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WHITEPAPER

Modernizing Construction Administration: Lessons from Public Agencies & Engineering Firms

How agencies are replacing paper processes, improving visibility, strengthening accountability, and delivering better project outcomes through digital project delivery.

Why Construction Administration Needs Modernization

About a year ago, I moved to New York City. Here, I am a constant victim of modernization. I say victim, because these changes are often sprung upon me with little to no warning, often replacing something with which I was totally comfortable.

I'll give you an example: subway turnstiles. I've never thought much about them. I pay my fare and walk through them without giving them a second glance. However, in an effort to combat fare evasion, our transit authority recently replaced many old-fashioned, mechanical turnstiles with digital doorways that feel better suited for a spaceship.

At first, I hated them. They impacted the rhythm of foot traffic exiting a subway station, causing each commuter to pause uncertainly before exiting and creating a herky-jerky motion to what was once a simple task. However, as people got more comfortable with them, the stop-and-go ceased, and people now mill out of the station smoothly and consistently. And wouldn't you know it, fare evasion is down by 20% in stations with the new turnstiles.

That's often how things go with modernization: resistance and hesitation, even in the face of improvement. This reluctance can be especially true in the construction industry, where tried-and-true methodologies have prevailed for decades.

Construction administration may not be as visible as a subway turnstile, but the same dynamic often applies. Processes that have existed for decades become deeply ingrained, even when they create inefficiencies. And while change can introduce short-term discomfort, the long-term benefits can be substantial. But there's no denying that the industry is finding evolution increasingly necessary because effective construction administration has never been more important.

Today's public agencies face a unique combination of pressures. Infrastructure funding has increased significantly in recent years, bringing new opportunities to improve transportation networks, utilities, and public facilities. At the same time, agencies are being asked to manage growing project portfolios while navigating workforce shortages, increasing compliance requirements, and heightened expectations for transparency and accountability.

These challenges have exposed limitations in many traditional construction administration processes →

Across the industry, it is still common to find project information managed through paper reports, spreadsheets, physical file storage, email chains, and disconnected systems. While these approaches often evolved to meet specific organizational needs, they can create significant administrative burdens as project volume and complexity increase.

Common Construction Administration Pain Points

- Duplicate data entry and manual reporting
- Limited visibility into project progress
- Difficulty sharing information across teams
- Long-term document storage requirements
- Audit and compliance challenges
- Time-consuming document retrieval
- Delayed identification of project issues

As infrastructure programs continue to grow, agencies are increasingly recognizing that traditional processes may not provide the efficiency, visibility, or scalability required to support modern project delivery.

The Emergence of Digital Project Delivery

Recognizing these challenges, transportation agencies across the country have increasingly embraced digital project delivery.

For more than a decade, the Federal Highway Administration has encouraged agencies to use technology to improve communication, streamline documentation, and make project information easier to access and share.

For many agencies, digital project delivery has become a practical response to growing administrative demands and staffing constraints. By digitizing construction administration processes, organizations can reduce redundant work, improve visibility, and strengthen documentation without sacrificing compliance requirements.

In this whitepaper, we'll share several case study examples of how leading local agencies and consultants have modernized to address common construction administration challenges through digital project delivery.

Replacing Paper and Spreadsheets

Despite increasing pressure to modernize, construction administration at many agencies still relies on a patchwork of tools and processes developed over decades to meet specific organizational needs.

Daily reports are completed by hand. Quantities are tracked in spreadsheets. Photos live on cameras or local drives. Project records are stored in filing cabinets. I once spoke to a project manager who was purchasing a new filing cabinet every few months simply to keep up with project record retention requirements.

The challenge is that today's infrastructure projects demand a level of speed, transparency, and accessibility that these systems were never designed to support.

Across the agencies and engineering firms featured in this paper, the modernization journey often began with a common realization: critical project information existed, but accessing, sharing, and managing it had become increasingly difficult.

Information Exists, But Isn't Easily Accessible

One of the most common frustrations agencies described was not a lack of information, but a lack of visibility. The requirements of travel and the lack of centralized data meant information wasn't always available when people needed it.

Charleston County, South Carolina, experienced this challenge firsthand.

Managing between 20 and 40 active construction projects at any given time, the County relied heavily on spreadsheets to track project information. Construction Manager Buck Dukes maintained a detailed spreadsheet that contained the information he needed, but keeping it current required significant effort.

> **"I manage our CEI program, and back then, I kept an Excel spreadsheet. I had pretty good information, but it was information that I had to put in, usually at the end of the month."**

The result was a reporting process that was often retrospective rather than proactive.

Project information existed, but it was not always available when decisions needed to be made.

> **"Sometimes you wouldn't find out a problem until Friday afternoon, when it's too late to do anything about it."**

Charleston County wasn't alone in this struggle. →

Multiple agencies and consultants described similar situations where information lived in spreadsheets, notebooks, paper reports, email chains, and filing cabinets rather than in a centralized, accessible system.

CTL Engineering, an Ohio-based consulting firm, recalled the difficulties associated with spreadsheet-driven project management.

"That's a recipe for disaster, when you have multiple people working off the spreadsheet," said Chief Growth Officer Joe Warino.

C&S Companies Principal Engineer Greg Fehrman shared a similar sentiment:

> **"A lot of our highway/bridge projects were one-person shows. And if you have 20 of those projects, how do you check to make sure things were done correctly?"**

Without a centralized source of information, teams often found themselves manually transferring information between systems, reports, and stakeholders.

For many agencies, project setup can involve taking information from PDF bid documents, transcribing it into spreadsheets, and then importing it into project management systems. Every manual step introduced opportunities for errors, inconsistencies, and wasted effort.

Building a Single Source of Truth

As these agencies modernized their construction administration processes, one benefit emerged repeatedly: centralization. Instead of maintaining separate systems for reports, photos, quantities, materials, and financial information, organizations began consolidating project information into a single record.

What a Single Source of Truth Enables

- Elimination of duplicate data entry
- Reduced spreadsheet version-control issues
- Consistent project records across teams
- Real-time access to current information
- Faster reporting and decision-making

As noted above, while efficiency was often the first benefit agencies noticed, it wasn't always the most valuable one. When information becomes more centralized and accessible, agencies gain something just as helpful: real-time visibility.

In the next chapter, we'll explore how real-time access to project information is helping agencies improve decision-making, strengthen collaboration, and increase transparency across projects and teams.

Improving Real-Time Visibility Across Projects and Team Members

When project information is scattered across notebooks, spreadsheets, email chains, and filing cabinets, it becomes difficult to answer even basic questions.

- **How much work has been completed?**
- **Is the project on schedule?**
- **Are there any issues that require attention?**
- **Has a contractor submitted the required documentation?**

Often, the information exists somewhere. The challenge is finding it quickly enough to make informed decisions. By centralizing project information and making it available in real time, agencies gain a clearer picture of project progress and can respond to issues before they become larger problems.

From Weekly Updates to Real-Time Information

When Charleston County moved away from spreadsheets and started tracking projects in a centralized project management system, the positive impacts were immediate. After modernizing construction administration processes, project managers gained direct access to real-time information entered by inspectors and consultant staff.

"It's very transparent. It's real-time data versus, you know, a week. Project managers can open it at any time, look in the software, and find out what went on with their project," said Dukes.

Rather than waiting for updates to be compiled and distributed, project staff could immediately understand project status and make decisions based on current information.

Connecting Distributed Teams

Real-time visibility becomes even more important when project teams are spread across multiple offices, job sites, or geographic regions.

At CTL Engineering, staff are frequently managing projects across Ohio while inspectors, project managers, and clients work from different locations.

Before implementing digital workflows, retrieving project information could require phone calls, emails, or even travel to a job site.

Today, project information is accessible regardless of location.

As CTL's Joe Warino described:
"If you live in Dayton, and the job he's talking about is in Athens, and our office is in Columbus... now it's like, 'Hey, let's look in [the software],' and in minutes you have what you need."

By eliminating information silos, project teams can spend less time tracking down information and more time acting on it.

Improving Transparency for Stakeholders

Visibility isn't only valuable for project managers and inspectors. Many agencies found that real-time access to project information improved communication with stakeholders both inside and outside their organizations.

Charleston County uses real-time project data to keep leadership informed and demonstrate progress on high-profile infrastructure initiatives.

"We can show our elected officials who can go back to their constituents and say, look, we are on schedule," said Dukes.

Similarly, CTL Engineering frequently provides project owners with read-only access to project information.

According to Regional Manager Greg Kronstain:

> **"Allowing read-only access and giving them the opportunity to check their reports and see what's going on and keep up with the progress, that saves us in the long run as well."**

This transparency reduces uncertainty, improves communication, and helps build trust among project stakeholders.

What Real-Time Visibility Enables

- Faster issue identification
- Improved decision-making
- Better communication between teams
- Increased transparency for stakeholders
- Reduced dependence on manual reporting
- Greater confidence in project information

In the next section, we'll explore how comprehensive digital documentation helps agencies reduce risk, resolve disputes, support audits, and protect public investments.

Protecting Agencies Through Better Documentation

Many construction projects are completed without major disputes, audits, or legal challenges. But when those situations do arise, the quality of project documentation often determines how quickly they can be resolved.

The use of paper reports, filing cabinets, spreadsheets, and archived project records to preserve project history can often lead to long weekends spent digging through them.

As organizations modernize construction administration processes with digital solutions, they are discovering that digital documentation vastly improves record-keeping and, as a natural byproduct, reduces risk.

Resolving Disputes Faster

For engineering consulting firm RS&H, comprehensive project records proved invaluable when a subcontractor dispute surfaced more than a year after a runway project had been completed.

The subcontractor questioned quantities and ultimately filed a claim against the project owner. Historically, responding would have required digging through archived files and manually assembling documentation.

Instead, Construction Services Discipline Leader David Elliott was able to generate reports on the disputed items in a matter of minutes.

> **"8-10 hours of researching files the old way, I did in about 5 minutes."**

What previously would have required an entire weekend of research was completed in a single evening. The ability to quickly retrieve historical reports, quantities, and supporting documentation allowed the team to respond confidently and efficiently.

Digital Documentation Time Savings

80% REDUCTION IN RESEARCH TIME

RS&H reduced documentation research from approximately 8-10 hours to just minutes when responding to a project dispute. →

Sometimes, a comprehensive digital record will even support collaboration with the contractor, as was the case with Wolverine Engineering. The consulting firm provided their contractors with read-only access into their construction administration system, allowing the contractor to rely on the accuracy of the project record when proposing changes.

"We had a contractor run into some contaminated groundwater and soil. He went back and reviewed the inspector's IDR, looked at the comments, and pieced together a change proposal for an extension of time because of the days associated with contaminated soil. He literally copied and pasted the comments from our IDRs into his supporting documentation," said Project Engineer Joe White.

Creating a Defensible Project Record

Documentation becomes especially valuable when project teams need to verify what occurred long after construction is complete. Charleston County emphasized the importance of maintaining long-term project records, particularly on projects involving multiple funding sources and public accountability requirements.

"Problems don't always show up six months or a month after you finish the job. Problems start showing up a year, two years, or something later. A year from now, if somebody's getting sued, we can go back to our [digital] report and hand it to our lawyers," said Dukes.

Rather than searching through paper files or piecing together records from multiple sources, project teams can quickly access a complete history of project activities, quantities, photos, and reports to support their legal case.

Supporting Audits & Compliance Reviews

Many agencies featured in this paper deliver projects that leverage federal and state funding, making documentation a critical component of compliance. The City of Meriden originally began exploring digital construction administration as a way to streamline the paper-intensive Four Volume process required on DOT-funded projects.

While the process provided consistency, it also created challenges related to document storage, retrieval, and auditing, according to Director of Public Works Howard Weissberg:

> **"The challenge of the Four Volume method is you have to do enough of it to figure it out, because there are a lot of intricacies and dynamics. There are so many processes that if you don't do it routinely, you don't know how to do it."**

By leveraging digital solutions to replace the Four Volume method, the City was able to simplify compliance while making information easier to access and organize.

Similarly, Charleston County highlighted the ease of compiling documentation for agency partners and funding organizations.

"When we finish, it's easy for us to download that information into a format that they can use. We can load it straight into the DOT portal," said Dukes. →

Documentation-Driven Cost Savings

In some cases, strong documentation delivers direct financial value. CTL Engineering shared an example involving a contractor dispute over cost analyses on a project. Using project records, daily reports, and photographs, the team was able to verify quantities and support its position during negotiations.

The result was approximately:

$100,000
IN SAVINGS

According to Construction Management Project Manager David Ley:

> **"I was able to go back through the diaries and the photo log in order to resolve it, so it really helped quite a bit."**

Without readily accessible project records, resolving the dispute would have been significantly more difficult and potentially more costly.

What Better Documentation Enables

- **Faster** dispute resolution
- **Stronger** claims defense
- **Improved** audit readiness
- **Easier** regulatory compliance
- **Reduced** legal risk

The value of documentation extends beyond risk reduction. For many agencies, it also plays a critical role in managing increasingly complex funding requirements, as we'll see in the next section.

Managing Multiple Funding Sources

For many agencies, managing construction projects is only part of the challenge. Handling the funding behind those projects can be just as complex.

Infrastructure projects increasingly rely on multiple funding sources, each with its own requirements, reporting obligations, reimbursement processes, and audit expectations. Federal grants, state transportation dollars, local funding programs, gas taxes, sales taxes, and utility reimbursements often converge within a single project.

While these funding sources make more projects possible, they also increase the importance of accurate documentation, financial tracking, and accountability, so local agencies can be effective stewards of public funds. →

Tracking Funding Streams

Charleston County, South Carolina, encountered the challenge of managing multiple funding sources while delivering pedestrian safety improvements along Woodland Shores Road and Maybank Highway.

The project combined multiple funding streams, including:

- Federal funding
- State funding
- County funding
- Gas tax revenues
- Sales tax programs

Managing these funding sources required the County to carefully track project costs, maintain supporting documentation, and prepare reimbursement requests.

According to Construction Manager Buck Dukes:

> **"There's a lot of pots of money in there... if we do not do the funding correctly and keep all the data, we'd have a chance of losing some of that funding."**

Historically, this type of financial tracking often required maintaining multiple spreadsheets and manually assigning costs to the appropriate funding source.

> **"It would have been multiple spreadsheets, trying to split the money of what share comes from which one."**

By centralizing project records, quantities, and financial information, Charleston County was able to simplify the process while maintaining confidence in the accuracy of its funding records.

Managing Complex Pay Items at Scale

Funding complexity isn't limited to federal reimbursement tracking. Large projects often contain hundreds of bid items, multiple contract packages, and evolving scopes of work that must all be tracked accurately throughout construction.

For Felsburg Holt & Ullevig (FHU), this challenge became particularly apparent on an $80 million roadway widening project that included three separate funding packages and more than 600 pay items.

According to Regional Manager Tom Nead:

> **"Trying to manage that many pay items manually would have been a nightmare. It wouldn't have worked. It would have required a full-time administrator just to manage the paperwork."**

To simplify management, FHU organized the funding packages separately within their construction administration software while maintaining visibility into all associated pay items. This approach allowed the team to verify quantities, identify discrepancies, and keep the project moving efficiently despite its complexity.

Nead noted that accurate pay item tracking also helps identify potential issues before they become payment disputes.

> **"We can run a report for a certain pay item number and compile all the payments that are posted in one place. If someone is saying that they're paving a section of sidewalk, but you're in a curb and gutter pay item, the mistake will stand out really quickly."**

The ability to quickly validate quantities and payment records reduces administrative effort while improving confidence in the project's financial data. →

Balancing Compliance & Efficiency

Historically, compliance has often been viewed as a necessary administrative burden. The agencies and consultants featured throughout this paper discovered that modernization can make compliance a natural byproduct of standardized digital processes.

Whether managing multiple funding sources, hundreds of pay items, reimbursement requests, or audit requirements, centralized project information reduces the effort required to maintain accurate records while improving confidence in the results.

What Better Funding Management Enables

- **Simplified** tracking of multiple funding sources
- **Improved** pay item management
- **Faster** reimbursement processing
- **Stronger** audit readiness
- **Reduced** administrative burden
- **Increased** confidence in project financial data

As infrastructure funding programs continue to grow in size and complexity, agencies will need systems and processes capable of supporting both project delivery and financial accountability.

In the next section, we'll cover how agencies and engineering firms further streamlined their processes by extending modernization to different phases of the project lifecycle.

Modernizing & Integrating Bidding

This whitepaper primarily focuses on modernizing the construction administration and management phase of a transportation asset. But in talking to many agencies, we found many who are updating their bidding process side by side with construction administration and experiencing complementary benefits.

After all, bidding has historically faced many of the same challenges as paper or spreadsheet-based construction administration; paper plan sets, physical bid submissions, manual bid tabulations, and in-person bid openings.

By modernizing bidding alongside administration, agencies are creating a more connected project delivery process that improves efficiency, increases competition, and creates continuity between bidding, construction, and project closeout.

Expanding Contractor Participation

When Clinton County, Ohio, began modernizing its project delivery processes, one of the first areas it targeted was bidding. Deputy Engineer Adam Fricke had already

embraced digital construction administration, but saw similar opportunities to improve procurement.

Initially, the County's leadership preferred traditional, in-person bid openings. Over time, however, the advantages of online bidding became increasingly apparent.

The transition proved especially valuable during the COVID-19 pandemic, when staff were suddenly required to work remotely.

> **"We bid projects where I'm sitting at home, the commissioner is at the office, my boss is at his house, and we're doing Zoom calls where I share my screen and we open bids. We never missed a day from COVID."**

More importantly, the County experienced a significant increase in contractor participation.

BIDDER PARTICIPATION INCREASED BY

40% – 70%

According to Fricke:

> **"We're seeing a 40%-70% increase in the number of bidders, depending on the scope of the project."**

For public agencies, increased competition can lead to more responsive pricing and greater contractor engagement.

Eliminating Administrative Burden

Before implementing digital bidding, the Cherokee Nation Department of Transportation relied on a largely manual procurement process. Staff were responsible for printing specification books, contracts, and plan sets, managing receipts for plan purchases, distributing bid notifications, and conducting in-person bid openings. The process consumed significant staff time and often required several days of preparation before a project could even be advertised.

According to Infrastructure Data Coordinator Sherry Waters:

> **"From start to finish, the old way of getting a bid out was about three days. And now it takes what, an hour?"**

By transitioning to e-bidding, the Cherokee Nation DOT dramatically simplified how projects were advertised, distributed, and processed. Rather than printing and mailing plan sets or faxing bid notices, contractors could be notified electronically and access bid documents immediately.

The efficiencies continued through bid opening and award.

Under the previous process, staff manually opened bids, reviewed calculations, checked required documentation, and assembled bid tabulations by hand. Depending on the number of bids received, this effort could take several hours following each bid opening.

> **"Sometimes it would take two to three hours just to do the bid tabs per opening."**

Today, much of that work is automated.

> **"We went from what would be three hours, because we would have to put all the items in, all the quantities for each person. And now, we just click a button."**

Beyond efficiency gains for agency staff, e-bidding also removed barriers for contractors. Digital submissions eliminated

concerns about travel time, late arrivals, and physical bid delivery, helping create a more convenient and accessible procurement process.

Connecting Bidding and Construction Administration

While increased bidder participation and administrative efficiency are important benefits, some agencies and consultants are discovering that the greatest value of digital bidding emerges after bids have been opened.

Bidding and construction administration are often operated as separate processes supported by separate systems. Bid tabs, quantities, and contract information often needed to be manually transferred from one platform to another before construction could begin. This handoff created instances of duplicate work, inconsistencies, and errors.

Before CTL Engineering modernized its workflows, project setup often involved extracting information from bid documents, manually entering quantities into spreadsheets, and then transferring that information into construction administration systems.

"The setup process used to be very labor intensive. You're taking information from one source, putting it into another, checking it, and then checking it again," said Joe Warino, Chief Growth Officer.

Now, instead of the painful, drawn-out process of transcribing handwritten bids into Excel and uploading them into a project management system, the team at CTL Engineering gains efficiency by using an integrated solution for bidding and construction administration. Bid tabulations are exported from the bidding platform and imported into the project management system for simple and seamless project setup.

"[e-Bidding] is the way to do it. It's an added level of efficiency for the owner and the construction manager on the back-end," said Warino.

Clinton County takes the same approach. After bids are received electronically, project information can be imported directly into construction administration workflows for bid analysis and project setup.

According to Deputy Engineer Adam Fricke:

> **"After collecting bids, we export them into [the software] for bid analysis."**

This process allows project teams to quickly move from procurement to construction while reducing the amount of manual data entry traditionally required. As more agencies adopt digital project delivery practices, the boundary between bidding and construction administration workflows continues to shrink.

Rather than existing as separate phases supported by disconnected tools, bidding and construction administration are increasingly becoming part of a single, unified project workflow.

What Modernized Bidding Enables

- **Increased** contractor participation
- **Faster** distribution of plans and addenda
- **Reduced** administrative effort
- **Remote** bid opening capabilities
- **Improved** transparency
- **Easier** bid analysis
- **Better** integration with construction administration systems

Summarizing the Key Lessons from Agencies and Consultants Modernizating Construction Administration

While the organizations featured throughout this paper vary in size, geography, and project types, their experiences reveal several common lessons about modern construction administration.

1 Paper Processes Create Hidden Costs

Paper reports, spreadsheets, and disconnected systems often persist because they are familiar. However, agencies consistently found that these processes created administrative burdens, duplicate data entry, reporting delays, and challenges accessing project information when it was needed most.

2 Visibility Improves Decision-Making

When project information is centralized and accessible in real time, teams spend less time searching for answers and more time solving problems. Improved visibility enables faster issue identification, stronger collaboration, and better communication with stakeholders.

3 Documentation Reduces Risk

Comprehensive digital records support audits, claims defense, dispute resolution, and long-term record retention. In many cases, agencies found that improved documentation delivered value long after construction was complete.

4 Compliance and Efficiency Can Coexist

Modernization does not require agencies to sacrifice compliance or oversight. Instead, digital workflows help organizations maintain strong documentation while reducing the administrative effort required to manage funding, reimbursements, and reporting requirements.

5 Modernization Is Most Effective When It Spans the Entire Project Lifecycle

The greatest benefits occur when agencies connect bidding, inspection, and construction administration into a unified workflow. Information becomes easier to manage, easier to access, and more valuable throughout the life of a project.

Modernize Your Construction Administration Process with Appia

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Every agency and consultant highlighted in this paper leveraged Appia as the key software solution in their modernization journey.

Appia is a GIS-enabled construction project management solution designed specifically for local public agencies and engineering firms. With intuitive features for project planning, reporting, fund tracking, risk management, and collaboration, Appia enables project teams to deliver projects on time and within budget while ensuring safety and compliance.

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Track complex funding setups

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