Aggregate Optimization Chart

Production Gradation Report

PLANT #: P11

Sample Date: 9/25/23

Concrete Grade: **P1M, 3500HP**

Contractor: _____

Dates Test Represents: 9/26/2023 through 10/2/2023

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	850	5.20	2.62	27.7
IA	71-47	Presque Isle	1020	6.24	2.62	33.2
2NS	95-013	Smelter Bay	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"	96.9	100.0	100.0	99.1	0.9	0.9
1"	31.4	100.0	100.0	81.0	18.1	19.0
3/4"	9.6	97.1	100.0	74.0	7.0	26.0
1/2"	2.9	62.2	100.0	60.6	13.5	39.4
3/8"	2.4	34.0	100.0	51.0	9.5	49.0
#4	1.9	4.7	97.7	40.3	10.8	59.7
#8	1.8	2.7	83.8	34.2	6.1	65.8
#16	1.7	2.2	69.1	28.2	5.9	71.8
#30	1.7	2.2	50.5	20.9	7.3	79.1
#50	1.6	2.0	23.4	10.3	10.7	89.7
#100	1.6	1.8	6.2	3.5	6.8	96.5
LBW	1.4	1.7	1.9	1.7	1.8	98.3

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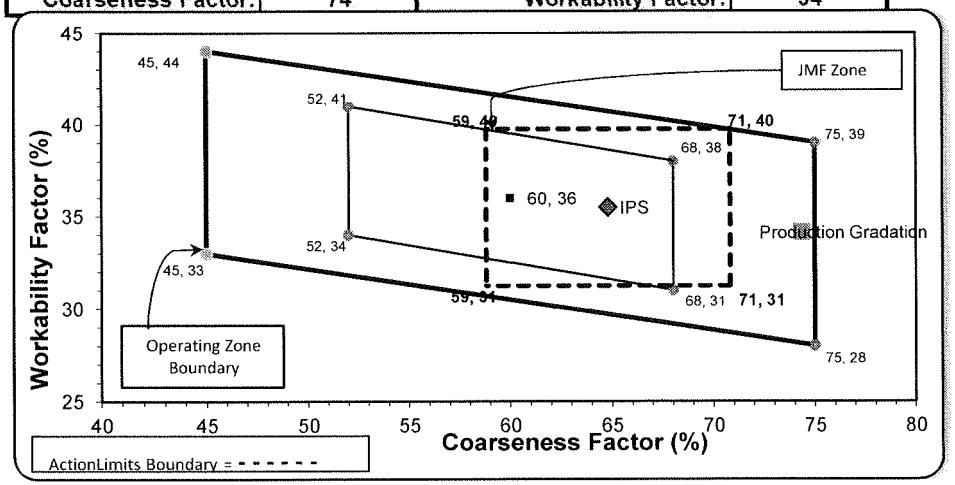
Suite 500
Farmington Hills, MI 48336

*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:	74	Workability Factor:	34



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:

SUPERIOR MATERIALS

Plant S11-Onsite Jefferson

Product 7919-COARSE AGG P1M LS

Period: 09/24/2023 - 09/30/2023

Name/Title Doug Storey / QC Technician

Report Date 09/30/2023

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	96.9	%	
	1" (25mm)	31.4	%	
	3/4" (19mm)	9.6	%	
	1/2" (12.5mm)	2.9	%	
	3/8" (9.5mm)	2.4	%	
	#4 (4.75mm)	1.9	%	
	#8 (2.36mm)	1.8	%	
	#16 (1.18mm)	1.7	%	
	#30 (.6mm)	1.7	%	
	#50 (.3mm)	1.6	%	
	#100 (.15mm)	1.6	%	
	#200 (75µm)	1.5	%	
	Wash Loss (#200/75um)	1.4	%	0-2
	Total Moisture	2.87	%	

SUPERIOR MATERIALS

Plant S11-Onsite Jefferson

Product 7920-INTERMED AGG P1M

LS Period: 09/24/2023 - 09/30/2023

Name/Title Doug Storey / QC Technician

Report Date 09/30/2023

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)	97.1	%	
	1/2" (12.5mm)	62.2	%	
	3/8" (9.5mm)	34.0	%	
	#4 (4.75mm)	4.7	%	
	#8 (2.36mm)	2.7	%	
	#16 (1.18mm)	2.2	%	
	#30 (.6mm)	2.2	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.8	%	
	#200 (75µm)	1.7	%	
	Wash Loss (#200/75um)	1.7	%	0-3
	Total Moisture	3.23	%	

SUPERIOR MATERIALS

Plant S11-Onsite Jefferson

Product 1022-2NS GR

Period: 09/24/2023 - 09/30/2023

Name/Title Doug Storey / QC Technician

Report Date 09/30/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.7	%	95-100
	#8 (2.36mm)	83.8	%	65-95
	#16 (1.18mm)	69.1	%	35-75
	#30 (.6mm)	50.5	%	20-55
	#50 (.3mm)	23.4	%	10-30
	#100 (.15mm)	6.2	%	0-10
	#200 (75µm)	2.1	%	
	FM	2.69		2.6-3
	Wash Loss (#200/75um)	1.9	%	0-3
	Total Moisture	5.22	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: 20

Sample Date: 9/25/23

Dates Test Represents: 9/26/2023 through 10/2/2023

Concrete Grade: **P1M, 3500HP**

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	920	5.63	2.62	30.0
IA	71-47	Presque Isle	950	5.81	2.62	30.9
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"	97.2	100.0	100.0	99.2	0.8	0.8
1"	39.5	100.0	100.0	81.9	17.3	18.1
3/4"	12.1	98.9	100.0	73.3	8.6	26.7
1/2"	3.4	85.9	100.0	66.7	6.6	33.3
3/8"	2.2	67.8	100.0	60.7	6.0	39.3
#4	1.3	16.3	97.9	43.7	17.0	56.3
#8	1.0	3.9	85.0	34.7	9.0	65.3
#16	1.0	2.5	70.6	28.7	6.1	71.3
#30	0.9	2.4	52.9	21.7	7.0	78.3
#50	0.9	2.3	22.7	9.9	11.8	90.1
#100	0.9	2.2	3.7	2.4	7.5	97.6
LBW	0.8	2.0	1.0	1.2	1.1	98.8

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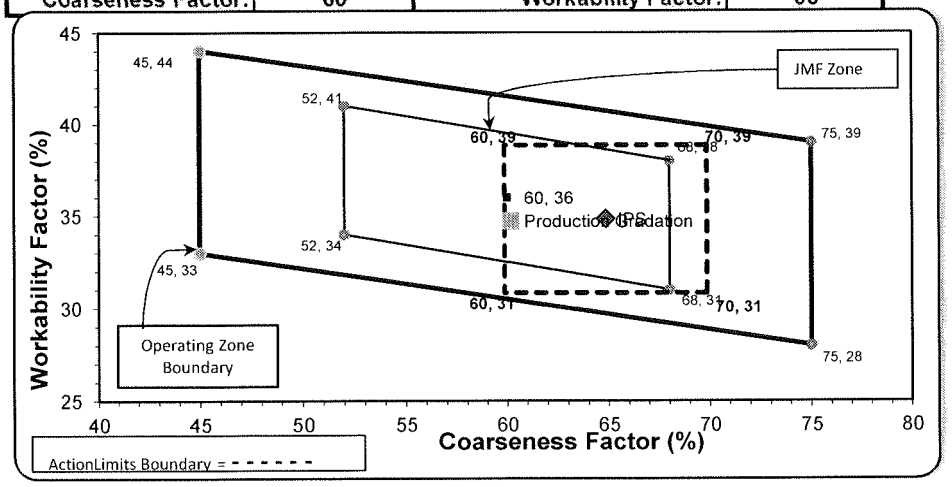
Suite 500
Farmington Hills, MI 48336

*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:	60	Workability Factor:	35



Intial Production Sample (IPS)

Coarseness Factor:	65
Workability Factor:	35

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.1	0.9	0.9
1"	80.8	18.2	19.2
3/4"	71.3	9.6	28.7
1/2"	64.0	7.3	36.0
3/8"	57.7	6.2	42.3
#4	42.8	15.0	57.2
#8	34.8	7.9	65.2
#16	28.4	6.4	71.6
#30	20.2	8.2	79.8
#50	7.6	12.6	92.4
#100	1.6	6.0	98.4
LBW	1.0	0.6	99.0

PREPARED BY:
SM, LLC Technical Service

Approved By:

Plant S20-Superior Flint

Product 7919-COARSE AGG P1M LS

Period: 09/24/2023 - 09/30/2023

Name/Title Doug Storey / QC Technician

Report Date 09/30/2023

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	97.2	%	
	1" (25mm)	39.5	%	
	3/4" (19mm)	12.1	%	
	1/2" (12.5mm)	3.4	%	
	3/8" (9.5mm)	2.2	%	
	#4 (4.75mm)	1.3	%	
	#8 (2.36mm)	1.0	%	
	#16 (1.18mm)	1.0	%	
	#30 (.6mm)	0.9	%	
	#50 (.3mm)	0.9	%	
	#100 (.15mm)	0.9	%	
	#200 (75µm)	0.8	%	
	Wash Loss (#200/75um)	0.8	%	0-2

Plant S20-Superior Flint

Product 7920-INTERMED AGG P1M LS

Period: 09/24/2023 - 09/30/2023

Name/Title Doug Storey / QC Technician

Report Date 09/30/2023

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)	98.9	%	
	1/2" (12.5mm)	85.9	%	
	3/8" (9.5mm)	67.8	%	
	#4 (4.75mm)	16.3	%	
	#8 (2.36mm)	3.9	%	
	#16 (1.18mm)	2.5	%	
	#30 (.6mm)	2.4	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.2	%	
	#200 (75µm)	2.1	%	
	Wash Loss (#200/75um)	2.0	%	0-3

Plant S20-Superior Flint

Product 1022-2NS GR

Period: 09/24/2023 - 09/30/2023

Name/Title Doug Storey / QC Technician

Report Date 09/30/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.9	%	95-100
	#8 (2.36mm)	85.0	%	65-95
	#16 (1.18mm)	70.6	%	35-75
	#30 (.6mm)	52.9	%	20-55
	#50 (.3mm)	22.7	%	10-30
	#100 (.15mm)	3.7	%	0-10
	#200 (75µm)	1.3	%	
	FM	2.67		2.6-3
	Wash Loss (#200/75um)	1.0	%	0-3

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-102

Sample Date: 9/25/23

Concrete Grade: **P1M, 3500HP**

Contractor: _____

Dates Test Represents: 9/26/2023 through 10/2/2023

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1370	8.16	2.69	43.9
IA	58-003	Stoneco	550	3.28	2.69	17.6
2NS	81-019	Pleasant Lake	1200	7.26	2.65	38.5
		Total Wt	**3120**	**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"	100.0	100.0	100.0	100.0	0.0	0.0
1"	77.2	100.0	100.0	90.0	10.0	10.0
3/4"	50.5	100.0	100.0	78.3	11.7	21.7
1/2"	30.7	86.5	100.0	67.2	11.1	32.8
3/8"	20.2	68.1	100.0	59.3	7.9	40.7
#4	3.9	12.6	98.6	41.9	17.5	58.1
#8	1.8	3.5	85.4	34.3	7.6	65.7
#16	1.5	2.0	65.7	26.3	8.0	73.7
#30	1.4	1.6	45.4	18.4	7.9	81.6
#50	1.3	1.5	21.4	9.1	9.3	90.9
#100	1.3	1.4	4.4	2.5	6.6	97.5
LBW	1.1	1.3	0.5	0.9	1.6	99.1

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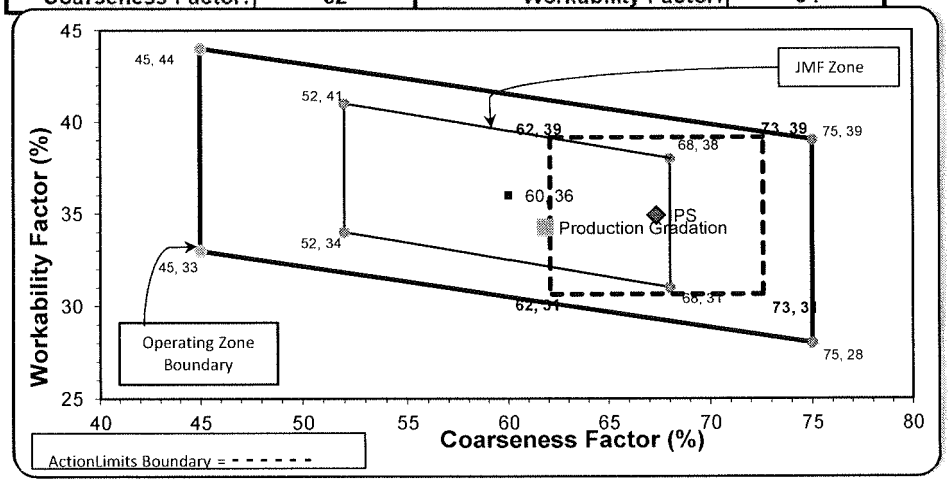
Suite 500
Farmington Hills, MI 48336

*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:	62	Workability Factor:	34



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"	85.5	14.5	14.5
3/4"	73.4	12.1	26.6
1/2"	61.0	12.4	39.0
3/8"	56.2	4.8	43.8
#4	43.1	13.1	56.9
#8	34.9	8.2	65.1
#16	29.4	5.5	70.6
#30	21.6	7.8	78.4
#50	8.1	13.4	91.9
#100	2.2	5.9	97.8
LBW	1.4	0.8	98.6

PREPARED BY:
SM, LLC Technical Service

Approved By:

Plant S102-Superior Novi

Product 7919-COARSE AGG P1M LS

Period: 09/24/2023 - 09/30/2023

Name/Title Doug Storey / QC Technician

Report Date 09/30/2023

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	77.2	%	
	3/4" (19mm)	50.5	%	
	1/2" (12.5mm)	30.7	%	
	3/8" (9.5mm)	20.2	%	
	#4 (4.75mm)	3.9	%	
	#8 (2.36mm)	1.8	%	
	#16 (1.18mm)	1.5	%	
	#30 (.6mm)	1.4	%	
	#50 (.3mm)	1.3	%	
	#100 (.15mm)	1.3	%	
	#200 (75µm)	1.2	%	
	Wash Loss (#200/75um)	1.1	%	0-2
	Total Moisture	2.38	%	

Plant S102-Superior Novi

Product 7920-INTERMED AGG P1M LS

Period: 09/24/2023 - 09/30/2023

Name/Title Doug Storey / QC Technician

Report Date 09/30/2023

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)	100.0	%	
	1/2" (12.5mm)	86.5	%	
	3/8" (9.5mm)	68.1	%	
	#4 (4.75mm)	12.6	%	
	#8 (2.36mm)	3.5	%	
	#16 (1.18mm)	2.0	%	
	#30 (.6mm)	1.6	%	
	#50 (.3mm)	1.5	%	
	#100 (.15mm)	1.4	%	
	#200 (75µm)	1.3	%	
	Wash Loss (#200/75um)	1.3	%	0-3
	Total Moisture	2.25	%	

Plant S102-Superior Novi

Product 1022-2NS GR

Period: 09/24/2023 - 09/30/2023

Name/Title Doug Storey / QC Technician

Report Date 09/30/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.6	%	95-100
	#8 (2.36mm)	85.4	%	65-95
	#16 (1.18mm)	65.7	%	35-75
	#30 (.6mm)	45.4	%	20-55
	#50 (.3mm)	21.4	%	10-30
	#100 (.15mm)	4.4	%	0-10
	#200 (75µm)	0.6	%	
	FM	2.79		2.6-3
	Wash Loss (#200/75um)	0.5	%	0-3
	Total Moisture	3.49	%	