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Article 4. Existing Conditions

4.1 General

4.1.1 Scope

- (a) This Article 4 [Existing Conditions] specifies requirements and criteria for the Design and Construction of the Work in relation to Existing Conditions, including the preparation, implementation and delivery of plans and reports in respect of such Work.

4.1.2 General

- (a) Without limiting any other provision of this Agreement, the Primary Contractor shall take all steps and measures necessary:
 - (i) to provide, perform and carry out the Work, including any Work undertaken during the General Work Defect Warranty Period and Latent Work Defect Warranty Period, so as to:
 - A. not cause damage or otherwise adversely impact Existing Conditions; and
 - B. prevent damage or other adverse impacts to Existing Conditions arising from or as a result of the performance, provision and carrying out of the Work,

provided that damage to property or other adverse impacts, to the extent that such damage or other adverse impacts is a reasonable and unavoidable consequence of performing the Work in accordance with this Agreement and in compliance with all other obligations of the Primary Contractor under this Agreement, will not constitute a breach of this Article 4.1.2(a); and
 - (ii) over the design life of each of the components of the Evergreen Line where specified in this Agreement, to prevent damage or other adverse impacts to Existing Conditions arising from or as a result of the Design, the Construction or the use of the Evergreen Line in accordance with or as anticipated by this Agreement.

4.2 Construction Risk and Impact Assessment and Report

4.2.1 Construction Risk and Impact Assessment

- (a) The Primary Contractor shall carry out a risk and impact assessment of any Existing Condition that may potentially be damaged or otherwise adversely impacted, directly or indirectly:

- (i) by the performance, provision and carrying out of the Work; or
- (ii) over the design life of each of the components of the Evergreen Line, arising from or as a result of the Design, the Work, or the use of the Evergreen Line in accordance with this Agreement,

which assessment shall be undertaken in sufficient time so as to comply with the deadline for submission of the Construction Risk and Impact Assessment Report set out in Article 4.2.2(a) of this Part 1.

- (b) Without limiting the generality of the risk and impact assessment to be undertaken by the Primary Contractor under Article 4.2.1(a) of this Part 1, the Primary Contractor shall, as part of such assessment be responsible for:
 - (i) identifying and locating any Existing Condition referred to in Article 4.2.1(a) of this Part 1, whether or not such Existing Condition is disclosed in Disclosed Data or in any office of public record; and
 - (ii) identifying any and all potential damage and other adverse impacts on any Existing Conditions, including the following potential damages and other adverse impacts arising from the Design or the Construction of the Work:
 - A. deformations resulting from static or vibratory loads, or deformations resulting from changes in groundwater pressures or groundwater drawdown;
 - B. cracking of slabs, pavements, walls, utilities or other facilities;
 - C. modification of surface or underground drainage patterns, or impacts on wells and aquifers and other effects arising from changed groundwater conditions;
 - D. increased stresses on underground structures and utilities;
 - E. re-grading or removal of support from slopes which would result in decreased support or stability of such slopes below the level of support or stability existing as at the date of the Primary Contractor's risk and impact assessment; and
 - F. any potential conflicts between any Existing Condition and the Design and Construction of the Work.
- (c) As part of its risk and impact assessment, the Primary Contractor shall define the area (the "**Zone of Influence**") containing any Existing Conditions that may potentially be damaged or otherwise adversely impacted, directly or indirectly:
 - (i) by the performance, provision and carrying out of the Work; or
 - (ii) over the design life of each of the components of the Evergreen Line, arising from or as a result of the Design, the Work, or the use of the Evergreen Line in accordance with or as anticipated by this Agreement.

- (d) Without limiting the Primary Contractor's obligations to define the Zone of Influence, the Primary Contractor shall include the following in the Zone of Influence:
 - (i) all buildings, structures, track and roadway on the CPR Lands within 30 meters of the Guideway; and
 - (ii) any additional Existing Conditions that the Province may reasonably request.

4.2.2 Construction Risk and Impact Assessment Report

- (a) By no later than 65 Business Days prior to the commencement of construction activities, the Primary Contractor shall prepare and submit to the Province's Representative, for review, acting reasonably, under the Review Procedure, a construction risk and impact assessment report (the "CRIAR") that has been signed and sealed by the Geotechnical Manager and that presents the findings of the risk and impact assessments undertaken by the Primary Contractor under Article 4.2.1 [Construction Risk and Impact Assessment] of this Part 1. The Primary Contractor may, instead of submitting a single CRIAR for the Project, divide the Site into segments and prepare a separate CRIAR for each segment, in which case the Primary Contractor shall submit the CRIAR for a segment to the Province for review under the Review Procedure no less than 3 months prior to the commencement of the construction activities in the applicable segment.
- (b) Without limiting the generality of the foregoing, the CRIAR shall, with respect to the segment of the Construction covered by the applicable CRIAR:
 - (i) identify the Zone of Influence and all Existing Conditions within the Zone of Influence;
 - (ii) set out the results of the Primary Contractor's analysis regarding ground deformations (both horizontal and vertical) anticipated by the Primary Contractor as a result of the provision, performance and carrying out of the Work, including:
 - A. the basis of the analysis, including:
 - (1) the key input criteria (such as volume losses for bored tunnelling);
 - (2) the basis for the selection of the key input criteria;
 - (3) a description of the analysis methodology; and
 - (4) such other information as required to support the analytical prediction;
 - B. where applicable, the predicted depth, width, slope and shape, ground strains and other related characteristics of the ground settlement associated with all Transition Tunnel and Bored Tunnel sections;
 - C. drawings showing:

- (1) the predicted horizontal and vertical deformation contours;
 - (2) the transient settlement trough that will develop ahead of the advancing Tunnel Boring Machine (TBM); and
 - (3) the expected response of the Existing Condition to the forces referenced in Articles 4.2.2(b)(ii)C(1) and (2) of this Part 1; and
- D. the impact that such deformations will have on Existing Conditions, as well as an assessment of deformations considered acceptable for each Existing Condition;
- (iii) in respect of each Existing Condition within the Zone of Influence, identify and assess the potential causes of damage or other adverse impacts arising from the Design or the Construction of the Project, including but not limited to:
- A. the geotechnical and hydrogeological characteristics of the ground under and around the Existing Condition, as well as the testholes and geotechnical test parameters and values that were used for the evaluation of such characteristics;
 - B. the proposed construction methodologies, including construction sequencing and equipment to be used in connection with the Construction; and
 - C. the ground displacements, vibrations and changes in groundwater conditions induced by the Construction;
- (iv) in respect of each Existing Condition within the Zone of Influence, identify the nature of the potential damage and other adverse impacts arising from the Design or the Construction of the Project, including but not limited to:
- A. deformations resulting from:
 - (1) static or vibratory loads; and
 - (2) changes in groundwater pressures or groundwater drawdown;
 - B. cracking of slabs, pavements, walls, utilities or other facilities;
 - C. modification of surface or underground drainage patterns, and impacts on wells and aquifers and other effects arising from changed groundwater conditions;
 - D. increased stresses on underground structures and utilities; and
 - E. re-grading or removal of support from slopes which would result in decreasing the support or stability of such below the level of support or stability existing as at the date of the Primary Contractor's risk and impact assessment;

- (v) in respect of each Existing Condition within the Zone of Influence, describe the Primary Contractor's proposed temporary and permanent methods, measures and procedures (including accommodating, protecting, relocating, modifying, re-constructing, decommissioning and/or abandoning such Existing Condition) to prevent potential damage and other adverse impacts to such Existing Condition;
- (vi) where damage or other adverse impact to an Existing Condition resulting from or to be caused by the performance, provision or carrying out of the Work in accordance with this Agreement is unavoidable despite the Primary Contractor's compliance with Good Industry Practice:
 - A. identify the nature and extent of such unavoidable damage or other adverse impacts to such Existing Condition; and
 - B. describe the Primary Contractor's proposed steps and measures:
 - (1) to repair the damage or mitigate other adverse impacts to such Existing Condition to a state equivalent to that which existed prior to the damage or other adverse impact; and
 - (2) where it is not feasible because of the Design and Construction of one or more Fixed Facilities to repair the damage or mitigate the other adverse impacts to such Existing Condition to a state equivalent to that which existed prior to the damage or adverse impact, the Primary Contractor may, with the prior written approval of the relevant owner(s):
 - I. restore such Existing Condition to a state as close to comparable to that which existed prior to the damage or adverse impact as the applicable Fixed Facilities permit; or
 - II. relocate, modify, reconstruct, decommission or abandon such Existing Condition; and
- (vii) identify the instrumentation that the Primary Contractor proposes to utilize to monitor the Existing Conditions during the Construction to verify that ground deformations are within the predicted and tolerable limits permitted by this Agreement, including at a minimum:
 - A. the proposed type, location, installation method and data collection procedures (including monitoring frequency) of such instrumentation; and
 - B. for each instrument:
 - (1) the action level for any settlement, lateral movement or strains, or changed water conditions as applicable ("**Action Levels**"); and

- (2) the specific action(s) that are to be taken at each identified Action Level.

4.3 Mitigation of Damage and Other Impacts

4.3.1 Impact Mitigation Plan

- (a) The Primary Contractor shall, for each Existing Condition identified in the CRIAR as being vulnerable to damage or other impacts arising from the Design, the Construction or the Operational Evergreen Line, prepare and implement a work plan (“**Impact Mitigation Plan**”) that sets out, in sufficient detail to inform the Province of the particulars of the temporary and permanent methods, measures and procedures (including accommodating, protecting, relocating, modifying, re-constructing, decommissioning and/or abandoning such Existing Condition) that the Primary Contractor shall provide, perform and carry out to prevent, minimize or resolve damage or other adverse impacts to the Existing Condition arising from the Design, the Construction and the Operational Evergreen Line, including the instrumentation and the frequency of monitoring required to allow preventative measures to be taken to protect Existing Conditions.
- (b) The Primary Contractor shall submit the Impact Mitigation Plan in respect of each Existing Condition to the Province’s Representative for review, acting reasonably, under the Review Procedure by no less than 20 Business Days prior to commencing any of the Work set out in such plan. The Primary Contractor shall use all reasonable efforts to obtain the written approval of the owner(s) of the applicable Existing Condition to the contents of such plan, which approval, where obtained, shall be submitted with the Impact Mitigation Plan. Notwithstanding the foregoing, the Primary Contractor shall obtain the written approval of the owner(s) of any Existing Condition that the Primary Contractor proposes to relocate, modify, reconstruct, decommission or abandon, which written approval shall be submitted with the applicable Impact Mitigation Plan.
- (c) The Impact Mitigation Plan for an Existing Condition shall be sealed by an architect registered with the Architectural Institute of British Columbia or by a Professional Engineer, as applicable, where such plan contains any design documents for permanent methods, measures or procedures.

4.3.2 Mitigation of Damage or Other Impacts

- (a) Where the Primary Contractor has identified that damage or other adverse impact resulting from or to be caused by the performance, provision or carrying out of the Work in accordance with this Agreement to an Existing Condition is unavoidable despite the Primary Contractor’s compliance with Good Industry Practice, the Primary Contractor shall:

- (i) to the satisfaction of the owner(s) of the affected Existing Condition, conduct all Work necessary to, as applicable:
 - A. repair the damage or mitigate other adverse impacts;
 - B. restore such Existing Condition to a state as close to comparable to that which existed prior to the damage or other adverse impact as the applicable Fixed Facilities permit; or
 - C. relocate, modify, reconstruct, decommission or abandon such Existing Condition; and
 - (ii) prior to Substantial Completion, use all reasonable efforts to obtain written confirmation from the owner(s) that they are so satisfied and submit to the Province written confirmation of the satisfaction of the owner(s) with such steps and measures to the extent that such written confirmations have been obtained.
- (b) Should any damage or other adverse impacts occur during the Construction which are determined to have been caused by the Work, the Primary Contractor shall take all steps and measures necessary to rectify the damage or other adverse impacts to the satisfaction of the owner(s) of the Existing Condition and shall, prior to Substantial Completion, submit to the Province written confirmation of the satisfaction of the owner(s) with such steps and measures.
- (c) Notwithstanding Articles 4.2.2(a) and (b), Part 3 of Schedule 4, the Primary Contractor shall, in respect of any relevant part of the Site in respect of which an Access Period Expiry Date applies that is prior to the Substantial Completion Date, complete all Work necessary to comply with the requirements of Articles 4.2.2(a) and (b), Part 3 of Schedule 4, by no later than the applicable Access Period Expiry Date unless a later date has been agreed to with the relevant owner(s).

4.4 Pre – Construction Condition Survey and Reports

4.4.1 Pre-Construction Condition Surveys

- (a) By no later than 45 Business Days prior to the commencement of any excavation, dewatering, tunneling, or other settlement- or vibration-producing activity as part of the Construction, the Primary Contractor shall, with respect to each Existing Condition within the Zone of Influence, carry out a comprehensive pre-construction condition survey of the state of the Existing Condition (each a “**Pre-Construction Condition Survey**”), which survey shall include, as applicable, the following:
- (i) where the survey is in respect of an Existing Facility, a visual inspection of the exteriors and interiors of the said facility;
 - (ii) a record of the state of the Existing Condition by means of video and photographs and, where an Existing Condition is a sewer system, a CCTV

- survey of the said system. Without limiting the generality of the foregoing, the Primary Contractor shall prepare a video condition survey of streets and sidewalks, gravity sewer and drainage systems within the Zone of Influence;
- (iii) where the survey is in respect of an Existing Facility, a survey giving elevations of the basement and ground floor of the said facility;
 - (iv) a survey of existing features of each of the Ioco Overhead and Moody Street Overpass, including the abutments, abutment fills, wing walls, and bridge decks;
 - (v) notations, measurements and engineering sketches of any damage in the Existing Condition, including architectural, structural, cosmetic, plumbing, or electrical damage; and
 - (vi) identification of any equipment sensitive to vibration or movement located within or in respect of the Existing Condition.
- (b) The Primary Contractor shall take all steps and measures necessary to ensure that the Pre-Construction Condition Survey of an Existing Condition is undertaken in accordance with the requirements of this Agreement, including as necessary:
- (i) cleaning sewer and drainage pipes to facilitate preparation of the Pre-Construction Condition Survey; and
 - (ii) using all reasonable efforts to obtain the prior approval of the owner(s) of the Existing Condition to undertake the Pre-Construction Condition Survey.
- (c) The Primary Contractor shall provide the owner(s) and occupier(s) of each Existing Condition with the opportunity to attend during the course of the Pre-Construction Condition Survey of the said Existing Condition.
- (d) The Province's Representative shall be entitled to attend during the course of the Pre-Construction Condition Survey of each Existing Condition and the Primary Contractor shall provide 24 hours' advance written notice to the Province's Representative of the timing and location of each such survey at each Existing Condition.
- (e) The Primary Contractor shall ensure that an architect registered with the Architectural Institute of British Columbia or a Professional Engineer, as applicable, assumes responsibility for any Pre-Construction Condition Survey involving any of the following aspects of an Existing Facility:
- (i) structural;
 - (ii) architectural; or
 - (iii) any plant or equipment within the Existing Facility.

4.4.2 Pre-Construction Condition Survey Reports

- (a) By no later than 20 Business Days prior to the commencement of any excavation, dewatering, tunnelling, or other settlement- or vibration-producing activity as part of the Construction which may damage or affect an Existing Condition within the Zone of Influence, the Primary Contractor shall prepare and submit a pre-construction condition report with respect to the said Existing Condition (each a “**Pre-Construction Condition Survey Report**”) for review by the Province’s Representative, acting reasonably, under the Review Procedure that:
- (i) summarizes all of the Primary Contractor’s survey findings with respect of the pre-construction state of the Existing Condition;
 - (ii) includes copies of all photographs and videos, including, as applicable, CCTV sewer system surveys, taken by the Primary Contractor of the Existing Condition; and
 - (iii) includes all data and other information collected by the Primary Contractor regarding the Existing Condition, including the data and information required under Article 4.4.1 [Pre-Construction Condition Surveys] of this Part 1.
- (b) Where Article 4.4.1(e) of this Part 1 applies with respect to the survey of an Existing Condition, the Pre-Construction Condition Survey Report in respect of the said Existing Condition must be signed and sealed by the applicable Architect or a Professional Engineer who assumed responsibility for the survey of the said Existing Condition.

4.5 Condition Surveys during Construction

- (a) If, at any time during Construction, an Existing Condition is damaged or otherwise adversely impacted by the Work, the Primary Contractor shall, with respect to the said Existing Condition:
- (i) immediately notify the Province’s Representative of such damage or other adverse impact;
 - (ii) as soon as practicable conduct a further survey of such Existing Condition utilizing the same survey procedures as were undertaken with respect to the condition prior to the commencement of Construction under Article 4.4.1 [Pre-Construction Condition Surveys] of this Part 1; and
 - (iii) within 5 Business Days of completion of the survey undertaken in accordance with Article 4.5(a)(ii) of this Part 1, submit to the Province’s Representative a report, which report shall, with respect to the further survey:
 - A. summarize all of the Primary Contractor’s survey findings with respect of the damaged or otherwise adversely impacted state of the Existing Condition;

- B. include copies of all photographs and videos taken by the Primary Contractor of the Existing Condition, both before and after the damage or other adverse impact; and
 - C. include all data and other information collected by the Primary Contractor regarding the damage or other adverse impact of the Existing Condition, including the data and information required under Article 4.4.1 [Pre-Construction Condition Surveys] of this Part 1.
- (b) In addition to the requirements set out in Article 4.5(a) of this Part 1, during the construction of the Project adjacent to each of the Ioco Overhead and Moody Street Overpass, the Primary Contractor shall take survey readings with respect to any Work that may damage or otherwise adversely impact any of the existing features referred to Article 4.4.1(a)(iv) of this Part 1. The survey readings shall be taken at a minimum frequency of once per month and the summary of surveys and results shall be provided to the Province's Representative within five Business Days after the readings are taken. The Primary Contractor shall ensure that the survey undertaken pursuant to this Article 4.5(b) of this Part 1 captures any movements of the existing features.

4.6 Post – Construction Condition Surveys and Reports

4.6.1 Post-Construction Condition Surveys

- (a) The Primary Contractor shall carry out a comprehensive post-construction survey of each Existing Condition within the Zone of Influence (each a "**Post-Construction Condition Survey**") to identify any changes in the state of each Existing Condition. The Primary Contractor shall undertake the Post-Construction Condition Survey of an Existing Condition no more than three months prior to making application for Substantial Completion but not prior to the completion of any Work that may yet damage the Existing Condition. In undertaking the Post-Construction Condition Survey of an Existing Condition, the Primary Contractor shall, at a minimum, undertake the same survey procedures as were undertaken with the said Existing Condition prior to Construction under Article 4.4.1 [Pre-Construction Condition Surveys] of this Part 1.

4.6.2 Post-Construction Condition Survey Reports

- (a) By not less than two months prior to making application for Substantial Completion, the Primary Contractor shall, with respect to each Existing Condition within the Zone of Influence, prepare and submit a post-construction condition survey report (each a "**Post-Construction Condition Survey Report**") for review by the Province's Representative, acting reasonably, under the Review Procedure that:

- (i) summarizes all findings with respect of the post-construction state of the Existing Condition, including a comparison of the pre- and post-construction states of each Existing Condition;
 - (ii) includes copies of all photographs and videos, including CCTV sewer system surveys, taken by the Primary Contractor of the Existing Condition following completion of Construction; and
 - (iii) includes all data and other information collected by the Primary Contractor regarding the Existing Condition following completion of Construction, including the data and information required under Article 4.4.1 [Pre-Construction Condition Surveys] of this Part 1.
- (b) Should a Post-Construction Condition Survey identify any damage or other adverse impacts to an Existing Condition caused by the Work, the Primary Contractor shall:
- (i) in the applicable Post-Construction Condition Survey Report, describe the Primary Contractor's proposed temporary and permanent methods, measures and procedures to repair the identified damage or other adverse impacts and to prevent further damage or other adverse impacts; and
 - (ii) undertake the repair and mitigation work described in the applicable Post-Construction Condition Survey Report in accordance with the requirements of Article 4.3.2 [Mitigation of Damage or Other Impacts] of this Part 1.