



INDIANAPOLIS METROPOLITAN
PLANNING ORGANIZATION

WHITE PAPER

Utility Coordination Best Practices

Natalie Parks, PE
KIMLEY-HORN

October 2024

INDYMPGOV

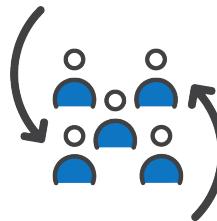
INTRODUCTION

Utility coordination is crucial to the successful planning and execution of transportation projects. Utility infrastructure within transportation corridors may require relocation to accommodate the transportation improvement projects. These relocations can, and often do, impact project schedules, costs, and work zone safety. Regional transportation leaders are met the challenge of implementing processes to efficiently and effectively coordinate with utility representatives in an effort to minimize impacts the utility relocations can have on the traveling public, as well as the taxpayer and utility rate payer.

Utility coordination and accommodation processes are historically developed by federal and state agencies such as the FHWA and State departments of transportation (DOT). However, local agency projects often have schedules, budgets, and goals that do not align with the larger DOT processes. Unfortunately, utility stakeholders expect these more aggressive local projects to follow the DOT established processes often resulting in significant delays to the project, whether in design or construction.

ABOUT THE MPO

The Indianapolis Metropolitan Planning Organization (IMPO) is Central Indiana's federally-designated regional planning organization. The IMPO creates and implements short and long range plans to advance the region's goals in transportation, economic development, housing, safety, sustainability, and other quality of life issues. The IMPO is also responsible for distributing certain federal transportation funds for roads, transit, trails, and other means of moving people and goods around Central Indiana. Our planning region includes almost 1,500 square miles, 36 jurisdictions, and approximately 1.78 million residents.



CONVENE

Bring experts and community members together



INFORM

Provide reliable data to support planning and policy-making



PLAN

Create and adopt infrastructure plans and track their implementation



FUND

Fund regionally-significant projects



BACKGROUND

Past Research

Utility companies provide a service to the municipalities they serve, whether it is electric power, natural gas, telecommunications, water, or wastewater. In order to provide these services, a utility company must build the infrastructure that carries their service, often within the public rights-of-way owned by local agencies, such as counties, cities, and towns. However, when that municipality seeks to do an infrastructure improvement project, the utilities may be adversely affected by this work. Municipalities will go through a process to coordinate with utility stakeholders during the design of the project. Unfortunately, when the project goes to construction, the theoretical issues that were coordinated in design become reality during construction. Those conflicts become delays. Those delays cost time for the Contractor to complete their project. The Contractor turns that time into dollars and issues a delay claim to the municipality.

A significant amount of research has been conducted to determine the root causes of utility related construction delays as related to

utility coordination completed during the design process. A review of the research findings shows that the primary factors contributing to utility related delays are:

1. Existing utility information and location is inaccurate.
2. Gaps in mapping of new and/or relocated installations prior to construction.
3. Insufficient communication and coordination.
4. Differing policies between state and local agencies.
5. No oversight or inspection of utility installations.
6. Lack of strong permitting requirements and language.
7. Abandoned facilities.

Diving into the root causes for utility-related delays, there are roughly three main causes:

1. Coordination and communication
2. Accurate utility information during design and into construction
3. Lack of standard permitting requirements and policies

Communication and Coordination Processes

Communication is possibly the most important factor in effective coordination practices. It also requires engagement by all project stakeholders. Project owners indicate utility stakeholders fail to engage in the project. Utility stakeholders claim that project owners and/or their agents fail to engage them early enough in the design process and don't communicate critical changes to the project such as project limits, right-of-way changes, schedule changes, or critical design changes impacting utility facilities.

Design changes, project schedule changes, right-of-way and environmental commitments all affect a utility's ability to appropriately plan a facility relocation associated with improvement projects. Failure to clearly and effectively communicate any changes to the utility stakeholders leads to frustration by both the designer and the utility. Uncommunicated changes that affect utility infrastructure lead to delays in relocation schedules when utilities have to re-design their relocation, incur additional costs to the utility stakeholder, and increases risk to the construction schedule. In some cases, particularly with late design changes, utilities are forced to react quickly, often after relocation plans and funding allocations have been approved and potentially already in construction.

In 2008, recognizing that the lack of a standard utility coordination process and failure to engage with utility stakeholders early and often was impeding the coordination efforts between the project design team and utility stakeholders, 105 IAC 13, "Utility Facility Relocations on Construction Contracts" was adopted and subsequently implemented. In this rulemaking, the Indiana Department of Transportation (INDOT) established a standard process for all improvement projects. An improvement project, as defined by 105 IAC 13-2-10, is "the construction, reconstruction, rehabilitation, and process incidental to building, fabricating, or bettering any of the following... (3) a local project administered by the department." As

such, federally funded local public agency (LPA) projects fall under the 105 IAC 13 guidance. The 105 IAC 13 guidance was developed to provide a process by which design consultants, on the behalf of the INDOT or LPA, communicate with a utility stakeholder. The goal of the process is to provide utility stakeholders regular opportunities to review the project plans, provide pertinent utility facility information, and develop comprehensive relocation plans. By coordinating throughout the design process, designers are able to minimize utility conflicts that often result in utility related delays during construction. Providing utility work plans as attachments to the construction bid documents, confusion as to anticipated utility relocations within the public right-of-way was also minimized. The result of adopting this rulemaking has been a decline in utility related delay claims on INDOT projects.

While the 105 rulemaking provided a backbone for the frequency of engaging with utility stakeholders, this rulemaking fails to consider the processes and procedures of each individual utility, and those policies and procedures may not align with the standard procedures that have been established for the design and/or construction. Failure to understand the limitations of each utility will often result in delays in communication, deliverables, and relocation. Funding allocations for relocations, material planning, personnel planning, and permitting are a few areas where utility stakeholder processes may not necessarily align with the design processes. The utility stakeholder processes can often impede the speed at which a facility may be relocated.

Accurate Utility Information During Design and Into Construction

The issues that arise in construction are often directly tied to the reliability of the utility information provided throughout the design process and the lack of requirements for as-built documents for permitted and/or relocated utility installations. Furthermore, utilities are rarely held accountable for inaccurate or incomplete information that is provided to the Contractors prior to and during construction.

The use of inaccurate utility information to inform project design decisions is a bit like an avalanche. The inaccuracies and unreliability begin with survey. The design team will typically contact one call to locate subsurface utilities and rely on the surveyor to pick up the above ground appurtenances as well as the 811 marks. The reliability of the one call information is unknown, as are the accuracies. This information is added to the plans and the designers begin their preliminary engineering work for the project.

Design decisions are made using the information obtained during survey, inaccuracies included. Conflict analysis is conducted between the proposed design features and the inaccurate utility information. Relocation plans and final design plans are completed based on the inaccurate utility information. The Contractor is then provided a set of plans that shows utilities as depicted by 811 at the start of the project and expected to construct the project, as designed, with no ability to ensure the utility information depicted on the plans will match the damage prevention marks obtained prior to the start of excavation. The inaccuracies due to unreliable subsurface utility information carries through from survey to design to construction, with those inaccuracies continuously building on one another.

Without accurate data, designers and project owners cannot make design decisions that minimize or avoid utility infrastructure. Drainage features, such as trunklines, manholes, inlets, underdrains, ditches, etc., lighting features, signal

features, are all dependent on occupying space within the municipality's right-of-way, the same space that utilities are allowed to occupy. When design decisions to relocate facilities due to perceived conflicts between the existing facility and the proposed design are made, it can cost the utility and the project owner time and money if those decisions are made with erroneous information. This could be relocating a facility that didn't need to be relocated, or finding out a facility was not in the location that it was shown to be in, or uncovering a utility that was previously unknown. In construction, all of these issues can cause delays resulting in additional costs in both time and money.

Obtaining accurate data is difficult for many reasons. In many cases, the utility stakeholders simply lack the necessary information to provide accurate data: as-builts don't exist, the facility is old and no information is available, GIS data provided lacks the accuracy levels needed to make informed decisions, are just a few of the challenges in obtaining accurate utility information. This is particularly true of subsurface utilities since they cannot be seen. However, even above ground facilities and appurtenances can be incorrectly attributed to a utility company, incorrectly represented on the plans, or absent from the survey information altogether. It is also important to note that the topographic survey will include the above ground appurtenances and features such as poles, pedestals, handholes, etc., but will not include the owner of the facility, nor will the survey data include the number and types of facilities located on a single pole.

The development of relocation plans, while helpful, can also cause additional problems during construction. Utility installations are rarely inspected to ensure correct horizontal and vertical placement. As-builts of relocated facilities or new installations via permit are not provided, even when required. Existing facilities within the right-of-way are not mapped with survey grade accuracy levels. With the lack of inspections and as-builts, and little to no mapping of existing facilities, the Contractor will be unable to confirm if the damage prevention locates are for the new facility installations or abandoned facilities.

Working to confirm the location of active lines versus abandoned or retired facilities costs time which translates to money.

Lack of Standard Policies and Permitting Requirements

The Federal Highway Administration (FHWA) has established policies and procedures that State Departments of Transportation follow in the administration of their projects. These include the accommodation requirements found in 23 CFR Part 645 and establishing a State Utility Accommodation Policy. However, these policies are specific to State DOT's or projects administered by the DOT, such as federally funded local public agency projects (LPA).

As required by the FHWA, INDOT has established a Utility Accommodation Policy (UAP) to appropriately manage utility installations within their right-of-way. In addition, they developed Chapter 104 of the Indiana Design Manual which incorporates the 105 rulemaking into a defined process to be utilized on all INDOT-owned or administered projects. However, as defined by the policy, Chapter 104, and the rulemaking, "department" means "the Indiana Department of Transportation (INDOT) or any agent that: (1) INDOT has authorized through written or electronic communications; and (2) is acting on behalf of the department." Based on this definition, the rulemaking does not apply to projects entirely funded by the local agency.

Looking at the Indiana Code as it pertains specifically to local government and right-of-way management with utility installations, local agencies are governed by such codes as IC 8-1-2-101, "Municipal regulations; county executive's power, relocation of facilities", which discusses the powers that municipal councils and county executives have as it pertains to the regulation of public utilities.

IC 36-1-3, "Home Rule", which allows local agencies to adopt ordinances (IC 36-1-4-11).

IC 36-9-42, "Utility Relocations", which discusses notification of a project to utilities as well as relocation agreements.

The Home Rule law gives municipal governments and counties the authority to establish ordinances regarding right-of-way management and utility installation with the right-of-way. Ordinances typically establish what permits may be required when there is an encroachment onto the local agency's right-of-way. Ordinance and permit language, as well as management fees allowed by IC 8-1-2-101 differ between local agencies. Even though local agencies may establish policies for right-of-way management, many municipal governments have deferred to the INDOT standards and policies for right-of-way management and utility coordination processes.

Failure to establish standards and expectations for utility accommodation and management within municipal right-of-way will result in utility stakeholders holding local agencies to the requirements of the INDOT UAP, design manual, and utility coordination process. However, many locally funded projects are on more aggressive schedules that do not align with the expectations of the INDOT utility coordination process.

Without standardized permit language and expectations for right-of-way management, municipalities lack the ability to require the utility stakeholders to provide as-built data, follow standard accommodation requirements such as minimum depth below a structure or minimum height when crossing a roadway, and inspection of installations. This results in congestion within the right-of-way, unknown utilities, abandoned and/or retired facilities with unknown ownership in conflict with proposed projects, and higher risks to budgets, schedules, and construction delays.



MOVING FORWARD

Addressing Root Causes of Delays

Determining the root causes of utility delays is only part one of mitigating the problem. The bigger challenge is implementing solutions. Solutions range from legislative to improved procedures to the use of technology to field practices. Some suggested best practices based on the research include:

1. Early utility stakeholder involvement.
2. Digital as-built documentation.
3. Standard ordinances and permit requirements.
4. Utilizing subsurface utility engineering (SUE).
5. Conducting utility pre-construction meetings.
6. Allowing sufficient time for planning and design.
7. Inspection of utility installations.
8. Communicating short term and long-term improvement plans.
9. Developing utility accommodation policies.
10. Establishing utility coordination councils.
11. Utilizing a risk register or conflict matrix for conflict management.

These eleven best practices can be grouped together:

- 1. Improved communication and engagement**
- 2. Obtaining accurate utility information through SUE, as-builts, and inspection**
- 3. Conflict management**
- 4. Standardization of policies, procedures, permits**

Improved Communication and Engagement

Communicating and engaging with utility stakeholders is the overwhelming leader in mitigating utility delays during construction.

Early Engagement. Communication and engagement should happen very early in the project development. This can start as early as 0% design if a feasibility study is being conducted.

When a project proceeds from study to design, communication can begin as early as notice to proceed. Engaging with utility stakeholders early in the design process makes them aware of the project, gives them an opportunity to determine what impacts the project could have on their facilities, their short and long-term planning, and their budgets.

Early engagement with utilities can take many forms. An initial notice can be sent to utilities that are known to be within the project limits based off existing project plans, prior records, familiarity with the project area, available GIS mapping, and 811. There are technologies that can also be utilized to generate a heat map of potential stakeholders.

EARLY COORDINATION MEETINGS

Early engagement is step one. Step two is consistent engagement. Holding early coordination meetings, providing opportunities for utility stakeholders to comment on the accuracy of the information shown on the plans through survey, allowing utilities to be active participants in conflict analysis and management, holding page turn meetings at strategic points during the design to ensure everyone is on the same page, conducting a utility pre-construction meeting prior to utilities beginning their relocations are examples of consistent communication with utility stakeholders.

An early coordination meeting should result in a risk register or assessment to determine critical factors that should be reviewed and reassessed regularly during the design process. Providing the risk register to the project owner, utility stakeholders, and design team members ensuring all project stakeholders are aware of the risks and seek to mitigate those risks when possible. When a risk cannot be mitigated through changes to design, schedule, right-of-way, the team is able to determine the appropriate next steps that must be taken to achieve the project goals. When all the stakeholders are engaged in the risk assessment process, everyone takes ownership of the project and its outcome.

COMMUNICATION

Communication goes beyond making sure everyone is getting the necessary information at specific times or engaging in meetings. The communication must be meaningful. Early coordination discussions should:

- Clearly define the project goals including design schedule, relocation schedule, and construction schedule
- Discuss utility infrastructure and resulting impacts to the project if a relocation is required.
- Discuss permits or administrative waivers that may be required.
- Develop a communication and engagement plan.
- Discuss any internal processes that may not align with the project goals, including engineering, scheduling, funding requirements, material procurement and any lead times that need to be considered when design changes have been made.
- Discuss any potential reimbursable positions.



ENGAGEMENT IN DESIGN

Moving into design, providing regular plan updates to the utility stakeholders is critical. Ensuring accurate information is provided prior to design requires providing the utilities an opportunity to review the topographic survey to ensure their facilities have been accurately depicted. Allowing the utility stakeholders an opportunity to review preliminary designs that include establishing right-of-way and project limits gives them the ability to determine if additional information is needed, an opportunity to suggest design changes to mitigate substantial risks and verify any existing property rights are shown correctly. As the design team, including right-of-way and environmental reports and permitting, proceed through the design, significant changes to the design and schedule should be clearly communicated to the utilities. A change in the schedule could affect the funding source for any relocation work, cause a potential risk with material delivery, and cause a potential delay to the overall project.

PRE-CONSTRUCTION COORDINATION

Once relocation plans have been submitted, reviewed, and are ready for construction, a pre-construction meeting with all utility stakeholders, their contractors, the design team, project owner, and the Contractor, if known, should be held. This is especially critical for projects with a significant amount of utility relocations or those within a congested corridor. A page turn discussion of the project showing each utility relocation can indicate where potential conflicts between utilities may exist, particularly those with existing facilities that are not relocating. This meeting can give utilities an opportunity to find ways to work together, such as joint trenches. Schedules are also discussed, focusing on when each utility can begin their work and what activities must happen before they can begin, such as right-of-way clearing and staking. Utility work dependent on other utilities should be discussed to determine the order in which each utility will conduct their relocation and if relocation schedules could be affected by delays from predecessor events. While many of the scheduling details should have been vetted prior to notice to proceed, there are often scheduling challenges once relocations begin.



CONSTRUCTION COORDINATION

Ultimately the delays arise during construction, where time becomes as much of a conflict as the utility itself. Regular progress meetings with the utility stakeholders and their contractors should be held. Consider including relocation work in the contract, particularly for municipally owned utilities like sewer and water. The contractor and their team should provide regular updates to the utilities on their schedule, operations, and work areas so that utility contractors aren't trying to work around the project contractor. Minimize design changes during construction that could impact the utility relocations. Communicate unforeseen field conditions to the utility contractors so they can make any necessary changes. Discuss how abandoned and/or retired facilities should be treated, particularly who is responsible for removing them. Ensure the Contractor has an accurate list of utility stakeholder contacts in case there is an emergency or an unknown facility in encountered.

UTILITY COORDINATION COUNCILS

Utility stakeholders often have several ongoing projects within a jurisdiction. Utility coordination councils involve coordination for internal utility projects, ongoing municipal projects, and/or upcoming utility or municipal projects.

A utility coordination council should establish a regular meeting with key utility personnel to go through project schedules, issues, and delays, such as the Public Works Coordination Council established by Indianapolis DPW. The purpose of these meetings is to discuss the status of all projects in design and/or construction with DPW staff, utility coordinators, and utility stakeholders. At these meetings, short-term and long-term plans are shared with the utility stakeholders so they are aware of upcoming improvement projects in which they may be involved. Any issues they are seeing in the field, such as delayed permitting, material lead times, or even traffic control, are discussed. These meetings allow consistent updates between all personnel involved in the projects as well as the ability to discuss any issues that are arising during construction in an effort to prevent similar occurrences in the future, or simply to inform project managers of challenges they may experience on upcoming projects.

Obtaining Accurate Utility Information through SUE, As-Builts, and Inspection

Julie Johnston, FHWA Utility Program Manager, said it best in her 2018 Utility Program Review Report: "The effects of not accurately locating subsurface utilities undermine the entire utility coordination process. Without accurate location of utilities, designers have to make an educated guess or assume the location and therefore are unable to accurately identify and manage utility conflicts. Inaccurate utility location data during the preconstruction phase has a detrimental effect on construction and leads to: increased risk for contractors, increased contract bids, increased costs due to change orders and claims, project delays, and increased safety risks to contractors and the traveling public because of longer-lasting work zones and the threat of hitting live utility lines, gas, and power."

With the amount of congestion that continues to grow within the public right-of-way, knowing where utilities are located, who owns them, and what they are is becoming increasingly important. With the numerous BEAD projects combined with alternative uses of the right-of-way, the amount of real estate available for utility infrastructure is dwindling and right-of-way management becomes increasingly critical. Having a better understanding of utility facilities that exist within the right-of-way of a potential project is important for understanding the inherent risks associated with them. The more accurate the available information, the more risk can be reduced during design which is translated into construction.

More effective utility relocation plans, agreements, and relocation schedules are developed when utilizing accurate information. Utilizing accurate utility information also reduces the risk to the Contractor personnel, damage to utility infrastructure, and frustration by the traveling public.

If early engagement with utility stakeholders is the overwhelming leader in improving communication with the utility stakeholders,

Subsurface Utility Engineering (SUE) is the overwhelming leader in obtaining accurate utility information. SUE combined with as-builts, mapping, and inspection of utility installations create a comprehensive picture of the utility infrastructure for an improvement project.

SUBSURFACE UTILITY ENGINEERING (SUE)

Any SUE investigation done for a design project should be done in accordance with ASCE 38, "Standard Guideline for Investigating and Documenting Existing Utilities". ASCE 38 discusses the various quality levels based on the accuracy of the utility information, tools that may be used to conduct a SUE investigation, and the responsibilities of the licensed professional engineer who signs and seals the SUE investigation. A qualified SUE provider will work with the designer and project owner to provide a comprehensive investigation of the existing utilities at the time of the investigation.

The Quality Levels (QL) that are depicted on the SUE plans are defined in the ASCE 38 standard. A professional engineer must assign the quality level of a depicted utility based on the information obtained through records, survey, and the field investigation.

- » **QL-D** is record information and is the least accurate. Records alone do not provide sufficient accuracy of the utility infrastructure. This information can be useful when a utility cannot be confirmed in the field but is known to exist. The inability to locate the facility is often due to lack of a tracer wire, a damaged tracer wire, the age of the facility or material that is not conductive, such as plastic or concrete.
- » **QL-C** is assigned to a subsurface utility when above ground features can be used to estimate the existence and location of a subsurface utility. The SUE professional will apply engineering judgement to determine if a line can be considered QL-C. Above ground features such as power poles, pedestals, manholes, etc. are also considered QL-C.

↳ **QL-B** is assigned to a subsurface utility when geophysical methods have been used to obtain a horizontally accurate (0.2 feet) location. Geophysical methods include electromagnetic locators and ground penetrating radar, among others. A combination of geophysical methods may be required in order to obtain accurate information. The location must be tied to a project datum. Many of the tools utilized in a QL-B investigation can provide approximate depths of the facilities. A great deal of caution should be utilized when relying on this information to make informed design decisions. As a practice, SUE providers will not recommend the use of QL-B elevations for critical design decisions.

↳ **QL-A** is the most accurate utility information that can be obtained on a subsurface utility. QL-A is obtained by conducting a test hole through either air vacuum excavation or hydro-evacuation to expose a utility facility to determine an accurate elevation of the facility. Similar to QL-B the information is tied to a project datum. In addition to the X, Y, and Z coordinates, a test hole can also provide valuable information about a facility's size and material. The test hole is accurate at a specific location and the depth of the utility feature is only accurate at that location. Care should be taken when assuming a constant depth across the facility when making design decisions.

Most SUE investigations should be conducted to achieve Quality Level B of all subsurface utility infrastructure. A licensed professional engineer will use engineering judgement to assign quality levels to the utility features depicted on the plans, including unknown utilities that may have been found during the designating. When QL-B cannot be achieved for a utility feature, the engineer must provide reasoning for why QL-B could not be achieved. It is important to note that while a SUE investigation is a highly accurate map of the existing facilities, it cannot be utilized as damage prevention during construction. The investigation

is only as accurate as the information obtained at the time of that investigation and does not include any relocated or utility installations completed after the date of the investigation.

The SUE investigation should then be included as a reference to the contract bid documents and provided to the Contractor for their use during construction. This does not negate the Contractor's requirement to contact 811 for damage prevention locates. However, the SUE information reduces risk in the project estimate by providing more accurate utility data to the Contractor before construction, and accurate information to compare with the damage prevention locates in the field.

SUE can be a powerful tool in reducing delays during construction. So much so that some states have provided legislation for the SUE on design projects. For example, Colorado has legislated SUE as part of their damage prevention law and requires that the Colorado Department of Transportation (CDOT) conduct a SUE project when the project meets specific criteria. Pennsylvania requires a SUE project for any project over \$400,000.

AS-BUILTS AND UTILITY MAPPING

In addition to obtaining a SUE investigation during design, mapping of existing utilities and requiring utility installation as-builts as part of a permitted utility project should also be considered when reducing utility related delays. When existing utility mapping and as-builts are provided to the Contractor at the start of construction, the Contractor is able to compare the field markings through 811 to the mapped facilities to determine if the marks on the ground match those that are anticipated based on the mapping. If they don't, the Contractor can coordinate directly with the utility stakeholder to determine what is depicted is either active, retired and/or abandoned, or an error.

As-builts should be completed by the utility contractor, a surveyor, or an inspector who is onsite during construction. The as-built data should be collected for all above-ground appurtenances, changes in direction of subsurface facilities, crossings with any existing utilities, and at recommended distances along a line. Expected accuracy levels should be communicated to the utility in the permit language and/or provisions. The as-builts should clearly depict the type of facility, owner, material type, size, and date of installation. Ideally the as-builts should be delivered digitally so they can be easily uploaded to an existing data repository and combined with any other utility data that may already exist.

Mapping of existing facilities is a "from this day forward" activity, where existing facilities associated with an ongoing project are mapped and included in the database. As additional projects are completed, permits are approved, and as-builts are submitted, the map will continue to be populated. Incorporating existing GIS data or surveys from previous projects can also be utilized to develop a comprehensive map of the facilities within the right-of-way. Unless the data collection is for the utility owner, only the utility features located within the right-of-way should be collected.

Understanding how to collect, record, and share utility data amongst stakeholders is critical. This is the reason the ASCE 75 standard was developed. Any utility mapping or as-built data collection should be done in accordance with ASCE 75, "Standard for Recording and Exchanging Utility Infrastructure Data". The ASCE 75 standard defines the various positional accuracy levels, attribute information, and sample schemas that should be applied to the utility data being collected.

All utility data, from SUE, as-builts, or existing mapping, should be managed in a data repository that can be easily accessed and updated when new information is available. The most efficient way to collect the data would be to utilize a system that does not require relying on too many people to update the map. The more people that need to review the data before uploading it to a map, the longer it will take to have accurate information available to those who utilize it, like those who approve permits for proposed utility installations, designers, utilities, and contractors. Whatever mapping system is used, the information should be made available and be accessible in the field and in real time.

INSPECTION OF UTILITY INSTALLATIONS

As with any construction, utility installations should be inspected to ensure the installation is completed in accordance with the approved permit. This should include ensuring the utility's contractor is placing the facility in the correct location, horizontally and vertically, verifying exiting utility crossings are recorded, completing inspection reports, and capturing as-built data. Non-utility related items such as traffic control and restoration of the project area should be considered as part of the inspection as well. Inspection can be done by an employee of the municipality or county, or via a third-party inspector. Inspection reports should be attached to the approved permit upon completion.



Conflict Management

Identifying potential conflicts between the existing utilities and the proposed design is critical to reducing risk in construction. Developing a conflict management plan or process can help to identify the type of conflict (direct or indirect), the reason for the conflict, the facility in conflict, the location of the conflict, the risk to the project if the conflict is not resolved, and possible mitigation measures.

Utilizing a conflict matrix is helpful in organizing the direct conflicts between an existing facility and a proposed design element and ensuring each conflict is mitigated either by design changes, construction special provisions, or relocation. The matrix should also be utilized to capture indirect conflicts. Indirect conflicts include constructability conflicts, conflicts with schedules, materials procurement, and even agreement processing. The matrix provides a framework for ongoing discussions with the utility stakeholders as the project advances. As conflicts are remediated through design, the information is continuously updated. The matrix is provided to the Contractor with the contract bid documents as a summary of the coordination efforts to mitigate utility conflicts. The focus can then be on working with utility stakeholders who have outstanding utility conflicts to resolve.

Standardization of Policies, Procedures, and Permits

Legislation is one method to standardize communication and expectations with utility stakeholders on a project. The one call legislation IC 8-1-26 standardizes the damage prevention laws. 105 IAC standardizes the utility coordination process for projects administered by INDOT. Through IC 8-1-2-101, municipal councils and county executives are given the power to manage their right-of-way with regard to utility installations.

Summarizing this code, local government units have the power to establish an ordinance that governs how a utility can utilize the right-of-way (101-a-1), designate the location, time, and conditions of an installation within the right-of-way (101-a-2), and provide a penalty for noncompliance of the ordinance (101-a-3). This code also allows a municipality or county to require compensation by the utility for management costs including registering occupants, verifying right-of-way occupation, inspection, restoration, and implementation of the ordinance. And IC 36-1-4-11 permits local government units, municipalities and counties, to "adopt, codify, and enforce ordinances."

There are, however, few state-level legislative actions that are specific to how municipal and county governments regulate utility infrastructure within their right-of-way. Without standards to support municipal and county executives with regard to utility encroachments, each local government must develop their own ordinances, permits, and processes. Absent any formal process, utilities will defer to INDOT's processes and procedures, and as previously discussed, this is a conflict when the project timeline does not align with the INDOT process.

Some municipalities and counties have established more robust ordinances, codes, permits, and policies to standardize how to more effectively coordinate with utilities and manage their right-of-way.

Case Study:

Boone County: Boone County is in the process of adopting an ordinance that includes SUE on projects meeting specific criteria, establishing a utility accommodation policy, establishing a utility coordination design process, and providing permit provisions requiring as-builts on all utility installations.

Case Study:

Indianapolis DPW: Recognizing that a standard process needed to be established for communication with utility stakeholders, the City of Indianapolis Department of Public Works (DPW) has established their own Utility Coordination Process for Capital Improvement Projects. The language is similar to that of the 105 rulemaking but has response times more appropriate for the speed at which DPW projects are designed and taken to construction. DPW has also created their own standard letters and documents to be utilized during the coordination process.

PERMITS

The most effective right-of-way management tool available to municipal and county governments is the establishment of a robust permitting process that includes fees, encroachment provisions, and as-built requirements for all utility installations, whether required by a project or a new installation requested by the utility. A permit provides the right-of-way owner the power to regulate how a utility will install facilities within their right-of-way, require inspection of the installation, and receive as-builts from the utility post-installation.

Permit applications should be accompanied by general encroachment provisions. These provisions should reference the UAP, restoration requirements, inspection requirements, as-built requirements, type of construction, traffic control requirements, notification requirements, and other conditions that a utility must adhere to during the installation of their facility. Failure to adhere to the permit provisions could result in the delay of successive permits or releasing of bonds until such time as the permit conditions have been met.

When a utility permit is required for a relocation as a result of an improvement project, it is important to tie the permit to the specific project, whether in design or construction. This allows project personnel to account for any work being done that could impact the design or construction of the proposed project. Permit coordinators for the municipality or county should communicate any new permits within a proposed project to the project team. The project team should advise on whether the utility installation will require relocation as a result of the project, if the utility should install in a different location, and provide guidance on the right-of-way and any other design features the utility should be aware of prior to the installation.

UTILITY ACCOMMODATION POLICY

As important as a permit is the establishment of a utility accommodation policy (UAP). UAPs establish where and how utility infrastructure may be installed in the right-of-way. Provided the municipal or county policy is no less strict than

INDOT's, there is nothing that prohibits them from developing their own policy. The UAP is important for specifying the location, vertically and horizontally, of a utility installation. For example, overhead utility installations crossing the roadway should have a specific clearance that may be dependent on the type of vehicles that may utilize the roadway, such as large farm equipment. For underground utilities, require a specific clearance between the bottom of ditches, tiles, pipes, or structures.

UTILITY COORDINATION DESIGN PROCESSES

Similar to the 105 rulemaking and the code adopted by the Indianapolis DPW, municipal and county governments can establish their own utility coordination processes and standard documents. Utility stakeholders are familiar with the INDOT process, therefore mimicking that process may be advantageous, simply adjusting the response times to better align with the project schedule. The utility coordination process should include a requirement for a SUE investigation for a project meeting specific criterion.

Rather than spell out the specific language of a process, procedure or permit in the ordinance language, incorporate them into the ordinance by reference. This will eliminate the need to pass a new ordinance each time a change is made to the referenced documents.

The challenge facing utility stakeholders is that many utility territories cross jurisdictional boundaries. When each jurisdiction has their own set of standards, delays can occur simply by not understanding the necessary processes within each jurisdiction. Standardizing the requirements utilities must follow between jurisdictions may reduce confusion and delays as the expectations are the same regardless of location. Standard language can be utilized for encroachment permits, general encroachment provisions, standard drawings, utility accommodation policies, and design procedures.



IMPLEMENTATING CHANGES

Encouraging Change

In order to encourage project stakeholder cooperation, developing an implementation plan for any changes will be important. This should include the opportunity for stakeholders to provide input and ask questions. Develop a schedule for how and when the changes will be communicated and implemented. Determine what assistance can be provided by the local agency when questions or problems arise. Clearly communicate expectations.

Standardizing processes and policies may require changes to existing ordinances, permits, or special provisions. As an organization, develop ordinance language that can be used consistently in order to standardize the expectations of all utility stakeholders within the area. This language should clearly indicate any fees associated with permits, policies and procedures that will be adopted by the local agency, and penalties for violations of the ordinance. The goal in standardizing ordinances, permits, and processes among the organization would be to provide consistency with regard to anticipated and expected deliverables from the stakeholders.

Draft permit language that is standard to the organization, but flexible enough that each municipality can cater it to their specific needs. The permit, general provisions, and encroachment guidelines should include the requirement for as-built submissions including the accuracy of the data, how the data is collected, where the data will be stored, and how the data will be managed. If inspections for utility-initiated projects is required, provide guidance on who is responsible for the inspections and the qualifications of the inspector. Engage in third-party inspectors as needed to ensure the utility work is proceeding and installed as permitted.

Develop a utility accommodation policy. Using the existing INDOT policy is a start and can be referenced in a local UAP. The local UAP may require different clearances or construction and restoration requirements. Working as an organization to standardize this document will reduce confusion among the utility stakeholders.

Develop a utility coordination process document that should be utilized by design consultants during locally funded project development. The process should also include how, and when, the

utility stakeholders should engage during project development. Similar to the INDOT process, standardizing the expectations from municipality to municipality during project development will encourage better coordination and collaboration between project owner, design team, and utility stakeholder. This document should include the frequency of and submittals to the utility stakeholders, as well as identifying the response times. Include expectations of when SUE is to be utilized, what a SUE deliverable includes, how the data is incorporated into the construction bid documents, and who is responsible for the data that is collected in a SUE investigation.

Making any changes to existing processes or expectations requires time, understanding, and patience for and between all parties. Once the ordinances, permits, policies, and procedures have been developed, communicating these changes should be a priority. Suggestions for communicating changes include holding forums with utility stakeholders, contractors, and designers; meetings with individual utility stakeholders that may not have the personnel to accommodate the changes and how those challenges will be overcome; the development of utility coordination councils where changes can be discussed, monitored, and adjusted as needed to all stakeholders; and annual trainings of procedures. If utilizing a new technology, provide training on how the technology is used, how the data is incorporated into existing data repositories, how to access data when needed, and submission requirements.

CLOSING SUMMARY

Utility facilities in public right-of-way is not new, nor is it going to change any time in the near future. With federal programs such as BEAD, utility facilities will continue to cause congestion within public right-of-way and conflicts during construction. Unless practices are implemented to bring all stakeholders to the project table with the objective of minimizing utility conflicts and ultimately construction delays, there will be continued frustration and confusion among the stakeholders. The practices discussed in this paper are not fool proof methods to eliminate all utility-related construction delays. If implemented, these strategies could provide a platform for cooperation and collaboration throughout a project, benefiting all project stakeholders, the traveling public, the utility provider, and the right-of-way owner. It's important to remember, too, that the funding for the project comes from the taxpayer and the funding for relocations comes from the utility rate payer, and those are one and the same.

Documents Used

- ↳ ASCE 38, N. (2022). Standard Guideline for Investigating and Documenting Existing Utilities. American Society of Civil Engineers. <https://doi.org/10.1061/9780784415870>
- ↳ ASCE 75, N. (2022). Standard Guideline for Recording and Exchanging Utility Infrastructure Data. American Society of Civil Engineers. <https://sp360.asce.org/personifyebusiness/Merchandise/Product- Details/productId/280994612>
- ↳ CDOT. (2021). Rules and regulations of the Colorado Department of Transportation: Pertaining to accommodating utilities in the state highway rights of way. Colorado Department of Transportation (CDOT), USA.
- ↳ National Academies of Sciences, Engineering, and Medicine. 2022. Implementation of Subsurface Utility Engineering for Highway Design and Construction. Washington, DC: The National Academies Press. <https://doi.org/10.17226/26588>.
- ↳ FHWA. (2002). Avoiding Utility Relocations. U.S. Department of Transportation. U.S. Department of Transportation, Federal Highway Administration, Research, Development, and Technology. <https://www.dot.gov/PartnerSmart/utilities/Documents/AvoidingUTLRelocations.pdf>
- ↳ FHWA. (2018, October). National Utility Review: Utility Coordination Process. <https://www.fhwa.dot.gov/utilities/hif18039.pdf>
- ↳ INDOT. (2021). Chapter 104—Utility Coordination.pdf. Indiana Department of Transportation (INDOT), USA. <https://www.in.gov/dot/div/contracts/design/Part%201/Chapter%20104%20-%20Utility%20Coordination.pdf>
- ↳ Nemeth, B., Aulwes, G., & Ladwig, J. (2020). Best Practices for Managing Utility Congestion within Rights-of-Way. Minnesota Local Road Research Board, MnDOT Office of Research & Innovation, 12.
- ↳ Adebiyi, Jeremiah & Sturgill, R.E. (2024). Best Practices for Utility Management in the Public Right of Way. Iowa Department of Transportation.
- ↳ National Academies of Sciences, Engineering, and Medicine. 2017. Effective Utility Coordination: Application of Research and Current Practices. Washington, DC: The National Academies Press. <https://doi.org/10.17226/24687>.
- ↳ US General Accounting Office Report to Congressional Requestors, TRANSPORTATION INFRASTRUCTURE: Impacts of Utility Relocations on Highway & Bridge Projects, June 1999 <https://www.gao.gov/assets/rced-99-131.pdf>
- ↳ El-Rayes, K., Liu, L., El-Gohary, N., Golparvar-Fard, M., and Ignacio, E. (2017). Best Management Practices and Incentives to Expedite Utility Relocation: Final Report. Illinois Center of Transportation. URL : <https://rosap.ntl.bts.gov/view/dot/37608>
- ↳ Piratla, K., Le, T., Quiroga, C., Harbin, K., Shukla, H., Yadollahi, M., Elelu, K., and Attaway, M. (2024). Impact of Utility Delays on Project Delivery. Texas A&M Transportation Institute. Report Number : FHWA-SC-24-01. <https://rosap.ntl.bts.gov/view/dot/73800>
- ↳ Federal Transit Administration Project Management Oversight Program (2022). Utility Relocation – Challenges and Proposed Solutions. Utility Relocations – Challenges and Proposed Solutions (dot.gov)
- ↳ Sturgill, R., Taylor, T., Ghorashinezhad, S., Zhang, J. (2014) Methods to expedite and streamline utility relocations for road projects. University of Kentucky Transportation Center. <https://rosap.ntl.bts.gov/view/dot/28584>

Title VI and Non-Discrimination

The Indianapolis Metropolitan Planning Organization (IMPO) values each individual's civil rights and wishes to provide equal opportunity and equitable service. As a recipient of federal funds, the IMPO conforms to Title VI of the Civil Rights Act of 1964 (Title VI) and all related statutes, regulations, and directives, which provide that no person shall be excluded from participation in, denied benefits of, or subjected to discrimination under any program or activity receiving federal financial assistance from the IMPO on the grounds of race, color, age, sex, sexual orientation, gender identity, disability, national origin, religion, income status or limited English proficiency. The IMPO further assures every effort will be made to ensure nondiscrimination in all of its programs and activities, regardless of whether those programs and activities are federally funded. For any and all inquiries regarding the application of this accessibility statement and related policies, please view the IMPO Title VI page, indympo.org/policies

This plan was prepared in cooperation with the State of Indiana, the Indiana Department of Transportation, and the Federal Highway Administration. This financial assistance notwithstanding, the contents of this document do not necessarily reflect the official view or policies of the funding agencies.

If information is needed in another language, contact 317-327-5136. Si se necesita información en otro idioma, comuníquese con 317-327-5136.



INDYMPO.GOV