

# Vision for E-Maintenance

## March 13, 2016

1. E-Maintenance is the use of mobile devices coupled with software applications as tools to perform maintenance work in a more efficient, streamlined manner; in a paperless, cloud environment; and with statewide data reporting capabilities.
2. E-Maintenance consists of two phases.
  - a. Phase 1 is inventory, inspection, and evaluation. This phase uses mobile devices and software applications to perform Roadway Characteristics Inventory (RCI); sign, guardrail, and crash cushion inspections; and Maintenance Rating Program (MRP). This work is currently performed using clipboards, standard paper forms, and pencils. Subsequent work is then necessary to file the standard form as a hardcopy; scan and file the standard form as an electronic file; and hard code the data written on the form into a database with limited statewide reporting capabilities.
  - b. Phase 2 is contract administration. This phase will be very similar to E-Construction.
3. The critical path is the implementation of the Guardrail End Terminal and Crash Cushion In-Service Performance Evaluations which is scheduled to start July 1, 2016. Maintenance will currently perform this more detailed inventory and incident data gathering by using paper forms and pencils, cameras, taking the paper forms back to the office, printing photos, filing, and entering the data into databases. This is a great opportunity to jump start E-Maintenance Phase 1 with the use of mobile devices with GPS and camera capabilities, electronic forms which are app based portals to enter data in real time, and creation of a statewide reportable database.
4. Two statewide task teams have been formed to establish direction, details, and implementation. Additional teams will be formed as E-Maintenance expands.
  - a. The first team is an E-Maintenance Task Team.
  - b. The second team is a Guardrail End Terminal and Crash Cushion In-Service Performance Evaluation Task Team.

Direction will be established in a white paper. Details will be established in processes, procedures, questions and answers, etc. that will be the how-to to accomplish the direction in the white paper. Implementation will be established by identifying a date or series of dates and it will be all in. Implementation is not optional.

5. At this time, it is undetermined whether the best tool for maintenance to use is a tablet or smartphone and whether a single mobile device should be selected. There are pros and cons to both, and the statewide task teams will tackle this issue along with many others.
  - a. A tablet will require a waiver to the device neutral exchange requirement of the mobile device policy because a tablet is not currently a 100% one to one exchange with a laptop or desktop computer. The attached "Device Neutral White Paper 01-19-15.doc" prepared by the State Construction Office outlines the justification for the use of the iPad Air 2 tablets for E-Construction without being device neutral and this justification is the same for E-Maintenance. This waiver was received on February 17, 2016.



Device Neutral White  
Paper 01-19-15.docx

- b. A smartphone will require approval by the Assistant Secretary for Engineering and Operations.
6. Eighty two mobile devices are needed for E-Maintenance Phase 1.
  - a. The approximate cost of the iPad Air 2 with accessories is \$710 (\$630 tablet + \$80 accessories) so the total statewide cost for hardware purchase is \$58,220.
  - b. The approximate cost of a smartphone is \$100 so the total statewide cost for hardware purchase is \$8,200.
7. Eighty two data plans for mobile devices are needed for E-Maintenance Phase 1. The data plan cost is anticipated to be approximately \$40 per user per month so the total yearly cost is anticipated to be \$39,360.
8. The software development and support cost is anticipated to be approximately \$50 per user per month so the total yearly cost is anticipated to be \$49,200 for 82 users. Software development and support is the development of electronic forms as mobile apps to allow electronic forms to be populated and at the same time allow the data to be uploaded in real time to a database that is searchable, retrievable, and reportable.
9. Budget options are being reviewed. Budget to be used will be a combination of expense and contracted services budget categories from the Central Office and Districts. A grant thru FHWA is also being pursued for E-Operations.