



e-Construction

PEER-TO-PEER EXCHANGE

Summary Report



Texas Department of Transportation and
Montana Department of Transportation

San Antonio, Texas
November 17-18, 2015



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1. Background

The Texas Department of Transportation (TXDOT) hosted a peer exchange with the Montana Department of Transportation (MDT) in San Antonio, Texas on November 17-18, 2015. The focus of the peer exchange is e-Construction – or a paperless construction administration delivery process that includes electronic submission of all construction documentation by all stakeholders, electronic document routing/approvals (e-signature), and digital management of all construction documentation in a secure environment that nonetheless allows distribution to all authorized project stakeholders through mobile devices. The event was sponsored by the Federal Highway Administration (FHWA), and representatives from the FHWA Resource Center and each participating State's FHWA Division Office also participated in the event.

The morning sessions on the first day served as an introduction to the peer exchange and allowed for personal introductions, along with background information on each State's construction program and e-Construction activities. The afternoon of the first day consisted of discussion sessions on technologies and systems in use in Texas including SiteManager, EquipmentWatch, and ProjectWise. The morning of the second day consisted of additional discussion sessions on e-Construction field devices, including a software tool named Headlight for mobile inspection. The afternoon of the second day included a field visit to a TXDOT Area Maintenance Facility to discuss mobile devices and applications, followed by a summary discussion on next steps, action items, and follow-up.

The Peer Exchange is the third in a series designed to assist States with implementation, while allowing peers to network and share information across State Departments of Transportation (DOT) in a relatively small group setting. Construction and information technology (IT) leaders, inspectors, managers, and engineers from each agency participated in the event. The list of attendees, along with contact information for each, is provided as an appendix to this document to promote further networking among participants.

Participants discussed the important issues and challenges, potential solutions, and e-Construction practices that have proven beneficial to agencies and contractors. Application of e-Construction in the field through portable devices, documentation through project collaboration sites, IT security analysis and needs, newer mobile device applications, and the use of digital signatures and workflows were all focus areas of the peer exchange.

This report includes a summary of key findings from the event with links to relevant documents, along with the full notes from the peer exchange discussions.

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2. e-Construction Implementation – Key Peer Exchange Findings

The peer exchange produced several relevant and practical “takeaways” identified by the group roundtable discussions. The following sections address the items that were highlighted by the group as a next step, implementation idea, document exchange, or focus area – all of which are designed to assist with future implementation within the States’ e-Construction programs. Where available, Web site links are provided for some of the practices currently in use by the agencies. In some cases, TXDOT and MDT shared documents by email that are not publically available on the internet. Where possible, those documents are included as appendices to this report.

TXDOT shared information on the magnitude of investments made in e-Construction software and hardware. This investment data includes licensing fees, consulting costs, time and resources for employees, as well as the time frame for deployment and meeting the learning curve on new software applications. Both agencies agreed that this information helps sell concepts to decision-makers and allows for budgeting for initial costs and annual maintenance costs.

See Appendix C for TXDOT e-Construction process flowchart and list of software applications.

Mobile devices take the form of laptops, tablets, and even cellular phones. A process should be outlined for use of applications on each device, along with a feedback loop for recommendations from agency and consultant inspectors. TXDOT shared a list of the standard applications that are installed on each iPad used in the pilot and beyond (CITRIX and XenDesktop for connecting through VPN, Crossroads application for accessing the TXDOT Intranet, and PDF Notes, Dropbox, and Skitch for mark-ups and file transfer). MDT is planning to test some mobile devices, and while TXDOT has piloted iPads, they allow flexibility across the State and have designed systems to be device independent. TXDOT demonstrated each software application and discussed a recent pilot project to implement HeadLight – a system designed to create efficiencies in project inspection activities using mobile technologies.

Link to Washington State research study on the benefits of using tablet devices for inspection:
<http://www.wsdot.wa.gov/Research/Reports/800/840.2.htm>

Link to further information on HeadLight Software:
<http://www.paviasystems.com/products/headlight/>

TXDOT has an Inspector Development Program that uses in person mentoring and an “IDP Channel” to provide training videos to staff. Videos are housed on YouTube and viewable from the mobile devices.

Link to TXDOT Inspector Development Program and e-Construction training videos:
<https://www.youtube.com/user/TxDOTidp>

File storage conventions, library structures, and naming systems are important in using document management systems such as ProjectWise. TXDOT shared their proposed project directory structure, while allowing flexibility across the district offices in setting up project file conventions and structures.

e-Construction systems may include access by entities outside the State agency’s firewall, such as for contractors and consultants, and may require approvals or digital signatures. TXDOT evaluated what legally needed to be signed by all parties involved and established workflow items with basic approvals and

workflow items that required a signature such as for change orders and contract execution. Currently, TXDOT uses some system-based workflow approvals in lieu of digital signatures, but also uses digital signatures through Adobe and DocuSign. DocuSign is a product that allows for multiple users to sign documents digitally as part of a workflow process. Only the originator needs to have the DocuSign license – others can sign without a license. The software also integrates with SharePoint sites (via Office 365) to allow further efficiencies in managing document signatures and approvals.

Link to TXDOT policy on the use of digital signatures and electronic engineering seals:

http://onlinemanuals.txdot.gov/txdotmanuals/pse/engineers_seal_txdot_copyright_requirements.htm

Link to information on the Copeland Act and FHWA's policy on the use of digital signatures for construction projects.

<http://www.fhwa.dot.gov/construction/cqit/111204dol.cfm>

TXDOT, other local agencies, and some contractors use a software package named LCPTracker for **managing certified payrolls and other labor compliance related documents, including Davis-Bacon Act wages**. MDT's Civil Rights Office handles the tracking and reporting on labor compliance.

Link to information on LCPTracker software application:

<http://www.lcptracker.com/>

TXDOT is using Adobe and Skitch software for as-built management and to provide comments on documents electronically. They have also used these tools for annotating photographs, developing inspection reports, and to document deficiencies for correction by the contractor. TXDOT also uses dropbox to share, store, and transfer files between iPads and other devices. Large files can potentially be accessed and used more quickly than when accessed via websites.

Link to more information on the Skitch software application:

<https://evernote.com/skitch/>

Link to dropbox software:

<http://www.dropbox.com>

Stockpile measurement is a work activity that historically required workers to traverse a stockpile to take measurements and estimate quantities based on those measurements. TXDOT uses the iPhone and a third party stockpile measurement application that sends data to an external site for processing. While used commonly in maintenance, electronic processing of stockpile data has application to construction as well.

Link to sample stockpile measurement report:

<http://www.stockpilereports.com/sample-stockpile-report/>

3. Peer Exchange Discussion Notes

This section provides additional notes following the organization of the agenda. Question and answer sessions followed each presentation and demonstration (labeled “Q:” in the notes). The full agenda for the Peer Exchange is included as an appendix to this document, along with a roster of participants with contact information for participants.

3.1 Host State Presentation – Texas DOT e-Construction Overview

Ricardo Castaneda, the Deputy District Engineer for the San Antonio District, outlined some of the current construction and safety issues of focus in Texas. TXDOT is divided into 24 districts and the San Antonio District covers 11 surrounding counties, with 254 counties in the entire State. The San Antonio District recently awarded \$12 million in Highway Safety Improvement Program (HSIP) Projects, including longitudinal rumble strips for shoulders that are 4 feet wide or larger. Montana performed a research project to investigate the use of rumble strips on edge lines and also use them on centerlines. Bicyclists have difficulties navigating edge line rumble strips when vehicles approach from behind.

TXDOT has completed 92 construction projects totaling just over \$600 million for the year as of August 2015. The San Antonio area recently included a slide-in bridge replacement project that was completed in one weekend. The DOT maintenance program totals approximately \$70 million annually. TXDOT has a total maintenance contract for Interstate 410 that loops around San Antonio. Average contract letting volume is approximately \$300 million, with the expectation for near double that amount in 2016 and 2017.

Roxana Garcia presented on e-Construction initiatives at TXDOT from the Central Office perspective. TXDOT recently outsourced all IT services but has a total of approximately 12,000 State employees. TXDOT converted philosophy from custom applications to commercial off the shelf systems under an initiative from the Executive Director. Also, the initiative maintains the policies on IT access restrictions while shifting focus to alleviate some of the burden on enforcement resources. This philosophy also encourages expanded use of the existing e-Construction systems by others within the department. ProjectWise and other systems were rolled out statewide for use by the entire department. TXDOT maintains a 24-hour turn around goal for many IT related requests. The group discussed the importance of employee flexibility in changes to systems, forms, and devices.

TXDOT has approximately 800 construction inspectors. San Antonio, Houston, Dallas, and Fort Worth are large districts for TXDOT, and some districts have taken the lead in rolling out use of the Electronic Document Management System (EDMS), with implementation based on the guidelines provided by the central office. TXDOT uses ProjectWise and also has a shared drive for internal storage of documents, with limits on space on individual drives which also encourages users to store files in ProjectWise. By uploading all documentation in ProjectWise, a system that all DOT employees can access, TXDOT has eliminated storage issues with redundancy in saving multiple copies of files or emailing multiple copies of files. As long as documentation is in a construction folder, users can create their own file organization conventions and structures. TXDOT and MDT both recommend having employees supporting SiteManager who are outside of the general IT group (a position titled “Business Analyst” in Texas). In Montana, contractors all use Primavera 6 for project scheduling.

3.2 Exploring State Presentation – Background on Montana e-Construction Status and Plans

Dwane Kailey provided an overview of Montana DOT e-Construction activities. Implementation of 3D design, upgrades to project scheduling systems, evaluation of the existing Program and Project Management System (PPMS), updating LRS system, and implementing the financial management system are all current initiatives. Currently there is no access to SiteManager by contractors. Montana is also looking at tablet devices and pros and cons of the various types. The document management system is the first step in implementation of e-Construction. Montana DOT currently uses an Oracle database forms and design tools system. A linear referencing system is also underway as well as the document management system and materials management system. All contract administration is done in-house for Montana DOT. Remote locations prove challenging for MDT to run lines and create internet connectivity. MDT uses approximately 30% consultant contracts for design, and also uses BidExpress for electronic bidding. MDT built in-house system for managing as-built drawings. There is an ongoing requirements gathering process for ProjectWise to replace an existing file management system in place in Montana.

In order to alleviate similar issues with connectivity in remote locations in Texas, TXDOT runs fiber within the State right-of-way to remote locations where little connectivity may exist. TXDOT uses ExeVision for electronic bidding, and developed a system named Compass to replace their Laboratory Information Management System (LIMS). TXDOT is also using SiteManager for materials test results and data management.

3.3 TXDOT Demonstration of e-Construction Systems and Technologies (SiteManager and EquipmentWatch)

Brian Dewey presented on use of EquipmentWatch as an electronic system for managing and electronically checking and verifying equipment rates for force accounts and change orders. Both Texas DOT and Montana DOT have access to Blue Book equipment rental rates; however, TXDOT uses EquipmentWatch to automatically and systematically verify contractor submissions of rental rates, create fleets, and ensure that characteristics are correct such as the appropriate region along with the appropriate model year for equipment. The system also develops a report for review. An inventory can be developed using the equipment data entered into the system. Contractors can then develop fleets and share them with the DOT, and the system will allow the information to be shared across the contractor and the DOT. An email is sent from the system interface to share the fleet with the DOT based on the login (email address). The system provides efficiencies in verifying rates as a worthwhile example of using electronic innovation to support e-Construction. Mobility is also enhanced, as DOT inspectors can record serial numbers from field equipment in use and search for the rate information in the system electronically. It also allows users to export to a spreadsheet and use the data for force accounts. Data integrity can also be checked through custom reports that can be compared with spreadsheet data that could otherwise be changed or modified, as compared with the baseline process that only includes spreadsheet data.

Cullen Pfeiffer outlined the process for the use of SiteManager in Texas.

Q: How does TXDOT certify materials? Periodically through the project or at the end? Area Engineers develop a materials certification letter at the end of the project. Testing is performed throughout the project to ensure materials meet specifications. TXDOT monitors deficiencies and reports to FHWA and uses SiteManager to ensure that appropriate payments are made and deficiencies are managed and resolved.

MDT provided an example situation where a contract in Montana was behind schedule on closeout – substantially complete to closure must occur within 90 days. When certifying materials at the end of the project, this duration is no more than 30 days due to other requirements on the critical path during the 90 day period. This process is important for certifying that the project is built in reasonable conformance with the plans and specifications, for making payments on bid items, and ensuring disposition of materials issues. TXDOT stated that they manage deficient materials as the project progresses thru progress payment workflows and change orders as opposed to managing those items at the end of the project.

Texas uses a workflow within SiteManager for change order approvals. The typical project process is outlined here: ExeVision holds bids until bid openings and they are downloaded into mainframe system (still allow paper bids but very few happen). Electronic bids are read and the mainframe system automatically performs bid tabulations for the lowest responsible bidder. When the project is awarded, the project information is migrated into SiteManager. SiteManager Interface Computer (SMIC) is a TXDOT custom system that pulls information from the mainframe to SiteManager. Contract execution is performed on paper for signatures. Senate Bill 20 requires TXDOT to post electronic documents on the internet which also assists with implementation of electronic signatures. DocuSign can be used to execute contracts, since the documents must be scanned and made available electronically to meet the requirements of Senate Bill 20. Once the contract is executed, information flows to the district level for management and use until project completion (assigned to an area office in TXDOT).

Q: Who performs the customizations to SiteManager? Construction division staff members handle customizations and IT staff members perform coding updates as needed. Updates are pushed over the weekend.

For projects of FHWA Division Interest (PoDI), change order approvals are performed in SiteManager.

TXDOT customized SiteManager to query contracts by parameters including all contracts, construction, maintenance, or other. All information is inputted by the area office, and personnel approve contractor payments from this information. Project managers will approve each other's Daily Work Reports (DWR), as the original developer is prohibited from approving their own DWR. TXDOT also created a calendar view in SiteManager to allow ease of access to particular weeks within the month.

Q: How do you access SiteManager from tablets? The Citrix application is used and a local application named Standalone Inspector also provides rights to access SiteManager. Although, there are issues with the speed of this connection. Another option is to use a VPN connection which provides faster access.

Montana DOT inspectors are using standalone SiteManager software on the laptop and the daily work reports replace the inspector diary as the formal record. Some laptops are shared between employees that work on crews.

A determination is needed for the types of technology (laptops, smart phones, tablets, etc.) to issue to employees. Texas DOT recommends only using smart phones where applications are designed to be viewed and forms allow input based on the size of the screen. In locations where connectivity is limited, a notes application allows users to take notes and then copy them into SiteManager when back at an office, all electronically.

TXDOT uses LCPTTracker as a solution for 100% compliance with audits on certified payrolls. Previous year audits would often require adding management actions to attempt to have all payrolls meet audit requirements (sometimes a small percentage would not meet the standard, prompting action).

Q: Does the folder go into FileNet or stay in ProjectWise? The files are maintained in ProjectWise. Records retention occurs using FileNet as policies and timelines allow. Fewer users have access to FileNet, while every employee uses ProjectWise. FileNet is older software that TXDOT has used for a longer period of time compared with ProjectWise.

Folders can be built in ProjectWise to handle non-project related documents in addition to the typical use for project-related documents. Montana is developing a system for storage of non-project-specific documents that can be found more easily.

Q: Do you have rules for retention and clean-up in ProjectWise? TXDOT is building those rules now.

When TXDOT began e-Construction, the iPad was the technology available. Other types of devices are also used by TXDOT employees depending on location and preferences. Each device needs connectivity at all times, and the smart phone can be used as a hot spot for access to the internet by other devices such as laptops and tablets.

The State Transportation Innovation Councils (STIC) can get up to \$100K per cycle for purchasing technologies. There is also a pilot program - Aid Demo Grants – to help with funding for technology deployments.

Determining an IT investment level per employee will help relate the costs of a new device and show that it may be minimal with large benefits that will outweigh the costs. It is better to focus on the overall costs and relate it to how much is spent per employee as opposed to whether an employee can add a new device. Another hurdle is that there are many products and software available but only a few employees may be using it. TXDOT uses air watch on devices to monitor employee use as needed.

3.4 Technical Exchange Topic #1 – Document Management Systems and Workflows (ProjectWise)

Diana Rogerio from the San Antonio District gave a presentation on ProjectWise, the TXDOT document management system. TXDOT has been using this system for 6 years and the system was rolled out statewide recently. Montana DOT is looking to purchase a similar solution to use, including a Computer-Aided Design and Drafting (CADD) management system first and also a document management system.

Control Section Job (CSJ) is the linear referencing system used by TXDOT for a roadway segment that will have project numbers associated with it. When a project is created in design, it has a CSJ number included. The data for projects is stored in the cloud, including design files. All TXDOT employees have read-only access, while some have write access to ProjectWise files.

Q: Can you track who accesses the system? There is a change history for when a change is made, although not a history for exactly what was changed. TXDOT also keeps backup versions of files weekly and monthly.

Q: Are contract documents and federal aid approval documents also stored in ProjectWise? Yes, for example design exception files are stored in the appropriate folder.

Q: How is external access managed? The ProjectWise system is outside the TXDOT firewall and web-based.

Q: Consultant designs – are consultants loading design files into ProjectWise? TXDOT employees may load the consultant design files to avoid issues with CDs and storage/retrieval of the CDs.

Consideration has to be given to network access from smaller, more remote locations, as transferring files across the network may consume heavy network resources and limit other activities for slower connection offices. Any cloud hosted application changes the bandwidth needs and resources in the State data center.

FileNet and EDMS are two references to the same system used by TXDOT. Documents and data can be archived in FileNet for records retention purposes. The question now is whether to upgrade the FileNet system, as ProjectWise will handle the functions that FileNet was originally purchased for.

Q: Does TXDOT use workflow approval processes for design scoping documents? ProjectWise handles much of the documentation requirements for agreement on these types of issues. TXDOT uses design review meetings to reach consensus on the solutions and documents this and includes the documentation in ProjectWise. Email is used often for sharing this type of information as well.

The group discussed the importance of having an e-Construction champion within every State organization that can continue to provide leadership on the concept of going paperless, whether centralized or decentralized as an organization. This may need to be mandated through policy for decentralized organizations.

Q: For TXDOT, is it a generational issue where newer staff will likely be more interested in using the technology? Not really, as one of the TXDOT Area Engineers that has implemented e-Construction is one of the more veteran employees of the department. Training, education, and marketing for use of new technologies are all important.

TXDOT has needed to upgrade and replace numerous legacy systems over the years. One action they have done is to shut-down old legacy systems and immediately implement a new system without knowing the full impacts on the remaining legacy systems. The process to fully identify all connections to existing programs was impossible to navigate and prone to speculation. So rather than delay, they jumped in and promptly dealt with the consequences. There were occasions where those connections needed to be reestablished but there were more that were not needed or better severed under a different connection.

3.5 Use of Construction Data and Data Management (Headlight and LCPTracker)

Si Katara of Pavia Systems presented on an application for project inspection using mobile technology. Texas, Washington, and Minnesota sponsored a research study to answer the question on how can industry make efficiencies and improvements using technology. The study compared project inspection procedures across each of these States. The Headlight system was developed based on the need to better capture information, organize it, and find needed information quickly for claims or project closeout. Inspectors collect information (called observations) through the iPad in the field including notes and photographs. The system time and location stamps the information, and allows for direct annotation on the photograph. A web-based application with project dashboard also allows users to review all the information collected and

stored in the system. The system also allows for exporting data to a spreadsheet for further analysis and filtering and for compilation or download into daily reports in SiteManager.

Q: With the e-signature in the application, is there a security verification process involved? This solution provides for an electronic signature, as opposed to a digital signature, by signing the screen.

Q: Does the system allow for creation of pre-determined queries or searches that are repeatable? Yes, users can develop a dashboard view of the most important content.

Q: Is Washington DOT storing information internally or in the cloud? WSDOT is storing the information securely in the cloud which provides for additional capacity.

Q: Are the plan sets downloaded to the iPad? Users can download the plans if connections are available, or download them and add to favorites to allow recall of the documents in the field where adequate connectivity may not exist. This software is also compatible with other platform devices in addition the iPad (the platform it was piloted on).

Q: How does this interact with SiteManager? When information is uploaded to HeadLight, the information is directly pulled in to SiteManager.

Q: How is the QR code used? TXDOT uses QR codes for custody of materials samples. For pre-fabricated inspection components, an inspector can take a QR code and embed the information into the code and place it on the component. The QR code could be printed and placed on the device, or pre-printed QR codes could be used by scanning and associating the code with the component.

The pilot results compared a baseline process with the use of the HeadLight application. Average time savings – 1.75 hours per day per inspector; Inspectors collected 275% more data; on time document submission increased by 51%. Researchers also estimated 38 hours per month were saved for each inspector, resulting in a dollar benefit of more than \$1000 per inspector. Incorporation of 3-dimensional data is a future application of this tool. A licensing model exists to allow agencies to use the tool and customize it.

Q: Where is the point of diminishing return when technology allows for collection of more data but then analysis requirements may be more resource intensive? If the data is structured in a certain way where the needed data can be found easier, then the benefits can be maximized.

Q: Do contractors have direct access to the reports in Washington? The WSDOT policy is not to allow contractors access to this information, but consultants have access in some cases.

TXDOT has plans to implement the HeadLight application in the field as funds become available for purchase of the necessary licenses.

3.6 Technical Exchange Topic #2 – Electronic/Digital Signatures and Workflow Utilization

Montana DOT has a guiding document that outlines the process and requirements and security for various applications of digital and electronic signatures. The State statute references a federal government position paper on electronic signatures. Construction documents are not signed electronically as of now.

TXDOT has made a suite of apps available to all users by purchasing enterprise level licenses. One popular app is Adobe Fill and Sign. This program locks the signed document and prevents changes to the signed document. If a user wants to change the document, the signature is invalidated and the document must be resigned.

TXDOT uses Adobe and DocuSign for digital signatures. One of the formats includes a hand-written signature that is scanned into Adobe for placement on documents. When inserting a signature in Adobe, users can add a password to this operation to ensure that the signature is valid. Third party authentication is available from companies that are certified by the responsible federal agency. TXDOT accepts signatures in various forms – faxed signatures have been common and the electronic signature without high levels of verification was deemed to be similar to hand-written or faxed signatures. The group discussed the need for individual States to develop their own policies on digital signatures based on State statutes.

With the need for multiple signatures on a document, a solution named DocuSign allows for routing the workflow to multiple people for signature. The system uses active directory authentication to log in to the website to access DocuSign and provide user authentication. The system provides a dashboard view of the status of documents and also the user information – it also provides an interface similar to an email inbox. Users sending documents need a license, while those signing documents do not need a license. Notes and annotations can be included in the documents, and if users add notes within the workflow it can be set to reroute the workflow so that prior approvals can be updated. DocuSign will integrate directly with SharePoint sites for use in routing workflows. This is part of Office 365 as a plug-in.

Q: Do you apply engineering seals through DocuSign? Engineers apply the seal in MicroStation and then import the plans to the system.

Q: Do you worry about tracking the workflows in ProjectWise? This is a great tool for workflows that include external partners. It provides a log of where each document stands in the process.

Ryan Ronk with LCPTracker presented on the web-based Labor Compliance Program software tool that provides a platform for the collection, monitoring, and validation of prevailing wages. The break-in period for contractors is estimated to be 3 to 4 weeks for use of this system. Montana DOT's Civil Rights Office manages the certified payroll, while the DOT performs spot checks in the field. The system can link with the accounting system in use and generate the certified payrolls. The system also provides for use of an electronic signature for certification of the payroll information and reporting. Montana DOT is currently using paper based forms for documentation of Davis-Bacon Act wages. TXDOT pays for the licensing for contractors to use this software on projects. There is a labor interview module in the software as well, and the DOT can use this to ensure that personnel were paid the prevailing wages.

Q: At the end of the project, where does the information go? It stays in the database and is stored in the cloud environment. Legally the information must be kept for 3 years. The DOT can also access the database and maintain copies of the information. TXDOT adds this documentation to ProjectWise. Certified payrolls are saved as a PDF file so that the integrity of the document is maintained and accessible in the project file, regardless of the software used to create it.

3.7 Technical Exchange Topic #3 – Mobile Device Platforms; Field Review of e-Construction Technologies (iPads and Apps)

The group visited the Texas DOT Bourne Maintenance Facility to review mobile devices and application of technology.

TXDOT uses a third party stockpile measuring application on the iPhone and pulls reports from the measurements taken by the application. The application requires layout of two cones that are 25 feet apart to establish a reference – beginning on one cone using cell phone video, and end on the other after walking around the stockpile. Stockpile reports and site reports are generated from the application. Maintenance has piloted this application and TXDOT is looking to implement this process in construction to verify stockpile information. The vendor reports the calculation results and users pay for calculations and reports by measured pile. There is no cost for the application but there is a cost for the reports. The vendor traveled to TXDOT to perform a week long training course.

Q: Do you make any payments based on calculation results? In maintenance, the pile is measured, estimated quantities documented, and progress estimates paid. Final payment is based on tickets.

Q: Does TXDOT know what cost savings have been realized or was cost savings the intent? Safety and accuracy and avoiding adjustments due to inaccurate measurements are all primary benefits. This eliminates the need for inspectors to traverse stockpiles manually.

The group noted to share the cost of the Stockpile Reports software, processing, and support by unit or annually. In addition to the use of Stockpile Reports, TXDOT uses Compass as the maintenance management system for data and information recording.

TXDOT uses iPads in the field and is also interested in other types of tablet devices that may become desktop or laptop replacement devices. This will allow greater mobility for field inspections, while also providing for access to common applications, file storage and retrieval, and manipulation of files and data. TXDOT also purchased iPhones for inspectors in the State.

TXDOT uses the CITRIX receiver and XenDesktop app for viewing the desktop along with Crossroads, the TXDOT intranet. PDF Notes is another app needed, along with Dropbox where users create a login and upload files to the cloud storage system. Dropbox and PDF Notes integrate to allow markups of PDF files as needed. Dropbox allows for cloud storage, real-time access to large files, and the ability to transfer files between the iPad and PC based devices. Skitch is another app TXDOT uses to mark on a photograph to share with others for faster decision-making. This could occur for a contractor deficiency, noting on the photograph exactly what needs to be corrected.

Another popular and valuable TXDOT implemented app on the iPad and iPhones is FaceTime. Facetime allows users to video chat with other users and use the camera to show field issues and concerns in real-time.

Appendix A – e-Construction Peer Exchange Agenda





**Texas/Montana
e-Construction Peer
Exchange**
4615 Northwest Loop 410
San Antonio, Texas 78229



Agenda

Day 1 – November 17, 2015		
Time	Topic	Presenters / Facilitators
8:00am – 8:15am	Welcoming Remarks and Introductions	Ricardo Castaneda, Texas DOT Dwane Kailey, Montana DOT Kathryn Weisner, FHWA
8:15am – 8:30am	Peer Exchange Background and Overview	Tim Luttrell, Leidos Tom Zagorski, Michael Baker International
8:30am – 9:00am	Montana DOT Current Practices in e-Construction	Montana DOT
9:00 am – 10:00 am	TXDOT eConstruction Overview	Texas DOT
10:00am – 10:15am	Break	
10:15am – 11:45am	Demonstration of Host State e-Construction Technologies and Systems (SiteManager, EquipmentWatch)	Texas DOT/All
11:45am – 1:00pm	Lunch	
1:00pm – 2:30pm	Project Life Cycles and Approach to e-Construction	Texas DOT/All
2:30pm – 2:45pm	Break	
2:45pm – 3:45pm	Technical Exchange Topic #1: Document Management Systems and Workflows (Projectwise)	Texas DOT/Montana DOT/All
3:45pm – 4:15pm	Discussion on Day 1 Takeaways for Implementation	Tom Zagorski, Michael Baker International
4:15pm – 4:30pm	Preview of Day 2 Agenda Items and Field Review Safety Briefing	Tom Zagorski, Michael Baker International
4:30pm	Adjourn	
Dinner at Mi Tierra Café & Panadería (Address: 218 Produce Row, San Antonio, TX 78207)		

Day 2 – November 18, 2015		
Time	Topic	Presenters / Facilitators
7:45am – 8:15am (commute) 8:15am – 8:30am (recap)	Recap of Day 1 Discussion – Challenges and Themes	Tom Zagorski, Michael Baker International
8:30am – 9:00am	Technical Exchange Topic #2: Electronic/Digital Signatures and Workflow Utilization	Texas DOT/All
9:00am – 10:15am	Use of Construction Data and Data Management (Headlight and LCPTracker)	Texas DOT/All
10:15am – 11:30am	Technical Exchange Topic #3: Mobile Device Platforms; Field Review of e-Construction Technologies (iPads and Apps)	Texas DOT/All
11:30am – 12:45pm	Lunch	
12:45pm – 2:15pm	Technical Exchange Topic #3 (continued)	Texas DOT/All
2:15pm – 2:30pm	Break	
2:30pm – 3:15pm	Discussion on Takeaways for Implementation – Suggestions for MDT Implementation	Tom Zagorski, Michael Baker International Tim Luttrell, Leidos
3:15pm – 3:30pm	Closing Remarks, Feedback on Peer Exchange, and Next Steps	All
3:30pm	Adjourn	

Appendix B – e-Construction Peer Exchange Roster

Name	Agency	Email Address
Mike Bousliman	Montana DOT – IT	mbousliman@mt.gov
Ricardo Castaneda	TXDOT – San Antonio District	Ricardo.castaneda@txdot.gov
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Jon Swartz	Montana DOT – Maintenance	joswartz@mt.gov
Kathryn Weisner	FHWA – Resource Center	Kathryn.weisner@dot.gov
Lonnie Williams	TXDOT – San Antonio District	Lonnie.williams@txdot.gov
Tom Zagorski	Michael Baker International	tzagorski@mbakerintl.com
Lynn Zanto	Montana DOT – Planning	lzanto@mt.gov

Appendix C – TXDOT e-Construction Architecture and Systems in Use

Applications

ProjectWise: Helps project teams manage, share, and distribute engineering project content and review in a single platform and share information with contractors.

Primavera P6: Project scheduling software used to create time determination schedules and track contractor schedules for projects.

Diverse Management: Manages government diversity programs through collection of DBE/SBE information.

SiteManager: A comprehensive construction management tool that provides one place for all project information to be kept during the lifecycle of the project.

LCPTracker: A prevailing wage and labor compliance system used to collect and manage information for certified payrolls and reporting.

TRIMS: Texas Railroad Information Management System that coordinates safety measures between TXDOT and multiple railroad companies. Used to document progress on railroad projects.

FileNet: An electronic document management system that archives documents on the records retention schedule.

Electronic Plans/Proposals

BPRS: Bid Proposal Request System allows contractors to request proposals via a web portal. Contractors can directly request bid proposals from mainframe.

Electronic Bidding

Contractor Desktop Application: A web-based bidding system that reduces the amount of paper and the number of errors in the contractor bidding process.

Digitally Encrypted or Electronic Signatures

Echosign: Allows for electronic signatures and engineer seals. Forms needing signatures can be signed anywhere and are readily available.

(Construction)
Process
Workflows

Mobile Devices

Online Manuals
and Handbooks

Fillable Forms

e-Construction