

Aggregate Optimization Chart

PLANT #: **P-101**

Sample Date: 10/21/24

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 10/22/2024 through 10/28/2024

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	770	4.71	2.62	25.1
IA	71-47	Presque Isle	1100	6.73	2.62	35.8
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"	94.6	100.0	100.0	98.6	1.4	1.4
1"	31.2	100.0	100.0	82.7	15.9	17.3
3/4"	5.0	100.0	100.0	76.2	6.6	23.8
1/2"	1.9	71.9	100.0	65.3	10.8	34.7
3/8"	1.7	36.6	100.0	52.6	12.7	47.4
#4	1.7	2.4	96.3	38.9	13.7	61.1
#8	1.7	1.5	83.0	33.4	5.5	66.6
#16	1.6	1.3	69.4	28.0	5.4	72.0
#30	1.6	1.2	53.7	21.8	6.2	78.2
#50	1.5	1.1	26.2	11.0	10.8	89.0
#100	1.5	1.1	6.3	3.2	7.8	96.8
LBW	1.2	0.7	0.7	0.8	2.4	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

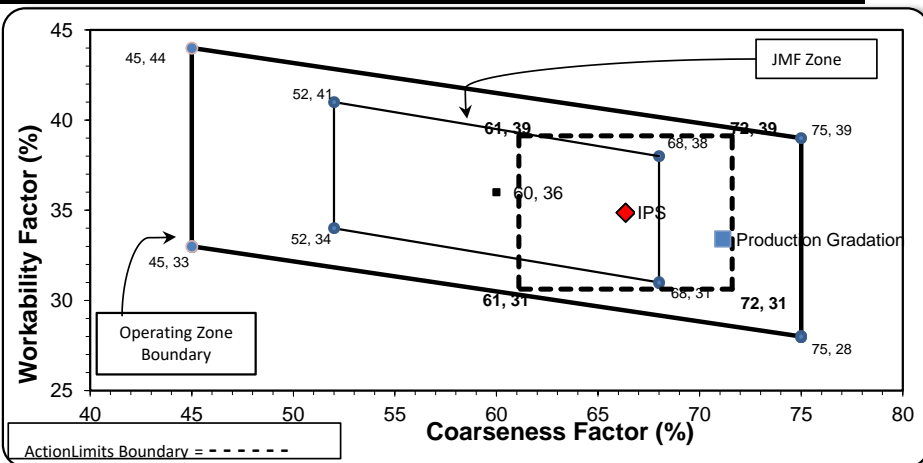
Coarseness Factor:	71	Workability Factor:	33
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Initial Production Sample (IPS)

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: 10/21/24

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 10/22/2024 through 10/28/2024

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1470	8.76	2.69	47.1
IA	58-003	Stoneco	450	2.68	2.69	14.4
2NS	63-114	Highland	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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



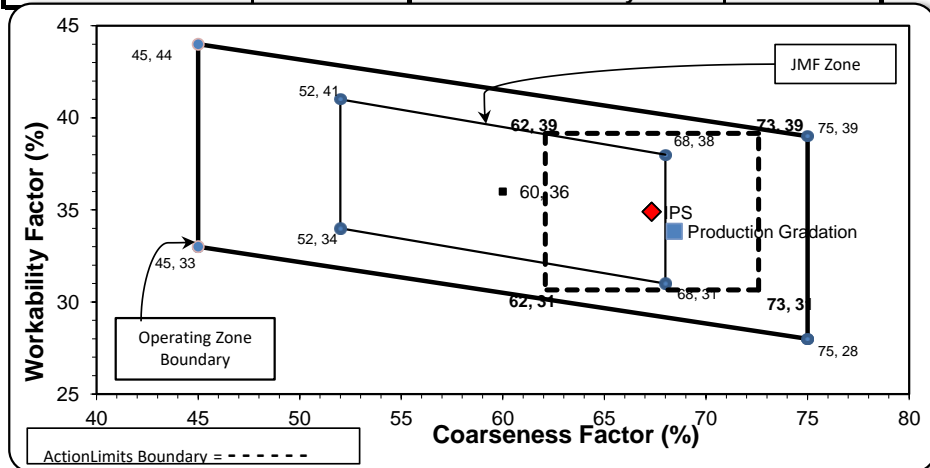
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 Suite 500
 Farmington Hills, MI 48336

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"	63.5	100.0	100.0	82.8	17.2	17.2
3/4"	32.7	100.0	100.0	68.3	14.5	31.7
1/2"	20.0	90.8	100.0	61.0	7.3	39.0
3/8"	12.2	72.9	100.0	54.7	6.3	45.3
#4	2.9	19.8	99.1	42.3	12.4	57.7
#8	1.9	5.5	83.6	33.8	8.5	66.2
#16	1.6	2.0	64.3	25.8	8.1	74.2
#30	1.5	1.7	42.4	17.3	8.5	82.7
#50	1.4	1.4	18.5	8.0	9.3	92.0
#100	1.3	1.3	4.0	2.3	5.6	97.7
LBW	1.1	1.1	0.8	1.0	1.4	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: 68 **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"	85.5	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-103**

Sample Date: 10/21/24

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 10/22/2024 through 10/28/2024

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1470	8.76	2.69	47.1
IA	58-003	Stoneco	450	2.68	2.69	14.4
2NS	63-114	Highland	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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



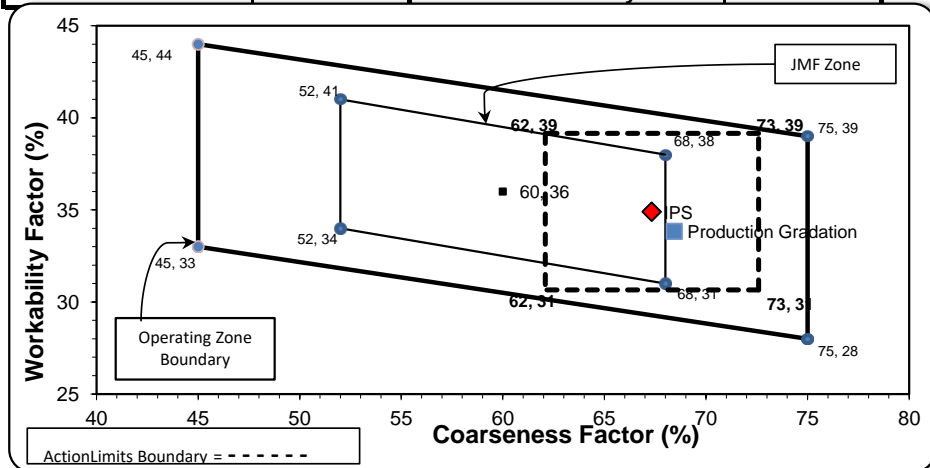
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 Suite 500
 Farmington Hills, MI 48336

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"	63.5	100.0	100.0	82.8	17.2	17.2
3/4"	32.7	100.0	100.0	68.3	14.5	31.7
1/2"	20.0	90.8	100.0	61.0	7.3	39.0
3/8"	12.2	72.9	100.0	54.7	6.3	45.3
#4	2.9	19.8	99.1	42.3	12.4	57.7
#8	1.9	5.5	83.6	33.8	8.5	66.2
#16	1.6	2.0	64.3	25.8	8.1	74.2
#30	1.5	1.7	42.4	17.3	8.5	82.7
#50	1.4	1.4	18.5	8.0	9.3	92.0
#100	1.3	1.3	4.0	2.3	5.6	97.7
LBW	1.1	1.1	0.8	1.0	1.4	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: 68 **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"	85.5	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 #: 12

Sample Date: 10/21/24

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 10/22/2024 through 10/28/2024

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	770	4.71	2.62	25.1
IA	71-47	Presque Isle	1100	6.73	2.62	35.8
2NS	63-115	Ray Rd	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



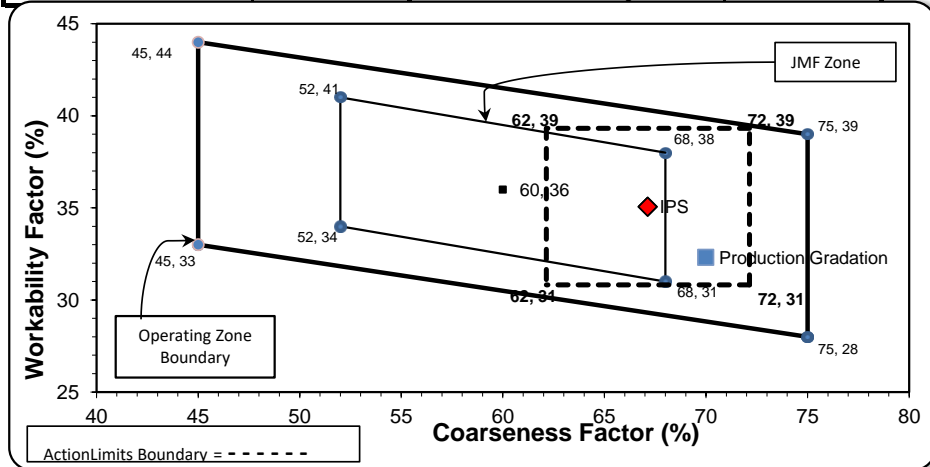
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 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.6	100.0	100.0	98.6	1.4	1.4
1"	31.2	100.0	100.0	82.7	15.9	17.3
3/4"	5.0	100.0	100.0	76.2	6.6	23.8
1/2"	1.9	71.9	100.0	65.3	10.8	34.7
3/8"	1.7	36.6	100.0	52.6	12.7	47.4
#4	1.7	2.4	96.2	38.9	13.7	61.1
#8	1.7	1.5	80.2	32.3	6.6	67.7
#16	1.6	1.3	64.1	25.9	6.4	74.1
#30	1.6	1.2	49.4	20.1	5.8	79.9
#50	1.5	1.1	26.9	11.3	8.9	88.7
#100	1.5	1.1	6.7	3.4	7.9	96.6
LBW	1.2	0.7	0.9	0.9	2.5	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: 70 **Workability Factor:** 32



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 #: **P11**

Sample Date: 10/21/24

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 10/22/2024 through 10/28/2024

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	770	4.71	2.62	25.1
IA	71-47	Presque Isle	1100	6.73	2.62	35.8
2NS	63-115	Ray Rd	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



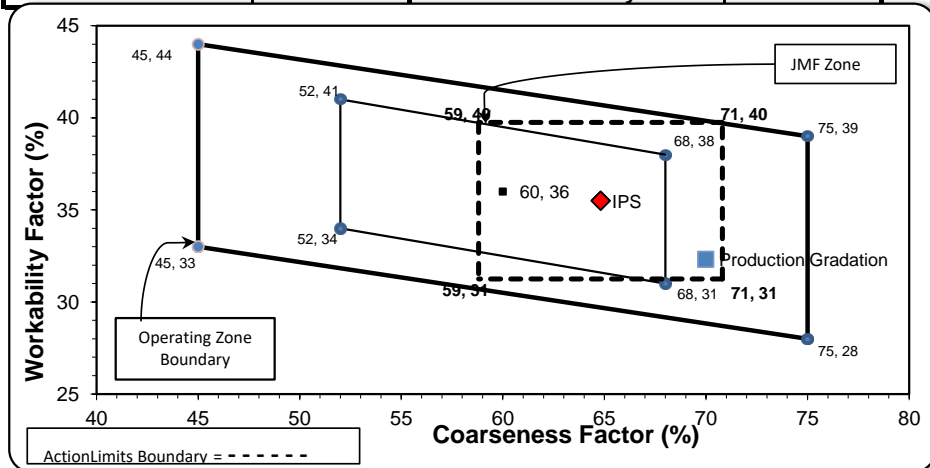
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 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.6	100.0	100.0	98.6	1.4	1.4
1"	31.2	100.0	100.0	82.7	15.9	17.3
3/4"	5.0	100.0	100.0	76.2	6.6	23.8
1/2"	1.9	71.9	100.0	65.3	10.8	34.7
3/8"	1.7	36.6	100.0	52.6	12.7	47.4
#4	1.7	2.4	96.2	38.9	13.7	61.1
#8	1.7	1.5	80.2	32.3	6.6	67.7
#16	1.6	1.3	64.1	25.9	6.4	74.1
#30	1.6	1.2	49.4	20.1	5.8	79.9
#50	1.5	1.1	26.9	11.3	8.9	88.7
#100	1.5	1.1	6.7	3.4	7.9	96.6
LBW	1.2	0.7	0.9	0.9	2.5	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:	70	Workability Factor:	32
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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-39**

Sample Date: 10/21/24

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 10/22/2024 through 10/28/2024

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	770	4.71	2.62	25.1
IA	71-47	Presque Isle	1100	6.73	2.62	35.8
2NS	44-051	Krake Willis Rd	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



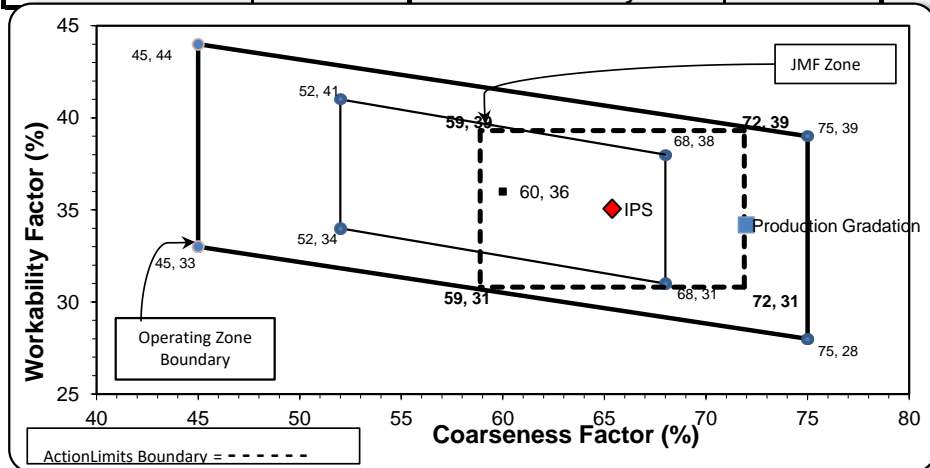
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 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.6	100.0	100.0	98.6	1.4	1.4
1"	31.2	100.0	100.0	82.7	15.9	17.3
3/4"	5.0	100.0	100.0	76.2	6.6	23.8
1/2"	1.9	71.9	100.0	65.3	10.8	34.7
3/8"	1.7	36.6	100.0	52.6	12.7	47.4
#4	1.7	2.4	99.2	40.1	12.6	59.9
#8	1.7	1.5	85.0	34.2	5.9	65.8
#16	1.6	1.3	69.6	28.1	6.1	71.9
#30	1.6	1.2	50.4	20.5	7.5	79.5
#50	1.5	1.1	21.8	9.3	11.2	90.7
#100	1.5	1.1	5.2	2.8	6.5	97.2
LBW	1.2	0.7	0.4	0.7	2.1	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:	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: 10/21/24

Concrete Grade: P1M, 3500HP

Dates Test Represents: 10/22/2024 through 10/28/2024

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	770	4.71	2.62	25.1
IA	71-47	Presque Isle	1100	6.73	2.62	35.8
2NS	63-115	Ray Rd	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



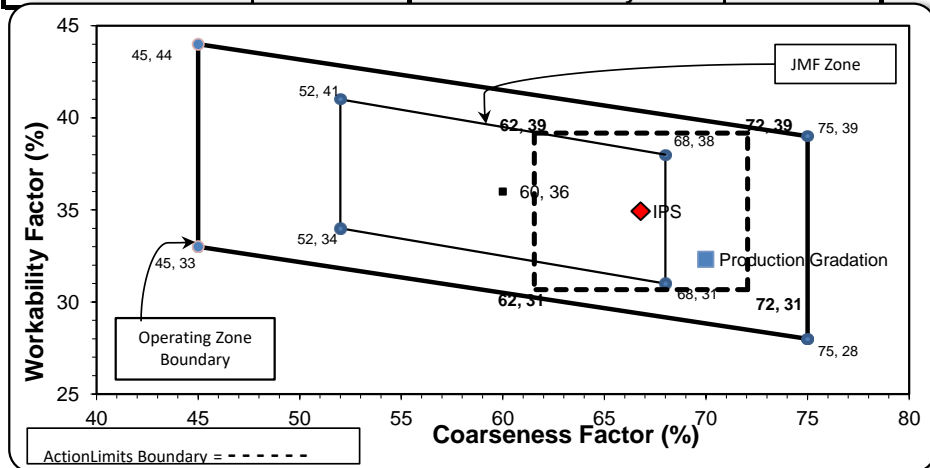
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 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.6	100.0	100.0	98.6	1.4	1.4
1"	31.2	100.0	100.0	82.7	15.9	17.3
3/4"	5.0	100.0	100.0	76.2	6.6	23.8
1/2"	1.9	71.9	100.0	65.3	10.8	34.7
3/8"	1.7	36.6	100.0	52.6	12.7	47.4
#4	1.7	2.4	96.2	38.9	13.7	61.1
#8	1.7	1.5	80.2	32.3	6.6	67.7
#16	1.6	1.3	64.1	25.9	6.4	74.1
#30	1.6	1.2	49.4	20.1	5.8	79.9
#50	1.5	1.1	26.9	11.3	8.9	88.7
#100	1.5	1.1	6.7	3.4	7.9	96.6
LBW	1.2	0.7	0.9	0.9	2.5	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: **70** Workability Factor: **32**



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: