

Modernizing SEA Airport: A giant jigsaw built one project at a time

■ How one of the nation's busiest airports manages a multitude of projects at a time within a tight footprint.

By **ALY LANDE**
Port of Seattle

If you've traveled through Seattle-Tacoma International Airport (SEA) lately, you may have noticed just a bit of construction happening. Ok, maybe more than a bit.



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SEA is currently navigating dozens of major capital projects—all while maintaining operations at one of the most space-constrained airports in the country. Each project is another piece in the broader modernization puzzle.

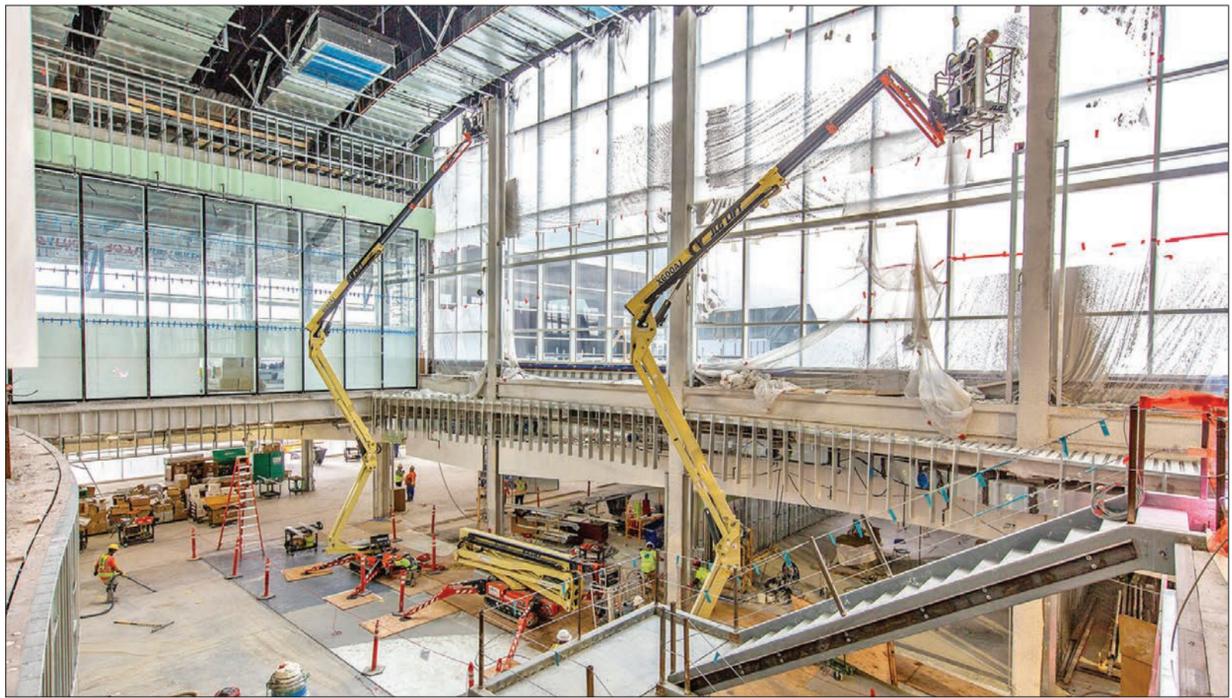
After completing some recent projects like the Central Terminal Renovation, N Concourse Modernization, and the International Arrivals Facility, the airport has been making strides to update its 1970s-era facilities and bring them into a modern era. A running joke claims the airport sometimes feels more like a construction company, with an airport on the side. This speaks to just how complex it is to plan projects to upgrade the airport,

while keeping the airport open and operational.

SEA has an incredibly limited footprint and has nowhere to expand outward, so coming up with ways to modernize the airport has to fit within that footprint and requires getting creative. To give context, SEA is 2,500 acres in size with 89 gates for 52 million annual passengers. In comparison, Phoenix (PHX) has 3,400 acres with 119 gates; Miami (MIA) has 3,300 acres and 131 gates, while San Francisco (SFO) has 5,200 acres and 115 gates. All these airports serve about the same number of annual passengers as SEA.

FROM IDEAS TO PROJECTS

The giant jigsaw doesn't just include projects happening in and around the airport, but the teams working to make them fit. The Capital Programs Department helps with the early stages of planning and scoping modernization projects. Mandy Xiggores, assistant director of Aviation Capital Programs, said, "We bring diverse airport stakeholders together to develop concepts that become the foundation for the large projects you see all over campus." Planning so many projects at the airport relies heavily on stakeholder



Construction inside the N Concourse as part of the N Concourse Modernization project, completed in 2021. Photo via Port of Seattle

engagement and looking at every possible option.

The Capital Programs team does a lot of research and engagement with multiple stakeholders, and analyzes alternatives before a project even gets drafted. Xiggores says that depending

on the size of the project, the planning and definition can take years before the design process even begins.

But when it does come to fruition, it can be brilliant. Xiggores was a part of the Restroom Renovation project, which upgrad-

ed and added restrooms on the B, C, and D concourses. While restrooms seem like such a small piece of a greater puzzle, it's a piece that is equally important to every person, and used by all.

This project also added the airport's first and only All-Gender

Restroom, on which Xiggores learned a lot about building accessible spaces for all passengers. One of her wish list projects includes expanding the restroom

See **MODERNIZING** — page

Future-proofing America's aging airports

■ How strategic systems upgrades are powering Seattle-Tacoma International Airport for the next 50 years.

By **TYSON WAGNER**
and **DANNY KEIM**
Mortenson

For much of the past century, airports throughout the U.S. were built for a very different era of air travel. Electrical systems were sized for incandescent lighting and basic mechanical loads, while data networks were often an afterthought. Today, many of these facilities, including Seattle-Tacoma International Airport (SEA), operate with electrical, technology, and communications infrastructure that can be half a century old, well beyond its intended service life and inadequate for modern air travel.



Wagner



Keim

Rather than waiting for failures, many airport owners are taking a strategic, long-range approach. They are investing in programs that rebuild electrical and digital backbones, improve resiliency, and create capacity for

emerging technologies so their facilities are prepared to serve communities for the next 50 years and beyond.

At SEA, that modernization journey has been underway for well over a decade. One of the most critical early steps came in 2010, when the Port of Seattle deployed nine 2-megawatt generators to provide emergency backup power in response to potential flood risks to the regional utility. That interim system was later replaced through a design-build project that added 10 3-megawatt generators as part of a long-term resiliency plan. Mortenson was selected to deliver that project and brought the new generation system online in 2018. Since then, the Port of Seattle has had a robust safety net in place to mitigate any potential impacts to the utility grid.

Building on that work, Mortenson has continued to pursue highly technical infrastructure projects at SEA, focusing on the critical behind-the-scenes systems that keep the airport running. Today, that targeted effort includes the Main Terminal Low-Voltage (MTLV) and Concourse Low-Voltage (CLV) GC/CM projects, the Telecom Meet Me Room (MMR), and critical gate and concourse upgrades that strengthen the airport's core systems while respecting the realities of operating one of the nation's busiest airports.

Airports like SEA are no longer simply public buildings with gates. They function as complex, interconnected systems. Electrical distribution, low-voltage technology, airline equipment, and airside infrastructure must all work together as a single ecosystem. From Mortenson's perspective, and in collaboration with the Port of Seattle, futureproofing an airport means:

- Upgrading the electrical and digital backbone, especially low-voltage systems, so emerging technologies such as biometrics, automated baggage handling, digital wayfinding, and electrified ground equipment can be integrated seamlessly
- Planning with a 50-year hori-



New electrical rooms like this one provide the power capacity needed for future mechanical and technology upgrades across the terminal. Photos courtesy of Mortenson

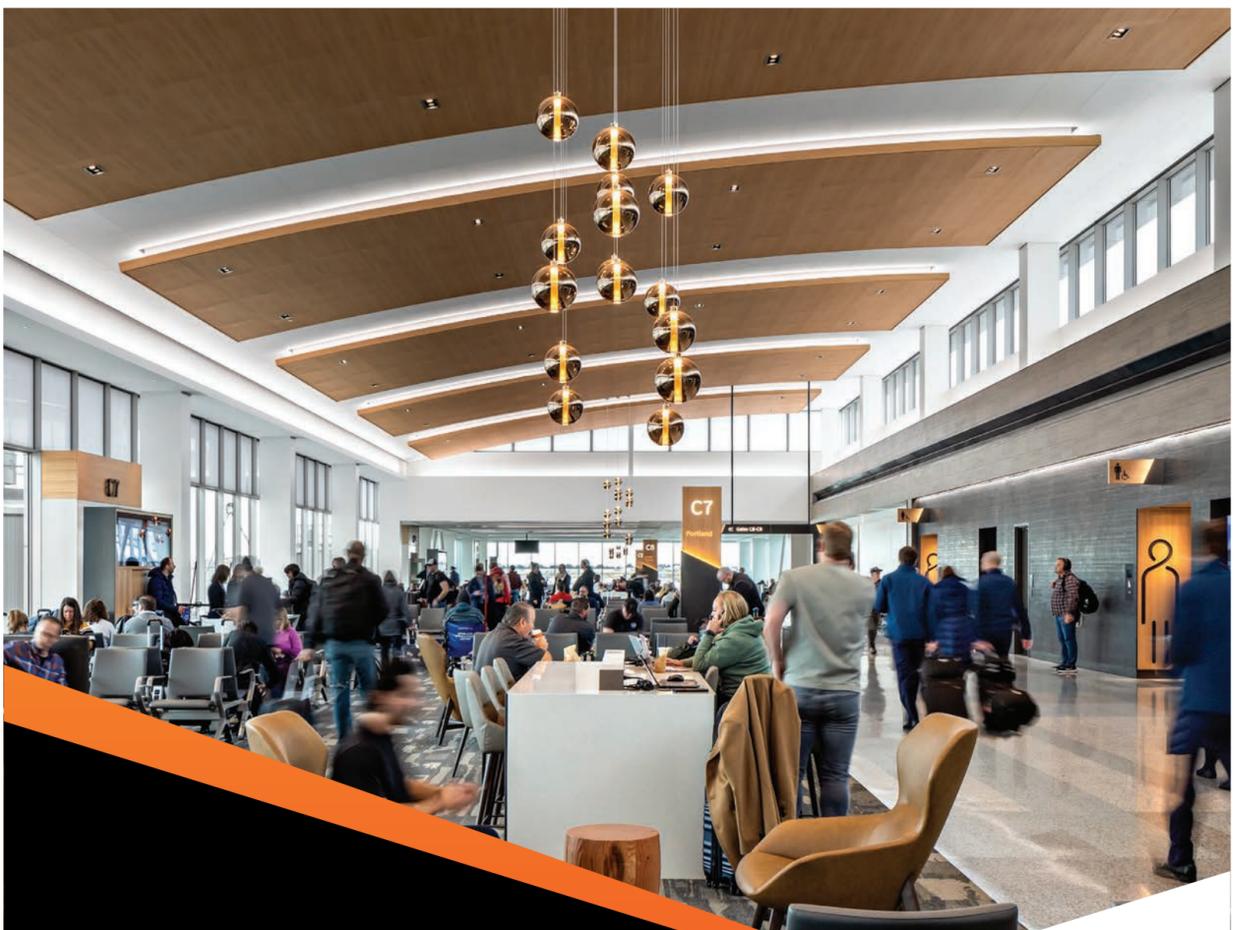
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SEA's Alternative Utility Facility provides uninterrupted operations during outages or grid disruptions.



Gate modernizations were made to accommodate both wide-body and narrow-body aircraft, improving operational flexibility.



SIA Terminal Renovation & Expansion C Concourse

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Reimagining the C Concourse for today's travelers

■ The project team considered the way people move, rest and connect in making circulation, design and infrastructure upgrades.

By KRIS STOYAK
Turner Construction

The C Concourse Expansion at Seattle-Tacoma International Airport (SEA) is a major step in the Port of Seattle's effort to improve the travel experience and keep up with a rapidly growing number of passengers. The four-story, 110,000-square-foot addition expands on the existing 99,000-square-foot C Concourse building and turns one of the airport's busiest hubs into a more spacious, welcoming and efficient destination.



Stoyak

The project reimagines how travelers move, rest and connect, introducing an expanded Gate C3 waiting area, vibrant new dining and retail options, and modern amenities such as a post-security sensory room, interfaith prayer and meditation room, a nursing room, and a public lookout. Behind the scenes, upgrades to baggage systems, loading docks and mechanical infrastructure enhance both comfort and operational performance.

Guided by the port's vision to deliver a world-class, climate-conscious airport experience, the expansion combines practical features with the warmth and energy of the Pacific Northwest. This project creates a space that reflects Seattle's identity and prepares the airport for future growth.

From the start, the design team of Miller Hull and Woods Bagot emphasized the importance of circulation, proposing to route passengers through the heart of the planned dining and retail hub to establish an active marketplace within a daylit atrium.

The project's concept of "Bringing In, Seeing Out" fosters a con-

nection to the Pacific Northwest through its materiality, framed sightlines to the outdoors, public art, and climate-conscious design. The concourse interior evokes the textures and energy of the region's renowned artisanal markets, anchored by a central marketplace offering dining and retail options.

Inspired by local outdoor community markets, the atrium marketplace grew to include a busker area to expand the port's popular live music program, a Grand Stair that provides a space for viewing and a clear connection to mezzanine-level dining venues, retail kiosks to support local merchant start-ups, and a public outdoor lookout with views of the airfield and the Olympic mountains.

The team collaborated with the port's Art Program to feature the work of over a dozen artists across multiple venues including; a 40-foot video display wall, a collection of art displays integrated into the Grand Stair seating area, feature art glass installations by Fumi Amano and Crystal Worl, and integrated artworks within the interfaith prayer and meditation room, sensory room, and nursing room.

Collaboration with Turner Construction identified several permit and bid package opportunities to initiate early relocation and demolition activities, update underground utilities, and release key material packages — such as structural steel for detailing and fabrication — ahead of the main construction effort.

As part of a series of biophilic strategies, early collaboration with ceiling fabricators and manufacturers helped identify approaches for the "Tree at C," a centerpiece of the design featuring western hemlock panels that rise organically from the Grand Stair and branch into the feature ceiling spanning the Concourse and Mezzanine levels. Working



Passengers will be routed through the heart of the planned dining and retail hub within the daylit atrium.

Image by The Miller Hull Partnership

closely with the port, the team coordinated with flooring manufacturers to develop terrazzo mixes for the flooring below, incorporating a variety of local stones to further strengthen the connection between the new building and its surrounding context.

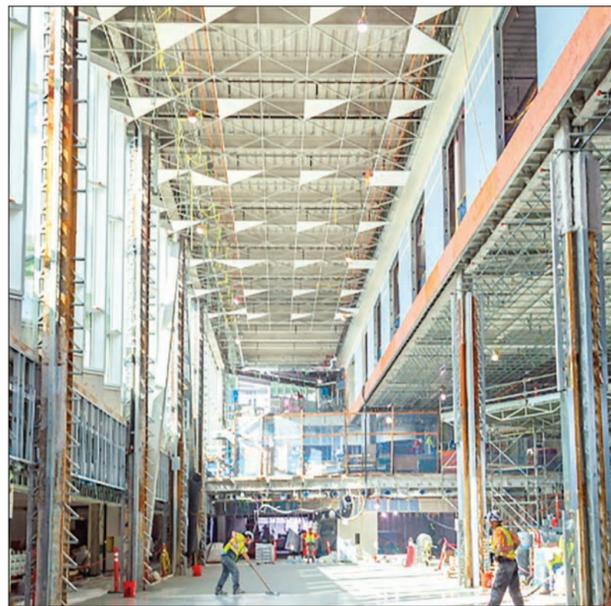
"The C Concourse Expansion project will be more than just a transit hub — it will reflect the world it serves and the collaborative process behind it. Working closely with the port from concept through construction, we've experienced a level of engagement that meaningfully informs every decision. Their consistent involvement, from technical guidance to broader design discussions, fosters a true partnership," said Woods Bagot Principal Katy Mercer. "Together, we're creating spaces that embrace the diverse backgrounds of all passengers — an authentic, shared vision where every traveler finds a sense of belonging, and every corner tells the story of the place it represents."

Rich Whealan, principal at The Miller Hull Partnership, said the

project also had many sustainability firsts.

"The port's first implementation of their Sustainable Evaluation Framework process resulted in other firsts for SEA, including the first photo-voltaic panel installation with a 500 kW array that will produce 12% of the project's annual energy, the first all-electrical project, including air-source heat pumps for space heating and hot water systems, the first public outdoor space on the airside, and the first project at SEA to target LEED Gold certification," Whealan said.

The expansion is leading the way in sustainability. Being the first project to use the port's new Sustainability Evaluation Framework means every decision, big or small, takes into account the environment, the community and the local economy. By weaving these values into each step of planning and design, the team is making sure this project does more than just build; it's



The atrium at SEA (shown here under construction) was designed to optimize circulation in the new C Concourse. Photo via Port of Seattle

See C CONCOURSE — page



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C Concourse

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about making a real, lasting difference for people and the planet.

SEA wants to be the greenest and most energy-efficient port in North America, and this project is a big step toward achieving that. The expansion brings in creative solutions, like heating and cooking systems that don't rely on fossil fuels, solar panels on the roof to provide renewable energy, and smart windows that tint automatically to keep things cool. Water-saving fixtures reduce unnecessary water use, while new dish-washing and food-donation systems minimize landfill waste and support local food banks.

What started as a goal for LEED Silver certification quickly grew into an ambition for LEED Gold, showing just how serious the port is about building green and thinking ahead.

"The Sustainability Evaluation Framework is essential for the port. It's a powerful tool to embed sustainable design and equity principles into the port's capital construction projects,"

the port's Sustainability Communications and Reporting Program Manager Mallory Hauser said. "This framework is what allowed us to design the new C Concourse Expansion at SEA, which is our greenest building to date, by successfully prioritizing climate consciousness hand-in-hand with passenger comfort."

Delivering the expansion is a true team effort that requires thoughtful planning, problem-solving, and constant communication. Constructing a four-story addition in the center of one of the country's busiest airports meant Turner and our trade partners had to keep work advancing while thousands of travelers, dozens of airlines and retail vendors, and essential airport operations continued uninterrupted. To achieve this, Turner developed a highly coordinated approach that allowed construction activity to progress without any unplanned impacts to daily airport operations.

The team worked closely with the port, TSA, retail and dining vendors,

and airline partners to adjust access routes, schedule work around peak travel periods, and manage complex airside logistics, including constructing a tower crane at SEA for the first time in decades. Just-in-time deliveries, strategic after-hours work, and the use of prefabrication reduced congestion in the terminal and kept the building process moving safely and efficiently.

Safety remained the constant foundation of every decision. Working inside an active airport terminal required enhanced protocols and continuous collaboration and communication with airport stakeholders. Turner's workforce embraced the unique environment, creating a space where both workers and travelers could move confidently throughout the building. The project also reflects Turner's commitment to the community. Local businesses, diverse subcontractors, and apprenticeship programs played key roles in delivering the concourse, creating opportunities for firms across the local region and con-

tributing to a stronger, more inclusive industry.

"It has been an incredible opportunity to work collaboratively with our trade partners, the port, and design team, to leverage the knowledge, experience, and innovation that each brings to the construction of the C Concourse Expansion," said Kris Stoyak, Senior Project Manager with Turner. "Turner is proud to be part of the team that delivered such a remarkable building, which is certain to provide an exceptional travel experience for millions of people."

The opening of the C Concourse Expansion marks a major milestone for Seattle-Tacoma International Airport and a meaningful step forward in how travelers experience SEA. The new concourse offers a brighter, more spacious environment, with expanded amenities and a public outdoor lookout that connects passengers to the beauty of the Northwest. The design creates a true sense of place, bringing in natural light, local materials, and welcoming public

art that reflects the region's character.

Beyond the enhanced experience for travelers today, the project is a key part of SEA's larger capital improvement program to prepare the airport for the future. With upgrades happening across the airport from modernized terminals to more efficient infrastructure, the port is investing in long-term capacity, sustainability, and community-focused growth.

"The C Concourse Expansion represents more than a new building for the Port of Seattle, it demonstrates what is possible when innovation, environmental leadership, and partnership come together," said SEA Airport spokesperson Perry Cooper. "The port is proud to deliver a transformative space that elevates comfort and connection while advancing its climate goals."

Kris Stoyak is a senior project manager with Turner Construction Company in Seattle, with nearly 20 years of construction experience.

Modernizing

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upgrades across the entire airport property.

MANAGING THE BUILD, MINIMIZING DISRUPTION

When a capital project moves from the development phase onward into design and construction, the Aviation Project Management Group (AVPMG) steps in and helps carry the torch. They sit right in the middle of the puzzle and help manage all these capital projects, coordinate how and when the design and construction take place, and take steps to ensure it doesn't excessively impact the operating airport.

"SEA is a very important part of the transportation network and economic engine of the region," said Stuart Mathews, assistant director for the AVPMG team. He goes on to say, "Modernizing SEA means a more efficient, less stressful, and more pleasant experience for the traveling public. It is very import-

ant for the region to have an airport that can serve its needs long into the future."

There could be hundreds of projects happening at a time, some visible and obvious, but some behind walls or out of sight. The AVPMG team is tasked with coordinating all these projects while keeping within bounds of the current airport and minimizing traveler impacts. Mathews said, "We are often planning interim conditions, phasing, and amenities to mitigate those impacts."

PREPARING FACILITIES FOR OPENING DAY

While the airport tries to keep everything business-as-usual and is continually striving for five-star service, construction impacts are inevitable when you're one of the busiest, and most compact airports in the country. AVPMG teams up with the Operational Readiness, Activation, and Transition team

(ORAT), and they work together to track potential impacts. Charles Goedken is the Senior Manager for the ORAT team and said, "At SEA, we work in a very collaborative manner to reduce those impacts as much as possible, helping construction projects move forward to completion."

While the ORAT team helps focus and take lead on activating and opening new facilities and everything that goes into that, they are also engaging stakeholders to learn what their needs are in the new facility, teach them about new equipment, confirm procedures and contingency plans, develop operational trials, identify operational risks and issues, and ensure they're prepared to operate in the new facility upon completion.

The SEA ORAT team is still fairly new and was formed during the N Concourse Modernization project around 2018, and it's a project that Goedken is very proud of. He said, "Not only is the facility

beautiful and a huge improvement over the old 1973 concourse, but I'm proud of how ORAT started, developed our principles and procedures, and showed how to successfully open a new facility by engaging with stakeholders and the project team."

UPGRADING FOR TOMORROW

While looking towards the future, Goedken said, "The Pacific Northwest is still growing, and all transportation hubs will struggle to keep up with the pace. SEA is no different. Though our future is bright, there will be construction impacts as we continue to maximize the space we have to keep up with regional growth."

SEA is not a construction company with an airport on the side; it's an airport equipped with the best of the best teams working to make sure it doesn't always feel like a construction company. However, you might as well be the best

at both!

Upgrade SEA is the current capital campaign focused on modernizing SEA Airport and taking it into the future to meet the region's demand and growth. Some Upgrade SEA projects that wrapped up in 2025 include the Restroom Renovation and Checkpoint 1 Relocation projects. But the future looks even brighter with Roadway Improvements, SEA Gateway Project, and the C Concourse Expansion planning to wrap up in 2026.

Modernizing SEA may be a massive jigsaw puzzle, but each new piece brings the region closer to a more welcoming and efficient airport for generations to come.

Aly Lande is the capital project marketing specialist at the Port of Seattle and helped launch Upgrade SEA, a brand campaign for all SEA Airport capital projects helping to improve the traveler journey.

Future

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zon, not simply meeting today's minimum code requirements

- Leveraging GC/CM and other collaborative delivery models to minimize risk, manage cost escalation, and protect 24/7 operations
- Executing highly sequenced, live-environment phasing that replaces mission-critical systems while keeping passengers moving safely

The Main Terminal Low-Voltage (MTLV) GC/CM program is a cornerstone of the current modernization strategy. Many of the existing panels and feeders were at or beyond their intended life, with some equipment no longer supported by manufacturers. Over the decades, incremental additions for new security, concessions, and technology demands had created a patchwork system that was increasingly difficult to maintain and lacked the clear capacity to handle future loads.

Through the GC/CM preconstruction process, the team conducted in-depth assessments and field investigations, developed a multi-year phasing plan, and coordinated outages with airport

stakeholders months in advance. Shutdowns were confined to carefully scheduled overnight windows, often between midnight and 4 a.m., with contingency plans ready if work needed to be extended or rescheduled. The result is a safer, more resilient low-voltage backbone for the main terminal that can support future growth, provide clearer capacity paths for upgrades, and simplify long-term maintenance.

As airports expand their digital operations, the reliability of their network infrastructure becomes just as important as their electrical systems. SEA's new Telecom Meet Me Room (MMR) reflects that shift because it consolidates and strengthens the airport's core network and carrier connections. This design-build project established a secure, centralized hub for telecom and IT systems designed to support redundant fiber routes, diverse carrier paths, and future growth. It also enhances cyber and physical security for critical network assets and simplifies how future projects plug into SEA's digital backbone.

Future-proofing features for the MMR

include upgrading from copper to high-speed fiber, creating dual redundant data pathways to each main distribution point, expanding capacity for new service providers, and aligning with SEA's Master Plan to support long-term digital transformation. Network cutovers are planned as carefully as electrical shutdowns, with detailed rollback plans when needed.

Renewal of electrical infrastructure in Concourses B, C, and D, delivered under the Concourse Low-Voltage (CLV) GC/CM program, extends this future-proofing strategy gate by gate. The work replaces aging low-voltage distribution equipment with modern switchboards, panels, and feeders sized for future loads, and coordinates closely with new 400-hertz gate power systems to support current and next-generation aircraft operations.

Panel-by-panel investigations, tracing decades of legacy circuits, were required just to understand existing conditions and design accurate, constructible solutions. In many cases, the team uncovered undocumented connections and outdated equipment that had to be

addressed before new systems could be safely energized. More than 200 strategically phased electrical shutdowns, often between midnight and 4 a.m., and coordinated with airlines, building tenants, and airport operations, have been used to avoid operational disruption while the work proceeds.

Mortenson and the Port of Seattle share a passion for strengthening SEA's critical infrastructure and keeping the airport operating safely for the traveling public. Rather than treating each scope as a one-off project, Mortenson approaches this work as part of a long-term modernization journey led by the port.

The focus is on sequencing construction logically, coordinating multiple programs with port stakeholders and trade partners, and using collaborative delivery models such as design-build and GC/CM. This approach helps manage risk while tackling some of the airport's most technically challenging infrastructure.

As aging domestic airports face rising passenger volumes, climate pressures, and rapidly evolving technology, SEA's

approach offers a compelling model. Strategic, system-focused upgrades, planned and delivered collaboratively, can extend the life of existing facilities while improving safety, reliability and operational flexibility. SEA's modernization strategy is not about a single project or ribbon-cutting moment. Rather, it is about patiently rebuilding the airport's critical infrastructure, system by system and concourse by concourse, so it can reliably serve the region for decades to come.

Tyson Wagner is a MEP executive in Mortenson's Seattle office and a key leader for aviation infrastructure projects at Seattle-Tacoma International Airport, leading complex systems work, and related resiliency and airside upgrades. Danny Keim is a project executive in Mortenson's Seattle office and a key leader for aviation infrastructure projects at Seattle-Tacoma International Airport, with recent work focused on concourse upgrades, critical systems modernization and long-term resiliency planning.