

Aggregate Optimization Chart

PLANT #: **P-101**

Sample Date: 11/15/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/16/2021 through 11/22/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	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	75-051	Mid-Michigan	1200	7.23	2.66	39.1
Total Wt			3070	18.67		100.0

<---- Verify this number is 100%



Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.8	100.0	100.0	99.2	0.8	0.8
1"	49.9	100.0	100.0	82.5	16.7	17.5
3/4"	12.3	98.0	100.0	68.9	13.6	31.1
1/2"	2.8	82.3	100.0	61.5	7.4	38.5
3/8"	2.0	60.4	100.0	55.5	6.0	44.5
#4	1.7	14.5	98.9	43.0	12.5	57.0
#8	1.5	4.8	81.1	33.5	9.6	66.5
#16	1.5	2.7	63.8	26.2	7.3	73.8
#30	1.4	2.4	47.7	19.8	6.4	80.2
#50	1.4	2.3	24.8	10.8	9.0	89.2
#100	1.3	2.2	6.8	3.7	7.1	96.3
LBW	1.1	1.9	0.8	1.2	2.5	98.8

*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

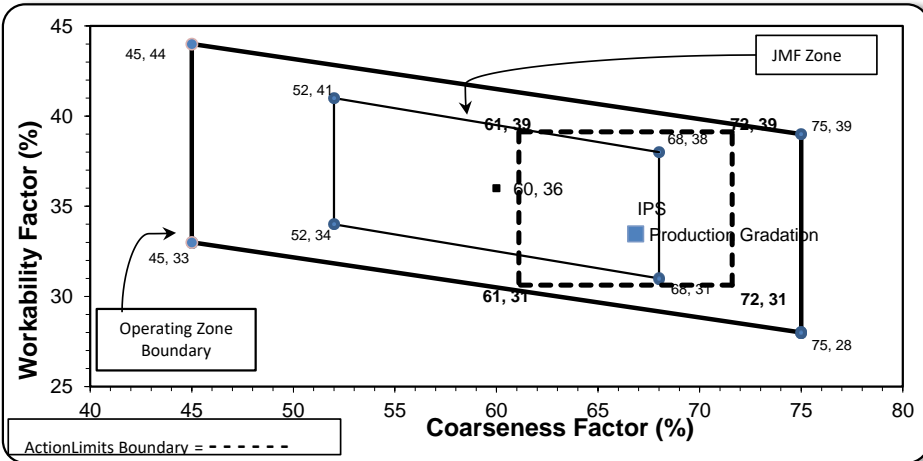
Coarseness Factor:	67	Workability Factor:	33
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Initial Production Sample (IPS)

Coarseness Factor:	66
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Workability Factor:	35
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Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.6	0.4	0.4
1"	84.3	15.3	15.7
3/4"	74.8	9.6	25.2
1/2"	64.3	10.4	35.7
3/8"	56.8	7.5	43.2
#4	43.0	13.8	57.0
#8	34.9	8.1	65.1
#16	26.4	8.5	73.6
#30	19.9	6.5	80.1
#50	10.4	9.5	89.6
#100	3.4	7.0	96.6
LBW	1.2	2.2	98.8



PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-102**

Sample Date: 11/15/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/16/2021 through 11/22/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1420	8.46	2.69	45.5
IA	58-003	Stoneco	500	2.98	2.69	16.0
2NS	63-114	Highland	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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



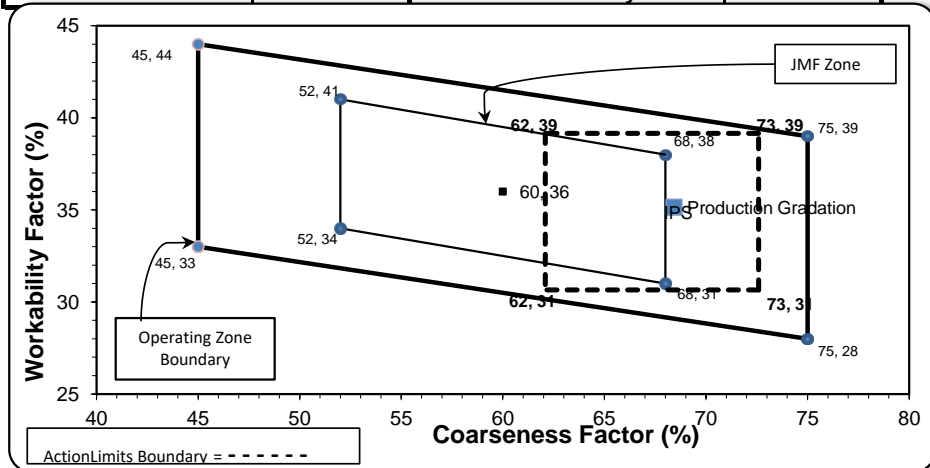
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 Suite 500
 Farmington Hills, MI 48336

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"	67.4	100.0	100.0	85.2	14.8	14.8
3/4"	42.8	100.0	100.0	74.0	11.2	26.0
1/2"	19.4	89.3	100.0	61.6	12.4	38.4
3/8"	12.2	72.5	100.0	55.6	6.0	44.4
#4	3.5	17.6	99.6	42.7	12.9	57.3
#8	2.0	4.4	87.2	35.2	7.6	64.8
#16	1.7	2.4	67.9	27.3	7.9	72.7
#30	1.4	1.9	47.6	19.2	8.0	80.8
#50	1.3	1.7	19.7	8.4	10.8	91.6
#100	1.2	1.7	3.2	2.0	6.4	98.0
LBW	1.0	1.4	0.7	0.9	1.1	99.1

*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:	68	Workability Factor:	35
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Initial 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:

Aggregate Optimization Chart

PLANT #: P-12

Sample Date: 11/15/21

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 11/16/2021 through 11/22/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1020	6.24	2.62	33.2
IA	71-47	Presque Isle	800	4.89	2.62	26.1
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



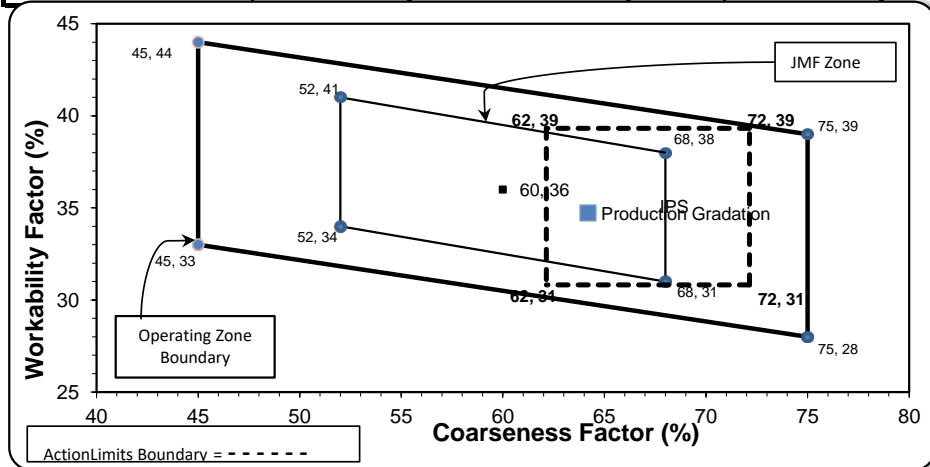
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	47.7	100.0	100.0	82.6	17.4	17.4
3/4"	17.5	99.2	100.0	72.4	10.2	27.6
1/2"	5.8	84.2	100.0	64.6	7.8	35.4
3/8"	4.4	61.1	100.0	58.1	6.5	41.9
#4	2.9	19.1	96.3	45.2	12.9	54.8
#8	2.3	7.5	78.6	34.7	10.4	65.3
#16	2.0	4.4	62.3	27.2	7.5	72.8
#30	1.9	3.7	47.2	20.8	6.4	79.2
#50	1.7	3.3	28.8	13.2	7.7	86.8
#100	1.6	3.0	6.3	3.9	9.3	96.1
LBW	1.3	2.3	0.8	1.4	2.5	98.6

*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: 64 **Workability Factor:** 35



Initial Production Sample (IPS)

Coarseness Factor: 67
Workability Factor: 35

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.6	0.4	0.4
1"	83.9	15.7	16.1
3/4"	74.0	9.8	26.0
1/2"	63.7	10.3	36.3
3/8"	56.4	7.3	43.6
#4	43.0	13.4	57.0
#8	35.1	7.9	64.9
#16	29.0	6.1	71.0
#30	20.9	8.0	79.1
#50	8.1	12.8	91.9
#100	1.6	6.5	98.4
LBW	0.9	0.8	99.1

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 11/15/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/16/2021 through 11/22/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	950	5.81	2.62	30.9
IA	71-47	Presque Isle	870	5.32	2.62	28.3
2NS	95-013	Smelter Bay	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



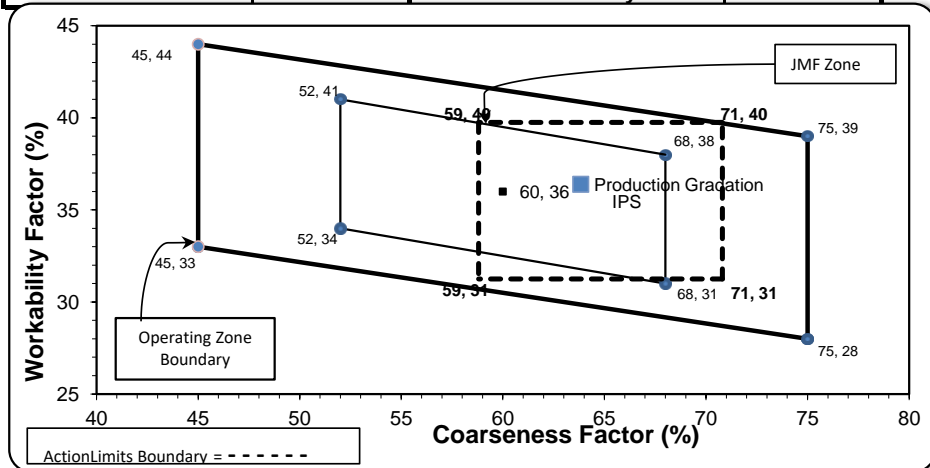
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	47.7	100.0	100.0	83.8	16.2	16.2
3/4"	17.5	99.2	100.0	74.2	9.6	25.8
1/2"	5.8	84.2	100.0	66.4	7.9	33.6
3/8"	4.4	61.1	100.0	59.4	7.0	40.6
#4	2.9	19.1	95.7	45.3	14.1	54.7
#8	2.3	7.5	82.4	36.4	8.9	63.6
#16	2.0	4.4	66.9	29.1	7.3	70.9
#30	1.9	3.7	48.0	21.2	7.9	78.8
#50	1.7	3.3	24.9	11.6	9.6	88.4
#100	1.6	3.0	7.7	4.5	7.1	95.5
LBW	1.3	2.3	2.0	1.9	2.6	98.1

*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:	64	Workability Factor:	36
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Initial Production Sample (IPS)

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:

Aggregate Optimization Chart

PLANT #: **P-35**

Sample Date: 11/15/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/16/2021 through 11/22/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	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	81-093	Burmeister	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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



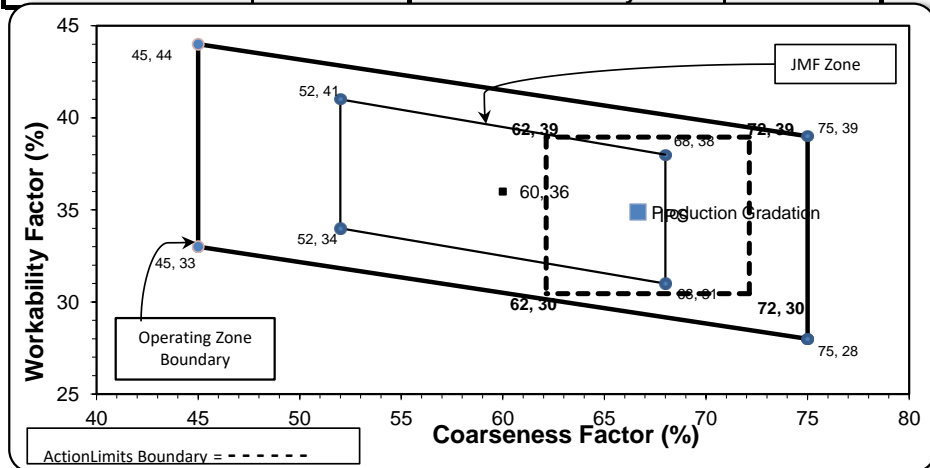
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 Suite 500
 Farmington Hills, MI 48336

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"	67.4	100.0	100.0	85.7	14.3	14.3
3/4"	42.8	100.0	100.0	74.9	10.8	25.1
1/2"	19.4	89.3	100.0	62.7	12.2	37.3
3/8"	12.2	72.5	100.0	56.6	6.1	43.4
#4	3.5	17.6	98.9	42.7	13.9	57.3
#8	2.0	4.4	86.4	34.9	7.8	65.1
#16	1.7	2.4	71.8	28.8	6.1	71.2
#30	1.4	1.9	53.9	21.7	7.1	78.3
#50	1.3	1.7	21.2	9.0	12.7	91.0
#100	1.2	1.7	3.5	2.2	6.9	97.8
LBW	1.0	1.4	1.2	1.1	1.0	98.9

*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:	67	Workability Factor:	35
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Initial 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"	86.9	13.1	13.1
3/4"	76.1	10.8	23.9
1/2"	63.7	12.4	36.3
3/8"	56.2	7.5	43.8
#4	43.2	13.0	56.8
#8	34.7	8.5	65.3
#16	27.5	7.2	72.5
#30	20.6	7.0	79.4
#50	9.0	11.6	91.0
#100	2.1	6.9	97.9
LBW	1.0	1.1	99.0

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-39**

Sample Date: 11/15/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/16/2021 through 11/22/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	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	44-051	Krake Willis Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



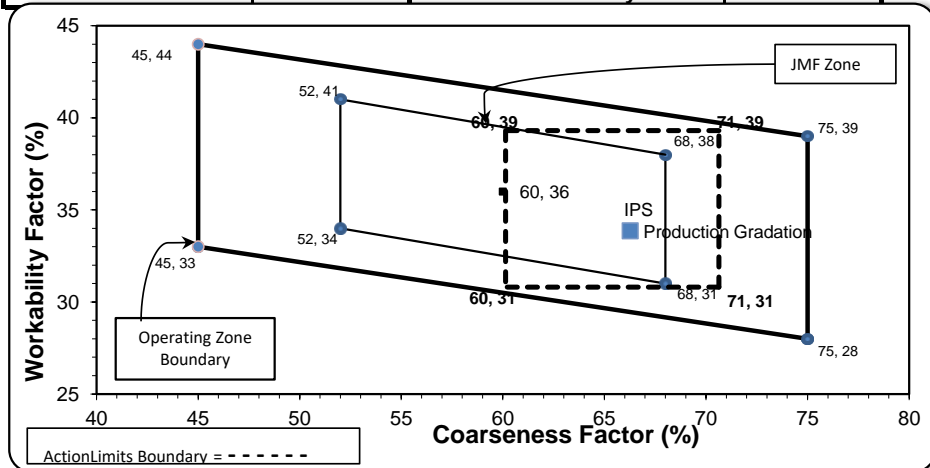
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.8	100.0	100.0	99.2	0.8	0.8
1"	49.9	100.0	100.0	82.5	16.7	17.5
3/4"	12.3	98.0	100.0	68.9	13.6	31.1
1/2"	2.8	82.3	100.0	61.8	7.1	38.2
3/8"	2.0	60.4	100.0	56.2	5.6	43.8
#4	1.7	14.5	96.6	43.5	12.7	56.5
#8	1.5	4.8	79.0	33.9	9.6	66.1
#16	1.5	2.7	64.0	27.2	6.6	72.8
#30	1.4	2.4	49.1	21.1	6.2	78.9
#50	1.4	2.3	28.0	12.5	8.6	87.5
#100	1.3	2.2	9.8	5.0	7.5	95.0
LBW	1.1	1.9	1.0	1.3	3.7	98.7

*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: **66** **Workability Factor:** **34**



Initial Production Sample (IPS)

Coarseness Factor: **65**
Workability Factor: **35**

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.6	0.4	0.4
1"	83.9	15.7	16.1
3/4"	74.1	9.8	25.9
1/2"	64.3	9.7	35.7
3/8"	57.5	6.8	42.5
#4	44.5	13.1	55.5
#8	35.1	9.4	64.9
#16	27.9	7.2	72.1
#30	21.7	6.2	78.3
#50	12.6	9.1	87.4
#100	3.5	9.1	96.5
LBW	1.2	2.4	98.8

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: P-02

Sample Date: 11/15/21

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 11/16/2021 through 11/22/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	950	5.81	2.62	30.9
IA	71-47	Presque Isle	870	5.32	2.62	28.3
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



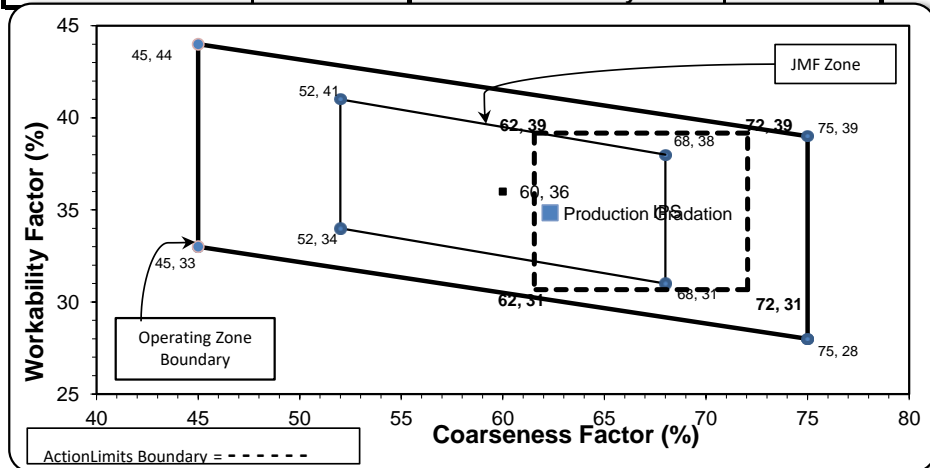
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

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"	47.7	100.0	100.0	83.8	16.2	16.2
3/4"	17.5	99.2	100.0	74.2	9.6	25.8
1/2"	5.8	84.2	100.0	66.4	7.9	33.6
3/8"	4.4	61.1	100.0	59.4	7.0	40.6
#4	2.9	19.1	96.3	45.5	13.9	54.5
#8	2.3	7.5	78.6	34.8	10.7	65.2
#16	2.0	4.4	62.3	27.2	7.6	72.8
#30	1.9	3.7	47.2	20.9	6.4	79.1
#50	1.7	3.3	28.8	13.2	7.7	86.8
#100	1.6	3.0	6.3	3.9	9.3	96.1
LBW	1.3	2.3	0.8	1.4	2.5	98.6

*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:	35
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Initial 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"	72.3	12.7	27.7
1/2"	64.5	7.8	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:
 SM, LLC Technical Service

Approved By: