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TO: WisDOT and Consultant Bridge Design Staff

FROM: William C. Dreher, P.E.
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SUBJECT: Revised Pile Capacities

The January 2010 release of the WisDOT LRFD Bridge Manual has revised resistance values for driven piles (see Table 11.3-5, page 11-40) which will affect pile design as well as construction. The purpose of this letter is to provide guidance for the application of these changes based on what stage of design or construction a particular project is at.

1. Substructures that have not been designed:

Use the current Bridge Manual criteria (January 2010 release) including the reduced axial compression resistance, the increased resistance factor (0.5) and the decreased required driving resistance. (Remember that the required driving resistance should be determined based on the axial compression resistance required by the design, *limited by* the maximum values shown in the table.) Coordination will be necessary with the Geotechnical Engineer to consider a reduction in estimated pile length due to decreased required driving resistance.

2. Substructures that were designed (LRFD) prior to the January 2010 release, but have not been submitted for PS&E:

Revise the foundation data typically shown on the first sheet of the structure plans as well as applicable piling notes on abutment and pier sheets: revise the required driving resistance by multiplying the resistance by 0.8 (this represents the resistance factor change from 0.4 to 0.5; i.e. 0.4/0.5), and change the modified Gates resistance factor from 0.4 to 0.5 (see example below). Verify that the lower required driving resistance and potential reduction in pile length will not be detrimental to the performance of the substructure due to downdrag or scour concerns.

3. Structures that have been submitted for PS&E or have been let:

A construction note issued via the Construction and Materials Manual (CMM) will direct the construction project engineer to prepare and execute a contract change order to modify the required driving resistance and resistance factor values as indicated in 2. above.

Example Original Foundation Data note:

Foundation Data

ABUTMENTS TO BE SUPPORTED ON HP 12 X 53 STEEL PILING DRIVEN TO A REQUIRED DRIVING RESISTANCE OF 350 TONS** PER PILE AS DETERMINED BY THE MODIFIED GATES DYNAMIC FORMULA.

**THE FACTORED AXIAL RESISTANCE OF PILES IN COMPRESSION USED FOR DESIGN IS THE REQUIRED DRIVING RESISTANCE MULTIPLIED BY A RESISTANCE FACTOR OF 0.4 USING MODIFIED GATES TO DETERMINE DRIVEN PILE CAPACITY.

Example Revised Foundation Data note:

Foundation Data

ABUTMENTS TO BE SUPPORTED ON HP 12 X 53 STEEL PILING DRIVEN TO A REQUIRED DRIVING RESISTANCE OF 280 TONS** PER PILE AS DETERMINED BY THE MODIFIED GATES DYNAMIC FORMULA.

**THE FACTORED AXIAL RESISTANCE OF PILES IN COMPRESSION USED FOR DESIGN IS THE REQUIRED DRIVING RESISTANCE MULTIPLIED BY A RESISTANCE FACTOR OF 0.5 USING MODIFIED GATES TO DETERMINE DRIVEN PILE CAPACITY.