**Asset type:** Sign

**Process map name:** sign new/re-construction project

**Identifier:** PM.S.1

**OVERVIEW**

The workflow of a new or re-construction sign project shares common processes with a typical construction project and can be divided into the following phases (see the top row in the process map): planning and programming, design, contract development, fabrication and installation. Actors involved in the workflow, as presented in the left column of the process map, are traffic engineering (design function), Iowa sign shop or fabricator, office of contracts, office of construction and materials and resident construction engineering, and contractor.

**ACTORS**

**Monthly production schedule meeting board**

The production schedule meeting is held every month with a participant of all relevant offices to determine new or re-construction needs for across different districts within the state. A new sign construction project is usually initiated by the construction of larger associated projects such as paving.

**Traffic Engineering - design function**

The traffic engineers in the office of Traffic and Safety (T&S) leads the design phase. The purpose of this stage is to determine what types of signs need to be placed and their geometry information in accordance with federal and state manuals and specifications. Excerpts of relevant manuals used by Iowa DOT for sign design include: Sign Inventory User’s Guide, Iowa DOT Standard Specifications – Division 25 Miscellaneous Construction, Iowa DOT Standard Road Plans, Sign Truss Standards. Designers use Google Earth or Road View to identify the location of the existing signs to make decisions on the locations of new signs. Signs are modeled as 3D objects in MicroStation which supports automated creation of PDF plans and Excel files summarizing their designed attribute details. Designers also do preliminary estimate using bid items. At the end of the design phase, designers will produce a set of MicroStation files, PDF plans, and excel files. 3D MicroStation models and excel files are archived in ProjectWise; PDF plans are transferred to the Office of Contracts.

**Iowa Sign Shop**

Iowa sign shop is responsible for the fabrication of sign once the design is completed. Before the fabrication of signs, shop drawings are needed to describe the design in detail. Shop drawings are developed based on the summarized designed information and other detailed requirements specified in the attached manuals, specifications and standards received from the T&S office. These drawings will need approval from Iowa DOT before the fabrication. The fabricated signs will be provided to the selected contractor.

**Office of Contracts**

Upon receiving the design package, the Office of Contracts performs the following three tasks to determine the total price of the project and who will install the signs: cost estimating, bidding, and contract development. The design information from the pdf plans and design summary excel files are used to quantify the work quantities which are embedded with unit prices to estimate the total cost of the project. Quantified contractor with lowest price is selected and the project contract that specifies contracted time, price, and quantity is developed. After the contract is signed, all documents will be stored in the ERMS system, and the project information will be transferred to the Construction and Materials Office or RCE who do the construction inspection.

**Office of construction and materials**

Construction engineers inspect the project during the construction phase to ensure signs installed at the right location, right materials used and other contracted requirements such quantity, quality and schedule met. As-built information are presented in pdfs and stored in ERMS. These as-built data are mainly recycled from the design pdf plans. Other data created in this phases related to materials and costs are stored in the ERMS as well.

**Contractor**

A contractor is hired to install new signs. The contractor may need to pick up signs form multiple Iowa sign shops. Materials used and quantities need to be submitted to the construction office for approval.

**Databases:**

The following are two databases used to archive data created through the entire workflow of new or re-construction for signs.

* ProjectWise is used to stored data related to the project such as MicroStation design files, tabulations, excel files.
* ERMS (Electronic Records Management System) systems stores contracts data and others such as design plan pdfs, CAD files and as-built drawings.

**Software applications and data format**

* Google Earth: used to verify what exist on the roadway and their locations. Designers can do measuring on Google Earth.
* Road View: basically have the same function as Google Earth, but it is a collection of street pictures rather than satellite images as in Google Earth.
* SignCAD: used to design signs in 3D environment. Once the design is completed, it is exported to MicroStation.
* MicroStation: Signs are modeled as 3D object with attributes including dimensions, geolocation information, sign type, sign identification number, and ground level. MicroStation can generate 2D CAD or PDF drawings based the 3D model.
* MS Excel: design information is summarized in excel format.
* Adobe Acrobat: final design details are summarized in a PDF file.

**DATA EXCHANGE**

This row shows the Exchange Requirement (ER) documents for different exchange cases within the workflow. There are cases where data exchange is required that are listed below. The detail of what type of data to be exchanged are presented in these ERs.

* Designer to Iowa sign shop or fabricator
* Designer to office of contracts
* Office of contracts to office of construction and materials or RCE
* Office of contracts to contractor
* Contractor to office of construction and materials