APPENDIX

B Contract Administration

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ENGLISH TO METRIC (SI) CONVERSION FACTORS

Quantity	from English	to Metric (SI)	Multiply by	Quick Conversions
Mass	lb	kg	0.453592	1 lb (mass) = 0.5 kg
Force	lb	N	4.44822	1 lb (force) = 4.5 N
	kip	kN	4.44822	1 kip (force) = 4.5 kN
Force/unit length	plf	N/m	14.5939	1 plf = 14.5 N/m
	klf	kN/m	14.5939	1 klf = 14.5 kN/m
Pressure, stress, modulus of elasticity	psf	Pa	47.8803	1 psf = 48 Pa
	ksf	kPa	47.8803	1 ksf = 48 kPa
	psi	kPa	6.89476	1 psi = 6.9 kPa
	ksi	MPa	6.89476	1 ksi = 6.9 MPa
Length	inch	mm	25.1	1 in = 25 mm
	foot	m	0.3048	1 ft = 0.3 m
		mm	304.8	1 ft = 300 mm
Area	sq inch	sq mm	645.16	1 sq in = 650 sq mm
	sq foot	sq m	0.09290304	1 sq ft = 0.09 sq mm
	sq yard	sq m	0.83612736	1 sq yd = 0.84 sq mm
Volume	cubic inch	cu mm	16386.064	1 cu in = 16,400 cu mm
	cubic foot	cu m	0.0283168	1 cu ft = 0.03 cu m
	cubic yard	cu m	0.764555	1 cu yd = 0.76 cu m
Moment	lb-ft	N-m	1.3558	1 lb-ft = 1.4 N-m
	lb-in	N-m	0.11298	1 lb-in = 0.11 N-m
Energy	ft-lb	Joule	1.3558	1 ft-lb = 1.4 J
Unit Weight	lb/cu ft	kN/m3	0.1572	1lb/cu ft = 0.16 kN/ m3
	lb/cu in	kN/m3	271.43	1lb/cu in = 271 kN/m3
Moment of Inertia	in4	mm4	416,620	1 in4 = 420,000 mm4
Coefficient of permeability	ft/min	m/min	0.3048	1ft/min = 0.3 m/min
	ft/sec	m/sec	0.3048	1 ft/sec = 0.3 m/sec
	in/sec	mm/sec	25.4	1 in/sec = 25 mm/sec
Coefficient of consolidation	sq in/sec	sq m/yr	20,346	1 in2/sec=20,300 m2/yr
	sq in/sec	sq cm/sec	6.452	1 in2/sec = 6 cm2/sec
	sq ft/sec	sq cm/sec	929.03	1 ft2/sec= 929 cm2/sec

Notes:

1. In a "soft" conversion, an English measurement is mathematically converted to its exact metric conversion.
2. In a "hard" conversion, a new rounded, metric number is created that is convenient to work with and remember.
3. Avoid using centimeter for length.
4. The pascal (Pa) is the unit for pressure and stress (Pa=N/sq.m)
5. Structural calculations should be shown in MPa or kPa.

DEFORMED REINFORCING BARS
Metric (SI) – AASHTO M31M/ASTM A615M (Grade 420)
English – AASHTO M31/ASTM A615 (Grade 60)

Bar Size Designation No.		Nominal Dimensions				Diameter	
		Area		Weight			
SI	English	sq mm	sq in	kg/m	lb/ft	mm	in
10	3	71	0.11	0.560	0.736	9.5	0.375
13	4	129	0.20	0.944	0.668	12.7	0.500
16	5	199	0.31	1.552	1.043	15.9	0.625
19	6	284	0.44	2.235	1.502	19.1	0.750
22	7	387	0.60	3.042	2.044	22.2	0.875
25	8	510	0.79	3.973	2.670	25.4	1.000
29	9	645	1.00	5.060	3.400	28.7	1.128
32	10	819	1.27	6.404	4.303	32.3	1.270
36	11	1006	1.56	7.907	5.313	25.8	1.410
43	14	1452	2.25	11.380	7.650	43.0	1.693
57	18	2581	4.00	20.240	13.600	57.3	2.257

Comparison of Bar Reinforcement Currently Used with Metric Bars as Contained in the Current ASTM Specifications and Metric Bars as CRSI has Proposed to ASTM

A615M or A706M Bars in Current ASTM					A615 or A706 Bars Currently Used					Metric Bars as Proposed by CRSI				
No.	Diam in	Diam mm	Area in^2	Area mm^2	No.	Diam in	Diam mm	Area in^2	Area mm^2	No.	Diam in	Diam mm	Area in^2	Area mm^2
10	0.444	11.3	0.16	100	3	0.375	9.5	0.11	71.3	10	0.394	10.0	0.12	78.5
15	0.628	16.0	0.31	200	4	0.500	12.7	0.20	126.7	13	0.512	13.0	0.21	132.7
20	0.770	19.5	0.47	300	5	0.625	15.9	0.31	197.9	16	0.630	16.0	0.31	201.1
25	0.993	25.2	0.78	500	6	0.750	19.1	0.44	285.0	20	0.787	20.0	0.49	314.2
30	1.175	29.9	1.09	700	7	0.875	22.2	0.60	387.9	25	0.984	25.0	0.76	490.0
35	1.405	35.7	1.55	1000	8	1.000	25.4	0.79	506.7	30	1.181	30.0	1.10	706.9
45	1.777	45.1	2.48	1600	9	1.128	28.6	1.00	644.7	35	1.378	35.0	1.49	962.1
55	2.176	55.3	3.72	2400	10	1.270	32.3	1.27	817.3	43	1.693	43.0	2.25	1452.2
					11	1.410	25.8	1.56	1007.4	57	2.244	57.0	3.96	2551.8
					14	1.693	43.0	2.25	1452.3					
					18	2.257	57.3	4.00	2581.2					