Maximize Success with Early Utility Coordination

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Discussion Points

- The Research
- The Reasons
- The Road to Implementation
Research—Findings

KYTC SPR 13-460

Top Ten Considerations for Expediting Utility Relocations

1. Early Utility Involvement
2. Communicate & Coordinate Actively (multiple areas)
3. Put a Utility Expert on the Team
4. Use SUE (requires thorough understanding)
5. Training (utilities in highway design & vice versa)
6. Electronic Utility Tracking *See KURTS
7. Use Utility Corridors/Duct Banks (when appropriate)
8. Consider Utilities in ROW Acquisition
9. Avoidance (have to know where they are!)
10. Reimbursement for early relocation (use with care)
Research—Findings

NCHRP Synthesis 506

Overview

- National STA(DOT) Survey 84% Response Rate
- Non-STA Survey 29 Responses (16 Utility Owners)
- Interviews w/Kentucky, Maryland, Utah, Virginia, Washington, & Wyoming
“At what point does the utility coordination process typically begin?”

- 90% Project Design Complete: 2%
- 60% Project Design Complete: 15%
- 30% Project Design Complete: 34%
- During Planning: 27%
- 10% Project Design Complete: 22%

FIGURE 2 STA survey responses for timing of utility involvement.
## Research—Findings

### NCHRP Synthesis 506

A similar message since 1980’s…

### TABLE 1: STA Effective Utility Coordination Practices

<table>
<thead>
<tr>
<th>Element</th>
<th>Percent of STA Respondents Selected (n = 42)</th>
<th>Number of Non-STA Respondents Selected (n = 29)</th>
<th>Number of Utility Owners Selected (n = 16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Utility Involvement in Design (30% or earlier)</td>
<td>88% ✫</td>
<td>26 ✫</td>
<td>15 ✫</td>
</tr>
<tr>
<td>Utility Preconstruction Meetings</td>
<td>67% ☆</td>
<td>20 ☆</td>
<td>12 ☆</td>
</tr>
<tr>
<td>Defined Procedures (i.e., Utility Coordination Guidance Manual)</td>
<td>67% ✫</td>
<td>17 ✫</td>
<td>8 ☆</td>
</tr>
<tr>
<td>Consideration of Utilities Relocation Schedules in Relation to Project Schedules</td>
<td>74% ✫</td>
<td>15 ☆</td>
<td>10 ✫</td>
</tr>
<tr>
<td>Use of SUE (Subsurface Utility Engineering)</td>
<td>57% ☆</td>
<td>13 ☆</td>
<td>2 ✫</td>
</tr>
<tr>
<td>Regularly Scheduled Meetings with Utility Owners</td>
<td>57% ☆</td>
<td>12 ☆</td>
<td>5 ✫</td>
</tr>
<tr>
<td>Communication of Short-Range Transportation Plan</td>
<td>21% ✫</td>
<td>12 ✫</td>
<td>9 ☆</td>
</tr>
<tr>
<td>Use of Utility Corridors</td>
<td>14% ✫</td>
<td>12 ✫</td>
<td>8 ✫</td>
</tr>
<tr>
<td>Use of Standardized Utility Agreements</td>
<td>60% ☆</td>
<td>8 ✫</td>
<td>6 ✫</td>
</tr>
<tr>
<td>Identification of and Plan for Long-Lead Items</td>
<td>50% ☆</td>
<td>4 ✫</td>
<td>0 ✫</td>
</tr>
<tr>
<td>Utility Mapping System (utility location information entered into a GIS-based system)</td>
<td>26% ☆</td>
<td>10 ✫</td>
<td>7 ✫</td>
</tr>
<tr>
<td>Communication of Long-Range Transportation Plan</td>
<td>24% ✫</td>
<td>10 ✫</td>
<td>7 ✫</td>
</tr>
</tbody>
</table>

☆ Top eight elements selected by respondents.
✫ Top three elements selected by respondents.
Respondents were limited to choosing their top eight.
AASHTO CRUO—Survey
- 50 Completed Responses
  - 35 State DOTs (all regions represented)
  - 9 Design or Utility Consultants
  - 1 University
  - 5 Other
<table>
<thead>
<tr>
<th>Topics</th>
<th>State Department of Transportation</th>
<th>Design or Utility Consultant</th>
<th>University</th>
<th>Other</th>
<th>Aggregated</th>
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</thead>
<tbody>
<tr>
<td>Strategies to Eliminate Delays and Higher Costs to Transportation Projects Caused by Conflicts with Utilities</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Strategies to Improve the Participation of Utility Owners During Project Delivery</td>
<td>2</td>
<td>6</td>
<td>7</td>
<td>1</td>
<td>4</td>
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<tr>
<td>Technologies to Improve the Detection and Documentation of Existing Utility Infrastructure</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>2</td>
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<tr>
<td>Quantification and Management of Utility-Related Risks During Project Delivery</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Early Data Management Strategies to Enhance Damage Prevention Practices</td>
<td>5</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Small Cell Tower and Other Communication Technologies</td>
<td>5</td>
<td>9</td>
<td>12</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Curriculum Development and Training for Transportation and Utility Stakeholders</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Technologies and Processes to Improve Utility Data Management Practices Through the Entire Life Cycle of Transportation and Utility Features</td>
<td>8</td>
<td>1</td>
<td>3</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Strategies to Ensure an Effective Dissemination of Research Results to Users</td>
<td>9</td>
<td>9</td>
<td>3</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Strategies to Generate Revenue and Optimize the Societal Value of The Right of Way</td>
<td>10</td>
<td>12</td>
<td>7</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Strategies to Manage Out-of-Service Utility Infrastructure</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Assessment, Risk Management, and Rehabilitation of Aging Utility Facilities within the Right of Way</td>
<td>12</td>
<td>8</td>
<td>3</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>
Reasons

- KYTC Utility Issues
  - 9th Most Frequent Used Change Order Reason Code (Out of a study of 30 codes)
  - Average Percent Change +3.16%
  - Average Amount $35,400 per change order

- Some studies report $1 of utility coordination can save $4 to $10+ in construction
3rd Leading Cause of Project Delays

Source: 2018 AASHTO CRUO Annual Meeting FHWA Presentation, Julie Johnston
Reasons

Cost Influence Curve

- Major Influence
- Rapidly Decreasing Influence
- Low Influence

Influence
Commitment ($)

Scope
Definition

Planning
Design
Construction
Early Utility Coordination

- HOW?
- Project Development
  - Phase 1 Design ~ Preliminary
    - Utility Engineering
  - Phase 2 Design ~ Final
    - Utility Coordination/Relocation
KYTC PROJECT DEVELOPMENT PROCESS

PLANNING
The scope of the potential project is defined.

PRELIMINARY ENGINEERING (PE) & ENVIRONMENTAL EVALUATION
All environmental studies are performed and a minimal amount of engineering is completed. The end result is an environmental document and preferred roadway alternative.

DESIGN
Once an environmental document is approved, the project moves into final design, which takes the final approved alternative from the previous phase and designs the project. The end result is a set of construction plans and cost estimates. Right of way needs are authorized during the design phase and utility relocation impacts also are addressed.

RIGHT OF WAY & UTILITY COORDINATION
During this phase, right of way needs are negotiated and utility relocation impacts also are addressed.

CONSTRUCTION
The project is put out for bid, a contractor is selected and the project is built.
Early Utility Coordination

- What does it look like for KYTC?
- Phase 1 Design
  - Key Steps
  - Plan for Phase 2
Early Utility Coordination

- Phase 1 Design—Purpose & Need
  - Maybe not this early…
Early Utility Coordination

- Phase 1 Design—Preliminary Survey
  - Identify above ground features
  - Complex features, joint-use poles, transmission, etc.
  - Begin utility records/contact research
Early Utility Coordination

- Phase 1 Design—Preliminary Survey
  - Initial contact to utilities?
  - One-Call Design Ticket?
  - Use of SUE QLD or QLC
  - Develop initial utilities inventory
**Early Utility Coordination**

**SUE QL D**

- Review of existing utility records, permits, and plans for an approximate horizontal location.

**SUE QL C**

- Survey visible above ground facilities to facilitate better approximation of horizontal locations.
Early Utility Coordination

- Phase 1 Design—Range/Selection of Alternatives
  - Refine previous information
  - One-Call Design Ticket
  - SUE QLB or QLA?
  - Preliminary Joint Utilities Meeting?
  - Identify & evaluate utility conflicts
Early Utility Coordination

SUE QL B

- Use geophysical prospecting tools to determine the existence and horizontal position of underground utilities.
  - THIS IS NOT ONE-CALL
  - Multiple means (GPR, inductive, conductive, and other methods) to determine HORIZONTAL locations

SUE QLA

- Use non-destructive digging equipment at critical points to determine precise horizontal AND vertical position (also type, size, and other characteristics).
Early Utility Coordination

Strategic Use of SUE

UNDEFINED QUALITY LEVEL

TOTAL RISK

Without SUE

WITH SUE

DEFINED QUALITY LEVEL

DESIGN ENGINEER

SUE ENGINEER

RISK ELIMINATED

2019 partnering conference
acec-ky-hwakyn
Early Utility Coordination

Utility Conflict Analysis

- Identify utility conflicts
- Estimate cost & time to potential resolutions
- Proposed relocations
- ROW & environmental impacts
- Phase 2 or construction implications
Early Utility Coordination

- Phase 1 Design—Preliminary Line & Grade
  - Refine previous information
  - SUE QLB or QLA
  - Preliminary Joint Utilities Meeting
- Avoid—Minimize—Accommodate
- Utility Conflict Matrix
### Early Utility Coordination

**Utility Conflict Matrix**

- Identified conflicts
- Responsible parties
- Current status
- Estimated clearance dates

#### Utility Conflict Matrix

<table>
<thead>
<tr>
<th>Utility Owner and/or Contact Name</th>
<th>Conflict ID</th>
<th>Drawing or Sheet No.</th>
<th>Utility Type</th>
<th>Size and/or Material</th>
<th>Utility Conflict Description</th>
<th>Start Station</th>
<th>End Station</th>
<th>Start Offset</th>
<th>End Offset</th>
<th>Utility Investigation Level Needed</th>
<th>Test Hole</th>
<th>Recommended Action or Resolution</th>
<th>Estimated Resolution Date</th>
<th>Resolution Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWS</td>
<td>C16</td>
<td>1</td>
<td>Water</td>
<td>3&quot; ductile iron pipe</td>
<td>Proposed 18&quot; drainage pipe would cross water main.</td>
<td>30+50</td>
<td></td>
<td></td>
<td></td>
<td>QLA</td>
<td>17</td>
<td>Review possibility of adjusting drainage pipe to avoid conflict.</td>
<td>Utility conflict created</td>
<td></td>
</tr>
<tr>
<td>CPS</td>
<td>C12</td>
<td>1</td>
<td>Electric</td>
<td>45' pole</td>
<td>Existing pole in proposed roadway.</td>
<td>38+55</td>
<td></td>
<td></td>
<td></td>
<td>QLC</td>
<td>Pole to relocated.</td>
<td>Utility conflict created</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWS</td>
<td>C43</td>
<td>1</td>
<td>Water</td>
<td>12&quot; water pipe</td>
<td>Proposed sidewalk in conflict with 12&quot; water main.</td>
<td>37+00</td>
<td></td>
<td></td>
<td></td>
<td>QLA</td>
<td>21</td>
<td>Highway/sidewalk re-design to avoid utility impact.</td>
<td>Utility conflict created</td>
<td></td>
</tr>
<tr>
<td>CPS</td>
<td>C54</td>
<td>1</td>
<td>Electric</td>
<td>45' pole</td>
<td>Existing pole in proposed curb line.</td>
<td>38+30</td>
<td></td>
<td></td>
<td></td>
<td>QLC</td>
<td>Pole to relocated.</td>
<td>Utility conflict created</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPS</td>
<td>C55</td>
<td>1</td>
<td>Electric</td>
<td>45' pole</td>
<td>Existing pole in area of grade cut.</td>
<td>38+50</td>
<td></td>
<td></td>
<td></td>
<td>QLC</td>
<td>Pole may need to be supported or replaced with taller pole.</td>
<td>Utility conflict created</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPS</td>
<td>C61</td>
<td>1</td>
<td>Electric</td>
<td>45' pole</td>
<td>Existing pole in proposed curb line.</td>
<td>40+00</td>
<td></td>
<td></td>
<td></td>
<td>QLC</td>
<td>Pole to relocated.</td>
<td>Utility conflict created</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATT</td>
<td>C28</td>
<td>1</td>
<td>Communications</td>
<td>45' pole</td>
<td>Existing pole in conflict with proposed drainage.</td>
<td>40+15</td>
<td></td>
<td></td>
<td></td>
<td>QLC</td>
<td>Pole to relocated.</td>
<td>Utility conflict created</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Refer to subsheet for utility conflict cost analysis.
Early Utility Coordination

- Phase 1 Design—Preliminary Line & Grade
  - D phase funds for preliminary utility engineering
  - Consider utility ROW needs
  - Consultant/KYTC utility design
  - Preferred relocation alignments
Early Utility Coordination

- Noted Reasons of Why Not
  - Funding not available
  - Resources not available
  - Requires multiple agreements
  - Utility companies won’t engage

“If you don’t have time to do it right, when will you have time to do it over?”
- John Wooden
Early Utility Coordination

**Things to Consider**

- Phase 2 needs…clearing, relocation by contractor, etc.
- Identify long-lead materials
- Prioritized utility relocations & ROW parcels
- Replacement easements & reimbursement (used carefully)
Early Utility Coordination

**Things to Consider**

- Master agreements
- Put the time into the relationships
- Transparent information exchange
- Continue to invite & let them decide
- See their point of view
Coming soon…

- SPR 20-581: Integration of Utility Coordination & Highway Design
- Alignment of Utility Engineering & Coordination Phases with Project Development Phases
- Roles & Responsibilities
Maximize Success with Early Utility Coordination

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