



# Pennsylvania Department of Transportation e-Construction Initiatives

Jim Foringer, P.E.  
Assistant District Executive  
PA Department of Transportation, District 11-0

## ► PennDOT e-Construction Initiatives

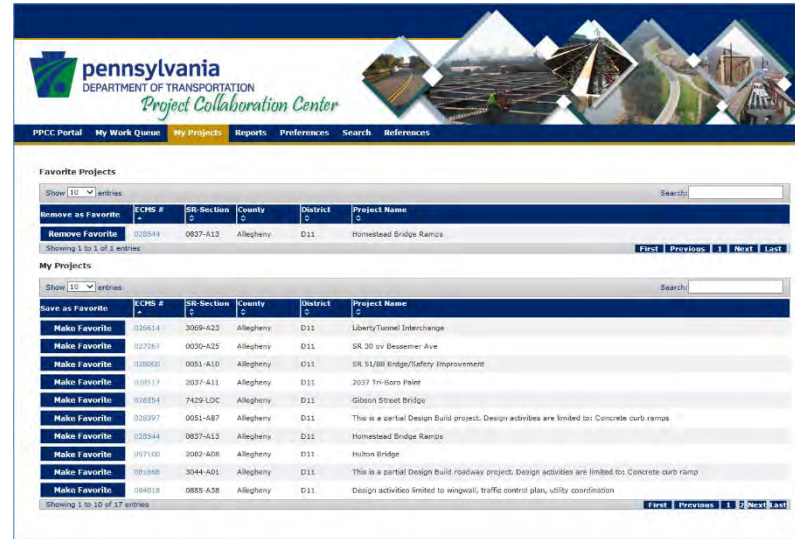
# ECMS



# eCAMMS



# PPCC



## Mobile Construction



# ➤ PennDOT's Return On Investment

Project	Initiation Dates	Development Cost	Overall Savings
CDSv3	August 2012	\$ 2.74 million	\$5 million/year
Release 1 implemented 8-18-14			
Release 3.0 implemented 7-18-16			
Mobile Construction	July 2012	\$1.67 million	\$28 million
Sprint 1 implemented 9-6-13			
Sprint 40 implemented 8-23-16			
PPCC	October 2011	\$5.2 million	\$29.1 million
Release 1 implemented 9-13-13			
Release 5.1 implemented 8-15-16			
eCAMMS	January 2012	\$6.9 million	Being assessed
Implemented January 2012			

# ➤ PennDOT Mobile Construction Initiative Apps



**Mobile Construction Documents**



**Concrete Inspection Diary**



**Project Site Activities**



**Maintenance & Protection of Traffic**



**Punchlist**



**Environmental & Sediment Visual Inspection**



**Force Account**



**Consultant Hours & Mileage**


# ➤ PennDOT e-Construction Initiative

**MC PSA V3.4**




# MC PSA Log In

Verizon LTE 7:23 AM 87%



Project Site Activity  
Version 3.1.2

Login to ECMS SYST system



User Name

Password

[Forgot Password](#) [Login](#)

By logging into this application, you are allowing PennDOT to view and monitor your actions inside of the Project Site Activity.

PSAApp-PLS [Show App Info](#)

# MC PSA Project Screen


























Verizon LTE 7:24 AM 87%

PennDOT Project Site Activity

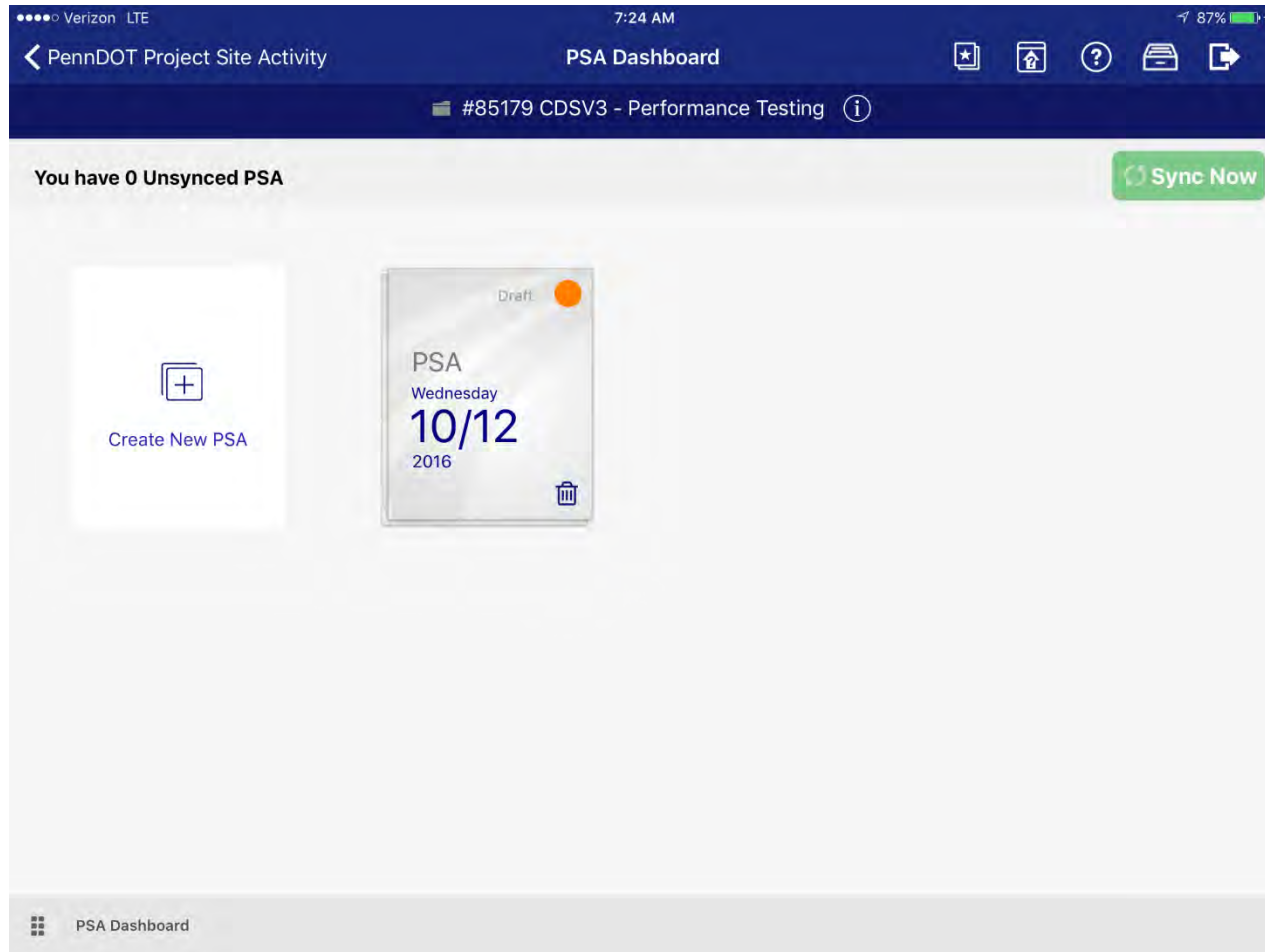
Welcome: John B Myler

Search Projects

8 Projects

20159 - READING ROAD BRIDGE				
20163 - READING ROAD BRIDGE				
20204 - Armstrong Valley Road				
20231 - READING ROAD BRIDGE				
61345 - Lincoln Way Improvement				
85179 - CDSV3 - Performance Testing				
85180 - CDSV3 - Performance Testing				

# MC PSA Active PSA's





# MC PSA Site Activity

Verizon LTE 7:24 AM 87%

PSA Dashboard Project Site Activities Form

#85179 CDSV3 - Performance Testing

John B Myler PSA Report DRAFT Incomplete PSA

PSA Date Wednesday 10/12/2016

Inspector Hours 0 + >

Weather & Work Suspended 0 + >

Contractor Labor & Equipment 0 + >

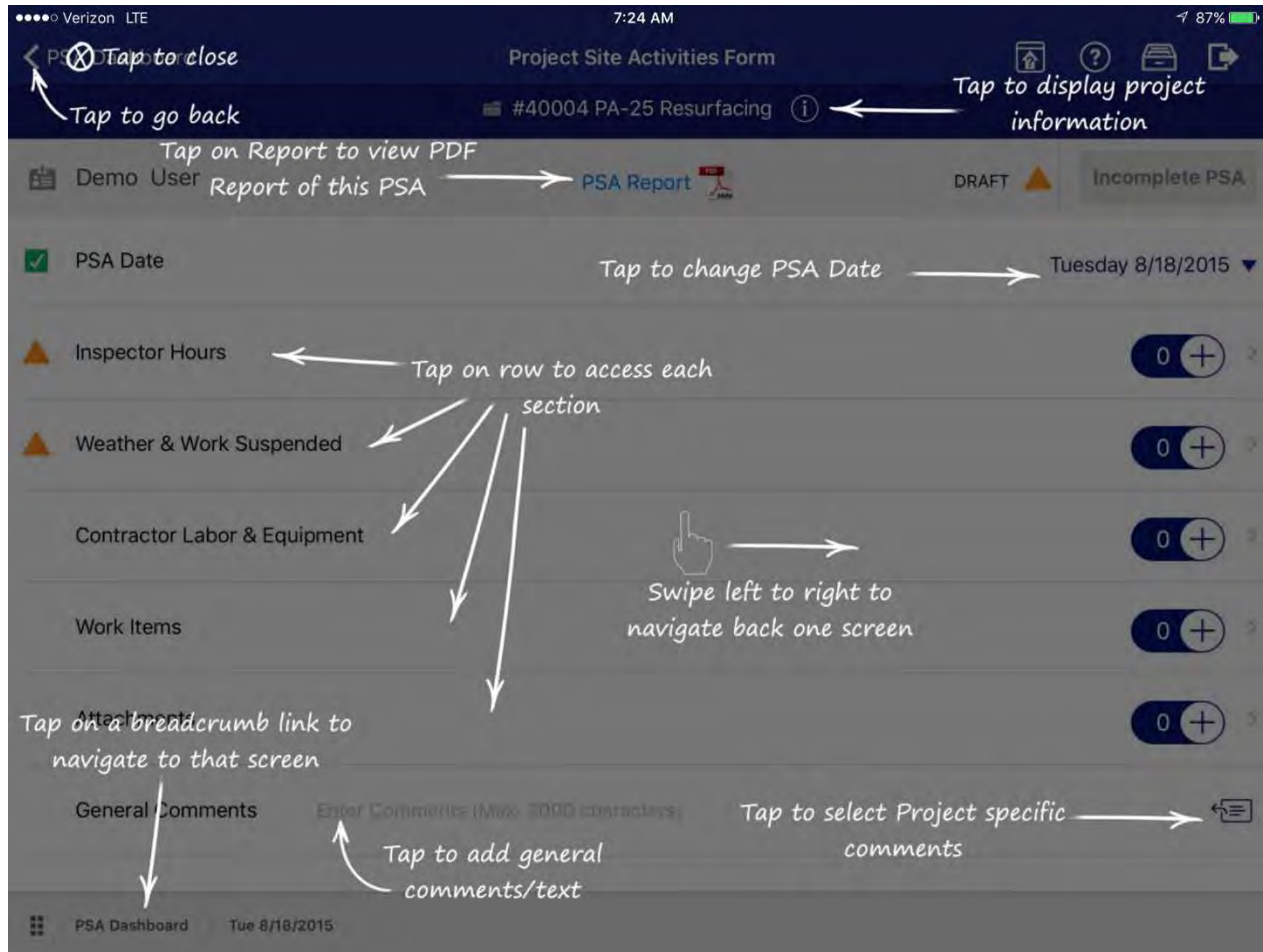
Work Items 0 + >

Attachments 0 + >

General Comments Enter Comments (Max: 3000 characters)

PSA Dashboard Wed 10/12/2016

# MC PSA Help Overlay



# MC PSA Inspector Hours

Verizon LTE 7:25 AM 87%

< Project Site Activities Inspector Hours

#85179 CDSV3 - Performance Testing

Add Inspector Work Hours

Pay Code Normal

Cancel New Inspector Work Hours Done

Pay Code	Normal	>
L/C Code	Project Management	>
Start Time	7:00 AM	>
Quit Time	3:00 PM	>
Total Hours	8.00	

Quit Time 3:00 PM Hours 8.00

Total Hours 8.00

PSA Dashboard Wed 10/12/2016 Inspector Hours

# ➤ MC PSA Contractor Info

Verizon LTE 7:26 AM 87%

Project Site Activities Contractor Labor and Equipment

#85179 CDSV3 - Performance Testing Edit

Add New Contractor Labor And Equipment

Contractor Superintendent

**Cancel** **New Contractor Labor and Equipment** **Done**

Contractor Details

Contractor	Select Contractor	>
Superintendent	Select Superintendent	>

PSA Dashboard Wed 10/12/2016 Contractor Labor & Equipment

# ➤ MC PSA Contractor Info

Verizon LTE 7:27 AM 87%

Best Contractor Services Contractor Labor

#85479 CDSV3 - Performance Testing

Cancel Add Contractor Labor Done

New Entry Add Entries from Favorites

Search for Labor by Name

STANDARD LABOR		
ironworker		<input checked="" type="checkbox"/>
Laborer	4	<input checked="" type="checkbox"/>
Laborer Class Group 1 (General)		<input checked="" type="checkbox"/>
Laborer Class Group 2 (Skilled)		<input checked="" type="checkbox"/>
Laborer Group 3 (Luteman, Screed, walkbehind saw)		<input checked="" type="checkbox"/>
Laborer Group 4 (Rebar tie)		<input checked="" type="checkbox"/>
Laborer Group 5 (Pipeline welder)		<input checked="" type="checkbox"/>

PSA Dashboard Wed 10/12/2016 Contractor Labor & Equipment Best Contractor Services Labor

# MC PSA Contractor Info

Verizon LTE 7:27 AM 87%

< Best Contractor Services Contractor Labor

#85179 CDSV3 - Performance Testing Edit

Add Contractor Labor +

Labor Type	Quantity
✓ Carpenter	4
✓ Laborer	4

Save Labor Entries as Favorite ☆

PSA Dashboard Wed 10/12/2016 Contractor Labor & Equipment Best Contractor Services Labor

# MC PSA Contractor Info

Verizon LTE 7:28 AM 87%

< Contractor Labor and Equipment Best Contractor Services

#85179 CDSV3 - Performance Testing

Superintendent  
Francis Hawk

✓ Hours 1 + >

✓ Labor 2 + >

✓ Equipment + >

PSA Dashboard Wed 10/12/2016 Contractor Labor & Equipment Best Contractor Services

# MC PSA Work Item

Verizon LTE 7:33 AM 87%

< Project Site Activities Work Items

#85179 CDSV3 - Performance Testing

Add Work Item

Item Number	Description	Type	Fund	UoM	
✓ 0203-0001	CLASS 1 EXCAVATION		01	CY	1 + >
▲ 0305-0011	BITUMINOUS CONCRETE BASE COURSE, 8" DEPTH		01	SY	+ >

PSA Dashboard Wed 10/12/2016 Work Items



# MC PSA Work Item

Verizon LTE 7:30 AM 87%

Project Site Activities Work Items

Cancel Common Selection - Project Work Items Done

Search by Item Number, Description, Type, Fund, or UoM

Item Number	Description	Type	Fund	UoM	
0203-0001	CLASS 1 EXCAVATION		01	CY	<input checked="" type="checkbox"/>
0204-0105	CLASS 3 EXCAVATION	L	01	CY	<input checked="" type="checkbox"/>
0204-0105	CLASS 3 EXCAVATION	L	02	CY	
0204-0105	CLASS 3 EXCAVATION	L	03	CY	
0204-0105	CLASS 3 EXCAVATION	L	04	CY	
0205-0366	SELECTED BORROW CLASS R-6 EXCAVATION ROCK,		01	TON	<input checked="" type="checkbox"/>
0220-0020	FLOWABLE BACKFILL, TYPE C	L	01	CY	
0220-0020	FLOWABLE BACKFILL, TYPE C				

PSA Dashboard Wed 10/12/2016 Work Items

# ➤ MC PSA Work Item

Verizon LTE 7:31 AM 87%

Actual Locations Actual Location Details

#85179 CDSV3 - Performance Testing

Plan Station	Actual Location	Status
2+33 to 3+14 RT/LT	2+33 to 3+14 RT/LT	Not Complete

Calculations & Sketches

Payment Information

Field Quantity  Remaining Quantity 0.000000 CY

Additional Information

Date Placed Select Date Placed

Remarks Enter Remarks (Max. 3000 characters)

References Enter References (Max. 3000 characters)

PSA Dashboard Wed 10/12/2016 Work Items 0203-0001 Actual Locations 2+33 to 3+14 RT/LT

# MC PSA Work Item

Verizon LTE 7:32 AM 87%

Cancel Sketch Done

**Calculation**

Calculation Name  
Rectangle Vol

Variables - (In Feet):

a	20.0
b	12.0
c	1.0

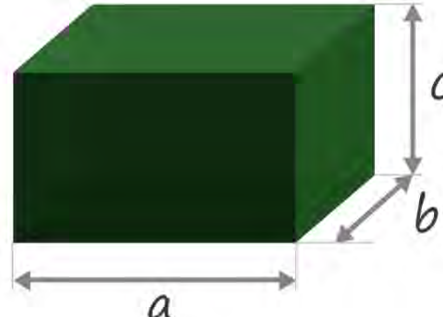
Total Quantity:

8.888 CY

Actual Value: 8.88888888888889

**Shape**

Rectangle  
(Volume)



**Formula**

$V = a * b * c$   
UOM Conversion:  $V / 27$

# MC PSA Work Item

Verizon LTE 7:32 AM 87%

Actual Locations Actual Location Details

#85179 CDSV3 - Performance Testing

Plan Station  
2+33 to 3+14 RT/LT

Calculations & Sketches Rectangular

Payment Information

Field Quantity 8.89

Additional Information

Date Placed

Remarks Additional location.

References Enter References (Maximum 1000 characters)

PSA Dashboard Wed 10/12/2016

Cancel Remarks Done

PROJECT SPECIFIC REMARKS

test - test

STANDARD REMARKS

**Additional Location** - Additional location.

**Additional Work** - Additional work as directed by the <Engineer or WHOM>.

**Estimated Pay** - Estimated payment, to be final field measured and payment adjusted at a later date.

**Force Account** - Work based on force account

**Measured Quantities** - Payment based on actual field measurements.

**No Pay** - No payment, work is incidental to item.

**No Pay Today** - No payment at this time, will be paid at a later date upon final measure.

**Pay** - Pay quantity for work performed <DATE>, refer to <PSA> for details of work performed.

**Tab Deleted** - Based on a review, this Plan Station is not required to complete the contract, therefore it has been deleted.

**Tab Measured** - Based on review, this Plan Station is final field measured and complete.

**Work Incomplete** - Work incomplete.

# MC PSA Work Item

Verizon LTE 7:35 AM 87%

< Project Site Activities Work Items

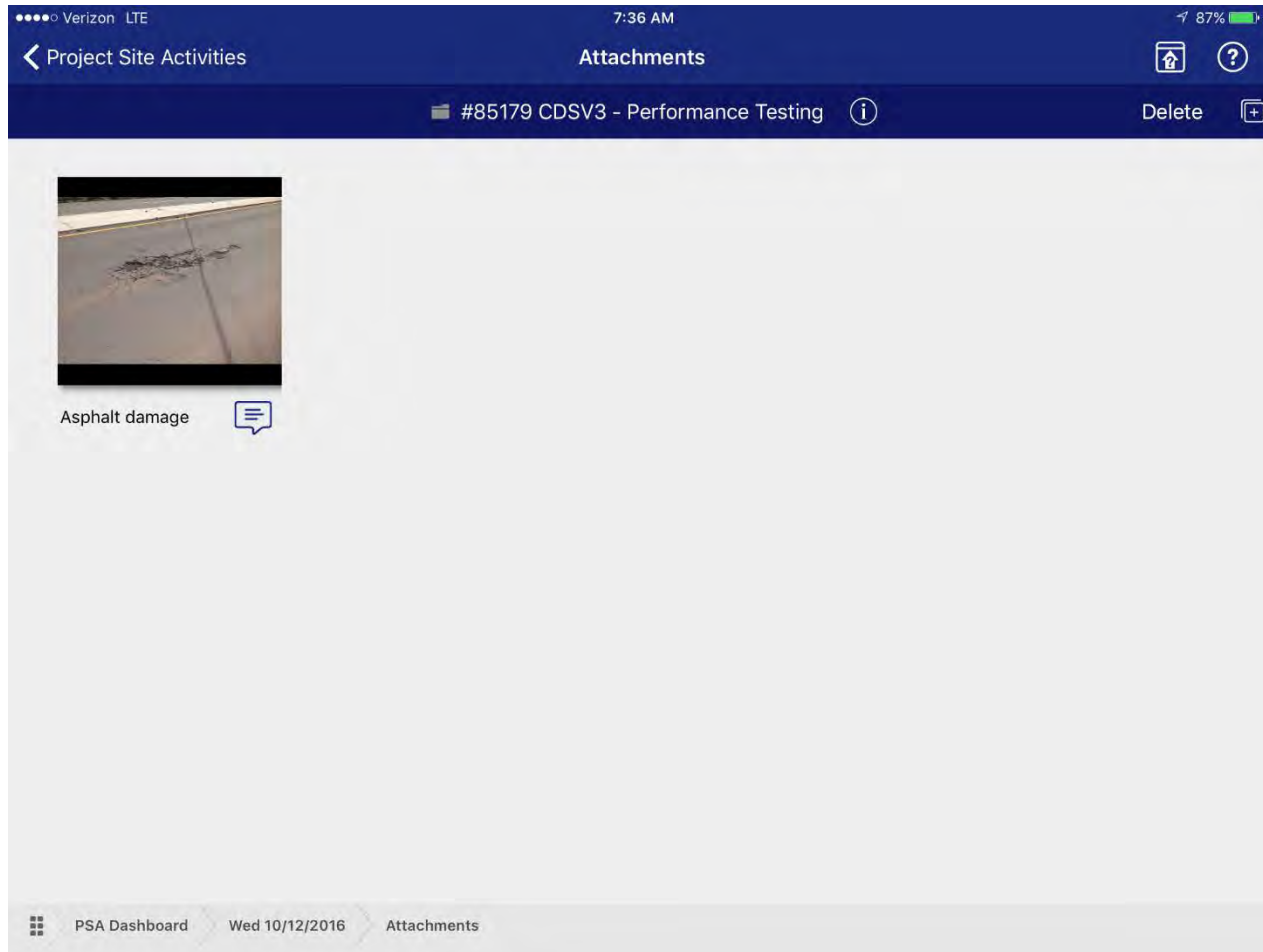
#85179 CDSV3 - Performance Testing

Add Work Item

Item Number	Description	Type	Fund	UoM	
<input checked="" type="checkbox"/> 0203-0001	CLASS 1 EXCAVATION		01	CY	1 + >
<input checked="" type="checkbox"/> 0305-0011	BITUMINOUS CONCRETE BASE COURSE, 8" DEPTH		01	SY	1 + >

PSA Dashboard Wed 10/12/2016 Work Items

# MC PSA Attachments



# MC PSA Complete

Verizon LTE 7:36 AM 87%

PSA Dashboard Project Site Activities Form

#85179 CDSV3 - Performance Testing

John B Myler PSA Report DRAFT Review & Finalize

PSA Date Wednesday 10/12/2016

Inspector Hours 1

Weather & Work Suspended 2

Contractor Labor & Equipment 1

Work Items 2

Attachments 1

General Comments Test PSA

PSA Dashboard Wed 10/12/2016



# MC PSA Finalization

Verizon LTE 7:37 AM 87%

PSA Dashboard Project Site Activities Form

#85179 CDSV3 - Performance Testing

John B Myler PSA Report DRAFT Review & Finalize

PSA Date Wednesday 10/12/2016

Inspector Hours 1 +

Weather & Work Suspended 2 +

Contractor Labor & Equipment 1 +

Work Items 2 +

Attachments 1 +

General Comments Test PSA

PSA Dashboard Wed 10/12/2016

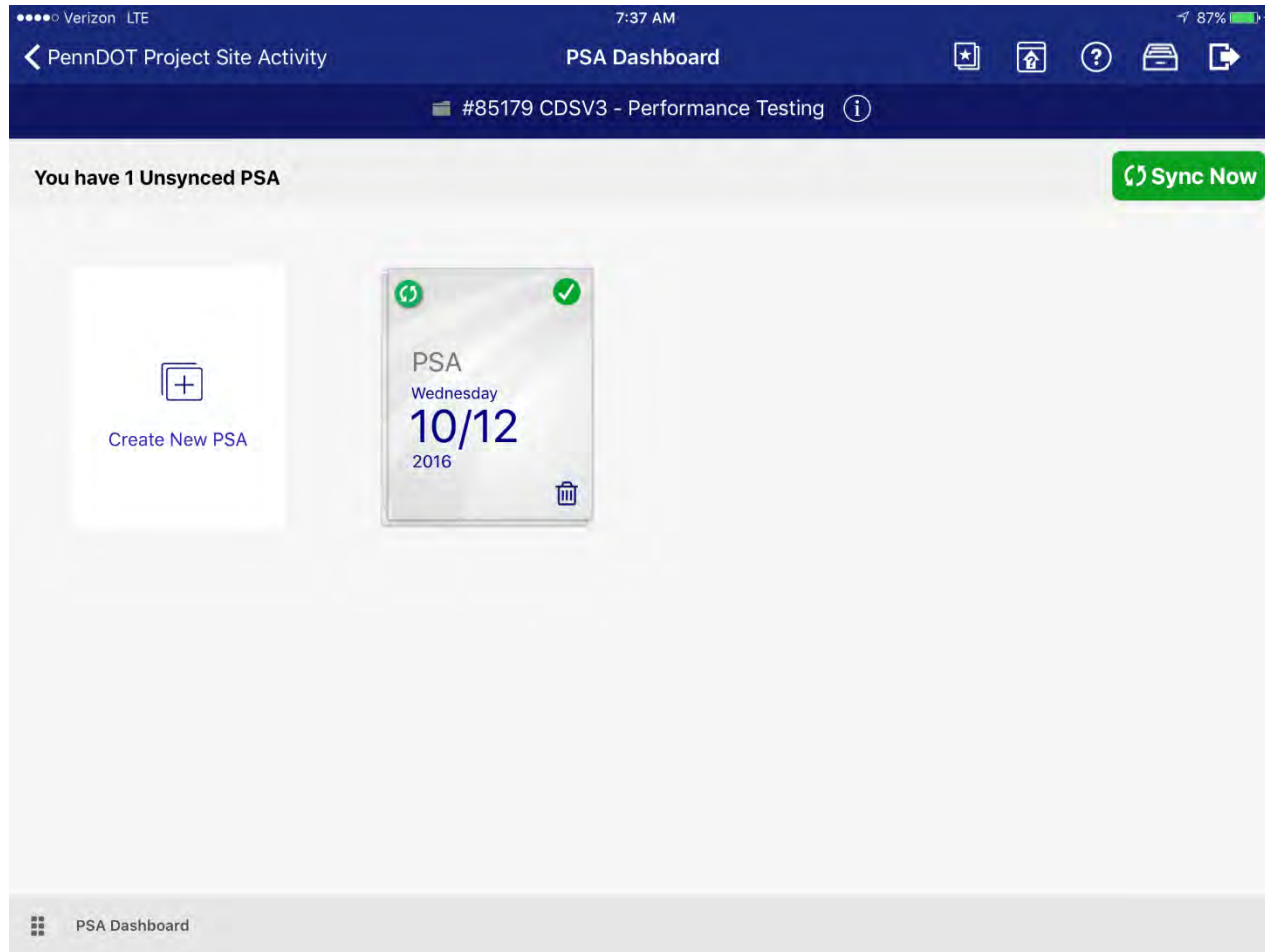
**NOTICE**

You are about to finalize this PSA.  
Once you do so, any additional changes will need to be performed in ECMS after the sync. Are you sure you want to finalize?

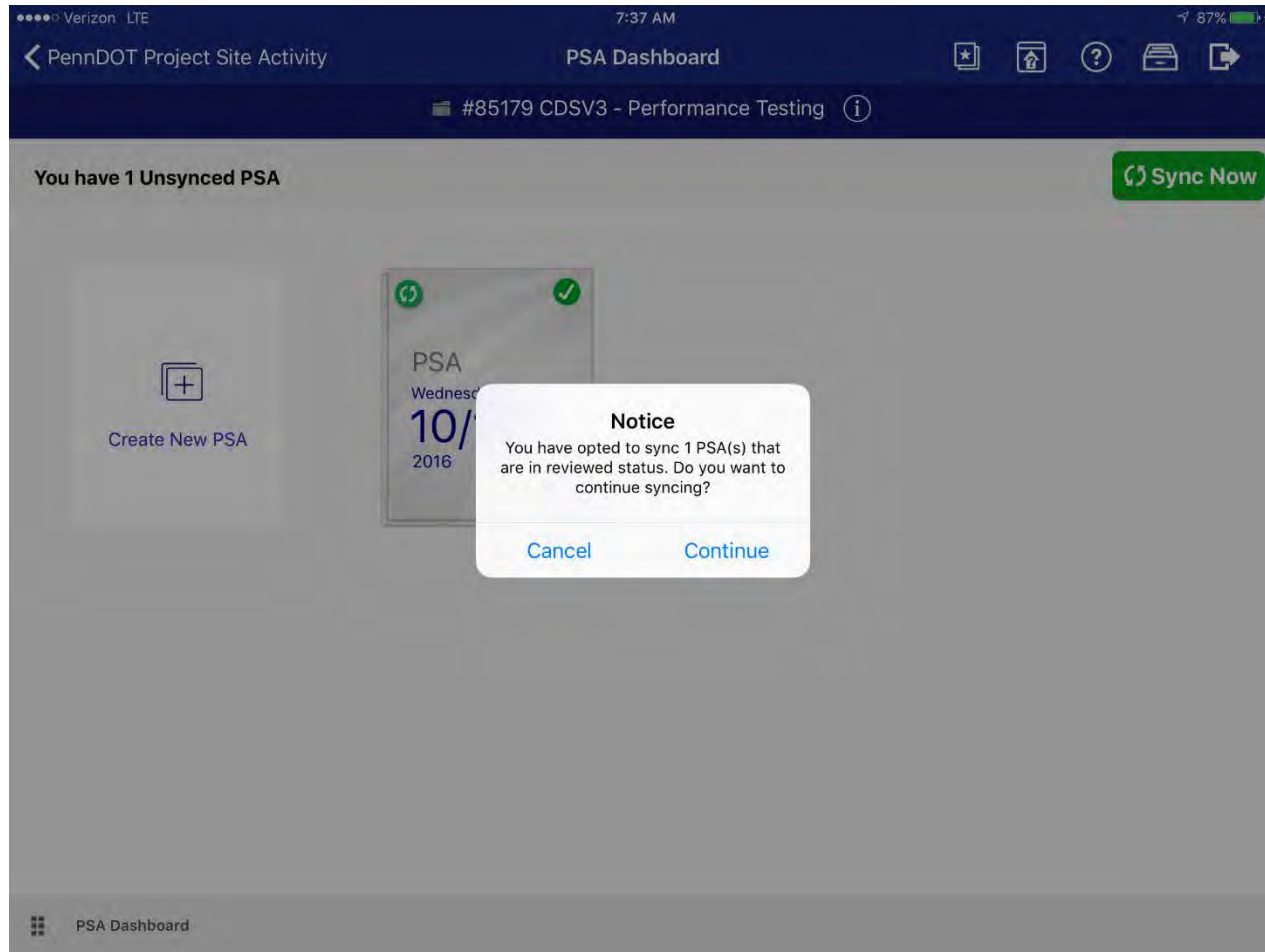
Cancel Finalize



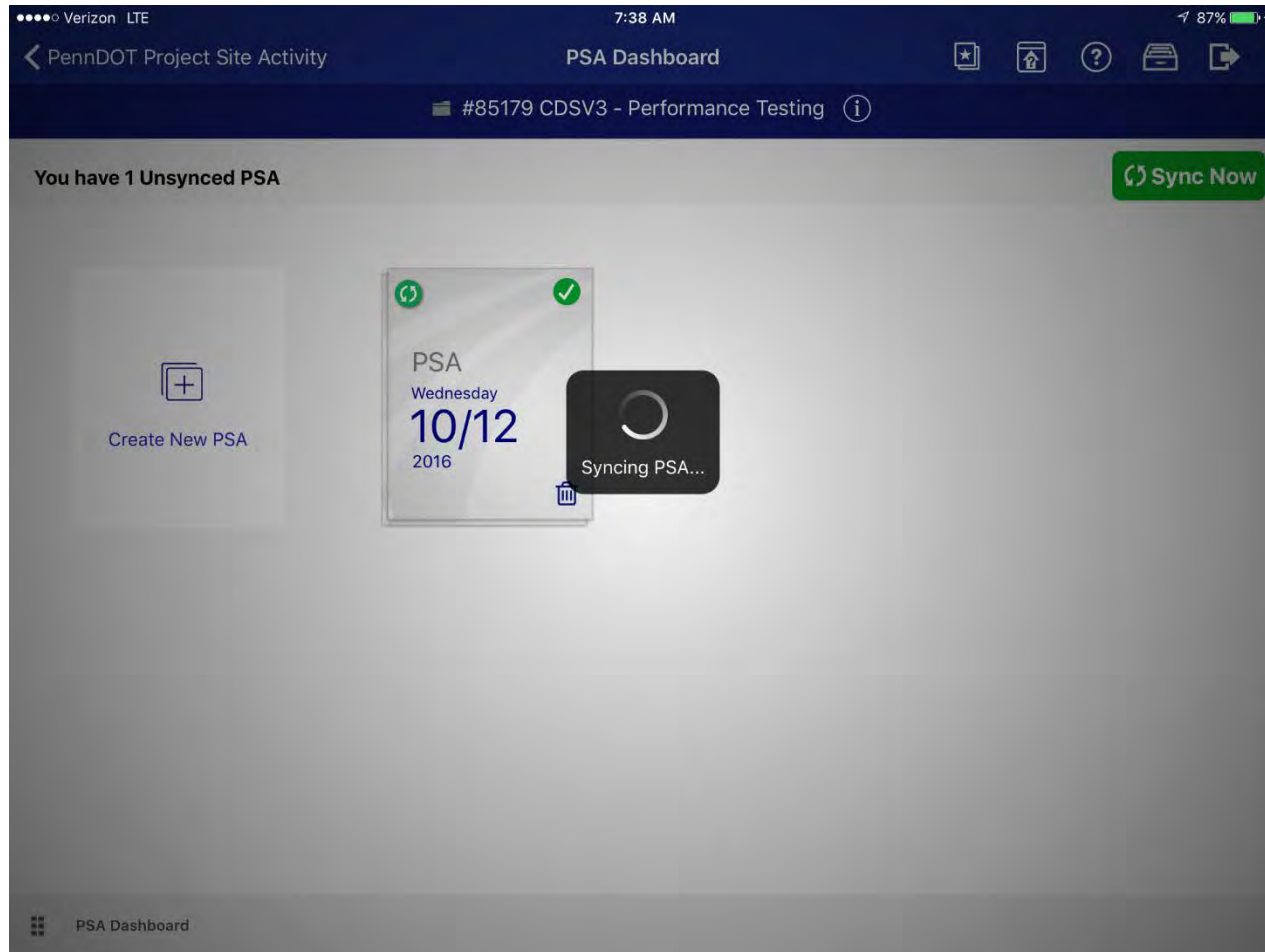
# MC PSA Sync



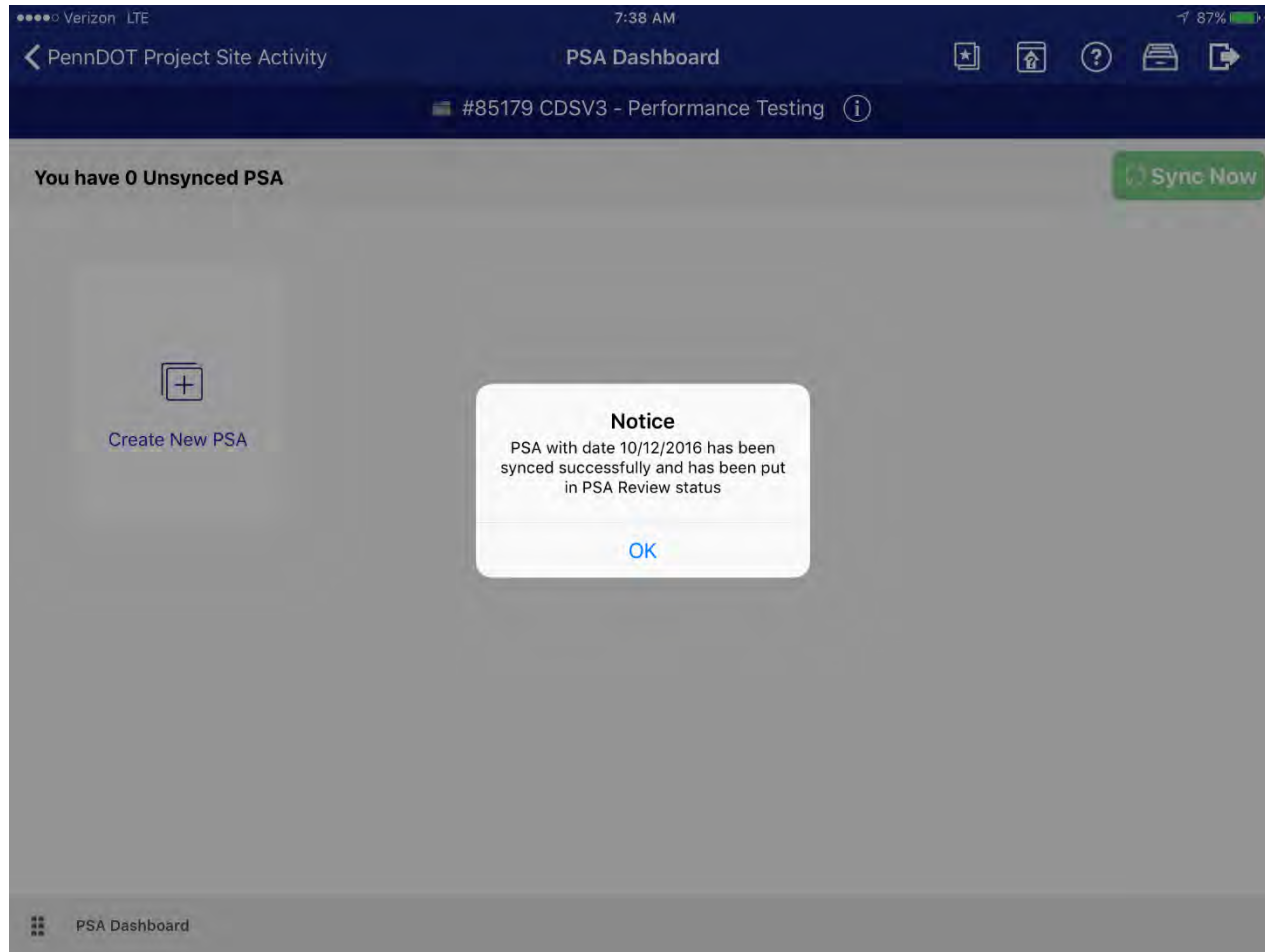
# MC PSA Sync



# MC PSA Sync



# MC PSA Sync Complete



# MC PSA Reviews

Verizon LTE 7:42 AM 87%

Cancel PSAs In Process (Select to Download) Download

Search on Project, Date, or Status


Project	Date	Status		
20204 - Armstrong Valley Road	05/05/2015	DRAFT	<input checked="" type="checkbox"/>	>
20204 - Armstrong Valley Road	03/17/2015	DRAFT	<input checked="" type="checkbox"/>	>
20204 - Armstrong Valley Road	02/19/2015	DRAFT	<input checked="" type="checkbox"/>	>
20204 - Armstrong Valley Road	08/28/2014	DRAFT	<input checked="" type="checkbox"/>	>
20204 - Armstrong Valley Road	02/13/2015	DRAFT	<input checked="" type="checkbox"/>	>
20204 - Armstrong Valley Road	10/20/2014	DRAFT	<input checked="" type="checkbox"/>	>
61345 - Lincoln Way Improvement	05/17/2016	PSA REVIEW	<a href="#">Change To Draft &amp; Download</a>	>
85179 - CDSV3 - Performance Testing	08/19/2014	DRAFT/REVISE	<input checked="" type="checkbox"/>	>
85179 - CDSV3 - Performance Testing	10/12/2016	PSA REVIEW	<a href="#">Change To Draft &amp; Download</a>	>

In Process

# MC PSA Acceptance

Verizon LTE 7:43 AM 87%

< PSA Review List Accept Reject

 **pennsylvania**  
DEPARTMENT OF TRANSPORTATION

**PSA - Daily Site Activity**

CREATION DATE	PROJECT NUMBER	PSA STATUS CODE	USER NAME
09/03/2014	85180	PSA QC	Mike Lentz/PennDOT
COUNTY	MUNICIPALITY	SECTION	SR
Monroe	MOUNT POCONO	ITS	0078

**INSPECTOR HOURS**

Pay Code	L	Start Time	Quit Time	Hours
Normal	P	22:00	02:00	0.00

**WEATHER**

Time	Temperature	Condition	Work Suspended	Created By	Timestamp
01:15	45	Clear	None	Mike Lentz/PennDOT	10/29/2014 01:40:23 PM
02:00	45	Blizzard	None	Mike Lentz/PennDOT	10/29/2014 01:40:41 PM

**GENERAL COMMENTS**

**CONTRACTOR**

Best Contractor Services

Start Time	Quit Time	Superintendent	Equipment Name	Equip. Qty	Labor Name	Labor Qty
06:15	14:00					

PSA Approvals 85180-09/03/2014

**Accept PSA?**  
Are you sure you want to Accept this PSA?

Cancel Accept

# ➤ PennDOT e-Construction Initiative

**MC-MPT V1.2**

















# MPT Dashboard

Verizon LTE 7:30 AM 97%

< PennDOT Maintenance and Protection of Traffic Work Zone Dashboard

61345 - 0094 / 007 ⓘ Edit

All (14) Draft (3) Completed (11) Template (10) Sync All

Date	Inspector	Deficiencies AM	Deficiencies PM	Phase	Status
 11/17/2016	John B Myler/PennDOT	1	--	1A	Complete
 11/17/2016	John B Myler/PennDOT	1	0	1A	Complete
 11/29/2016	Fisher Christy/PennDOT	--	0	teal	Complete
 11/29/2016	Fisher Christy/PennDOT	1	--	yellow	Complete
 11/29/2016	Fisher Christy/PennDOT	3	0	test comments	Complete
 12/21/2016	John B Myler/PennDOT	1	0	Bridge Detour 2	Complete
 12/20/2016	John B Myler/PennDOT	1	1	Bridge Phase 2	Complete
 12/19/2016	John B Myler/PennDOT	1	--	1	Draft
 01/05/2017	John B Myler/PennDOT	1	0	phase 2	Draft
 01/06/2017	John B Myler/PennDOT	1	--	Phase 1	Complete
 01/09/2017	John B Myler/PennDOT	0	--	e	Complete
 01/11/2017	John B Myler/PennDOT	1	--	1	Complete















# MPT Template Copy

Verizon LTE 7:45 AM 99%

PennDOT Maintenance and Protection of Traffic Work Zone Dashboard

61345 - 0094 / 007 ⓘ Edit

All (16) Draft (5) Completed (11) Template (10) Sync All (2)

Date	Inspector	Deficiencies AM	Deficiencies PM	Phase	Status	
 11/17/2016	John B Myler/PennDOT	1	0	1A	Complete	
 11/29/2016	Fisher Christy/PennDOT	3	0	test comments	Complete	
2/20/2016	John B Myler/PennDOT	1	1	Bridge Phase 2	Complete	 Copy
 01/11/2017	John B Myler/PennDOT	1	--	1	Complete	
 01/06/2017	John B Myler/PennDOT	1	--	Phase 1	Complete	
 11/29/2016	Fisher Christy/PennDOT	--	0	teal	Complete	
 01/09/2017	John B Myler/PennDOT	0	--	e	Complete	
 01/11/2017	John B Myler/PennDOT	1	--	q	Complete	
 12/21/2016	John B Myler/PennDOT	1	0	Bridge Detour 2	Complete	
 11/29/2016	Fisher Christy/PennDOT	1	--	yellow	Complete	



# MPT Checklist

Verizon LTE 7:48 AM 100%

< Work Zone Dashboard Work Zone Checklist PDF + Edit

AM REVIEW	PM REVIEW	INSPECTOR
01/23/2017 07:47 AM	01/23/2017 01:47 PM	John B Myler/PennDOT
PHASE	WZLD WILL BE ASSESSED	
Phase 1	<div>Form Incomplete</div>	

TRAFFIC CONTROL DEVICES	AM DEFICIENCY	PM DEFICIENCY	DATE/TIME CORRECTED
Detour sign	YES NO	YES NO	
Stop sign	YES NO	YES NO	01/23/2017 12:00 PM
Yield sign	YES NO	YES NO	



# ➤ MPT Checklist Comments

Verizon LTE 7:48 AM 100%

Work Zone Dashboard

Work Zone Checklist

Cancel 22 characters left Done

AM REVIEW  
01/23/2017 07:47 AM

PHASE  
Phase 1

TRAFFIC CONTROL DEVICES  
Detour sign  
Stop sign  
Yield sign

Sign blown over and was reset at noon.

01/23/2017 12:00 PM

q w e r t y u i o p  
a s d f g h j k l  
z x c v b n m , .  
. ? 123




# MPT Checklist Review

Verizon LTE 7:48 AM 100%

Work Zone Checklist Report Preview

CS-901 (07-16)

 **pennsylvania**  
DEPARTMENT OF TRANSPORTATION

**WORK ZONE TRAFFIC CONTROL  
COMPLIANCE CHECKLIST  
AND NOTIFICATION**

Phase: Phase 1  
Contract No: 61345  
Copy Sent: Not Delivered

AM Review	PM Review	Created By	Inspected By
1/23/2017 07:47 AM	1/23/2017 01:47 PM	John B Myler/PennDOT	John B Myler/PennDOT
WZLD Will Be Assessed*	Refused to Sign Off	Recipient of Notification	Signature
--	--	--	

Traffic Control Devices	AM	PM	Date/Time Corrected
Detour sign	No	No	--
Stop sign <b>Comments:</b> Sign blown over and was reset at noon.	Yes	No	1/23/2017 12:00 PM
Yield sign	No	No	--

\* Work Zone Liquidated Damages will be assessed as per Publication 408 Section 901.3(f).



# ➤ MPT Checklist Signoff

Verizon LTE 7:49 AM 100%

< Work Zone Dashboard Work Zone Checklist + Edit

Signature is required from your field person charge.

AM REVIEW	PM REVIEW	INSPECTOR
01/23/2017 07:47 AM	01/23/2017 01:47 PM	John B Myler/PennDOT

PHASE

Phase 1

WZLD WILL BE ASSESSED

YES NO

Sign-Off Complete

TRAFFIC CONTROL DEVICES

Detour sign

Stop sign

Yield sign

DATE/TIME CORRECTED

01/23/2017 12:00 PM

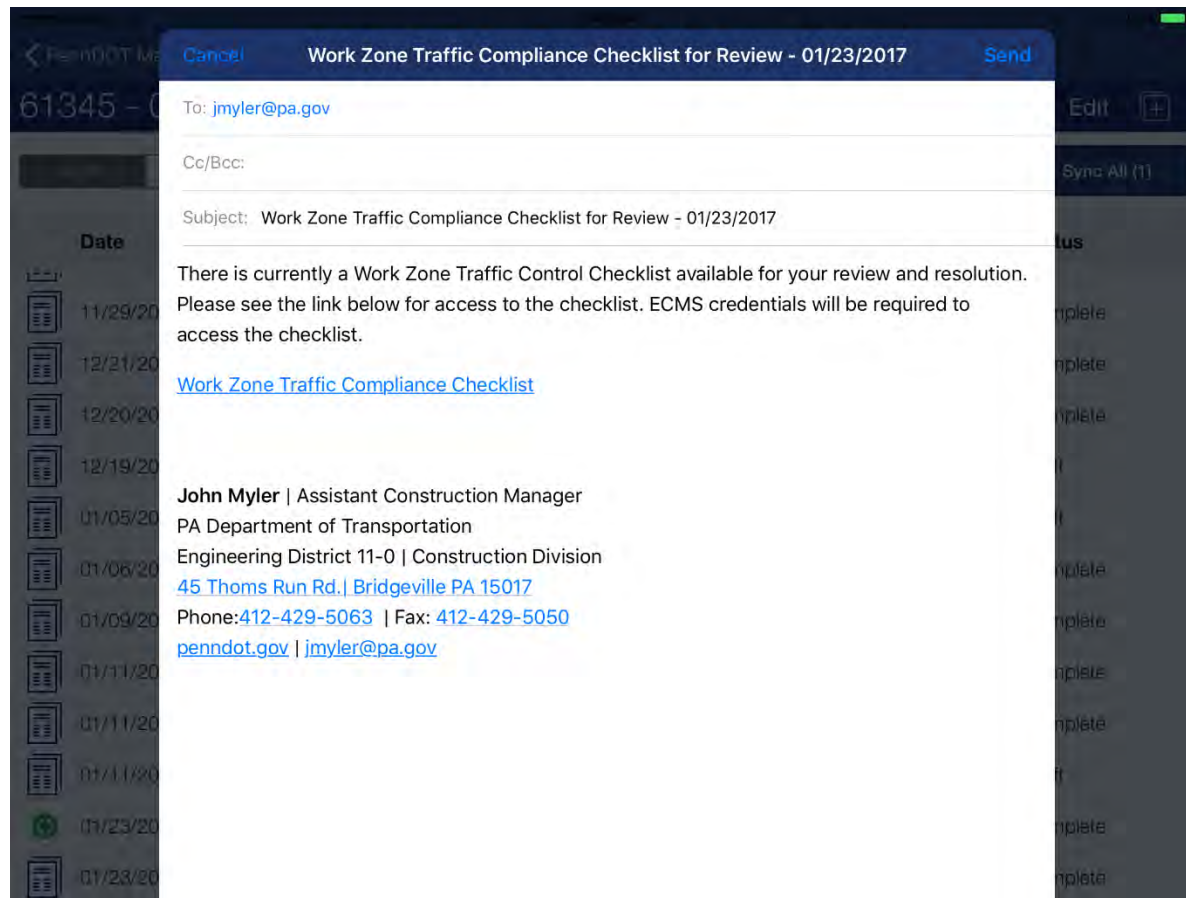
Sign Off Complete Close

✓

Send a Copy Dismiss



# MPT Generated Email





# MPT Web Portal Log In

Mail ••••• LTE 7:50 AM 100%

dotsystmobileconstruction.pa.gov

Contract Construction Specifications Favorites Work Zone Traffic Control Compliance...

v1.0.3 Work Zone Traffic Control Compliance Checklist and Notification Monday, 01/23/2017



ECMS User Name

Password

Login

Contact Information

PennDOT IT Service Desk : 717 - 783 - 8330  
855 - 783 - 8330

Individuals may also submit an RFS (Request for Service)



# MPT Reports Available for Review

Verizon LTE 7:51 AM dotsystemobileconstruction.pa.gov 100%



















v1.0.3 Work Zone Traffic Control Compliance Checklist and Notification Monday, 01/23/2017

John B Myler/PennDOT Logout

ECMS # Begin Date End Date Status Inspector

61345 Begin Date End Date Complete Inspector

12 Records Found Clear Search Search

ECMS #	Date	Inspector	Deficiencies		Phase	Status	PDF
			AM	PM			
61345	01/11/2017	John B Myler/PennDOT	1	--	q	Complete	 
61345	01/11/2017	John B Myler/PennDOT	1	--	1	Complete	 
61345	01/09/2017	John B Myler/PennDOT	0	--	e	Complete	 
61345	01/06/2017	John B Myler/PennDOT	1	--	Phase 1	Complete	 
61345	12/21/2016	John B Myler/PennDOT	1	0	Bridge Detour 2	Complete	 
61345	12/20/2016	John B Myler/PennDOT	1	1	Bridge Phase 2	Complete	 
61345	11/29/2016	Fisher Christy/PennDOT	3	0	test comments	Complete	 
61345	11/17/2016	John B Myler/PennDOT	1	0	1A	Complete	 
61345	11/29/2016	Fisher Christy/PennDOT	--	0	teal	Complete	 





# MPT Report in Web Portal

Mail ••••• LTE 7:50 AM 100%

dotsystmobileconstruction.pa.gov

Contract Construction Specifications Favorites Work Zone Traffic Control Compliance...

Work Zone Traffic Control Compliance Checklist and Notification Monday, 01/23/2017


Home Logout

CS-901 (07-16)

**pennsylvania**  
DEPARTMENT OF TRANSPORTATION

**WORK ZONE TRAFFIC CONTROL COMPLIANCE CHECKLIST AND NOTIFICATION**

Phase: Phase 1  
Contract No: 61345  
Copy Sent: 1/23/2017 07:49 AM

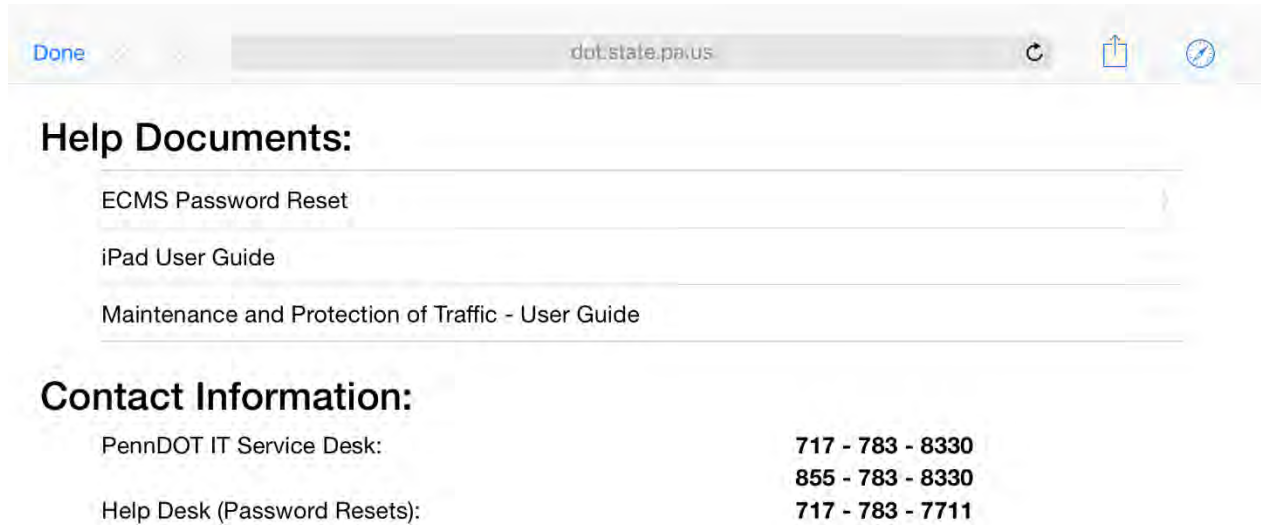
AM Review	PM Review	Created By	Inspected By
1/23/2017 07:47 AM	1/23/2017 01:47 PM	John B Myler/PennDOT	John B Myler/PennDOT
WZLD Will Be Assessed*	Refused to Sign Off	Recipient of Notification	Signature
No	No	Mickey Mouse	

Traffic Control Devices	AM	PM	Date/Time Corrected
Detour sign	No	No	--
Stop sign Comments: Sign blown over and was reset at noon.	Yes	No	1/23/2017 12:00 PM
Yield sign	No	No	--

\* Work Zone Liquidated Damages will be assessed as per Publication 408 Section 901.3(t).



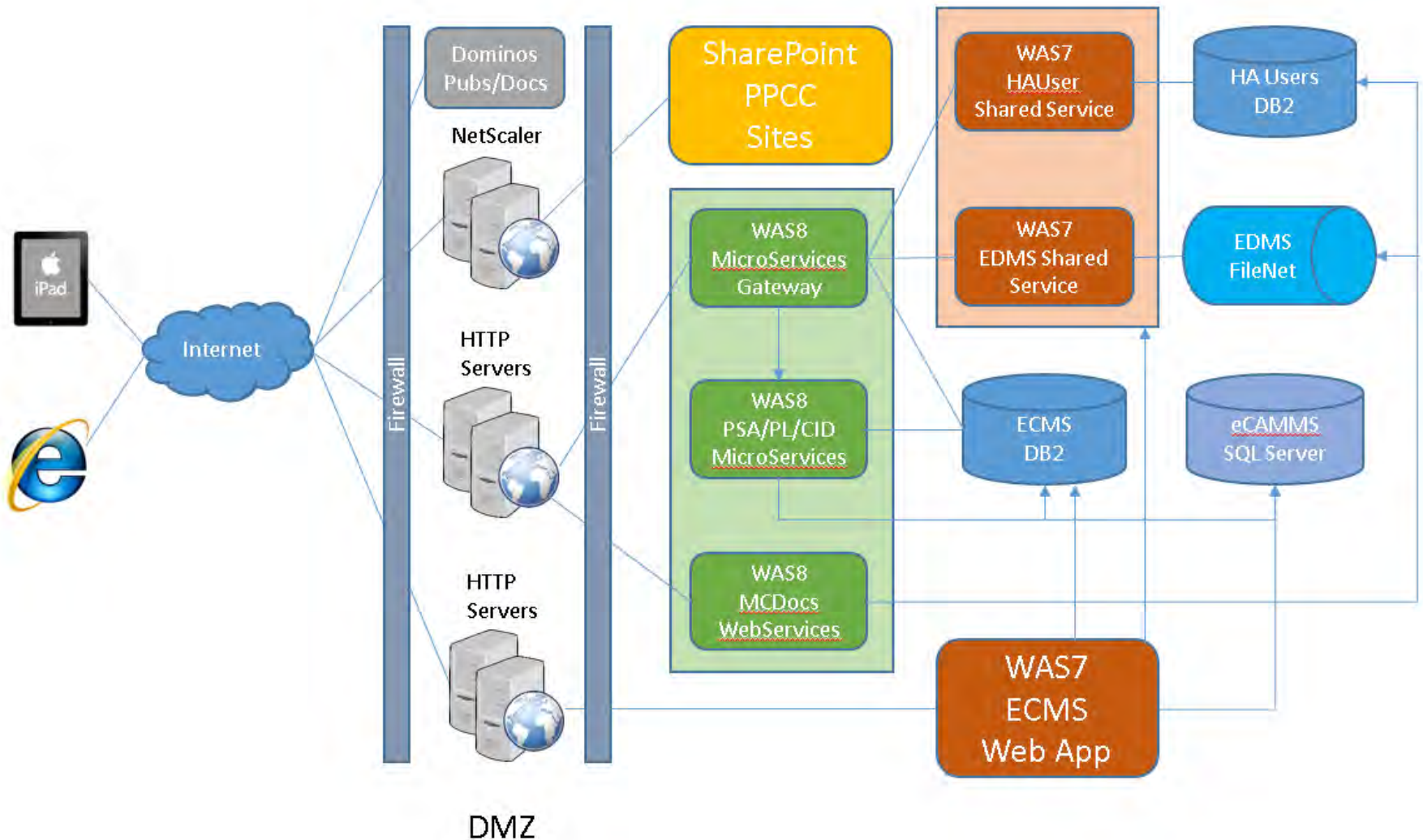
# > Help Documents in all Apps



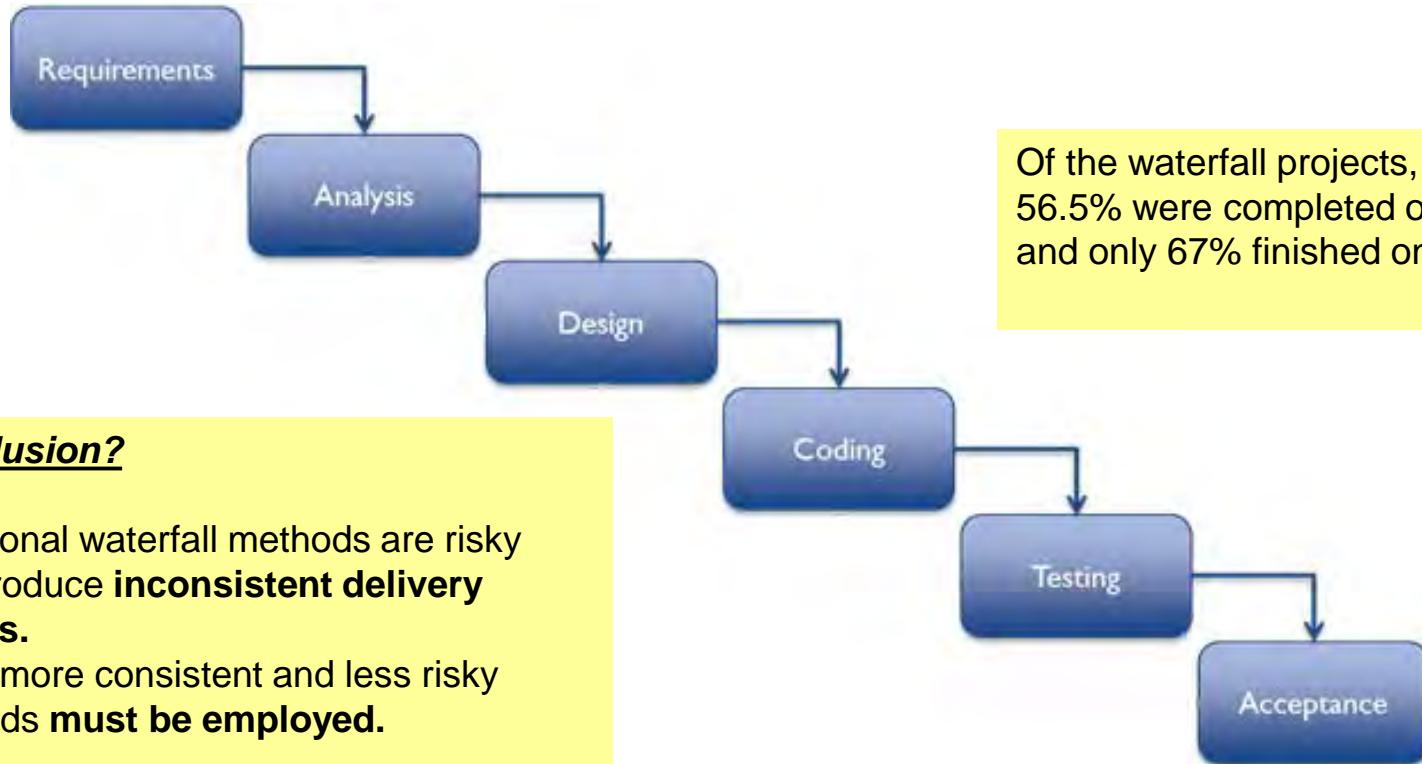
Individuals may also submit an RFS (Request For Service).



# ➤ Mobile Construction Infrastructure



# ➤ Waterfall Methodology



Of the waterfall projects, only 56.5% were completed on time and only 67% finished on budget!

## Conclusion?

Traditional waterfall methods are risky and produce **inconsistent delivery results**.

Other more consistent and less risky methods **must be employed**.

➤ *Iterative and Agile*

# SCRUM Method

## Pros:

1. Shorter “timeboxes” minimize risk more than iterative
2. Easier to adapt to changes in reqs
3. Customer is engaged throughout the entire project
4. Builds strong teams



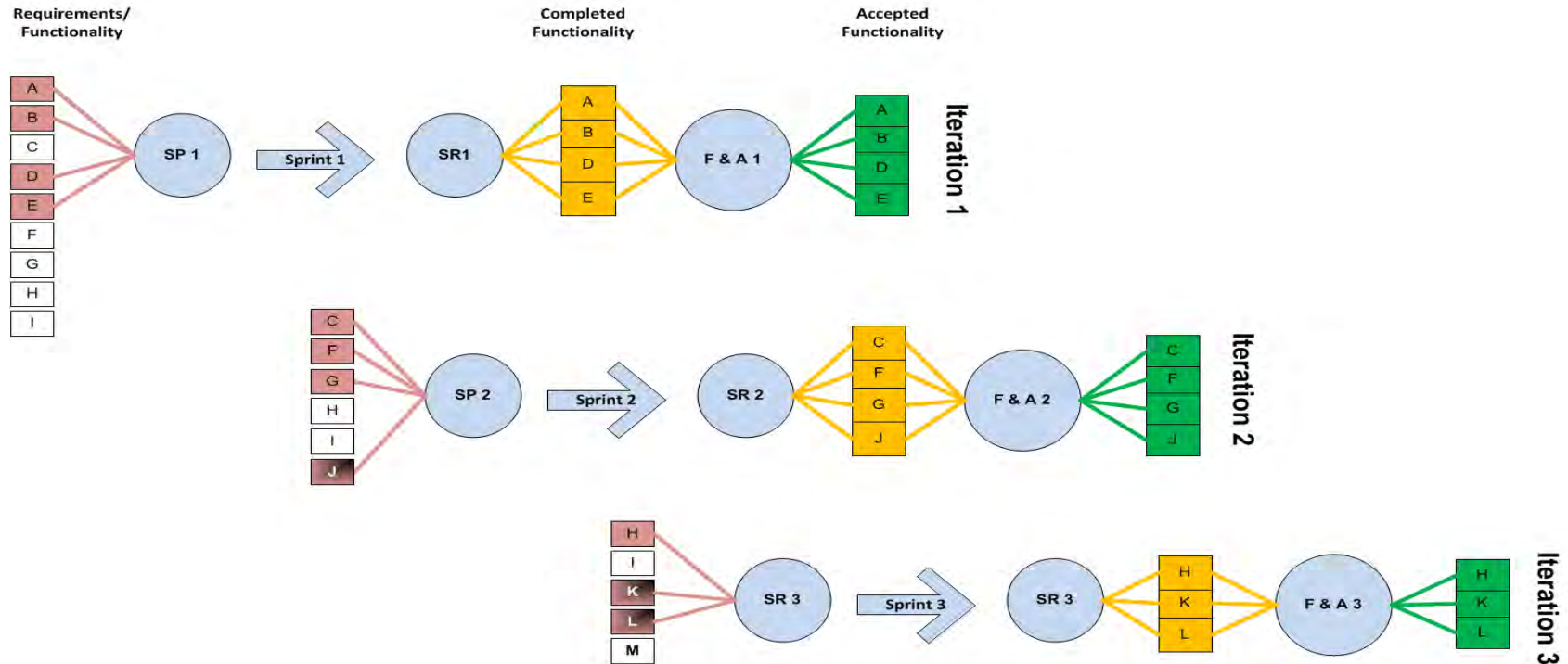
## Cons:

1. Agile requires a significant culture shift
2. Agile does not always conform with traditional large org performance metrics; effort estimations can be difficult

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# ► Anatomy of a Sprint

## RELEASE 1



## RELEASE 1

- Requirements for Sprint
- Additional Requirements
- Req. not selected For this sprint

SP=Sprint Planning : SR= Sprint Review : F&A= Fix and Accept

Process

Completed Functionality

Requirements



## ► Keys to Success

- Agile development methodology with committed business involvement
  - Business participates in Daily SCRUM meetings
  - Use of Business Pilot Groups
- Managed devices allow us to mass deploy new and updated apps to users
- Focus on internal apps
- Leveraging common components and frameworks accelerates development
- **Development team goes into the field to see real world scenarios**