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USING "THE TAC GUIDELINE FOR THE COORDINATION OF UTILITY RELOCATIONS" ON CAPITAL INFRASTRUCTURE PROJECTS

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Abstract: The Transportation Association of Canada's (TAC) Public Utilities Management Sub-committee has published a new document - Guideline for the Coordination of Utility Relocations. The purpose of the guideline is to assist various Right-of-way (ROW) owners and Utility agencies to develop or enhance their utility coordination processes. For Utilities with infrastructure in a variety of areas, it gives them a consistent process they can follow when working with any ROW owner. For ROW owners it allows them to learn from the best practices and procedures of different parties and implement a process that will be readily accepted and adopted by utility agencies. This presentation will review the key aspects of the new Guideline, highlighting the Objectives, Intended Audiences, "Utility Coordination Phases" and some of the new developments being made. Major themes contained in the guideline such as the use of Utility Coordinators, and SUE mapping as per ASCE 38-02 will be reviewed. The audience will have an opportunity to ask questions about the new guideline and determine how it can best be incorporated into their community or business.

1 Objective of "The Guideline"

The main objective of "The Guideline" is to aid in the standardization of the utility relocation process on major capital road projects that have utilized a Design-Bid-Build procurement model. The ROW Owners can use "The Guideline" to develop a new utility coordination process or enhance their existing process to be in alignment to the industry-accepted standard. The Utility Agencies will then have a standardized process that they know will be implemented in all locations across Canada.

2 Intended Audience:

"The Guideline" was written primarily for all stakeholders involved in the planning, design and construction of major capital roads projects. This list of stakeholders may include, but not be limited to, ROW owners, Utility Agencies, consultants, utility contractors, road contractors and inspectors. "The Guideline" may also be used as a training document for new engineering professionals involved in the delivery of major capital roads projects.

3 Utility Coordination Phases:

"The Guideline" separates the utility coordination process into four distinct phases known as: A) The Planning Phase, B) The Design Phase, C) The Construction Phase and D) The Post-Construction Phase. Each of these phases contains utility coordination tasks that need to be completed to successfully manage utility risks on major capital infrastructure projects.

3.1 The Planning Phase

The Planning Phase can also be referred to as the Functional Planning and Environmental Assessment Phase. For the purpose of this paper, the Planning Phase is the process of evaluating various designs and selecting the preferred option. Utilities can have a significant impact on this selection process; therefore, it is essential to commence communications with the Utility Agencies in the Planning Phase. Early consultation with the Utility Agencies is beneficial to both the project and the utility agencies.

The project's planning team gains a better understanding of the existing utilities within the project limits which will benefit the project as a whole. The early consultation with the Utility Agencies will be of great assistance since the Utility Agencies will be in a better position to budget for the relocation work in the appropriate year.

One of the first tasks in the Planning Phase relates to the management of the project's utility risk by assigning a Utility Coordinator. "The Guideline" highlights the importance of the Utility Coordinator's role in the management of the utility coordination process. At a high level, the role of the Utility Coordinator is to ensure that all tasks related to utilities on the project are completed correctly and at the appropriate time in the project's lifecycle.

In the Planning Phase the Utility Coordinator begins the process of identifying the utilities within the project limits. As a best practice "The Guideline" promotes the implementation of a Subsurface Utility Engineering (SUE) investigation in accordance with the American Society of Civil Engineers (ASCE) 38-02, "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data". The quality level as defined in ASCE 38-02 of the SUE investigation is project specific and should be determined through a high-level Utility Impact Study. As a rule, the more congested, critical and complex the utility situation is within the project limits the greater the quality of a SUE investigation that is required. The ASCE 38-02 SUE quality levels will be described in detail below. The information gathered through the SUE investigation is mapped and forms one of the foundational pillars of a project's base plan. The Design Planner is now equipped with utility information on the base plan that will aid in the selection of the preferred design option.

Key information to obtain from the utility agency in this Planning Phase is any critical or vital infrastructure that will require lengthy relocation timelines or design changes to eliminate any potential utility conflict. It is also important to obtain a high-level relocation schedule and a cost estimate especially for the crucial/vital utility infrastructure. With the preferred design option approved the project can move forward to the Design Phase.

3.2 The Design Phase

The Design Phase continues until all utility designs are completed and all utility relocation construction dependencies are in place. Similar to the Planning Phase, the selection of the Project Utility Coordinator is an essential first step to ensure that all utility tasks are completed correctly and at the appropriate time in the project delivery process.

"The Guideline" divides the Design Phase into two sub phases called Preliminary Design Phase and Detailed Design Phase.

The Preliminary Design Phase takes the Planning Phase Design and progresses it to the 30% design milestone. The key design elements to be completed to meet the 30% design criteria as listed in Appendix B of "The (TAC) Guideline" (TAC 2003) are:

- Base plan survey completed including property lines, easements etc.
- Composite utility drawing completed in accordance with ASCE 38-02 including the appropriate Quality Levels
- Required right-of-way widths and constraints identified

- Plan and profile views of existing storm sewers, watermains, sanitary sewers and new construction completed
- Road geometrics added
- Excessive horizontal alignment and vertical grade changes identified
- Potential new developments consulted
- Road cross sections added
- Retaining walls identified
- Initial Utility Conflict Matrix included
- SUE QL-A (test pit) locations identified
- Existing structures (bridges, culverts) condition survey included
- Identify rail way crossings and required permitting process identified
- Commence land attainment process commenced
- Permission to Enter agreements that are required are identified
- Environmental conditions, permit requirements and associated timing restrictions are identified
- All partnerships and cost-sharing agreements are identified (i.e. streetscaping, municipal infrastructure improvements, illumination etc.)
- Initial constructability reviewed
- Street Tree Inventory and Street Tree Preservation Plan completed
- Initial streetscape plan completed

The Utility Tasks Performed in the Preliminary Design Phase are:

- notification of the Commencement of the Design Phase includes identifying the Design Consultant, “Designer”, contact information, the project scope and timelines, is given to the Utility Agencies
- additional SUE investigations are conducted to further identify the existing utility corridor
- base plans are updated with additional SUE investigation findings
- utility conflict analysis is prepared and includes the creation of a Utility Conflict Matrix to track potential utility conflicts
- a schedule is created and a utility coordination face-to-face meeting with the project owner, design team and the impacted utility agencies is conducted.

Typically utility relocation design does not commence until later in the Detail Design process but some initial utility relocation design can occur during the Preliminary Design Phase. An example would be the initial hydro pole relocation alignment. The new hydro pole alignment often aids in moving the project design from 30% Preliminary Design to the 60% Detailed Design.

The Detailed Design Phase commences once the Preliminary Design Phase has been completed and continues until the utility relocation designs are finished and all utility relocation design dependencies are in place. The Designer progresses the project status from the 30% to 60% Detailed Design milestone.

The key design elements to be completed to meet the 60% design criteria as listed in Appendix D of "The Guideline" (TAC 2003) are:

- Base plan survey finalized including property lines, easements, etc.
- Composite utility drawing finalized in accordance with ASCE 38-02 including the appropriate Quality Levels.
- Required right-of-way widths and constraints finalized
- Plan and profile views of existing and proposed storm sewers, watermains, sanitary sewers and new construction finalized
- Road geometrics finalized
- Horizontal alignment and vertical grade finalized
- New developments access locations and servicing finalized
- Road cross-sections finalized
- Retaining walls designed
- Updated Utility Conflict Matrix produced
- Further SUE QL-A (test pit) locations identified
- Existing and proposed structures (bridges, culverts) designed
- Rail way crossings and required permitting process identified
- Land procurement nearly completed (land required prior to the commencement of utility relocations)
- Permission to Enter agreements nearly completed
- Location of environmental conditions, permit requirements and associated known timing restrictions identified
- Partnerships and cost sharing agreements finalized (i.e. streetscaping, municipal infrastructure improvements, illumination, etc.)
- Temporary and proposed illumination and traffic signal designs completed
- Constructability reviewed
- Street Tree Inventory and Street Tree Preservation Plan completed
- Streetscape designed completed

The 60% Detailed Design is a key milestone in utility coordination as it is the point in the project process when the utility agencies typically begin their relocation designs. Further SUE investigations (i.e. test holes) may be required to identify the scope of the utility relocations needed to deliver the project. An experienced Utility Coordinator is essential to a project at this stage to identify all potential utility conflicts and the appropriate conflict mitigation option. An experienced Utility Coordinator can save the project costs and time through a philosophy of minimizing project utility relocations.

With the utility relocation scope identified through a utility conflict analysis, through additional SUE investigation findings and through the conflict mitigation process, the utility agencies are in a position to complete their relocation designs and submit for Road Authority and other regulating agency permits. A

utility relocation cost estimate is prepared by the utility agency upon acceptance of the relocation design by the design team. This estimate commences the Purchase Order Process. The Purchase Order is a dependency for utility relocation construction.

The Detailed Design Phase ends when all utility relocation construction dependencies are in place. These dependencies include the utility relocation design completed and approved by the governing Road Authority; the other issued agency permits (i.e. environmental regulators, railway companies, the third party attachment agreements etc.); the land obtained and registered and the Purchase Orders issued to the Utility Agencies.

3.3 The Construction Phase

The goal on large capital infrastructure projects is to have all utility relocations completed prior to the tendering of the project contract or at the very latest before the Project Contractor commences work. “The Guideline” speaks to three timelines where the utility relocations can occur in the construction phase. These timelines are “Prior to Construction”, the “ During Construction” and the “Post-Construction”.

Assigning a Utility Coordinator at the start of the Construction Phase will help in the management of the utility relocations in the field. One of the key tasks of the Utility Coordinator in the “Prior to Construction” timeline is to track the schedule of the utility relocations in the field. Any slippage in the schedule needs to be communicated to the design team, project owner and other utility agencies that will be affected by the potential delays. This communication is critical in order for the tendering document preparation and timing of the project can be adjusted accordingly. The “During Construction” timeline requires the Utility Coordinator to collaborate with the Utility Agencies and the project contractor to ensure time and space are made available for the relocation work by the Utility Agency and the project contractor. On a rare occasion there may be a need to have the utility relocations occur in the “Post Construction” timeline. This scenario typically happens when a temporary utility relocation is conducted and the ultimate utility relocation has to be installed after the project construction has been completed.

Upon completion of the utility relocations, the utility agency notifies the Utility Coordinator of the completion of the relocation work. The utility agency prepares the“As Built” drawings and the invoices in accordance with the cost-sharing apportionment agreements and legislation. These documents are forwarded to the Utility Coordinator.

3.4 The Post-Construction Phase

The Post-Construction Phase involves the reconciliation of the financial aspects surrounding the utility relocations on the project. The Utility Coordinator is responsible for:

- the review and payment recommendation of all invoices to the project owner,
- the resolution of invoicing discrepancies or concerns,
- the review and acceptance of CSA S250 quality “As Built” utility drawings, and
- the management of any project contractor delay claims caused by a negligent Utility Agency failing to relocate in the agreed timeline.

When all invoice recommendations have been made and the CSA S250 quality “As Built” utility drawings have been accepted, the Project Owner pays the final invoice and the “As Built” utility drawings are retained in the Road Authority’s comprehensive record storage. GIS mapping is a suggested as a best practice.

4 “The Guideline” - Two Major Themes:

Two major themes introduced in “The Guideline” are

a) the role of Utility Coordinator, and

b) the implementation of a SUE data collection and mapping in accordance with ASCE 38-02, “Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data”.

4.1 The Implementation of a Subsurface Utility Engineering (SUE) Data Collection and Mapping

To ensure consistency and transparency in the collection and depiction of utilities at various stages of capital infrastructure projects, “The Guideline” promotes that Subsurface Utility Engineering (SUE) investigations are performed in accordance with ASCE 38-02: “Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data”. ASCE 38-02 describes a dependable system to classify the quality of the subsurface utilities mapped on engineering drawings. These quality levels range from Quality Level D (QL-D) which is known as the least accurate, to QL-A which is known as the most accurate. Understanding the quality level of the utilities depicted on engineering drawings is crucial for excellent utility coordination. The Quality Level Descriptions from ASCE Standard 38-02 (ASCE 2003) are listed below.

Quality Level D – Information derived from existing records or oral recollections.

Quality Level C – Information obtained by surveying and plotting visible above-ground utility features and by using professional judgment in correlating this information to quality level D information.

Quality Level B – Information obtained through the application of appropriate surface geophysical methods to determine the existence and approximate horizontal position of subsurface utilities. Quality Level B data should be reproducible by surface geophysics at any point of their depiction. This information is surveyed to applicable tolerances defined by the project and reduced onto plan documents.

Quality Level A – Precise horizontal and vertical locations of utilities obtained by the actual exposure (or verification of previously exposed surveyed utilities) and subsequent measurement of surface utilities, usually at a specific point. Minimally intrusive excavation equipment is typically used to minimize the potential for utility damage. A precise horizontal and vertical location, as well as other utility attributes, are shown on plan documents. Accuracy is typically set to 15-mm vertical and to applicable horizontal survey and mapping accuracy as defined or expected by the project owner.

4.2 The Role of the Utility Coordinator

As per “The Guideline”, the Utility Coordinator is/are the person(s) on a project team responsible for coordination of all phases (Planning Phase, Design Phase, Construction Phase and Post-Construction Phase) of the project’s utility relocations. The utility tasks outlined in “The Guideline” gives an understanding of the depth and breadth of expertise required to perform the Utility Coordinator’s role. A Utility Coordinator experienced in a) utility design and construction, b) project design and construction and c) utility/municipal relationship(s) building is essential for the success of the project.

The Utility Coordinator’s role on a capital infrastructure project typically resides with the Project Owner’s agent. The “Agent” could potentially be the Owner’s Project Manager, or a consultant (Planning and/or Design) or a specialist in utility coordination. All stakeholders may assign a utility coordinator on the project. For example, on a large capital infrastructure project with a congested, complex utility presence, the Project Owner may choose to assign the Utility Coordinator role to a consultant as well as retaining an additional Owner Utility Coordinator to manage their utility risk. Utility Agencies may choose to assign their own Utility Coordinator to manage their risk on complex projects.

In this example, not all utility coordinators assigned to the project by the various stakeholders are responsible for all the tasks outlined in “The Guideline”. The Utility Coordinator assigned by the Project Owner would be responsible for the completion of the utility coordination tasks. The other utility coordinators would play a part in the completion of some of the tasks.

5 New Developments Related to "The Guideline":

Since the publication of "The Guideline" in 2016, several ROW owners have used it develop a new utility coordination process manual or used it to enhance their existing process.

Alberta Transportation is using "The Guideline" as a seed reference document to develop their own Utility Coordination Manual that would help resolve the issues of utility coordination put forth by their Utility Partnership Subcommittee Tasks Forces. The basic principles outlined in "The Guideline" answered their issues related to the utility coordination process. The utility relocation cost apportionment issue put forth by their Task Forces goes beyond the scope of "The Guideline" and, therefore, is being resolved through the review and revision of utility agreements between Alberta Transportation and the Utility Agencies.

Similar to Alberta Transportation, the Regional Municipality of Durham has embarked on the development of their formal Utility Coordination Process Manual as a means to improve the management of the utility risk on their capital delivery projects. "The Guideline" was also used as a seed document that directed the development of their manual.

There is still a need for further utility management guidelines to aid the industry in the standardization of the utility coordination process. TAC has recognized this void.

Since the publication of "The Guideline", TAC's Public Utilities Management Subcommittee has been developing the next instalment for utility coordination. The next guideline will be focusing upon Utility Coordination on Public-Private-Partnership (P3) Projects and is anticipated to be completed by late 2019.

Other associations are also tackling the utility coordination challenge. One such group is the ASCE Utility Engineering and Survey Institute (UESI) Utility Coordination Committee, which is currently working toward a national certification course for Utility Coordinators among other projects. All this work in the utility process management by the different associations is raising the industry bar and will ultimately result in quality utility coordination.

6 Conclusion

To answer the industry call to aid in the management of the utility relocation risk on capital infrastructure projects, TAC developed a national guideline, called "The TAC Guideline for the Coordination of Utility Relocations" to standardize utility coordination process on design-bid-build projects. This paper has reviewed and discussed the key aspects of "The Guideline" through, highlighting its "Objectives", its "Intended Audiences", "Utility Coordination Phases" and discussed some of the "New Developments" as result of "The Guideline". The "Two Major Themes" contained in "The Guideline", a) The Implementation of a Subsurface Utility Engineering (SUE) Data Collection and Mapping and b) The Role of the Utility Coordinator were reviewed and discussed. The importance of SUE, in accordance with ASCE 38-02, in the utility coordination process and the importance of an experienced Utility Coordinator to manage the diversity of utility tasks encountered in the delivery of a large capital infrastructure project are two major themes reviewed and discussed. It is evident that "The (TAC) Guideline for the Coordination of Utility Relocations" is beginning to have an effect in the industry as seen in the role it has played in the development of the Alberta Transportation's and Region of Durham's Utility Coordination Process Manuals.

References

Transportation Association of Canada. (2003) Guideline for the Coordination of Utility Relocations, Ottawa, Ontario.

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American Society of Civil Engineers. (2003) Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data, Standard #38-02, Reston, Virginia.