

Aggregate Optimization Chart

PLANT #: **P-101**

Sample Date: 11/8/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/9/2021 through 11/15/2021

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"	97.1	100.0	100.0	99.0	1.0	1.0
1"	43.9	100.0	100.0	80.4	18.5	19.6
3/4"	12.1	98.9	100.0	69.1	11.4	30.9
1/2"	3.0	86.2	100.0	62.6	6.5	37.4
3/8"	2.5	65.2	100.0	56.9	5.6	43.1
#4	2.2	14.7	99.0	43.3	13.7	56.7
#8	2.0	4.5	82.3	34.0	9.3	66.0
#16	1.9	2.6	65.4	26.9	7.1	73.1
#30	1.9	2.2	48.8	20.3	6.6	79.7
#50	1.8	2.1	24.8	10.9	9.4	89.1
#100	1.8	1.9	6.8	3.8	7.1	96.2
LBW	1.7	1.8	0.9	1.4	2.4	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.

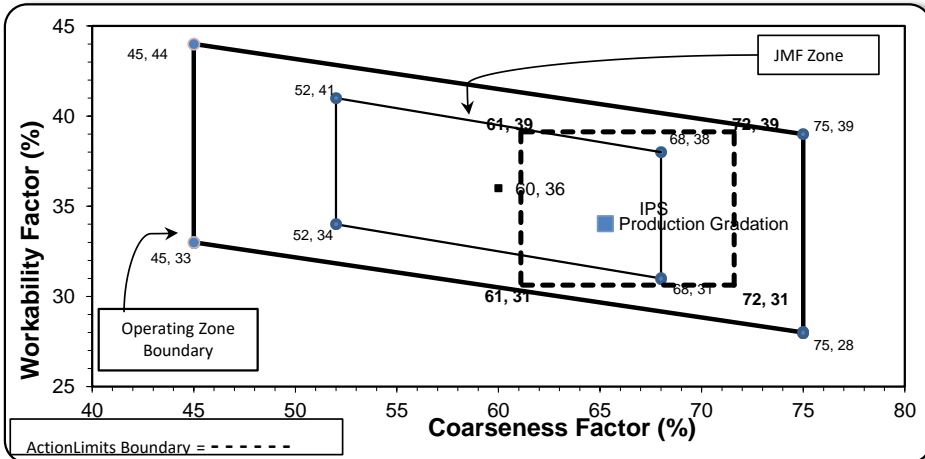
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor:	65	Workability Factor:	34
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Initial Production Sample (IPS)

Coarseness Factor:	66
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"	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: 11/8/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/9/2021 through 11/15/2021

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%



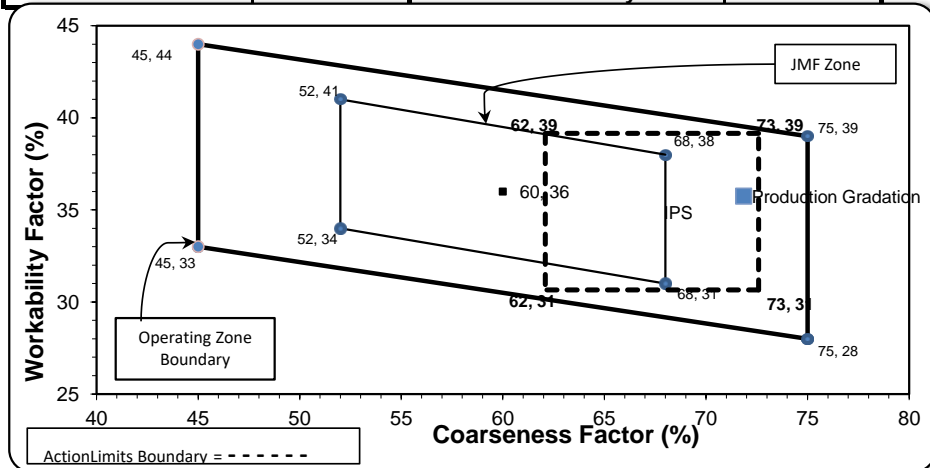
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 Suite 500
 Farmington Hills, MI 48336

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"	69.4	100.0	100.0	86.1	13.9	13.9
3/4"	49.6	100.0	100.0	77.1	9.0	22.9
1/2"	14.8	93.8	100.0	60.2	16.8	39.8
3/8"	5.8	79.5	100.0	53.8	6.4	46.2
#4	2.7	15.9	99.7	42.1	11.7	57.9
#8	1.7	7.8	87.7	35.8	6.4	64.2
#16	1.4	2.8	69.1	27.7	8.1	72.3
#30	1.2	1.6	48.1	19.3	8.4	80.7
#50	1.1	1.2	17.8	7.5	11.8	92.5
#100	1.0	1.1	2.8	1.7	5.8	98.3
LBW	0.8	0.7	0.6	0.7	1.0	99.3

*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:	72	Workability Factor:	36
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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: 11/8/21

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 11/9/2021 through 11/15/2021

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%



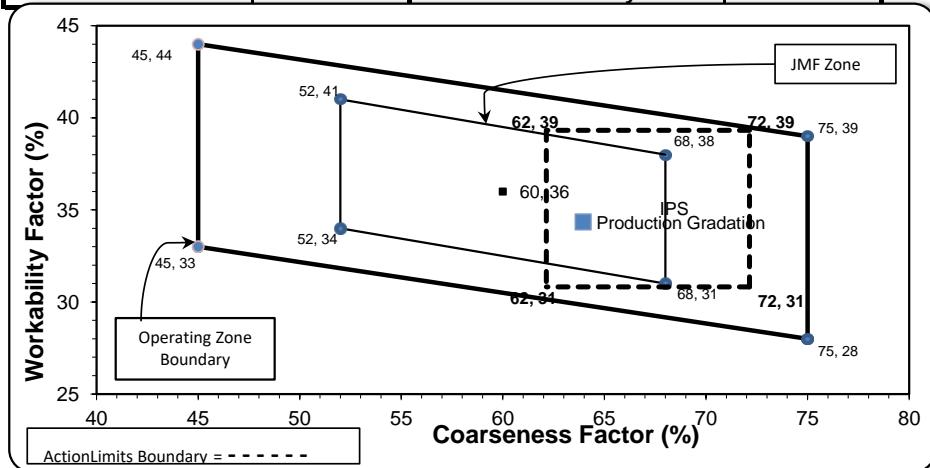
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 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.0	100.0	100.0	98.7	1.3	1.3
1"	32.7	100.0	100.0	77.6	21.0	22.4
3/4"	5.1	98.8	100.0	68.2	9.5	31.8
1/2"	2.1	83.9	100.0	63.3	4.9	36.7
3/8"	1.8	64.1	100.0	58.0	5.3	42.0
#4	1.6	18.6	95.8	44.4	13.6	55.6
#8	1.5	7.4	78.4	34.3	10.0	65.7
#16	1.4	4.0	62.3	26.9	7.5	73.1
#30	1.4	3.2	46.2	20.1	6.8	79.9
#50	1.4	2.8	26.2	11.9	8.2	88.1
#100	1.3	2.5	6.8	3.9	8.0	96.1
LBW	1.1	1.9	1.0	1.3	2.6	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: 64 **Workability Factor:** 34



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: 11/8/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/9/2021 through 11/15/2021

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%



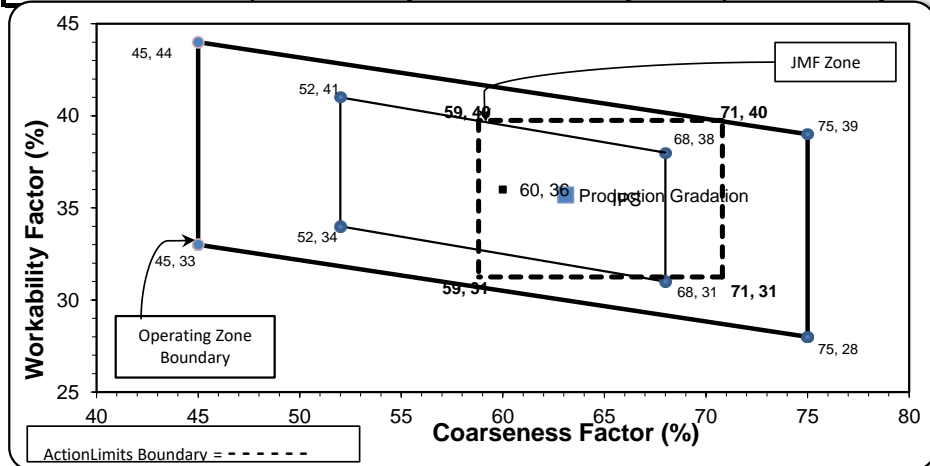
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 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.0	100.0	100.0	98.8	1.2	1.2
1"	32.7	100.0	100.0	79.2	19.6	20.8
3/4"	5.1	98.8	100.0	70.3	8.9	29.7
1/2"	2.1	83.9	100.0	65.1	5.2	34.9
3/8"	1.8	64.1	100.0	59.4	5.7	40.6
#4	1.6	18.6	95.0	44.4	15.0	55.6
#8	1.5	7.4	81.4	35.7	8.7	64.3
#16	1.4	4.0	65.3	28.2	7.5	71.8
#30	1.4	3.2	48.0	20.9	7.3	79.1
#50	1.4	2.8	23.3	10.7	10.2	89.3
#100	1.3	2.5	6.6	3.8	6.9	96.2
LBW	1.1	1.9	0.3	1.0	2.8	99.0

*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: **63** **Workability Factor:** **36**



Initial 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:

Aggregate Optimization Chart

PLANT #: **P-35**

Sample Date: 11/8/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/9/2021 through 11/15/2021

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%



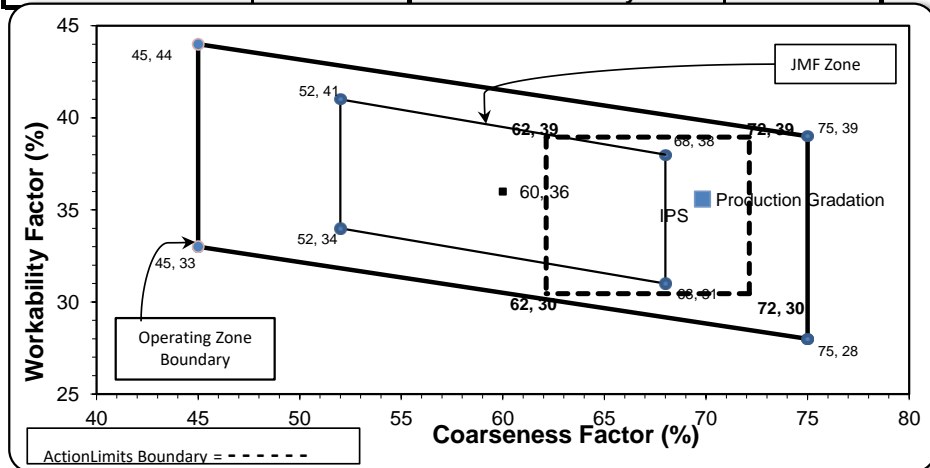
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 Suite 500
 Farmington Hills, MI 48336

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"	69.4	100.0	100.0	86.6	13.4	13.4
3/4"	49.6	100.0	100.0	77.9	8.7	22.1
1/2"	14.8	93.8	100.0	61.5	16.4	38.5
3/8"	5.8	79.5	100.0	55.0	6.5	45.0
#4	2.7	15.9	99.0	42.1	13.0	57.9
#8	1.7	7.8	87.0	35.6	6.5	64.4
#16	1.4	2.8	72.3	28.9	6.7	71.1
#30	1.2	1.6	54.4	21.7	7.2	78.3
#50	1.1	1.2	21.3	8.9	12.8	91.1
#100	1.0	1.1	3.2	1.9	7.0	98.1
LBW	0.8	0.7	0.9	0.8	1.0	99.2

*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:	70	Workability Factor:	36
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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-36**

Sample Date: 11/8/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/9/2021 through 11/15/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	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%



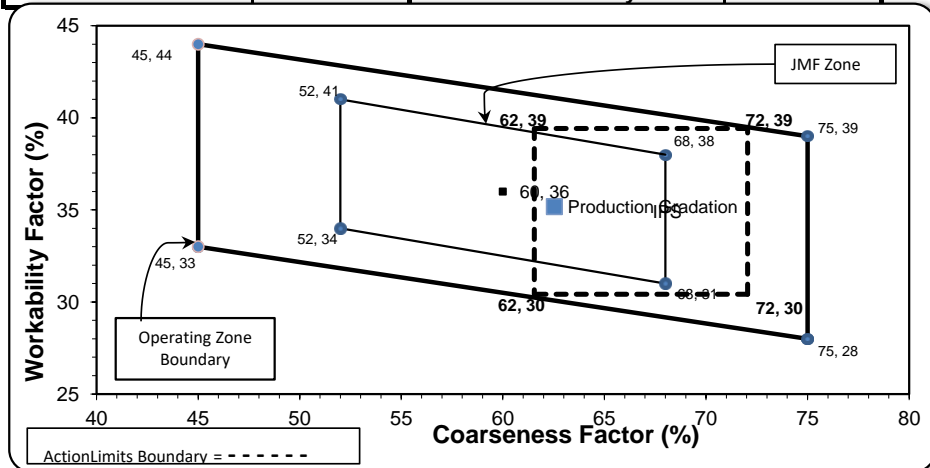
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.0	100.0	100.0	98.8	1.2	1.2
1"	32.7	100.0	100.0	79.8	19.0	20.2
3/4"	5.1	98.8	100.0	71.2	8.6	28.8
1/2"	2.1	83.9	100.0	65.7	5.5	34.3
3/8"	1.8	64.1	100.0	59.5	6.2	40.5
#4	1.6	18.6	97.1	44.2	15.3	55.8
#8	1.5	7.4	83.0	35.2	9.0	64.8
#16	1.4	4.0	68.5	28.4	6.7	71.6
#30	1.4	3.2	51.8	21.7	6.8	78.3
#50	1.4	2.8	26.0	11.4	10.2	88.6
#100	1.3	2.5	4.0	2.7	8.7	97.3
LBW	1.1	1.9	0.3	1.0	1.7	99.0

*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:	63	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"	72.1	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:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-39**

Sample Date: 11/8/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/9/2021 through 11/15/2021

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%



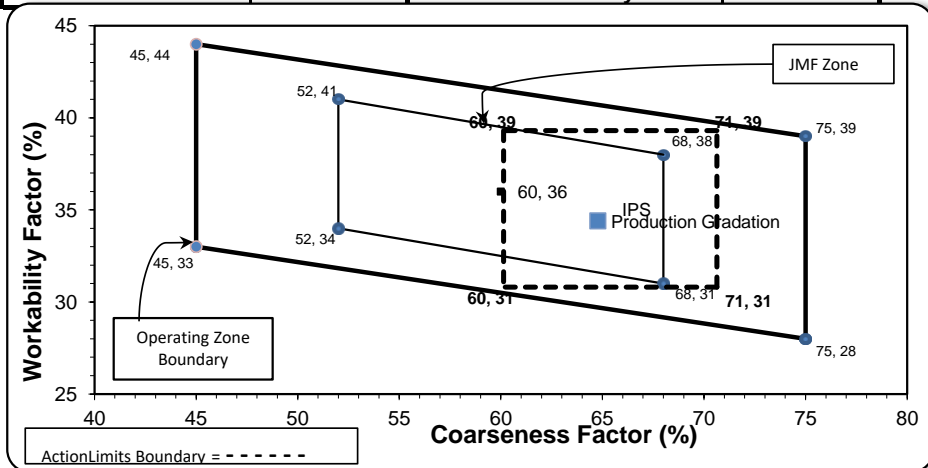
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.1	100.0	100.0	99.0	1.0	1.0
1"	43.9	100.0	100.0	80.4	18.5	19.6
3/4"	12.1	98.9	100.0	69.1	11.4	30.9
1/2"	3.0	86.2	100.0	62.8	6.3	37.2
3/8"	2.5	65.2	100.0	57.5	5.3	42.5
#4	2.2	14.7	96.8	43.8	13.7	56.2
#8	2.0	4.5	80.1	34.4	9.4	65.6
#16	1.9	2.6	64.5	27.6	6.9	72.4
#30	1.9	2.2	48.5	20.9	6.6	79.1
#50	1.8	2.1	25.4	11.5	9.5	88.5
#100	1.8	1.9	7.8	4.3	7.2	95.7
LBW	1.7	1.8	1.2	1.5	2.7	98.5

*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:	65	Workability Factor:	34
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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: 11/8/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/9/2021 through 11/15/2021

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%



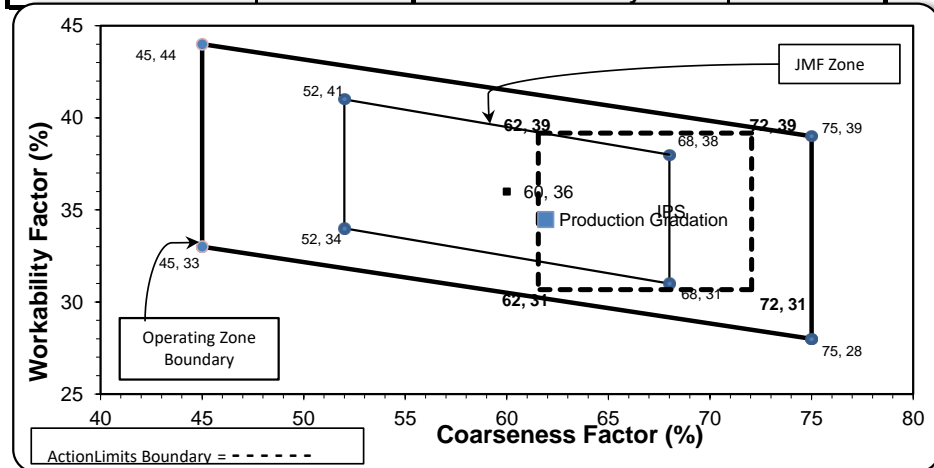
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.0	100.0	100.0	98.8	1.2	1.2
1"	32.7	100.0	100.0	79.2	19.6	20.8
3/4"	5.1	98.8	100.0	70.3	8.9	29.7
1/2"	2.1	83.9	100.0	65.1	5.2	34.9
3/8"	1.8	64.1	100.0	59.4	5.7	40.6
#4	1.6	18.6	95.8	44.8	14.7	55.2
#8	1.5	7.4	78.4	34.5	10.3	65.5
#16	1.4	4.0	62.3	26.9	7.5	73.1
#30	1.4	3.2	46.2	20.2	6.8	79.8
#50	1.4	2.8	26.2	11.9	8.3	88.1
#100	1.3	2.5	6.8	3.9	8.0	96.1
LBW	1.1	1.9	1.0	1.3	2.6	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:	62	Workability Factor:	34
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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: