

Aggregate Optimization Chart

PLANT #: **P-101**

Sample Date: 3/28/22

Concrete Grade: **P1M, 3500HP**

Contractor: _____

Dates Test Represents: 3/29/2022 through 4/4/2022

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"	96.5	100.0	100.0	98.8	1.2	1.2
1"	48.0	100.0	100.0	81.9	16.9	18.1
3/4"	15.4	98.6	100.0	70.1	11.7	29.9
1/2"	4.2	78.9	100.0	61.1	9.0	38.9
3/8"	3.0	51.3	100.0	53.5	7.6	46.5
#4	2.2	11.1	98.5	42.2	11.3	57.8
#8	2.0	2.5	83.3	33.9	8.3	66.1
#16	1.9	1.7	68.3	27.8	6.1	72.2
#30	1.9	1.5	53.3	21.9	5.9	78.1
#50	1.8	1.4	29.2	12.4	9.5	87.6
#100	1.6	1.4	7.3	3.8	8.6	96.2
LBW	1.5	1.3	0.6	1.1	2.7	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

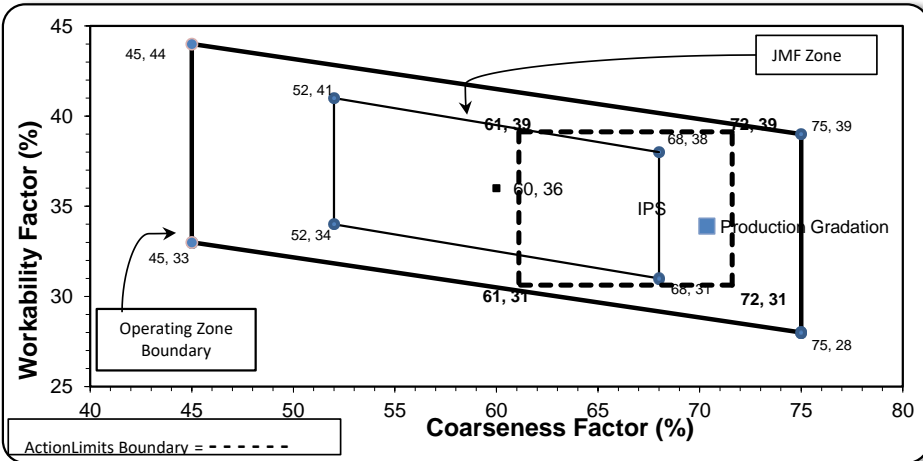
Coarseness Factor: **70** **Workability Factor:** **34**

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: 3/28/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 3/29/2022 through 4/4/2022

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1450	8.64	2.69	46.5
IA	58-003	Stoneco	520	3.10	2.69	16.7
2NS	81-019	Pleasant Lake	1150	6.95	2.65	36.9
Total Wt			3120	18.69		100.0

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



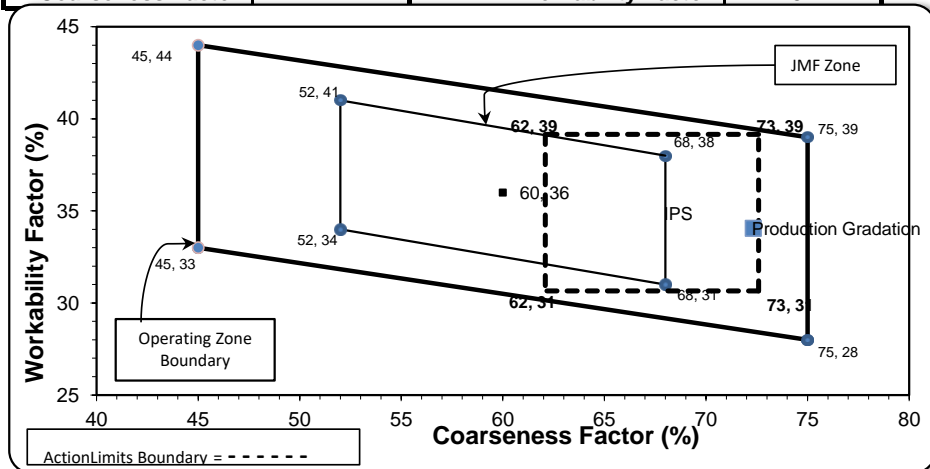
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 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	68.3	100.0	100.0	85.3	14.7	14.7
3/4"	39.5	100.0	100.0	71.9	13.4	28.1
1/2"	19.6	93.8	100.0	61.6	10.3	38.4
3/8"	3.5	82.9	100.0	52.3	9.3	47.7
#4	3.1	22.0	99.4	41.7	10.6	58.3
#8	2.8	7.4	85.5	34.0	7.7	66.0
#16	2.4	3.4	67.7	26.6	7.4	73.4
#30	2.3	2.6	48.8	19.5	7.1	80.5
#50	2.2	2.5	23.8	10.2	9.3	89.8
#100	2.1	2.3	6.5	3.8	6.5	96.2
LBW	1.9	1.9	2.0	1.9	1.8	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:	72	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"	85.5	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

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Aggregate Optimization Chart

PLANT #: **P-12**

Sample Date: 3/28/22

Concrete Grade: **P1M, 3500HP**

Contractor: _____

Dates Test Represents: 3/29/2022 through 4/4/2022

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%



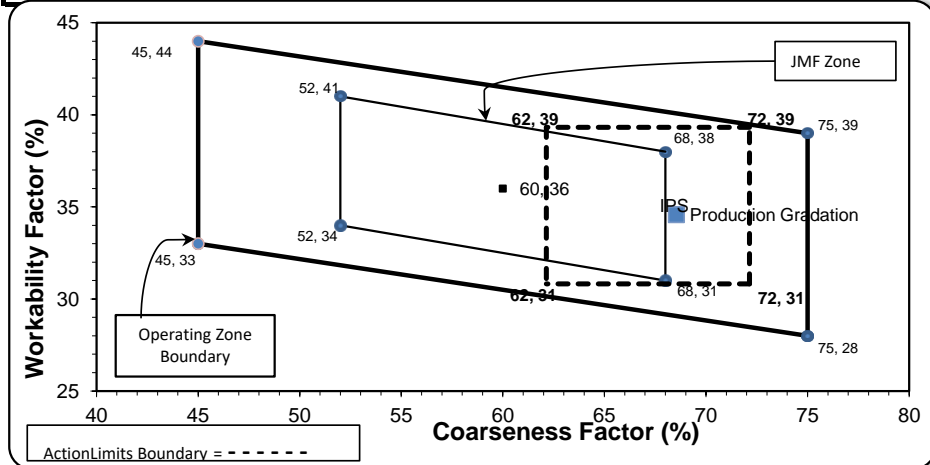
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.7	100.0	100.0	98.9	1.1	1.1
1"	40.9	100.0	100.0	80.4	18.5	19.6
3/4"	8.9	97.5	100.0	69.1	11.3	30.9
1/2"	2.2	76.2	100.0	61.3	7.8	38.7
3/8"	1.9	53.0	100.0	55.2	6.1	44.8
#4	1.8	13.7	96.6	43.5	11.7	56.5
#8	1.7	5.7	79.9	34.6	8.9	65.4
#16	1.7	4.5	63.5	27.6	7.0	72.4
#30	1.6	3.9	46.8	20.6	7.0	79.4
#50	1.5	3.6	24.3	11.3	9.3	88.7
#100	1.3	3.4	4.6	3.2	8.1	96.8
LBW	1.0	1.7	0.7	1.1	2.1	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: **69** **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

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Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 3/28/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 3/29/2022 through 4/4/2022

Contractor: _____

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	900	5.50	2.62	29.3
2NS	95-013	Smelter Bay	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



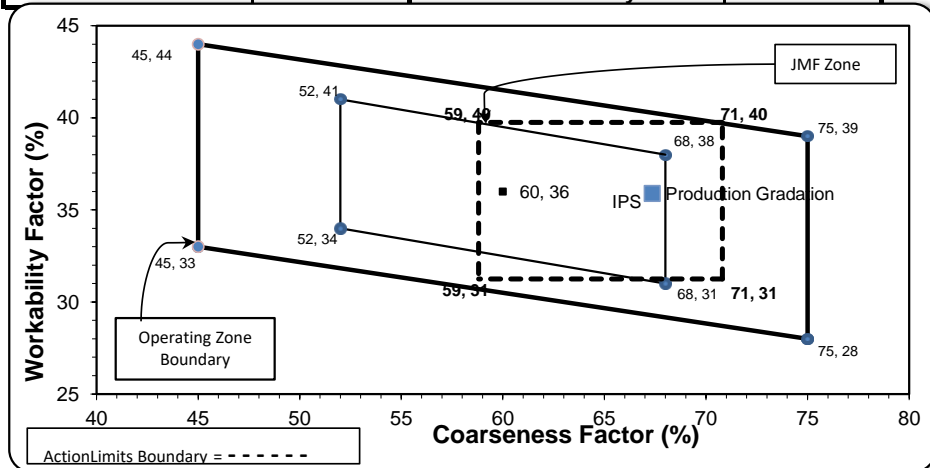
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 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.7	100.0	100.0	99.0	1.0	1.0
1"	40.9	100.0	100.0	82.3	16.7	17.7
3/4"	8.9	97.5	100.0	72.0	10.3	28.0
1/2"	2.2	76.2	100.0	63.7	8.3	36.3
3/8"	1.9	53.0	100.0	56.8	6.9	43.2
#4	1.8	13.7	95.9	43.6	13.2	56.4
#8	1.7	5.7	82.8	35.9	7.7	64.1
#16	1.7	4.5	68.1	29.6	6.3	70.4
#30	1.6	3.9	49.7	21.9	7.7	78.1
#50	1.5	3.6	24.9	11.6	10.2	88.4
#100	1.3	3.4	7.6	4.5	7.2	95.5
LBW	1.0	1.7	1.8	1.5	2.9	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**



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: 3/28/22

Concrete Grade: **P1M, 3500HP**

Contractor: _____

Dates Test Represents: 3/29/2022 through 4/4/2022

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1450	8.64	2.69	46.5
IA	58-003	Stoneco	520	3.10	2.69	16.7
2NS	81-019	Pleasant Lake	1150	6.95	2.65	36.9
Total Wt			3120	18.69		100.0

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



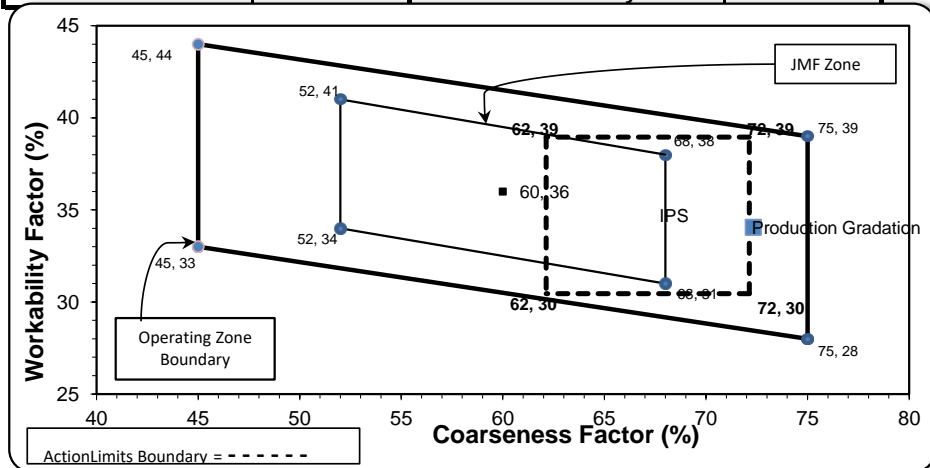
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 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	68.3	100.0	100.0	85.3	14.7	14.7
3/4"	39.5	100.0	100.0	71.9	13.4	28.1
1/2"	19.6	93.8	100.0	61.6	10.3	38.4
3/8"	3.5	82.9	100.0	52.3	9.3	47.7
#4	3.1	22.0	99.4	41.7	10.6	58.3
#8	2.8	7.4	85.5	34.0	7.7	66.0
#16	2.4	3.4	67.7	26.6	7.4	73.4
#30	2.3	2.6	48.8	19.5	7.1	80.5
#50	2.2	2.5	23.8	10.2	9.3	89.8
#100	2.1	2.3	6.5	3.8	6.5	96.2
LBW	1.9	1.9	2.0	1.9	1.8	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: **72** **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"	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: 3/28/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 3/29/2022 through 4/4/2022

Contractor: _____

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	44-051	Krake Willis Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



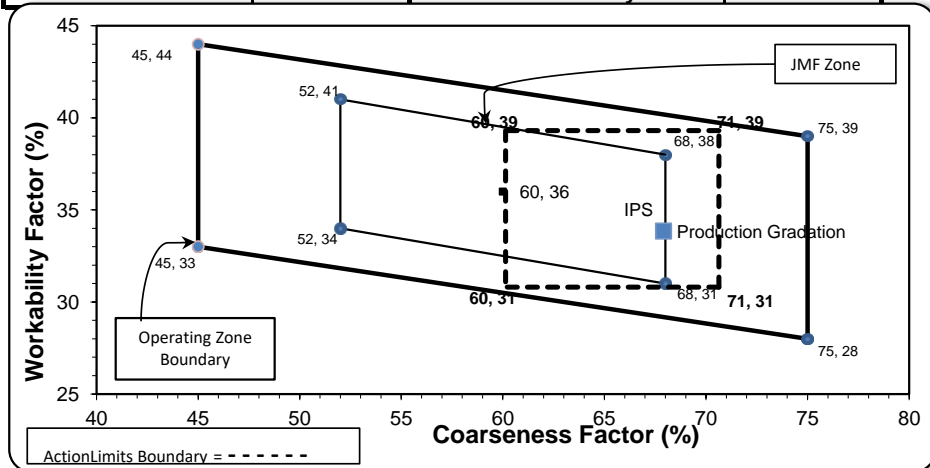
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.5	100.0	100.0	98.8	1.2	1.2
1"	48.0	100.0	100.0	82.7	16.1	17.3
3/4"	15.4	98.6	100.0	71.5	11.2	28.5
1/2"	4.2	78.9	100.0	62.7	8.9	37.3
3/8"	3.0	51.3	100.0	55.1	7.6	44.9
#4	2.2	11.1	96.4	42.9	12.2	57.1
#8	2.0	2.5	79.9	33.8	9.0	66.2
#16	1.9	1.7	64.4	27.3	6.6	72.7
#30	1.9	1.5	47.5	20.4	6.9	79.6
#50	1.8	1.4	22.3	10.0	10.3	90.0
#100	1.6	1.4	5.9	3.3	6.7	96.7
LBW	1.5	1.3	0.6	1.1	2.2	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: **68** **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: 3/28/22

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 3/29/2022 through 4/4/2022

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	970	5.93	2.62	31.6
IA	71-47	Presque Isle	850	5.20	2.62	27.7
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

<---- Verify this number is 100%



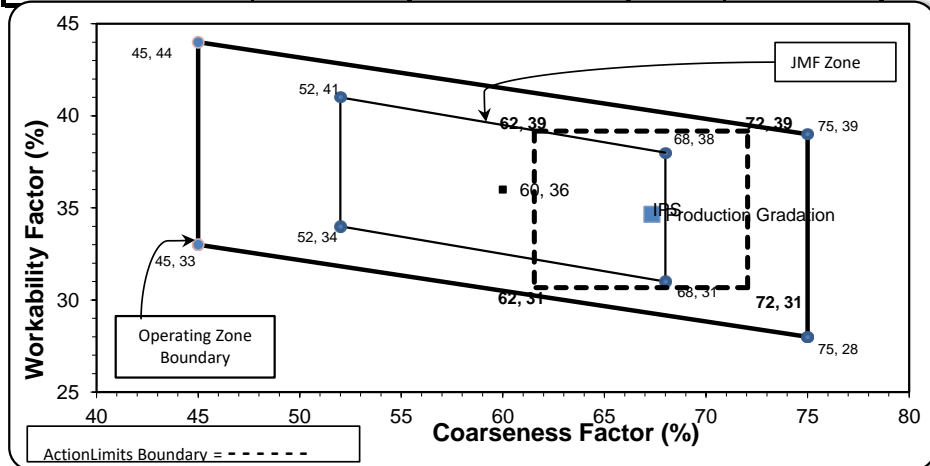
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 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.7	100.0	100.0	99.0	1.0	1.0
1"	40.9	100.0	100.0	81.3	17.6	18.7
3/4"	8.9	97.5	100.0	70.5	10.8	29.5
1/2"	2.2	76.2	100.0	62.5	8.0	37.5
3/8"	1.9	53.0	100.0	56.0	6.5	44.0
#4	1.8	13.7	96.6	43.7	12.3	56.3
#8	1.7	5.7	79.9	34.6	9.0	65.4
#16	1.7	4.5	63.5	27.6	7.0	72.4
#30	1.6	3.9	46.8	20.6	7.0	79.4
#50	1.5	3.6	24.3	11.4	9.3	88.6
#100	1.3	3.4	4.6	3.2	8.1	96.8
LBW	1.0	1.7	0.7	1.1	2.2	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**



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: