Electronic Files as the Controlling Document

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Overview

• Why
• Some of The Issues
• Our approach
• The results (thus far)
• Next Steps
Why

- **Intelligent Plan**
  - Attaches intelligence or information to the features in the plan
  - That model then becomes the platform for electronic As-Built
  - The gateway to harvest the project data on an enterprise wide basis

- **Civil Integrated Management**
  - Initially we approached this as two separate initiatives, 3D Design and Machine Control Construction
  - There is an increasing demand to share data across platforms
  - CIM provides a roadmap or concept for how we tie all this together
Civil Integrated Management (CIM)

Facility Life Cycle View

From NCHRP 20-68A Scan 13-02 Advances In Civil Integrated Management (CIM)
Why

- Industry moving this direction (actually supportive)
  - Reduces Cost
  - More efficient
  - Improved results

- Files that can be directly incorporated into Automated Machine Guided equipment.

- You Don’t Know, What You Don’t Know: So we needed an opportunity to learn
The Present
The Future
The Future

Issues

• Change the perception and use of the electronic document. Move from At-risk to Value Added.
• How do we preserve the integrity of the electronic documents.
• We needed to find the right project, in this case that was one that had both grading and paving.
• How would this impact contract administration
• Industry readiness
• We needed to learn more about what happens to the files once they leave our hands.
  – How do you control changes to the model
  – Can we incorporate some of that into our process
Our Approach

• We selected a project that we thought had all of the elements that would give us good feedback and included several disciplines.

• We added a Special Provision by addendum elevating the electronic files above the paper.pdf plans.

• We indicated that if any changes needed to be made that the Department would be responsible for making the necessary changes.

• We made it mandatory for machine guided grading and optional for paving.

• We did not change our process for this project.
SPECIAL PROVISIONS FOR CONFORMITY WITH AND COORDINATION OF THE CONTRACT DOCUMENTS

A. With the exception of small or irregular areas, **Automated Machine Guidance** according to Article 1105.17 **will be required** for the grading and paving on this project.

B. **Digital Contract Files.**
   1. Digital Files contained within the 81-1691-021_E_Files_(DataFiles).zip file package listed below *(files are listed in descending order of precedence)*:
      a. LandXML Geometry file: hv_dsn_021.xml within the “Alignment_Data_Files” subfolder.
      b. LandXML surface files: All LandXML files within the “Machine_Control_Surfaces” subfolder.
      c. Three dimensional line string CADD files: All DXF files contained within the “DXF_Files” subfolder.

   2. See Appendix A for names, time stamps, and sizes of official files.

   3. The digital files are available for download at the following web site for the project listed above: http://www.iowadot.gov/contracts/lettings.html
SPECIAL PROVISIONS FOR CONFORMITY WITH AND COORDINATION OF THE CONTRACT DOCUMENTS

In case of a discrepancy between contents of the contract documents, the following items listed by descending order shall prevail:

1. Addendum
2. Proposal Form
3. Special Provision
5. Plans
7. Developmental Specifications
8. Supplemental Specifications
9. General Supplemental Specifications
10. Standard Specifications
11. Materials I.M.
1105.04, D.

Replace the Article:

The Contractor shall not take advantage of any apparent error, omission, or discrepancy in the contract documents. The Engineer will be permitted to make such correction in interpretation as may be deemed necessary for the fulfillment of the intent of the contract documents subject to compensation as provided in Articles 1109.03, 1109.04 and 1109.16. Written notice of changes in the contract documents will be given to the Contractor by the Engineer. Field adjustment of digital contract files, if necessary, will be completed by the Engineer.
The Project
IA 196 in Sac County

Grade and Pave

• Project Information
  – Length: 8 miles
  – Earthwork Quantity: 432,651 Cubic Yards
  – Paving Quantity 148,618 Square yards
  – Two Bridge Replacements: Over the Raccoon River and Cedar Creek
  – Replacement of a Single Box Culvert

• In conjunction with the completion of the US 20 Corridor in Northwest Iowa
Project runs from the Junction of IA 196 and US 71 north to approximately 1 mile north of US 71 in Sac County, Iowa.
Junction of IA 196 and US 71
IA 196 at the Raccoon River
Single Box Culvert
Cedar Creek Bridge
Cedar Creek Bridge
The Results

- The successful low bidder was a joint venture between Peterson Contractors Inc. and Godbersen-Smith. Cedar Valley Corp. was selected as sub for the Paving.
- Letting Results: (Grade and Pave Project only)
  - Programmed Amount: $18,915,000
  - Awarded Amount: $18,854,801.68
- No adjustments in electronic files needed by the contractor
- Contractor typically transfers risk to the engineering consultant on traditional GPS projects.
- Reduced costs for contract survey.
- No difference in their bid, if anything it reduced costs.
- The contractor preferred this approach. Less risk.
- No difference or issues for the contract administration staff. Although initially concerned now supportive.
Next Steps

- Try this again on more projects.
- Gain experience with a Paving project.
- Review our process for preparing files.
- Place copyright on all plans.
- Developing and electronic seal
- Continue working toward an Intelligent Plan
- Begin discussions for incorporating CIM into our business model.
Questions

THE ROAD TO SUCCESS IS ALWAYS UNDER CONSTRUCTION