



# eConstruction in Quality Control and Assurance

*Virginia Department of  
Transportation*

*Dakota Clifford*

# Key Priorities

Time, Budget, Quality

Business Process  
Reengineering

Digital Transformation

Complexity  
Reduction

Change  
Management

Strengthen Core  
Competencies

User Focus

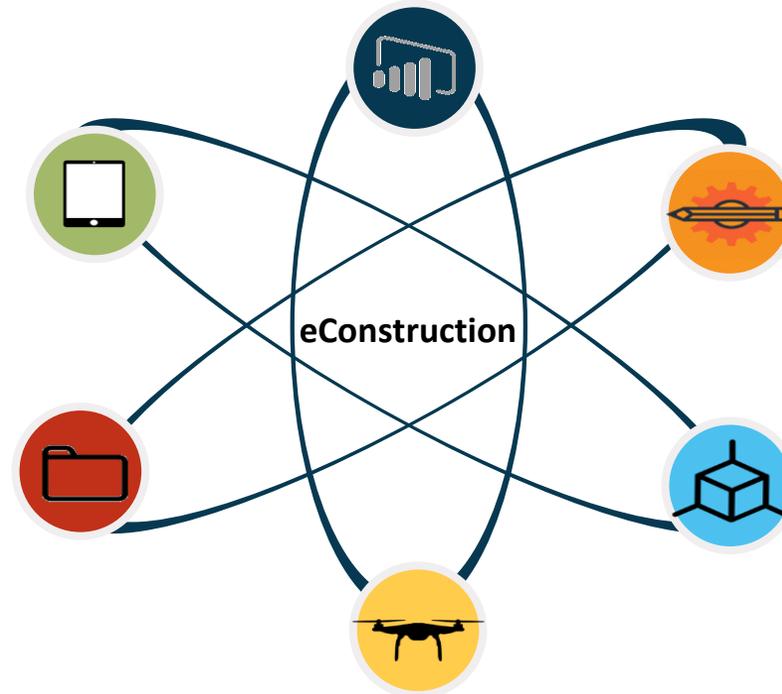
Reduce  
Fragmentation

Data Driven  
Decision Making

Eliminate Paper  
Processes

# DIGITAL STRATEGY

- Project Analytics and Dashboarding
  - Evaluation of Current Systems
- Business Process Re-development
  - Seamless Integration



# UNMANNED AERIAL SYSTEMS

- Progress Photos
- Plan Verification
  - As-Builts

# TABLET BASED INSPECTION

- PlanGrid for advanced PDF tools
- Headlight Pilot for Field Data Capture

# DOCUMENT MANAGEMENT SYSTEMS

- Submittal processes
- Workflow mapping
- Project Document Management

# JOBSITE TECH & FURTHER RESEARCH

- Headlight Data Usage
- RFID
- Team Member
- eTicketing
- Augmented Reality
- 3D Printing
- Further Research & Development

# 3D/4D MODELING

- 3D engineered model linked to project schedule (4D)
- Automated Machine Guidance (AMG)

# Deployment Timeline

iPads in Field



PlanGrid



Headlight



DMS/Submittal Workflow



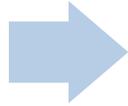
Integrations



# VDOT eConstruction Strategy

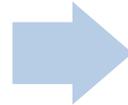
**Provide the right tools for the right ROLE**

ProjectWise



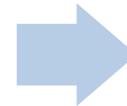
Centralized data and document management system

PlanGrid



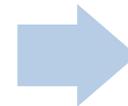
PDF and collaboration tool for inspectors

Headlight



Field data collection tool

AWP\*



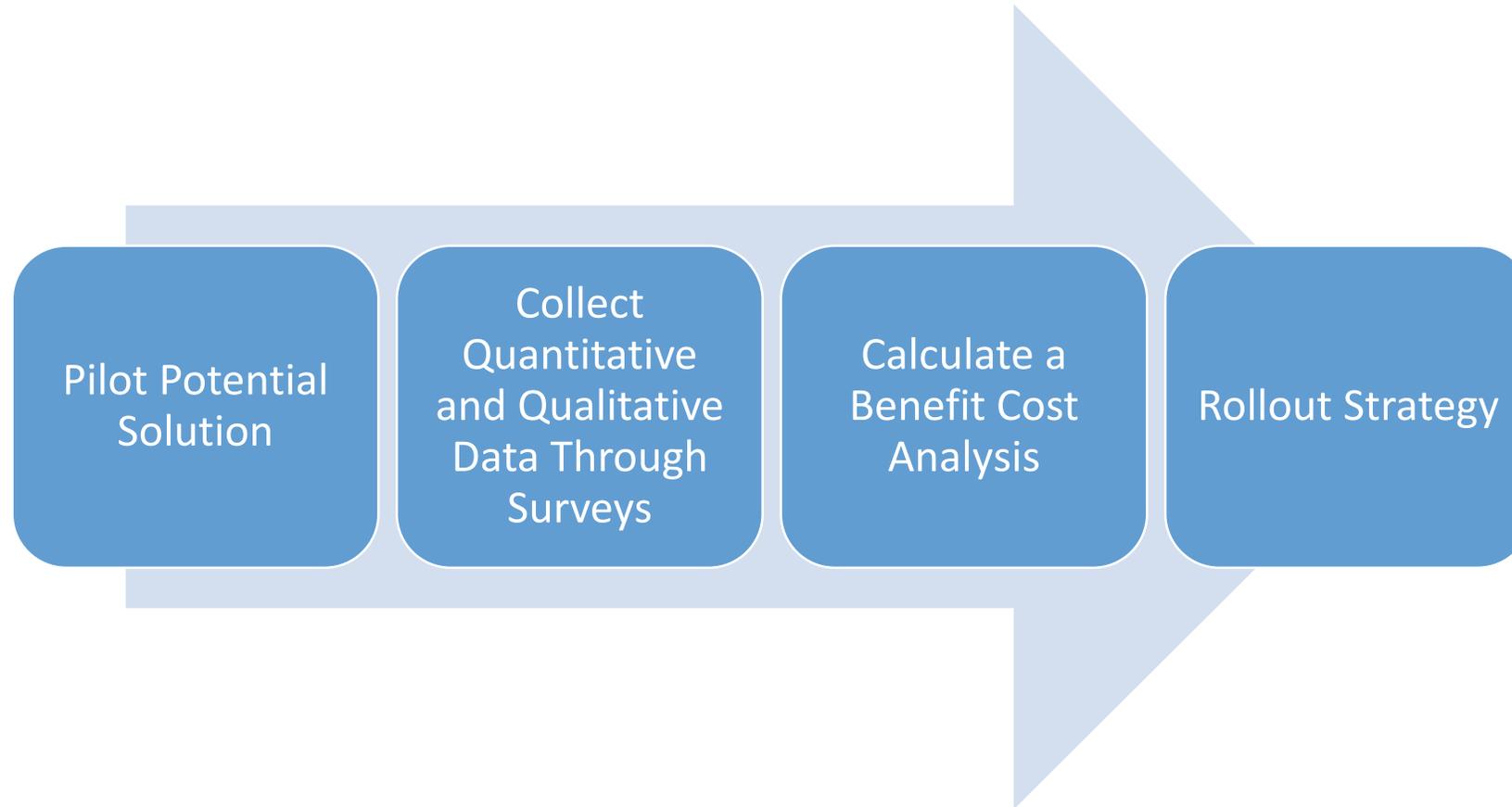
Contract Management

# Digital Transformation

Piloting Solutions



# Digital Implementation Strategy



# Pilot Approach



## Test Field User Applications

- Asses program strengths and limitations
- Collect User Feedback
- Identify additional areas for use



## Develop Best Practices

- Help set standard for larger scale use
- Establish internal experts/power users



## Asses Value

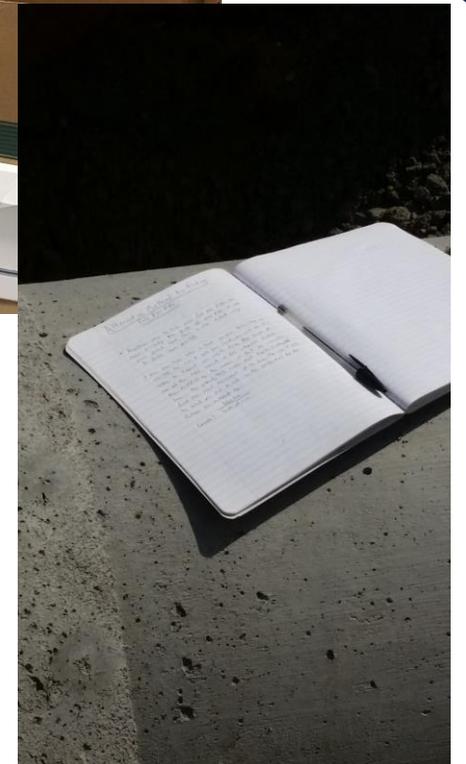
- Formal return-on-investment analysis
- Usability Assessment

# Major Initiatives



# Document Management Systems

- Encompasses both Document Management and Submittals
  - Working to identify best DMS
- Piloting ProjectWise Deliverables Management
  - Submittals Workflow Management Tool
  - Deployed Statewide on Design Build
  - Piloting on Design-Bid-Build



# What is ProjectWise?

- Engineering project collaboration software from Bentley Systems
- Helps project teams manage, share, and distribute engineering project content
- Provides a centralized data and document management system for all project related documents and information in one system

Current Conditions



# Implementation for DBB

## Formalize Pilot

- DBB
- Emergency Contract
- Schedule Work
- On Call Contract

- +/- 60 Projects Statewide
- Currently have 2 and a high demand for participation by project teams

## Collect Information

- Accessibility
- Usability
- Process Efficiency
- Uniform Solution Statewide
- Complexity Reduction

- Assess if we are ready for a full or partial roll-out
- Start marketing to stakeholders

## Implementation Strategy

- Timeline
- Policy
- Training Development
- Support Team

- Make it a contractual requirement
- Repeat for additional features

# PlanGrid Pilot Program

**50**

Projects

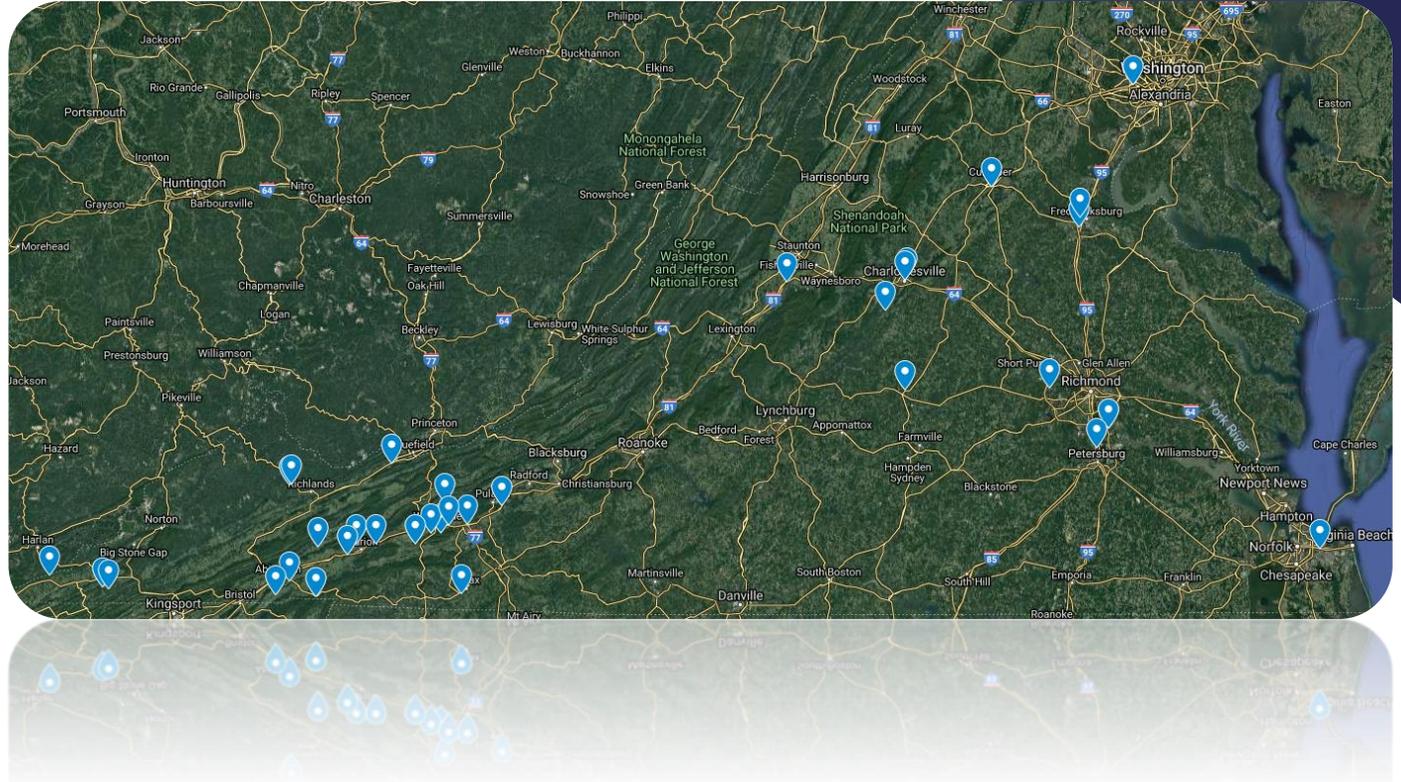
- Design Build
- I-66 OTB Mega-Project
- Emergency, on-call, schedule

**75**

Pilot Program Participants

**8**

Districts Participating



# PlanGrid Pilot Program Results

**3.6**

Average Total hours/wk  
saved

**4.2**

Additional hours/wk spent  
on jobsite by inspectors

**16**

Additional photos taken per  
week per inspector

# Headlight Pilot Program



# Headlight Pilot Program: Phase 2 Details

9

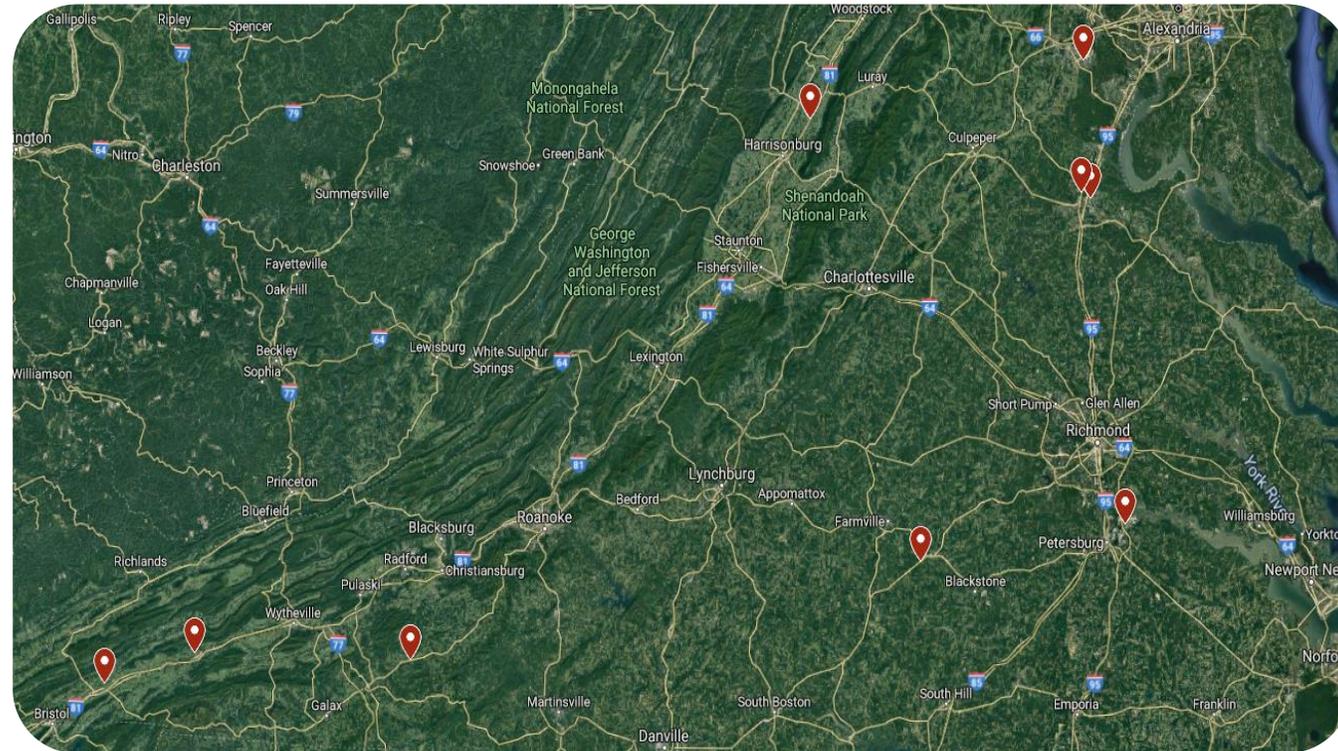
Projects

45

Users

8

Districts



# Headlight Survey Highlights

## Field Users

**4.4 hours**

Average time saves per week on data entry

**5.4 hours**

Average added time per week in field

**21.4**

Average # of additional pictures

## Office Users

**13**

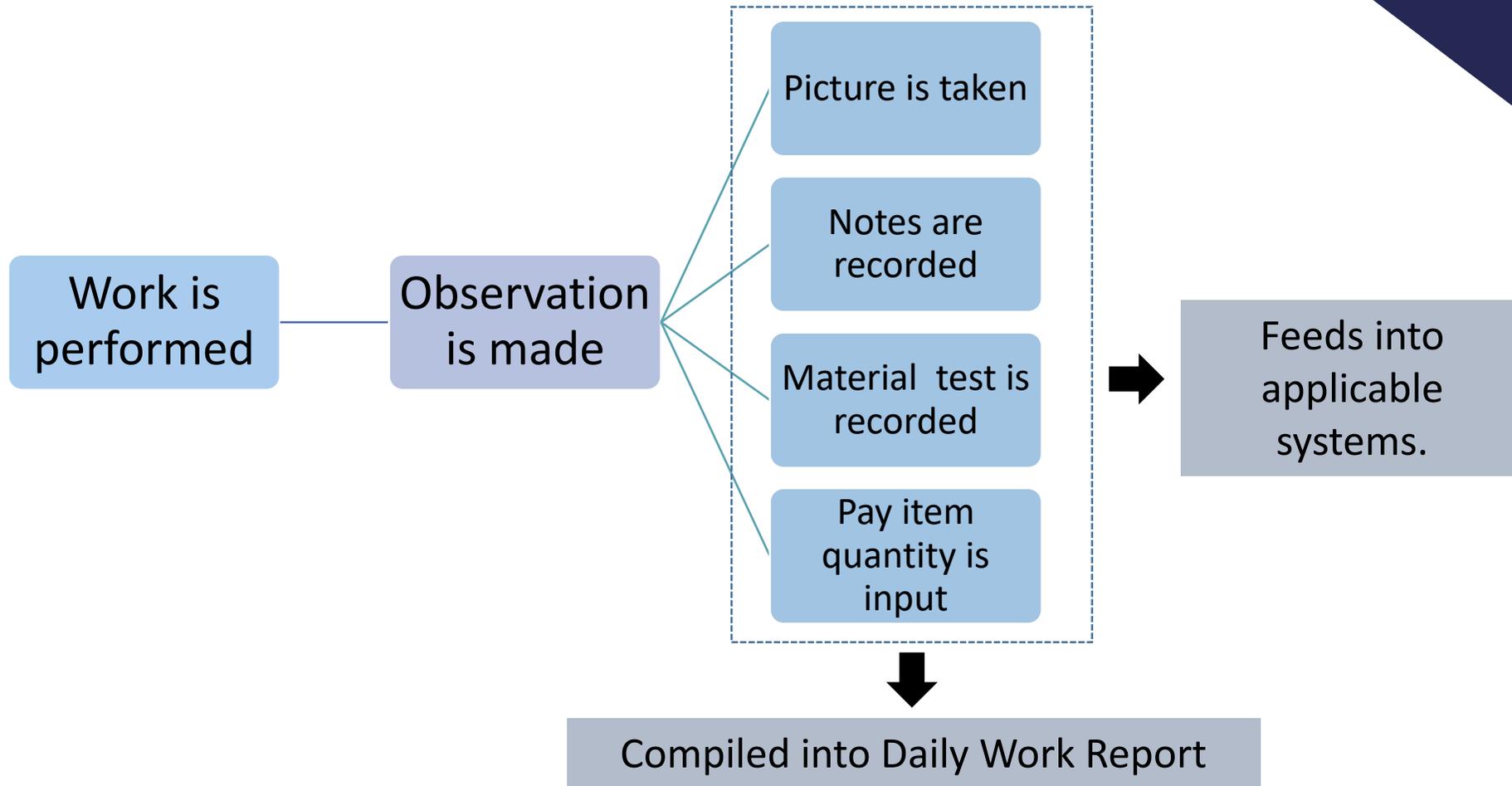
Average # additional observations

## All Users

**81%**

HeadLight Reports submitted within  
24 hours

# What is Data-First Reporting?



# Phase 3

**Additional Projects/More Users**

**Administrative Side**

**Integrations**

**Design Build??**

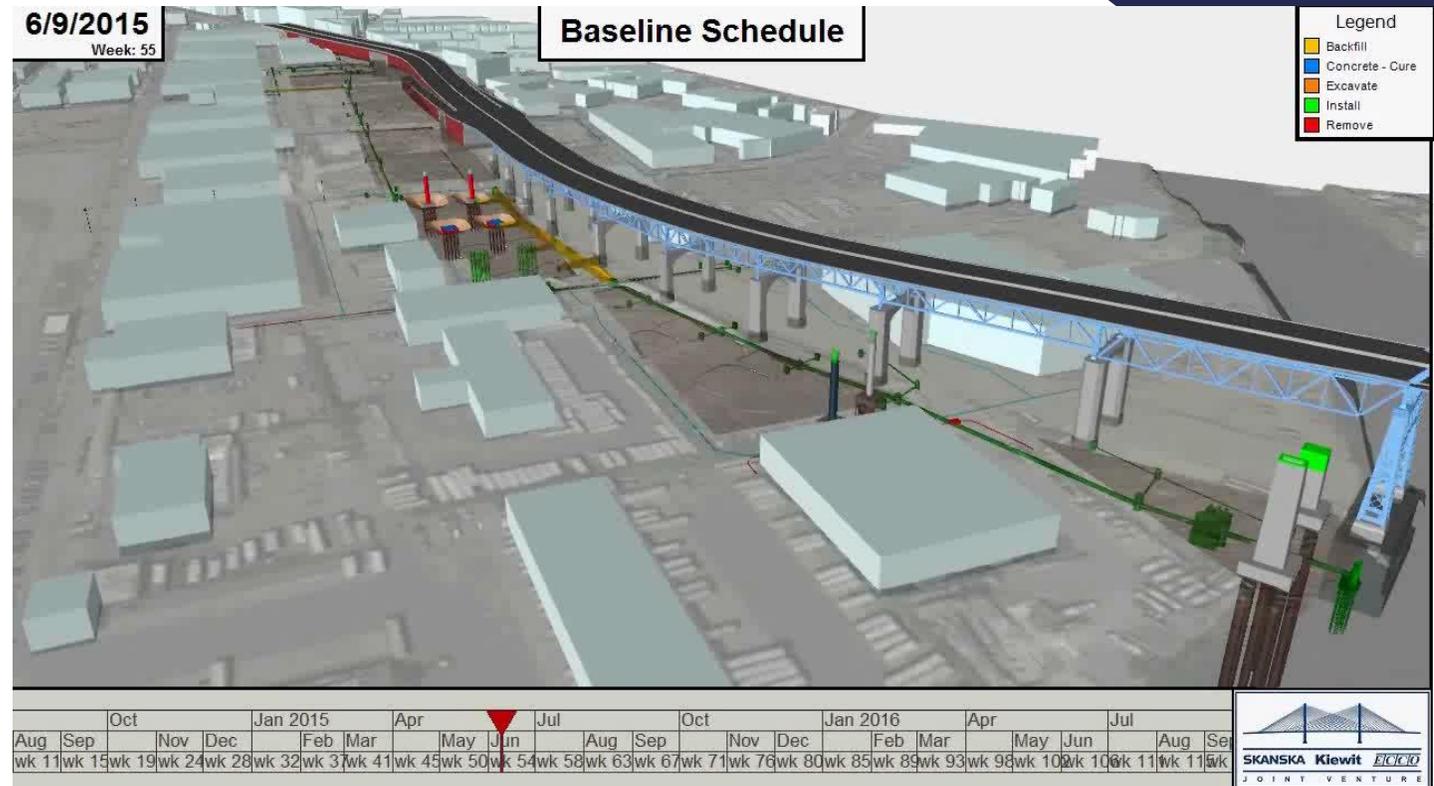
**Materials Notebook???**

# Other Initiatives



# 3D/4D Modelling

- 3D Engineered Model linked to the schedule (4D)
- Post-award requirement
- Included on Select Major Projects
  - Hampton Roads Bridge Tunnel Expansion Project
  - I-95 Rappahanock Northbound



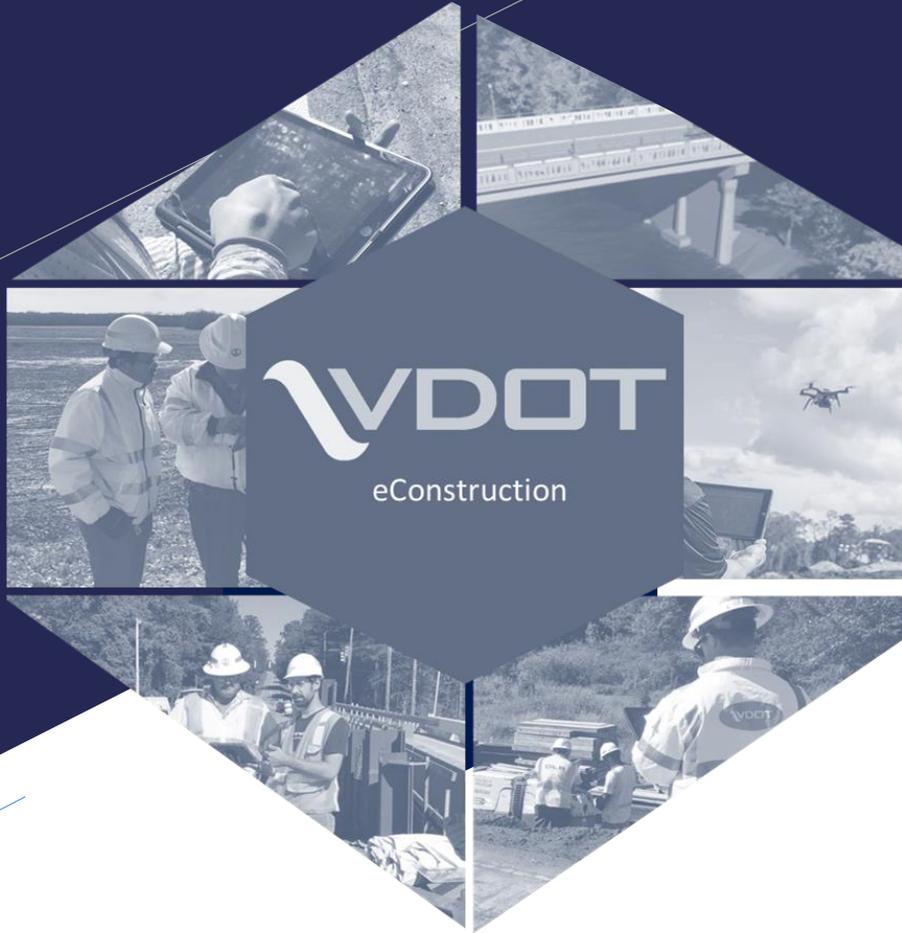
# Unmanned Aerial Systems

- Currently in Pilot Phase
- Working with other Divisions as appropriate
- Working to identify appropriate applications
  - Materials Measurement
  - Alignment Verification
  - Environmental Inspection
  - MOT Set-up

# Jobsite Tech & Further Research

- Jobsite Technologies
  - RFID
  - eTicketing
  - Augmented Reality
  - 3D Printing
- Data Management
  - Dashboarding
  - Project Level Analytics
  - Systems Integrations
- Further Research and Policy
  - Evaluation of Alternatives
  - Upcoming Technologies
  - Policy guidance





## Contact Us:



Dakota Clifford



804-786-2199



[Dakota.Clifford@vdot.virginia.gov](mailto:Dakota.Clifford@vdot.virginia.gov)



[eConstruction@vdot.virginia.gov](mailto:eConstruction@vdot.virginia.gov)