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EXECUTIVE SUMMARY

The guidelines are designed as a template that public agencies can refer to for developing a process for the coordination of utility relocations. For those agencies with existing processes, it can be reviewed as a best practices document, ensuring that all key aspects are covered, and consistent practices are followed. For those without an existing process this can be a base document used to develop a manual for agency specific situation.

The document is divided into two main components – the flow chart and the write-up. The flow chart is intended as an overall summary of the processes used on a typical capital works design-bid-build project to coordinate all relocations required. It covers all major components of the project: preliminary design, detailed design, construction and post-construction.

The main body of the document complements the information in the flow chart providing additional detail on each of the various phases of the project.

The intent of the document is to advance the overall coordination of utility relocations across the country for the benefits of both, public agencies and utility companies. The key component of the success is use and implementation of the guidelines.

RÉSUMÉ

Ces lignes directrices ont été conçues sous forme de gabarit de référence à utiliser par les administrations gouvernementales pour l'élaboration de leurs propres processus de coordination du déplacement des réseaux de services publics. Les administrations possédant déjà un processus de déplacement peuvent se référer aux lignes directrices pour vérifier s'ils ont bien tenu compte de tous les aspects de la démarche de déplacement des réseaux de services publics, et pour vérifier la cohérence des pratiques établies. En l'absence d'un processus existant, ces lignes directrices offrent un document de base complet à employer pour l'élaboration de processus adaptée aux besoins particuliers de chaque administration gouvernementale.

Le document est divisé en deux sections – l'organigramme du processus et la description détaillée des étapes. L'organigramme résume graphiquement l'ensemble des étapes de la coordination des travaux de déplacement des réseaux de services publics dans le cadre d'un projet d'aménagement réalisé selon le modèle conception-construction. L'organigramme du processus couvre toutes les principales étapes du projet : design préliminaire, design détaillé, construction et post-construction.

Le corps du document vient compléter l'organigramme du processus en offrant une description détaillée des éléments constituants de chaque étape du projet.

Ce document a pour but de rehausser les pratiques de coordination des projets de déplacement des réseaux de services publics à travers le Canada, ce qui est à l'avantage des administrations gouvernementales et des entreprises de services publics. Le succès de cette initiative sera déterminé par le degré d'utilisation et de mise en œuvre des lignes directrices.

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PUBLIC UTILITIES MANAGEMENT GROUP OF PUBLICATIONS

This group of titles has been created over time under the auspices of the **Public Utilities Management Subcommittee** TAC's **Maintenance and Construction Standing Committee**. All of these titles were developed as volunteer projects. The hard work and efforts of these committed volunteers is greatly appreciated; the individuals involved are listed on the 'Acknowledgments' page of each title.

- Guidelines for the Coordination of Utility Relocation (2016)
- Guidelines for Underground Utility Installations Crossing Highway Rights-of-Way (2013)
- A Guide for the Accommodation (Guide sur l'installation d'équipements de services publics dans laes emprises autoroutières (2011)
- Management of Utilities in and Adjacent to the Public Right-of-Way: Survey of Practices (2008)

These publications are being offered as FREE DOWNLOADS, in order to make them as widely-available as possible, thanks to the generous support of the following sponsors:

- Alberta Common Ground Alliance
- Alberta Transportation
- Nova Scotia Transportation & Infrastructure Renewal
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- Ontario Regional Common Ground Alliance
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- T2 Utility Engineers Inc

FOREWORD

Canadian right-of-way (ROW) owners manage the placement of infrastructure within the ROW in order to provide a wide variety of services to the public. As this demand increases, the public ROWs also become increasingly crowded and complex.

Any future projects initiated by various parties can quickly become in-efficient and costly without proper coordination.

It is the responsibility of both the ROW owners and utility agencies to develop an efficient and consistent utility coordination process that works in the best interest of all stakeholders.

OBJECTIVE OF GUIDELINES

The objective of the *Guidelines for Coordination of Utility Relocations* is to assist various ROW owners and utility agencies to develop or enhance their utility coordination processes. Project delivery efficiencies are expected to improve after coordination becomes more standardized across all areas of the country. For utility agencies 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.

The guidelines do not constitute policy, a standard, a specification or a regulation. It is not intended to, nor does it discuss any financial responsibilities, but rather focuses on tasks involved in the utility coordination process. It is a best practices guideline developed from a review of current practices across North America. Each ROW owner and utility agency is encouraged to follow it as the basis for their processes and enhance it with details specific to their area, situation or other unique criteria.

INTENDED AUDIENCE

These guidelines are intended for road authorities, consultants and utility agencies, with a specific focus on projects initiated by the public land authority. Although the guidelines can be used by anyone in order to relocate public and private utilities, they are specifically aimed at the following audiences:

- Road authority and utility agency managers
- Consulting engineers practicing in the related field
- Training purposes, students and individuals entering the construction industry

Other agencies such as transit, land development and others, with applicable projects, can benefit from the use of these guidelines. It is specifically designed with the design – bid – build process in mind. It is acknowledged that using a Design-Build, PPP or other procurement process will introduce unique parameters however the general fundamental principles will still apply.

1. INTRODUCTION

The coordination of projects between public land authorities and utility service providers is an integral factor in project planning, design and construction. To provide for efficient accommodation of utilities and minimize delays at all phases of a project, it is necessary to coordinate the process from inception to completion. This can be accomplished by using a comprehensive utility coordination process. This process is intended to provide early identification and resolution of possible delays and confusion that may add unnecessary complexity and cost to a project.

Use of this manual benefits all stakeholders:

Road authority – minimizes costs, minimizes conflicts, maintains schedules, manages risk

Utility interest – minimizes costs, protects the integrity of infrastructure, manages risk

Public interest - coordination saves on tax payer dollars and reduces traffic impacts

The guidelines make no reference to the legal right of utilities to use or occupy ROWs or to the financial responsibility involved in the adjustment or relocation of utilities on such ROWs.

This guideline is intended to provide guidance to the intended audience when utility relocation is required. The guidelines are put forth to encourage consistency and minimize conflicts when coordinating utility relocation projects. This manual is not region specific and is not intended to cover all possible scenarios.

This guideline provides:

- A brief overview of the roles and responsibilities of the public road authorities and the utility agencies
- A general description of the laws, rules, regulators and regulations in the Canadian construction environment.
- A flow chart illustrating the coordination steps required to successfully navigate from the planning phase of a project to the final post construction phase.
- An in-depth description of each phase found on the flow chart.

2. ROLES AND RESPONSIBILITIES

2.1 GENERAL

The key to successful utility coordination efforts is the establishment of a team approach to each project. Like a team, each member plays a key role in completing their portion of the project. This manual is organized to describe the key steps in the utility coordination process along with the specific players responsible for completing each step. This section outlines some of the key players on the team that have involvement with utility coordination and their roles and responsibilities.

2.2 ROAD AUTHORITY

The road authority is defined as a federal/provincial Ministry, a municipal corporation, a board, a commission or a body having control of the construction, improvement, alteration, maintenance or repair of a highway/road. Depending on the size and nature of the project the road authority may have an internal UC assigned to projects, or it may be completed by the owner's project manager. The road authority is responsible for outlining the scope of the project, setting up agreements with key parties and facilitating the final job.

2.3 UTILITY COORDINATOR (UC)

The UC is the person(s) on a project team responsible for coordination of all stages (planning, design, construction and close out) of the project's utility relocations. Simple projects may have one UC whereas more complex utility relocations may assign several UCs. The UC is typically an agent of the road authority. The road authority may choose to assign the UC responsibilities to the road authority's project manager, their consultant (planning and/or detail design) or a specialist in utility coordination. The utility agencies may assign their own UC to a project to protect the utility agency's interests. The roles and responsibilities mentioned in this manual refer to the road authority's UC.

2.4 DESIGNER

The designer is typically a consulting firm hired by the road authority to complete the design. The designer can also be an internal group within the road authority's organization. Depending on the size and nature of the project the designer may have a dedicated UC assigned to the project, or it may be completed by the designer's project manager.

The designer is responsible for the project's preliminary and/or detailed design including utility related aspects. They must communicate with both the road authority and utility agencies to facilitate the project.

2.5 UTILITY AGENCIES

Utility agencies are the owners of the utility infrastructure. In many cases the project owner is also the utility agency (i.e. for municipal infrastructure such as watermains and sewers, etc.).

Utility agencies are responsible for providing records of their existing infrastructure, reviewing plans, participating in design and related meetings, submitting relocation plans and schedules, and coordinating their relocation work with the road authority / designer and UCs. Their involvement will vary from project to project depending on the impacts to their infrastructure.

2.6 OTHER AUTHORITIES

Several other authorities may be involved with the utility coordination aspects of the projects such as Ministries of the Environment, local conservation authorities and, utility regulatory authorities (e.g. Electrical Safety Association), and non-utility right of way agencies (e.g. Railway and Airport Authorities)

These authorities typically regulate certain aspects or certain parties. They provide valuable input to ensure the projects are being completed in accordance with relevant laws, rules and regulations.

3. LAWS, RULES AND REGULATIONS

3.1 GENERAL

All work completed must be done in accordance with federal, provincial and local laws and regulations. These may vary from location to location. Therefore it is vital that all parties are familiar with and understand the laws and regulations of their local area. Depending on funding mechanisms for certain projects, different levels of government or other authorities may be involved.

3.2 FEDERAL LAWS/REGULATIONS

Federal laws and regulations are applicable across the country and are typically high in the hierarchy of applicable laws and regulations. An example of federal bodies would be the Canadian Radio-television and Telecommunications Commission, National Energy Board and Industry Canada.

3.3 PROVINCIAL LAWS/REGULATIONS

Provincial laws and regulations are applicable within specific provinces. Examples are the provincial Ministry of Transportation, Ministry of Environment, provincial building code and the Ministry of Labour.

3.4 LOCAL MUNICIPAL LAWS/REGULATIONS

Local bylaws and regulations are applicable within specific municipalities or selected geographical areas. An example would be local conversation authorities who may mandate the requirements for utility placement within local environmentally sensitive areas such as wetlands. Municipal bylaws may dictate specific guidelines related to construction of utility infrastructure.

It is important to understand the order of precedence as well as the applicability of these laws and regulations for each particular area.

4. PLANNING PHASE

4.1 GENERAL

For new road corridors, or major changes to the alignment of an existing road, utility relocation may be a significant factor in selecting a preferred plan for eventual construction. Even small projects can be delayed or have forced revisions, if utility conflicts are not identified early in the project's life. Early engagement of utilities in the project will allow the utilities to fit the project into their planning cycles so that it can be properly resourced.

Any work that will affect, or be affected by, existing and planned utilities must include utility coordination. Utility agencies can expect requests for information on existing facilities and their long-term plans over many kilometres of transportation corridor, or within an urban lot. The quality of information used for this level of planning will vary, and the guiding principle should be to "make decisions based on the best information available ".

The planning phase sometimes referred to as the environmental assessment or functional planning phase, is the process in which options are analysed to address a particular need or problem. The designer concludes with a recommendation to the road authority of the preferred construction option.

While some projects may combine the planning phase with subsequent work, this manual will discuss the more complex case where the planning is managed as a separate, stand-alone project. For the remainder of Section 1, the term "project" refers to the planning phase only, not the later construction project.

The major players involved in the planning phase are:

- The road authority
- The road authority's UC (designated under the Designer boxes in this guideline),
- The designer
- Representatives from all utility agencies and other authorities that may be affected by the construction contract.

The UC is responsible for ensuring project tasks related to utilities are completed at the appropriate time and within budget.

4.2 PLANNING START UP

Through discussion with the road authority, the project team determines the scope of the future construction project, a preliminary construction schedule and which stakeholders (including utility agencies) need to be consulted with during the planning phase.

Outcomes of these discussions include:

- Who will be the designer
- What are the outer limits of the area affected by the future construction contract

- A tentative timeline for construction will happen and relocations may occur. (A tentative timeline allows the utility agencies to evaluate whether their own plans for future development will be affected by the road authority's construction)

The road authority selects a designer. If the designer's role is filled internally, the road authority may appoint the designer (for simple construction projects, the designer and UC may be the same person). When the designer's role is filled by an outside organization, the road authority will use appropriate procurements methods to procure the designer.

4.3 IDENTIFYING UTILITIES IN THE EXISTING CORRIDOR (PART 1)

Understanding the existing corridor and the location of utilities within it, is a key element that the designer will depend on when developing options for construction. It provides the foundation for recommendations regarding how the construction project will be designed and where the construction will take place. The American Society of Civil Engineers (ASCE) standard 38-02 gives definition to the various quality levels of subsurface utility engineering (SUE) that can be utilized to identify underground infrastructure. (See Appendix E for additional detail on Quality Levels).

The designer is responsible to develop an up-to-date topographic survey and plan (base plan) of the general construction project area. The UC is responsible to ensure that the base plan is adequate for the requirements of utility coordination. This base plan is forwarded to all utility agencies (private and public) with a request for each utility to forward their respective mark-up drawings. The mark-up drawings display where the utility agency's records indicate the infrastructure is located within the study area. This information along with survey data would be a basis for some of the Quality Level D and C (QL-D, QL-C) information for the project. Additional investigations may also be completed in key areas to improve the quality of the utility information. It is important that utility agencies flag any existing or planned critical/vital infrastructure, and known abandoned infrastructure, within the project's study area on the mark-up drawings.

The American Society of Civil Engineers (ASCE) Standard 38-02 defines the process used to complete subsurface utility engineering (SUE) investigations that can be utilized to identify underground infrastructure. The 38-02 establishes quality levels for the underground utility information so that all parties can evaluate the accuracy and reliability of the data.

The designer will be responsible for updating the base plan for each of the planned alignments.

The UC will create a preliminary utility conflict matrix that lists potential utility conflicts and pertinent information about the utilities (See Appendix C – Sample of Utility Conflict Matrix).

4.4 EARLY CONSULTATION WITH UTILITY AGENCIES

The best practice is to hold a project kick-off meeting with representatives from the utilities potentially affected by the construction project. The road authority, UC and designer team are introduced and expectations are clarified (e.g. project scope, project deliverables, milestone delivery dates, potential utility conflicts). No utility commitment is required at this stage. The UC chairs this meeting.

Individual meetings to discuss the implications of any critical/vital infrastructure within the project's study area can be requested by any utility agency, UC or the designer.

Utility coordination is only one of the many factors considered in the planning phase. The designer does the preliminary planning analysis according to the road authority's standard procedures and

requirements; this usually considers present and future land use, alignment or cross-sectional alternatives, and impacts on current and future vehicular and/or pedestrian traffic.

Following the initial meeting and submission of information from the utilities, the designer may request preliminary high level cost estimates, when critical/vital infrastructure are within the limits of the project study area. It may be necessary to do additional consultation with specific utility agencies about various options under consideration, including redesign options to avoid relocations, especially if utility relocation or removal could seriously affect construction scheduling.

For example, utility agencies may require several years to relocate high-tension electrical towers or electrical transmission lines prior to the start of construction.

The designer reviews utility issues with the UC.

When the designer has completed the planning phase of the project, the road authority is presented with options for construction. The road authority will choose which option to proceed with, informing the UC and designer so the planning report can be completed.

4.5 CREATION OF PREFERRED ALIGNMENT BASE PLAN

At the completion of the planning phase, the designer will create a base plan for the preferred alignment that will be the foundation for future detailed design.

4.6 FLOW CHART TASK BOXES

The following section is to be read in conjunction with the flow chart found in Appendix A. It provides further valuable commentary and description about the tasks at each stage of the utility coordination process. Each section is aligned with the corresponding numbered box on the flow chart.

1.1 Road Authority

- The road authority selects a designer for the Planning Phase
- The road authority selects a UC for the Planning Phase. The UC normally acts as the road authority's agent, and should be a competent person from the road authority’s staff.

For smaller organizations or for particularly complex construction projects, the road authority may choose to hire from a consulting firm, or from the designer's staff, to act as the UC.

1.2 Designer

- The designer selects a UC for the project if different from the road authority’s UC.
- The designer will follow the road authority's normal process for construction planning studies, including analysis of how utilities located in or near the future construction project will affect work.
- The UC conducts an existing utility facilities investigation also known as a subsurface utility engineering (SUE). For subsurface utility data collection refer to the American Society of Civil Engineers Standard 38-02.
- The UC sends notification to the utility agencies informing them of the planning design project which explains the scope of the project.

- The UC requests utility mark-up information for the existing infrastructure. A base plan of the project is forwarded with the mark-up request, and if available a copy of the central registry of utility data may also be included.
- The UC identifies critical/vital utility infrastructure within the project limits.
- The UC provides a rough utility relocation scope and requests a high level estimate and schedule for the relocation of critical/vital utility infrastructure

1.3 Utility Agency

- After receipt of the notification and the base plan, utility agencies will review the base plan drawings sent by the UC and forward the requested mark-up drawings in a reasonable time span to the UC.
- The utility agencies will display on the mark-up drawings existing critical/vital infrastructure in the study area and a high level cost estimate and schedule to relocate the critical/vital infrastructure, based on the scope provided by the UC.
- If known, the utility agency will inform the UC of potential future infrastructure projects in the study area.
- The utility agency may request a meeting with the designer and UC to discuss any issues related to the existing and future critical/vital infrastructure.

1.4 Designer

- The UC reviews completeness of all information received from the utility agencies. If additional information is required from a utility agency, the UC will request the additional information and follow up to ensure this information is received. Drawings can be prepared following the ASCE 38-02 guideline.
- The UC forwards the utility information (mark-ups, critical/vital infrastructure) to the designer.
- The designer updates utility information on the base plans.
- The designer assesses costs, effect on construction scheduling, and environmental impacts of all alternatives and develops a recommended alignment. The designer develops ROW requirements once the preferred alignment is chosen by the road authority.
- The designer finalizes the planning report and obtains the proper regulating authority's approval for the report.

1.5 Road Authority

- The road authority receives and reviews the approved planning report.
- The road authority selects a designer and UC for the design phase.

5. DESIGN PHASE

5.1 GENERAL

The design phase outlines all tasks essential for utility relocation design and when these tasks need to occur during the project's detail design process. The design phase follows the planning phase and continues through to the completion of all utility relocation designs required for the specific project. The project's UC is responsible for ensuring these tasks are completed at the appropriate time in the project's Design phase process.

5.2 DESIGN KICK-OFF MEETING

Road authority and designer are introduced at the design kick-off meeting, including the UC(s) for the project. Expectations are clarified at this meeting (e.g. project scope, project deliverables, milestone delivery dates).

5.3 IDENTIFYING UTILITIES IN THE EXISTING CORRIDOR (PART 2)

As mentioned earlier, understanding the existing corridor within the project limits is fundamental to good design. The implementation of a Subsurface Utility Engineering (SUE) investigation, including Quality Level-B (QL-B) within the project limits is an excellent method to gain a better understanding of the existing corridor and results in a greater certainty in the accuracy of the underground infrastructure. Additional investigations, including test holes (QL-A), may be completed in key areas to improve the quality of the utility information. The UC is responsible for the implementation of a SUE investigation and to what quality level. For clarification purposes, it is not intended that the Regional One-Call is involved at this stage of the project. The Regional One-Call is only involved at the pre-excavation stage.

The UC shall notify utility agencies that the design phase has commenced and will request mark-up drawings in the project limits. The mark-up request will be made by the SUE consultant if a SUE investigation is implemented. The planning phase base plan is forwarded with this request. The designer is responsible for updating the base plan with the information obtained from these mark-up drawings and/or the SUE investigation.

(See Appendix E – SUE Quality Levels - Excerpt from ASCE 38-02 Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data).

5.4 30% DESIGN

The 30% design is typically the first milestone of the detail design process. The road geometrics of the proposed infrastructure and the associated grading should be finalized at this stage. In respect to utility impacts the following design elements should be known:

- Impact of proposed grading on utilities (cuts, fills, relocations, adjustments, rebuilds)
- Impact of proposed geometrics on existing infrastructure
- Consideration of proposed pole heights (cuts, fills, minimum safety clearances)
- Utilities displayed on new construction profiles/cross-sections (if information is known)

- SUE QL-A investigation location identified (if applicable)
- Existing utilities on existing bridge structures (if applicable)
- Land acquisition requirements finalized and acquisition process commences
- Opportunities for co-location of utilities (i.e. Joint trenches, shared poles)

The UC is responsible for ensuring all parties are aware of these design elements.

(See Appendix B – 30% Design Criteria)

5.5 UTILITY CONFLICT MATRIX

The UC, in consultation with the designer, reviews the impacts the 30% Design has on existing utility infrastructure. This task will identify the potential utility conflicts from a plan view perspective for the project. The UC updates the Utility Conflict Matrix listing potential utility conflicts and pertinent information about the utilities (See Appendix C – Sample of Utility Conflict Matrix). The UC will work with designer to minimize conflicts through revisions in the design, as well as identify protection strategies that may minimize potential damage to the utilities.

5.6 30% DESIGN UTILITY COORDINATION MEETING

The UC schedules a utility coordination meeting with all impacted utility agencies, the designer and the road authority. The 30% design drawings and utility conflict matrix should be sent to the utility agencies a minimum of two (2) weeks prior to the meeting for their review and preparation for the meeting. At this meeting the following topics, but not limited to, will be discussed:

- Accuracy of the utility plant on the 30% design drawings (SUE Quality Level)
- Utility conflicts and mitigations
- Betterments to or abandonment of the existing utility infrastructure
- Future SUE quality level B and level A (daylighting/test pitting) requirements
- Land acquisition issues
- High level cost estimates and scheduling requirements
- Material ordering requirements
- Relocation cost sharing
- Sharing of geodetic reports
- Identify any environmental issues

5.7 IDENTIFYING UTILITIES IN THE EXISTING CORRIDOR (PART 3)

The UC will implement further SUE investigations based on the needs of the utility agencies stated at the 30% design utility coordination meeting. The UC is responsible for communicating the results of the additional SUE investigation to the designer and utility agencies.

5.8 60% DESIGN

Proposed design is complete at the 60% design milestone. All proposed geometrics (roads), grading, alignments (horizontal and vertical), drainage (storm and sanitary), watermains, street illumination, traffic signalization and streetscaping elements are finalized. The 60% design is the key milestone in initiating the utility agencies to commence their relocation design.

(See Appendix D – 60% Design Criteria)

5.9 UPDATE UTILITY CONFLICT MATRIX

The UC in consultation with the designer reviews the impacts the 60% design has on existing utility infrastructure. The 60% design plans, profiles and cross section are used to update the utility conflict matrix. All proposed geometrics (roads), grading, alignments (horizontal and vertical), drainage (storm and sanitary), watermains, street illumination, traffic signalization, oversized signalization support/anchor structures and streetscaping elements are finalized.

5.10 60% DESIGN UTILITY COORDINATION MEETING

The UC schedules a utility coordination meeting with all impacted utility agencies, the designer and the road authority. The 60% design drawings and utility conflict matrix should be sent to the utility agencies a minimum of two (2) weeks prior to the meeting for their review and preparation for the meeting. At this meeting the following topics, but not limited to, will be discussed:

- Utility conflicts and mitigations
- Additional cross section requirements for utility relocation design
- Betterments to the existing utility infrastructure (finalize)
- Initial relocation design submission timeline
- Final cost estimate submission timeline for procurement of a Purchase Order
- Other authority permits required for the relocation
- Land acquisition completion
- Utility relocation construction scheduling
- Material ordering
- Relocation cost sharing
- Test hole requirements for utility relocation design
- Discuss constructability issues associated with working around utilities.
- Opportunities for the road authority to embed utility works into the owners contract.

5.11 IDENTIFYING UTILITIES IN THE EXISTING CORRIDOR (PART 4)

The UC will implement a SUE QL-A investigation based on the needs of the utility agencies stated at the 60% design utility coordination meeting. The UC is responsible for communicating the results of the SUE QL-A investigation to the designer and respective utility agencies.

5.12 FINALIZE UTILITY CONFLICT MATRIX

The UC, in consultation with the designer and utility agencies, will finalize the extent of the utility conflicts and update the utility conflict matrix. The final utility relocation scope is communicated to affected utility agencies.

5.13 UTILITY AGENCY RELOCATON DESIGN

Each impacted utility agency prepares its respective relocation design. Utility agencies submit the initial design to the UC following the timeline discussed at the 60% design utility coordination meeting. The design may also be circulated to the other utility stakeholders as required. The UC, in consultation with the designer, consolidates and reviews the initial relocation designs. If the relocation design is acceptable, the UC advises the utility agency of its acceptance and requests they submit the relocation design for approval to the road authority. If the initial design is not acceptable, the UC notifies the utility agency of this and the reasons why the design does not meet the project's needs. The utility agency revises the relocation design as per the UC's comments and resubmits. This continues until the UC accepts the relocation design. The road authority approval process follows this relocation design acceptance.

5.14 UTILITY RELOCATION DEPENDENCIES

The following outlines some of the stakeholders that will have to be consulted as part of the design process. Care should be taken to ensure that all necessary parties for each jurisdiction are identified.

i. Public Utility Coordination Committee (PUCC)

   In municipalities where there is a PUCC, the PUCC is comprised of municipal officials and utility agency representatives. The PUCC meet regularly to discuss common design and construction blocks, share new innovations, coordinate project issues and approve municipal consent applications. In some municipalities PUCC approval is required prior to construction of the utility relocation.

   Note: Not all municipalities approve municipal consents through the PUCC.

ii. Consent Approval and other Road Authority Permits

   Consent gives authorized utility agencies permission to install or move utilities within a municipal ROW at a certain location and depth. Consent approval must be obtained by the utility agency prior to construction of the utility relocation. The road authority may have additional permitting requirements, such as a road occupancy permit. All other road authority permits must be obtained by the utility agency prior to construction of the utility relocation.

iii. Other Authority Permits

Utility relocation may involve permits from authorities and agencies other than those required by road authorities such as environmental and railway crossings permits. All other authority permits must be obtained by the utility agency prior to construction of the utility relocation. The UC may help the utility agencies to obtain the other authority permits.

iv. Land Acquisition

The UC verifies that all land acquisitions for the project that might impact utility relocation have been completed prior to the commencement of the utility agency's construction. If the land acquisition has not been completed prior to this the UC will ensure alternative arrangements (e.g. temporary/permanent easement agreements, permission to enter agreements) are finalized. The UC forwards land plans to the utility agencies for construction layout purposes.

5.15 RELOCATION CONSTRUCTION COORDINATION/SCHEDULING MEETING

The UC schedules a relocation construction coordination/scheduling meeting with the road authority, designer and all impacted utility agencies. This meeting will determine:

- The order of relocations (Who goes first?)
- When the first utility can begin (Are there any incomplete construction dependency tasks?)
- How long to complete each relocation
- If more than one relocation can occur at the same time within the project limits
- If relocation deliveries need to be phased within the project limits
- What relocations are not constructible prior to commencement of the project's construction (i.e. grading needs to be completed to deliver the relocation)
- Potential constructor issues when multiple utility agencies are working concurrently in the same area
- Temporary measures or structures required by utility agencies or road authority.

Potential constructor issues when multiple utility agencies are working concurrently in the same area.

Note: Utility relocation can start any time after the 60% Design Utility Coordination meeting as long as all construction dependencies have been attained.

5.16 FLOW CHART TASK BOXES

The following section is to be read in conjunction with the flow chart found in Appendix A. It provides further valuable commentary and description about the tasks at each stage of the utility coordination process. Each section is aligned with the corresponding numbered box on the flow chart.

2.1 Designer

The following tasks are to be completed for Box 2.1 of the Utility Relocation Guidelines Flow Chart:

- The designer reviews the planning report thoroughly to understand the scope of the project, deliverable milestones and potential project risks (i.e. utility relocation delivery).
- During this early stage of the design phase process, the road authority and/or designer decide if the services of a SUE consultant to perform a SUE QL-B investigation for the project are needed (Information attained by the SUE QL-B investigation will be utilized by the designer to update the planning design base plan).
- The designer determines if SUE QL-A investigations are required for the purpose of completing the 30% design.
- The UC is responsible for the implementation of the SUE investigations.
- The UC contacts all utility agencies with high level details of the scope of the project, such as:
    i. Location and limits of the project
    ii. Type of work to be constructed (e.g. road widening)
    iii. Contact information of the project's UC, designer and road authority
    iv. High level schedule of when construction is to commence and be completed
- If a SUE consultant is not attained for the project the UC will request mark-up drawings from each utility agency (A copy of the project's planning phase base plan will be sent with this request)
- The designer updates the base plan with the information from these mark-up drawings
- The designer completes the design to the 30% level and forwards this design to the road authority for review and acceptance (See Appendix B – 30% Design Criteria)
- Once the 30% design is accepted by the road authority, the UC, in consultation with the designer, identifies potential utility conflicts with the 30% design and creates a potential utility conflict matrix (See Appendix C – Sample of Utility Conflict Matrix)
- The UC schedules a 30% design utility coordination meeting with all impacted utility agencies (typically the 30% design drawings and utility conflict matrix are forwarded to utility agencies a minimum of two (2) weeks prior to the 30% design utility coordination meeting. This gives the utility agencies ample time to review and prepare for the 30% design utility coordination meeting)

2.2 Utility Agency

The following tasks are to be completed for Box 2.2 of the Utility Relocation Guidelines Flow Chart:

- All utility agencies will forward to the UC the requested mark-up drawings and contact information of the person(s) responsible for the relocation design.
- Upon receipt of the 30% design drawings and utility conflict matrix, each utility agency will review the documents in preparation for the 30% design utility coordination meeting.

- Each utility agency shall send a competent representative to the 30% design utility coordination meeting. This representative should have sufficient knowledge of the project to discuss the topics stated in section 5.6 of this guideline on behalf of the utility agency.
- When the road authority is responsible for all or part of the utility relocation cost each impacted utility agency will provide a high level estimate and construction schedule to the UC in an agreed to time frame.

2.3.1 Road Authority

The following tasks are to be completed for Box 2.3.1 of the Utility Relocation Guideline Flow Chart:

- The road authority and the designer finalize the land requirements for the project based on the Planning report and the 30% design
- The road authority begins the land procurement process to attain the necessary lands
- The road authority determines cost allocations with the utility agencies if not identified in existing road authority/utility agency agreements

2.3.2 Designer

The following tasks are to be completed for Box 2.3.2 of the Utility Relocation Guideline Flow Chart:

- The designer will update the base plan with the information received from the utility agencies.
- The UC will implement a SUE QL-A investigation based on the requirements discussed at the 30% design utility coordination meeting.
- The UC will forward the information from the SUE QL-A investigation to the designer and appropriate utility agency.
- The designer completes the design to the 60% level.
- The designer forwards the design to the road authority for review and acceptance.
- Once the 60% design is accepted the UC, in consultation with the designer, updates the utility conflict matrix.
- The UC schedules a 60% design utility coordination meeting with the road authority, designer and all impacted utility agencies (typically the 60% design drawings and utility conflict matrix are forwarded to utility agencies a minimum of two (2) weeks prior to the 60% design utility coordination meeting. This gives the utility agencies ample time to review and prepare for this meeting).
- The UC implements a SUE QL-A investigation based on the utility agencies' needs to complete their relocation design as stated at the 60% design utility coordination meeting
- The UC forwards the SUE QL-A investigation information to the designer and appropriate utility agencies

2.4 Utility Agency

The following tasks are to be completed for Box 2.4 of the Utility Relocation Guidelines Flow Chart:

- Upon receipt of the 60% design drawings and the updated utility conflict matrix, each utility agency reviews the documents in preparation of the 60% design utility coordination meeting
- Each utility agency will send a competent representative to the 60% design utility coordination meeting (This representative should have sufficient knowledge of the project to discuss the topics stated in section 5.10 of this guideline on behalf of the utility agency)
- The utility agencies complete their initial relocation designs upon receiving the information requested at the 60% design utility coordination meeting
- The initial utility relocation designs are submitted to the UC within the timeline agreed to at the 60% design utility coordination meeting
- The utility agencies submit for road authority consent and other authorities for permits once the design has been accepted by the UC
- The utility agencies prepare final estimates and construction schedules and forward the documents to the UC
- All property requirements for the relocation are identified by the utility agency to complete their relocation (i.e. easements for guying, working easements etc.).
- Utility agencies identify to the UC any relocation that cannot be completed prior to the award of the project contract

2.5.1 Road Authority

The following tasks are to be completed for Box 2.5.1 of the Utility Relocation Guidelines Flow Chart:

- The road authority completes the land procurement process and forwards a land acquisition schedule to the UC.
- The UC forwards the land acquisition schedule, including any alternative arrangements (i.e. temporary/permanent easements, permissions to enter) to the utility agencies.
- Once the land acquisition is completed the road authority notifies the UC who then notifies the utility agencies.
- All land acquisitions and alternate arrangements must be finalized prior to commencing utility relocation construction.
- Grants utility relocation approval and identifies relocation completion date.
- Sign crossing agreements and cost allocation responsibilities if required.
- Signs other agreements with utility agencies as required.

2.5.2 Designer

The following tasks are to be completed for Box 2.5.2 of the Utility Relocation Guidelines Flow Chart:

- The designer forwards the design to the 90% level and forwards design to the road authority for review and acceptance.
- The designer prepares crossing and cost allocation nd forwards it to the road authority.

2.6 Utility Agency

The following tasks are to be completed for Box 2.6 of the Utility Relocation Guidelines Flow Chart:

- Utility agencies submit and obtain utility coordination committee approvals (if applicable)
- Utility agencies sign the crossing and cost allocation responsibilities agreements prepared by the designer (if required).
- Utility agencies schedule an internal construction/scheduling meeting to ensure the relocation timelines agreed to are adhered to.

6. CONSTRUCTION PHASE

6.1 GENERAL

Construction of utility relocations is a step to ensure the project can commence unencumbered and on time. The construction of the utility relocations commences once all dependencies are in place. (i.e. government agencies approvals, road authority permits, environmental permits, locates, etc.). This section will outline the tasks and processes necessary to successfully execute, monitor and control the construction of the utility relocations. The UC is responsible for ensuring all tasks are completed on schedule and all processes are adhered to.

6.2 UTILITY RELOCATION MEETINGS

Utility Relocation Pre-Construction Meeting

- The UC arranges a preconstruction meeting with utility agency representatives and the road authority's representatives before the start of utility relocation construction work. The meeting offers participants the opportunity to review, discuss and finalize the proposed utility relocation coordination Plan outlining the sequence and timing of utility relocations, as well as to raise and resolve concerns about the overall construction plan. This discussion should include addressing items from the special provisions that the road authority may need to do before completing utility relocations (i.e. tree clearing, pre-grading, etc.). There also needs to be discussions on the status of the dependencies required to be in place to commence construction. Each impacted utility may have different dependencies. The process to handle scope changes to the utility relocation should be communicated at the meeting by the UC. The UC keeps a written record of decisions and action steps from the meeting. The road authority and the utility agencies should exchange names of contacts that are available 24-hours-a-day in case of emergency. The UC is responsible for managing changes to scope and schedule.

Other Utility Relocation Construction Meetings

- Additional utility meetings may be useful particularly on complex projects with significant utility involvement. The UC or utility agency may call these meetings. The UC and road authority may need to meet with one utility, with all utilities, or with a particular group of utilities, depending on project needs. The project may require one meeting or more, or a series of regular meetings. The UC decides the best course of action based on the circumstances.

6.3 UTILITY RELOCATION PRIOR TO PROJECT CONSTRUCTION

It is the intent of most projects to complete the utility relocations prior to the start of project construction. To meet this goal it is imperative that a utility relocation coordination plan be developed and agreed to by the road authority and utility agencies. The utility relocation coordination plan should include, but not necessarily restricted to, a list of all utility relocation construction dependencies, the sequencing of the relocations and the duration of the utility relocations. It is the utility agency's responsibility to communicate their construction dependencies to the UC. Some dependencies are road authority approvals and permits, environmental agencies approvals and permits, road authority's

purchase orders, and locates. It is important that the UC and the utility agencies have an understanding of the conditions in all permits as they could directly impact the scheduling of the relocations.

The utility agency shall notify the UC once their relocation is completed so that the UC can notify the next utility agency to commence their relocation in accordance with the utility relocation coordination plan.

It is the intention of the project to relocate all utilities to the permanent location. In some cases the project requires a temporary installation, or one that will be in service for only a short time. Temporary facilities require the same care in coordination and construction as permanent facilities.

6.4 UTILITY RELOCATION DURING AND POST CONSTRUCTION

It is been the intent of the project to relocate all utilities prior to construction. This may not always be possible. In these situations, the utility may need to be relocated during the project's construction phase. The project's tender documents must reflect this situation, and allow for time or space for the utility relocation to occur during the project's construction schedule. The UC is responsible for the coordination of these types of relocations. Communication between the road contractor, UC and utility agency is essential to coordinate a successful and time sensitive utility relocation.

For some projects utility relocation needs to occur after the project construction phase has been completed. The UC notifies the utility agency when the construction is complete and the site is available for their relocation to commence.

6.5 QUALITY ASSURANCE/QUALITY CONTROL

The quality assurance (QA) and quality control (QC) of a utility relocation is of utmost importance for a successful project especially on projects where there is a congestion of underground infrastructure. Both the road authority and utility agencies should be responsible for QA/QC.

The road authority, in conjunction with each utility agency, shall develop QA processes to ensure the quality of the utility relocation product. Examples of typical QA processes include:

- Documentation control for the utility relocation. (who, what, when, where, why and how)
- Installation tolerances and how they are to be monitored
- Types of and frequency of testing
- Installation / construction methodology (open trenching, boring, directional drilling, etc.)

All involved with utility relocation is responsible for QA. The UC is responsible for documenting the QA processes and ensuring they are implemented.

Inspection, documentation and testing are the main QC activities for a utility relocation. Inspection and documentation of utility construction play an important role in successful utility relocation, in early resolution of issues, and in decisions about claims, and for reimbursement. The utility agency may assign an inspector to ensure safe and efficient installation. All quality issues discovered during inspection should be addressed with immediacy, and resolved while construction is still in process whenever possible. The UC is responsible for coordinating resolution meetings with the road authority and utility agency as required. The UC is responsible for keeping written record of the resolutions agreed to at these meetings and for ensuring the resolutions are implemented.

Testing of materials used in the utility relocation is the responsibility of the utility agency. The road authority may also perform testing to verify any concerns they may have with the quality of the utility relocation.

(Transportation Association of Canada's *Guidelines for Underground Utility Installations Crossing Highway Rights-of-Way* can be used as a reference)

6.6 UNKNOWN CONFLICT RESOLUTION

Each utility agency will communicate any unknown conflicts encountered in the field to the UC immediately. The UC will implement the project's field conflict resolution process to mitigate the conflict. The field conflict resolution process should include input from all relevant stakeholders. The UC is responsible for keeping written records of all decisions made during this process. The utility agency will notify the UC at the first indication of a delay to their relocation schedule due to the unknown conflict. The UC reviews the impact of the delay on the overall utility relocation coordination plan. If necessary, the UC schedules a meeting between the road authority and utility agency to review all options (i.e. additional crews, working overtime etc.) to mitigate the delay to the schedule. The UC is responsible for keeping written record of meeting decisions.

6.7 SCOPE CHANGE PROCESS

The scope of the utility relocation can be altered by the road authority (i.e. late project design changes), utility agencies (i.e. additional operational or capacity needs) or due to unknown site conditions (i.e. poor soil conditions, unknown conflicts). The UC schedules scope change meetings between the road authority and the utility agency as required. All scope changes to the utility relocation shall be agreed to in writing prior to the utility agency completing the additional work. The UC is responsible for keeping written records of signed scope changes.

Significant scope changes may necessitate resubmission of the utility plans for approval. In other cases, submission of as-built plans may be sufficient depending on the road authority's requirements.

6.8 FLOW CHART TASK BOXES

The following section is to be read in conjunction with the flow chart found in Appendix A. It provides further valuable commentary and description about the tasks at each stage of the Utility Coordination Process. Each section is aligned with the corresponding numbered box on the flow chart.

3.1 Road Authority

The road authority selects a UC for the construction phase if different from Box 1.1 of the flow chart.

3.2 UC

The UC works with all parties to resolve utility relocation issues throughout the construction phase.

3.3 Utility Relocation Prior to Road Construction

Prior to starting utility relocations, a pre-construction meeting will be scheduled by the UC. The road authority and impacted utility agencies and/or a representative for the utility agency will attend. The utility relocation coordination plan is developed and finalized at the pre-construction stage. The utility relocation coordination plan outlines the sequencing and scheduling of the

various utility relocations for the project as well as an unknown conflict resolution process. The more complex the utility relocations have a greater need for a comprehensive utility relocation coordination plan. Once the plan is finalized the utility agencies commence their relocation in accordance to the plan.

Delays to the utility relocation schedule or unknown conflict discovered during the utility relocation are required to be communicated to the UC by the utility agency immediately. The resolution of delays and unknown conflicts is the responsibility of the UC. Detail documentation of the resolution process is essential.

Any scope changes to the utility relocation initiated by the road authority, (late project design changes), the utility agency (late change to meet their operational or capacity needs), or various site conditions (poor soil conditions, unknown conflicts) are to be agreed to in writing by both the road authority and the utility agency.

Inspection by the utility agency and the UC is essential to ensure the new utility infrastructure is installed in the correct location and to the standards set out in all approvals and permits.

The utility agency notifies the UC when their relocation is completed.

After completing installation the utility agency submits invoices and supporting documentation to the UC in a timely manner.

The utility agency prepares and submits CSA S250 quality “As-Built” plans to the UC in a time frame and format in accordance with agreements between the road authority and utility agency.

3.4 Road Authority

The road authority selects a project road contractor through an appropriate tendering process.

3.5 Road Contractor

The road contractor coordinates with the road authority to schedule a pre-construction meeting. If utility relocations occur during the project construction phase the impacted utility agencies need to attend the meeting. Discussions surrounding scheduling of the relocation should occur at the meeting. The road contractor will notify the UC of changes to the timing schedule discussed at the meeting. The UC communicates the scheduling change to the utility agency. The utility agency must inform the UC if the new schedule cannot be met. The UC resolves schedule changes with the road contractor and utility agency.

If a utility relocation is to occur after the road construction is completed the road contractor notifies the UC when they have completed their work. The UC notifies the utility agency that the road construction is completed and the post construction utility relocation can begin. The utility agency notifies the UC once this final utility relocation is completed.

3.6 Utility Agency

Once a timing window is established the utility agency prepares to commence the “during construction” utility relocation in the scheduled timeline. The utility agency notifies the UC once the “during construction” relocation is completed. The UC notifies the road contractor that the relocation is complete.

When notified by the UC that the road construction is finished, the utility agency completes the “post construction” utility relocation. The utility agency notifies the UC once the “post construction” relocation is completed.

7. POST CONSTRUCTION PHASE

7.1 GENERAL

Agreements between road authorities and the utility agencies as well as legislations detail the cost allocations for eligible utility relocation costs. This section highlights invoice and payment steps. The UC oversees the tasks within this section.

The UC coordinates the processing of all invoices for all privately owned utilities and some municipally owned utilities, depending on the type of agreement.

7.2 INVOICING AND PAYMENTS

This section provides information about how invoicing and payments could be handled if the agreement and/or legislation between the road authority and the utility agency involve reimbursement for the utility relocation work. If the utility is solely responsible for relocation, this section need not apply. The UC reconciles all utility relocation invoices that are received from the utility agencies. The reconciliation of invoices may involve the following:

i. **Additional Costs**
   If the utility agency must perform additional work beyond the agreed upon scope, the utility agency must immediately notify the UC in writing of the scope change and provide a cost estimate for the additional work before the work begins. The UC must grant approval for the additional work.

   The UC verifies that the utility agency's invoices fall within the parameters of the agreed to scope change.

ii. **Itemized Invoice**
   The project requires utility agencies to submit itemized invoices for actual cost of the relocation.

   The items listed on the invoices should be within an agreed to variance of the items in the estimate for the work.

iii. **Processing Invoices**
   The utility agency may submit periodic or final invoices based on the cost apportionment defined in the agreements and/or legislation. The UC processes partial/final invoices ensuring that the invoice is in adherence with the agreements and/ or legislation. The UC is responsible for resolving billings that exceed the estimated costs and that were not part of an agreed to scope change prior to recommending payment. The UC makes a recommendation to the road authority to pay the invoice or revised invoice, if the initial billing was inconsistent to the cost apportionments outlined in the agreements and/or legislation.

7.3 BETTERMENTS

Utility agencies may take the opportunity to upgrade its facility as part of the utility relocation. These betterments, identified during the design phase of the project delivery, may or may not have been necessitated by the project. Typically the road authority pays their portion of a "like for like" relocation.

The cost apportionment for betterments that are not required by the project would be the difference between the total cost of the relocation and the "like for like" estimated cost.

Some exceptions exist to the general betterment rule. The project may reimburse for the following types of betterment:

- Betterments required by the project, Provincial or Federal law or regulation
- Replacement devices or materials that are equivalent but not identical standards
- Replacement of devices or materials no longer regularly manufactured with next higher grade or size
- Betterments required by current design practices and offer direct benefit to the project

The UC determines the overall scope of the betterment and verifies the utility agency's calculation.

7.4 AS-BUILT PLANS

All utility agencies must prepare as-built plans of their relocated infrastructure. For additional guidance in preparing as-built plans see CSA S250-11, Mapping of Underground Utility Infrastructure. As-built plans are submitted to the UC. The UC reviews and ensures the as-built plans meet the minimum requirements as specified in the road authority/utility agency agreements. Any discrepancies with as-built plans must be resolved between the UC and the utility agency before acceptance of the plans. Acceptable as-built plans must be received by the UC prior to payment of the final invoice.

7.5 FINAL PAYMENT

The road authority makes the final payment when the UC's recommendation and "as-built" plans are received.

7.6 FLOW CHART TASK BOXES

The following section is to be read in conjunction with the flow chart found in Appendix A. It provides further valuable commentary and description about the tasks at each stage of the Utility Coordination Process. Each section is aligned with the corresponding numbered box on the flow chart.

4.1 Designer

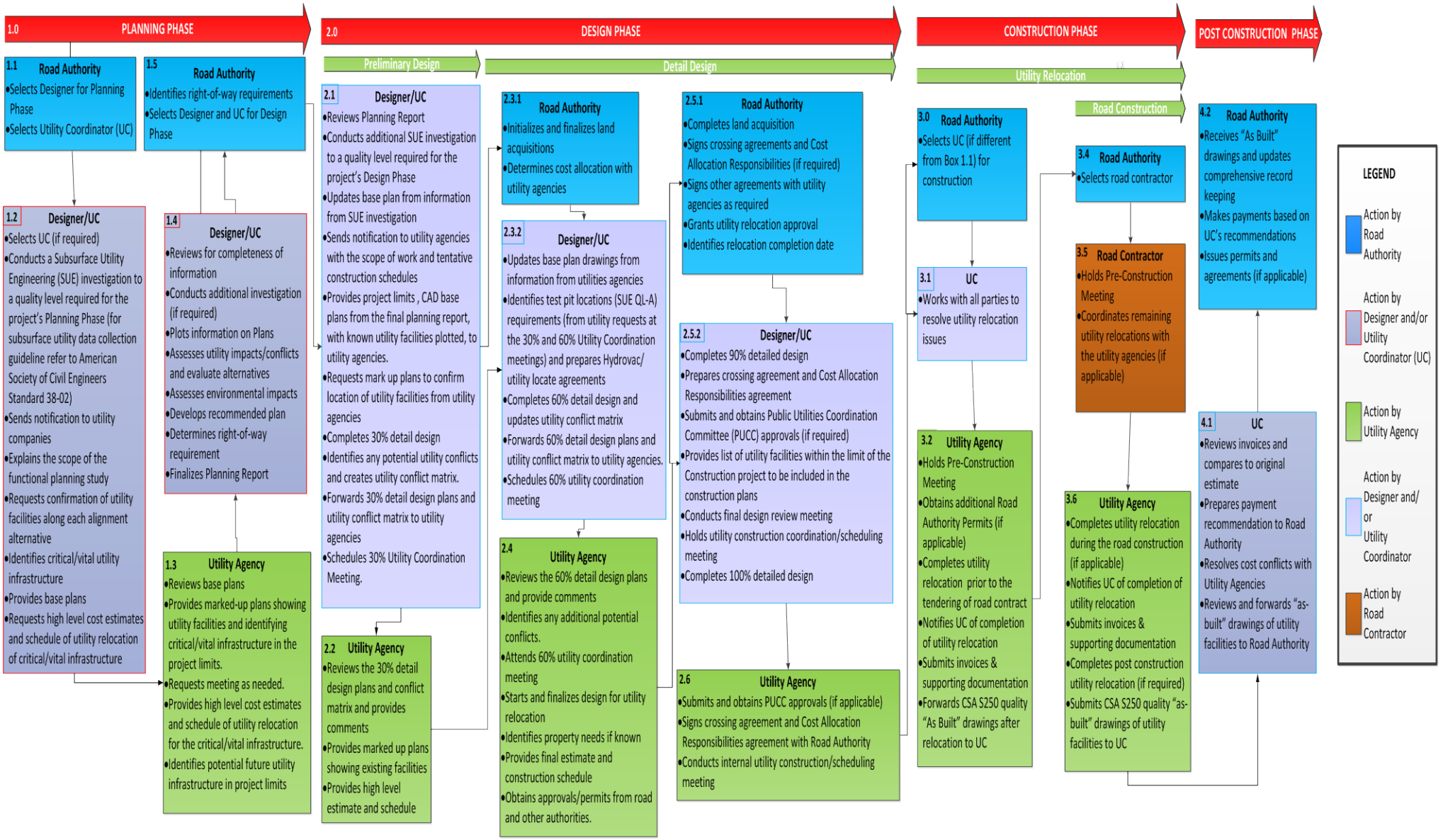
Upon receipt of the utility agency's invoice (interim or final) the UC will perform a review of the invoice. The review may include, but is not limited to, ensuring all work itemized in the invoice has been completed to the UC's satisfaction, comparing the itemized invoice with the original estimate, determining purchase order cost percentage increase and identifying and recommending cost adjustment to the invoice. If the UC has no objections with the invoice, it will be forwarded to the road authority for payment. The UC resolves invoice issues identified in the review with the utility agency. When a negotiated agreement to the invoice is achieved, the utility agency revises the invoice to reflect the negotiated amount and forwards the revised invoice to the UC. The UC makes recommendation for payment to the road authority. Prior to recommending the final invoice for payment, the UC will ensure CSA S250 quality as-built plans have been submitted. It is the UC's responsibility to review and resolve any disputes with the as-built plans submitted by the utility agency. Once the as-built plans are deemed acceptable by the UC, the plans are forwarded to the road authority.

4.2 Road Authority

The road authority pays all invoices based on the UC's recommendation. If required, the road authority will issue any outstanding permits and/or agreements.

Upon receipt of the as-built plans, the road authority updates their comprehensive record keeping with the as-built plan information.

APPENDIX A:
Guidelines for the Coordination of Utility Relocations Flow Chart


1.0 PLANNING PHASE
2.0 DESIGN PHASE
CONSTRUCTION PHASE
POST CONSTRUCTION PHASE
Preliminary Design
Detail Design
Utility Relocation
Road Construction
1.1 Road Authority
•Selects Designer for Planning Phase
•Selects Utility Coordinator (UC)
1.5 Road Authority
•Identifies right-of-way requirements
•Selects Designer and UC for Design Phase
1.2 Designer/UC
•Selects UC (if required)
•Conducts a Subsurface Utility Engineering (SUE) investigation to a quality level required for the project's Planning Phase (for subsurface utility data collection guideline refer to American Society of Civil Engineers Standard 38-02)
•Sends notification to utility companies
•Explains the scope of the functional planning study
•Requests confirmation of utility facilities along each alignment alternative
•Identifies critical/vital utility infrastructure
•Provides base plans
•Requests high level cost estimates and schedule of utility relocation of critical/vital infrastructure
1.4 Designer/UC
•Reviews for completeness of information
•Conducts additional investigation (if required)
•Plots information on Plans
•Assesses utility impacts/conflicts and evaluate alternatives
•Assesses environmental impacts
•Develops recommended plan
•Determines right-of-way requirement
•Finalizes Planning Report
1.3 Utility Agency
•Reviews base plans
•Provides marked-up plans showing utility facilities and identifying critical/vital infrastructure in the project limits.
•Requests meeting as needed.
•Provides high level cost estimates and schedule of utility relocation for the critical/vital infrastructure.
•Identifies potential future utility infrastructure in project limits
2.1 Designer/UC
•Reviews Planning Report
•Conducts additional SUE investigation to a quality level required for the project's Design Phase
•Updates base plan from information from SUE investigation
•Sends notification to utility agencies with the scope of work and tentative construction schedules
•Provides project limits , CAD base plans from the final planning report, with known utility facilities plotted, to utility agencies.
•Requests mark up plans to confirm location of utility facilities from utility agencies
•Completes 30% detail design
•Identifies any potential utility conflicts and creates utility conflict matrix.
•Forwards 30% detail design plans and utility conflict matrix to utility agencies
•Schedules 30% Utility Coordination Meeting.
2.2 Utility Agency
•Reviews the 30% detail design plans and conflict matrix and provides comments
•Provides marked up plans showing existing facilities
•Provides high level estimate and schedule
2.3.1 Road Authority
•Initializes and finalizes land acquisitions
•Determines cost allocation with utility agencies
2.3.2 Designer/UC
•Updates base plan drawings from information from utilities agencies
•Identifies test pit locations (SUE QL-A) requirements (from utility requests at the 30% and 60% Utility Coordination meetings) and prepares Hydrovac/ utility locate agreements
•Completes 60% detail design and updates utility conflict matrix
•Forwards 60% detail design plans and utility conflict matrix to utility agencies.
•Schedules 60% utility coordination meeting
2.4 Utility Agency
•Reviews the 60% detail design plans and provide comments
•Identifies any additional potential conflicts.
•Attends 60% utility coordination meeting
•Starts and finalizes design for utility relocation
•Identifies property needs if known
•Provides final estimate and construction schedule
•Obtains approvals/permits from road and other authorities.
2.5.1 Road Authority
•Completes land acquisition
•Signs crossing agreements and Cost Allocation Responsibilities (if required)
•Signs other agreements with utility agencies as required
•Grants utility relocation approval
•Identifies relocation completion date
2.5.2 Designer/UC
•Completes 90% detailed design
•Prepares crossing agreement and Cost Allocation Responsibilities agreement
•Submits and obtains Public Utilities Coordination Committee (PUCC) approvals (if required)
•Provides list of utility facilities within the limit of the Construction project to be included in the construction plans
•Conducts final design review meeting
•Holds utility construction coordination/scheduling meeting
•Completes 100% detailed design
2.6 Utility Agency
•Submits and obtains PUCC approvals (if applicable)
•Signs crossing agreement and Cost Allocation Responsibilities agreement with Road Authority
•Conducts internal utility construction/scheduling meeting
3.0 Road Authority
•Selects UC (if different from Box 1.1) for construction
3.1 UC
•Works with all parties to resolve utility relocation issues
3.2 Utility Agency
•Holds Pre-Construction Meeting
•Obtains additional Road Authority Permits (if applicable)
•Completes utility relocation prior to the tendering of road contract
•Notifies UC of completion of utility relocation
•Submits invoices & supporting documentation
•Forwards CSA S250 quality "As Built" drawings after relocation to UC
3.4 Road Authority
•Selects road contractor
3.5 Road Contractor
•Holds Pre-Construction Meeting
•Coordinates remaining utility relocations with the utility agencies (if applicable)
3.6 Utility Agency
•Completes utility relocation during the road construction (if applicable)
•Notifies UC of completion of utility relocation
•Submits invoices & supporting documentation
•Completes post construction utility relocation (if required)
•Submits CSA S250 quality "as-built" drawings of utility facilities to UC
4.2 Road Authority
•Receives "As Built" drawings and updates comprehensive record keeping
•Makes payments based on UC's recommendations
•Issues permits and agreements (if applicable)
4.1 UC
•Reviews invoices and compares to original estimate
•Prepares payment recommendation to Road Authority
•Resolves cost conflicts with Utility Agencies
•Reviews and forwards "as-built" drawings of utility facilities to Road Authority
LEGEND
Action by Road Authority
Action by Designer and/or Utility Coordinator (UC)
Action by Utility Agency
Action by Designer and/ or Utility Coordinator
Action by Road Contractor

APPENDIX B:
30% Design Criteria

The following is the level of design required to be completed to meet a 30% design criteria for the purposes of this manual:

- Base plan survey completed including property lines, easements etc.
- A composite utility drawing 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
- Road geometrics
- Excessive horizontal alignment and vertical grade changes identified
- Consult with potential new developments
- Road cross sections
- Retaining walls identified
- Initial utility conflict matrix
- Identify SUE QL-A (test pit) locations
- Existing structures (bridges, culverts) condition survey
- Identify rail way crossings and required permitting process
- Commence land attainment process
- Identify if permission to enter agreements are required
- Identify environmental conditions, permit requirements and associated timing restrictions
- Identify all partnerships and cost sharing agreements (i.e. streetscaping, municipal infrastructure improvements, illumination etc.)
- Initial constructability review
- Street tree inventory and street tree preservation plan Initial streetscape plan

APPENDIX C:
Sample Utility Conflict Matrix

Modified: 10/09/2015

Work Packages

A=cable, B = pedestals,
PC = protect during construction

CONFLICT MATRIX

No longer a conflict based on SUE

Stationing : 00+ 000 to 00 + 000																			
CONFLICT #	UTILITY	Item	LOCATION	STA. (Start)	STA. (Finish)	Size (mm)	Depth to top	Depth to bottom	Conflict Cause	Comments	Probability of Move/ Replacement/Adjustment	Recommended	Work Package	Work Package Description	Designer	Builder	Design Time	Build Time	Design Schedule	Build Schedule
Bell Canada - Telecom																				
Power Stream - Hydro																				
Enbridge Gas																				

APPENDIX D:
60% Design Criteria

For the purpose of this manual, the following level of design is required to be completed to meet a 60% detail design criteria:

- Base plan survey completed including property lines, easements, etc.
- A composite utility drawing 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
- Road geometrics finalized
- Horizontal alignment and vertical grade finalized
- New developments access locations and servicing finalized
- Road cross sections finalized
- Retaining walls design
- Updated utility conflict matrix
- Identify further SUE QL-A (test pit) locations
- Existing and proposed structures (bridges, culverts) design
- Rail way crossings and required permitting process
- Commence land procurement nearing completion (land required prior to the commencement of utility relocations)
- Permission to enter agreements nearing completion
- Location of environmental conditions, permit requirements and associated known timing restrictions
- Partnerships and cost sharing agreements finalized (i.e. streetscaping, municipal infrastructure improvements, illumination, etc.)
- Temporary and proposed illumination and traffic signal designs
- Constructability review
- Street tree inventory and street tree preservation plan
- Streetscape design

APPENDIX E:
SUE Quality Levels (Excerpt from ASCE 38-02 Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data)

5.0 UTILITY QUALITY LEVEL ATTRIBUTES

5.1 Quality Level D

Typical tasks by the engineer leading to utility quality level D are:

5.1.1 Conduct utility records research to assist in identifying utility owners that may have facilities on or be affected by the project. Sources of information may include, but are not limited to (project- and scope-dependent):
Utility section of the state Department of Transportation or other public agency
One-call notification center
Public Service Commission or similar organization
County Clerk's office
Landowner
Internet or computer database search Visual site inspection
Utility owners

5.1.2 Collect applicable utility owner records. Applicable records may include:
Previous construction plans in area Conduit maps
Direct-buried cable records Distribution maps Transmission maps Service record cards
"As-builts" and record drawings
Field notes
County, city, utility owner or other geographic information system databases Circuit diagrams
Oral histories

5.1.3 Review records for:
Indications of additional available records
Duplicate information and credibility of such duplicate information Need for clarifications by utility owners

5.1.4 Develop utility composite drawing or equivalent. The engineer should also make professional judgments regarding the validity and location of topographic features on records versus current topographic features (when available) and conflicting references of utilities. And the engineer should indicate quality levels; utility type and/or ownership; date of depiction; accuracy of depicted appurtenances (quality level C vs. quality level D);

end points of any utility data; active, abandoned, or out- of-service status; size; condition; number of jointly buried cables; and encasement.

5.2 Quality Level C

Typical tasks by the engineer leading to utility quality level C are:

5.2.1 Perform tasks as described for quality level D. Quality level C and D tasks do not necessarily need to be performed in any prescriptive order.

5.2.2 Identify surface features on the topographic plan and ground surface that are surface appurtenances of existing subsurface utilities.

5.2.3 Survey such features if the features have not already surveyed by a registered professional. If previously surveyed, check survey accuracy and completeness for applicability with the existing project.

5.2.4 Correlate applicable utility records to these surveyed features, taking into account the geometries and indications on the records of these surface features.

5.2.5 Determine when records and features do not agree and resolve discrepancies. This may be accomplished by depiction of a utility line at quality level D, effectively bypassing or disregarding (but still depicting) a surveyed structure of unknown origin. Additional resolution may result from consultation with utility owners.

5.3 Quality Level B

Typical tasks by the engineer leading to utility quality level B are:

5.3.1 Perform tasks as described for quality level C. Quality level C and B tasks do not necessarily need to be performed in any prescriptive order. It may be more cost effective to perform some quality level B tasks before and/or in conjunction with quality level C or D tasks.

5.3.2 Select an appropriate suite of surface geophysical methods (see the Appendix for discussions of methods, relative merits, and relative costs) to search for utilities within the project limits or to perform a utility trace for a particular utility system.

5.3.3 Apply appropriate surface geophysics to search for utilities within the project limits, or trace a particular utility system if the scope of investigation is limited.

5.3.4 Interpret the surface geophysics. Depending on the methods, this may be performed in the field or in the office.

5.3.5 Mark the indications of utilities on the ground surface for subsequent survey. Local utility owners, agencies, and/or one-call statutes may dictate, or suggest, the markings' colors, sizes, and/or other labeling. Care should be taken to differentiate markings placed

on the ground for design purposes from those placed on the ground for damage prevention purposes. (Note: If a particular surface geophysical method allows for field data collection or storage for future computer downloading and evaluation, if a utility search technique that allows for comprehensive area coverage is used, and if a survey grid or line is laid out that allows for future correlations of surface geophysical data to points depicted on a map, then ground markings may be unnecessary.)

5.3.6 Survey all markings that indicate the presence of a subsurface utility. This survey should be to the accuracies and precision dictated by the project's survey control.

5.3.7 Depict all designated utilities. These utility depictions may follow the general guideline as presented in Section 6.0. Depiction is usually accomplished via computer-aided design and drafting or manual plotting methods onto plan sheets, into geographic information systems databases, or onto other appropriate documents. Quality level B data should be reproducible by surface geophysics at any point of their depiction.

5.3.8 Correlate the designated utilities' depictions with utility records and/or surveyed appurtenances to identify utilities that may exist but were not able to be designated.

5.3.9 Resolve differences between designated utilities and utility records and surveyed appurtenances. This may take the form of additional surface geophysical searches or depiction of designated or nondesignated utilities at a lower quality level. It may take the form of an upgrade at appropriate points to quality level A information. Situations require judgment that a designated utility and a utility of record are actually identical, even if not interpreted as geographically coincident.

5.3.10 Recommend to the project owner additional measures to resolve differences if they still exist. Such recommendations may include additional or different surface geophysical methods, exploratory excavation, or an upgrade to quality level A data.

5.4 Quality Level A

Typical tasks by the engineer leading to utility quality level A are:

5.4.1 Perform tasks as described for quality level B at the appropriate project location. Quality level B, C, and D tasks do not necessarily need to be performed in any prescriptive order.

5.4.2 Select an appropriate method of gathering data that will achieve the accuracies and precision required by the project. These accuracies are currently typically set to 15- mm vertical and to applicable horizontal survey and mapping accuracy as defined by the project owner. Exposure and survey of the utility at each specific location where quality level A data are obtained are currently necessary.

5.4.3 Excavate test holes exposing the utility to be measured in such a manner that protects the integrity of the utility to be measured. Exposure is typically performed via minimally

intrusive excavation. In some cases, data gathering during utility construction may eliminate the need for excavation of the utility, as it is already exposed.

5.4.4 Comply with applicable utility damage prevention laws, permits, and specifications, and coordinate with utility and other inspectors, as required.

5.4.5 Determine (a) the horizontal and vertical location of the top and/or bottom of the utility referenced to the project survey datum; (b) the elevation of the existing grade over the utility at a test hole referenced to the project survey datum; (c) the outside diameter of the utility and configuration of non-encased, multiconduit systems; (d) the utility structure material composition, when reasonably ascertainable; (e) the benchmarks and/or project survey datum used to determine elevations; (f) the paving thickness and type, where applicable; (g) the general soil type and site conditions; and (h) such other pertinent information as is reasonably ascertainable from each test hole site.

5.4.6 Resolve differences between depicted quality level A data and other quality levels. This may take the form of additional surface geophysical searches or a depiction of adjacent or nearby data points at a lower quality level. It may require that utilities already depicted at quality level B, C, or D should be re-depicted to coincide with the more accurate quality level A data. It may take the form of additional upgrades at appropriate points to quality level A information.

APPENDIX F:
Glossary

As-Built Plan: a representation of the as-constructed situation showing the position and features of components as actually put in place

Base Plan: a topographical survey plan depicting the existing conditions (surface and subsurface) within the project limits.

Betterments: utility upgrades made to existing infrastructure constructed as part of the utility relocation for a project.

Mark-Up Drawings: a plan view drawing supplied by the utility owner reflecting the location of subsurface infrastructure within the requested limits.

Quality Assurance (QA): a program for the systematic monitoring and evaluation of the various aspects of a project, service, or facility to ensure standards of quality are being met.

Quality Control (QC): the activity of checking goods as they are produced to ensure the final products are good.

Right-of-way (ROW): the right to make a way over a piece of land, usually to and from another piece of land. A right of way is a type of easement granted or reserved over the land for transportation purposes. This can be for a highway, public footpath, railway and canal, as well as for electrical transmission lines, oil and gas pipelines.

Road Geometrics: engineering concerned with the positioning of physical roadway elements according to standards and constraints. The basic objectives in geometric design are to optimize efficiency and safety while minimizing cost and environmental damage.

Subsurface Utility Engineering (SUE): a branch of engineering practice involving classifying and reducing the uncertainty of the presence and location of underground utility infrastructure by delivering data about that infrastructure. For example reports and utility mapping at appropriate Utility Quality Levels, and using this data for purposes including utility coordination, utility relocation design and coordination, utility condition assessment, communication of utility data to concerned parties, utility relocation cost estimates, implementation of utility accommodation policies, and utility design.

APPENDIX G:
Supporting Reference Documents for the Guidelines

1. Minnesota Department of Transportation. 2013. "Utility Coordination Section, Step 14: Payment and Closeout," In *Utility Accommodation and Coordination Manual* [online]. http://dotapp7.dot.state.mn.us/edms/download?docId=1401425

2. American Society of Civil Engineers CI/ASCE 38-02 Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data American Society of Civil Engineers, and Construction Institute. 2003. *Standard guideline for the collection and depiction of existing subsurface utility data*. Reston, Va: American Society of Civil Engineers.

3. Canadian Standards Association. 2011. *CSA S250-11: Mapping of Underground Utility Structures.* Toronto, ON: Canadian Standards Association.

4. Public Utilities Management Sub-Committee. 2011. *A Guide for the Accommodation of Utilities Within Freeway Rights-of-Way/Guide sur l'Installation d'équipements de services publics dans les emprises autoroutières.* Ottawa, ON: Transportation Association of Canada.

5. Public Utilities Management Sub-Committee. 2013. *Guidelines for Underground Utility Installations Crossing Highway Rights-of-Way.* Ottawa, ON: Transportation Association of Canada.