MASS HIGHWAY

Number: E-94-005

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ENGINEERING DIRECTIVE

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CHIEF ENGINEER

REVISIONS TO THE FOUNDATION DESIGN CHARTS SPAN WIRE ASSEMBLY - STANDARD DRAWINGS

The purpose of this Engineering Directive is to formally notify **ALL** Department Engineering Personnel that the attached Charts sheet (one English version and one S.I. version) replace Sheet 4 of 4 of the Standard Drawings for Span Wire Assembly.

These new and revised charts will apply to new projects as well as on going projects.

Distribution: B Please post: _____ Do not post X

FOUNDATION DESIGN CHART I

SOIL TYPE = ALLUVIAL

Moment at Existing Ground (FT - KIPS)	Dia. (B) = 3' - 0"		Dia. (B) = 3' - 6"		Dia. (B) = 4' - 0"	
	Depth (D)	Vertical Bars	Depth (D)	Vertical Bars	Depth (D)	Vertical Bars
50 OR LESS	13' - 0"	10 ø 6	11' - 6"	8 ø 8	10' - 0"	12 ø 7
100	18' - 0"	10 ø 6	17' - 0"	8 ø 8	16' - 0"	12 ø 7
150	21' - 0"	10 ø 8	19' - 6"	8 ø 8	18' - 6"	12 ø 7
200	24' - 0"	16 ø 8	22' - 0"	12 ø 8	21' - 0"	12 ø 7
250			25' - 0"	12 ø 8	23' - 6"	14 ø 8
300			28' - 0"	16 ø 8	26' - 0"	14 ø 8
350					28' - 0"	12 ø 10
400					30' - 0"	12 ø 10
450						
500						
550						

FOUNDATION DESIGN CHART II

SOIL TYPE = CLAYEY (MEDIUM STIFF)

Moment at Existing Ground (FT - KIPS)	Dia. (B) = 3' - 0"		Dia. (B) = 3' - 6"		Dia. (B) = 4' - 0"	
	Depth (D)	Vertical Bars	Depth (D)	Vertical Bars	Depth (D)	Vertical Bars
50 OR LESS	8' - 0"	10 ø 6	8' - 0"	8 ø 8	7' - 6"	12 ø 7
100	13' - 0"	10 ø 6	12' - 0"	8 ø 8	11' - 0"	12 ø 7
150	14' - 0"	10 ø 8	13' - 0"	8 ø 8	12' - 0"	12 ø 7
200	15' - 6"	16 ø 8	14' - 6"	12 ø 8	13' - 6"	12 ø 7
250	17' - 0"	16 ø 8	16' - 0"	12 ø 8	15' - 0"	14 ø 8
300	18' - 6"	16 ø 10	17' - 6"	16 ø 8	16' - 6"	14 ø 8
350	20' - 0"	16 ø 10	19' - 0"	16 ø 8	18' - 0"	12 ø 10
400	22' - 0"	16 ø 10	20' - 3"	18 ø 9	19' - 0"	12 ø 10
450			21' - 6"	18 ø 9	20' - 0"	12 ø 10
500			22' - 9"	16 ø 11	21' - 0"	14 ø 11
550			24' - 0"	16 ø 11	22' - 0"	14' ø 11"

FOUNDATION DESIGN CHART III

SOIL TYPE = WET SANDY

Moment at Existing Ground (FT - KIPS)	Dia. (B) = 3' - 0"		Dia. (B) = 3' - 6"		Dia. (B) = 4' - 0"	
	Depth (D)	Vertical Bars	Depth (D)	Vertical Bars	Depth (D)	Vertical Bars
50 OR LESS	8' - 0"	10 ø 6	7' - 6"	8 ø 8	7' - 0"	12 ø 7
100	10' - 0"	10 ø 6	9' - 6"	8 ø 8	9' - 0"	12 ø 7
150	12' - 0"	10 ø 8	11' - 0"	8 ø 8	10' - 6"	12 ø 7
200	13' - 3"	16 ø 8	12' - 0"	12 ø 8	11' - 3"	12 ø 7
250	14' - 3"	16 ø 8	13' - 9"	12 ø 8	12' - 9"	14 ø 8
300	17' - 0"	16 ø 10	15' - 6"	16 ø 8	14' - 3"	14 ø 8
350	18' - 6"	16 ø 10	17' - 0"	16 ø 8	15' - 6"	12 ø 10
400	20' - 3"	16 ø 10	18' - 3"	18 ø 9	17' - 0"	12 ø 10
450	21' - 9"	18 ø 11	19' - 9"	18 ø 9	18' - 3"	12 ø 10
500	23' - 3"	18 ø 11	21' - 0"	16 ø 11	19' - 3"	14 ø 11
550	24' - 3"	24 ø 11	22' - 3"	16 ø 11	20' - 6"	14 ø 11

FOUNDATION DESIGN CHART IV

SOIL TYPE = DRY SANDY

Moment at Existing Ground (FT - KIPS)	Dia. (B) = 3' - 0"		Dia. (B) = 3' - 6"		Dia. (B) = 4' - 0"	
	Depth (D)	Vertical Bars	Depth (D)	Vertical Bars	Depth (D)	Vertical Bars
50 OR LESS	6' - 0"	10 ø 6	6' - 0"	8 ø 8	5' - 9"	12 ø 7
100	8' - 0"	10 ø 6	7' - 0"	8 ø 8	7' - 0"	12 ø 7
150	9' - 6"	10 ø 8	8' - 9"	8 ø 8	8' - 3"	12 ø 7
200	11' - 0"	16 ø 8	10' - 3"	12 ø 8	9' - 6"	12 ø 7
250	12' - 6"	16 ø 8	11' - 6"	12 ø 8	10' - 9"	14 ø 8
300	14' - 0"	16 ø 10	12' - 9"	16 ø 8	11' - 9"	14 ø 8
350	15' - 6"	16 ø 10	14' - 0"	16 ø 8	13' - 0"	12 ø 10
400	16' - 9"	16 ø 10	15' - 3"	18 ø 9	14' - 0"	12 ø 10
450	18' - 0"	18 ø 11	16' - 3"	18 ø 9	15' - 0"	12 ø 10
500	19' - 0"	18 ø 11	17' - 3"	16 ø 11	16' - 0"	14 ø 11
550	20' - 3"	24 ø 11	18' - 0"	16 ø 11	17' - 0"	14 ø 11

GENERAL NOTES:

1. DETERMINATION OF EXISTING SOIL CONDITIONS SHALL BE MADE BY THE DESIGN ENGINEER.
2. IF A POOR SOIL OR LEDGE IS ENCOUNTERED (i.e., ONE WHICH DOES NOT APPLY TO THE DESIGN CHARTS SHOWN ON THIS SHEET), AN ALTERNATE DESIGN SHALL BE DEVELOPED BY THE DESIGN ENGINEER AND SUBMITTED TO THE M.H.D. FOR APPROVAL. IF UTILITIES OR OTHER UNDERGROUND OBSTRUCTIONS ARE ENCOUNTERED IN THE PROPOSED FOUNDATION AREA DURING EXCAVATION, THE CONTRACTOR SHALL BACKFILL THE AREA TO ITS ORIGINAL CONDITION UNTIL AN ALTERNATE DESIGN HAS BEEN PROVIDED BY THE DESIGN ENGINEER.
3. FOR MOMENT DETERMINATION SEE "AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS AND TRAFFIC SIGNALS" LATEST EDITION.
4. FOR DETAIL OF FOUNDATIONS SEE SHEET 3 - "SPAN WIRE ASSEMBLY - FOUNDATION DETAILS".

MASSACHUSETTS HIGHWAY DEPARTMENT

STANDARD DRAWINGS

SPAN WIRE ASSEMBLY

FOUNDATION DESIGN CHARTS

Revised Date: Nov. 1994

FOUNDATION DESIGN CHART I (SI VERSION)

SOIL TYPE = ALLUVIAL

Moment at Existing Ground (kN·m)	Dia. (B) = 1.0m		Dia. (B) = 1.1m		Dia. (B) = 1.2m	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
70 OR LESS	3.8	10 ø 20M	3.3	8 ø 25M	3.3	12 ø 25M
135	5.5	10 ø 20M	5.3	8 ø 25M	4.9	12 ø 25M
200	6.4	10 ø 25M	6.0	8 ø 25M	5.7	12 ø 25M
270	7.3	16 ø 25M	6.7	12 ø 25M	6.4	12 ø 25M
335			7.6	12 ø 25M	7.2	14 ø 25M
400			8.5	16 ø 25M	7.9	14 ø 25M
475					8.9	12 ø 35M
540					9.2	12 ø 35M
610						
680						
750						

FOUNDATION DESIGN CHART II (SI VERSION)

SOIL TYPE = CLAYEY (MEDIUM STIFF)

Moment at Existing Ground (kN·m)	Dia. (B) = 1.0m		Dia. (B) = 1.1m		Dia. (B) = 1.2m	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
70 OR LESS	2.7	10 ø 20M	2.5	8 ø 25M	2.3	12 ø 25M
135	4.0	10 ø 20M	3.7	8 ø 25M	3.4	12 ø 25M
200	4.3	10 ø 25M	4.0	8 ø 25M	3.7	12 ø 25M
270	4.7	16 ø 25M	4.4	12 ø 25M	4.1	12 ø 25M
335	5.2	16 ø 25M	4.9	12 ø 25M	4.6	14 ø 25M
400	5.7	16 ø 25M	5.3	16 ø 25M	5.0	14 ø 25M
475	6.1	16 ø 35M	5.8	16 ø 25M	5.3	12 ø 35M
540	6.7	16 ø 35M	6.3	18 ø 30M	5.8	12 ø 35M
610			6.8	18 ø 30M	6.1	12 ø 35M
680			6.9	16 ø 35M	6.4	14 ø 35M
750			7.3	16 ø 35M	6.7	14 ø 35M

FOUNDATION DESIGN CHART III (SI VERSION)

SOIL TYPE = WET SANDY

Moment at Existing Ground (kN·m)	Dia. (B) = 1.0m		Dia. (B) = 1.1M		Dia. (B) = 1.2m	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
70 OR LESS	2.4	10 ø 20M	2.3	8 ø 25M	2.1	12 ø 25M
135	3.0	10 ø 20M	2.9	8 ø 25M	2.8	12 ø 25M
200	3.7	10 ø 25M	3.4	8 ø 25M	3.2	12 ø 25M
270	4.1	16 ø 35M	3.7	12 ø 25M	3.4	12 ø 25M
335	4.7	16 ø 35M	4.3	12 ø 25M	3.9	14 ø 25M
400	5.2	16 ø 35M	4.7	16 ø 25M	4.4	14 ø 25M
475	5.7	16 ø 35M	5.2	16 ø 25M	4.7	12 ø 35M
540	6.2	16 ø 35M	5.6	18 ø 30M	5.2	12 ø 35M
610	6.6	18 ø 35M	6.0	18 ø 30M	5.6	12 ø 35M
680	7.1	18 ø 35M	6.4	16 ø 35M	5.9	14 ø 35M
750	7.6	24 ø 35M	7.0	16 ø 35M	6.3	14 ø 35M

FOUNDATION DESIGN CHART IV (SI VERSION)

SOIL TYPE = DRY SANDY

Moment at Existing Ground (kN·m)	Dia. (B) = 1.0m		Dia. (B) = 1.1m		Dia. (B) = 1.2m	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
70 OR LESS	2.0	10 ø 20M	1.8	8 ø 25M	1.7	12 ø 25M
135	2.4	10 ø 20M	2.3	8 ø 25M	2.1	12 ø 25M
200	2.9	10 ø 25M	2.7	8 ø 25M	2.5	12 ø 25M
270	3.4	16 ø 25M	3.1	12 ø 25M	2.9	12 ø 25M
335	3.8	16 ø 25M	3.5	12 ø 25M	3.3	14 ø 25M
400	4.3	16 ø 35M	3.9	16 ø 25M	3.6	14 ø 25M
475	4.7	16 ø 35M	4.3	16 ø 25M	4.0	12 ø 35M
540	5.1	16 ø 35M	4.7	18 ø 30M	4.3	12 ø 35M
610	5.5	18 ø 35M	5.0	18 ø 30M	4.6	12 ø 35M
680	5.8	18 ø 35M	5.3	16 ø 35M	4.9	14 ø 35M
750	6.2	24 ø 35M	5.7	16 ø 35M	5.2	14 ø 35M

GENERAL NOTES (SI VERSION):

1. DETERMINATION OF EXISTING SOIL CONDITIONS SHALL BE MADE BY THE DESIGN ENGINEER.
2. IF A POOR SOIL OR LEDGE IS ENCOUNTERED, (i.e., ONE WHICH DOES NOT APPLY TO THE DESIGN CHARTS SHOWN ON THIS SHEET), AN ALTERNATE DESIGN SHALL BE DEVELOPED BY THE DESIGN ENGINEER AND SUBMITTED TO THE M.H.D. FOR APPROVAL. IF UTILITIES OR OTHER UNDERGROUND OBSTRUCTIONS ARE ENCOUNTERED IN THE PROPOSED FOUNDATION AREA DURING EXCAVATION, THE CONTRACTOR SHALL BACKFILL THE AREA TO ITS ORIGINAL CONDITION UNTIL AN ALTERNATE DESIGN HAS BEEN PROVIDED BY THE DESIGN ENGINEER.
3. FOR MOMENT DETERMINATION SEE "AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS AND TRAFFIC SIGNALS" LATEST EDITION.
4. FOR DETAIL OF FOUNDATIONS SEE SHEET 3 - "SPAN WIRE ASSEMBLY-FOUNDATION DETAILS.
5. SHAFT DEPTHS (D) IN METERS.

MASSACHUSETTS HIGHWAY DEPARTMENT

STANDARD DRAWINGS

SPAN WIRE ASSEMBLY

FOUNDATION DESIGN CHARTS

SI VERSION

Revised Date: Nov. 1994