

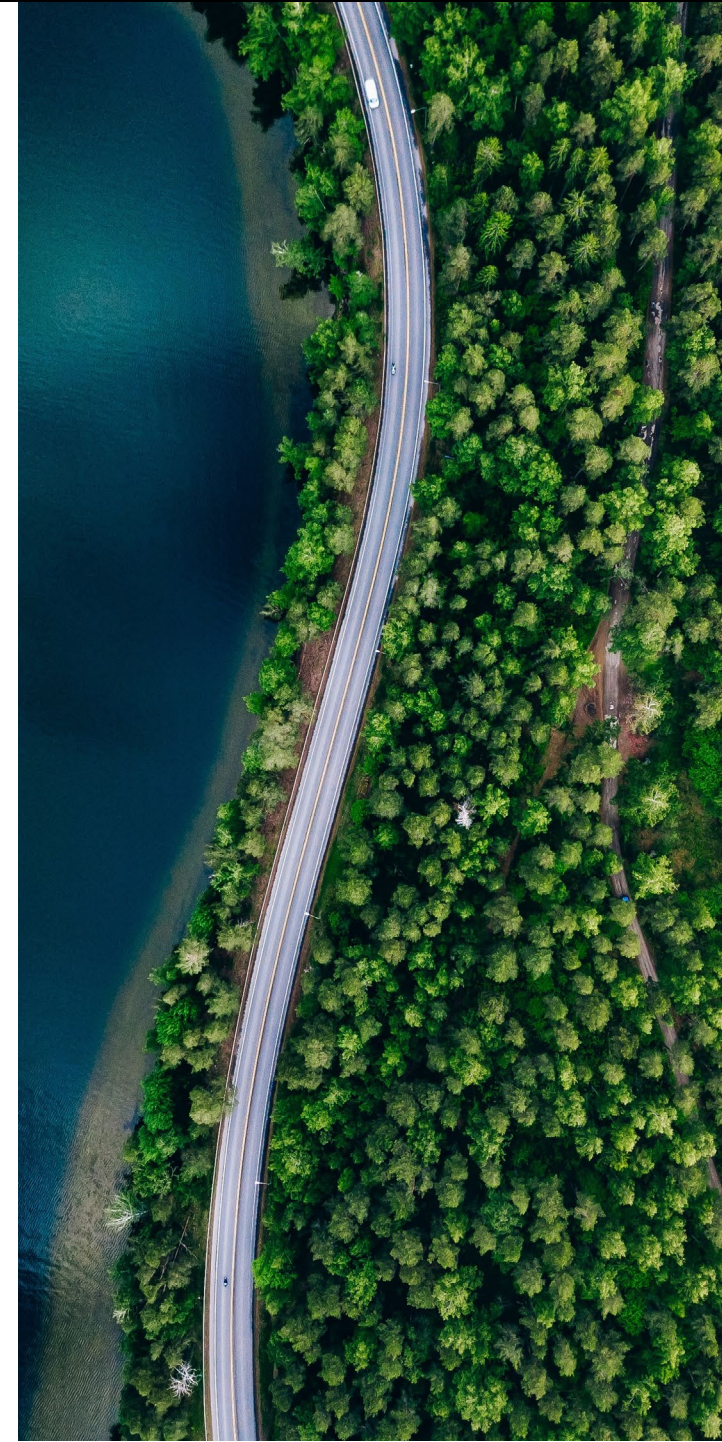
Breaking Data Silos

Enabling Engineering and Construction Collaboration
for Smarter Project Delivery

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Introduction

Construction is underway on a major infrastructure project with a tight timeline and even tighter budget. The stakes are high due to the significant publicity around the project. Once completed, it will be a game changer for the region and nearby communities. But there's a serious problem: without realizing it, the on-site construction teams are working from outdated designs.

This disconnect is all too common in the world of infrastructure projects. Teams rely on disparate systems and file-based processes, leaving critical information in silos.

The key to unlocking smarter, more efficient infrastructure project delivery lies in breaking down these silos and ensuring that design and construction teams can collaborate seamlessly. To achieve this interconnection, organizations should follow three steps:



Step 1:

Create a connected digital environment where design and construction work within the same platform.



Step 2:

Standardize processes to ensure that all teams are aligned, regardless of their location or discipline.



Step 3:

Validate data to prevent issues before they arise and keep projects on track.

By following these three steps, organizations can bridge the gap between design and construction to complete infrastructure projects on time, on budget, and to the highest standards.

Step 1: Create a connected digital environment

The goal is to have every team working from the most recent data, making decisions with full visibility, and resolving issues before they become problems. A **connected digital environment** accomplishes this goal by bringing all contributors and their data together on a single platform. However, simply uploading all project files to a shared folder won't improve outcomes. To encourage collaboration and deliver projects faster, organizations need to establish access controls and minimize friction for data sharing and collaboration.

"Bentley products and services are fundamental to our delivery of the Ontario Line—tools such as ProjectWise®, iTwin®, and SYNCHRO™ are providing unparalleled access to, control over, and insight into data shared by our project team."

—Cameron Schaefer, Transportation Digital Delivery and Data Acquisition Director, HDR





Minimize friction with design integration

Efficiency improvements begin with getting designs into a central location as quickly and easily as possible. The more manual uploads or conversions required, the longer it takes. If this process is tedious, it becomes prone to errors.

The solution is to streamline the process by integrating design applications with the connected digital environment.

The work done in design applications can then flow seamlessly into a centralized location where it can be accessed and reviewed by other stakeholders without downloading files and opening them in design programs.



Streamline use of non-engineering documents

Not all project data is created in design applications. Text documents, spreadsheets, presentations, and media files should all go into the connected data environment as well. From there, features such as integrated co-authoring of Microsoft 365 documents make it easy to review and revise shared documents.

Advanced search and AI-powered media indexing within the connected digital environment can simplify the organization and discovery of thousands of files.



Establish access controls

Once the data is in the connected digital environment, its integrity must be protected. Too many stakeholders with too much access is a recipe for miscommunication and rework.

Instead, make sure that the right data gets to the right people at the right time by implementing fine-tuned and automated access controls. Often, folder-level settings aren't enough. The best practice is to leverage file-based controls to ensure quality and consistency across workflows.

By adopting these principles to create a connected digital environment, infrastructure teams can eliminate disconnects, minimize errors, and keep projects on schedule. With the project data now centralized, it's time to improve the way teams use that data with standardized processes and workflows.

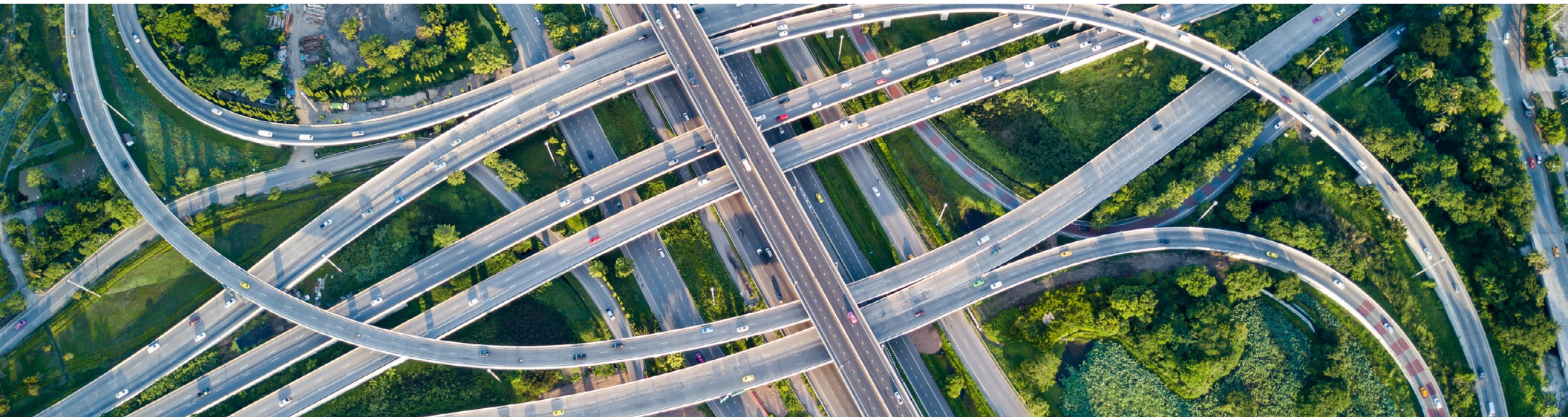
Step 2: Standardize processes to ensure team alignment

After establishing a connected digital environment, the next crucial step is to ensure that all teams across disciplines and project phases follow standardized processes. Doing so will enable contributors from design to construction to work in a consistent, predictable manner that aligns with project goals.

Without standardized workflows, even a connected digital environment can fall short. Disparate teams may interpret tasks differently, follow inconsistent processes, or miss critical steps, resulting in delays, confusion, and unnecessary rework. Standardization ensures that everyone follows best practices, speaks the same “project language,” and knows what’s expected regardless of their role or location.

“ProjectWise supports our cloud-first strategy, enabling teams to focus on what they do best: delivering high quality engineering solutions to our clients.”

- Don Bender, CTO, GAI

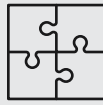




Use repeatable workflows for core activities

From engineering work-in-progress and design reviews to construction scheduling and site inspections, many project tasks follow predictable patterns. Standardizing these workflows ensures that tasks are completed the right way, every time.

Predefined templates can automate assignments, enforce document requirements, and ensure that no steps are skipped. As a result, you will experience fewer handoff errors and better tracking of project progress.



Align teams with a common framework

Each stakeholder brings a different perspective to a project. While their goals may vary, their workflows should be coordinated.

Aligning how documents are named, reviewed, approved, and stored makes it easier to collaborate across disciplines.

Whether a structural engineer is submitting updated plans or a contractor is logging a field issue, the process should follow a logical and consistent structure.



Create transparency and accountability

Maximize the effectiveness of standard workflows with automated audit trails. Set up properly, audit trails can automatically document every action taken with project data to simplify compliance, improving accountability.

It also helps project leaders to quickly identify bottlenecks or process gaps and adjust in real time.

By applying standard workflows, infrastructure teams reduce variability, maintain project momentum, and enable a smoother path from design through delivery. With processes now aligned, the next step is to ensure that the results of those processes are accurate, complete, and reliable.

Step 3: Validate data to minimize risk and rework

The goal is to build with confidence, using accurate and up-to-date information at every stage of the project. Poor-quality data, whether it's outdated models, incorrect specs, or incomplete documentation, is one of the leading causes of rework in construction.

Validating project data ensures that what's being built aligns with the approved design and that no detail is missed during execution.

"The innovation and technical creativity of the design team, led by WSB, has raised the bar for the future of 3D modeling, visualization, and cross-discipline project coordination in Minnesota. The approach, along with our willingness to coordinate and collaborate with the CMGC, has saved the project significant time and money by providing better meeting presentations, reducing design iterations, and lowering the need for contingency in the 30% and 60% construction cost estimates."

- Jon Chiglo, COO, WSB





Automate clash detection

Detecting design issues before they reach the field is critical. Automated clash detection and model validation tools can flag conflicts early, such as overlapping systems or clearance violations. With many different disciplines collaborating on designs, clashes are often overlooked in manual reviews.

Leveraging technology for automated clash detection adds a layer of assurance and minimizes the likelihood of errors slipping into the next project phase.



Connect field feedback to design and planning

Field teams generate valuable insights daily, from photos, inspections, punch lists, and issue reports. When this information is captured digitally and tied back to project elements, it becomes actionable data.

Real-time dashboards and reporting tools make it easy to monitor progress, track risks, and ensure that field conditions match design intent.



Use advanced validation and reporting tools

Interrogating designs by section, profile, and sheet provides additional precision during the design review process. Use advanced validation tools to increase quality control and reduce uncertainty, especially when paired with additional capabilities as quantity and materials reporting.

Embedding these checks into the design workflow helps resolve issues before they impact construction, reducing costly errors and rework.

By validating project data continuously, infrastructure teams reduce rework, avoid surprises, and ensure that decisions are based on facts not assumptions. The result is fewer delays, better outcomes, and greater trust across the project lifecycle.

Conclusion

In the fast-paced world of infrastructure projects, the key to success lies in seamless collaboration, standardized processes, and rigorous data validation. With a connected data environment, teams can ensure that everyone works from the most recent data, making informed decisions and resolving issues proactively.

Standardizing workflows across all disciplines and project phases ensures consistency, reduces variability, and maintains project momentum. Finally, validating data at every stage minimizes the risk of rework.

By following these steps, organizations can bridge the gap between design and construction, completing projects on time, within budget, and to the highest standards.

Bentley provides the tools and capabilities needed to implement these strategies effectively. Bentley's comprehensive suite of software supports every phase of the infrastructure lifecycle, from design and construction to operations and maintenance.

[Learn more](#)

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