DATE:
FILE:

STRUCTURE	DESIGNED GIRDERS									DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN					LOAD RATING FACTORS			
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS						NO.	TO END	RELEASE STRGTH (1) f'ci	MINIMUM 28 DAY COMP STRGTH f'c	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I) fct(ksi)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III) fcb(ksi)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I) (kip-ft)	LIVE LOAD DISTRIBUTION FACTOR (2)		STRENGTH I		SERVICE III
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE (in)	STRGTH fpu (ksi)	"e" ℄ (in)	"e" END (in)		(in)	(ksi)	(ksi)				Moment	Shear	Inv	Opr	Inv
Type Tx28 Girders 30' Roadway 8.5" Slab	40	ALL	Tx28		12	0.6	270	10.48	10.48			4.700	5.300	1.156	-1.635	1606	0.810	1.020	1.58	2.04	1.90
	45	ALL	Tx28		14	0.6	270	10.48	9.34	2	10.5	4.000	5.000	1.463	-1.996	1675	0.780	1.020	1.54	2.00	1.67
	50	ALL	Tx28		16	0.6	270	10.23	9.23	4	8.5	4.000	5.600	1.796	-2.409	1947	0.760	1.030	1.47	1.91	1.41
	55	ALL	Tx28		18	0.6	270	10.04	7.81	4	14.5	4.000	6.100	2.177	-2.861	2267	0.740	1.030	1.39	1.80	1.17
	60	ALL	Tx28		22	0.6	270	9.75	6.48	4	22.5	4.400	6.700	2.569	-3.322	2588	0.720	1.040	1.40	1.94	1.16
	65	ALL	Tx28		26	0.6	270	9.56	6.48	4	24.5	5.200	7.000	3.002	-3.815	2918	0.700	1.040	1.37	1.84	1.14
	70	ALL	Tx28		30	0.6	270	9.28	6.48	6	20.5	6.000	7.500	3.468	-4.351	3282	0.690	1.040	1.20	1.70	1.05
Type Tx34 Girders 30' Roadway 8.5" Slab	40	ALL	Tx34		12	0.6	270	13.01	13.01			4.000	5.000	0.910	-1.255	1907	0.840	1.000	1.86	2.41	2.49
	45	ALL	Tx34		14	0.6	270	13.01	12.15	2	8.5	4.000	5.000	1.147	-1.528	2120	0.810	1.000	1.85	2.40	2.25
	50	ALL	Tx34		14	0.6	270	13.01	12.44	2	6.5	4.000	5.000	1.418	-1.852	2072	0.790	1.010	1.49	1.93	1.67
	55	ALL	Tx34		16	0.6	270	12.76	11.76	4	8.5	4.000	5.000	1.699	-2.175	2326	0.760	1.010	1.47	1.90	1.48
	60	ALL	Tx34		16	0.6	270	12.76	11.76	4	8.5	4.000	5.200	2.022	-2.549	2687	0.750	1.010	1.18	1.56	1.07
	65	ALL	Tx34		20	0.6	270	12.41	9.61	4	18.5	4.000	5.700	2.350	-2.917	3027	0.730	1.020	1.37	1.77	1.11
	70	ALL	Tx34		24	0.6	270	12.18	7.84	4	30.5	4.300	6.100	2.723	-3.335	3412	0.720	1.020	1.47	1.91	1.10
	75	ALL	Tx34		28	0.6	270	12.01	8.58	4	28.5	5.200	6.400	3.093	-3.736	3765	0.700	1.030	1.52	2.03	1.13
	80	ALL	Tx34		32	0.6	270	11.64	7.14	6	30.5	5.500	6.700	3.515	-4.194	4172	0.690	1.030	1.26	1.75	1.06
Type Tx40 Girders 30' Roadway 8.5" Slab	40	ALL	Tx40		12	0.6	270	15.60	15.60			4.000	5.000	0.750	-1.015	1968	0.870	0.980	2.13	2.76	3.03
	45	ALL	Tx40		12	0.6	270	15.60	15.60			4.500	5.000	0.943	-1.235	2328	0.840	0.990	2.12	2.75	2.90
	50	ALL	Tx40		14	0.6	270	15.60	15.60			4.500	5.000	1.161	-1.488	2554	0.810	0.990	1.74	2.26	2.17
	55	ALL	Tx40		16	0.6	270	15.35	14.35	4	8.5	4.000	5.000	1.392	-1.755	2685	0.790	1.000	1.70	2.20	1.94
	60	ALL	Tx40		16	0.6	270	15.35	14.35	4	8.5	4.000	5.000	1.652	-2.046	2756	0.770	1.000	1.42	1.85	1.50
	65	ALL	Tx40		18	0.6	270	15.16	13.82	4	10.5	4.000	5.000	1.918	-2.340	3106	0.750	1.000	1.42	1.84	1.35
	70	ALL	Tx40		20	0.6	270	15.00	13.40	4	12.5	4.000	5.000	2.220	-2.674	3501	0.740	1.010	1.07	1.54	1.00
	75	ALL	Tx40		22	0.6	270	14.87	11.24	4	24.5	4.000	5.400	2.540	-3.011	3879	0.720	1.010	1.36	1.77	1.05
	80	ALL	Tx40		26	0.6	270	14.68	9.76	4	36.5	4.400	5.700	2.861	-3.360	4285	0.710	1.010	1.27	1.93	1.09
	85	ALL	Tx40		30	0.6	270	14.40	8.80	6	34.5	4.800	5.900	3.223	-3.744	4717	0.700	1.010	1.33	2.03	1.07
	90	ALL	Tx40		34	0.6	270	14.07	8.78	6	36.5	5.400	6.100	3.577	-4.121	5143	0.690	1.020	1.38	2.09	1.07
	95	ALL	Tx40	*	38	0.6	270	13.71	7.81	8	36.5	5.700	7.300	3.978	-4.537	5599	0.680	1.020	1.40	1.73	1.02
Type Tx46 Girders 30' Roadway 8.5" Slab	40	ALL	Tx46		12	0.6	270	17.60	17.60			4.000	5.000	0.661	-0.811	2050	0.900	0.970	2.36	3.06	3.61
	45	ALL	Tx46		12	0.6	270	17.60	17.60			4.000	5.000	0.830	-0.987	2428	0.870	0.970	1.96	2.54	2.89
	50	ALL	Tx46		14	0.6	270	17.60	17.60			4.500	5.000	1.014	-1.185	2866	0.840	0.980	1.95	2.52	2.65
	55	ALL	Tx46		14	0.6	270	17.60	17.60			4.000	5.000	1.223	-1.406	3025	0.820	0.980	1.61	2.08	2.08
	60	ALL	Tx46		16	0.6	270	17.35	16.35	4	8.5	4.000	5.000	1.450	-1.639	3218	0.800	0.980	1.60	2.07	1.89
	65	ALL	Tx46		16	0.6	270	17.35	16.35	4	8.5	4.000	5.000	1.695	-1.886	3263	0.780	0.990	1.35	1.75	1.48
	70	ALL	Tx46		18	0.6	270	17.16	15.83	4	10.5	4.000	5.000	1.946	-2.144	3669	0.770	0.990	1.35	1.75	1.34
	75	ALL	Tx46		18	0.6	270	17.16	15.83	4	10.5	4.000	5.000	2.225	-2.416	4069	0.750	0.990	1.11	1.49	1.02
	80	ALL	Tx46		22	0.6	270	16.88	15.06	4	14.5	4.000	5.000	2.524	-2.712	4512	0.740	0.990	1.25	1.72	1.07
	85	ALL	Tx46		26	0.6	270	16.68	12.07	4	34.5	4.000	5.300	2.821	-3.007	4954	0.730	1.000	1.37	1.91	1.10
	90	ALL	Tx46		30	0.6	270	16.40	9.20	6	42.5	4.100	5.400	3.150	-3.316	5383	0.710	1.000	1.46	2.06	1.10
	95	ALL	Tx46		34	0.6	270	16.07	9.72	6	42.5	4.700	5.600	3.488	-3.642	5854	0.700	1.000	1.54	2.16	1.11
	100	ALL	Tx46		38	0.6	270	15.81	10.13	6	42.5	5.300	6.200	3.856	-3.991	6348	0.690	1.000	1.35	2.07	1.02
	105	ALL	Tx46		42	0.6	270	15.60	10.46	6	42.5	5.900	6.800	4.231	-4.360	6895	0.690	1.010	1.40	1.82	1.03

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER
*	2.5(14),4.5(14),6.5(8),8.5(2)

(1) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

(2) Portion of full HL93.

DESIGN NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

Load rated using Load and Resistance Factor Rating according to AASHTO Manual for Bridge Evaluation.

Optional designs for girders 120 feet or longer 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 60 percent. Optional designs must likewise conform.

FABRICATION NOTES:

Provide Class H concrete.

Provide Grade 60 reinforcing steel bars.

Use low relaxation strands, each pretensioned to 75 percent of fpu.

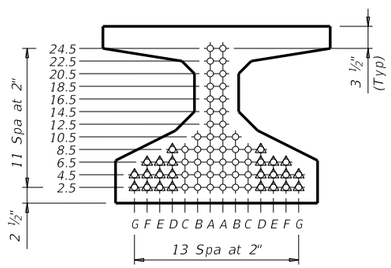
Strand debonding must comply with Item 424.4.2.2.2.4. Full-length debonded strands are only permitted in positions marked △. Double wrap full-length debonded strands in outer most position of each row.

When shown on this sheet, the Fabricator has the option of furnishing either the designed girder or an approved optional design. All optional design submittals must be signed, sealed and dated by a Professional Engineer registered in the State of Texas.

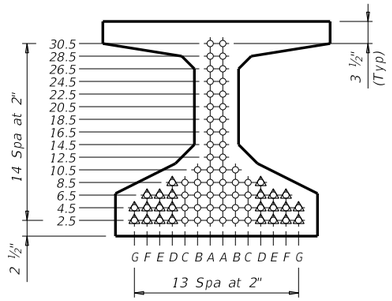
Seal cracks in girder ends exceeding 0.005" in width as directed by the Engineer. The fabricator is permitted to decrease the spacing of Bars R and S by providing additional bars to help limit crack width provided the decreased spacing results in no less than 1" clear between bars. The fabricator must take an approved corrective action if cracks greater than 0.005" form on a repetitive basis.

DEPRESSED STRAND DESIGNS:

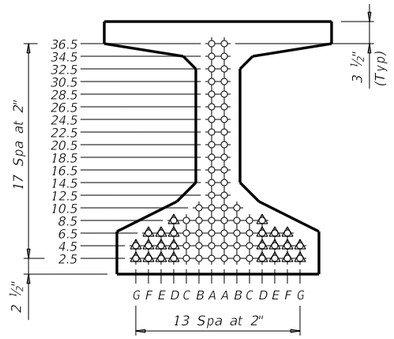
Locate strands for the designed girder as low as possible on the 2" grid system unless a non-standard strand pattern is indicated. Fill row "2.5", then row "4.5", then row "6.5", etc., beginning each row in the "A" position and working outward until the required number of strands is reached. All strands in the "A" position must be depressed, maintaining the 2" spacing so that, at the girder ends, the upper two strands are in the position shown in the table.



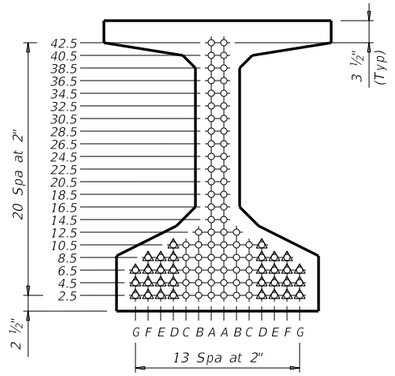
TYPE Tx28



TYPE Tx34



TYPE Tx40



TYPE Tx46

HL93 LOADING

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER STANDARD DESIGNS

30' ROADWAY

IGSD-30

FILE: IG-IGSD30-21.dgn	DN: EFC	CK: AJF	DW: EFC	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Redesigned girders. 1-21: Added load rating.				
	DIST	COUNTY		SHEET NO.

DATE:
FILE:

STRUCTURE	DESIGNED GIRDERS									DEPRESSED STRAND PATTERN		CONCRETE		OPTIONAL DESIGN					LOAD RATING FACTORS			
	SPAN NO.	GIRDER NO.	GIRDER TYPE	PRESTRESSING STRANDS						NO.	TO END	RELEASE STRGTH (1)	MINIMUM 28 DAY COMP STRGTH	DESIGN LOAD COMP STRESS (TOP ℄) (SERVICE I)	DESIGN LOAD TENSILE STRESS (BOTT ℄) (SERVICE III)	REQUIRED MINIMUM ULTIMATE MOMENT CAPACITY (STRENGTH I)	LIVE LOAD DISTRIBUTION FACTOR (2)		STRENGTH I		SERVICE III
				NON-STD STRAND PATTERN	TOTAL NO.	SIZE	STRGTH	"e" ℄	"e" END													
						(in)	fpu (ksi)	(in)	(in)		(in)	f'ci (ksi)	f'c (ksi)	fct(ksi)	fcb(ksi)	(kip-ft)	Moment	Shear	Inv	Opr	Inv
Type Tx54 Girders 30' Roadway 8.5" Slab	40	ALL	Tx54		10	0.6	270	21.01	21.01			4.000	5.000	0.548	-0.660	2115	0.930	0.960	2.18	2.83	3.72
	45	ALL	Tx54		12	0.6	270	21.01	21.01			4.000	5.000	0.686	-0.803	2508	0.900	0.960	2.25	2.92	3.52
	50	ALL	Tx54		14	0.6	270	21.01	21.01			4.000	5.000	0.837	-0.964	2962	0.870	0.960	2.24	2.90	3.25
	55	ALL	Tx54		14	0.6	270	21.01	21.01			4.000	5.000	1.009	-1.142	3457	0.850	0.970	1.86	2.42	2.61
	60	ALL	Tx54		16	0.6	270	20.76	20.26	4	6.5	4.000	5.000	1.194	-1.332	3922	0.830	0.970	1.86	2.41	2.42
	65	ALL	Tx54		16	0.6	270	20.76	20.26	4	6.5	4.000	5.000	1.394	-1.532	3871	0.810	0.970	1.59	2.06	1.96
	70	ALL	Tx54		18	0.6	270	20.56	19.23	4	10.5	4.000	5.000	1.608	-1.742	4099	0.790	0.980	1.60	2.08	1.83
	75	ALL	Tx54		18	0.6	270	20.56	19.67	4	8.5	4.000	5.000	1.840	-1.971	4227	0.780	0.980	1.37	1.77	1.45
	80	ALL	Tx54		18	0.6	270	20.56	19.67	4	8.5	4.500	5.500	2.068	-2.191	4639	0.760	0.980	1.39	1.81	1.36
	85	ALL	Tx54		20	0.6	270	20.41	18.81	4	12.5	4.000	5.000	2.327	-2.442	5111	0.750	0.980	1.20	1.55	1.05
	90	ALL	Tx54		24	0.6	270	20.17	17.84	4	18.5	4.000	5.000	2.582	-2.689	5579	0.740	0.990	1.39	1.80	1.13
	95	ALL	Tx54		28	0.6	270	20.01	14.29	4	44.5	4.000	5.000	2.868	-2.961	6079	0.730	0.990	1.37	1.78	1.01
	100	ALL	Tx54		32	0.6	270	19.63	11.38	6	50.5	4.100	5.000	3.169	-3.245	6594	0.720	0.990	1.43	1.94	1.01
	105	ALL	Tx54		34	0.6	270	19.48	12.77	6	44.5	4.600	5.300	3.471	-3.530	7110	0.710	0.990	1.51	2.07	1.03
	110	ALL	Tx54		38	0.6	270	19.22	12.27	6	50.5	5.000	5.700	3.799	-3.835	7652	0.700	0.990	1.60	2.18	1.08
	115	ALL	Tx54		42	0.6	270	19.01	12.72	6	50.5	5.600	6.400	4.126	-4.139	8193	0.690	0.990	1.45	1.94	1.02
	120	ALL	Tx54		46	0.6	270	18.66	11.36	8	50.5	5.800	6.800	4.481	-4.466	8761	0.680	1.000	1.35	1.78	1.05
Type Tx62 Girders 30' Roadway 8.5" Slab	60	ALL	Tx62		14	0.6	270	25.78	25.78			4.000	5.000	0.939	-1.113	4110	0.850	0.960	1.78	2.31	2.57
	65	ALL	Tx62		16	0.6	270	25.53	25.53			4.000	5.000	1.094	-1.280	4602	0.830	0.960	1.81	2.35	2.43
	70	ALL	Tx62		16	0.6	270	25.53	25.53			4.000	5.000	1.263	-1.462	4556	0.820	0.970	1.54	2.00	1.98
	75	ALL	Tx62		18	0.6	270	25.33	25.33			4.000	5.000	1.440	-1.646	4837	0.800	0.970	1.57	2.04	1.88
	80	ALL	Tx62		18	0.6	270	25.33	25.33			4.000	5.000	1.631	-1.847	4871	0.790	0.970	1.35	1.76	1.52
	85	ALL	Tx62		20	0.6	270	25.18	24.38	4	8.5	4.000	5.000	1.823	-2.043	5322	0.770	0.970	1.39	1.80	1.49
	90	ALL	Tx62		20	0.6	270	25.18	24.38	4	8.5	4.000	5.000	2.028	-2.256	5822	0.760	0.970	1.21	1.56	1.15
	95	ALL	Tx62		22	0.6	270	25.05	23.96	4	10.5	4.000	5.000	2.251	-2.484	6347	0.750	0.980	1.22	1.58	1.06
	100	ALL	Tx62		26	0.6	270	24.85	22.39	4	20.5	4.000	5.000	2.484	-2.721	6888	0.740	0.980	1.23	1.59	1.00
	105	ALL	Tx62		28	0.6	270	24.78	20.21	4	36.5	4.000	5.000	2.708	-2.950	7415	0.730	0.980	1.40	1.82	1.04
	110	ALL	Tx62		32	0.6	270	24.40	15.40	6	54.5	4.000	5.000	2.951	-3.195	7968	0.720	0.980	1.67	2.17	1.19
	115	ALL	Tx62		36	0.6	270	24.11	15.78	6	56.5	4.500	5.200	3.214	-3.458	8551	0.710	0.980	1.63	2.11	1.10
	120	ALL	Tx62		38	0.6	270	23.99	17.67	6	46.5	5.000	5.900	3.489	-3.730	9148	0.700	0.980	1.55	2.08	1.02
	125	ALL	Tx62		42	0.6	270	23.78	16.35	6	58.5	5.300	6.200	3.765	-4.014	9805	0.700	0.990	1.55	2.08	1.06
	130	ALL	Tx62		46	0.6	270	23.43	14.73	8	58.5	5.500	6.400	4.044	-4.291	10411	0.690	0.990	1.34	1.82	1.02
	135	ALL	Tx62	**	50	0.6	270	23.06	13.86	10	56.5	5.800	6.800	4.349	-4.589	11052	0.680	0.990	1.54	2.12	1.08

NON-STANDARD STRAND PATTERNS

PATTERN	STRAND ARRANGEMENT AT ℄ OF GIRDER
**	2.5(14),4.5(14),6.5(14),8.5(6),10.5(2)

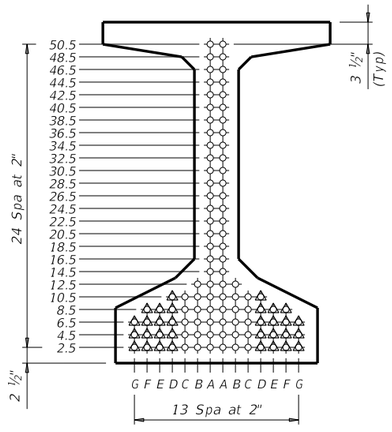
(1) Based on the following allowable stresses (ksi):

Compression = 0.65 f'ci

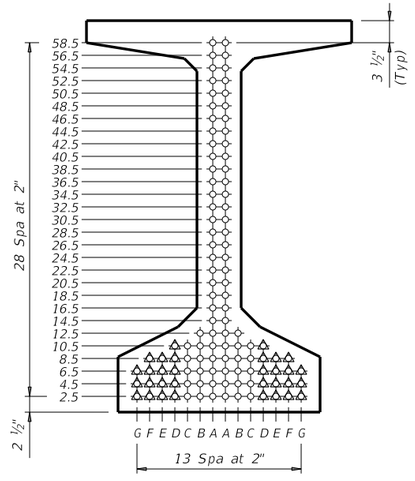
Tension = $0.24\sqrt{f'ci}$

Optional designs must likewise conform.

(2) Portion of full HL93.



TYPE Tx54



TYPE Tx62

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRESTRESSED CONCRETE I-GIRDER STANDARD DESIGNS

30' ROADWAY

IGSD-30

FILE: IG-IGSD30-21.dgn	DN: EFC	CK: AJF	DW: EFC	CK: TAR
©TxDOT August 2017	CONT	SECT	JOB	HIGHWAY
REVISIONS 10-19: Redesigned girders. 1-21: Added load rating.				
	DIST	COUNTY		SHEET NO.