

# PennDOT e-Construction:

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Presenter:  
John Myler

PennDOT

# Overview of PennDOT

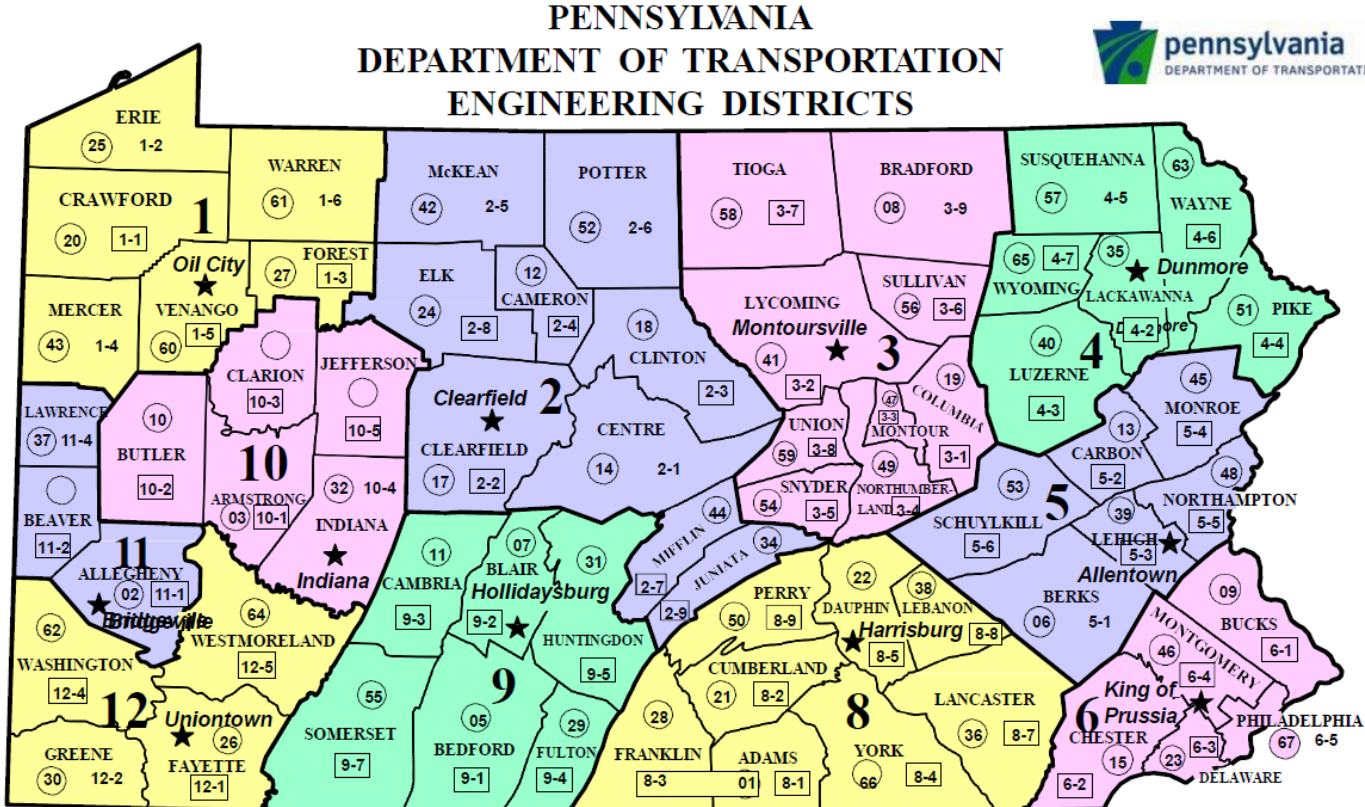
11 Districts

1162 active projects

\$7.3 Billion program

583 Full Time Inspectors

131 Local projects \$516M



# ▶ PennDOT e-Construction Initiative



## Construction Projects Involve LOTS of Paper

100 to 5,000 associated documents- multi-page plans, shop drawings, Requests for Information, e-mails, etc.

# PennDOT e-Construction Initiative

## ECMS/CDSv3

**PROJECT INFORMATION**

Project: ECMS  
 Sheet Description: Elizabeth Drive  
 County: Allegheny  
 Mark: 11

Standard / PENNDOT Oversight MHS  
 Orig Code: 110  
 Section: A70  
 Municipality: ELEMENET

**Detail Information**

Setup	Entity	Asset	Contract	Financial
<ul style="list-style-type: none"> <li>Team</li> <li>Release</li> <li>Program Data (E)</li> <li>Agreements (E)</li> <li>Drawings (E)</li> <li>Drawings (E)</li> <li>Cost Code</li> <li>Field or Project Numbers</li> <li>Security Code</li> </ul>	<ul style="list-style-type: none"> <li>Project Conditions</li> <li>Project Development Checklist</li> <li>Special Provisions</li> <li>Bridge Items</li> <li>DM Package 1</li> </ul>	<ul style="list-style-type: none"> <li>Asset Checklist</li> <li>Missing Substances</li> <li>Monthly Participation and Commitment</li> <li>Component Item Substances</li> <li>Items</li> <li>DM Items</li> <li>Contract</li> </ul>	<ul style="list-style-type: none"> <li>Addresses</li> <li>Administrative Reports</li> <li>Construction Items</li> <li>Source of Supply</li> <li>Project Site Activities</li> <li>Contract Work Substitutions</li> <li>Work Order</li> <li>Estimate (E)</li> <li>Asset Price Accounts</li> <li>Price Account Estimates</li> <li>Adjustments</li> <li>Time Extensions/Reductions</li> <li>Approved Day</li> <li>Request Utility</li> <li>Drain and Sediment Wash Site Inspections</li> </ul>	<ul style="list-style-type: none"> <li>Audit</li> <li>Construction Records</li> <li>Contract Evaluation</li> <li>Quality Review for Change Items</li> <li>Finalization Checklist</li> <li>Acceptance Certificate</li> <li>Final Quantities</li> </ul>

**Schedule Information**

	Prime Contractor: Search Construction Company, LLC (10648)		Original Completion Date
Original Completion:	08/23/2019	Approved Extension/Reduction Days:	0
Current Completion:		Current Completion Days:	0
Pending Completion:		Pending Extension Days:	0
Last COB Reaction Date:		Calendar Days Used:	0

**Financial Information**

	Design Estimate:	Adjustment Total:	Adjustment Total:
Original Contract:	\$13,398,000.00	Work Order: Partial:	\$0.00
Work Order Added:	\$0.00	Work Order: Total:	0.00%
Work Order Deducted:	\$0.00	Work Order: Pending:	\$0.00
Encumbrance Adjustments Added:	\$0.00	Other Adjustments Added:	\$0.00
Encumbrance Adjustments Deducted:	\$0.00	Other Adjustments Deducted:	\$0.00
Current Contract:	\$13,398,000.00	Pending Adjustments:	\$0.00
Estimate Item Total:	\$0.00	Work Completed:	0.00%
Amount Tendered:	\$0.00	Prime (Original):	100.00%

## eCAMMS

**Job Mix Formula - Search Criteria**

Searches on this page are done against live transactional data and have a maximum of 500 results.

Design Type: [Dropdown] Status: [Dropdown]

Job Mix Formula Year: [Dropdown] Material Class: [Dropdown]

JMF/Mix Design Number: [Dropdown] Bituminous JMF Asphalt Content Test Method: [Dropdown]

Supplier Party: [Dropdown] Bituminous JMF Design ESAL Range: [Dropdown]

District: [Dropdown] Bituminous Aggregate Skid Resistance Level: [Dropdown]

JMF Component Material Code/Class: [Dropdown]

JMF Component Material Class: [Dropdown]

[Search] [Search and Export] [Reset]

## PPCC

**Favorite Projects**

Remove as Favorite	ECMS #	Job Section	County	District	Project Name
	020544	0837-413	Allegheny	D11	Homestead Bridge Ramps

Showing 1 to 1 of 1 entries. [First] [Previous] [Next] [Last]

**My Projects**

Save as Favorite	ECMS #	Job Section	County	District	Project Name
Make Favorite	020614	3069-423	Allegheny	D11	Liberty Tunnel Interchange
Make Favorite	027267	0030-425	Allegheny	D11	SR 30 or Bessemer Ave
Make Favorite	029800	0051-410	Allegheny	D11	SR 51/88 Bridge/Safety Improvement
Make Favorite	029817	2037-411	Allegheny	D11	2037 Tri-Deers Point
Make Favorite	020254	7429-LOC	Allegheny	D11	Gibson Street Bridge
Make Favorite	020397	0051-467	Allegheny	D11	This is a partial Design Build project. Design activities are limited to: Concrete curb ramps
Make Favorite	020544	0837-413	Allegheny	D11	Homestead Bridge Ramps
Make Favorite	057100	2082-468	Allegheny	D11	Hulton Bridge

## Mobile Construction



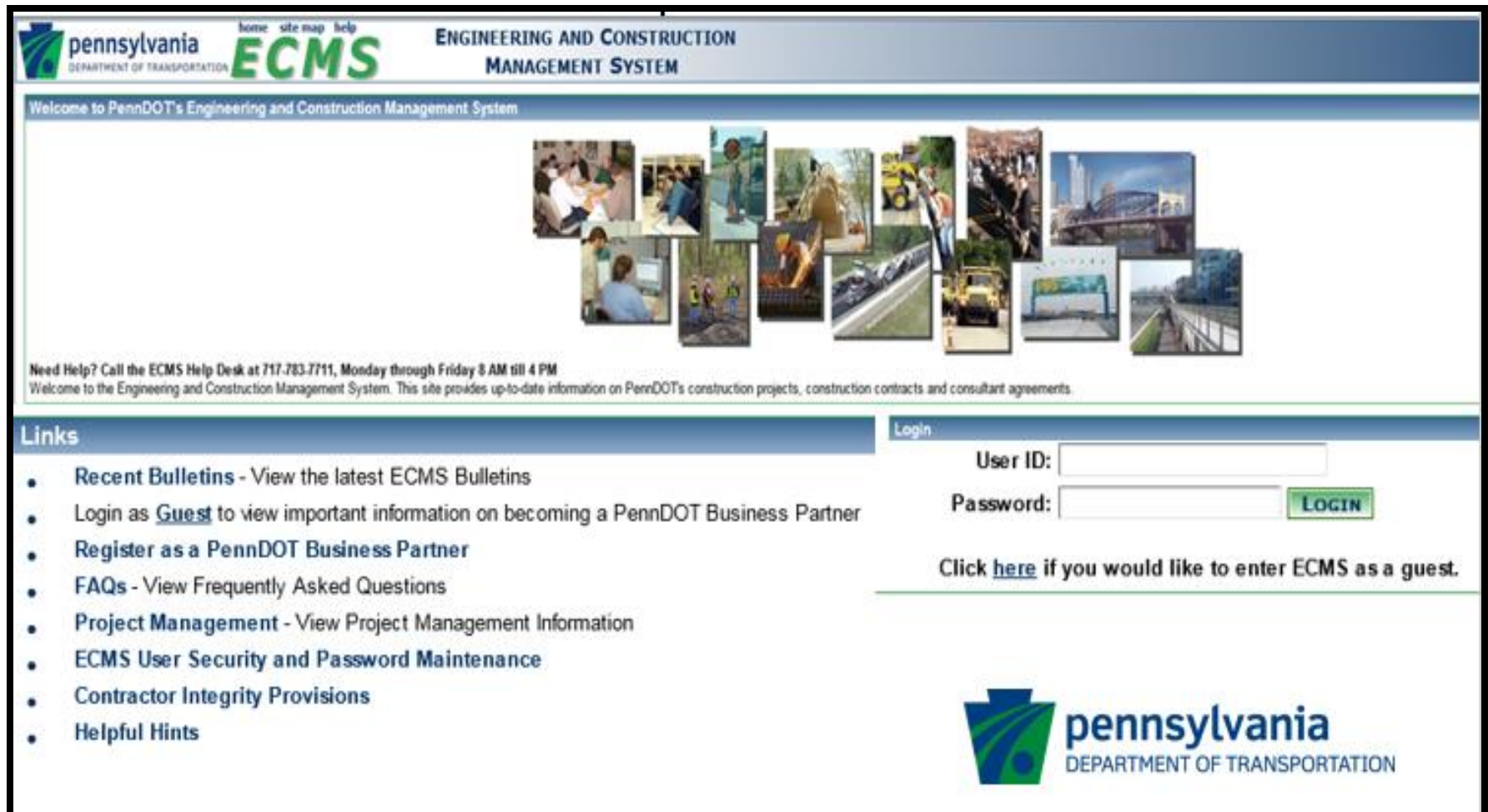
# ▶ PennDOT's Existing E-Construction



- Engineering and Construction Management System (ECMS)
  - (Material) Source of Supply
  - Project Site Activities (PSAs)
  - Actual Force Accounts
  - Force Account Estimates
  - Report Facility
  - Erosion and Sediment Visual Site Inspection
  - Audits
  - Project Punchlist

# Engineering Construction and Management System (ECMS)

ECMS was initially implemented in 2003



The screenshot shows the ECMS website interface. At the top left is the Pennsylvania Department of Transportation logo with the text "pennsylvania DEPARTMENT OF TRANSPORTATION" and "ECMS" in large green letters. Navigation links "home site map help" are positioned above the logo. The main header reads "ENGINEERING AND CONSTRUCTION MANAGEMENT SYSTEM". Below the header is a welcome message: "Welcome to PennDOT's Engineering and Construction Management System". A central collage of images depicts various construction and management activities. Below the collage, a help desk contact number is provided: "Need Help? Call the ECMS Help Desk at 717-783-7711, Monday through Friday 8 AM till 4 PM". A brief description follows: "Welcome to the Engineering and Construction Management System. This site provides up-to-date information on PennDOT's construction projects, construction contracts and consultant agreements." On the left side, a "Links" section lists several resources: "Recent Bulletins - View the latest ECMS Bulletins", "Login as Guest to view important information on becoming a PennDOT Business Partner", "Register as a PennDOT Business Partner", "FAQs - View Frequently Asked Questions", "Project Management - View Project Management Information", "ECMS User Security and Password Maintenance", "Contractor Integrity Provisions", and "Helpful Hints". On the right side, a "Login" section contains input fields for "User ID:" and "Password:", a "LOGIN" button, and a link: "Click here if you would like to enter ECMS as a guest." At the bottom right is the Pennsylvania Department of Transportation logo.

home site map help

pennsylvania DEPARTMENT OF TRANSPORTATION **ECMS**

ENGINEERING AND CONSTRUCTION MANAGEMENT SYSTEM

Welcome to PennDOT's Engineering and Construction Management System

Need Help? Call the ECMS Help Desk at 717-783-7711, Monday through Friday 8 AM till 4 PM  
Welcome to the Engineering and Construction Management System. This site provides up-to-date information on PennDOT's construction projects, construction contracts and consultant agreements.

**Links**

- **Recent Bulletins** - View the latest ECMS Bulletins
- Login as Guest to view important information on becoming a PennDOT Business Partner
- **Register as a PennDOT Business Partner**
- **FAQs** - View Frequently Asked Questions
- **Project Management** - View Project Management Information
- **ECMS User Security and Password Maintenance**
- **Contractor Integrity Provisions**
- **Helpful Hints**

**Login**

User ID:

Password:  **LOGIN**

Click here if you would like to enter ECMS as a guest.

pennsylvania DEPARTMENT OF TRANSPORTATION



# ECMS – Construction Project Menu

## Construct

- Addresses
- Subcontractor Requests
- Construction Items
- Source of Supply
- Project Site Activities
- Contract Work Authorizations
- Work Orders
- Estimates
- Actual Force Accounts
- Force Account Estimates
- Adjustments
- Time Extensions/Reductions
- Reassigned (No)
- Report Facility
- Erosion and Sediment Visual Site Inspections

## Closeout

- Audits
- Construction Records
- Contractor Evaluations
- Quality Survey for Design Items
- Project Punchlist
- Finalization Checklist
- Acceptance Certificate
- Final Quantities

# PennDOT's Existing E-Construction



- PennDOT Project Collaboration Center (PPCC)
  - Submittals with automated workflow
  - Shared/Project Files/Photos



# ▶ PennDOT's Existing E-Construction



Home Sample JMF ESB Maintenance Tools

TR-447 Ref #:

Sample #:

Search

- Electronic Construction And Material Maintenance System (eCAMMS)
  - Material Sampling Testing Data and Reporting
  - Job Mix Formulas
  - Producer Products

# ▶ PennDOT e-Construction Initiative

## Mobile Construction

iPad Developments Update  
2019



# ➤ PennDOT e-Construction Initiative

The goals of PennDOT's Mobile Program:

- Provide tools that increase productivity for our field staff and field consultants
- Transform labor intensive, manual paper processes through efficient mobile technology
  - We are NOT just “digitizing” existing forms
  - Transforming the way business is conducted
- Improve Data Collection and Reporting Capabilities

# ▶ PennDOT e-Construction Initiative

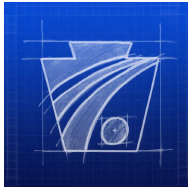
- In January 2013, PennDOT implemented our first mobile app
- With every app the business process is re-engineered
  - On-line data transfer to legacy systems
  - Improve data quality
  - Build User-Friendly interfaces
  - Reduce data entry
- Off-line work capability, synchronizing when connectivity is available

# ➤ PennDOT e-Construction Initiative

It doesn't happen overnight !!!

- Introducing APPLE into a Microsoft World
  - Technical Support
  - Resourcing - finding experienced team members
  - Apple User Agreements
- Identify and Recruit Business and Executive Champions
- Managing Senior Executives expectations
- Changing the Existing Culture and Policies
- Training, Training, Training

# PennDOT e-Construction Initiative



**MC DOCs**



**CMH Mobile**



**PSA**



**Visual Site  
Inspection Report**



**Punchlist**



**Sample ID**



**Force  
Account**



**Dept. ePayroll**



**CID**

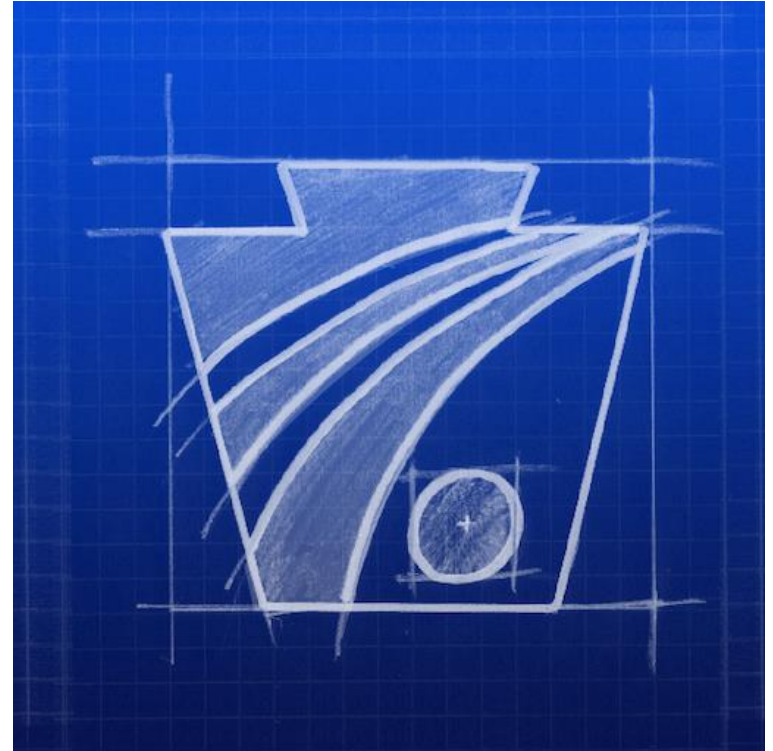


**MPT**




# ➤ PennDOT e-Construction Initiative

**MC Docs 3.0**




# PennDOT e-Construction Initiative

3:09 PM Fri Jan 18 LTE 48%



**MCDocs**  
Version v3.0  
Login to PROD App



CWOPA USERNAME

PASSWORD

Remember Me

LOGIN

If you forgot your password,  
contact PennDOT IT Service Desk:  
717-783-8330 | 855-783-8330

By logging into this app, you are allowing PennDOT to view and  
monitor your actions inside of the app.

[App Info](#)

# PennDOT e-Construction Initiative

7:22 PM Fri Jan 18 LTE 99%

**My Library** MCDocs v3.0 CHECK-(PROD)  
Shared Libraries/Common Publications

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**My Briefcase**

File Imports

Merged Files

---

**Common Documents**

Shared Libraries

Common Publications  
Downloaded: 2 Used: 14.4 MB

Reference Manuals  
Downloaded: 0 Used: --

Strike-Off Letters  
Downloaded: 0 Used: --

---

**ECMS Projects** All Projects

26614

27275

28000

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Search | Sort: Name | Download | Remove Files

	<b>72M_2010.pdf</b> Updated: Aug 31, 2017 Used: 41 KB	...
	<b>PUB 148.pdf</b> Updated: Dec 28, 2011 Size: 2.5 MB	☁
	<b>PUB 194.pdf</b> Updated: Mar 2, 2015 Size: 5.3 MB	☁
	<b>PUB 212.pdf</b> Updated: Mar 10, 2011 Size: 316 KB	☁
	<b>PUB 219M.pdf</b> Updated: Aug 8, 2017 Used: 14.4 MB	...
	<b>PUB 372.pdf</b> Updated: Oct 29, 2013 Size: 696 KB	☁
	<b>PUB 445.pdf</b> Updated: Jan 10, 2018 Size: 7 MB	☁
	<b>PUB 8.pdf</b> Updated: May 22, 2014 Size: 4 MB	☁
	<b>Pub 111.pdf</b> Updated: Jan 21, 2014 Size: 12.2 MB	☁
	<b>Pub 2.pdf</b> Updated: Apr 7, 2015 Size: 11.4 MB	☁

Shared Libraries: Common Publications

# PennDOT e-Construction Initiative

9:37 AM Tue Jan 22 LTE 100%

**My Library** MCDocs v3.0 CHECK-(PROD)  
110594/ECMS:Project Development Checklist

**ECMS Projects** All Projects

- 100605 (i) >
- 100632 (i) >
- 100683 (i) >
- 105229 (i) >
- 109324 (i) >
- 110594** (i) v
- ECMS  
Downloaded: 413    Used: 368.2 MB ⋮
- PPCC  
Downloaded: 33    Used: 47.6 MB ⋮
- Project Specific Manuals  
Downloaded: 2    Used: 71.6 MB ⋮
- 110880 (i) >
- 111743 (i) >

Search    Sort: Name    Download    Remove Files

- 2 Construction Coordination**  
Downloaded: 2    Used: 1.1 MB
- 5 Construction Items**  
Downloaded: 5    Used: 127.8 MB
- 4 Contract Award Items**  
Downloaded: 4    Used: 644 KB
- 2 Environmental Clearances**  
Downloaded: 2    Used: 298 KB
- 3 Estimates**  
Downloaded: 3    Used: 703 KB
- 1 Local Agreements and Coordination**  
Downloaded: 1    Used: 2 MB
- 3 Permits**  
Downloaded: 3    Used: 1.1 MB
- 146 Plans**  
Downloaded: 146    Used: 51 MB
- 8 Project-Specific Checklist Items**  
Downloaded: 8    Used: 32.8 MB
- 1 Railroad Coordination**  
Downloaded: 1    Used: 202 KB

<< 110594:ECMS > Project Development Checklist

# PennDOT e-Construction Initiative

9:37 AM Tue Jan 22 LTE 100%

**My Library** MCDocs v3.0 CHECK-(PROD)  
110594/PPCC

ECMS Projects		<span>Search</span>   <span>Sort: Name</span>   <span>Download</span>   <span>Remove Files</span>			
100605	<span>i</span> <span>&gt;</span>	OC	Downloaded: 0	Used: --	<span>⋮</span>
100632	<span>i</span> <span>&gt;</span>	PennDOT	Downloaded: 0	Used: --	<span>⋮</span>
100683	<span>i</span> <span>&gt;</span>	Pictures	Downloaded: 0	Used: --	<span>⋮</span>
105229	<span>i</span> <span>&gt;</span>	Prime	Downloaded: 0	Used: --	<span>⋮</span>
109324	<span>i</span> <span>&gt;</span>	5 ProjectFiles	Downloaded: 0	Used: --	<span>⋮</span>
110594	<span>i</span> <span>✓</span>	ProjectVideos	Downloaded: 0	Used: --	<span>⋮</span>
ECMS	<span>⋮</span>	11 RFI	Downloaded: 1	Used: 15 KB	<span>⋮</span>
Downloaded: 413	Used: 368.2 MB	SOS	Downloaded: 0	Used: --	<span>⋮</span>
PPCC	<span>⋮</span>	SharedFiles	Downloaded: 0	Used: --	<span>⋮</span>
Downloaded: 33	Used: 47.6 MB	32 Submittals	Downloaded: 32	Used: 47.6 MB	<span>⋮</span>
Project Specific Manuals	<span>⋮</span>	<span>⏪</span> 110594:PPCC			
Downloaded: 2	Used: 71.6 MB				
110880	<span>i</span> <span>&gt;</span>				
111743	<span>i</span> <span>&gt;</span>				

# ➤ PennDOT e-Construction Initiative

**PSA V4.4**





## Punchlist V1.5



# ➤ PennDOT e-Construction Initiative

## MC-Force Account V1.3



# ➤ PennDOT e-Construction Initiative

## MC-Concrete Inspection Diary V1.10



# PennDOT e-Construction Initiative

**MC-MPT V1.4**



# ► PennDOT e-Construction Initiative

## Visual Site Inspection Report



# ➤ PennDOT e-Construction Initiative

**Sample ID**





# PennDOT e-Construction Initiative

TR-447 (8-18)

**SAMPLE IDENTIFICATION**

Map Code: Material Class: S Class: **LTS USE ONLY** Lab Set of Number: **A700909**

Aggregate Usage by Spec: (M) State ID: Lab Batch Number:

Location Code: Plans Collected: Core Collected:

Tag # Construction Item # P/F/F/S

**WORK BREAKDOWN STRUCTURE (WBS)**

Contract Number: E MAP S SR or W/O Sp. I. P. Sec. Div. Program

Pub. Use Year: Wdr. Section: Special Provision:  Yes

**Sampled By**

Title: First Name: Middle Name: Phone Number: LEL: Certification ID: PennDOT Employee: Consultant: Other:

**Inspected By**

Title: First Name: Middle Name: Phone Number: Fe: Certification ID: PennDOT Employee: Consultant: Other:

**INCREMENT INFORMATION**

Inc.	County	SR	Segment	Offset	Section	Status	CIR Offset
1							
2							
3							
4							
5							
6							
7							

**JMF** Year: Number: **Design** Thickness: **Concrete** Age: Sample: Temp: **Self Consolidating Concrete** H-Req: Slump Flow: VSI:

Remarks:

TR-447e (8-18)



W000166-01



W000166-04



W000166-07



W000166-10



W000166-02



W000166-05



W000166-08



W000166-11



W000166-03



W000166-06



W000166-09



W000166-12

LAB



# ➤ PennDOT e-Construction Initiative

**CMH Mobile**



# ► PennDOT's Return On Investment

Project	Initiation Dates	Development Cost	Overall Savings
<b>CDSv3</b>	<b>August 2012</b>	<b>\$ 4.0 million</b>	<b>\$13.5 million</b>
Release 1 implemented 8-18-14			
<b>Mobile Construction</b>	<b>July 2012</b>	<b>\$2.3 million</b>	<b>\$39 million</b>
Sprint 1 implemented 9-6-12			
Sprint 74 implemented 4-1-19			
<b>PPCC</b>	<b>October 2011</b>	<b>\$6.3 million</b>	<b>\$34.4 million</b>
Release 1 implemented 9-13-13			
<b>eCAMMS</b>	<b>January 2012</b>	<b>\$6.9 million</b>	<b>Being assessed</b>
Implemented April 2014			

## ▶ PennDOT's Partnering with e-Construction

- PPCC
- Automated Force Account
- User Acceptance Testing
- Local Sponsors – utilizing PennDOT's systems
- Consultant Mileage and Hour Application
- Estimate tracking
- Work Order turn around



# ➤ PennDOT e-Construction Initiative

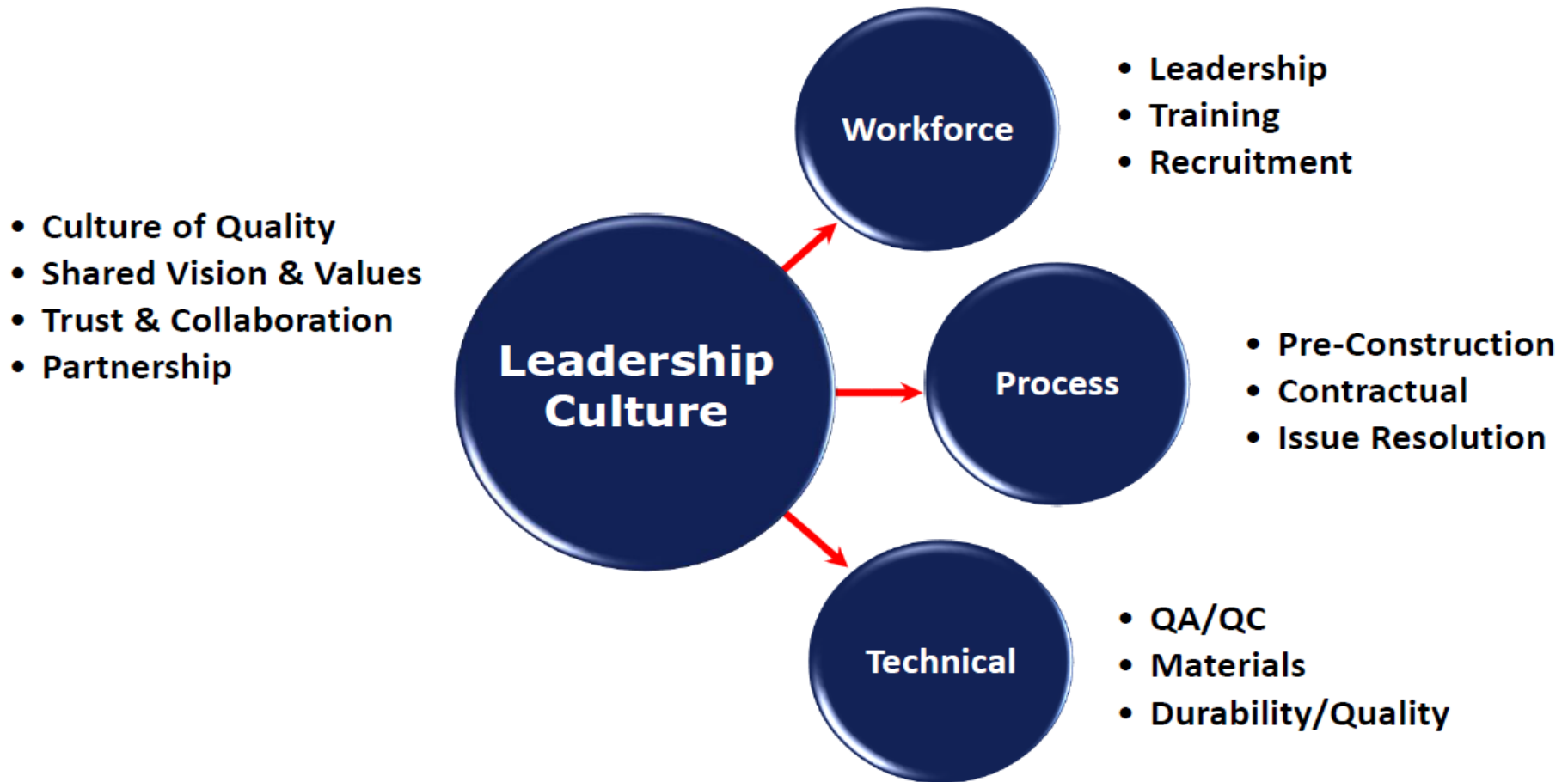
- E-Ticketing 2.0
  - District 11 Pilot Projects
  - PennDOT Evolution of the E-Ticketing Process
- Construction Contractors App Access and Functionality
  - APC STIC
  - Providing Access Improves Both Parties
- Support for PennDOT Maintenance Systems
  - Construction Data Evolves Into Maintenance Data
  - Guiderail Mobile App
- RFID Tags
  - Material Tracking and Data

# PennDOT's Transportation Quality Initiative (TQI)





# PennDOT's TQI's Framework



## Contact Information

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**PennDOT District 11-0 Construction**

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**Phone: 412-429-5063**