

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-101**

Sample Date: 4/6/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 4/7/2020 through 4/13/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1660	10.15	2.62	57.0
26A	71-47	Presque Isle	100	0.61	2.62	3.4
2NS	75-051	Mid-Michigan	1150	6.93	2.66	39.5
Total Wt			2910	17.69		100.0

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



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

Sieve	6AA	26A	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"	97.6	100.0	100.0	98.6	1.4	1.4
3/4"	88.6	100.0	100.0	93.5	5.1	6.5
1/2"	50.7	100.0	100.0	71.9	21.6	28.1
3/8"	31.3	88.4	100.0	60.4	11.5	39.6
#4	7.5	23.9	96.6	43.3	17.1	56.7
#8	2.8	7.2	79.0	33.1	10.2	66.9
#16	2.1	3.7	64.4	26.8	6.3	73.2
#30	2.0	3.1	49.4	20.8	6.0	79.2
#50	1.9	2.8	27.5	12.0	8.7	88.0
#100	1.8	2.6	7.8	4.2	7.8	95.8
LBW	1.6	2.3	1.7	1.7	2.5	98.3

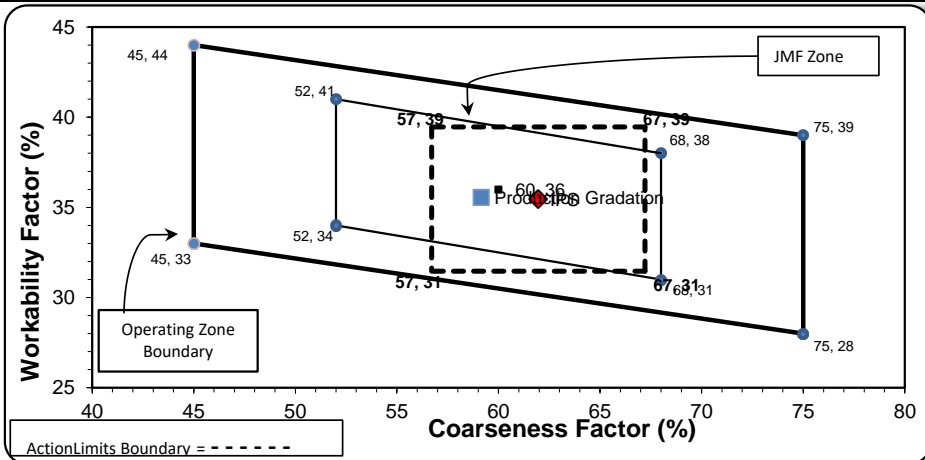
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	59	Workability Factor:	33	35.6	Coarseness Factor:	62
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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"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.0	5.0	5.0
1/2"	70.5	24.5	29.5
3/8"	60.0	10.5	40.0
#4	44.4	15.6	55.6
#8	35.5	9.0	64.5
#16	28.5	7.0	71.5
#30	21.5	7.0	78.5
#50	10.2	11.3	89.8
#100	3.1	7.1	96.9
LBW	1.3	1.8	98.7

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-102**

Sample Date: 4/6/20 Concrete Grade: **DM**
 Dates Test Represents: 4/7/2020 through 4/13/2020

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.1
26A	58-003	Stoneco	255	1.52	2.69	8.6
2NS	63-114	Highland	1100	6.65	2.65	37.2
Total Wt			2955	17.70		100.0

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



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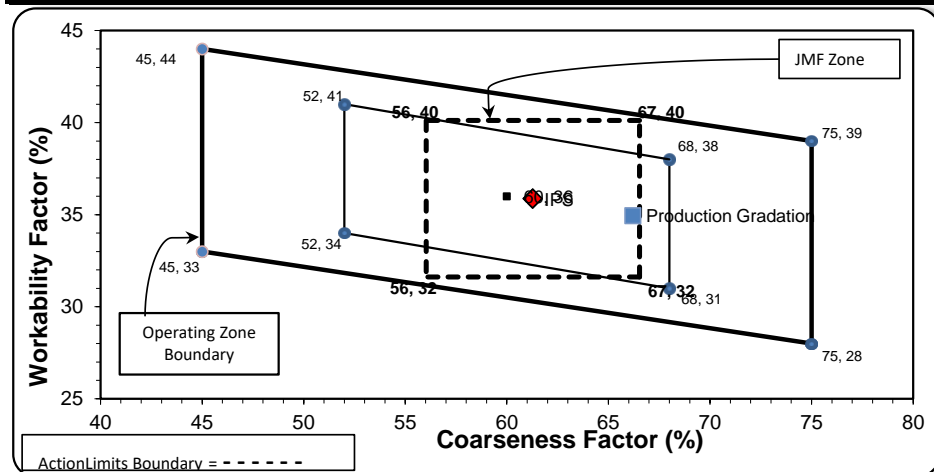
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	83.4	100.0	100.0	91.0	9.0	9.0
1/2"	39.1	99.8	100.0	67.0	24.0	33.0
3/8"	20.0	83.8	100.0	55.3	11.7	44.7
#4	4.2	18.1	98.9	40.7	14.6	59.3
#8	2.4	3.0	83.0	32.5	8.2	67.5
#16	1.8	1.5	65.4	25.4	7.0	74.6
#30	1.7	1.2	47.5	18.7	6.7	81.3
#50	1.6	1.1	19.9	8.4	10.3	91.6
#100	1.3	1.1	3.1	2.0	6.4	98.0
LBW	0.9	0.9	0.3	0.7	1.3	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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	66	Workability Factor:	32	Adjusted WF	35.0
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Coarseness Factor:	61
Workability Factor:	36



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.2	10.1	10.8
1/2"	70.7	18.5	29.3
3/8"	60.7	10.0	39.3
#4	44.4	16.3	55.6
#8	35.9	8.5	64.1
#16	27.3	8.6	72.7
#30	19.1	8.2	80.9
#50	7.4	11.7	92.6
#100	1.9	5.6	98.1
LBW	0.7	1.2	99.3

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-12**

Sample Date: 4/6/20 Concrete Grade: **DM**
 Dates Test Represents: 4/7/2020 through 4/13/2020

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1455	8.90	2.62	50.1
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
Total Wt			2905	17.69		100.0

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



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Sieve	6AA	26A	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"	96.9	100.0	100.0	98.4	1.6	1.6
3/4"	82.3	100.0	100.0	91.1	7.3	8.9
1/2"	37.3	100.0	100.0	68.6	22.5	31.4
3/8"	19.2	88.4	100.0	58.3	10.3	41.7
#4	2.5	23.9	98.0	42.5	15.8	57.5
#8	2.0	7.2	79.8	33.3	9.2	66.7
#16	2.0	3.7	63.3	26.4	6.9	73.6
#30	1.9	3.1	48.3	20.4	6.1	79.6
#50	1.8	2.8	24.3	10.8	9.6	89.2
#100	1.8	2.6	3.6	2.6	8.2	97.4
LBW	1.6	2.3	0.6	1.3	1.3	98.7

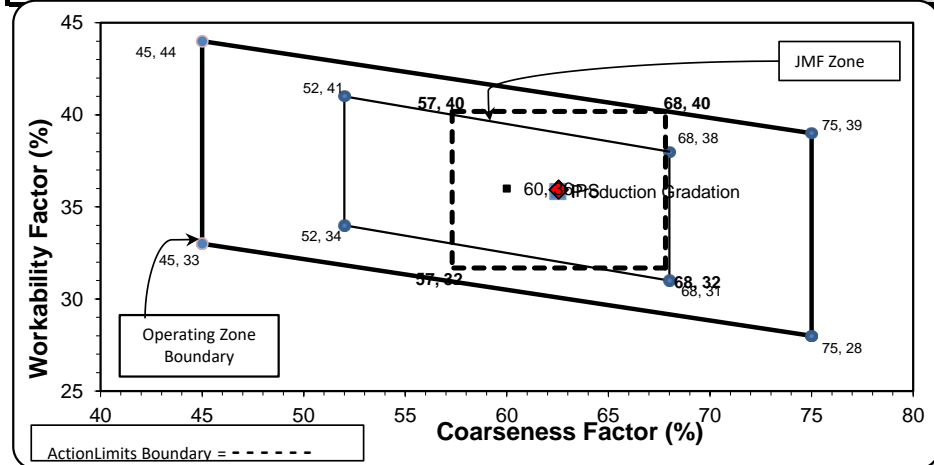
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	63	Workability Factor:	33	Adjusted WF	35.8
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Coarseness Factor:	63
Workability Factor:	36



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.0	10.3	11.0
1/2"	70.3	18.7	29.7
3/8"	59.9	10.4	40.1
#4	41.9	18.0	58.1
#8	35.9	6.0	64.1
#16	27.8	8.2	72.2
#30	18.9	8.8	81.1
#50	6.3	12.6	93.7
#100	1.7	4.6	98.3
LBW	1.0	0.7	99.0

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Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 4/6/20 Concrete Grade: **DM**
 Dates Test Represents: 4/7/2020 through 4/13/2020

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1450	8.87	2.62	49.9
26A	71-47	Presque Isle	305	1.87	2.62	10.5
2NS	63-115	Ray Rd	1150	6.95	2.65	39.6
Total Wt			2905	17.69		100.0

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



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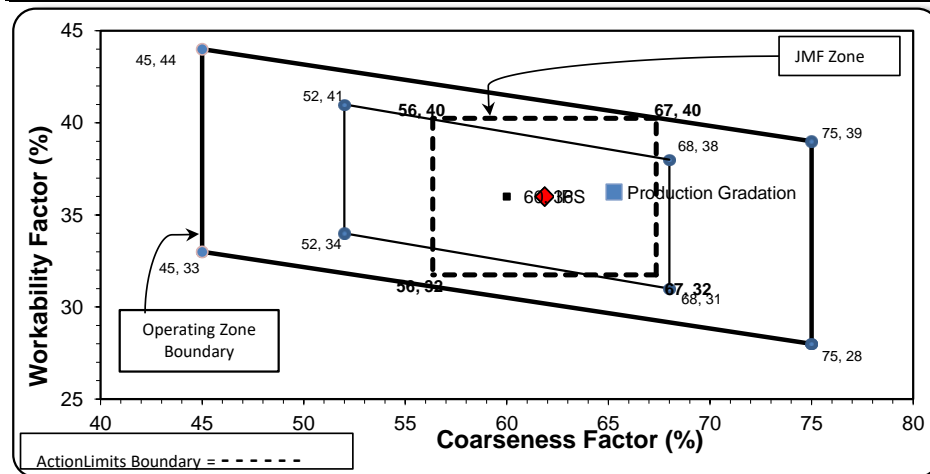
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	78.1	100.0	100.0	89.1	10.9	10.9
1/2"	33.1	100.0	100.0	66.6	22.5	33.4
3/8"	15.8	88.4	100.0	56.8	9.9	43.2
#4	3.8	23.9	98.0	43.2	13.6	56.8
#8	2.8	7.2	79.8	33.7	9.5	66.3
#16	2.5	3.7	63.3	26.7	7.0	73.3
#30	2.3	3.1	48.3	20.6	6.1	79.4
#50	2.2	2.8	24.3	11.0	9.6	89.0
#100	2.0	2.6	3.6	2.7	8.3	97.3
LBW	1.5	2.3	0.6	1.2	1.5	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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	34	Adjusted WF	36.2
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Coarseness Factor:	62
Workability Factor:	36



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	95.0	5.0	5.0
1/2"	72.3	22.8	27.7
3/8"	60.4	11.8	39.6
#4	42.6	17.8	57.4
#8	36.0	6.6	64.0
#16	29.5	6.5	70.5
#30	20.3	9.2	79.7
#50	9.5	10.8	90.5
#100	3.4	6.1	96.6
LBW	1.3	2.1	98.7

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Approved By:

Aggregate Optimization Chart

PLANT #: **P-35**

Sample Date: 4/6/20 Concrete Grade: **DM**
 Dates Test Represents: 4/7/2020 through 4/13/2020

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1505	8.97	2.69	50.9
26A	58-003	Stoneco	350	2.09	2.69	11.8
2NS	81-093	Burmeister	1100	6.65	2.65	37.2
Total Wt			2955	17.70		100.0

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



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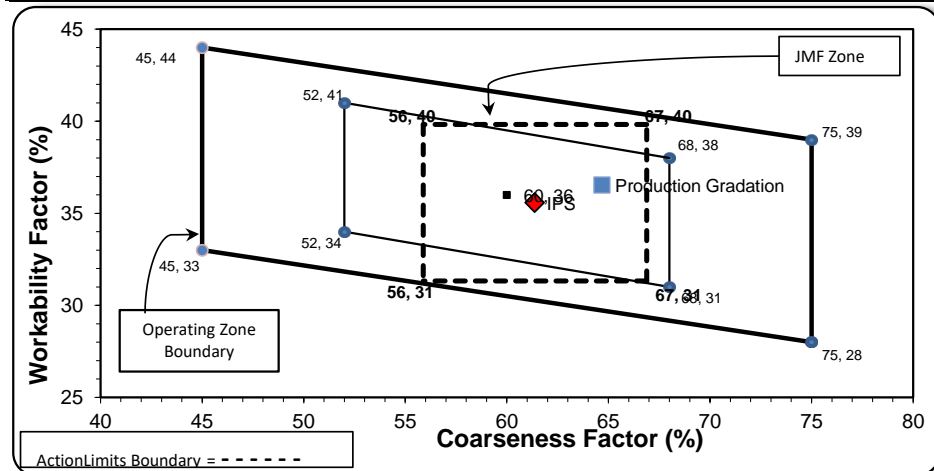
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	83.4	100.0	100.0	91.5	8.5	8.5
1/2"	39.1	99.8	100.0	69.0	22.6	31.0
3/8"	20.0	83.8	100.0	57.3	11.6	42.7
#4	4.2	18.1	96.4	40.2	17.2	59.8
#8	2.4	3.0	87.2	34.0	6.1	66.0
#16	1.8	1.5	60.8	23.7	10.3	76.3
#30	1.7	1.2	42.3	16.8	7.0	83.2
#50	1.6	1.1	16.7	7.2	9.6	92.8
#100	1.3	1.1	3.0	1.9	5.3	98.1
LBW	0.9	0.9	0.7	0.8	1.1	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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	34	Adjusted WF	36.5
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Coarseness Factor:	61
Workability Factor:	36



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.1	10.2	10.9
1/2"	70.5	18.6	29.5
3/8"	60.5	10.0	39.5
#4	44.1	16.4	55.9
#8	35.6	8.5	64.4
#16	27.7	7.9	72.3
#30	20.6	7.1	79.4
#50	8.7	11.8	91.3
#100	1.6	7.1	98.4
LBW	1.1	0.6	98.9

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 4/6/20 Concrete Grade: **DM**
 Dates Test Represents: 4/7/2020 through 4/13/2020

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	48.2
26A	71-47	Presque Isle	405	2.48	2.62	13.9
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
Total Wt			2905	17.69		100.0

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



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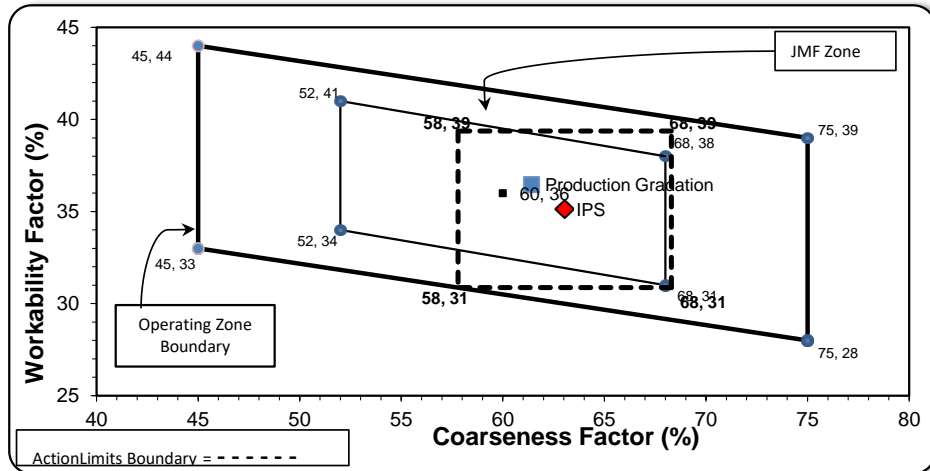
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	96.9	100.0	100.0	98.5	1.5	1.5
3/4"	82.3	100.0	100.0	91.5	7.0	8.5
1/2"	37.3	100.0	100.0	69.8	21.7	30.2
3/8"	19.2	88.4	100.0	59.4	10.3	40.6
#4	2.5	23.9	97.5	41.5	18.0	58.5
#8	2.0	7.2	84.5	34.0	7.5	66.0
#16	2.0	3.7	69.8	27.9	6.1	72.1
#30	1.9	3.1	51.4	20.8	7.1	79.2
#50	1.8	2.8	23.2	10.0	10.8	90.0
#100	1.8	2.6	3.3	2.5	7.6	97.5
LBW	1.6	2.3	0.7	1.4	1.1	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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	61	Workability Factor:	34	Adjusted WF	36.5
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Coarseness Factor:	63
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"	99.1	0.9	0.9
3/4"	90.3	8.8	9.7
1/2"	69.2	21.1	30.8
3/8"	59.1	10.1	40.9
#4	41.8	17.3	58.2
#8	35.1	6.6	64.9
#16	28.5	6.6	71.5
#30	21.2	7.3	78.8
#50	8.7	12.5	91.3
#100	1.8	7.0	98.2
LBW	0.7	1.0	99.3

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-39**

Sample Date: 4/6/20 Concrete Grade: **DM**
 Dates Test Represents: 4/7/2020 through 4/13/2020

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1705	10.43	2.62	58.7
26A	71-47	Presque Isle	100	0.61	2.62	3.4
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
Total Wt			2905	17.69		100.0

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



Superior Materials, LLC
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Sieve	6AA	26A	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"	97.6	100.0	100.0	98.6	1.4	1.4
3/4"	88.6	100.0	100.0	93.3	5.3	6.7
1/2"	50.7	100.0	100.0	71.1	22.2	28.9
3/8"	31.3	88.4	100.0	59.3	11.8	40.7
#4	7.5	23.9	97.5	42.1	17.1	57.9
#8	2.8	7.2	84.5	33.9	8.3	66.1
#16	2.1	3.7	69.8	27.8	6.1	72.2
#30	2.0	3.1	51.4	20.7	7.0	79.3
#50	1.9	2.8	23.2	10.0	10.7	90.0
#100	1.8	2.6	3.3	2.4	7.6	97.6
LBW	1.6	2.3	0.7	1.3	1.1	98.7

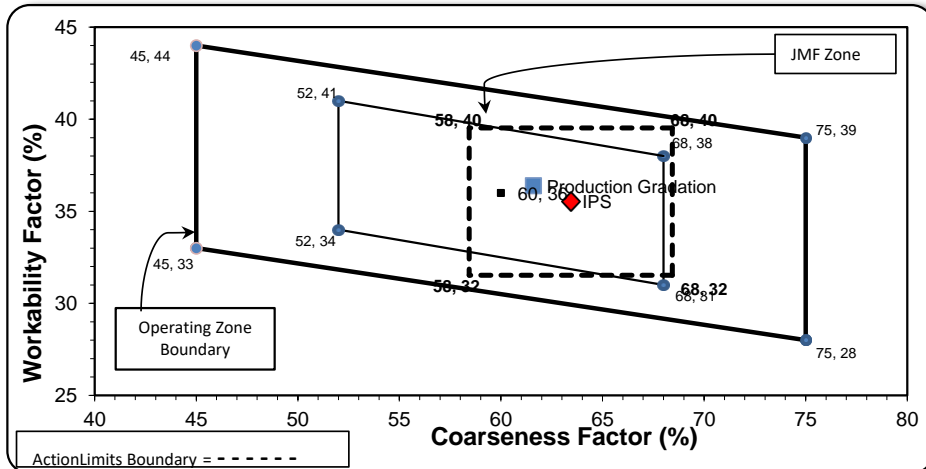
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	62	Workability Factor:	34	Adjusted WF	36.4
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Coarseness Factor:	63
Workability Factor:	36



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	100.0	0.0	0.0
3/4"	89.7	10.3	10.3
1/2"	70.3	19.4	29.7
3/8"	59.1	11.2	40.9
#4	42.8	16.3	57.2
#8	35.5	7.3	64.5
#16	29.0	6.5	71.0
#30	21.2	7.7	78.8
#50	9.8	11.5	90.2
#100	3.7	6.1	96.3
LBW	1.2	2.5	98.8

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-02**

Contractor: _____

Sample Date: 4/6/20

Concrete Grade: **DM**

Dates Test Represents: 4/7/2020 through 4/13/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1475	9.02	2.62	50.8
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	63-115	Ray Rd	1130	6.83	2.65	38.9
Total Wt			2905	17.69		100.0

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



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

Sieve	6AA	26A	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"	96.9	100.0	100.0	98.4	1.6	1.6
3/4"	82.3	100.0	100.0	91.0	7.4	9.0
1/2"	37.3	100.0	100.0	68.2	22.8	31.8
3/8"	19.2	88.4	100.0	57.8	10.4	42.2
#4	2.5	23.9	98.0	41.9	15.9	58.1
#8	2.0	7.2	79.8	32.8	9.1	67.2
#16	2.0	3.7	63.3	26.0	6.8	74.0
#30	1.9	3.1	48.3	20.1	5.9	79.9
#50	1.8	2.8	24.3	10.7	9.4	89.3
#100	1.8	2.6	3.6	2.6	8.1	97.4
LBW	1.6	2.3	0.6	1.3	1.3	98.7

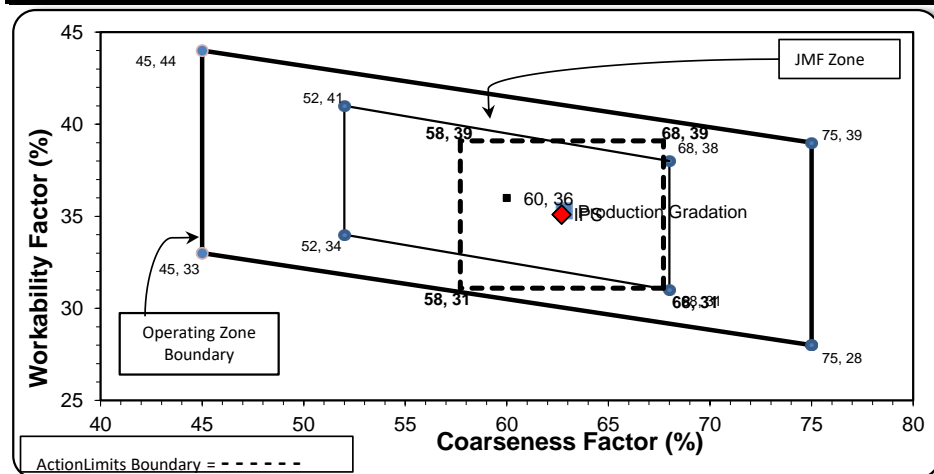
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	63	Workability Factor:	33	Adjusted WF	35.3
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Coarseness Factor:	63
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"	100.0	0.0	0.0
3/4"	95.1	4.9	4.9
1/2"	74.6	20.5	25.4
3/8"	59.3	15.3	40.7
#4	42.1	17.2	57.9
#8	35.1	7.1	64.9
#16	29.2	5.9	70.8
#30	21.9	7.3	78.1
#50	9.6	12.4	90.4
#100	2.4	7.2	97.6
LBW	0.9	1.5	99.1

PREPARED BY:
 SM, LLC Technical Service

Approved By: