Utilization of GIS for Construction Plans and Documentation

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Presentation Objectives

✓ Using GIS data to develop plan sheets.
✓ When using GIS data to develop plan sheets is most valuable.
✓ What GIS software does really well and what it doesn’t do really well.
✓ Helpful hints and lessons learned during bid phase and construction phase.
✓ How this can keep track of the as-built information.
✓ How this can integrate into your asset management.
✓ Real world example.
Applications

• Use these types of plan sheets for pipe or structure replacements.
• Can make plan sheets for emergency work and/or larger repair and maintenance projects.
• Not as efficient for complicated projects.
Getting Started

- What GIS data do you have?
- Is that enough? Data gaps?
- Do you have the staff to do this?
- This process can be tweaked to fit with your asset management goals.
- You have to start somewhere.
NOTE 1: Repair existing 10" of 36" RCP between 321-514 and 321-515 and existing 65' of 36" RCP and C&M between 321-515 and 321-516 with 30" Snap-Tite pipe.

NOTE 2: Install Snap-Tite elbow at material change between RCP and C&M between 321-515 and 321-516. Excavation shall be required for pipe adjustments and elbow installation.

NOTE 3: Downspouts currently connected to existing storm sewer will not be relocated.

NOTE 4: Provide fill material for case in locations and cost shall be subsidiary to pipe installation costs.

NOTE 5: All work utilizing Snap-Tite shall be completed by the manufacturer's recommendations.

NOTE 6: Approximate quantity of grout filling = 10cy
Limitations

• Not a lot of space for notes
Limitations

- Some sites are just too complex (i.e. streambank restorations, geomorphology)
When it Gets Complicated

• You can also package AutoCAD or Microstation plan sheets together with these sheets. (11x17)
• You can make these plans more complicated… we tried to keep them simple.
GIS Software

• It can:
  ✓ Center and scale the plan sheet on the project areas you define (or lines, circles, polygons)
  ✓ Draw the project area on your title block (with the notes, legend, scale bar, sheet name, etc.)
  ✓ Everything is easily editable from the attribute table attached within the GIS data
  ✓ Quickly makes a combined PDF of all plan sheets with one command
Real World Example
Site Visits are Crucial

- GIS can be inaccurate.
- Open the structure lids and look in (even if you don’t want to get into the structure).
- Obtain and review CCTV of all the lines.
Helpful Bid Phase Hints

• Keep things simple and flexible. Quantities will change based on field conditions.
• Set up your bid form with:
  ✓ Base Bid – specific to each project site area and covers all the contractors incidentals, mobilization, tools, special site constraints.
  ✓ Materials – pipe and bedding, structures, end sections.
  ✓ Restoration – by linear feet, paved and unpaved. Can also be further separated by depth.
• Set up a force account or contingency to cover unknowns. As a general rule, use 10% of the estimated construction cost.
• Any unused force account can be returned to your budget, or additional projects can be added to the project.
• Hold a mandatory pre-bid meeting. Tell the contractors to visit each site before bidding.
Helpful Construction Phase Hints

- The pre-bid meeting gives you a little more negotiating ability against change orders for “unknown” site conditions.
- Have a monthly progress meeting.
- Talk about any differences from the plan as soon as possible.
- If you do multiple contracts with multiple sites, make your site names unique.
Construction Documentation

• GIS is really good at organizing a lot of data.
• Contractor, construction dates, inspector name, length of repairs, utilities encountered, pipe sizes, fittings used, special comments, etc., etc., etc.
• This information was gathered by inspectors within the plan sheets, then entered into GIS separately.
• Technology is evolving.
### 2017 Sanitary Sewer Rehabilitation and Repair Contract 1

#### Installation Worksheet

<table>
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<th>Activity</th>
<th>Size (in)</th>
<th>Installed Date</th>
<th>Laterals Opened</th>
<th>Installed Length (ft)</th>
<th>Installed Thickness (mm)</th>
<th>Post CCTV Submitted</th>
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Conclusion

- Don’t avoid new practices because of “the way we’ve always done it”.
- Has been successfully applied on 8 contracts covering 50+ project sites.
- Plan sheets can be easily made and shelved for when budgeting allows.
- Construction notes and as-built information can be held with the same GIS information you currently maintain.
- This can improve your asset management strategy.
Questions?

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