

Every Day Counts

Case Study Number and Description: CS #1 – Bridge Replacement in Close Proximity to a Major Interstate-to-Interstate Interchange

	In this section, indicate whether prefabricated bridge components should be considered during the BDR evaluation	Conventional Alternate (yes/no/na)	Prefab. Alternate (yes/no/na)	Comments
1.	Prefabricated Beam	Yes	Yes	Given the span lengths, the BDR should consider FIB's for the conventional alternate. For the prefabricated alternate, consider both simple span precast FIB's and more-likely two-span continuous steel plate girder unit option.
2.	Prefabricated Piles	Yes	Yes	The BDR should consider both drilled shafts and prestressed piling for both the conventional and prefabricated alternates.
3.	Precast Footing	No	No	Under SPMT option described below, footings would be constructed outside of roadway and outside of the existing bridge footprint. Precast Footing not deemed to be beneficial for prefabricated option because footing construction is not on the critical path (substructure and superstructure constructed concurrently with near-site casting start-up time).
4.	Prefabricated Bent Cap	No	No	Not deemed to be beneficial because end bent construction is typically easy to construct in-situ and the number of components is small to justify precast set-up and construction learning curve.
5.	Prefabricated Pier Column	No	No	Not deemed to be beneficial for prefabricated option because column construction is not on the critical path (substructure and superstructure constructed concurrently with near-site casting start-up time). Under SPMT option described below, pier columns would be constructed outside of the existing bridge footprint.
6.	Prefabricated Pier Cap	No	Yes	The BDR should consider a precast pier cap option to be utilized in conjunction with the proposed SPMT in the case where FIB simple span beams are used.
7.	Prefabricated Prestressed Deck Units (w/o beams)	No	No	Does not apply.

8.	Prefabricated Full-Depth Deck Panels (w/ beams)	No	No	Not deemed to be beneficial if complete superstructure is constructed in near site casting yard with SPMT option.
9.	Prefabricated Complete Superstructure	No	Yes	The BDR should include a Self-Propelled-Modular-Transporter (SPMT) option with near-site casting as part of the Prefabricated Alternate.

In this section, include project constraints and user impact considerations:

Conventional Construction Approach

Bridge Demolition. Generally demolishing the existing bridge spans requires a minimum 2-3 day duration per span. Crossovers are typically employed to move traffic from under these work operations. Also the existing local road R/W constraints will likely require phased bridge construction which necessitates crossovers for each span as well as for each phase. However, the close proximity of the bridge to the interstate-to-interstate interchange makes employing crossovers extremely difficult. In fact it is unlikely that traffic coming off of the north-south interstate onto the eastbound interstate could be accommodated and would likely have to be rerouted to the west with a u-turn at the next interchange and then back east.

Also the existing east-west interstate accommodates three –lanes in each direction (6 lanes total). Each existing span at the local road, however is only long enough to accommodate two-lanes in each direction (4 lanes under 1 span). Therefore when crossovers are in place, only two lanes in each direction can be accommodated.

Beam Placement. Beams may be placed at night using either crossovers or rolling road blocks (pacing) in order to move traffic from under beam placement work operations. However if rolling road blocks were to be employed, the traffic coming off of the north-south interstate onto eastbound interstate would not be able to be accommodated. While the rolling road block is in place, this traffic would likely have to be rerouted to the west with a u-turn at the next interchange and then back east.

Prefabricated Construction Approach

Near Site Casting: There does appear to be sufficient space within the existing interstate right-of-way to set up a near site casting yard as well as sufficient space to demolish the existing spans outside of the interstate footprint. There does appear to be a reasonable SPMT access between possible near-site casting site and the existing bridge location. The BDR could also consider shored construction and composite dead loads in order to increase structural efficiency.

SPMT Costs: In order to decrease SPMT mobilization and remobilization costs, it would be desirable to utilize a straddle foundation concept which would allow the existing spans to be removed and the new spans (either two-simple spans or one-continuous two span unit) to be placed in the same day.