



Structures Engineering Instructions (SEI)

Distribution: Structures, Director PDD, Assistant Director PDD, PDD Section Managers, Chief of Contract Admin., Director Ops., Assistant Director Ops., Consultants

Approved: Wm. Michael Hedges **Date:** 3/5/09
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Subject: **Geotechnical and Hydraulic Resource Coordination**

Administrative Information:

Effective Date: This SEI shall be effective for the Structures Section projects from the date of approval.

Superseded SEI: None.

Exceptions: The Project Manager is authorized to deviate from adherence to the communication protocol when the scope of the project does not include new or rehabilitated bridge substructures for bridges over waterways.

Disposition of SEI Content: The content of this SEI will be incorporated into a future revision to the Structures Manual and modify as necessary the Project Development Process for bridge projects.

Purpose:

To formalize lines of communication between the Structures Section, Hydraulics Unit and Soils and Foundations Unit for bridges over waterways. Proper coordination between the equally essential technical parties will result in safe, yet cost-effective foundation designs.

Technical Information:

Recent past practice for determining footing depths for bridge abutments and piers at water crossings, as documented in Section 16 of the Structures manual and Chapter 8 of the Hydraulics Manual, has required a minimum 6 foot embedment below the stream thalweg. The provision requiring the 6 foot depth was instituted as a preventative measure against scour based on concerns with bridges that were constructed with 4 feet or less of embedment. This depth has been utilized regardless of actual site conditions such as soil type, channel condition, and stream flow characteristics and utilized without consideration for the proximity of the substructures to the stream.

To balance environmental and economic constraints with the risk of scour and the structural needs of the bridge foundations, it is essential that VTrans designers not embrace a "one size fits all" substructure design policy but rather investigate alternative

solutions that minimize excavation in or near streams that consider all site specific conditions. It is recognized that designing alternatives will require a multi-disciplinary

approach with geotechnical, hydraulic and structures input to arrive at the optimum safe design.

The multi-disciplinary approach requires increased communication and coordination between the Structures Section, Hydraulics Unit and the Soils and Foundations Unit.

The following is an outline of coordination that will be utilized in the design of bridge projects.

Scoping/Conceptual Phase

Request Preliminary Hydraulics – The request for preliminary hydraulics will be made by the Project Manager to the Hydraulics Unit. The Project Manager will include in the request the alternatives that are under consideration for the project such as rehabilitation, or replacement on existing or new alignments. The request should be timed such that the preliminary hydraulic information can be produced in time for the Pre-design meeting.

Request Preliminary Subsurface Information – The request for preliminary subsurface information will be made by the Project Manager to the Soils and Foundations Unit. This formal written request should be made prior to the Pre-design Meeting and concurrent with the preliminary hydraulic request such that existing records can be examined and the results provided for the meeting.

This preliminary investigation should include a review of existing records. This request is intended to get preliminary subsurface information at the project location, general soil types and estimated depth to bedrock, and soil profiles if available. This information will be used to make a preliminary determination of the type of foundation and the potential for scour.

A limited subsurface exploration may be required based on an analysis of available subsurface information. The extent the subsurface exploration (borings) at this time will be made on a case by case basis by the Project Manager in Consultation with Soils and Foundations Engineer. The limited subsurface exploration may not obtain a complete ledge profile nor complete soils information.

Pre-design Meeting – When preliminary hydraulics, preliminary subsurface information are completed and the environmental resources have been plotted a pre-design meeting will be scheduled by the Project Manager. This meeting should be attended by VTrans personnel that represent all of the affected resources for the project. The Hydraulics and Soils and Foundation Units will be invited to attend this meeting. During the meeting, resource impacts of the project alternatives should be discussed. At this time initial observations about the foundation type based on the project alternatives may be noted.

Preliminary Phase

Foundations Design Meeting – This meeting will be scheduled by the Project Manager and must be attended by representatives of the Hydraulics Unit, Soils and Foundations Unit, and the Structures Section. The intent of this meeting is to discuss the possible foundation alternatives and foundation locations for the

project. The desired outcome from the meeting is a consensus from all parties about the type, location and depth for the bridge foundations.

If a consensus cannot be achieved, then the parties should agree about whether more information is required or whether the matter should be referred to the Director of PDD for a final decision.

- If more information is required, such as additional detail on proposed scour mitigation measures or data stemming from an evaluation of the stream morphology, the Project Manager shall ensure this information is obtained prior to the final selection of the foundation.
- If the matter is referred to the Director of PDD for a final decision, the Project Manager shall schedule a meeting to present the information. The Hydraulics and Soils and Foundations Units will be notified so they may attend.

Request Final Hydraulics – The request for final hydraulics will be made after the type, depth and location of the foundations has been determined as described above.

Request Final Borings/Foundation Report – The request for Final Borings/Foundation Report shall be made after the type, depth and location of the foundations have been determined. In some instances more borings may be needed and in other instances the preliminary borings may be adequate. The Foundation Report will provide complete subsurface information and an analysis of the foundation type that was selected above.

The request shall be in writing and should include a title sheet with the project location, a plan sheet with the proposed boring locations including GPS coordinates, plan and elevation sheets with proposed footing locations detailed, channel sections in the bridge area, and bridge approach cross sections. Foundation designs loads including magnitude, direction and location should be provided when available.

Implementation:

The content of this SEI will be implemented immediately on all projects that have not progressed beyond the preliminary phase. For those projects that have progressed beyond the preliminary phase, the Project Manager may choose to schedule a Foundation Design Meeting to discuss the foundation location and type.

Transmitted Materials:

None.