

Utility Conflict Management (UCM)

Iowa Department of Transportation

Ames, Iowa (03/02/2023)

Instructors



Cesar Quiroga, PhD., P.E., F. ASCE
Senior Research Engineer
Manager, Utility Engineering Program
c-quiroga@tti.tamu.edu



Jenny Naranjo, M. ASCE
Assistant Research Scientist
Utility Engineering Program
j-naranjo@tti.tamu.edu



Harshit Shukla, PhD., M. ASCE
Assistant Research Scientist
Utility Engineering Program
h-shukla@tti.tamu.edu

Class Materials

- Download .zip file:
 - Hyperlink in email sent before the class
 - File: Utility Conflict Management <Date>.zip
- Extract class materials:
 - Slides (PDF)
 - Utility conflict analysis template (Excel)
 - US 65 Project files:
 - Current plans, ROW sheets, cross sections, city utilities

Overview

Welcome and Introductions

Introductions

Learning
Outcomes and
Agenda

Ground Rules

Miscellaneous

Introductions – Participants

First poll:

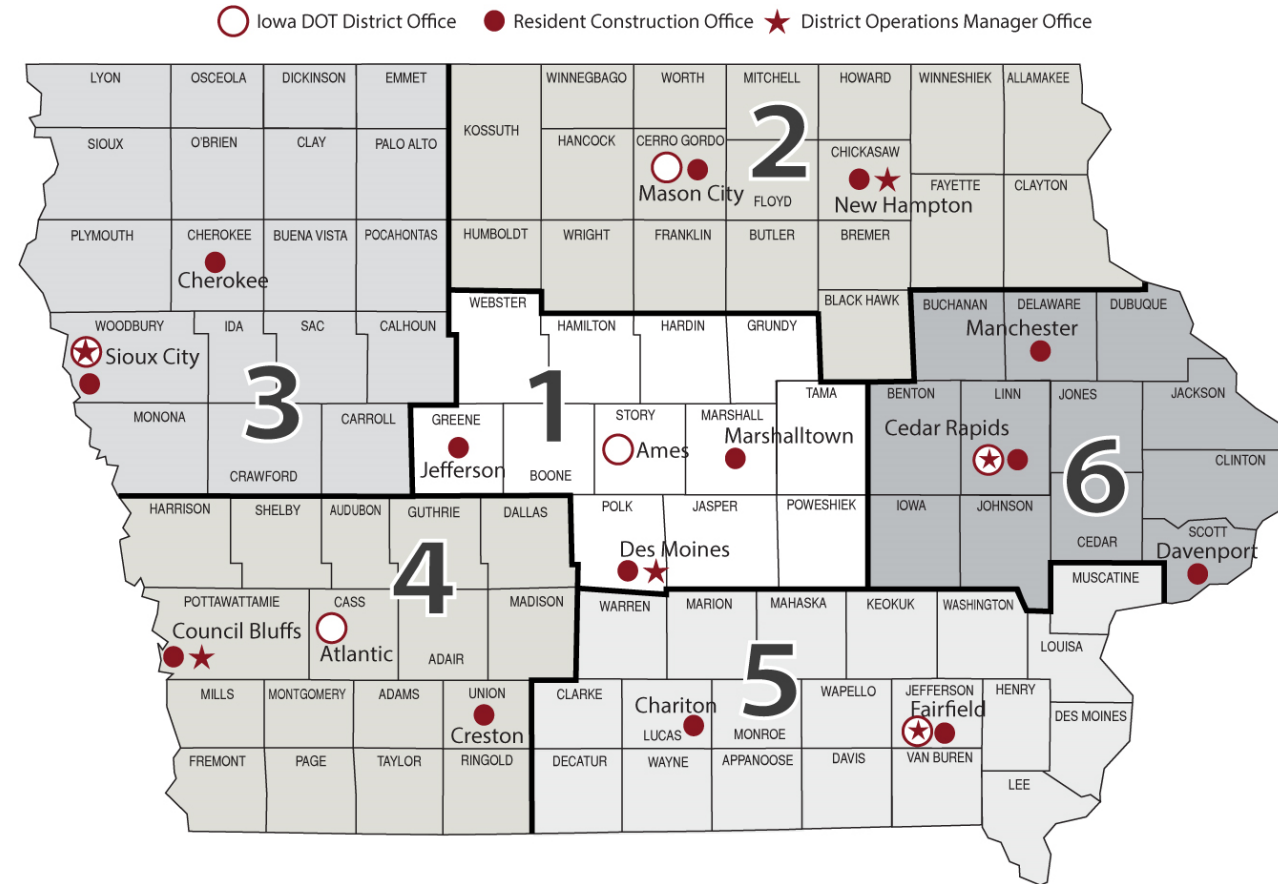
<https://pollev.com/edgarkraus565>

What's your name?

Where do you work?

Experience with the utility process?

Three pain points related to utilities?



Learning Outcomes

- 1 Explain the reasons to conduct effective UCM
- 2 Explain how UCM is integrated into project delivery
- 3 Describe the key elements of UCM
- 4 Identify and resolve utility conflicts for a sample project

Agenda

| Module | Description | Time |
|--------|---|-----------------|
| | Welcome and Introductions | 8:00AM–9:00AM |
| 1 | Reasons to Conduct Effective UCM | 9:00AM–10:00AM |
| 2 | Integration of UCM into Project Delivery | 10:00AM–11:00AM |
| 3 | Key Elements of UCM | 11:00M–12:00PM |
| | Lunch Break | 12:00PM–1:00PM |
| 4 | Hands-On Utility Conflict Management Exercise | 1:00PM–3:45PM |
| | Wrap-Up | 3:45PM–4:00PM |

Ground Rules

- Turn off email
- Put cell phones on silent
- Safety minute



**Participation is
KEY to Success!!!**

Module 1 Overview

Module 1: Reasons to Conduct Utility Conflict Management

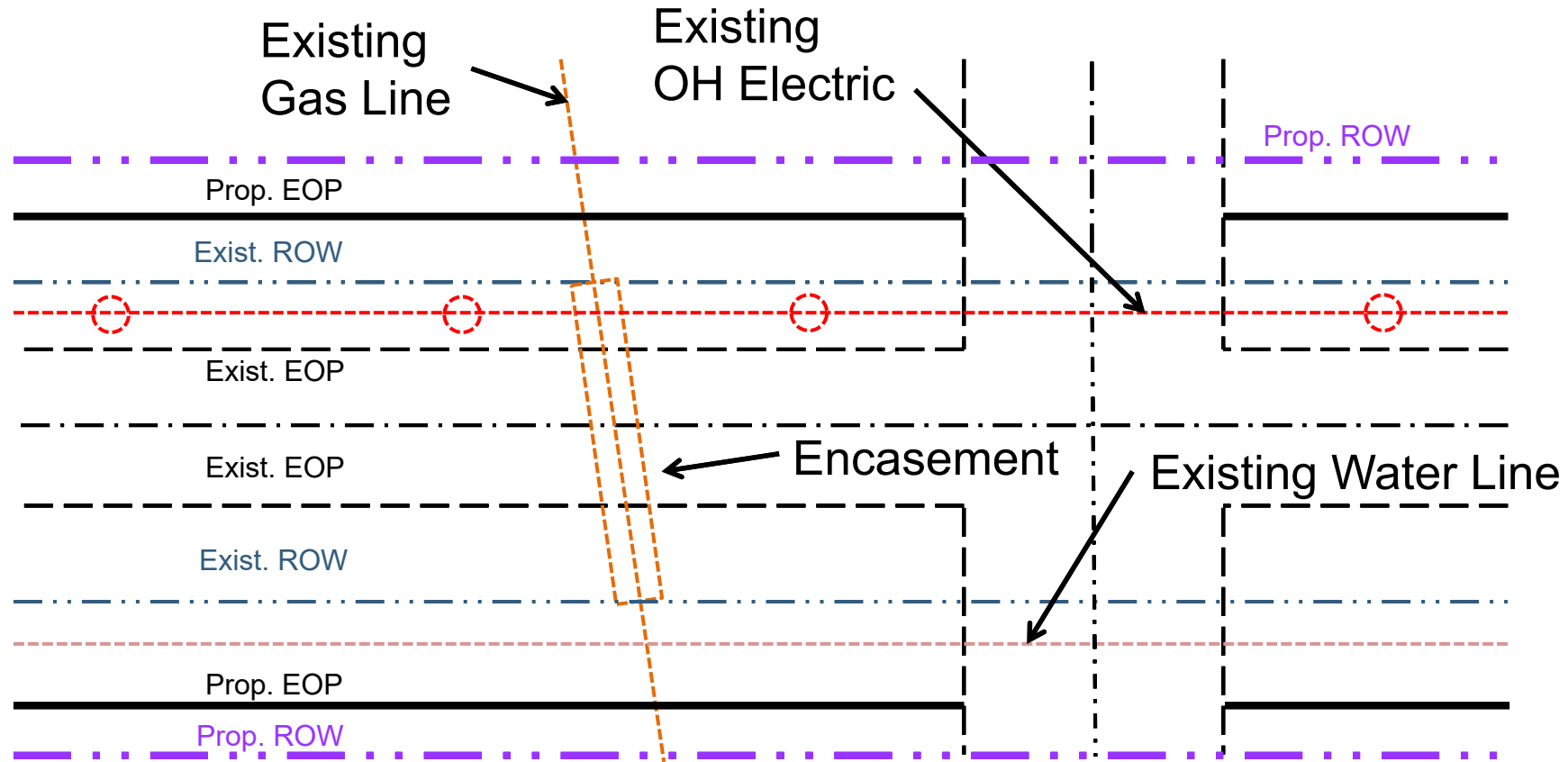
Learning Outcome: Explain the reasons to conduct effective UCM

Types of
Utility
Conflicts

Risks of Not
Using Effective
UCM

Benefits of
Applying UCM

Examples of Utility Conflicts



Types of Utility Conflicts

| Category | Examples |
|-----------------|--|
| Project Feature | Utility facility vs. transportation design feature (existing or proposed) Planned utility facility vs. existing utility facility |
| Project Phasing | Utility facility vs. transportation construction activity or phasing |
| Compliance | Noncompliance with: <ul style="list-style-type: none">• Utility accommodation statutes, regulations, and policies• Special provisions (typically project-level or for utility permits)• Safety or accessibility regulations• Industry standards or specifications |

Utility Accommodation Rules

- Iowa Admin. Code r. 761-115 (*Policy for Accommodating and Adjustment of Utilities on the Primary Road System*)
 - Vertical clearance/depth requirements
 - Encasement
 - Attachments to bridges
 - Longitudinal installations on freeways
 - Longitudinal installations on non-freeways
 - Abandoned/out-of-service utility facilities

Module 1 Overview

Module 1: Reasons to Conduct Utility Conflict Management

Types of
Utility
Conflicts

Risks of Not
Using Effective
UCM

Benefits of
Applying UCM

Ranking of Top Causes of Project Delays

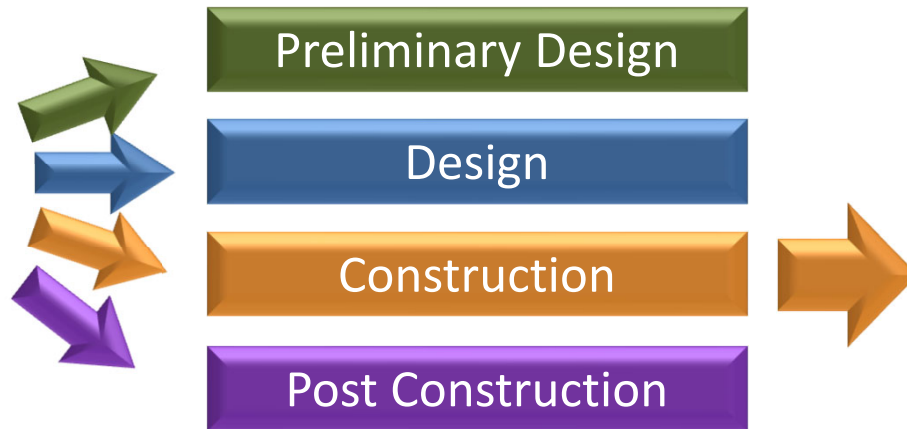
| Cause of Delay | DOTs | Designers | Contractors |
|---|------|-----------|-------------|
| Delays in utility relocations | 1 | 1 | 1 |
| Differing site conditions (DSCs) related to utility conflicts | 2 | 2 | 3 |
| Errors in plans and specifications | 3 | 13 | 2 |
| Weather | 4 | 6 | 4 |
| Permitting issues | 5 | 4 | 7 |
| Delays in right-of-way acquisition | 6 | 9 | 11 |
| Delays in environmental process | 7 | 3 | 8 |
| Insufficient work effort by contractor | 8 | 5 | 18 |
| Owner-requested changes | 11 | 10 | 5 |
| Differing site conditions (other causes) | 9 | 7 | 6 |

Project Delay Reasons (Utility Owner Perspective)

- Lack of project definition and detail by project owner
 - Horizontal and vertical alignment
 - Drainage design
 - Right of way acquisition
- Changes in project owner's design and schedules
- Unrealistic schedule by project owner for utility relocations
- Other
 - Limited resources (financial and personnel)
 - Internal demands (maintenance, service upgrades)
 - Utility owner's project delivery process protocols

Risks of Not Using Effective UCM

Results in impacts
during



Impacts during
Construction

- Construction site disruptions
- Damage to utility installations
- Unplanned environmental corrective actions
- Unnecessary utility relocations
- Project delays and higher project costs

Construction Site Disruptions

- Unavailable or incorrect information about existing utilities
- Out-of-service lines not shown on the plans
- Wrong or not visible One Call markings



Damage to Utility Installations

- Utility service interruptions
- Release of dangerous, explosive liquids and gases
- Risks to health and safety



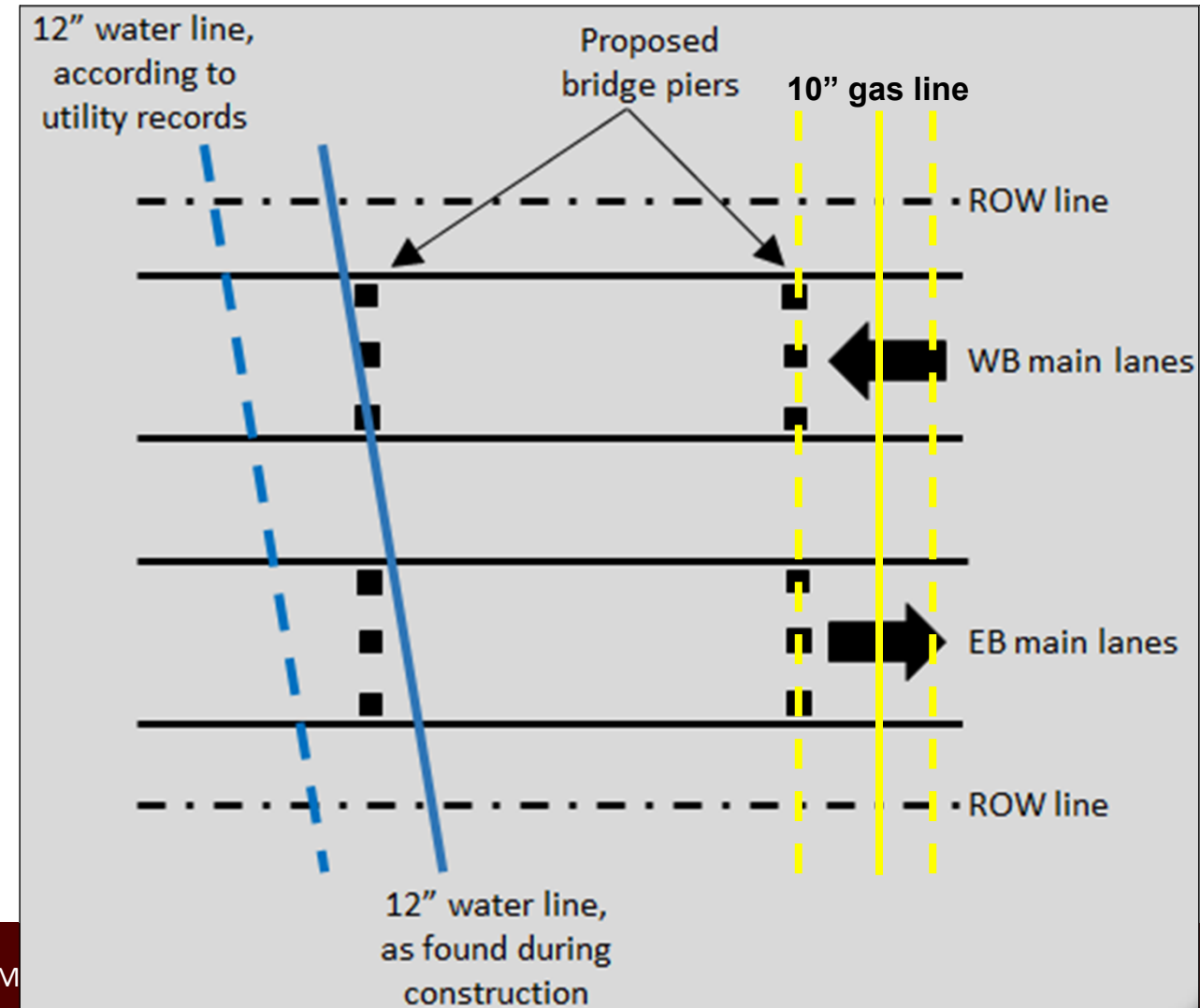
Unplanned Environmental Corrective Actions

- Asbestos-cement pipes
 - Production stopped in 1970s
 - Special care for asbestos
- Underground storage tanks and piping
 - Can be explosive
 - Can leak into the ground



Unnecessary Utility Relocations and Other Project Inefficiencies

- Inadequate utility information results in:
 - Unnecessary utility relocations
 - Incorrect design of project features



Project Delays and Higher Project Costs

- Delays:
 - During design when utilities are found late in the process
 - During construction when utility installations are found unexpectedly
- Higher project costs:
 - Higher construction bids
 - Utility-related change orders and claims
 - Litigation by affected stakeholders
- Other costs and inefficiencies:
 - Negative public perception about the project
 - Difficult working relationship with utility owners

Real-World Situations

- In 2017, contractors building a new bridge in North Carolina drove a steel post through an underground electric transmission cable. Thousands of residents and tourists were affected.
- In 2023, contractors drilling a shaft foundation for a rail expansion near Frankfurt Airport hit four 16-ft deep fiber optic cables:
 - Worldwide Lufthansa air traffic control was cut off
 - Several areas in Frankfurt were affected
 - Concrete was spilled over the cables, further complicating repairs

Real-World Situations

- In Georgia:
 - Bridge project affected multiple utilities (power, water, sewer, etc.)
 - Modifying horizontal bridge alignment slightly:
 - Would have avoided any utility impact
 - Would not have impacted right-of-way
 - Would not have compromised bridge construction
 - Discovered during construction... too late!
 - Utility relocation costs = \$5,000,000

Module 1 Overview

Module 1: Reasons to Conduct Utility Conflict Management

Types of
Utility
Conflicts

Risks of Not
Using Effective
UCM

Benefits of
Applying UCM

Benefits of Applying UCM

- Earlier identification of existing utility facilities and conflicts
- Fewer unnecessary utility relocations
- Fewer disruptions and utility damages during construction
- Fewer utility-related change orders and claims
- More effective working relationship with utility owners
- Tangible economic and project delivery time savings

Break

- We'll continue in ***10 minutes***

Module 2 Overview

Module 2: Integration of UCM into Project Delivery

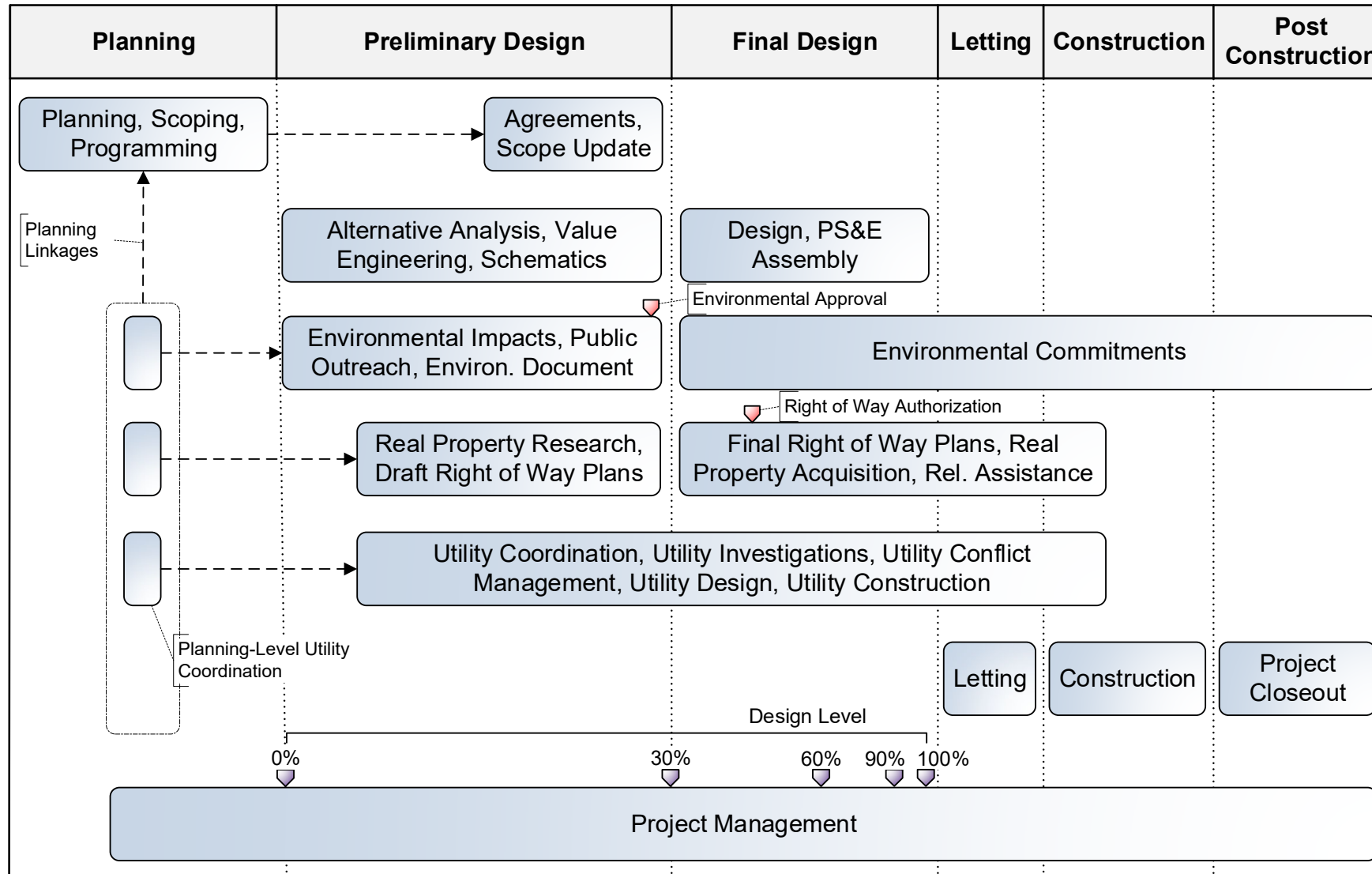
Learning Outcome: Explain how UCM is integrated into project delivery

Utility Process
within Project
Delivery

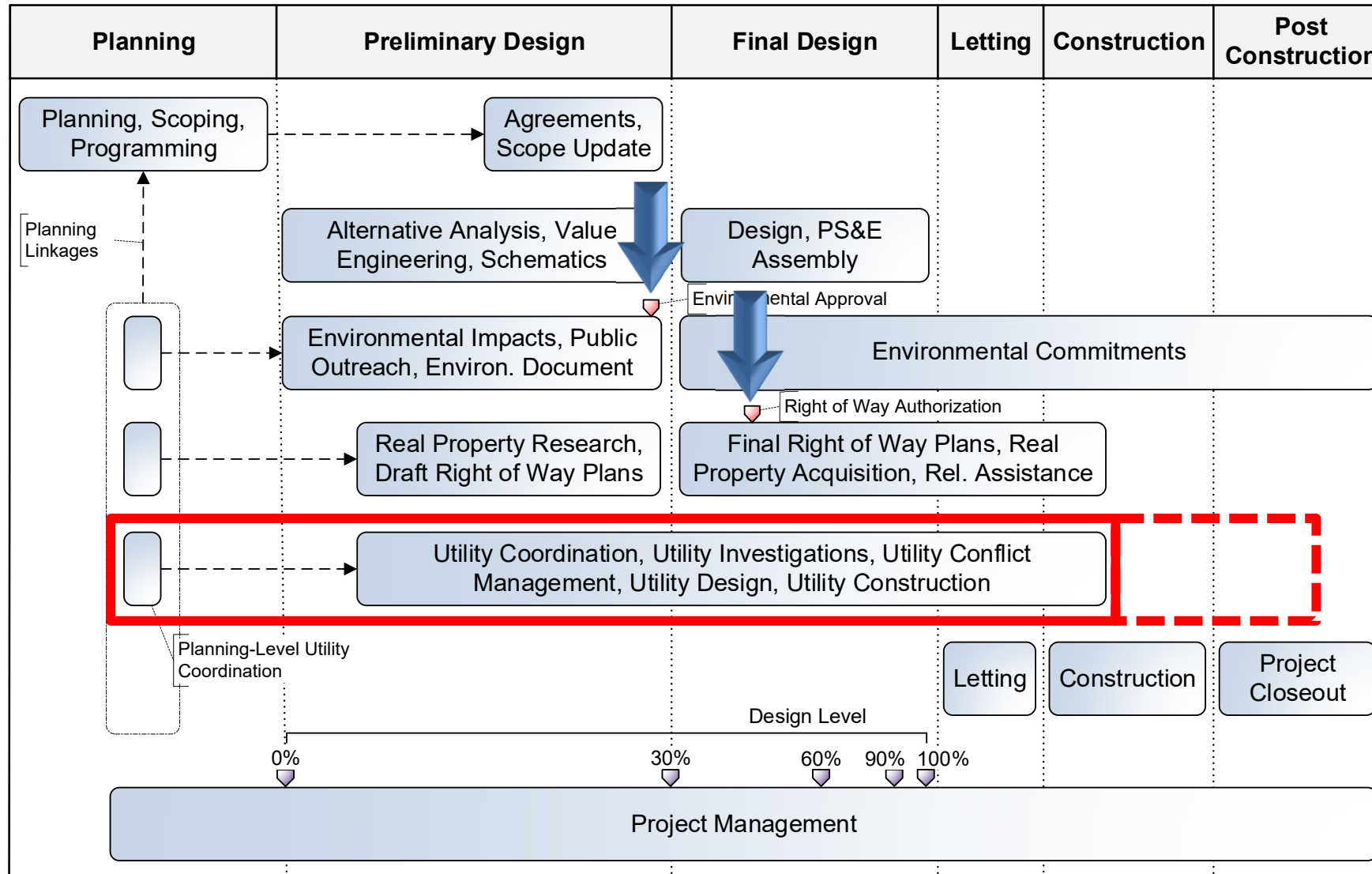
Utility
Engineering
Stages

Utility
Investigation
Deliverables

Design-Bid-Build Project Delivery Method

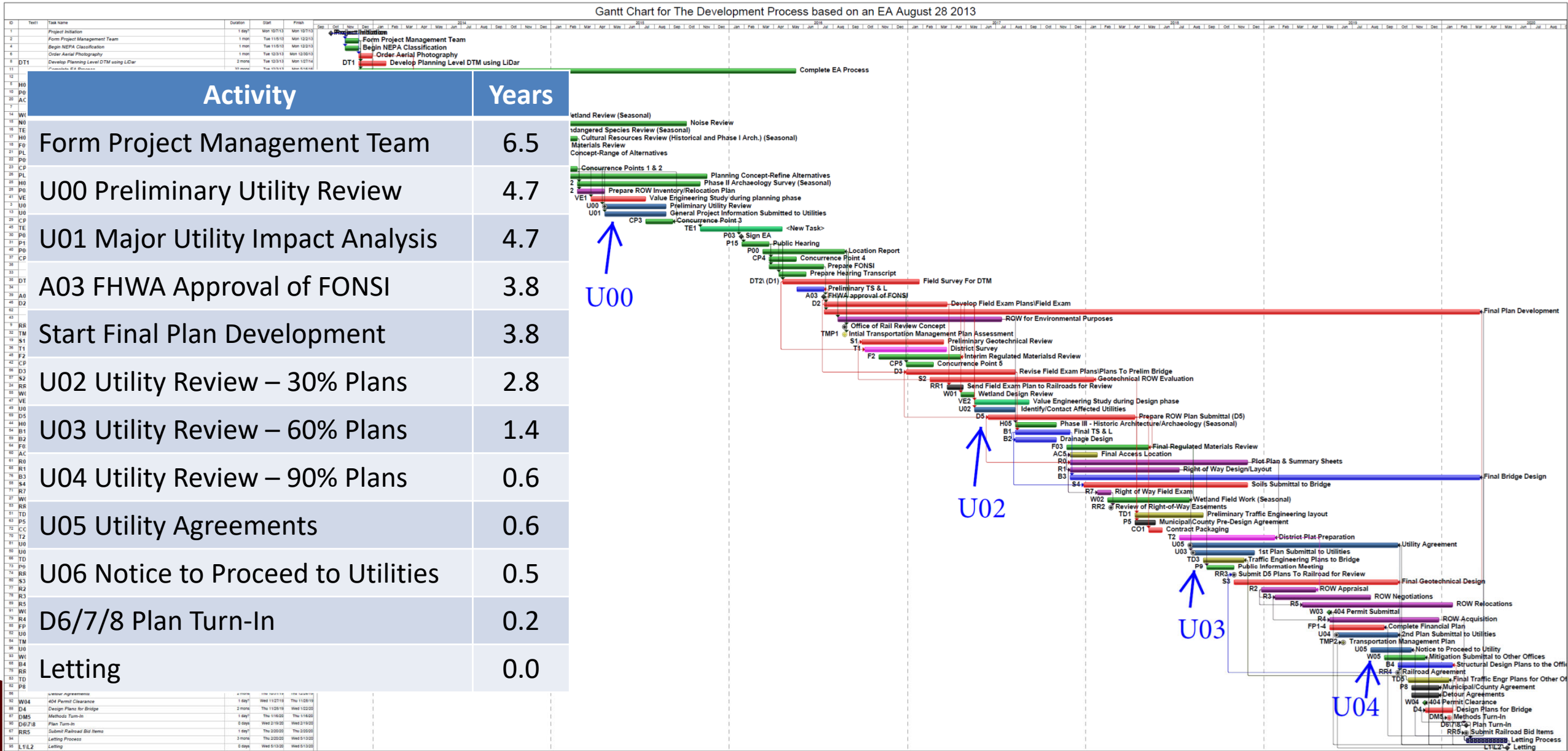


Design-Bid-Build Project Delivery Method



Project Delivery Timeline (Based on EA)

Gantt Chart for The Development Process based on an EA August 28 2013

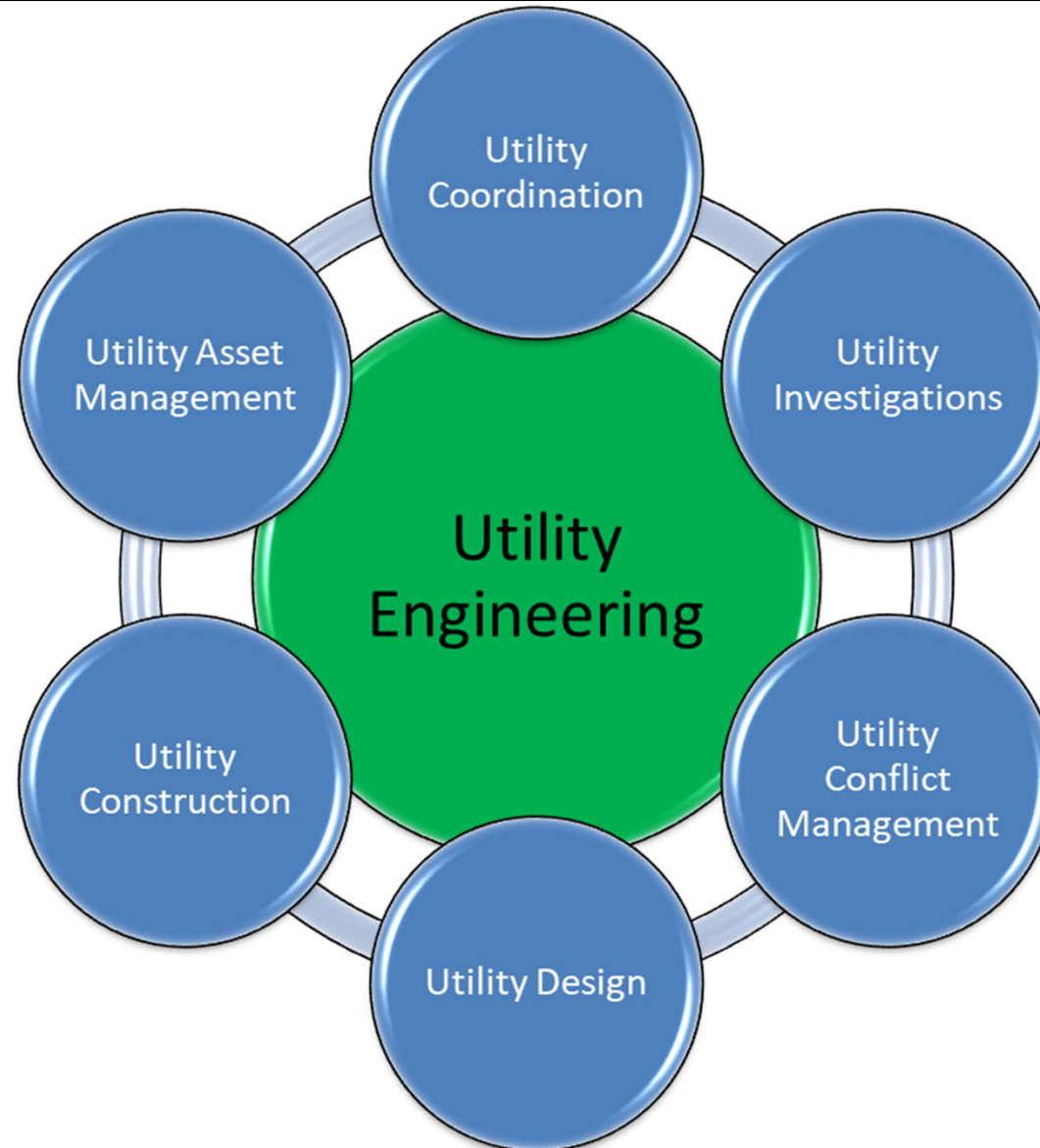


Utility Engineering Framework

- Utility Engineering is a branch of engineering that focuses on the planning, design, construction, operation, maintenance, and asset management of any and all utility systems, as well as the interaction (and interdependence) between utility infrastructure and other infrastructure.

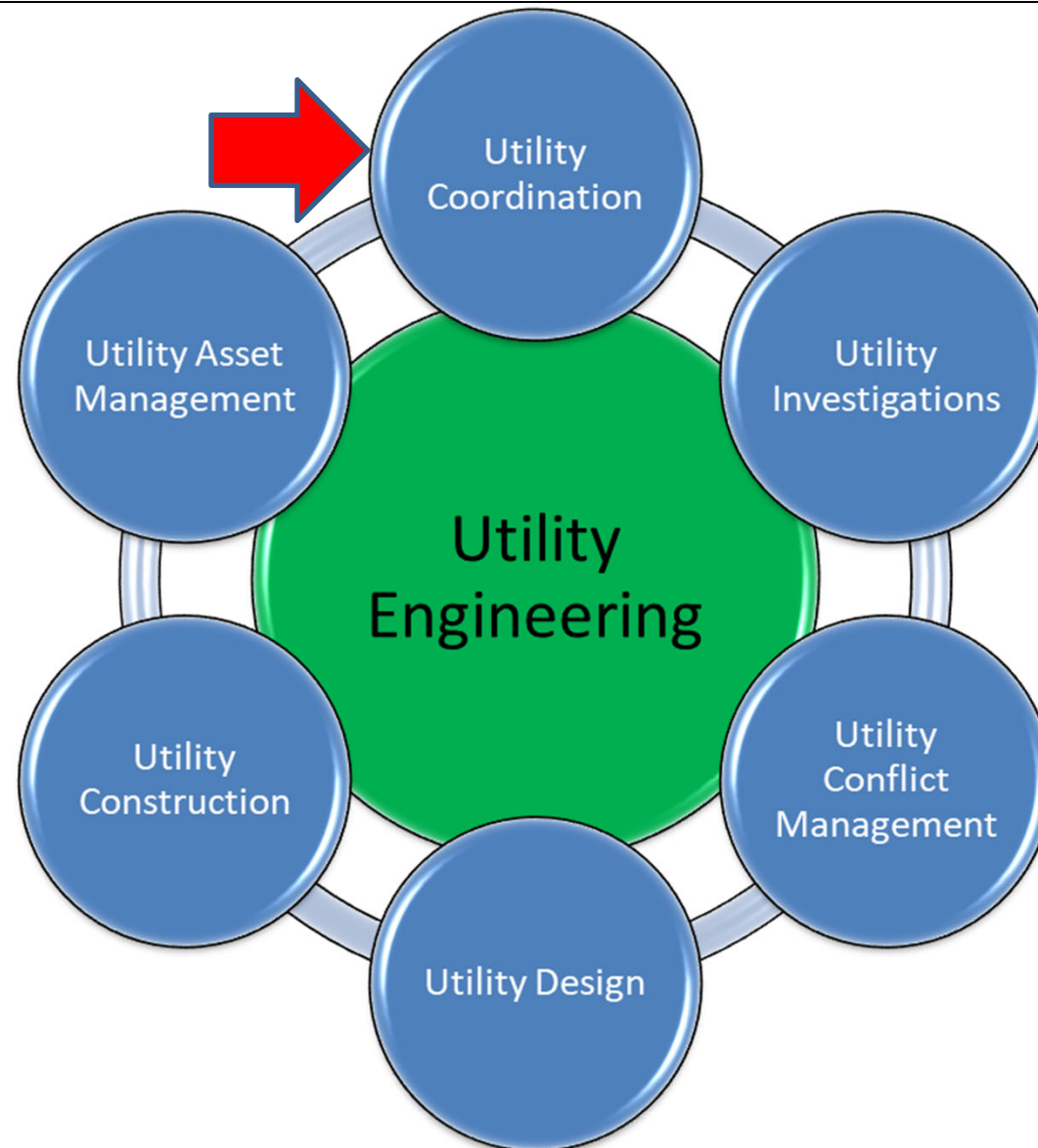
Utility Engineering Framework

- Utility Engineering focuses on the planning and asset management of the interconnected infrastructure



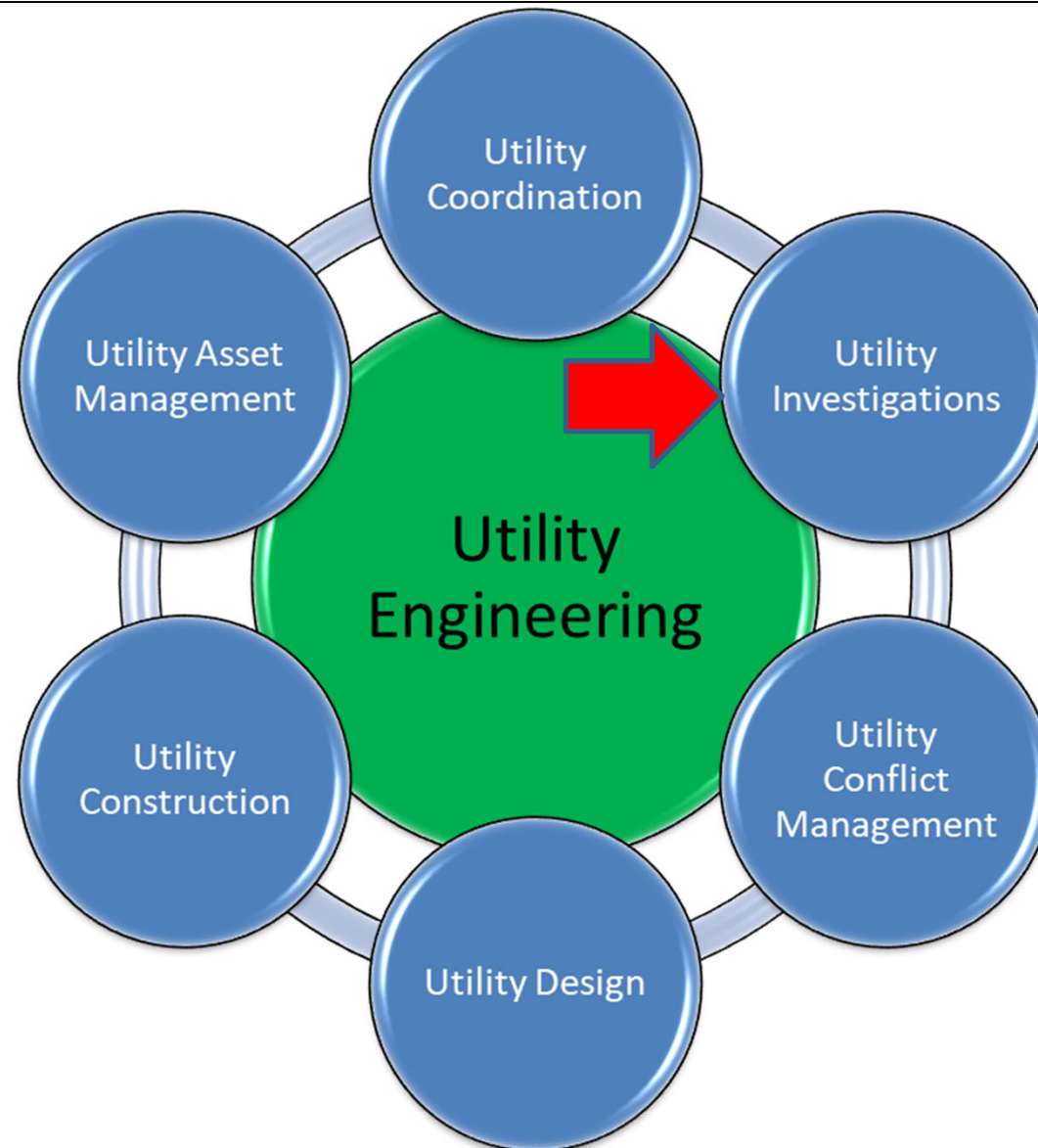
focuses on maintenance, safety, as well as reliability

Utility Engineering Framework—Utility Coordination



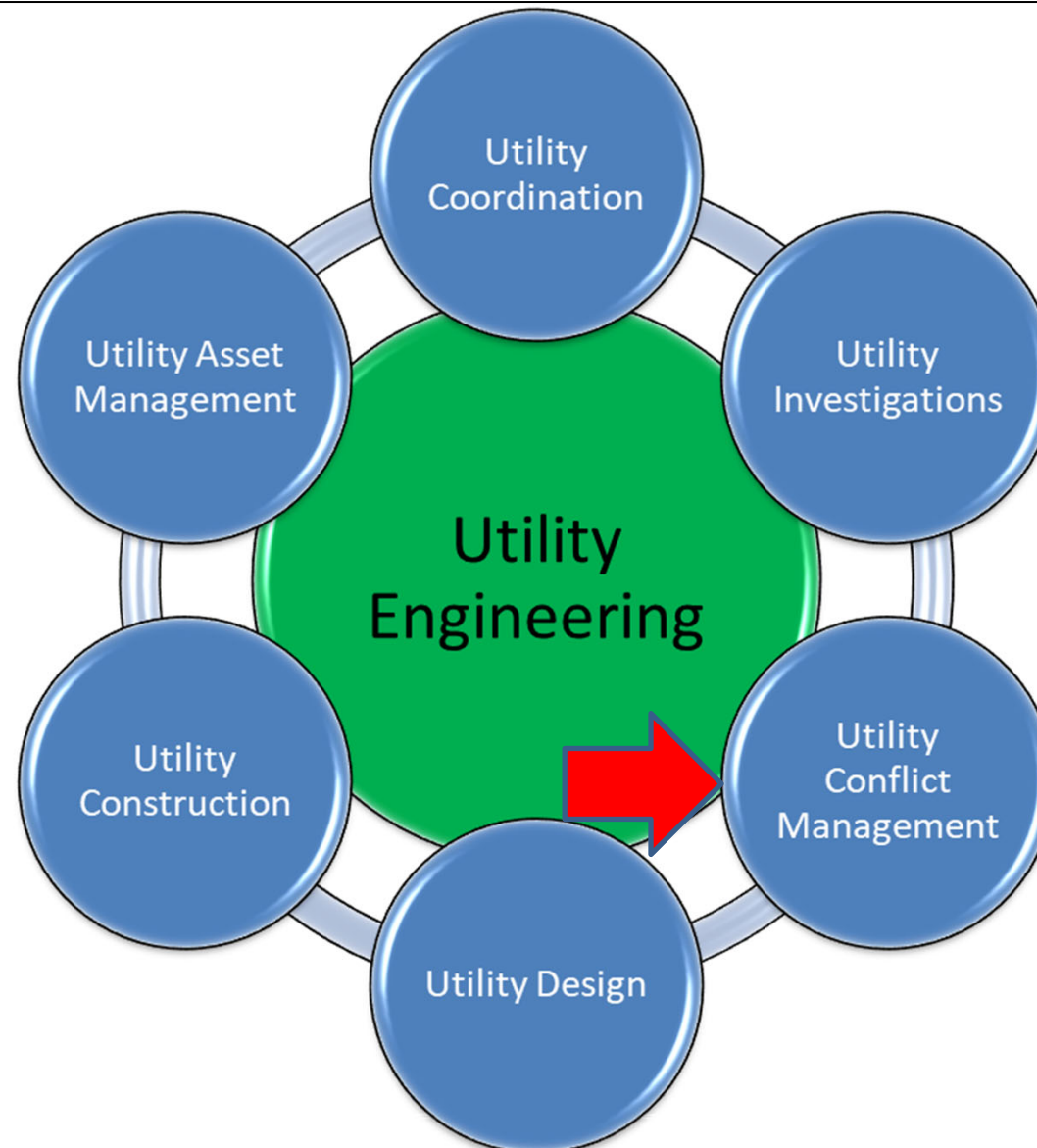
Techniques and procedures to provide effective coordination between project owners and utility stakeholders (including preparation, execution, and management of utility agreements, as well as preparation and management of utility-related documents in bid packages)

Utility Engineering Framework—Utility Investigations



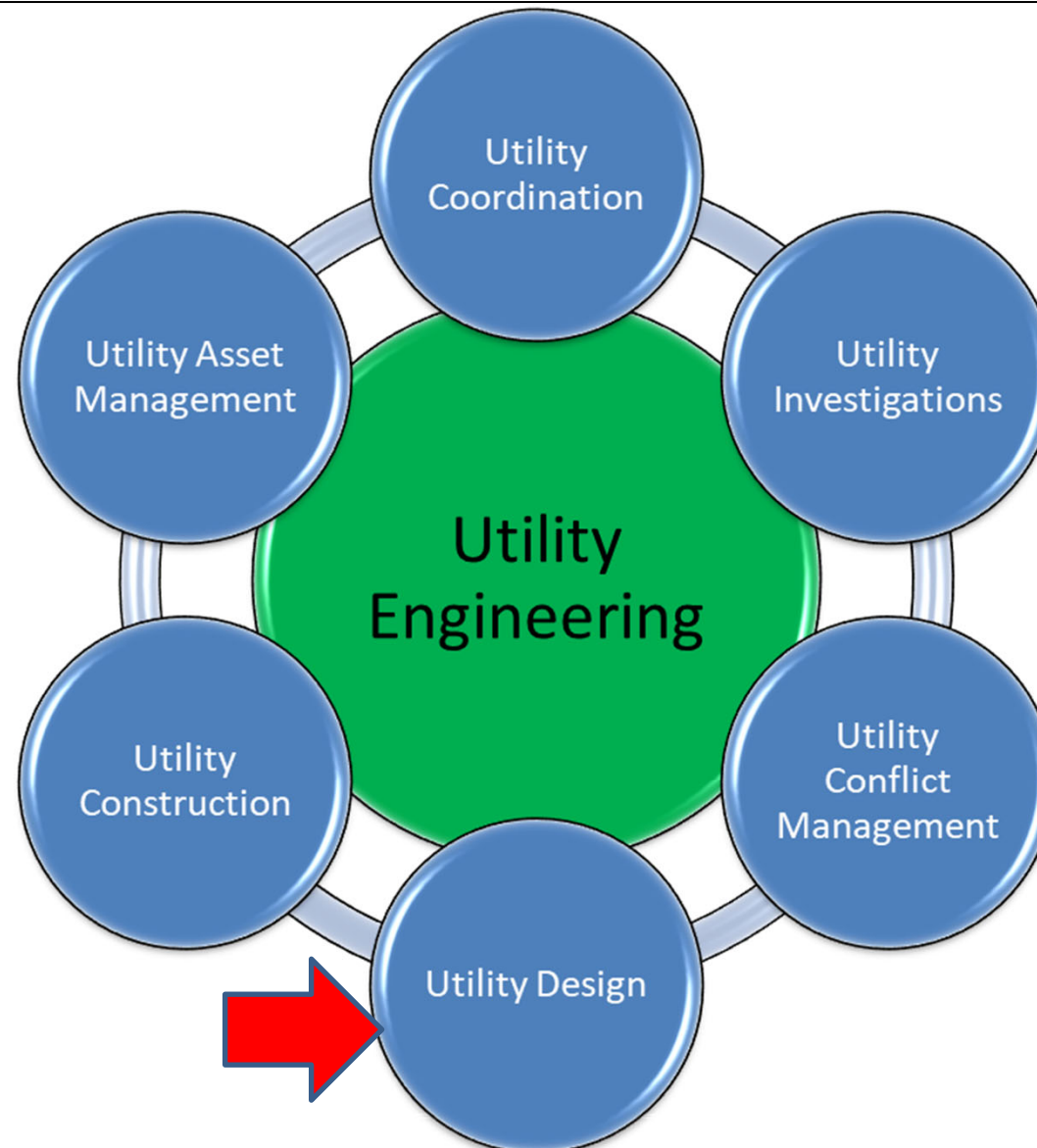
Technologies to detect, identify, and map existing utilities effectively and the integration of quality, standards-based utility information, including 3D modeling and building information modeling (BIM), in all phases of project delivery

Utility Engineering Framework—Utility Conflict Management



Techniques, protocols, and systems that use the *avoid, minimize, and accommodate* principle to identify and resolve conflicts systematically between infrastructure project features or phases and existing or proposed utility facilities

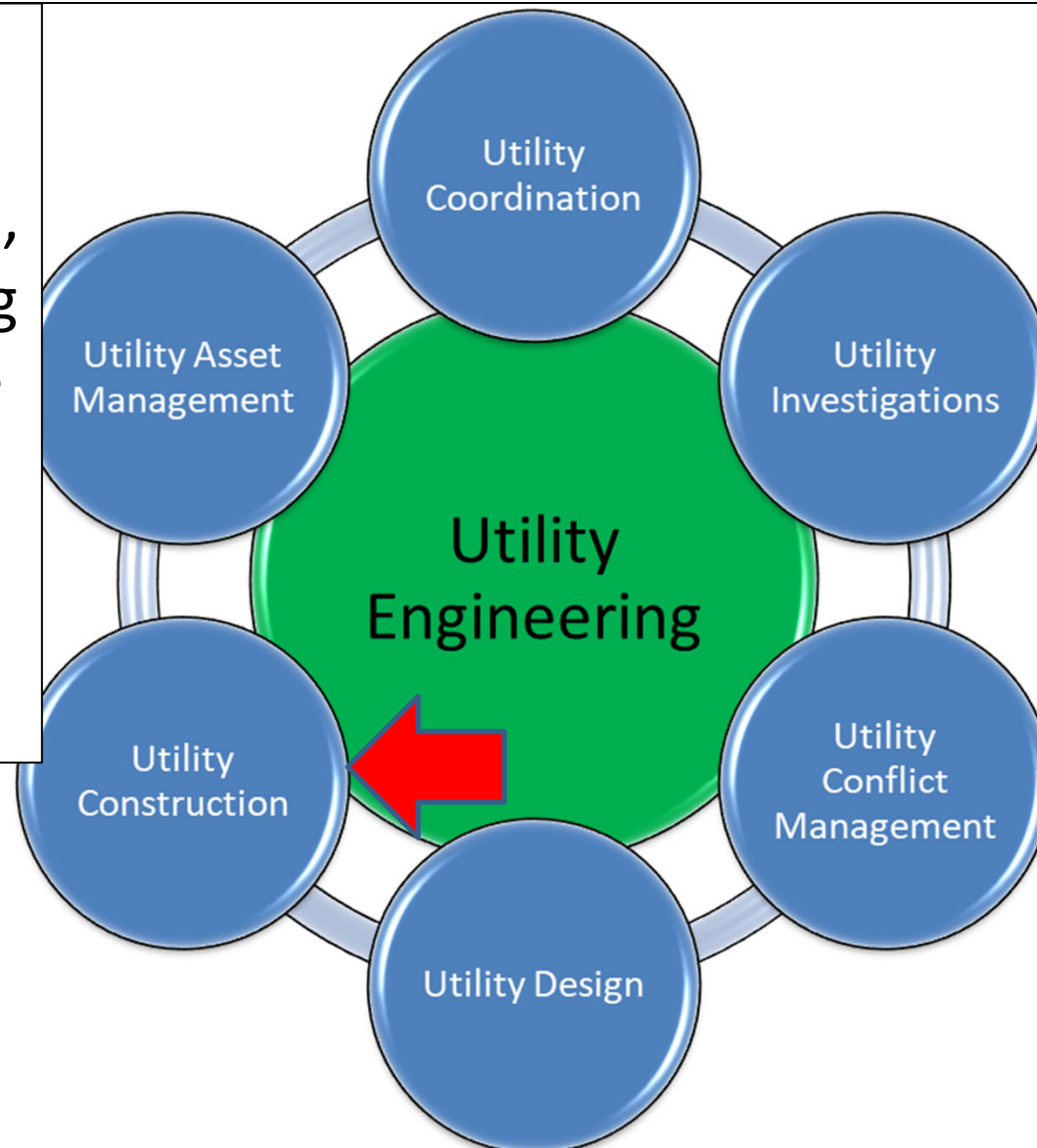
Utility Engineering Framework—Utility Design



Techniques and procedures that lead to more effective practices to design utility relocations and protect-in-place measures for existing facilities that remain in place (including preparation of plans, specifications, schedule, and cost estimate)

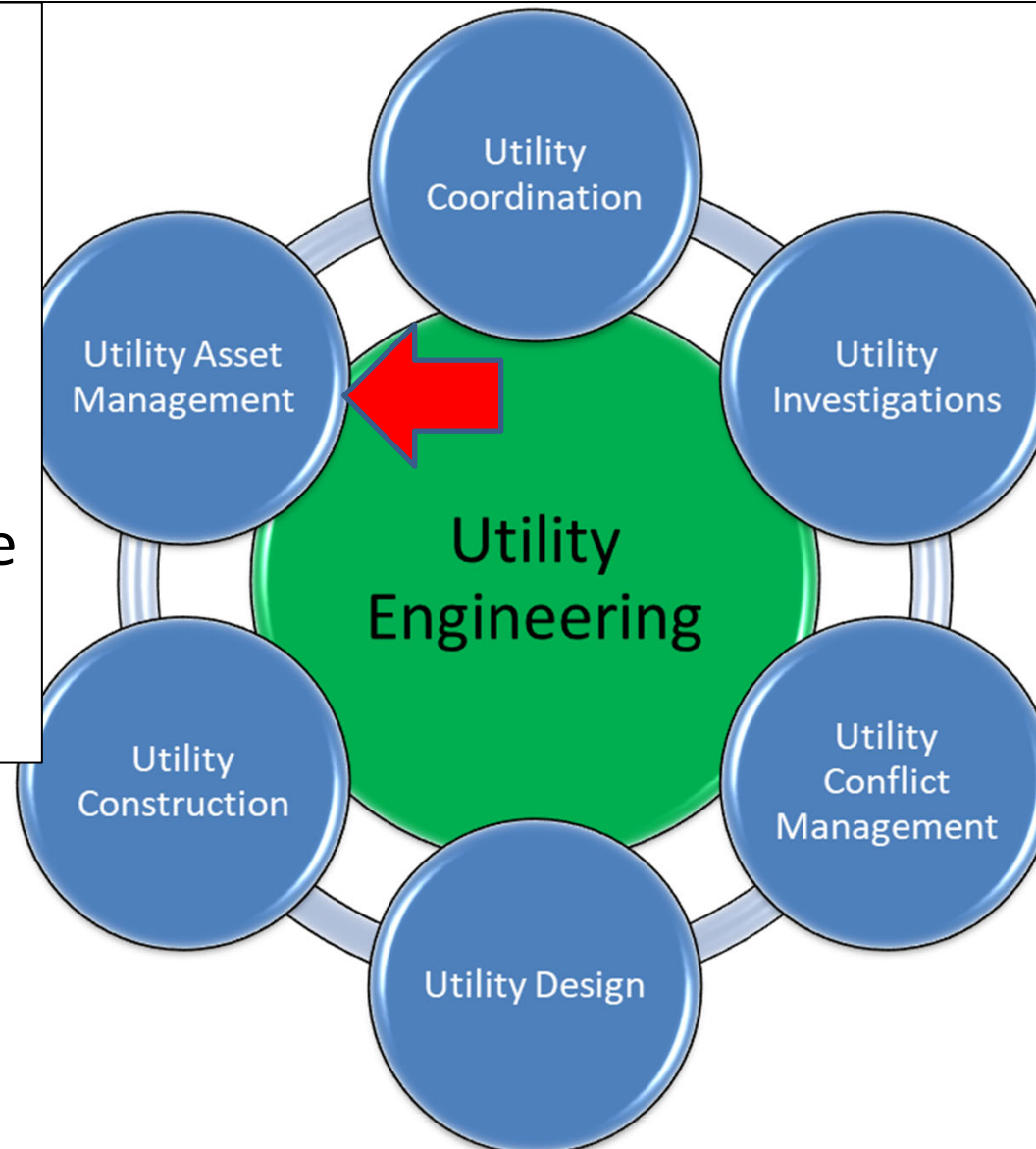
Utility Engineering Framework—Utility Construction

Techniques and procedures for constructing, monitoring, inspecting, and surveying utility installations at the job site, as well as mapping and producing quality, standards-based utility as-builts



Utility Engineering Framework—Utility Asset Management

Techniques and procedures for accommodating, permitting, managing, documenting, and assessing conditions of utility facilities within the right of way over their entire lifecycle



Module 2 Overview

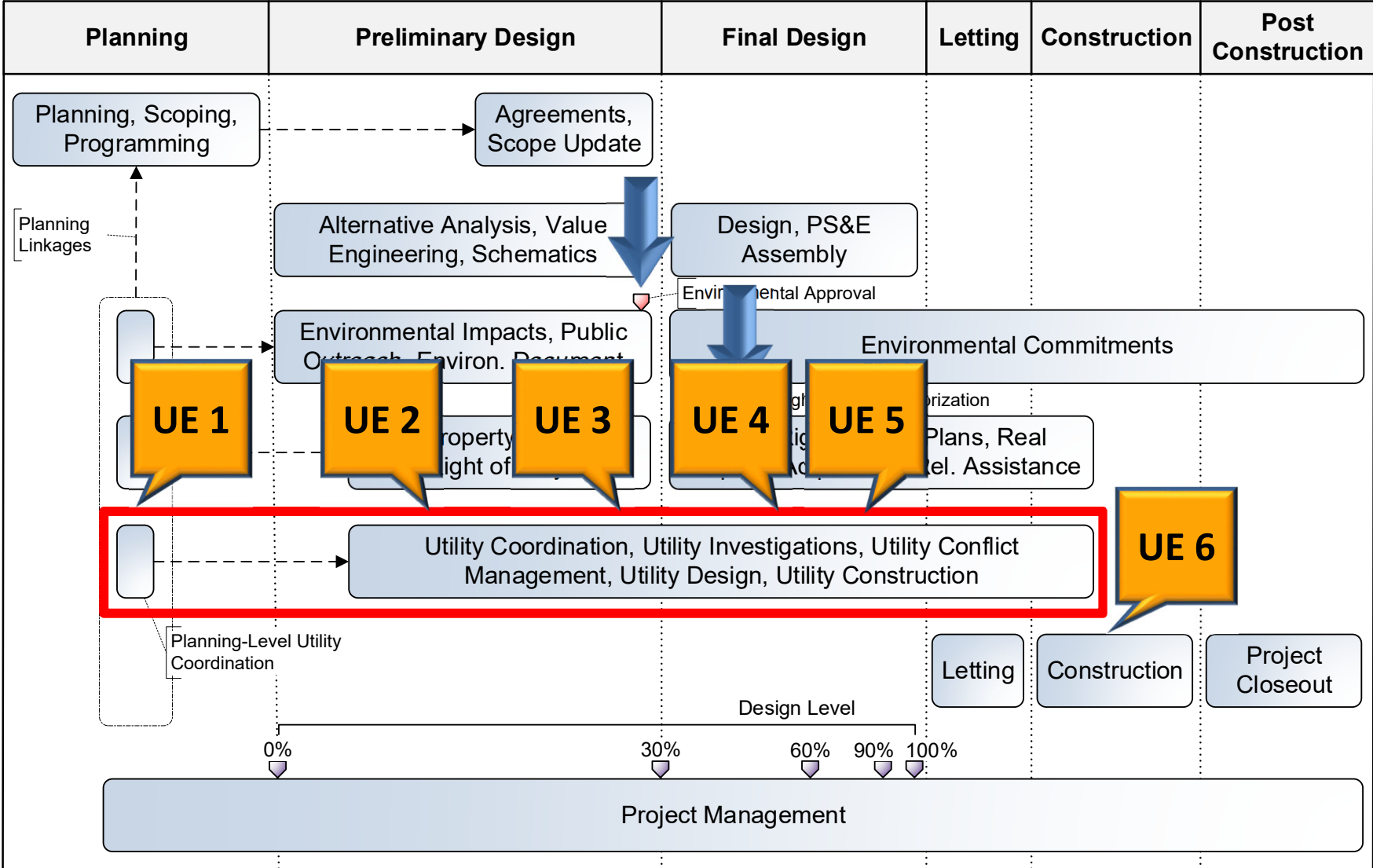
Module 2: Integration of UCM into Project Delivery

Utility Process
within Project
Delivery

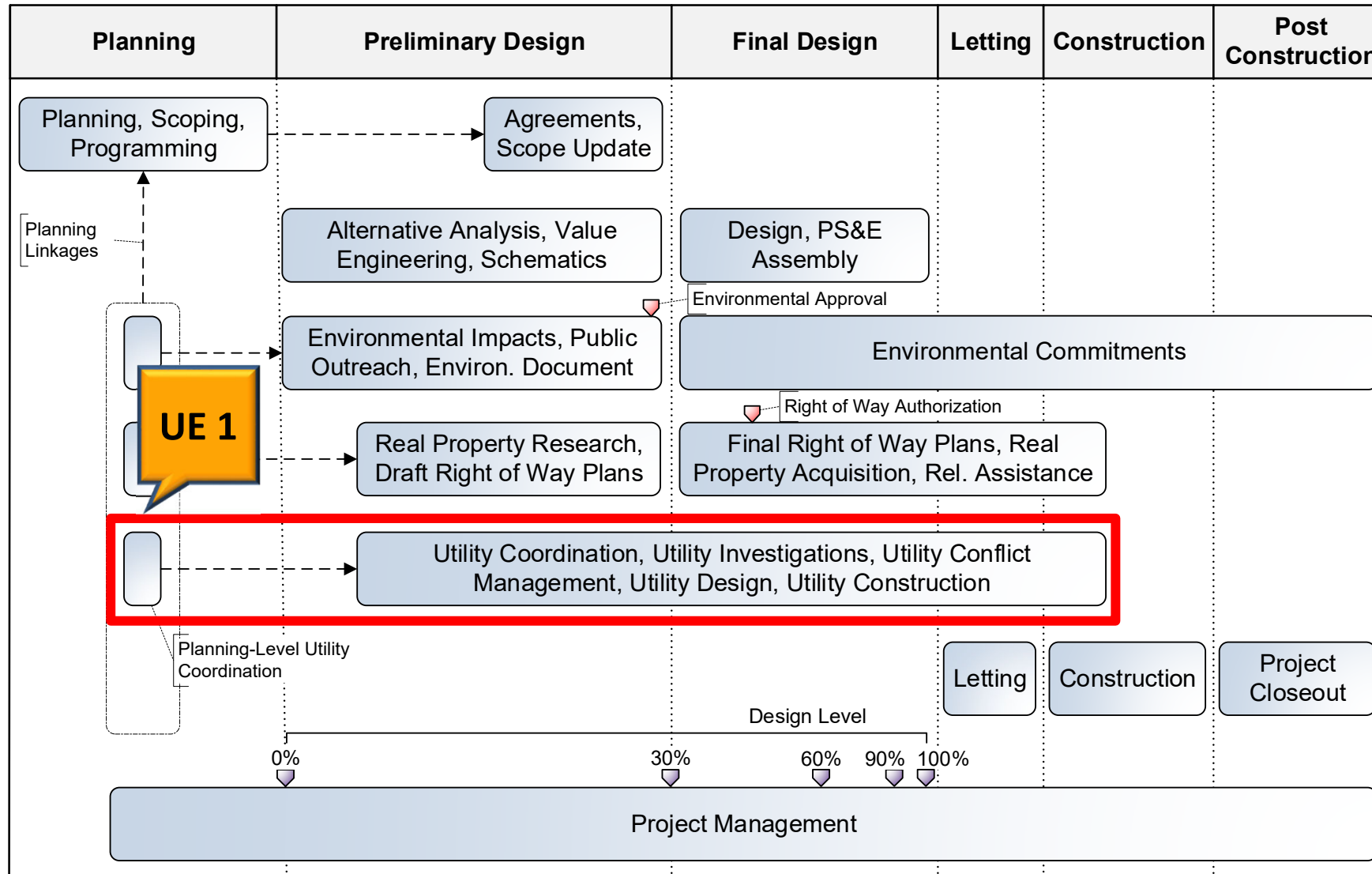
Utility
Engineering
Stages

Utility
Investigation
Deliverables

Utility Engineering Stages



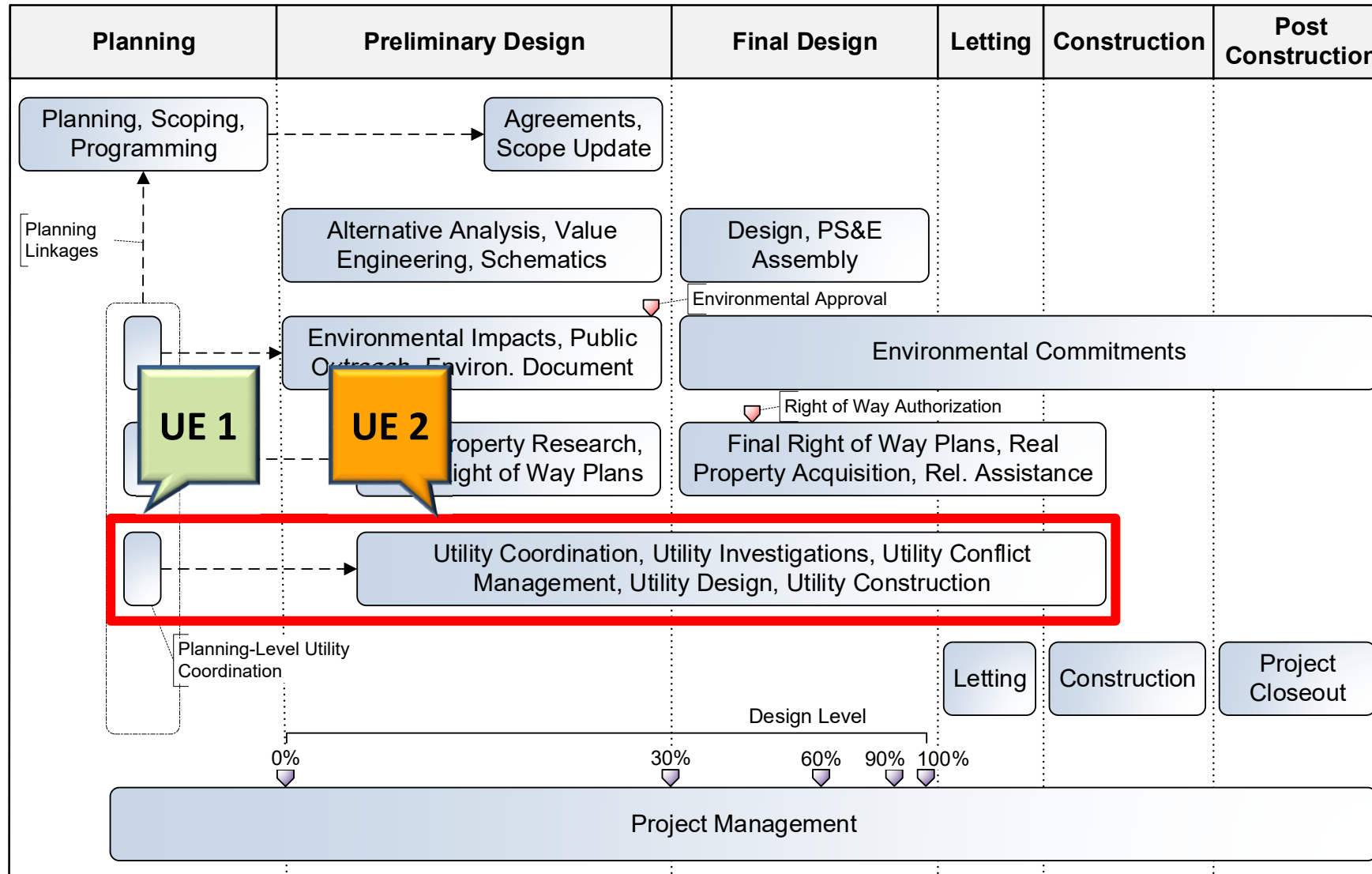
Utility Engineering Stages—Stage 1



Utility Engineering Stages—Stage 1 (Key Points)

- Utility investigation usually not conducted at this stage
- Identify major utility-related issues that might affect the project scope
- Meet with utility owners about planned project

Utility Engineering Stages—Stage 2



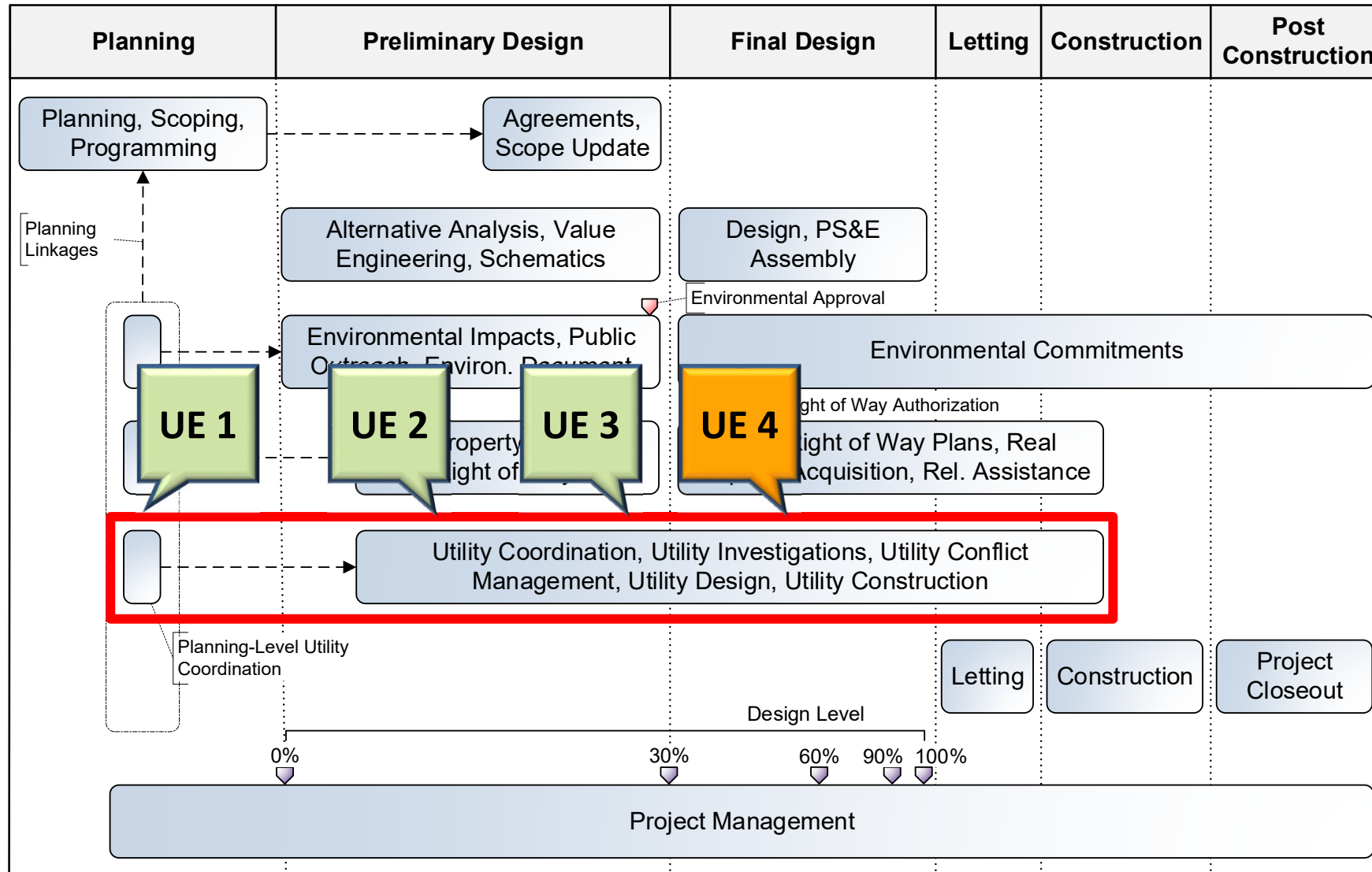
Utility Engineering Stages—Stage 2 (Key Points)

- Conduct preliminary utility investigation based on existing records
- Gather information about major physical constraints associated with utility facilities
- Conduct initial assessment of utility impacts and determine where additional data are needed

Utility Engineering Stages—Stage 3 (Key Points)

- Survey aboveground utility facilities
- If possible, conduct utility investigation using geophysical techniques to identify and document underground utility conflicts
- Identify utility conflicts
 - Utility layout
 - Preliminary utility conflict list
- Request utility owners to confirm conflict locations, assess constructability challenges, and discuss potential resolution strategies
- Determine where more detailed investigations are needed

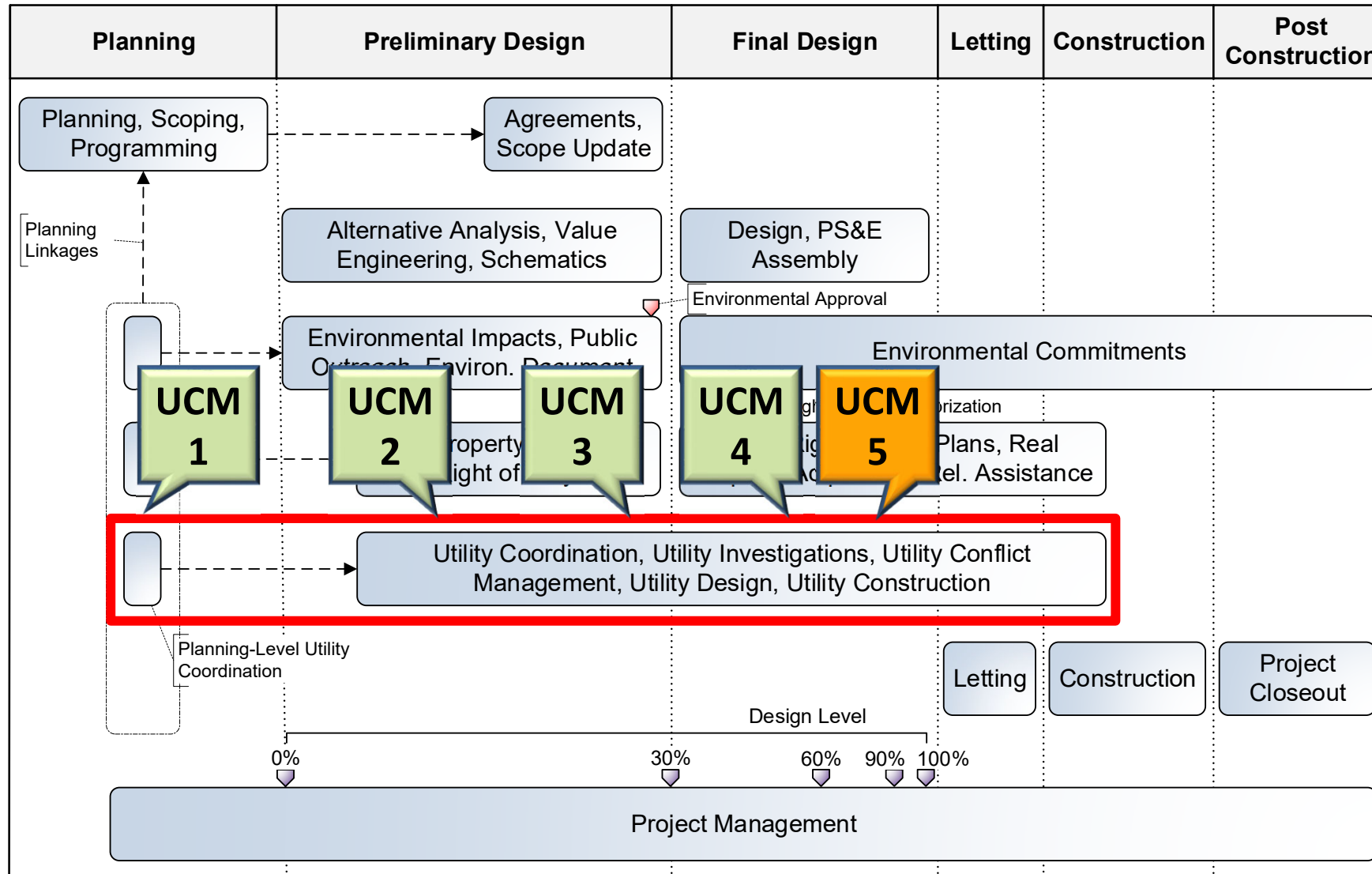
Utility Engineering Stages—Stage 4



Utility Engineering Stages—Stage 4 (Key Points)

- Conduct utility investigation by exposing utility facilities at specific locations
- Conduct geophysical investigation ASAP if not done before
- Analyze and review resolution strategies with an emphasis on avoiding or minimizing conflicts
- Coordinate utility relocation design if it is the most effective conflict resolution strategy
- Prepare utility relocation plans and schedules for inclusion in utility agreements
- Monitor utility relocations to ensure they are built and surveyed properly and depicted on as-built plans

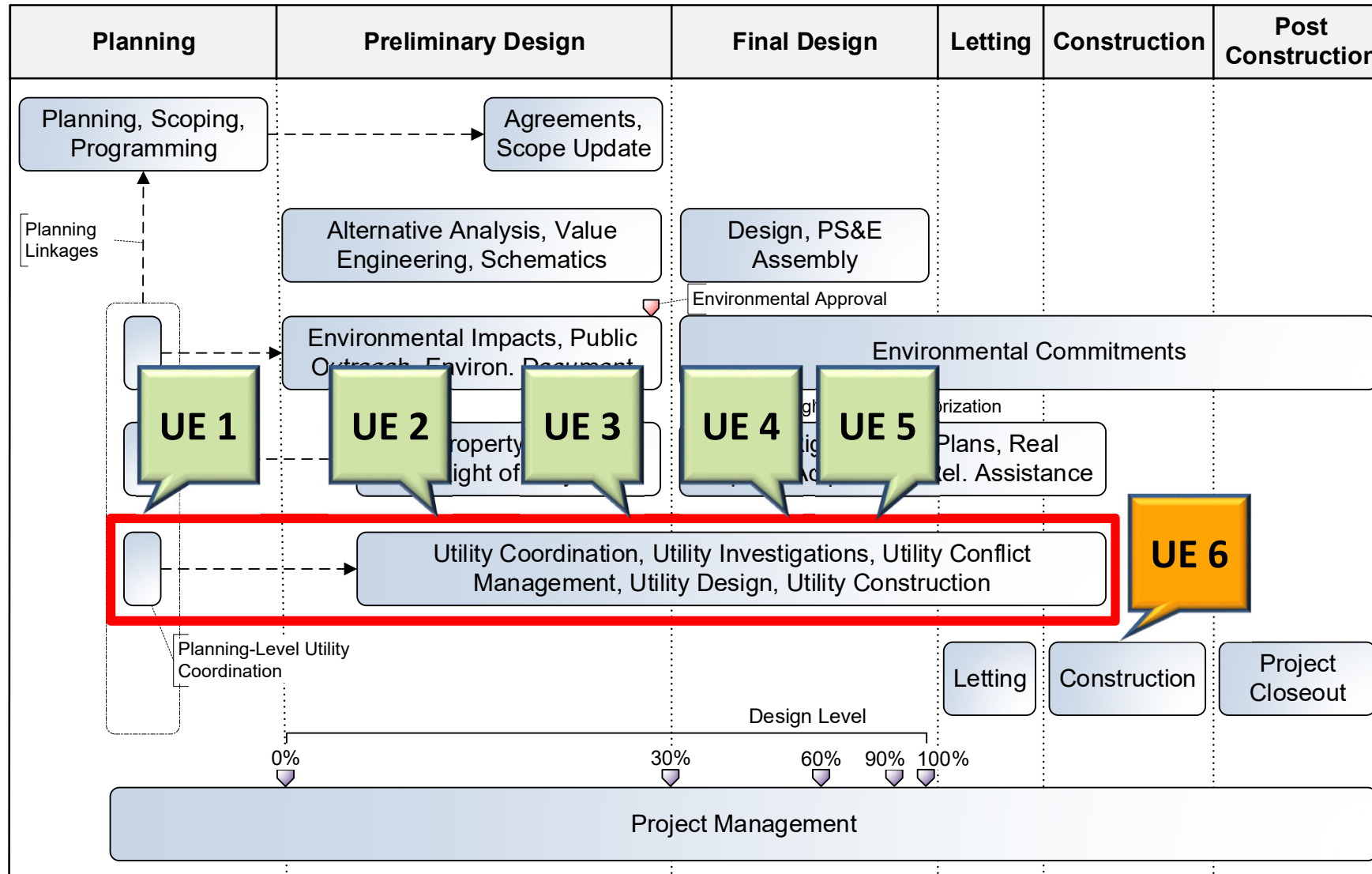
Utility Engineering Stages—Stage 5



Utility Engineering Stages—Stage 5 (Key Points)

- Need for a utility investigation at this point should be minimal
- Continue all other utility coordination activities
- Refine utility relocation schedules
- Include utility plans and utility relocation schedules in PS&E documents
- Prepare utility statement for inclusion in the bid package, showing utility work completed prior to construction, utilities not in conflict with the project, and utility work that must be completed during construction

Utility Engineering Stages—Stage 6



Utility Engineering Stages—Stage 6 (Key Points)

- Need for a utility investigation at this point should be minimal
- Conduct pre-construction utility coordination meeting
- Conduct construction utility coordination meetings
- Assess new utility conflicts and corresponding impacts that are uncovered during construction, if applicable
- Update utility relocation schedules

Module 2 Overview

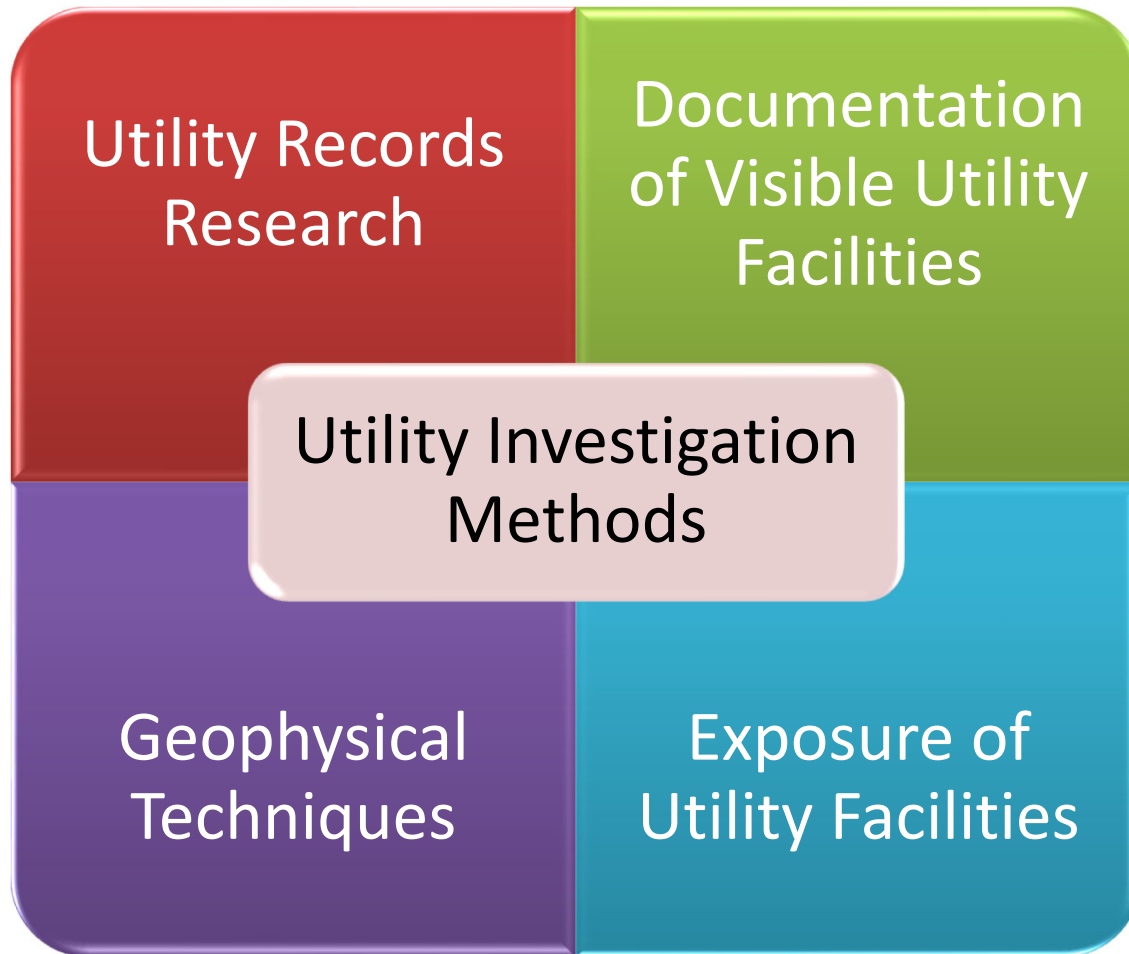
Module 2: Integration of UCM into Project Delivery

Utility Process
within Project
Delivery

Utility
Engineering
Stages

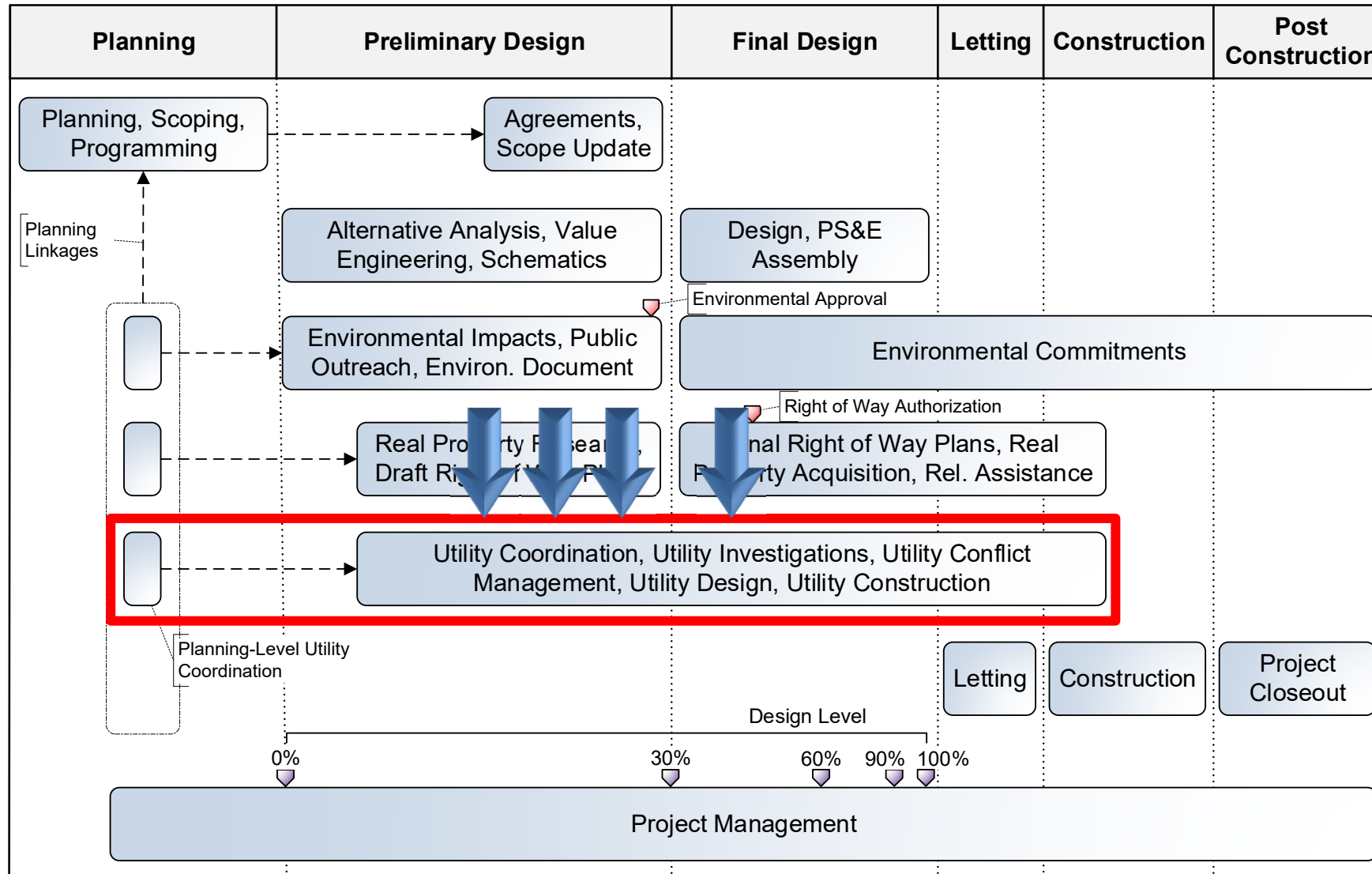
Utility
Investigation
Deliverables

Utility Investigation Methods



- Quality levels:
 - QLD, QLC, QLB, QLA
- Standard Guideline for Investigating and Documenting Existing Utilities
 - ASCE/UESI/CI 38-22

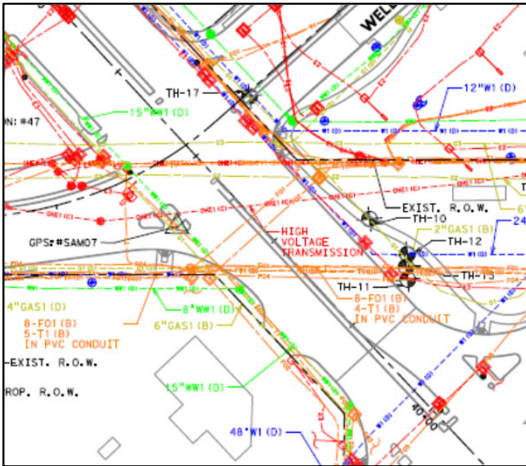
Utility Investigation Methods



Utility Records Research

Outcomes

- X-Y locations
- Attribute
- Metadata
- QLD (if done according to ASCE 38-22)



Uses

- Preliminary assessment of utility facilities
- Utility owner contacts
- Major constraints affecting project alignment and footprint
- Low cost
- Best done as early as possible (preliminary engineering phase)
- Send NOPCs before conducting utility records research

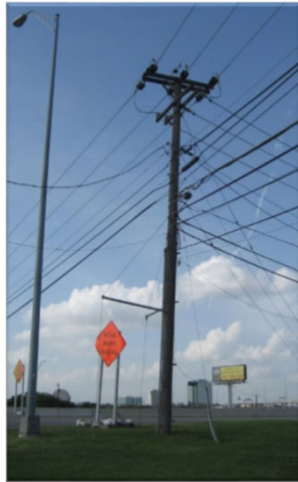
Limitations

- 50-60% of underground utility facilities identified
- Low positional accuracy
- Data not sufficient for design

Documentation of Visible Utility Facilities

Outcomes

- X-Y locations
- Attribute
- Metadata
- QLC, QLD (if done according to ASCE 38-22)



Uses

- Improved reliability of existing utility data
- Tight integration of utility data with project survey control
- Pole attachments:
 - Increasingly important
 - Ignored in utility records research
 - Need to coordinate with each utility pole tenant

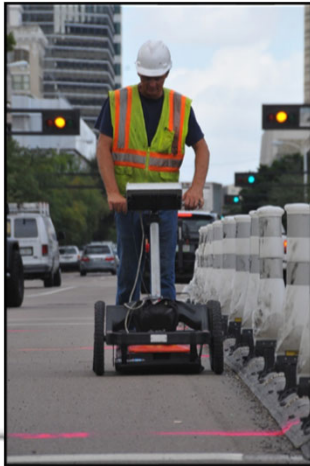
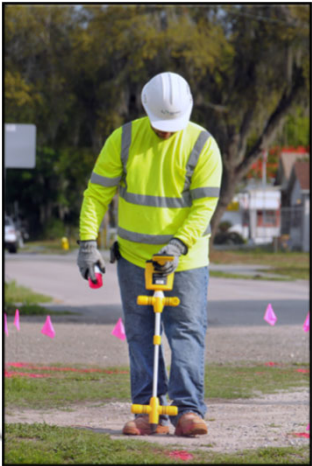
Limitations

- Mislabeled or misidentified utility features
- Surface features paved over or filled with dirt
- Vaults filled with water
- Traffic control to open and access vaults
- Difficult to measure top of pipe inside tight valve boxes
- Information at one location
- Difficult to access manholes and vaults
- Pole attachments not documented

Geophysical Techniques

Outcomes

- X-Y locations
- Z data (technique dependent)
- Attribute
- Metadata
- QLB, QLC, QLD (if done according to ASCE 38-22)



Uses

- Improved utility data completeness and reliability
- Up to 80-90% of underground utility installations located

Limitations

- Higher costs than for previous utility investigation phases
- More certainty for horizontal locations than vertical locations

Exposure of Utility Facilities

Outcomes

- X-Y-Z coordinates
- Grade elevation
- Map or aerial imagery
- Picture of utility facility
- Outside diameter
- Conduit configuration
- Material
- Condition
- Survey control
- Pavement thickness and type
- Soil type and conditions
- Metadata
- QLA (if done according to ASCE 38-22)

Uses

- Improved level of confidence about utility locations
- Reduced level of risk

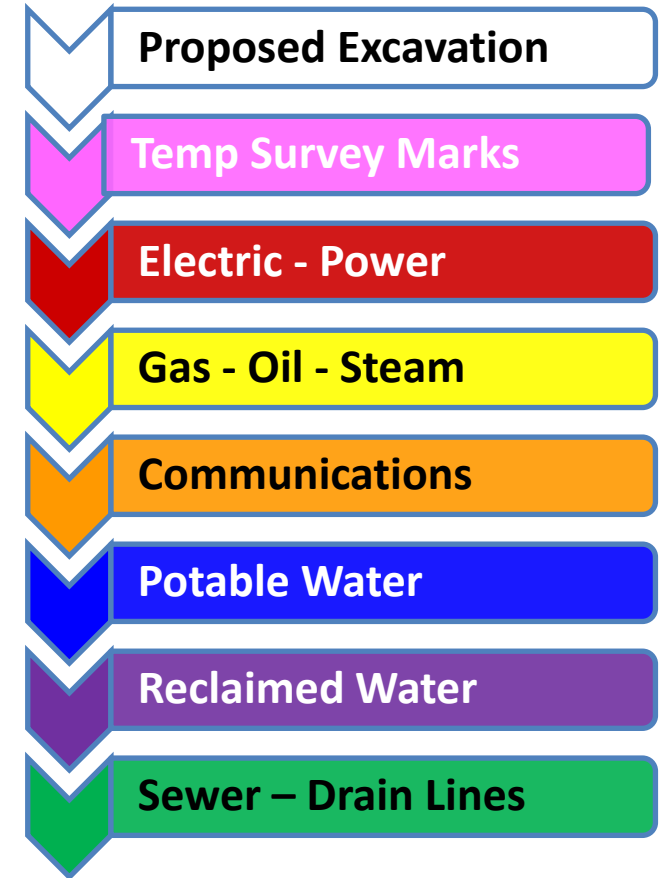


Limitations

- X-Y-Z data limited to test hole locations
- Risk of utility damage
- Traffic disruptions at test locations
- Risk to road surface integrity
- Difficulty in confirming exact utility and owner
- Dry holes
- Who covers the costs

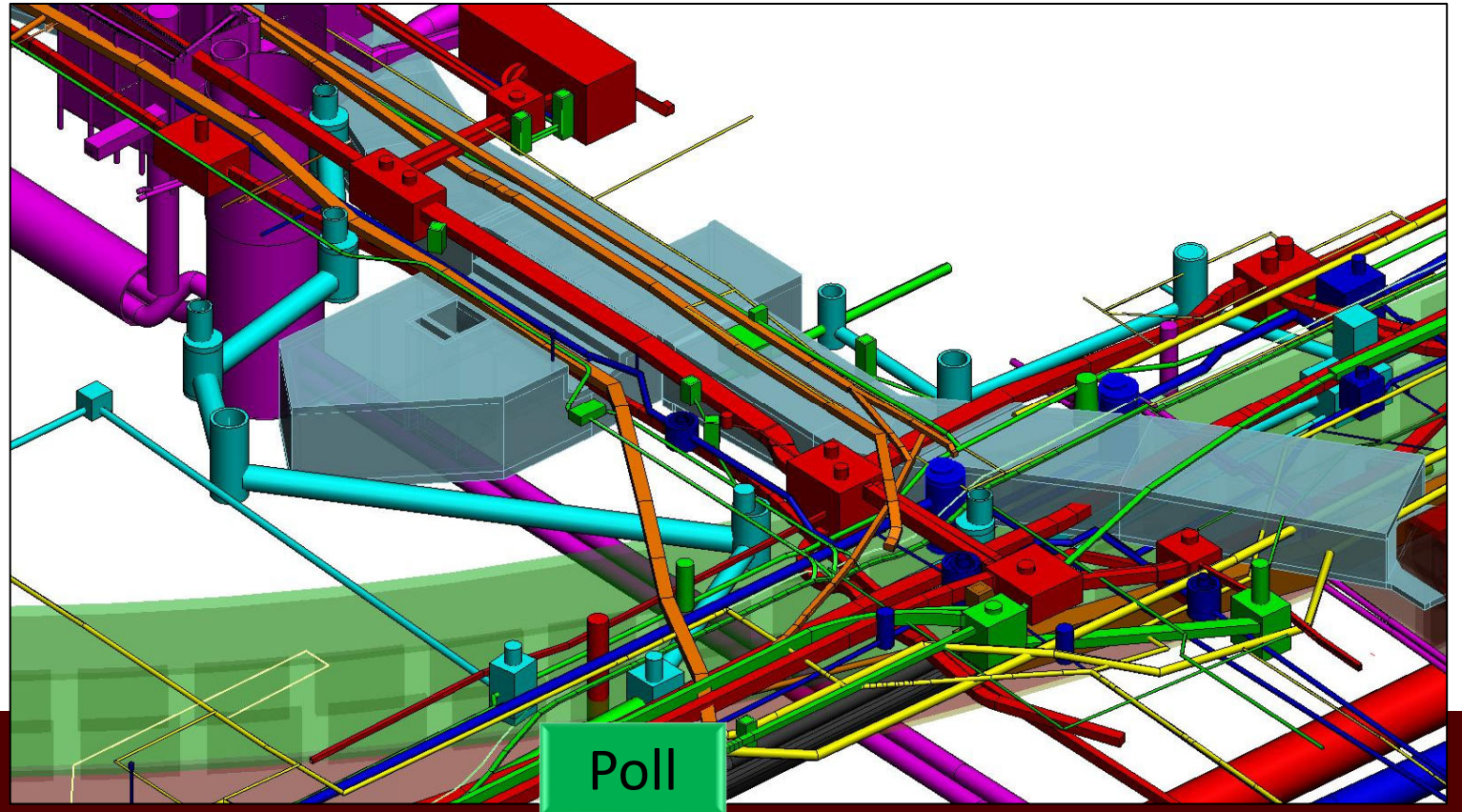
Utility Investigation Deliverables

- Plans
- Test hole sheets
- Utility report
 - Project description
 - Methods and equipment used
 - Software used to process and depict utility data
 - Description of utilities located and depicted
 - Problems encountered and resolutions



New ASCE Standard Guideline

- Standard Guideline for Recording and Exchanging Utility Infrastructure Data (ASCE/UESI/CI 75-22)
 - Utility infrastructure data content and accuracy
 - Data stewardship



Break

- We'll continue in ***10 minutes***

Module 3 Overview

Module 3: Key Elements of UCM

Learning Outcome: Describe the key elements of UCM

UCM Tools

Populating
Utility Conflict
Lists

Case Studies

UCM Tools

- Utility conflict list and...
- Utility layout
- Utility investigation deliverables
- Project plans (plan views, profiles, cross sections)
- Field visit information
- Right of way plans
- Hydraulic analysis and design
- Schedule (could be input or output)
- Utility installation specifications (could be input or output)
- Utility accommodation rules and utility industry standards
- Interactions with utility owners

Utility Conflict List

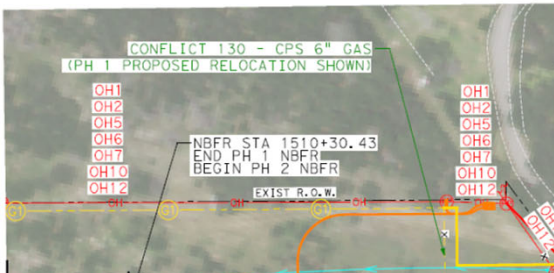
Utility Conflict Management (UCM) - Utility Conflicts

| Utility Conflict ID | Utility Layout/Sheet No. | Utility Owner | Utility Owner Contact Name | Utility Owner Contact Phone and Email | Utility Feature ID | Utility Function | Utility Type | Utility Subtype | Utility Feature | Size | Material | Utility Conflict Description |
|---------------------|--------------------------|---------------|----------------------------|---------------------------------------|--------------------|------------------|--------------|-----------------|-----------------|------|----------|------------------------------|
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Station Origin | Start Station | Start Offset | End Station | End Offset | From Latitude | From Longitude | To Latitude | To Longitude | Height/Depth (ft) | Placement Relative to Ground Level | Alignment Type | Placement Relative to Existing ROW | Property Interest Type | Parcel U-Number | Parcel Acquisition Status |
|----------------|---------------|--------------|-------------|------------|---------------|----------------|-------------|--------------|-------------------|------------------------------------|----------------|------------------------------------|------------------------|-----------------|---------------------------|
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

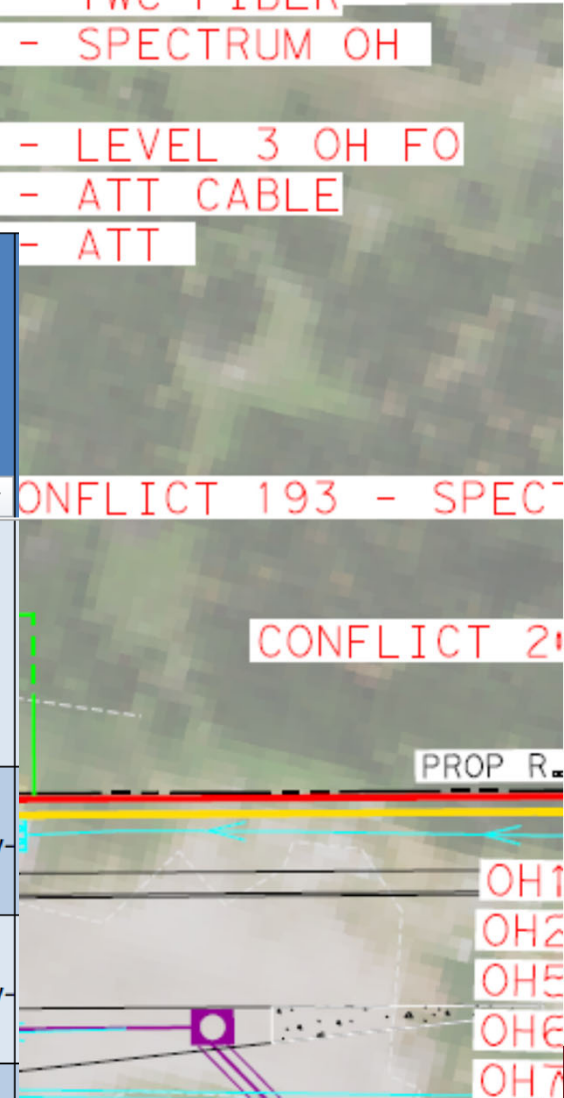
| Utility Investigation Completed | Utility Investigation Needed | Test Hole No. | Next Action | Resolution Strategy Selected (from Resolution Alternatives) | Reimbursable (Y/N) | High Priority (Y/N) | Utility Conflict Status | Status Achieved Date | Estimated Resolution Date | Comment |
|---------------------------------|------------------------------|---------------|-------------|---|--------------------|---------------------|-------------------------|----------------------|---------------------------|---------|
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

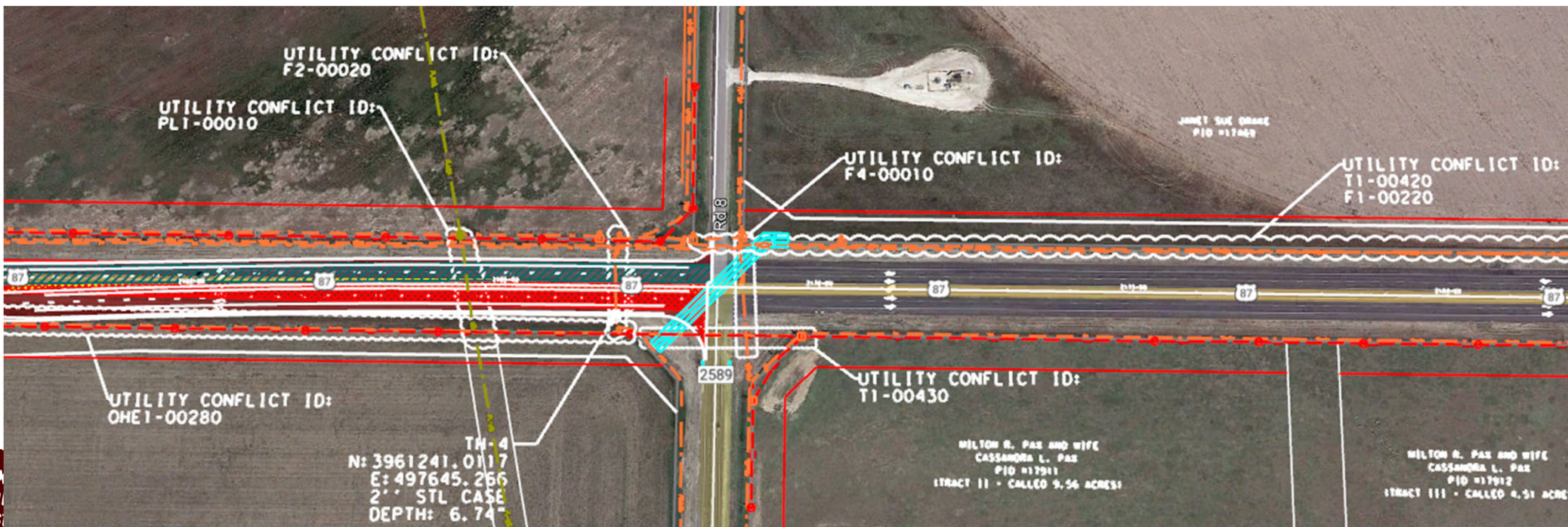
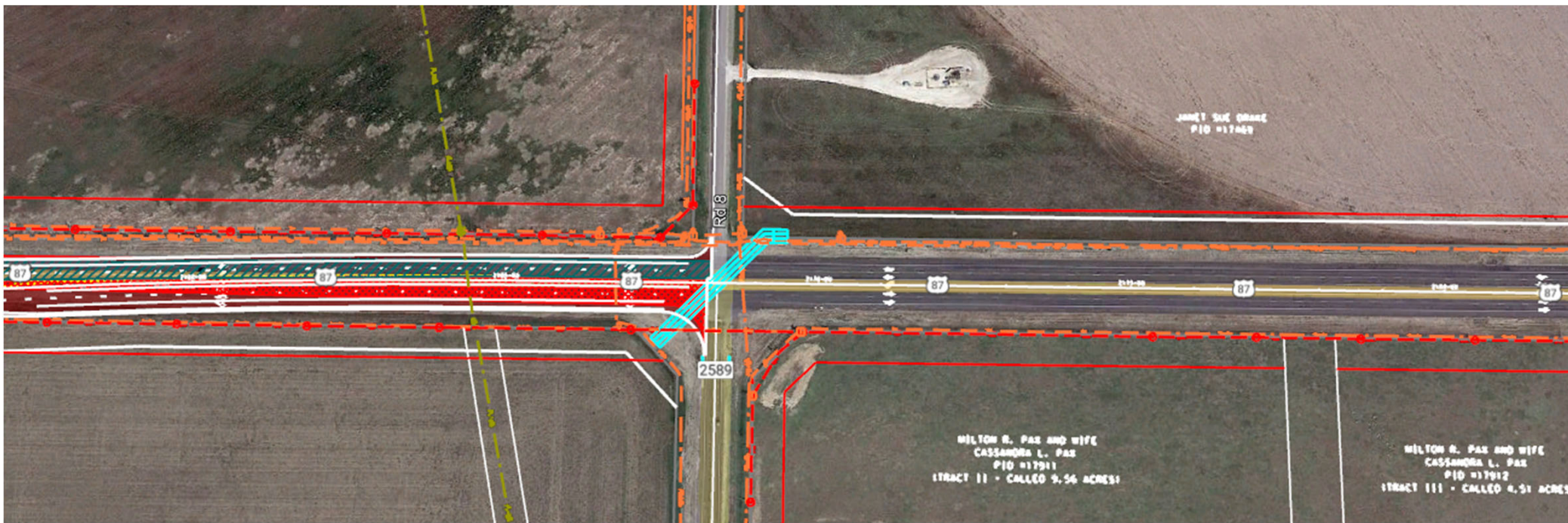
MATCH LINE STA 508+00.00



- CONFLICT 9 - CPS ELEC
- CONFLICT 218 - CPS FIBER
- CONFLICT 137 - TWC FIBER
- CONFLICT 138 - SPECTRUM OH CABLE
- CONFLICT 140 - LEVEL 3 OH FO
- CONFLICT 216 - ATT CABLE
- CONFLICT 193 - SPECT
- CONFLICT 21

| Utility Company | Utility Company Contact | Utility Conflict ID | Drawing or Sheet No. | Utility Type | Size and/or Material | Utility Conflict Description |
|-----------------|-------------------------|---------------------|----------------------|--------------|----------------------|--|
| CPS Energy | | 7 | 2 | Electric | | OHE with proposed pond/roadway-Crossing-Reloc in PH1 |
| CPS Energy | | 9 | 4-12 | Electric | | OHE with proposed roadway-Parallel |
| CPS Energy | | 11 | 4-5 | Electric | | OHE with proposed roadway-Parallel |
| CPS Energy | | 12 | 5 | Electric | | OHE with |





Best Practices

- Use UCM tools to:
 - Generate an inventory of utility conflicts
 - Analyze utility conflict resolution strategies
 - Track the resolution process for each utility conflict
 - Provide a link to other documents, including the utility layout
 - Prepare utility statement (or certification) to include in the PS&E package
- Immediate benefits:
 - Manage utility conflicts more effectively
 - “Tell the story” about how utility conflicts were identified and resolved

Best Practices

- Track utility conflicts at the utility facility level
- Maintain and update utility conflict list regularly
- Use utility layout to show utility conflict locations
- Start early (best during preliminary design)
- Involve stakeholders in review of utility conflicts and solutions
 - Regardless of reimbursement eligibility

Best Practices

- Bring to all utility coordination meetings:
 - Utility conflict list
 - Utility layout
 - Schedule (both project and utility relocations)
 - ROW acquisition status and exhibits
 - Environmental review status

Module 3 Overview

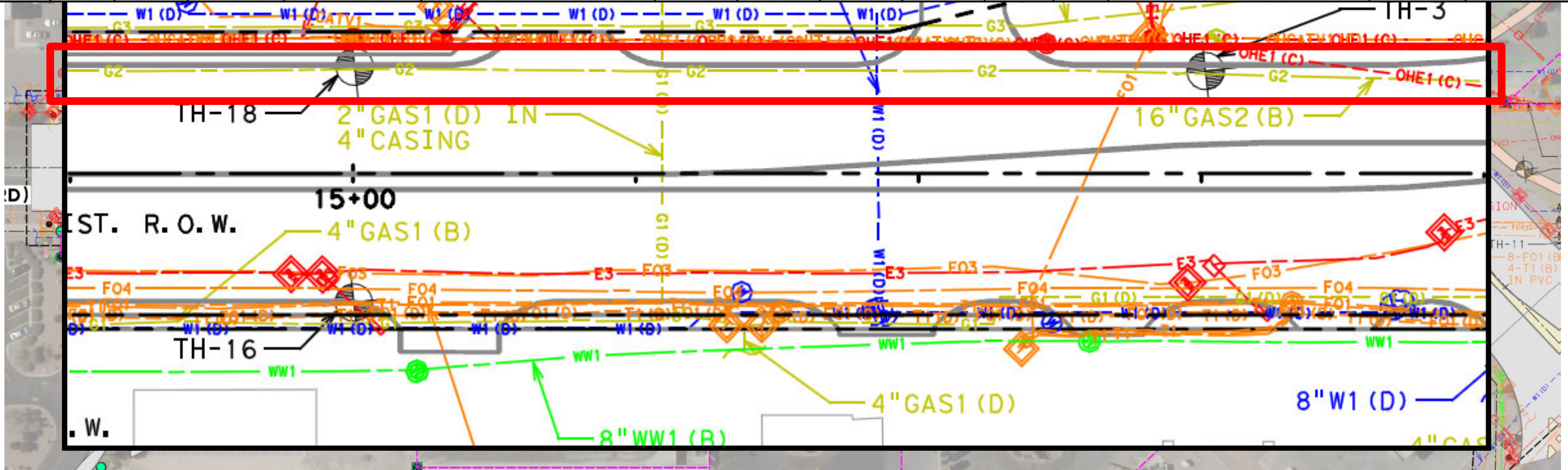
Module 3: Key Elements of UCM

UCM Tools

Populating
Utility Conflict
Lists

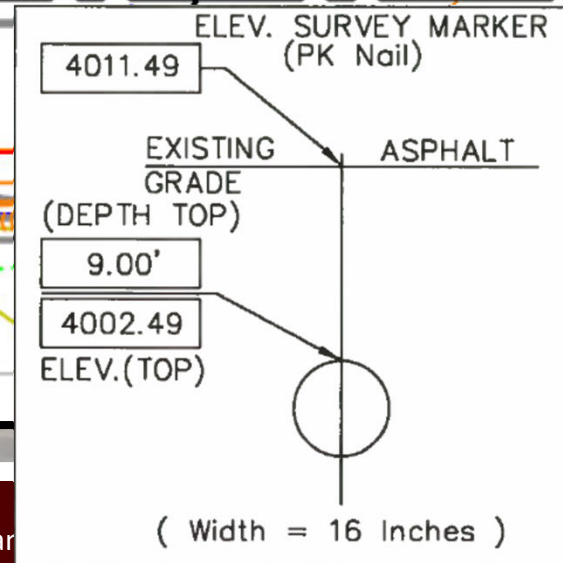
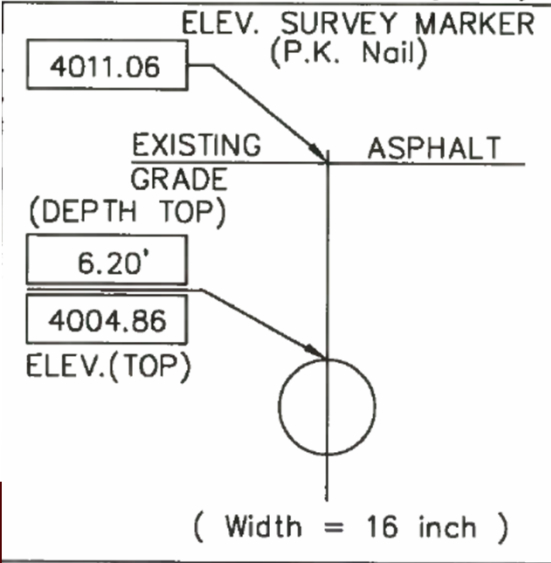
Case Studies

| Utility Owner | ID | Sheet No. | Utility Type | Size/ Material | Utility Conflict Description | Start Sta. | Start Offset | End Sta. | End Offset | Util. Inv. | Test Hole | Next Action or Resolution | High Priority | Util. Conflict Status |
|---------------|----|-----------|--------------|------------------|--|------------|--------------|----------|------------|------------|-----------|--|---------------|-----------------------------|
| ONE OK | 51 | 5 | Gas | 16 inches/ Steel | Existing transmission gas pipeline might be under the pavement | 13+00 | 30' LT | 23+00 | 95' RT | QLD QLB | | Conduct geophysical investigation to confirm horizontal location | Y | Utility conflict identified |
| Utility Owner | ID | Sheet No. | Utility Type | Size/ Material | Utility Conflict Description | Start Sta. | Start Offset | End Sta. | End Offset | Util. Inv. | Test Hole | Next Action or Resolution | High Priority | Util. Conflict Status |
| ONE OK | 51 | 5 | Gas | 16 inches/ Steel | Existing transmission gas pipeline is under the pavement | 13+00 | 35' LT | 23+00 | 100' RT | QLB QLA | | Conduct test holes to gather or confirm depth | Y | Utility conflict confirmed |



| Utility Owner | ID | Sheet No. | Utility Type | Size/ Material | Utility Conflict Description | Start Sta. | Start Offset | End Sta. | End Offset | Util. Inv. | Test Hole | Next Action or Resolution | High Priority | Util. Conflict Status |
|---------------|----|-----------|--------------|------------------|--|------------|--------------|----------|------------|------------|-----------|---|---------------|----------------------------|
| ONE OK | 51 | 5 | Gas | 16 inches/ Steel | Existing transmission gas pipeline might be under the pavement | 13+00 | 35' LT | 23+00 | 100' RT | QLA QLA | 3, 18 | Compare relocating vs. remaining in place | Y | Utility conflict confirmed |

| Utility Owner | ID | Sheet No. | Utility Type | Size/ Material | Utility Conflict Description | Start Sta. | Start Offset | End Sta. | End Offset | Util. Inv. | Test Hole | Next Action or Resolution | High Priority | Util. Conflict Status |
|---------------|----|-----------|--------------|------------------|--|------------|--------------|----------|------------|------------|-----------|-----------------------------------|---------------|---------------------------|
| ONE OK | 51 | 5 | Gas | 16 inches/ Steel | Existing transmission gas pipeline is under the pavement | 13+00 | 35' LT | 23+00 | 100' RT | QLA QLA | 3, 18 | Remain in place. Do not relocate. | Y | Utility conflict resolved |



Module 3 Overview

Module 3: Key Elements of UCM

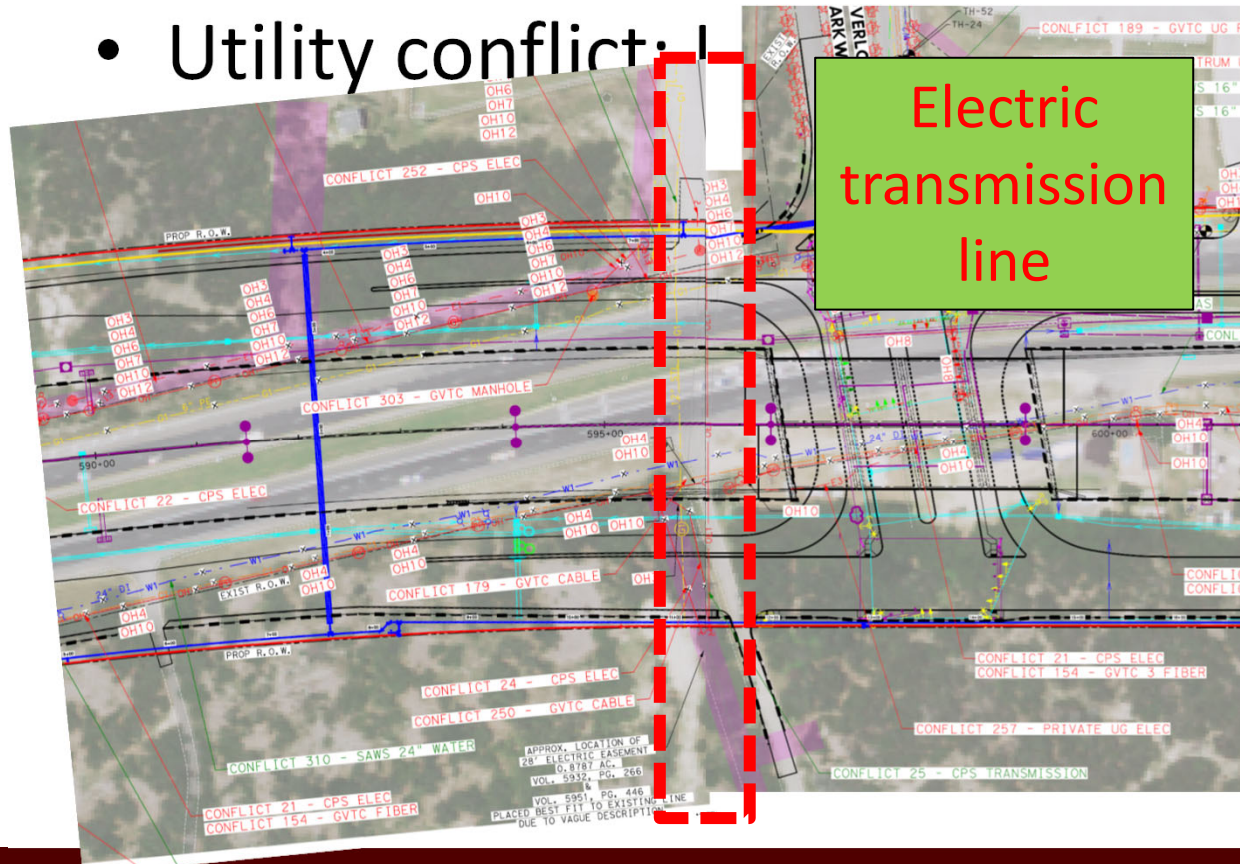
UCM Tools

Populating
Utility Conflict
Lists

Case Studies

Widening Project

- Case 1: Electric transmission line
- Utility conflict: 1

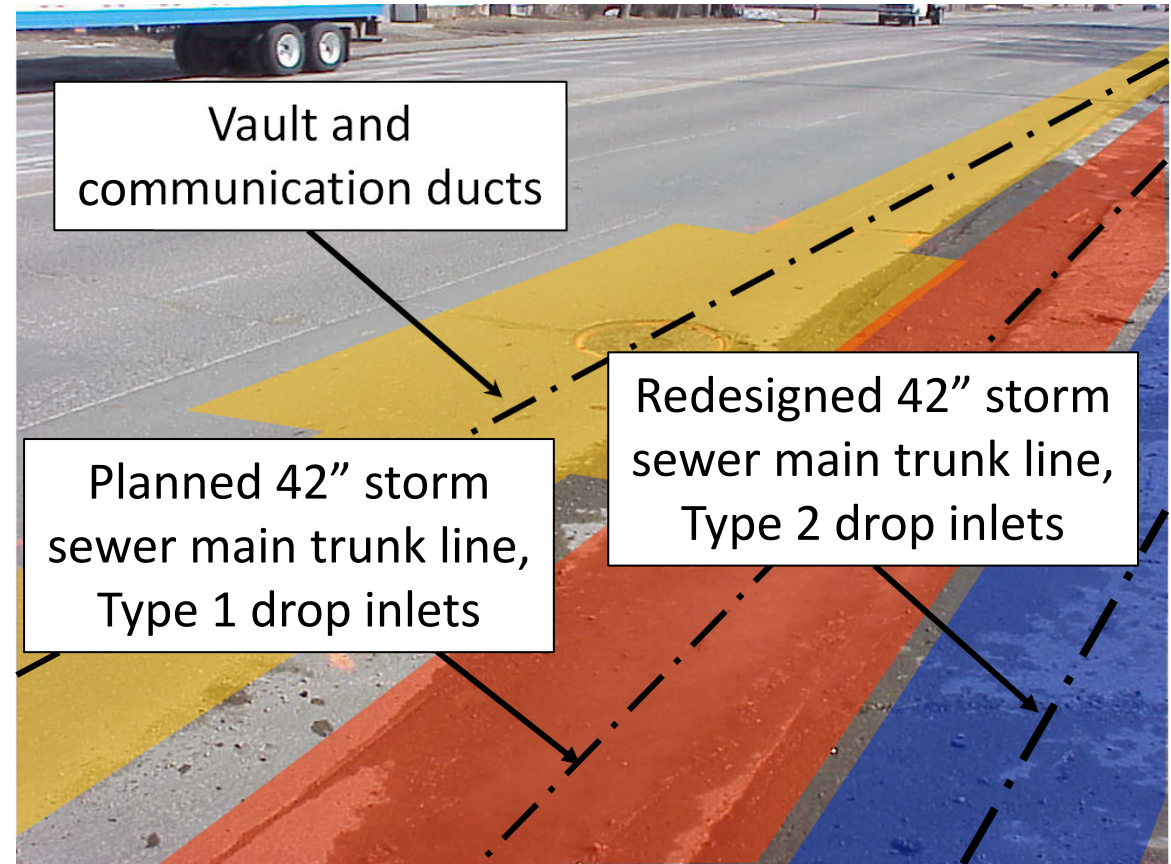


Widening Project

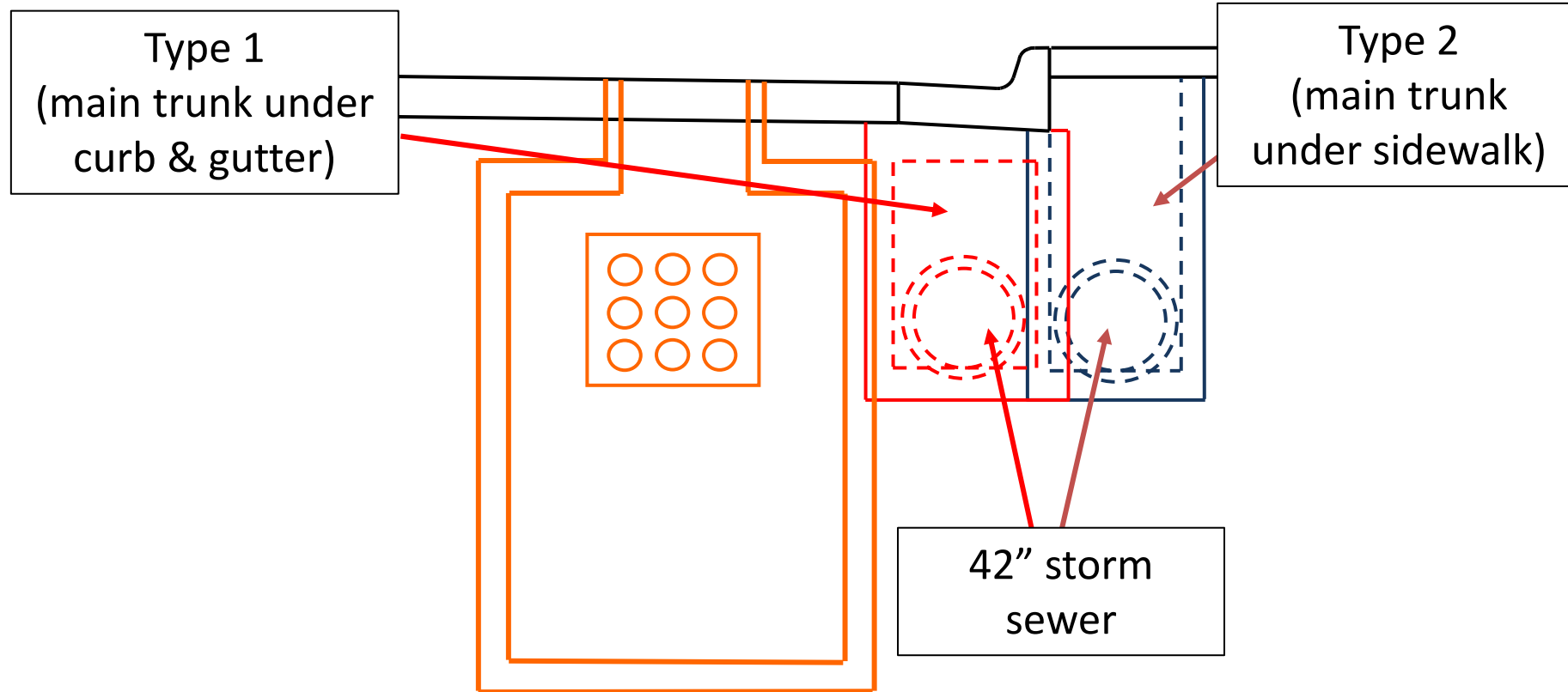
- Resolution alternatives:
 - Relocate transmission line
 - Modify final grade to avoid transmission line
- Decision:
 - Lowered final grade enough to satisfy overhead clearance
 - Maintained sufficient ground cover above gas line at same location
- Benefits:
 - Cost savings: \$3M
 - Time savings: 24 months of project delivery time

Storm Sewer and Communication Duct System

- Communication ducts along 5 blocks of city streets
- 5 vaults (5 feet x 7 feet x 12 feet) connected with 9 4-inch ducts encased in concrete
- In conflict with planned storm sewer



Storm Sewer and Communication Duct System



Storm Sewer and Communication Duct System

| | |
|--|-----------|
| • Utility owner's estimate to relocate 9-duct system | \$750,000 |
| • Additional cost to re-design storm sewer | -\$37,270 |
| | <hr/> |
| • Cost savings to consumers/taxpayers | \$712,730 |

Break

- We'll continue at ***1:00 PM***

Module 4 Overview

Module 4: Hands-On UCM Exercise

Learning Outcome: Identify and resolve utility conflicts for a sample project

Identify Utility
Conflicts

Analyze and
Compare
Resolution
Strategies

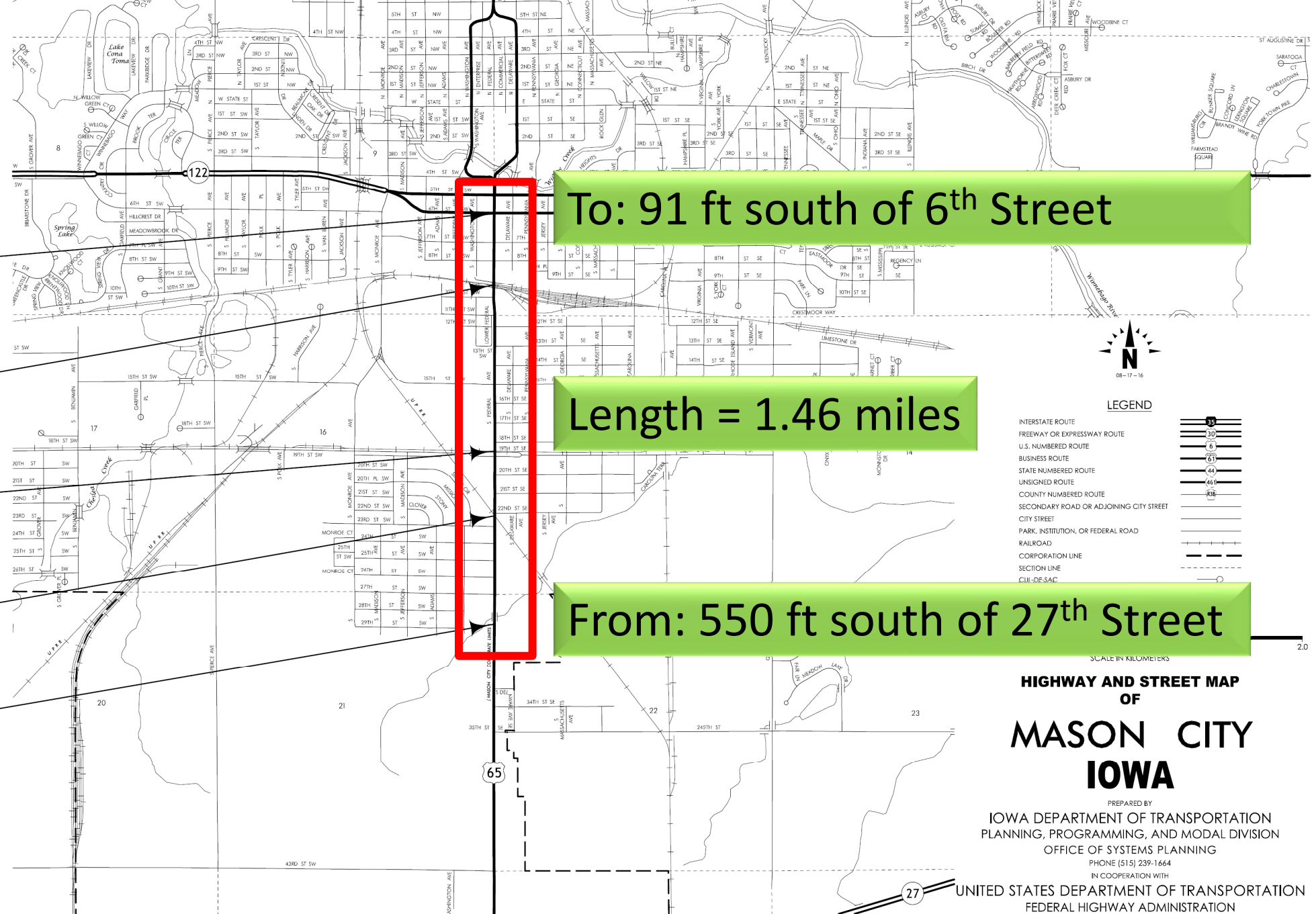
Present Findings

Hands-On UCM Exercise

- Identify potential conflicts using existing data (60 min)
- Analyze and compare resolution alternatives (60 min)
- Present findings (45 min)

Project Overview

- US 65 in Mason City (Cerro Gordo County)
- Scope of improvements:
 - Replace PCC pavement – Includes regrading
- Multiple utility owners:
 - Communications
 - Electric
 - Gas
 - Water
 - Wastewater



To: 91 ft south of 6th Street

Length = 1.46 miles

From: 550 ft south of 27th Street

STA. 260+54.68
END CONSTRUCTION

STA. 247+76.22
Mainline RR Bridge
FHWA 18920
Maint. No.
FRA NO. 385488G

STA. 216+19.79
At-Grade RR Crossing
FRA NO. 858792U

STA. 204+02.02
AT-GRADE RR CROSSING
FRA NO. 201861H

STA. 183+37.95
BEGIN CONSTRUCTION



LEGEND

- INTERSTATE ROUTE
- FREEWAY OR EXPRESSWAY ROUTE
- U.S. NUMBERED ROUTE
- BUSINESS ROUTE
- STATE NUMBERED ROUTE
- UNSIGNED ROUTE
- COUNTY NUMBERED ROUTE
- SECONDARY ROAD OR ADJOINING CITY STREET
- CITY STREET
- PARK, INSTITUTION, OR FEDERAL ROAD
- RAILROAD
- CORPORATION LINE
- SECTION LINE
- CUII-DE-SAC

SCALE IN KILOMETERS

**HIGHWAY AND STREET MAP
OF
MASON CITY
IOWA**

PREPARED BY
IOWA DEPARTMENT OF TRANSPORTATION
PLANNING, PROGRAMMING, AND MODAL DIVISION
OFFICE OF SYSTEMS PLANNING
PHONE (515) 239-1664
IN COOPERATION WITH

UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION



Hands-On UCM Exercise

- Identify potential conflicts using existing data (60 min)
 - Identify utility conflicts
 - Review data provided on utility investigation deliverables
 - Populate utility conflict list
 - Examine utility investigation activities needed
- Analyze and compare resolution alternatives (60 min)
- Present findings (45 min)

Utility Conflict List

| Utility Conflict Management (UCM) - Utility Conflicts | | | | | | | | | | | | |
|---|--------------------------|---------------|----------------------------|---------------------------------------|--------------------|------------------|--------------|-----------------|-----------------|------|----------|------------------------------|
| Utility Conflict ID | Utility Layout/Sheet No. | Utility Owner | Utility Owner Contact Name | Utility Owner Contact Phone and Email | Utility Feature ID | Utility Function | Utility Type | Utility Subtype | Utility Feature | Size | Material | Utility Conflict Description |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Station Origin | Start Station | Start Offset | End Station | End Offset | From Latitude | From Longitude | To Latitude | To Longitude | Height/Depth (ft) | Placement Relative to Ground Level | Alignment Type | Placement Relative to Existing ROW | Property Interest Type | Parcel U-Number | Parcel Acquisition Status |
|----------------|---------------|--------------|-------------|------------|---------------|----------------|-------------|--------------|-------------------|------------------------------------|----------------|------------------------------------|------------------------|-----------------|---------------------------|
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

| Utility Investigation Completed | Utility Investigation Needed | Test Hole No. | Next Action | Resolution Strategy Selected (from Resolution Alternatives) | Reimbursable (Y/N) | High Priority (Y/N) | Utility Conflict Status | Status Achieved Date | Estimated Resolution Date | Comment |
|---------------------------------|------------------------------|---------------|-------------|---|--------------------|---------------------|-------------------------|----------------------|---------------------------|---------|
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Module 4 Overview

Module 4: Hands-On UCM Exercise

Identify Utility
Conflicts

Analyze and
Compare
Resolution
Strategies

Present Findings

Hands-On UCM Exercise

- Identify potential conflicts using existing data (60 min)
- Analyze and compare resolution alternatives (60 min)
 - Identify 2 conflicts
 - Develop and compare 3-4 resolution alternatives
 - Select most appropriate resolution alternative
- Present findings (45 min)

Utility Conflict List

Utility Conflict Management (UCM) - Utility Conflicts

| Utility Conflict ID | Utility Layout/Sheet No. | Utility Owner | Utility Owner Contact Name | Utility Owner Contact Phone and Email | Utility Feature ID | Utility Function | Utility Type | Utility Subtype | Utility Feature | Size | Material | Utility Conflict Description |
|---------------------|--------------------------|---------------|----------------------------|---------------------------------------|--------------------|------------------|--------------|-----------------|-----------------|------|----------|------------------------------|
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Station Origin | Start Station | Start Offset | End Station | End Offset | From Latitude | From Longitude | To Latitude | To Longitude | Height/Depth (ft) | Placement Relative to Ground Level | Alignment Type | Placement Relative to Existing ROW | Property Interest Type | Parcel U-Number | Parcel Acquisition Status |
|----------------|---------------|--------------|-------------|------------|---------------|----------------|-------------|--------------|-------------------|------------------------------------|----------------|------------------------------------|------------------------|-----------------|---------------------------|
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

| Utility Investigation Completed | Utility Investigation Needed | Test Hole No. | Next Action | Resolution Strategy Selected (from Resolution Alternatives) | Reimbursable (Y/N) | High Priority (Y/N) | Utility Conflict Status | Status Achieved Date | Estimated Resolution Date | Comment |
|---------------------------------|------------------------------|---------------|-------------|---|--------------------|---------------------|-------------------------|----------------------|---------------------------|---------|
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Group Instructions

- Download project files
- Make sure to review ALL project files, not just the layout
 - Plan sheets
 - Utility layout
 - Drainage plan
 - Cross sections
 - Utility investigation deliverables
- Use Adobe Acrobat or Reader comment toolbox

Group Instructions

- Re-introduce yourself to others in your group
- Establish roles within the group
 - Group leader (one person)
 - Display and mark up .pdf files (one or more)
 - Populate utility conflict list (one or more)
 - Review files and (II)

**Participation is
KEY to Success!!!**

Module 4 Overview

Module 4: Hands-On UCM Exercise

Identify Utility
Conflicts

Analyze and
Compare
Resolution
Strategies

Present Findings

Hands-On UCM Exercise

- Identify potential conflicts using existing data (60 min)
- Analyze and compare resolution alternatives (60 min)
- Present findings (45 min)
 - (Each group) Give 5-minute presentation
 - Describe process to analyze and resolve two conflicts
 - Highlight major lessons learned
 - (Everybody) Ask questions

Wrap-Up Overview

Wrap-Up

Learning
Outcomes

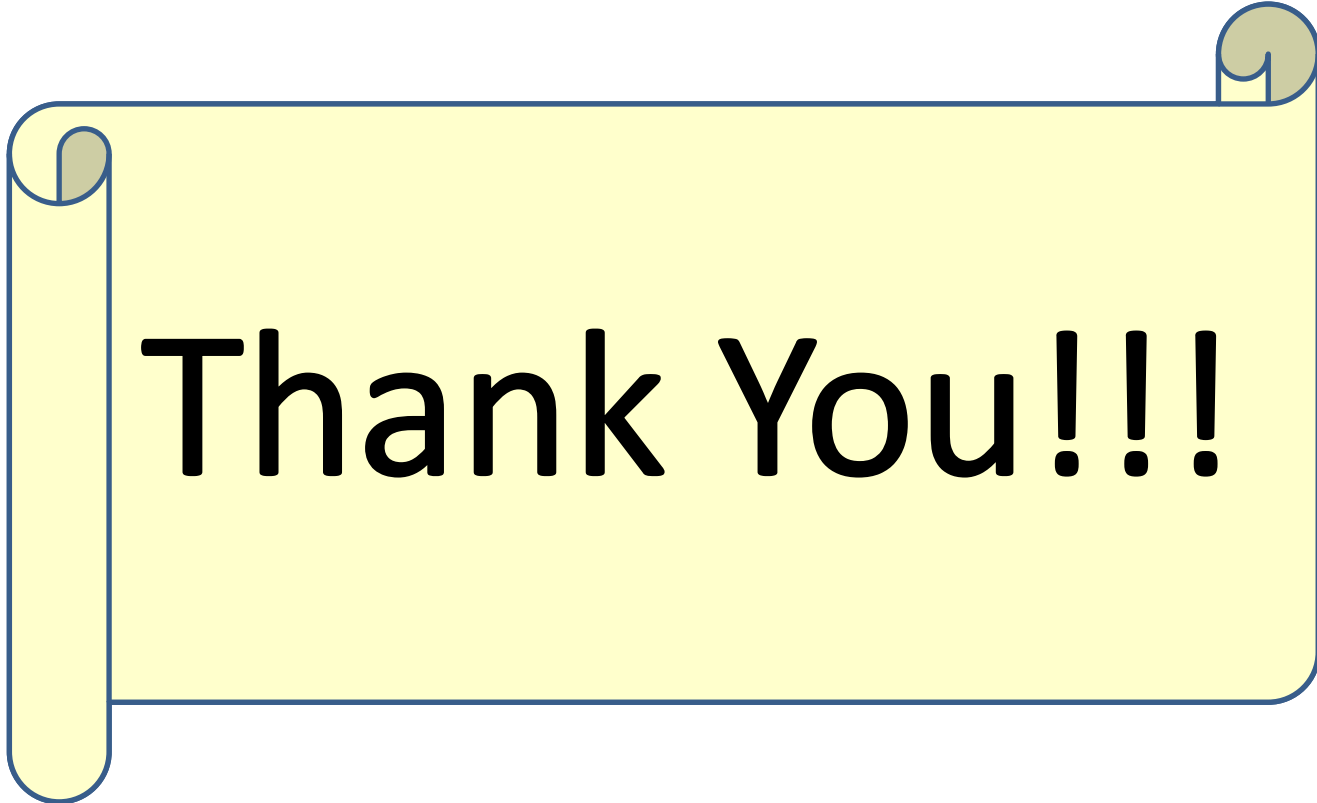
Applying
UCM in
Practice

Open
Discussion

Adjourn

Learning Outcomes

- 1 Explain the reasons to conduct effective UCM
- 2 Explain how UCM is integrated into project delivery
- 3 Describe the key elements of UCM
- 4 Identify and resolve utility conflicts for a sample project



Thank You!!!