Technical Circular T-03/25
Date: Update July 25, 2025

To: All Engineering Directors
All Regional Directors
All HQ Directors: Operations, Planning and Major Projects
All District Managers Transportation
All Engineering & Technical Staff

Subject: Design Variance - Exception, and Approval Process

Purpose:

To outline the Design Variance/Exception Process related to the BC Ministry of Transportation & Transit (MoTT) Engineering design policies, standards and guidelines.

General:

Staff are expected to follow MoTT engineering and environmental design criteria, standards and guidelines as provided in MoTT Manuals, Guidelines, Technical Circulars, Industry Design Codes/Standard Publications and related documents (the ***standards***) when carrying out engineering and environmental design work. In certain situations, it may not be possible or economically feasible to meet the design ***standards*** or the design domain recommended values. In those instances where it is not possible to meet the ***standards*** then the variance processes for the applicable areas of design work in the sections below shall be followed.

For the applicable areas of design work, only Ministry employees in the positions identified in the sections below have the authority to grant a variation to the ***standards*** as described herein.

Design Variance Process for Structural Design:

The governing standards for bridge design in the Ministry are the current version of CSA S6: the Canadian Highway Bridge Design Code (CHBDC) and the Ministry's Supplement to the CHBDC. The Supplement takes precedence over the Code. Variation from the Code and Supplement may be permitted through either "Consent" or "Design Exception".

Variation by "Consent" applies to a limited number of standards flagged in the Code and Supplement as "Consent Items" and design variation is only allowed within a defined scope. The wording in the Supplement is "... unless consented to by the Ministry". When this wording is used, Ministry means the MoTT Engineer who has the authority, responsibility, and technical expertise to vary from the Supplement and Code. The intent of this is to give the Ministry Engineer authority to Consent as described in the Supplement. The Ministry Engineer will consult with the Structural Standards Engineer and the Chief Bridge Engineer before issuing Consent. Chief Engineer approval is not required.

Variation by Exception applies to any items that vary from clauses in the CHBDC or Supplement or where the terms "Approval" or "Approved" are used in either document. In such cases formal approval from the Chief Engineer is required.

The Ministry Engineer will submit authenticated Design Exception requests to the Structural Standards Engineer and the Chief Bridge Engineer. If in agreement the Chief Bridge Engineer will endorse the request and, with the support of the Director of Structural Engineering, submit the Design Exception request to the Chief Engineer for approval. Requests for Design Exceptions should clearly identify the rationale for the Exception, the standard from which the exception is being requested, cost impacts, risks and any proposed mitigation, options, schedule impacts, or other pertinent information that supports the request.

A guidance document is available from the Ministry Structural Engineering Group that specifies the format and content that should be followed when preparing requests for design variation by either Consent or Exception.

Design Variance Process for Geometric Design:

For highway geometric design, the Ministry adheres to the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads as well as the BC Supplement to TAC Geometric Design Guide. The Supplement takes precedence over the TAC Guidelines. Variance from the TAC Design Guides will be included and justified in the Highway Engineering Project Design Criteria Sheet.

For geometric design work, a project design criteria sheet must be completed, which presents a comparison of: existing highway parameters; design criteria recommended in the Guidelines; and proposed design criteria for the project. The proposed design criteria must then be accepted and signed off by the engineer with the appropriate level of authority, as noted on the project design criteria sheet. The authority levels increase with increasing project significance and with the significance of the variance. If sign-off needs to be elevated, then all lower-level sign-off is required before elevating sign-off to a higher level. The approval hierarchy is as follows:

- Senior Highway Design Engineer
- Senior Engineering Manager, Highway Design Services
- Director, Highway Design and Survey Engineering
- Chief Engineer

Application for a variance should be prepared by completing a project design criteria sheet. It should clearly explain the request, the rationale, and the potential implications or proposed mitigation, i.e. which variance is being sought, why it is being sought, what are the impacts on roadway users from a safety perspective, what are the financial impacts of the request, what is proposed to offset any potential negative effects of the requested variance, and what other options have been explored.

The hierarchical sign-off structure does not apply to Clear Zone treatments for rehabilitation or minor geometric improvements projects which only require the approval of the Director, Highway Design and Geomatic Engineering.

Design Variance Process for Geotechnical, Materials and Pavement Design:

Geotechnical design related to bridges or structures including (but not limited to) retaining walls and foundations must follow the current version of CSA S6: the Canadian Highway Bridge Design Code (CHBDC) and the Ministry Supplement to the CHBDC where the Supplement takes precedence over the Code. Variation from the Code and Supplement may be permitted through either “Consent” or “Exception”.

Other design standards not covered in the Code or Supplement are in the current version of the Geotechnical Design Criteria Technical Circular T04/17. Variations from the standards in T04/17 are by Exception.

Variation by “Consent” applies to a limited number of standards in the Supplement flagged as “Consent Items” and variation is only allowed within a defined scope. The wording in the Supplement is "... unless consented to by the Ministry”. When this wording is used, Ministry means the MoTT Engineer who has the authority, responsibility, and technical expertise to vary from the Supplement and Code. The intent here is to give the Ministry Engineers the authority to Consent as described in the Supplement. The Ministry Engineer will consult with the appropriate Lead Engineer before issuing Consent. Chief Highway Engineer approval is not required.

Variation by Exception applies to any items that vary from clauses in the CHBDC or Supplement, or where the terms "Approval" and "Approved" are used in either document. In such cases formal approval from the Chief Engineer is required.

The Ministry Engineer will submit authenticated design exception requests to the appropriate Lead Geotechnical Engineer for review. If in agreement the Lead Geotechnical Engineer will endorse the request and with the support of the Director of Environmental & Geotechnical Engineering submit the request to the Chief Engineer for approval. Requests for design exceptions should clearly identify the rationale for the Exception, the standard from which the exception is being requested, cost impacts, risks and any proposed mitigation, options, schedule impacts, or other pertinent information that supports the request.

A guidance document is available from the Ministry Geotechnical and Environmental Group that specifies the format and content that should be followed when preparing requests for design variation by Consent or Exception.

Design Variance Process for Electrical Design:

All electrical designs are completed using the following standards: Canadian Electrical Code, The MoTT Electrical and Traffic Engineering Manual, Standard Specifications for Highway Construction, MUTCD Canada, IES RP-8, IES RP-22, and TAC Illumination of Isolated Rural Intersections.

Ministry electrical design standards are highly prescriptive and rarely require design variances.

Variation from design standards may be considered for:

- Illumination levels for remote locations where power may not be available,
- Ornamental lighting in rural municipalities,
- New Traffic Control Devices installation for test or evaluation purposes,
- Voltage level for special case,
- Clear Zone treatment,
- Other exceptional circumstances.

Application for a design variation should be in the form of a technical memo that clearly describes the rationale for the variation. All variation requests shall be submitted to the Director, Transportation Systems & Road Safety Engineering for input and support prior to submission to the Chief Engineer for approval.

Requests for design variation should clearly identify and explain the request, the rationale, and the potential implications or proposed mitigation, i.e. which variance is being sought, why it is being sought, what are the impacts on roadway users from a safety perspective, what are the financial impacts of the request, what is proposed to offset any potential negative effects of the requested variance, and what other options have been explored.

Design Variance Process for Environmental Design:

All environmental design work must meet MoTT engineering standards for the appropriate engineering discipline, and as applicable to any project. This includes, but is not limited to, specific structures and/or modifications to structures that may be utilized such as noise abatement walls, culverts, wildlife overpasses, wildlife fencing, and ungulate guards.

Variation to the applicable engineering design standard shall follow the procedure for that engineering discipline as described in this document. Note that hydrologic impacts in ditches/creeks/rivers or other water courses determined to be fish-bearing or environmentally sensitive are particularly sensitive to design variation. In many cases, variation from approved design standards will require approval from external permitting organizations, such as the BC Ministry of Forests, or the BC Ministry of Water, Land and Resource Stewardship or the Department of Fisheries & Oceans Canada (DFO).

The variation request shall detail the effect(s) or potential implications of the design variation on the project environmental requirements. These environmental requirements are defined in Federal or Provincial environmental permits specific to the project and/or applicable environmental regulations, standards, or specified design criteria.

Design Variance Process for Traffic Design:

Traffic Engineering works are completed using MOTT Traffic Engineering and Highway Safety policies, specifications, standards and guidelines.

While Ministry traffic engineering manuals and guidelines are highly prescriptive and variation from standards are rare, the practice of Traffic Engineering requires significant engineering judgement. Where engineering judgement determines the design substantially complies with the standards and guidelines then the variance process does not apply.

If a design variation by exception is required, up to four levels of review and acceptance may be applicable depending on the level of complexity and risk involved with the design element under consideration. Each review level has sole discretion to approve or determine when escalation to a higher level of approval is required. Each level shall indicate their support when escalating to a higher level. The approval hierarchy is as follows:

- Senior Traffic Operations Engineer (STOE),
- Senior Traffic Engineer (STE) - Traffic Policy and Standards and/or Principal Safety Engineer,
- Director/Deputy Director- Transportation Systems and Road Safety Engineering,
- Chief Engineer.

The documentation for variation from standards and policy should be in the form of a technical memo that clearly identifies the rationale for the variation, describes the location, context, and nature of variance. It should clearly identify the standard or policy to be varied, as well as the

possible impacts and risks, proposed mitigation processes, and other pertinent information that supports the request.

While not an exhaustive list, variation from standards may be considered for:

- Signal timing values beyond maximum and minimum values specified in design manuals.
- Spacing of new traffic signals, roundabouts, crosswalks and/or cross-rides when closer than the guidelines recommend.
- Adjustments to the size, style, or placement of signage and/or pavement markings contrary to standards.
- Crosswalks, cross-rides and/or in-lane bus stops where the minimum stopping sight distance stated in standards cannot be achieved.
- Implementation of ITS traffic control devices not included in any of the listed manuals and publications.
- Other circumstances.

Variation approval does not apply to speed zone sign-off because another process involving the Chief Engineer already exists.



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