Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-32

Sample Date: 7/3/23

Dates Test Represents: 7/4/2023 through 7/10/2023

Concrete Grade: **P1M, 3500HP**

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	750	4.59	2.62	24.4
2NS	95-013	Smelter Bay	1250	7.56	2.65	40.7
		Total Wt	**3070**	**18.69**		100.0

<----- Verify this number is 100%

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.1	100.0	100.0	99.0	1.0	1.0
1"	47.6	100.0	100.0	81.7	17.3	18.3
3/4"	12.1	98.6	100.0	69.0	12.7	31.0
1/2"	5.5	76.9	100.0	61.4	7.6	38.6
3/8"	4.2	52.5	100.0	55.0	6.4	45.0
#4	3.1	12.9	96.7	43.6	11.4	56.4
#8	2.8	5.2	85.1	36.9	6.7	63.1
#16	2.7	3.9	70.2	30.5	6.4	69.5
#30	2.6	3.4	50.6	22.3	8.1	77.7
#50	2.5	3.0	25.0	11.8	10.6	88.2
#100	2.3	2.7	7.6	4.6	7.2	95.4
LBW	1.8	2.2	1.3	1.7	2.9	98.3

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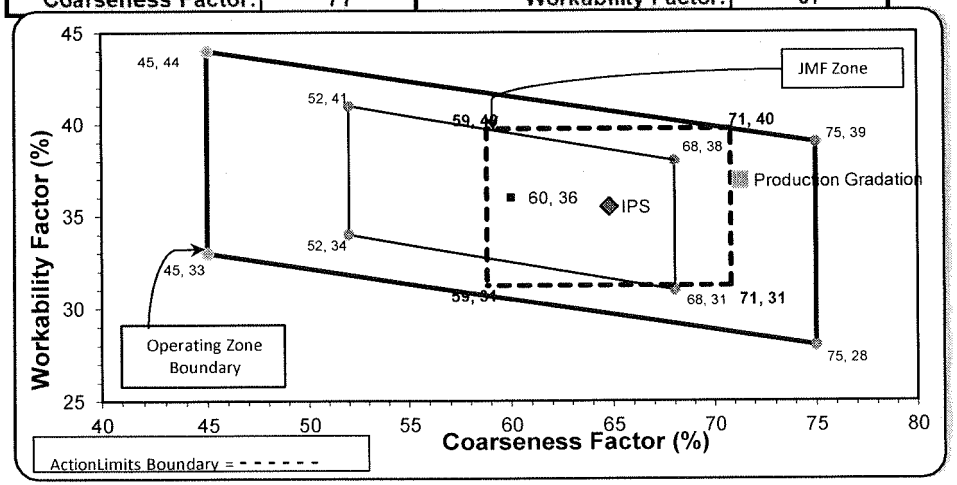
Farmington Hills, MI 48336

*Maximum % Retained must be above the 3/8" sieve.
*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	71	Workability Factor:	37



Intial Production Sample (IPS)

Coarseness Factor:	65
Workability Factor:	36

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.0	0.6	0.6
1"	84.0	15.3	16.0
3/4"	73.5	10.5	26.5
1/2"	65.2	8.2	34.8
3/8"	58.2	7.1	41.8
#4	44.1	14.1	55.9
#8	35.5	8.6	64.5
#16	29.1	6.4	70.9
#30	21.9	7.3	78.1
#50	9.6	12.2	90.4
#100	2.6	7.1	97.4
LBW	1.0	1.6	99.0

PREPARED BY:
SM, LLC Technical Service

Approved By:

Edw. C. Levy Co.

JMT
8911 W. Jefferson
Detroit, 48209
(313) 429-2429

Plant 958-JMT

Product 7919-COARSE AGG P1M LS PI

Period: 07/02/2023 - 07/08/2023

Name/Title Doug Storey / QC Technician

Report Date 07/07/2023

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	97.1	%	
	1" (25mm)	47.6	%	
	3/4" (19mm)	12.1	%	
	1/2" (12.5mm)	5.5	%	
	3/8" (9.5mm)	4.2	%	
	#4 (4.75mm)	3.1	%	
	#8 (2.36mm)	2.8	%	
	#16 (1.18mm)	2.7	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.5	%	
	#100 (.15mm)	2.3	%	
	#200 (75µm)	2.0	%	
	Wash Loss (#200/75um)	1.8	%	0-2
	Total Moisture	2.0	%	

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Plant 958-JMT

Product 7920-INTERMED AGG P1M LS PI

Period: 07/02/2023 - 07/08/2023

Name/Title Doug Storey / QC Technician

Report Date 07/07/2023

Procedure	Sieve/Test	Result	Unit	Intermed Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	98.6	%	
	1/2" (12.5mm)	76.9	%	
	3/8" (9.5mm)	52.5	%	
	#4 (4.75mm)	12.9	%	
	#8 (2.36mm)	5.2	%	
	#16 (1.18mm)	3.9	%	
	#30 (.6mm)	3.4	%	
	#50 (.3mm)	3.0	%	
	#100 (.15mm)	2.7	%	
	#200 (75µm)	2.3	%	
	Wash Loss (#200/75um)	2.2	%	0-3
	Total Moisture	3.1	%	

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Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Period: 07/02/2023 - 07/08/2023

Name/Title Doug Storey / QC Technician

Report Date 07/07/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.7	%	95-100
	#8 (2.36mm)	85.1	%	65-95
	#16 (1.18mm)	70.2	%	35-75
	#30 (.6mm)	50.6	%	20-55
	#50 (.3mm)	25.0	%	10-30
	#100 (.15mm)	7.6	%	0-10
	#200 (75µm)	1.8	%	
	FM	2.65		2.6-3
	Wash Loss (#200/75um)	1.3	%	0-3
	Total Moisture	5.4	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-36

Sample Date: 7/3/23

Concrete Grade: **P1M, 3500HP**

Contractor: _____

Dates Test Represents: 7/4/2023 through 7/10/2023

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1070	6.54	2.62	34.9
IA	71-47	Presque Isle	800	4.89	2.62	26.1
2NS	63-92	Grange Hall	1200	7.26	2.65	39.1
		Total Wt	**3070**	**18.70**		100.0

<----- Verify this number is 100%

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	90.2	100.0	100.0	96.6	3.4	3.4
1"	38.2	100.0	100.0	78.5	18.1	21.5
3/4"	15.3	98.3	100.0	70.0	8.4	30.0
1/2"	5.3	75.5	100.0	60.6	9.4	39.4
3/8"	4.4	55.0	100.0	55.0	5.7	45.0
#4	3.1	8.1	97.4	41.3	13.7	58.7
#8	2.9	2.5	85.0	34.9	6.4	65.1
#16	2.8	2.0	71.3	29.4	5.5	70.6
#30	2.6	1.8	54.0	22.5	6.9	77.5
#50	2.5	1.7	24.8	11.0	11.5	89.0
#100	2.2	1.6	4.9	3.1	7.9	96.9
LBW	1.7	1.3	0.5	1.1	2.0	98.9

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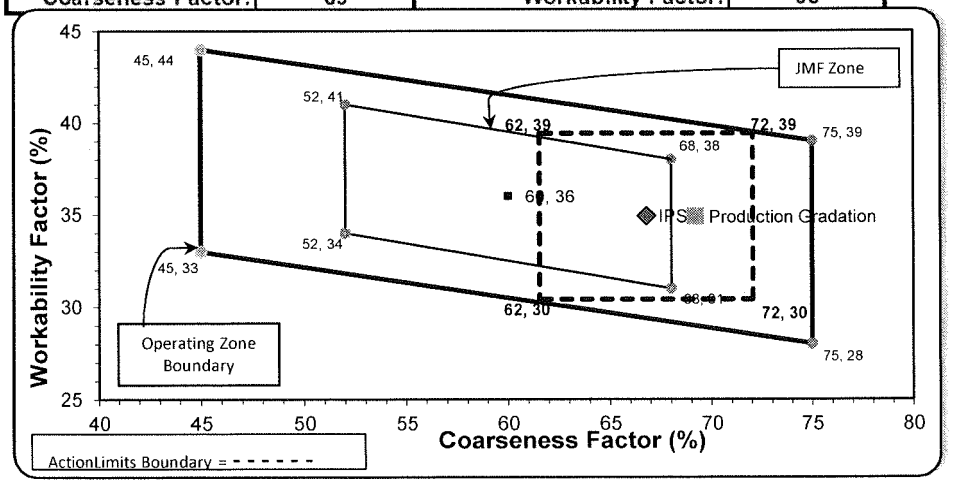
*Maximum % Retained must be above the 3/8" sieve.
*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	69	Workability Factor:	35



Intial Production Sample (IPS)

Coarseness Factor:	67
Workability Factor:	35

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	85.0	15.0	15.0
3/4"	72.1	12.9	27.9
1/2"	64.5	7.6	35.5
3/8"	56.5	8.0	43.5
#4	42.7	13.8	57.3
#8	34.9	7.8	65.1
#16	29.0	5.9	71.0
#30	21.0	8.0	79.0
#50	8.2	12.8	91.8
#100	1.6	6.5	98.4
LBW	0.7	0.9	99.3

PREPARED BY:
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Approved By:

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Plant S36-Superior Auburn Hills

Product 7919-COARSE AGG P1M LS

Period: 07/02/2023 - 07/08/2023

Name/Title Doug Storey / QC Technician

Report Date 07/07/2023

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	90.2	%	
	1" (25mm)	38.2	%	
	3/4" (19mm)	15.3	%	
	1/2" (12.5mm)	5.3	%	
	3/8" (9.5mm)	4.4	%	
	#4 (4.75mm)	3.1	%	
	#8 (2.36mm)	2.9	%	
	#16 (1.18mm)	2.8	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.5	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.7	%	0-2
	Total Moisture	2.16	%	

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Plant S36-Superior Auburn Hills

Product 7920-INTERMED AGG P1M LS

Period: 07/02/2023 - 07/08/2023

Name/Title Doug Storey / QC Technician

Report Date 07/07/2023

Procedure	Sieve/Test	Result	Unit	Intermed Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	98.3	%	
	1/2" (12.5mm)	75.5	%	
	3/8" (9.5mm)	55.0	%	
	#4 (4.75mm)	8.1	%	
	#8 (2.36mm)	2.5	%	
	#16 (1.18mm)	2.0	%	
	#30 (.6mm)	1.8	%	
	#50 (.3mm)	1.7	%	
	#100 (.15mm)	1.6	%	
	#200 (75µm)	1.4	%	
	Wash Loss (#200/75um)	1.3	%	0-3
	Total Moisture	3.96	%	

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Plant S36-Superior Auburn Hills

Product 1022-2NS GR

Name/Title Doug Storey / QC Technician

Period: 07/02/2023 - 07/08/2023

Report Date 07/07/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.4	%	95-100
	#8 (2.36mm)	85.0	%	65-95
	#16 (1.18mm)	71.3	%	35-75
	#30 (.6mm)	54.0	%	20-55
	#50 (.3mm)	24.8	%	10-30
	#100 (.15mm)	4.9	%	0-10
	#200 (75µm)	0.8	%	
	FM	2.63		2.6-3
	Wash Loss (#200/75um)	0.5	%	0-3
	Total Moisture	3.43	%	