Ohio River. The dam includes five, 110-foot tainter gates and a navigable pass section with boat-operated wicket gates. In-the-wet construction includes use of a 5,100-ton-capacity super gantry crane (pictured at top of page) to move precast concrete elements of the dam.*



# Monitoring



## Hoover Dam

Clark County, Nevada, USA

*Installing an automated system of vibration monitors to measure ground velocities associated with blasting for bridge piers near Hoover Dam. AECOM was one of the consortium of firms that built the Hoover Dam. More than 200 engineers worked to design the dam that would be constructed in Black Canyon. It is the highest concrete arch dam in the United States, and the largest building project that the federal government had ever undertaken.*

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Our engineers are experienced in producing dam safety management plans for the ongoing safety management of dams or during specific times such as construction staging, first filling or prolonged drawdowns. A key goal of our management plans is to provide early detection of potential dam safety issues so corrective actions can be implemented, if required, and dam safety is not compromised.

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Our experience includes condition assessment of existing instrumentation, upgrade of existing instrumentation to facilitate automation and the installation of new instrumentation. We believe instrumentation should be tailored to each individual dam so each instrument installed provides the owner with performance data linked to a key potential failure mode.

We offer our own comprehensive dam management system, DamSmart, which allows owners to actively manage their dam instrumentation data. Whether a project needs ongoing performance monitoring or an early warning system, DamSmart stands ready to serve as a single data source protector for





surveillance information. Since its inception, DamSmart has built a proven track record focusing on reduced labor costs and improved security.

For established instrumentation and surveillance networks, we can complete routine, comprehensive and special/emergency reviews. We tailor our services to each individual owner and project, providing solutions to many different types of challenges. We employ an integrated team approach to problem solving by collaborating with our clients to identify smart, viable, cost-effective solutions.

Our key skills include:

- Dam safety reviews and management of ongoing surveillance
- Installation and construction management of dam surveillance instrumentation
- Automated data acquisition systems
- Instrumentation data management
- Review of long-term performance monitoring of dams, levees, tunnels and other civil infrastructure

#### **Mosul Dam Rehabilitation**

Mosul, Iraq

*AECOM provided engineering and construction services in support of USACE during dam rehabilitation focused on foundation grouting and repair of bottom outlets.*



# Decommissioning



## **Glines Canyon Dam Removal**

Clallam County, Washington, USA

*We provided project and construction management for the National Park Service's simultaneous removal of the Elwha and Glines Canyon dams on the Elwha River. The project is considered the largest dam removal project in U.S. history and it has reopened more than 70-miles of pristine salmon spawning and rearing habitat in the river.*

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AECOM is an international leader in the design and construction of dams and reservoirs, as well as the decommissioning and removal of dams. Our engineers have a comprehensive understanding of the issues surrounding the decommissioning process and continue to play a key role in the sharing of knowledge in organizations such as the International Commission on Large Dams.

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Dam owner and stakeholder requirements can vary with time and result in dams that are no longer viable from an economic, environmental, public safety or other public interest standpoint. In such circumstances, treatment options may include decommissioning up to and including dam removal.

Dam decommissioning is gaining momentum as resource management, environmental and societal priorities change and the requirements for dam safety management become more rigorous.





We are experienced in guiding our clients through the dam decommissioning process and specifically in collecting and analyzing the technical and environmental data required to support the decision to decommission.

Coupled with our in-depth understanding and expertise of dam safety legislation and requirements, we are able to offer clients comprehensive solutions from planning through to delivery of the decommissioning phase of a dam.

Our key skills include:

- Engineering designs of partial and full removal options
- Cost estimates and cost benefit analyses
- Assessment of sediment disposal options
- Flora and fauna assessments
- Assessments of nonstructural options such as reduced water levels and change of operation
- Stakeholder engagement
- Hydrologic and hydraulic analyses

**San Clemente Dam Removal**

Monterey County, California, USA  
*San Clemente Dam was a 106-foot-high concrete arch dam approximately 18.5 miles from the Pacific Ocean on the Carmel River. When the dam was constructed in 1921, it had reservoir storage of approximately 1,424 acre-feet. Over the last few decades of its existence, the dam had lost its usefulness as a water supply source, and posted a significant safety risk to the public due to its compromised structural integrity. Although the dam had a fish ladder, annual fish counts revealed that passage was inconsistent and sub-optimal. With the removal of the dam in 2015, steelhead are now migrating up the river again to 25 miles of pristine main stem river and many miles of tributary habitat.*



## About AECOM

AECOM is the world's trusted infrastructure consulting firm, delivering professional services throughout the project lifecycle – from planning, design and engineering to program and construction management. On projects spanning transportation, buildings, water, new energy and the environment, our public- and private-sector clients trust us to solve their most complex challenges. Our teams are driven by a common purpose to deliver a better world through our unrivaled technical expertise and innovation, a culture of equity, diversity and inclusion, and a commitment to environmental, social and governance priorities. AECOM is a *Fortune 500* firm and its Professional Services business had revenue of \$13.3 billion in fiscal year 2021. See how we are delivering sustainable legacies for generations to come at [aecom.com](http://aecom.com) and [@AECOM](https://twitter.com/AECOM).

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