



Maura Healey, Governor
Kimberley Driscoll, Lieutenant Governor
Monica Tibbitts-Nutt, Secretary & CEO
Jonathan L. Gulliver, Highway Administrator



May 2, 2025

Mr. Chris Dauphinais
President
Dauphinais Concrete
P.O. Box 461
Sutton, MA 01590

Dear Mr. Dauphinais,

Your proposed cement concrete mix design formulations have been reviewed by the MassDOT Research and Materials Section (RMS) and are approved as identified on the enclosed RMS 043 Cement Concrete Mix Design Sheet, for the duration of the annual approval cycle, and will **expire on April 1, 2026**.

Approved Plant: DAUPHINAIS CONCRETE
Approved Plant Location: BELLINGHAM, MA
Mix Design Sheet Identification No.: 24-02-28-10-35-07

Modifications to the approved mix design formulations, including source of constituent materials, design proportions, mix type, combined aggregate system targets, paste system targets, slump targets, air content targets, and compressive strength targets are prohibited. At no point shall the water-cementitious (w/cm) ratio exceed the design target. Approval is subject to performance at the plant and project site, as well as conformance to MassDOT protocols and specifications.

Sincerely,

Jason M. Robertson
Director of Research and Materials

JMR/rfm
Enclosures
CC: District Materials Engineer

2025 CEMENT CONCRETE MIX DESIGN SHEET

RMS 043

PLANT INFORMATION		MAILING ADDRESS			MIX DESIGN SHEET IDENTIFICATION	
PLANT NAME	LOCATION	STREET NO. & ADDRESS	CITY/TOWN	EMAIL ADDRESS	CONTRACT	SHEET IDENTIFICATION NO.
DAUPHINAIS CONCRETE	BELLINGHAM, MA	P.O. Box 461	Sutton, MA 01590	chris@dauphinaisconcrete.com		24-02-28-10-35-07

CONSTITUENT MATERIALS

AGGREGATE						SG	UW _{DR} (PCF)	VC (%)	PERCENT PASSING BY MASS (%)														FM
ID	SOURCE	LOCATION	NMAS	DESCRIPTION	SPEC.				2 IN.	1 1/2 IN.	1 IN.	3/4 IN.	1/2 IN.	3/8 IN.	#4	#8	#16	#30	#50	#100	#200		
FINE	PYNE SAND AND GRAVEL	DOUGLAS, MA	FINE	NORMAL WEIGHT	M 6	2.66	102.5	38.1	100.0	100.0	100.0	100.0	100.0	100.0	96.8	80.9	68.5	49.9	28.0	8.6	2.5	2.67	
CA1	KIMBALL SAND COMPANY	BLACKSTONE, MA	3/4 IN.	NORMAL WEIGHT - 6	M 80	2.71	106.5	36.9	100.0	100.0	100.0	90.6	28.8	8.3	1.5	1.0	0.8	0.8	0.6	0.6	0.6	6.96	
CA2	KIMBALL SAND COMPANY	BLACKSTONE, MA	3/8 IN.	NORMAL WEIGHT - 8	M 80	2.70	108.1	35.7	100.0	100.0	100.0	100.0	100.0	91.3	13.5	3.4	3.0	1.8	1.6	0.9	0.9	5.85	
CA3	KIMBALL SAND COMPANY	BLACKSTONE, MA	1 1/2 IN.	NORMAL WEIGHT - 4	M 80	2.73	101.5	40.3	100.0	98.6	50.1	13.7	5.2	3.8	1.9	1.2	1.2	1.1	1.1	1.0	1.0	7.76	
CEMENT; SUPPLEMENTARY CEMENTITIOUS MATERIALS; PACKAGED; FIBERS						SG	CHEMICAL ADMIXTURES														V _s		
ID	SOURCE	LOCATION / PRODUCT	TYPE	DESCRIPTION	SPEC.		ID	SOURCE	PRODUCT	TYPE	DESCRIPTION	SPEC.	(%)										
CEM	HEIDELBERG MATERIALS	CANAKKALE, TURKEY (I / II)	I / II	GENERAL / MOD. SULFATE	M 85	3.15	AD1	GCP APPLIED TECHNOLOGIES	DAREX II AEA	AEA	AIR ENTRAINING	M 154	9.90										
SCM1	HEIDELBERG MATERIALS	CAMDEN, NJ	S-120	HIGH ACTIVITY (120)	M 302	2.92	AD2	GCP APPLIED TECHNOLOGIES	ADVA 140M	F	HIGH RANGE WATER REDUCING	M 194	12.66										
SCM2							AD3	GCP APPLIED TECHNOLOGIES	ADVA CAST 600	F	HIGH RANGE WATER REDUCING	M 194	34.22										
SCM3							AD4	GCP APPLIED TECHNOLOGIES	RECOVER	D	ATER REDUCING AND RETARDIN	M 194	15.53										
PKG							AD5	GCP APPLIED TECHNOLOGIES	DCI-S	CIA	CORROSION INHIBITING	C1582	22.00										
FIBER							AD6	GCP APPLIED TECHNOLOGIES	DARAFILL CLSM	CLSM	CLSM ENHANCING	TDS	0.00										

MIX DESIGN FORMULATION

MIX IDENTIFICATION NO.			C (PSI)	NMAS (IN.)	S (IN.)	AC (%)	W/CM RATIO	PC (%)	AGGREGATE (LBS.)				CEMENTITIOUS; PACKAGED; FIBER (LBS.)						TOTAL WATER (GAL.); ADMIXTURES (FL. OZ.)							YIELD (CF)
MASSDOT	PRODUCER	MIX DESIGN TYPE							FINE	CA1	CA2	CA3	CEM	SCM1	SCM2	SCM3	PKG	FIBER	W _T	AD1	AD2	AD3	AD4	AD5	AD6	
24-02-28-10-35-07-01	MHDCDFEX	CLSM MANUAL EXC	50	FINE	8.00	30.0	6.51	20.3	2226.0				50.0						39.0						1.0	27.00
24-02-28-10-35-07-02	MHDCDFNOEX	CLSM MECH EXC	200	FINE	8.00	25.0	1.59	22.6	2345.0				200.0						38.0						1.0	27.00
24-02-28-10-35-07-03	MHDCDFS	CLSM NON-EXC	325	FINE	8.00	25.0	0.98	24.9	2240.0				325.0						38.0						1.0	27.00
24-02-28-10-35-07-04	3034SMHD	CC	3000	3/4	5.00	6.0	0.53	26.3	1307.0	1250.0	500.0		390.0	130.0					33.0	2.0	30.0					27.00
24-02-28-10-35-07-05	3015SMHD	CC	3000	1 1/2	5.00	5.5	0.53	25.5	1247.0	710.0	450.0	720.0	375.0	125.0					32.0	2.0	30.0					27.00
24-02-28-10-35-07-06	4038SMHD	CC	4000	3/8	5.00	7.5	0.45	30.3	1155.0		1650.0		495.0	165.0					35.6	3.0	40.0					27.00
24-02-28-10-35-07-07	4034SMHD	CC	4000	3/4	5.00	6.0	0.45	28.5	1210.0	1250.0	500.0		465.0	155.0					33.5	3.0	36.0					27.00
24-02-28-10-35-07-08	4034SWMHD	ESC	4000	1	5.00	6.5	0.45	28.1	1234.0	685.0	530.0	510.0	458.0	153.0					33.0	4.0	36.0					27.00
24-02-28-10-35-07-09	4015SMHD	CC	4000	1 1/2	5.00	5.5	0.45	27.9	1168.0	700.0	450.0	700.0	454.0	152.0					32.7	2.0	36.0					27.00
24-02-28-10-35-07-10	5034SMHD	CC	5000	3/4	5.00	6.0	0.40	30.4	1125.0	1250.0	500.0		528.0	177.0					34.0	4.0	42.0					27.00
24-02-28-10-35-07-11	HPSMHD	HPC	5000	3/4	7.00	6.5	0.39	29.2	1142.0	1250.0	500.0		411.0	274.0					32.0	4.0		24.0	13.0	384.0		27.00
24-02-28-10-35-07-12	HP38SMHD	HPC	5000	3/8	7.00	6.5	0.38	29.7	1215.0		1650.0		426.0	284.0					32.0	4.0		24.0	13.0	384.0		27.00
24-02-28-10-35-07-13	5034HEMHD	HPC HESC	5000	3/4	8.00	6.0	0.39	29.2	1165.0	1250.0	500.0		423.0	262.0					32.0	5.0		35.0	16.0	384.0		27.00
24-02-28-10-35-07-14	5038HEMHD	HPC HESC	5000	3/8	8.00	7.0	0.37	29.6	1196.0		1650.0		438.0	272.0					31.8	5.0		36.0	16.0	384.0		27.00
24-02-28-10-35-07-15	HP15SMHD	HPC ESC	5000	1 1/2	6.00	6.5	0.40	28.6	1226.0	575.0	530.0	590.0	330.0	330.0					31.6	5.0	42.0		20.0	384.0		27.00
24-02-28-10-35-07-16	2538SMHD	CC	2500	3/8	5.00	7.5	0.55	26.8	1360.0		1600.0		390.0	130.0					34.0	2.0	32.0					27.00

COMBINED AGGREGATE AND PASTE SYSTEM

MIX IDENTIFICATION NO.		PERCENT BY MASS PASSING (%)													GRADATION OPTIMIZATION		VOID CONTENT (%)				PC _A /	PC _A /	SCM (%)			UW
MASSDOT	PRODUCER	2 IN.	1 1/2 IN.	1 IN.	3/4 IN.	1/2 IN.	3/8 IN.	#4	#8	#16	#30	#50	#100	#200	TARANTULA	SHILSTONE	VC ₀	VC _{0M}	VC _C	VC _{CM}	VC _{0M}	VC _{CM}	SCM1	SCM2	SCM3	(PCF)
24-02-28-10-35-07-01	MHDCDFEX	100.0	100.0	100.0	100.0	100.0	100.0	96.8	80.9	68.5	49.9	28.0	8.6	2.5	OUTSIDE	IV: TOO FINE	38.1	19.0			2.65		0.0	0.0	0.0	96.3
24-02-28-10-35-07-02	MHDCDFNOEX	100.0	100.0	100.0	100.0	100.0	100.0	96.8	80.9	68.5	49.9	28.0	8.6	2.5	OUTSIDE	IV: TOO FINE	38.1	20.0			2.38		0.0	0.0	0.0	106.0
24-02-28-10-35-07-03	MHDCDFS	100.0	100.0	100.0	100.0	100.0	100.0	96.8	80.9	68.5	49.9	28.0	8.6	2.5	OUTSIDE	IV: TOO FINE	38.1	19.1			2.61		0.0	0.0	0.0	106.7
24-02-28-10-35-07-04	3034SMHD	100.0	100.0	100.0	96.2	70.9	61.1	44.2	35.6	30.1	22.0	12.5	4.1	1.5	OUTSIDE	II: 3/4 - 2 IN.	37.2	25.2			1.28		25.0	0.0	0.0	142.7
24-02-28-10-35-07-05	3015SMHD	100.0	99.7	88.5	78.0	62.0	55.8	41.3	33.3	28.2	20.6	11.8	3.9	1.5	OUTSIDE	II: 3/4 - 2 IN.	38.0	26.2			1.18		25.0	0.0	0.0	144.2
24-02-28-10-35-07-06	4038SMHD	100.0	100.0	100.0	100.0	100.0	94.9	47.8	35.3	30.0	21.6	12.5	4.1	1.6	OUTSIDE	III: < 3/4 IN.	36.7	22.8			1.66		25.0	0.0	0.0	139.4
24-02-28-10-35-07-07	4034SMHD	100.0	100.0	100.0	96.0	69.9	59.8	42.5	34.1	28.8	21.0	12.0	3.9	1.4	OUTSIDE	II: 3/4 - 2 IN.	37.2	24.4			1.41		25.0	0.0	0.0	142.9
24-02-28-10-35-07-08	4034SWMHD	100.0	99.8	91.4	82.9	67.2	60.6	43.5	34.8	29.5	21.5	12.3	4.1	1.5	OUTSIDE	II: 3/4 - 2 IN.	37.8	24.7			1.40		25.0	0.0	0.0	142.4
24-02-28-10-35-07-09	4015SMHD	100.0	99.7	88.4	77.8	61.5	55.1	40.3	32.3	27.4	20.0	11.5	3.8	1.5	OUTSIDE	II: 3/4 - 2 IN.	38.0	25.3			1.32		25.1	0.0	0.0	144.4
24-02-28-10-35-07-10	5034SMHD	100.0	100.0	100.0	95.9	69.0	58.6	40.9	32.7	27.7	20.2	11.5	3.8	1.4	OUTSIDE	II: 3/4 - 2 IN.	37.2	23.6			1.54		25.1	0.0	0.0	143.1
24-02-28-10-35-07-11	HPSMHD	100.0	100.0	100.0	95.9	69.2	58.9	41.2	33.0	27.9	20.4	11.6	3.8	1.4	OUTSIDE	II: 3/4 - 2 IN.	37.2	23.8			1.50		40.0	0.0	0.0	142.8
24-02-28-10-35-07-12	HP38SMHD	100.0	100.0	100.0	100.0	100.0	95.0	48.8	36.3	30.8	22.2	12.8	4.2	1.6	OUTSIDE	III: < 3/4 IN.	36.7	23.3			1.55		40.0	0.0	0.0	142.7
24-02-28-10-35-07-13	5034HEMHD	100.0	100.0	100.0	96.0	69.5	59.2	41.6	33.3	28.2	20.6	11.7	3.8	1.4	OUTSIDE	II: 3/4 - 2 IN.	37.2	24.0			1.47		38.2	0.0	0.0	143.6
24-02-28-10-35-07-14	5038HEMHD	100.0	100.0	100.0	100.0	100.0	95.0	48.5	36.0	30.5	22.0	12.7	4.1	1.6	OUTSIDE	III: < 3/4 IN.	36.7	23.1			1.58		38.3	0.0	0.0	142.0
24-02-28-10-35-07-15	HP15SMHD	100.0	99.7	89.9	80.7	66.8	60.9	43.8	35.0	29.7	21.7	12.4	4.1	1.5	OUTSIDE	II: 3/4 - 2 IN.	37.9	24.5			1.43		50.0	0.0	0.0	142.8
24-02-28-10-35-07-16	2538SMHD	100.0	100.0	100.0	100.0	100.0	95.3	51.8	39.0	33.1	23.9	13.7	4.4	1.6	OUTSIDE	III: < 3/4 IN.	36.8	24.2			1.42		25.0	0.0	0.0	139.4