Assisting our waterfront clients with their safe return to operations through the implementation of programs and initiatives designed to support a phased Return to Service.
Introduction

With cruise ships subject to “no-sail” orders and ports experiencing decreases in cargo volumes, the impacts of coronavirus are far reaching. In the US alone where the largest cruise ports can process as many as 50,000 passengers per day, local and regional economies that benefit from cruise operations have been severely affected. Conversely, the pandemic may also drive an increase in ferry transport as commuters look for alternatives to traditional modes of public transit.

To ensure a successful return to full service, operations at ports and marine terminals will rely on the implementation of COVID-19 detection measures and deliberate actions undertaken to protect the safety of port staff, terminal personnel, ship crews and passengers. Whether driven by government regulation or industry best practice, new health screening systems, procedures and policies for building re-occupancy, cargo handling, passenger and baggage processing, security checks, and vessel boarding will be critical to future port and terminal operations.

AECOM has the expertise and technologies to help you identify and implement the short, medium and long-term strategies needed for safe operations. Our professionals will conduct a rapid assessment to help you better understand your current safety risks, and help you develop comprehensive pandemic influenza plans and Continuity of Operations Planning (COOP) exercises. Our team can evaluate terminal and port layouts to identify required modifications, provide engineering design services, and perform program and construction management to oversee the execution of required changes. We can also help you find, apply for and oversee grant funding and financing to help mitigate the impacts of lost revenue.

As protective measures are put in place, we have the tools to help you succinctly and openly communicate the actions you’ve taken to ensure passenger and workforce safety, while also strengthening port and terminal resiliency in the face of future shocks and stressors. As port and terminal activity picks up, our team will deliver the on-going monitoring and adjustments needed to support your future operations and safeguard a progressive return to full service.
Restarting and Facilitating the Cruise Experience

Through an increased use of technology and more efficient approaches to managing the passenger experience, we can support a safe return to service for the cruise industry by helping you to identify and implement:

- effective social distancing procedures;
- enhanced cleaning and sterilization protocols;
- advanced screening, touchless technology and other protective measures; and
- all other equipment and infrastructure modifications needed to help ensure the ongoing safety of passengers and staff.
A Phased Implementation Approach – Cruise Terminal

Phase 1: Reintroduction of Service
- Return to service planning
- Remapping terminals, roadways and baggage handling for passenger processing (ticketing, waiting, loading and unloading)
- Customs and Border Protection security processing protection
- Ship provisioning, handling, delivery and loading
- Temporary screening / quarantine facilities
- Short-term check-point reconfiguration
- Assess use of new technologies and implement health screening equipment
- Terminal workforce protection: baggage, passenger and ship provisioning
- Transport workforce protection: transport to and from terminal
- Crew protection during provisioning and passenger embarking / disembarking
- Passenger protection: in-terminal – at all arrival, check-in, waiting, baggage, and embark and disembark locations
- New communication protocols with travelers
- Cleaning and sterilization of ticketing counters, waiting rooms, baggage handling facilities, loading bridges, provisioning areas and ship

Phase 2: Near Term Modifications
- Road and intermodal reconfiguration for passenger drop-off and pick-up
- Terminal reconfiguration and passenger processing (ticketing, seating, queuing, floor signage, ship loading, etc.)
- Pre-entrance screening / quarantine facilities
- Baggage – in bound: sensors / cleansing agents
- Baggage – out bound: passenger retrieval (storage hall)
- Provisioning – separation between workforce entities
- Shuttle Transport – social distancing compliance
- Enhanced cleaning and sterilization of ticketing counters, waiting rooms, baggage handling facilities, loading bridges and ship
- Grant applications / funding management
- Medical screening surcharge (fees)

Phase 3: New Normal
- New terminal planning and design
- Touchless passenger processing
- Facial / optical recognition, biometrics, etc.
- Compliance with new guidelines
- Flexible queuing space
- Automated sanitation, sterilization systems
- On-line check-in and check-in appointment system
A Phased Implementation Approach – Ferry Landing / Terminal

**Phase 1: Continuity of Service**
- Return to service planning
- Remapping landings and terminals for passenger processing (ticketing, waiting, loading and unloading)
- Temporary screening / quarantine facilities
- Short-term check-point reconfiguration
- Assess use of new technologies
- Workforce protections such as masks and gloves for ferry deck hands, cafe captain, etc.
- Workforce protections for maintenance and repair staff
- New communication protocols with travelers
- Cleaning and sterilization of ticketing machines, ferry landings, handrails, gangways and all other ferry touch points

**Phase 2: Near Term Modifications**
- Ferry landing / terminal reconfiguration (seating, queuing, floor signage, etc.)
- Ferry seating and on-vessel concession reconfiguration
- Enhanced and recurring cleaning and sterilization of ticketing machines, ferry landings, handrails, gangways and all other ferry touch points
- Grant applications / funding management
- Medical screening surcharge (fees)

**Phase 3: New Normal**
- New landing / terminal planning and design
- Touchless passenger processing
- Facial / optical recognition, biometrics, etc.
- Compliance with new guidelines (Transportation Security Administration, United States Coast Guard, etc.)
- Flexible queuing space
- New technology to improve notification of ferry status (arrival times)
- Automated sanitation and sterilization systems for ticketing machines, ferry landings, handrails, gangways and other ferry touch points

NYC Ferry, New York City, NY
A Phased Implementation Approach – Container (Cargo) Terminal

Phase 1: Continuity of Service
- Remapping labor entrance / cafeteria / locker room – implement workforce protections
  - Visitor registration
  - Safety briefing
- Operations review to identify impacts
  - Ship arrivals and departure (line gangs)
  - STS container handling (twist-locks, driver interface)
  - Container yard storage
  - Gate (inbound / outbound)
  - Intermodal yard / transfer area
  - Ship crew processing for landside access
- Temporary screening / quarantine facilities
- Short-term check-point reconfiguration
- Assess use of new technologies
- New communication protocols with visitors
- CBP reconfiguration
- Cleaning and sterilization of cargo handling equipment between shifts; maintenance facilities and repair equipment; and administration buildings, locker rooms and cafeterias

Phase 2: Near Term Modifications
- Design and implement
  - Reconfigurations to lobby, cafeteria, locker room, etc.
  - Screening room
  - Quarantine facilities
  - HVAC system improvements to administration buildings, locker rooms, cafeterias and maintenance facilities
- Cleaning and sterilization of cargo handling equipment between shifts; maintenance facilities and repair equipment; and administration buildings, locker rooms and cafeterias
- Grant applications / funding management
- Medical screening surcharge (fees)

Phase 3: New Normal
- New facility planning and design
- Touchless labor security access / exit processing
- Facial / optical recognition, biometrics, etc.
- Compliance with new guidelines (TSA, USCG, etc.)
- Trucker resolution windows
- Automated sanitation and sterilization systems for cargo handling equipment between shifts; maintenance facilities and repair equipment; and administration buildings, locker rooms and cafeterias
Tools Applied to Seaports, Marine Terminals, Intermodal Yards and Rail Systems

AECOM has developed several in-house simulation models that provide port authorities, terminal operators, regulators and other third-party stakeholders with predictions of costs and benefits for alternative capital improvement scenarios.

These models allow convenient customization of inputs, outputs and dashboards to suit our clients. We also offer many standard commercial simulation models; thus providing a full suite of simulation services to transportation systems and infrastructure.
Vissim (Multi-Modal Traffic Flow Simulation)

Vissim is a commercial model that is specifically tailored and configured by AECOM specialists to analyze the operational effectiveness and capacity of marine terminals, intermodal yards, ferry landings / facilities, roadway systems and other passenger or freight networks. It has excellent graphics and can be used to develop 3D visualizations of terminals to help clients better understand the appearance, function, throughput and transfer capabilities of alternative development scenarios with impact of social distancing processes, varying level of resources, facility operating times and throughputs.

Vessel Network Model (VNM)

VNM evaluates the capacity of harbor channels, river systems, cruise and ferry passenger and freight terminal networks. It can range from global vessel distribution networks to small scale harbor capacity studies. VNM can accommodate a wide variety of dynamic conditions such as new or relocated ferry landings, varying level of terminal processing rates due to social distancing rules, vessel fuel cost vs. operating speed, vessel draft vs. cargo loaded, tidal range, darkness, or weather closures. Additional rules and processes can be tested and built into the VNM model to assess the impact of COVID-19 related rules on the existing passenger and cargo movement networks.
General Marine Terminal Simulation (GMTS)

GMTS provides detailed modeling of marine and intermodal container terminal operations. It can be used to compare physical layouts or operating modes and evaluate the relationship between various terminal equipment and terminal productivity. GMTS output can be used to feed detailed cost models of terminal operations.

View GMTS here.

Berth Analysis (BERTHA) Model Simulation

BERTHA evaluates the capacity of container terminals by analyzing the variability in vessel arrivals, crane assignments, crane productivity, and maintenance and weather related closures. BERTHA also tracks container inventory on an hourly basis and can be used for high level estimates of required yard cranes for a given level of throughput.

View BERTHA here.

DP World Centrex Container Terminal, Vancouver, BC

Port of Long Beach, Long Beach, CA
AECOM Virtual Public Consultation

AECOM’s interactive web-based tool allows clients to engage and consult stakeholders from their computer or mobile device. This tool enables clients to continue driving public engagement with their projects during the coronavirus pandemic. By providing an alternative resilient approach to community engagement, this new tool allows clients to engage with a wider audience who cannot attend in-person meetings during consultation periods.

Through the new platform, a virtual event can be tailored to show consultation materials including virtual reality and sound demonstrations, videos, maps, plans and pop up banners. The tool allows for instant feedback so public reaction can be captured and saved for analysis and accurate reporting. There is also a chat function so on-hand experts can remotely answer questions as visitors look around the materials, similar to what would take place during an in-person event.

AECOM Digital Environmental Impact Statement

Digital impact assessments use electronic technologies that modernize environmental impact analyses. Because we apply this worldwide, AECOM is at the forefront of generating creative, interactive, web-based solutions that speed and improve decision-making processes, regulatory compliance and permitting.

View Virtual Public Consultation Tool [here]().

View Digital EIS Tool [here](.)
From infrastructure master plans and operations analysis through detailed design and construction management services during normal operations to the integration of industry-changing security measures post-9/11, our broad range of experience and technical expertise means we provide our clients with solutions that matter.
Ferry Service Simulation, Staten Island, New York

AECOM provided support for the development of a ferry-based transportation plan. The goal was to allow loading and moving up to 30,000 passengers in two hours upon departure from a proposed motor speedway site to New York Harbor destinations.

A simulation model was used to convey the viability of the ferry-based system to policy-makers and local interests. AECOM created a custom computer simulation model that emulated the movement of fleets of 90 to 120 ferry boats serving up to eight destination terminals. The model considered boat capacity, operating speed, load/discharge rate, size, and load/discharge method. It also considered the staging of boats in harbor holding areas, movement to the site along constrained channels, boat staging at the raceway, passenger loading, boat movement to destinations, passenger discharge, and recycling of selected boats for second trips. The model also included an animated display of vessel movement that allowed the project developer to understand the movement of ferries throughout the system network. AECOM provided analysis of two alternative fleet deployments, and refinement of each to meet the developer’s commercial requirement of complete egress in two hours.

PortMiami Cruise Terminals Program Management, Miami, Florida

AECOM has served as Program Manager to PortMiami since 2011 providing support for administering its $1.5B Capital Development Program. AECOM primarily supported the cruise terminal developments, which included new terminals for Norwegian Cruise Line (NCL), Virgin, MSC Cruises and Disney, as well as expansion and renovation of the Carnival cruise terminal. Acting as an extension of PortMiami staff, our team provided project management, consulting, short- and long-term planning, facilities planning, cost estimating, scheduling, project programming, design review and oversight, review of design-build bid packages, oversight of engineering and inspection consultants, quality oversight, design criteria and standards oversight, value engineering, project controls, contract administration, and claims administration.
Post-9/11 Services – Transportation Security Administration (TSA)

In response to sweeping changes to the aviation industry following the 9/11 attack, AECOM assisted in the design, facility modifications, and the installation and maintenance of explosives detection systems at 438 airports nationwide. As a subconsultant to the Boeing Company, AECOM was able to accomplish what appeared to be a nearly impossible task under very difficult circumstances and time constraints. Our team was responsible for:

- site assessment and survey to gather all data required, including a comprehensive survey of airline ticket counters, baggage check-in areas and procedures, baggage makeup areas, baggage conveyors and baggage claim devices;
- field verification of electrical and communications infrastructure needed to plan electrical designs for the new equipment;
- reviewing baggage flow modeling and developing screening concepts at each airport; and
- developing design documents and field changes for each airport.

As an example of the fast turnaround times required for this project, AECOM produced design documents for the Miami, Fort Lauderdale–Hollywood and Luis Muños Marin International Airports in less than two weeks.

Post-9/11 Services – John F. Kennedy and La Guardia Airports, Port Authority of New York and New Jersey (PANYNJ)

Developed prototype security boom used to prevent waterborne access to Thurston Basin, the waterway behind JFK’s main runway 22L, the most utilized runway in the nation. AECOM designed the boom in collaboration with the PANYNJ and the Tuffboom manufacturer to meet specific requirements for Thurston Basin. Our team also designed the security zone marking system of buoys and piles to warn boaters of the restricted zone surrounding the airports at JFK and La Guardia. Where water depths didn’t allow for a buoy to float, a pile with the mariners symbol for restricted waters was installed.
Port Pilots Job Safety Risk Assessment, Port of Los Angeles, California

AECOM performed a job safety risk assessment (JSA) for the Port Pilots who live in communal housing at the Port. The Port Pilots take over command of ships to steer them into and out of the Port, as well as direct courses and speeds of the ships based on local winds, weather, water depths, tides, currents and hazards. The JSA was focused on preventing the spread of COVID-19 in this work/life environment and included review of living conditions, high touch surface cleaning, hygiene, and the type and frequency of shared furniture/living space cleaning. The JSA also included review of the Port Pilots interaction when they board ships with personnel that hail from different cities and countries. As part of the JSA, AECOM provided recommendations for controls that could be implemented to reduce the risk of COVID-19 transmission among the Port Pilots.

Chemical, Biological, and Radiological Incident Response Planning, Metropolitan Transportation Authority, New York

MTA is the largest public transportation provider in the Western Hemisphere serving 15 million people daily over 5,000 square miles. As part of MTA’s security strategy, AECOM developed pre-incident, facility-specific, remediation, and recovery plans for B. anthracis (anthrax), VX nerve agent, and cesium-137 incidents for a large urban transit facility. The plans addressed rapid and effective recovery operations.
Temporary COVID-19 Hospitals in Brooklyn and Queens, New York

AECOM provided construction management, emergency engineering and grant management services for the facilities, located in Brooklyn and Queens, which increased the city’s hospital capacity by more than 1,000 beds. Our extensive healthcare and disaster recovery experience enabled us to rapidly respond to the New York City Department of Design and Construction’s needs.

COVID-19 Acute-Care Facilities, Rhode Island

AECOM provided program oversight and management services for the assessment, planning, programming and design to convert existing facilities into newly constructed non-acute care facilities for patients with COVID-19 symptoms in Rhode Island. AECOM worked with the State, the Rhode Island National Guard, and other stakeholders to determine suitability and viability of the best development track for the facilities. In addition to overall program management, AECOM’s scope of work included rapidly assessing existing facilities and providing programming, medical planning, design and coordination during construction to rapidly establish temporary hospitals and/or medical care facilities. While providing construction management oversight services, we also worked with the State to manage received funding, provide and manage documentation, and provide expert insight to the State.
**Comprehensive Pandemic Influenza Plan, Nationwide Retail Chain**

AECOM led the development of a comprehensive pandemic influenza plan, inclusive of industrial hygiene requirements, for a nationwide retail chain. We developed sets of internal triggers to augment the World Health Organization Phases and Federal Government Response Stages and define hygiene parameters to mitigate the pandemic.

**Legionella Response, United States Postal Services, Washington, DC**

AECOM assisted the United States Postal Services in the rapid response to several potential outbreaks of Legionnaire’s disease (legionella) at their large mail processing plants. Immediately upon notification of these events, personnel met with state and local Department of Public Health and Federal OSHA representatives to develop a comprehensive investigative and remedial strategy.
OUR EXPERTS ARE READY

Abbas Sarmad, PE
National Ports and Marine Lead
Abbas is a senior vice president and structural/geotechnical marine engineer with extensive experience in the design, evaluation, analysis, construction rehabilitation, and installation of marine structures worldwide. He has applied his expertise in the industry on projects that include pile foundations, piers and waterfront structures, facilities, bulkhead, oil/gas drilling platforms, LNG facilities, and caissons, both nationally and internationally. Abbas has been a participant on some large scale industry-wide research projects and is the author of a number of technical research papers addressing current industry issues.

Marlin Peterson
Marine and Ferry Terminal Development
Marlin has more than 30 years of port, marine and intermodal/multi-modal planning, design and project/construction management experience. His extensive waterfront experience comprises planning and feasibility studies through environmental and permit compliance, design development, procurement, dredging material management, in-water and upland construction and operational readiness. His project experience includes both national and international locations, such as the U.S. Eastern seaboard, the Gulf of Mexico, Caribbean, and the Middle East.

Philip Hadfield, PE
Cargo and Cruise Terminal Development
Philip has over 26 years of local and international experience on port, harbor and marine development projects involving planning, design and construction quality assurance. His experience includes dredging, land reclamation and ground improvement, coastal protection, site remediation and backland development, terminal and waterfront development, rehabilitation and upgrade of waterfront structures, and new port infrastructure. These projects have included container and cargo terminals, handling facilities, cruise terminals, small craft harbors, marinas, transportation infrastructure, and new port facilities.
Our Experts are Ready continued

Mark A. Sisson, PE
Port Planning, Analysis and Simulation Lead
Mark has 25 years of experience on a wide range of planning, simulation, and analysis projects related to port and harbor developments. As supervisor of the analysis group, typical projects involve supervision of field data collection, model development and presentation of analysis results. He has led a number of due diligence analysis efforts for terminal sales where the typical scope of work includes detailed modeling of terminal capacity and the relationship between throughput and cost per move. Mark is a frequent presenter and author in industry publications on topics including terminal planning, sustainability, and automation.

Vijay Agrawal, PE
Marine and Cruise Terminal Development
Vijay is a Port Planner with 19 years of experience in the Port industry. He has led and worked on more than 50 port projects worldwide for development of efficient and world-class cargo and cruise business. Vijay specializes in feasibility studies, port master planning, productivity and cost optimization studies, concept engineering and detail design of marine and civil infrastructure to accommodate all types of cargo and passenger operations. Vijay has authored several papers for industry conferences/publications and is currently an advisory Board Member for the Center for Advances in Port Management in Lamar University and for the Broward College – Supply Chain Management Program.

Jeff Khouri, PE
Marine Terminal and Military Facility Development
Jeff has over 36 years of experience in engineering and construction management on projects including waterfront facilities and structures, piers and wharves, dredging and coastal engineering, breakwaters, railroads, intermodal facilities, roadways, grade crossing design and California Public Utilities Commission permitting, and utilities. He has worked on ports throughout the United States, Canada, Middle East, the south pacific and other international locations. Jeff has extensive experience working for the US Navy, Naval Facilities Engineering Command (NAVFAC), the US Army Corps of Engineers and for foreign navies. His experience also includes the design and construction of commercial and military ships in a shipyard environment and work within the aerospace industry.

Lori Chu, CIH
Senior Industry Hygienist
Lori is a senior specialist with over 20 years of industrial hygiene, occupational health and safety, and environmental experience. She manages and supports occupational safety and health management system and regulatory compliance projects. Lori has served on the University of California, Los Angeles (UCLA) Hazardous Materials Team and as a Biosafety Officer at UCLA. She has also worked as an inspector and District Manager for the California Division of Occupational Safety and Health where she performed hundreds of health and safety audits and conducted investigations of fatal accidents. As part of return to service during the COVID-19 Pandemic, she prepared a Re-Occupancy Plan for the Port of Los Angeles.
AECOM is the world’s premier infrastructure firm, delivering professional services throughout the project lifecycle – from planning, design and engineering to consulting and construction management. We partner with our clients in the public and private sectors to solve their most complex challenges and build legacies for generations to come. On projects spanning transportation, buildings, water, governments, energy and the environment, our teams are driven by a common purpose to deliver a better world. AECOM is a Fortune 500 firm with revenue of approximately $20.2 billion during fiscal year 2019. See how we deliver what others can only imagine at www.aecom.com and @AECOM.