

Aggregate Optimization Chart

PLANT #: **P-101**

Sample Date: 11/22/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/23/2021 through 11/29/2021

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"	98.7	100.0	100.0	99.5	0.5	0.5
1"	44.1	100.0	100.0	80.5	19.0	19.5
3/4"	10.9	99.0	100.0	68.7	11.8	31.3
1/2"	2.5	85.5	100.0	62.2	6.4	37.8
3/8"	2.0	63.7	100.0	56.4	5.9	43.6
#4	1.7	14.0	98.5	42.7	13.6	57.3
#8	1.5	4.4	80.4	33.1	9.6	66.9
#16	1.4	2.9	62.6	25.7	7.4	74.3
#30	1.4	2.5	46.4	19.3	6.4	80.7
#50	1.3	2.3	25.0	10.8	8.5	89.2
#100	1.3	2.2	7.4	3.9	6.9	96.1
LBW	1.1	2.1	0.7	1.2	2.7	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.

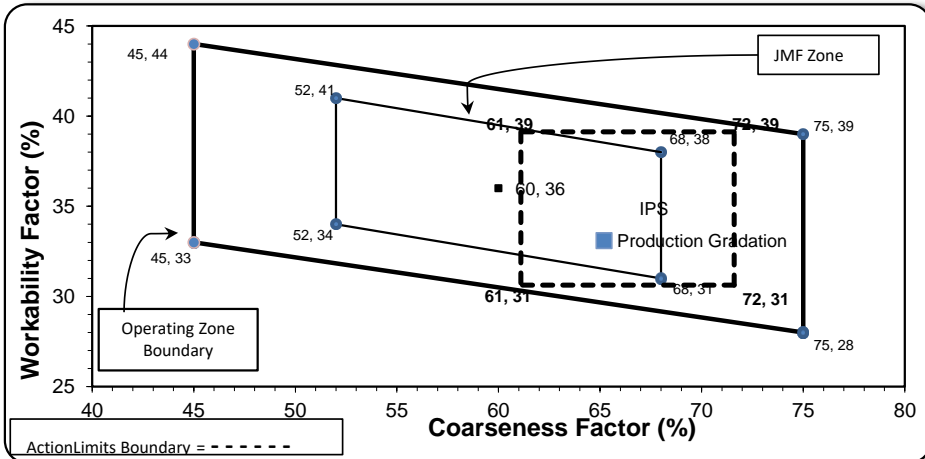
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor:	65	Workability Factor:	33
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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: 11/22/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/23/2021 through 11/29/2021

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%



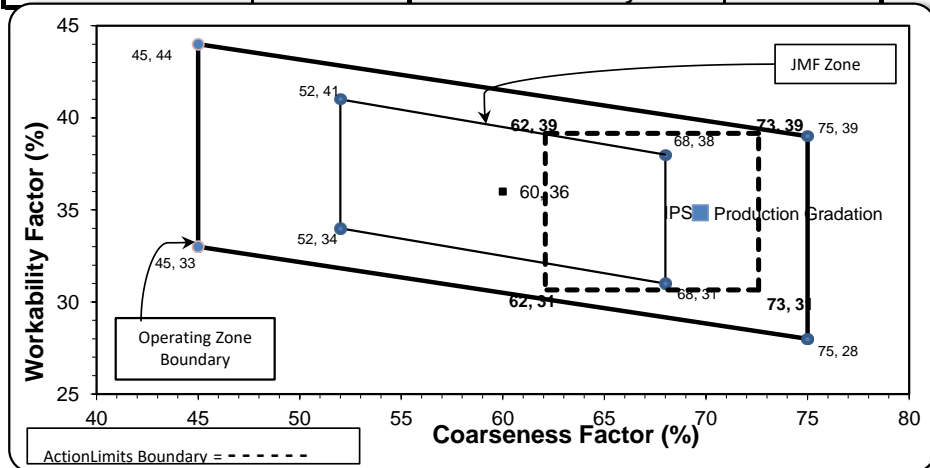
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 Suite 500
 Farmington Hills, MI 48336

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"	62.7	100.0	100.0	83.0	17.0	17.0
3/4"	31.2	100.0	100.0	68.7	14.3	31.3
1/2"	12.1	94.6	100.0	59.1	9.6	40.9
3/8"	5.5	84.9	100.0	54.6	4.6	45.4
#4	5.5	19.3	99.7	43.9	10.6	56.1
#8	1.8	5.4	86.2	34.8	9.1	65.2
#16	1.2	3.3	65.2	26.2	8.7	73.8
#30	1.2	2.7	44.7	18.2	8.0	81.8
#50	1.1	2.5	18.7	8.1	10.1	91.9
#100	1.1	2.3	3.7	2.3	5.8	97.7
LBW	1.0	2.1	0.6	1.0	1.3	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: **70** 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"	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:
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Aggregate Optimization Chart

PLANT #: P-12

Sample Date: 11/22/21

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 11/23/2021 through 11/29/2021

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%



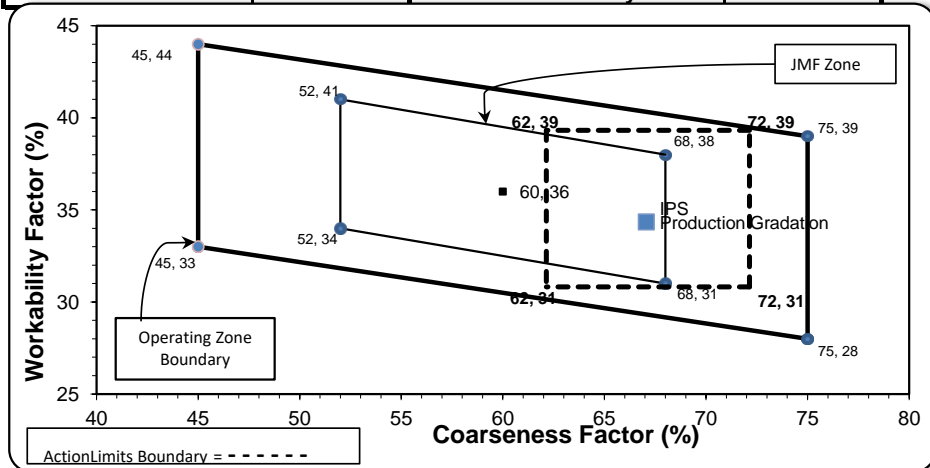
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.0	100.0	100.0	99.0	1.0	1.0
1"	47.8	100.0	100.0	82.7	16.3	17.3
3/4"	15.3	98.2	100.0	71.4	11.3	28.6
1/2"	4.1	77.7	100.0	62.3	9.1	37.7
3/8"	3.0	54.7	100.0	56.0	6.4	44.0
#4	2.7	13.6	96.6	43.8	12.2	56.2
#8	2.6	5.5	78.7	34.3	9.4	65.7
#16	2.3	3.6	61.7	26.8	7.5	73.2
#30	2.2	3.1	46.1	20.3	6.5	79.7
#50	2.0	2.7	27.8	12.7	7.6	87.3
#100	1.8	2.4	6.4	3.8	8.9	96.2
LBW	1.3	1.7	0.9	1.2	2.6	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:** 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

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Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 11/22/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/23/2021 through 11/29/2021

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%



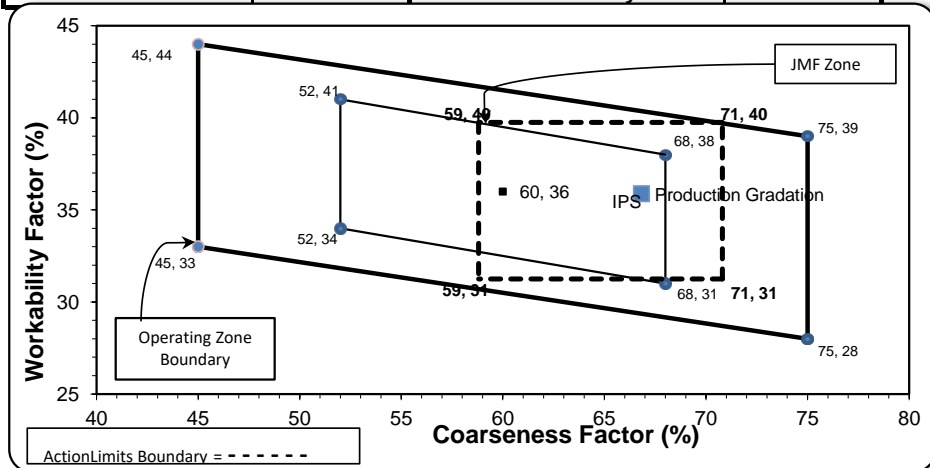
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.0	100.0	100.0	99.1	0.9	0.9
1"	47.8	100.0	100.0	83.8	15.2	16.2
3/4"	15.3	98.2	100.0	73.3	10.6	26.7
1/2"	4.1	77.7	100.0	64.0	9.3	36.0
3/8"	3.0	54.7	100.0	57.1	6.9	42.9
#4	2.7	13.6	95.7	43.7	13.5	56.3
#8	2.6	5.5	82.3	35.9	7.8	64.1
#16	2.3	3.6	67.3	29.1	6.7	70.9
#30	2.2	3.1	48.8	21.4	7.7	78.6
#50	2.0	2.7	25.5	11.8	9.7	88.2
#100	1.8	2.4	8.1	4.5	7.2	95.5
LBW	1.3	1.7	1.4	1.5	3.1	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:	67	Workability Factor:	36
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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: 11/22/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/23/2021 through 11/29/2021

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%



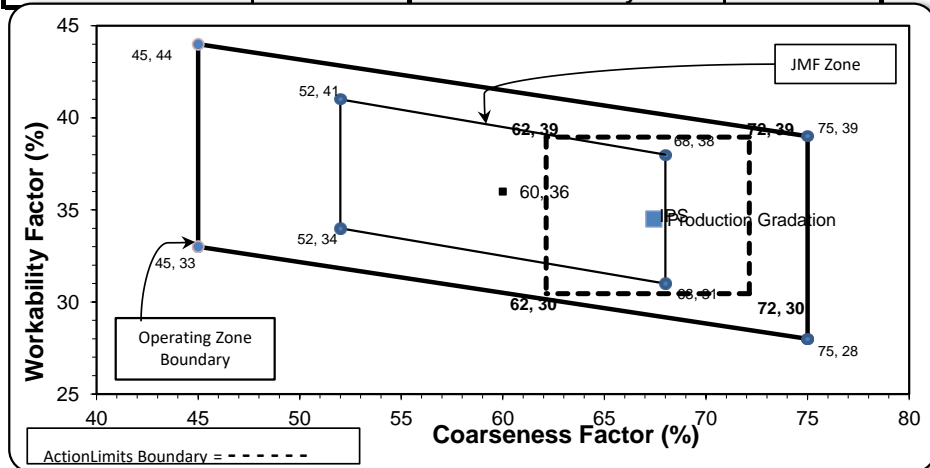
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 Suite 500
 Farmington Hills, MI 48336

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"	62.7	100.0	100.0	83.6	16.4	16.4
3/4"	31.2	100.0	100.0	69.8	13.8	30.2
1/2"	12.1	94.6	100.0	60.5	9.3	39.5
3/8"	5.5	84.9	100.0	55.8	4.6	44.2
#4	5.5	19.3	98.7	43.8	12.1	56.2
#8	1.8	5.4	85.2	34.5	9.3	65.5
#16	1.2	3.3	67.0	26.9	7.6	73.1
#30	1.2	2.7	46.6	18.9	8.0	81.1
#50	1.1	2.5	16.3	7.2	11.7	92.8
#100	1.1	2.3	2.8	2.0	5.2	98.0
LBW	1.0	2.1	1.0	1.2	0.8	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:** 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"	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: 11/22/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 11/23/2021 through 11/29/2021

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	63-92	Grange Hall	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



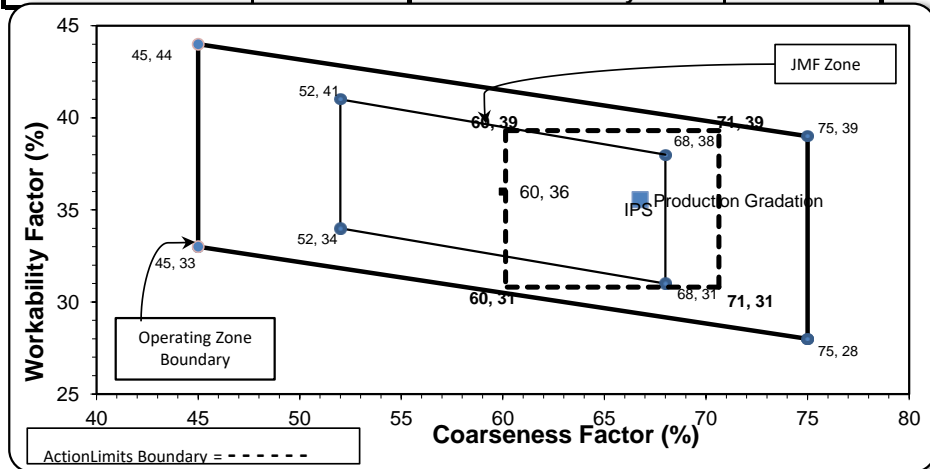
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.7	100.0	100.0	99.5	0.5	0.5
1"	44.1	100.0	100.0	80.5	19.0	19.5
3/4"	10.9	99.0	100.0	68.7	11.8	31.3
1/2"	2.5	85.5	100.0	62.5	6.2	37.5
3/8"	2.0	63.7	100.0	57.0	5.5	43.0
#4	1.7	14.0	97.5	43.7	13.3	56.3
#8	1.5	4.4	83.4	35.6	8.2	64.4
#16	1.4	2.9	67.7	28.8	6.8	71.2
#30	1.4	2.5	50.0	21.5	7.3	78.5
#50	1.3	2.3	25.0	11.2	10.3	88.8
#100	1.3	2.2	4.4	2.8	8.4	97.2
LBW	1.1	2.1	0.1	0.9	1.8	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:	67	Workability Factor:	36
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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: 11/22/21

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 11/23/2021 through 11/29/2021

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%



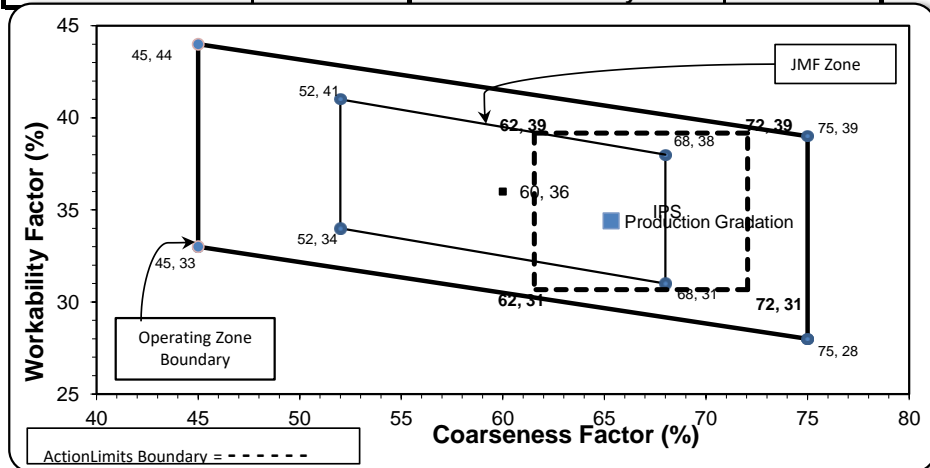
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 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.0	100.0	100.0	99.1	0.9	0.9
1"	47.8	100.0	100.0	83.8	15.2	16.2
3/4"	15.3	98.2	100.0	73.3	10.6	26.7
1/2"	4.1	77.7	100.0	64.0	9.3	36.0
3/8"	3.0	54.7	100.0	57.1	6.9	42.9
#4	2.7	13.6	96.6	44.0	13.1	56.0
#8	2.6	5.5	78.7	34.4	9.6	65.6
#16	2.3	3.6	61.7	26.9	7.6	73.1
#30	2.2	3.1	46.1	20.3	6.5	79.7
#50	2.0	2.7	27.8	12.7	7.6	87.3
#100	1.8	2.4	6.4	3.8	8.9	96.2
LBW	1.3	1.7	0.9	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: 65 **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"	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: