DATE:
FILE:

GENERAL NOTES:

Precast concrete alternate may be submitted in accordance with the TxDOT Bridge Design Manual – LRFD. Acceptance or denial of an alternate is at the sole discretion of the TxDOT. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

Develop alternates using the TxDOT Bridge Standards and working drawings for precast elements. For alternates not covered by the standards, develop these alternates based on the relevant concepts demonstrated within the standards and working drawings. Do not develop complex precast alternatives that will require additional research or investigation without prior approval from Bridge Division.

Do not develop entire bridge redesigns. Precast Alternates must adhere to the design requirements of the original plans and as amended by the requirements provided in these sheets. Notes included on this sheet shall be reproduced on the Precast Alternate Plans, and followed for design and construction purposes.

The proposer of Precast Alternates will be the new Engineer of Record for such portions of the bridge. The new Engineer of Record must be precertified by TxDOT and provide signed and sealed plans and calculations.

Design in accordance to AASHTO LRFD Bridge Design Specifications, 9th Edition (2020) and TxDOT Bridge Design Manual - LRFD (Aug 2024).

Provide alternate sheets that are detailed in accordance with the TxDOT Bridge Detailing Guide.

ALTERNATE SUBMISSION REQUIREMENTS:

Submit design concepts beyond the scope of TxDOT Bridge standards and here within, in accordance with the procedure outlined below.

1. Contractor is solely responsible for impacts to schedule and cost due to alternate proposals.
2. Contractor meets with the TxDOT District PM to discuss impacted elements and justification.
3. The TxDOT District PM meets with the Bridge Division for approval of the concepts.
4. If approved, contractor creates alternate design package(s) with signed plans and calculations signed and sealed by an Engineer precertified by TxDOT. Shop drawings are not acceptable as Alternate Plans.
5. The TxDOT District PM sends the alternate design to TxDOT Bridge Division for a 21 calendar day review period, excluding State Holidays. If comments are generated, the Contractor must address these comments and resubmit the alternate. The review time restarts with each submission.
6. The TxDOT District PM informs the contractor to whom and where to send the shop drawing submittals for review. Contractor submits shop plans according to the Guide to Electronic Shop Drawing Submittal.
7. The TxDOT District PM ensures that approved Alternate Plans are filed with contract plans to ensure the as-built plans are accurate and notifies the district bridge inspection coordinator of the change.

SUPERSTRUCTURE - WIDE FLANGE Tx GIRDERS

For the exterior girders, the Contractor has the option of furnishing either the as designed Tx-Girder or an approved alternate design for a Wide Flange Tx-Girder. All alternate design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

Submit a revised plan set including the Bridge Layout, Revised Bearing Seat Elevations, Span Sheets, Framing Plan (if applicable), WF-IGD, and WF-IGND. Verfiy the substrucure as shown in the plans is still applicable for the heavier beam load. Submit redesigned substructure sheets if a redesign is needed.

SUPERSTRUCTURE - ALTERNATE TYPE OF PRESTRESSED BEAMS

The Contractor has the option of furnishing either the as-designed prestressed beam/girder or an approved alternate type of prestressed beam/girder design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

Submit a revised plan set including the Bridge Layout, Bearing Seat Elevations, Span Sheets, Framing Plan, Beam/Girder details, Beam/Girder Strand layout, and Bearing Pad Details. Verfiy the substructure as shown in the plans is still applicable for alternate beam/girder load. Submit redesigned substructure sheets if a redesign is needed.

SUPERSTRUCTURE - CONTINUOUS PRESTRESSED CONCRETE SPLICED GIRDERS

Contractor has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must meet the following design criteria and be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

LOADING:

Dead Loads: Unit weight of girder reinforced concrete: ___ pcf
Live Loads: HL-93 with impact
Design Temperatures: Range of ___°F to ___°F with installation at __°F
Concrete Thermal Coefficient: 0.000006 per degree F
Wind Load: Exposure Category _ with wind speed (V) of ___ miles per hour
Minimum Lateral Force for superstructure to substructure connection: 0.15 times the sum of the tributary dead loads and half the tributary live load.

PRE-TENSIONING PARAMETERS:

Modulus of elasticity = 28,500 ksi
Optional designs for girders must have a calculated residual camber equal to or greater than that of the designed girder.
Prestress losses for the designed girders have been calculated for a relative humidity of __ percent. Optional designs must likewise conform.

POST-TENSIONING PARAMETERS:

Modulus of elasticity = 28,500 ksi
Anchor set = 0.375"
Friction coefficient, μ = 0.25
Wobble coefficient, K = 0.0002/ft
Eccentricity between ℄ Duct and CG Tendon = $\frac{3}{4}$"

LIMITS:

Temporary Stresses
At the time of transfer
- Compression: 0.65 f'ci
- Tension: 0.24 λ sqrt(f'ci)

During transportation due to prestress plus 1.33 times self-weight
- Compression: 0.65 f'ci
- Tension: 0.24 λ sqrt(f'ci)

During construction
- Compression: 0.65 f'ci
- Tension: 0.24 λ sqrt(f'c)

Stresses at service levels after all losses have occurred
Due to permanent loads including post-tensioning (no live load)
- Compression: 0.45 f'c
- Tension: no tension allowed

Due to service load combinations (includes live load)
- Compression: 0.60 f'c
- Tension: 0.09 λ sqrt(f'c) ≤ 0.3 ksi (Service III)
- Principal Tension: 0.11 λ sqrt(f'c) (Service I)

Due to fatigue load (Fatigue I) live load plus one-half of the sum of prestress and permanent design loads
- Compression: 0.40 f'c
- Tension: no tension allowed

Stresses in pre-tensioning strand
At the time of transfer (after seating of the chucks)
- 0.75 fpu

During transportation due to prestress plus 1.33 times self-weight
- 0.75 fpu

Due to service load combination after all losses have occurred (with and without live load)
- 0.80 fy

Stresses in post-tensioning strand
Prior to seating the chucks
- 0.90 fy

At the time of transfer (after seating of the chucks)
- At anchorages: 0.70 fpu
- Elsewhere: 0.74 fpu

Due to service load combinations after all losses have occurred (with and without live load)
- 0.80 fy

NOTE TO DESIGNER:

These sheets are to be used as a guide for preparing plans for precast superstructure alternates. Included on these sheets are design and construction requirements for various superstructure precast options. Include appropriate notes from this guide for the specific application. These sheets cannot be used without modification and in all cases notes not required must be removed. This note and the phrase "Not to be used as a standard" must be removed and the sheet must be signed and sealed by a Professional Engineer.

Texas Department of Transportation

Bridge Division Standard

PRECAST SUPERSTRUCTURE ALTERNATES
(Not to be used as a Standard)

PCA-SUP

FILE: MS-PCA-SUP-24.dgn	DN: TxDOT		CK: TxDOT	DW: TxDOT		CK: TxDOT
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REVISIONS						
	DIST	COUNTY				SHEET NO.