

SECTION 927

DESIGN CALCULATIONS

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927.01 SCOPE

This work consists of procuring and submitting design calculations to the Department for any element or part of the work, temporary or permanent. This may include but is not limited to: temporary works; design, supply and install elements, and alternative designs submitted by the Contractor.

927.02 GENERAL

Design Calculations shall be stamped and signed by a Professional Engineer registered in the Province of Newfoundland and Labrador. This person shall be known as the "Engineer of Record" for the component/work which they have designed. Additionally the calculations shall be stamped with a "Permit to Practice" from Professional Engineers and Geoscientists Newfoundland & Labrador for the company that employs the Engineer of Record.

The calculations will be held on file for the length of the structure's lifetime and will be available to the public on request.

The Department will not take any responsibility for accuracy, integrity or validity of the calculations; the Engineer of Record, and the company that employs them, is to have their own review procedure in place and not assume any technical oversight from the Department. The Department reserves the right to query the Contractor and/or the

Engineer of Record and their employer at the time of submittal, on any part of the calculations.

All calculations are to be designed to the latest version of CSA:S6 “Canadian Highway Bridge Design Code”, TAC “Geometric Design Guide for Canadian Roads” and any other relevant standards, guidelines and legislation applicable at the time of construction. These are considered by the Department to be the minimum standard a designer must achieve. Any variations from these codes, standards, guidelines and legislation shall be specifically accepted by the Department before construction is commenced.

927.03 CALCULATIONS REQUIRED

Calculations required by the Department shall include but are not limited to:

- a) Cover Sheet
- b) Index
- c) Design exceptions to S6, TAC design guidelines, and any other relevant standards, guidelines, and legislation applicable at the time of construction
- d) Design Methodology - Any use of “simplified” methods, alternative codes or methods should be made clear here and in the calculations for the relevant design element.
- e) Design Assumptions
- f) Calculations of Loads - This should include consideration of ALL loads specified under CSA:S6 any additional loads specified by the Department. Each element shall have its minimum and maximum load, and the corresponding load case clearly noted.
- g) Calculations of Superstructure - This would include but is not limited to design of deck, girders, diaphragms, bearings
- h) Calculations of Substructure - This would include but is not limited to design of abutments, piers, wingwalls, foundations (shallow or deep)
- i) Design Summary - This should include summaries of all design capacities and capacity/demand ratios with the critical load combination identified for each design element

Spreadsheets can be included to show calculations and summaries of calculations as long as one set of detailed calculations (relevant to this structure) per spreadsheet is submitted to show validity of the spreadsheet. The Department may waive this requirement if they consider the spreadsheet/method used to be sufficiently proven by the industry.

Calculations, that in the Department’s opinion, are not sufficiently detailed for future use by the Department to determine the structure or individual element’s ultimate and serviceability strength and serviceability shall be rejected and will require resubmittal.

Calculations shall be submitted as a single document unless agreed with the Department otherwise.

927.04 CALCULATION SUBMITTALS

For any element or part of the work requiring design calculations, the Contractor shall submit 1 electronic and 1 paper copy to the Department a minimum of 10 business days before construction of the element or part of the work commences. Electronic copies shall be submitted in PDF format unless requested otherwise. The Department may ask for a copy in native electronic format of any computer model used and referenced in the Design Calculations. Spreadsheets do not need to be submitted in native electronic formats.

Should calculations require resubmittal, the Contractor shall delay the construction of the element or part of the work a minimum of 10 business days after resubmittal of the calculations to the Department.

The Department will not accept any claims for time or cost associated with calculations that were rejected or required resubmittal.

927.05 UNASSIGNED

927.06 UNASSIGNED

927.07 UNASSIGNED

927.08 MEASUREMENT FOR PAYMENT

No measurement for payment will be made.

927.09 BASIS OF PAYMENT

The work described above shall be included in the unit price for the item requiring design calculations and no direct payment for "Construction Design Calculations" will be made.

Failure to provide design calculations acceptable to Department will result in 100% withheld of the payment for the item in the Unit Price Table for which the calculations are required.