

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-101**

Sample Date: 4/13/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 4/14/2020 through 4/20/2020

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"	98.1	100.0	100.0	98.9	1.1	1.1
3/4"	87.7	100.0	100.0	93.0	5.9	7.0
1/2"	50.8	100.0	100.0	71.9	21.0	28.1
3/8"	30.3	88.4	100.0	59.8	12.1	40.2
#4	4.4	23.9	96.5	41.5	18.4	58.5
#8	2.2	7.2	76.5	31.7	9.7	68.3
#16	1.9	3.7	60.9	25.3	6.5	74.7
#30	1.8	3.1	46.2	19.4	5.9	80.6
#50	1.7	2.8	26.0	11.3	8.1	88.7
#100	1.6	2.6	7.8	4.1	7.3	95.9
LBW	1.5	2.3	1.7	1.6	2.5	98.4

*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.

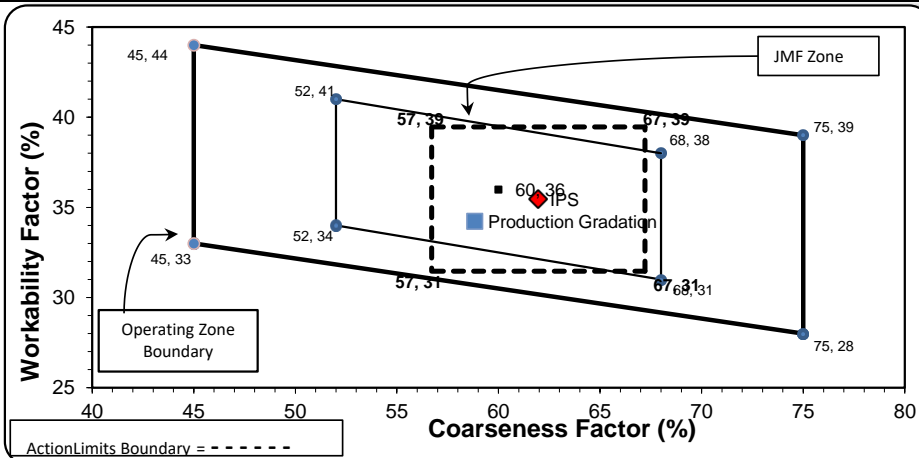
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	59	Workability Factor:	32	34.2	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: 4/13/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 4/14/2020 through 4/20/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	50.8
26A	58-003	Stoneco	305	1.82	2.69	10.3
2NS	63-114	Highland	1150	6.95	2.65	38.9
Total Wt			2955	17.71		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"	88.9	100.0	100.0	94.4	5.6	5.6
1/2"	38.2	99.7	100.0	68.6	25.8	31.4
3/8"	15.1	87.9	100.0	55.7	12.9	44.3
#4	1.9	10.5	98.9	40.5	15.1	59.5
#8	1.0	0.8	81.4	32.3	8.3	67.7
#16	0.8	0.6	61.7	24.5	7.8	75.5
#30	0.7	0.5	42.5	16.9	7.5	83.1
#50	0.6	0.4	16.8	6.9	10.1	93.1
#100	0.5	0.4	2.7	1.3	5.5	98.7
LBW	0.4	0.2	0.3	0.3	1.0	99.7

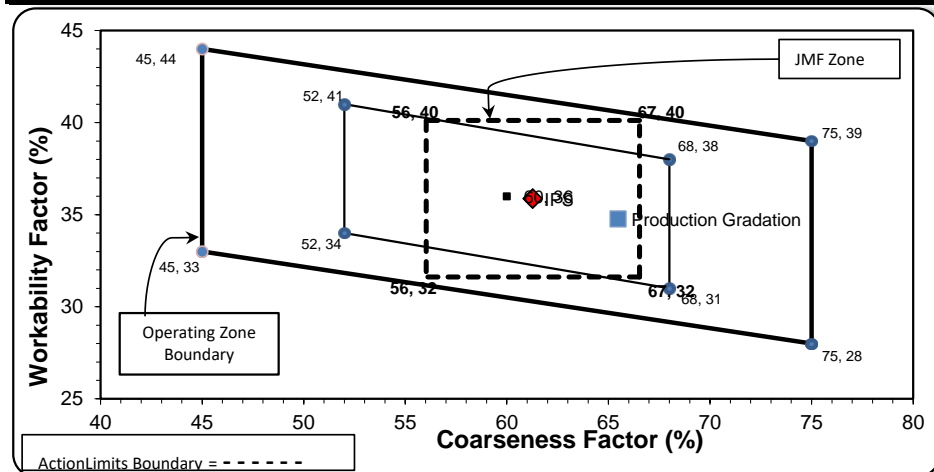
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	32	34.8	Coarseness Factor:	61
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Workability Factor:	36
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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"	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

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Aggregate Optimization Chart

PLANT #: **P-12**

Sample Date: 4/13/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 4/14/2020 through 4/20/2020

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"	67.9	100.0	100.0	83.9	14.5	16.1
1/2"	27.6	97.3	100.0	63.5	20.5	36.5
3/8"	13.4	87.8	100.0	55.4	8.1	44.6
#4	2.4	25.4	98.2	42.7	12.7	57.3
#8	1.7	7.4	80.3	33.4	9.3	66.6
#16	1.5	3.4	63.9	26.4	7.0	73.6
#30	1.4	2.8	48.2	20.1	6.3	79.9
#50	1.2	2.5	24.6	10.6	9.5	89.4
#100	1.1	2.3	4.2	2.5	8.1	97.5
LBW	0.8	1.8	0.7	0.9	1.6	99.1

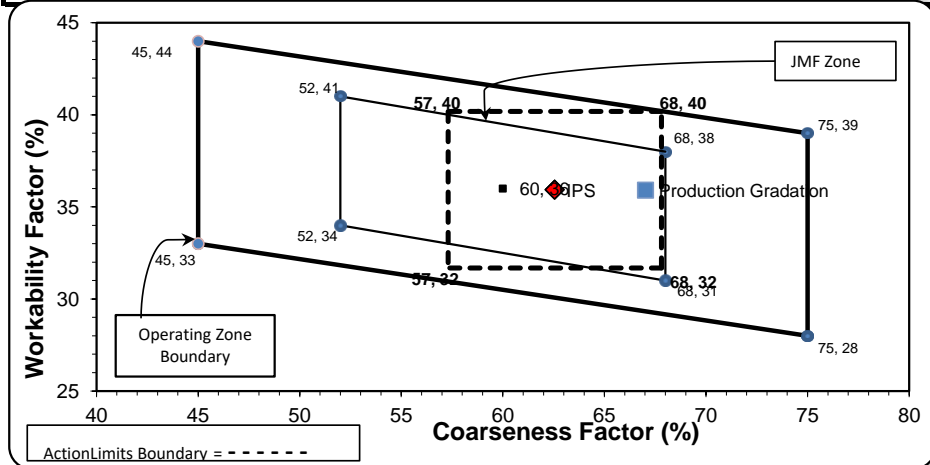
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	67	Workability Factor:	33	Adjusted WF	35.9
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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

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 4/13/20 Concrete Grade: **DM**
 Dates Test Represents: 4/14/2020 through 4/20/2020

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1350	8.26	2.62	46.5
26A	71-47	Presque Isle	405	2.48	2.62	13.9
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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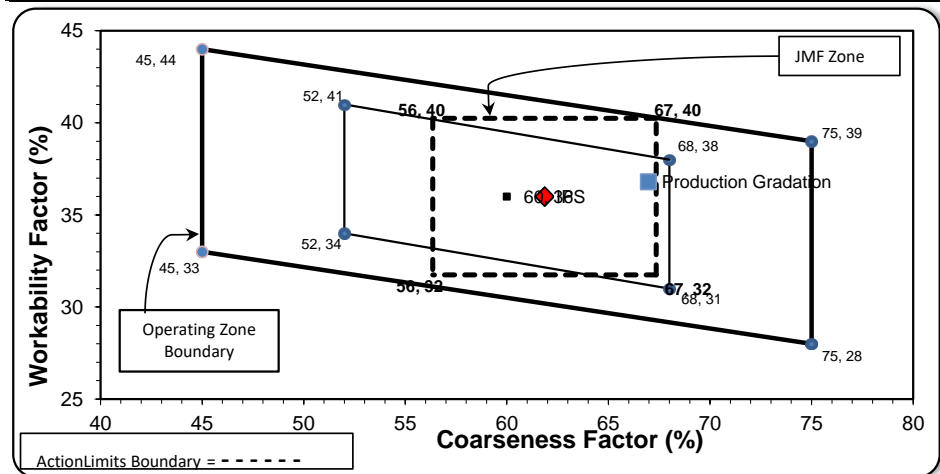
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	86.7	100.0	100.0	93.8	6.2	6.2
1/2"	30.7	97.3	100.0	67.4	26.4	32.6
3/8"	9.0	87.8	100.0	56.0	11.4	44.0
#4	3.8	25.4	98.2	44.2	11.8	55.8
#8	3.2	7.4	80.3	34.3	9.9	65.7
#16	3.0	3.4	63.9	27.2	7.1	72.8
#30	2.8	2.8	48.2	20.8	6.4	79.2
#50	2.6	2.5	24.6	11.3	9.5	88.7
#100	2.4	2.3	4.2	3.1	8.2	96.9
LBW	1.9	1.8	0.7	1.4	1.7	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:	67	Workability Factor:	34	Adjusted WF	36.8
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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

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-35**

Sample Date: 4/13/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 4/14/2020 through 4/20/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1455	8.67	2.69	49.2
26A	58-003	Stoneco	400	2.38	2.69	13.5
2NS	81-093	Burmeister	1100	6.65	2.65	37.2
Total Wt			2955	17.70		100.0

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

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"	88.9	100.0	100.0	94.5	5.5	5.5
1/2"	38.2	99.7	100.0	69.5	25.0	30.5
3/8"	15.1	87.9	100.0	56.6	13.0	43.4
#4	1.9	10.5	97.3	38.6	18.0	61.4
#8	1.0	0.8	88.4	33.5	5.1	66.5
#16	0.8	0.6	61.1	23.2	10.3	76.8
#30	0.7	0.5	44.7	17.1	6.2	82.9
#50	0.6	0.4	18.9	7.4	9.7	92.6
#100	0.5	0.4	3.1	1.5	5.9	98.5
LBW	0.4	0.2	0.7	0.5	1.0	99.5

*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.



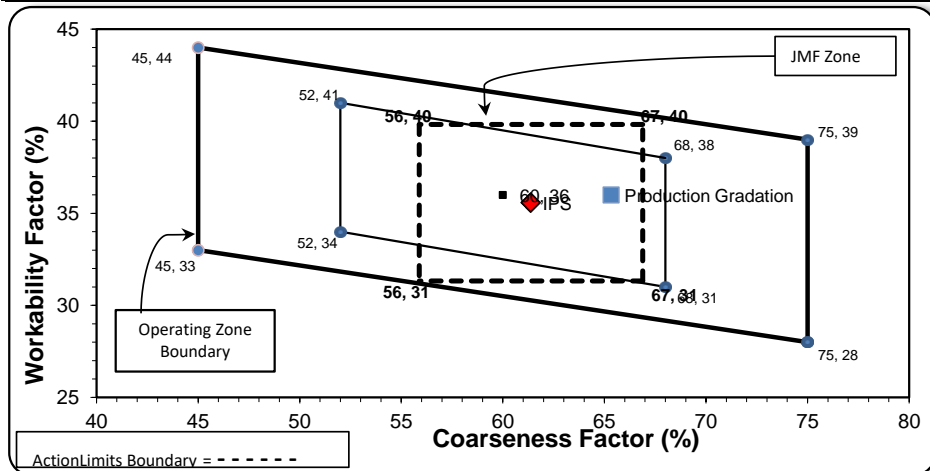
Superior Materials, LLC
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 Suite 500
 Farmington Hills, MI 48336

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	34	36.0
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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"	89.1	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: 4/13/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 4/14/2020 through 4/20/2020

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%



Superior Materials, LLC
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 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	98.5	1.5	1.5
3/4"	67.9	100.0	100.0	84.5	14.0	15.5
1/2"	27.6	97.3	100.0	64.7	19.8	35.3
3/8"	13.4	87.8	100.0	56.6	8.2	43.4
#4	2.4	25.4	97.3	41.5	15.0	58.5
#8	1.7	7.4	84.4	33.8	7.7	66.2
#16	1.5	3.4	69.1	27.4	6.4	72.6
#30	1.4	2.8	49.9	20.0	7.4	80.0
#50	1.2	2.5	22.7	9.5	10.4	90.5
#100	1.1	2.3	3.6	2.2	7.3	97.8
LBW	0.8	1.8	0.8	0.9	1.3	99.1

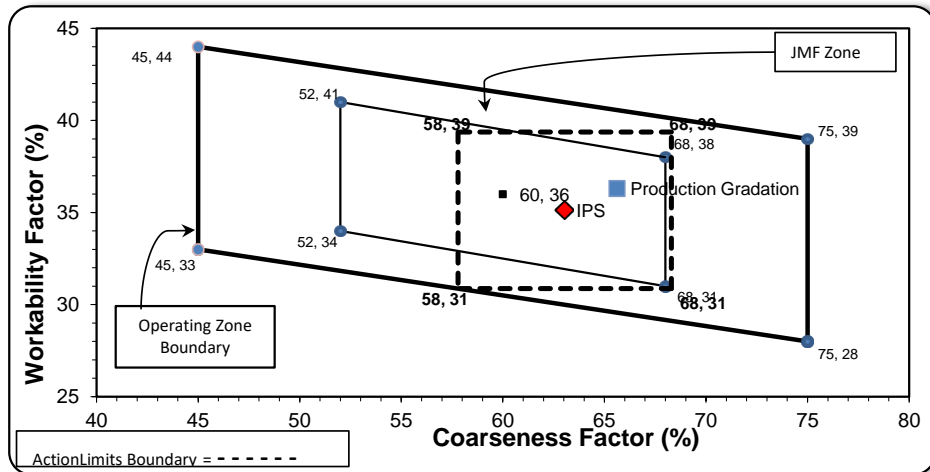
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	66	Workability Factor:	34	Adjusted WF	36.3
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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"	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: 4/13/20 Concrete Grade: **DM**
 Dates Test Represents: 4/14/2020 through 4/20/2020

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
 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"	98.1	100.0	100.0	98.9	1.1	1.1
3/4"	87.7	100.0	100.0	92.8	6.1	7.2
1/2"	50.8	100.0	100.0	71.1	21.7	28.9
3/8"	30.3	88.4	100.0	58.7	12.4	41.3
#4	4.4	23.9	97.3	40.2	18.4	59.8
#8	2.2	7.2	84.4	33.5	6.8	66.5
#16	1.9	3.7	69.1	27.4	6.1	72.6
#30	1.8	3.1	49.9	20.1	7.3	79.9
#50	1.7	2.8	22.7	9.7	10.4	90.3
#100	1.6	2.6	3.6	2.4	7.3	97.6
LBW	1.5	2.3	0.8	1.3	1.1	98.7

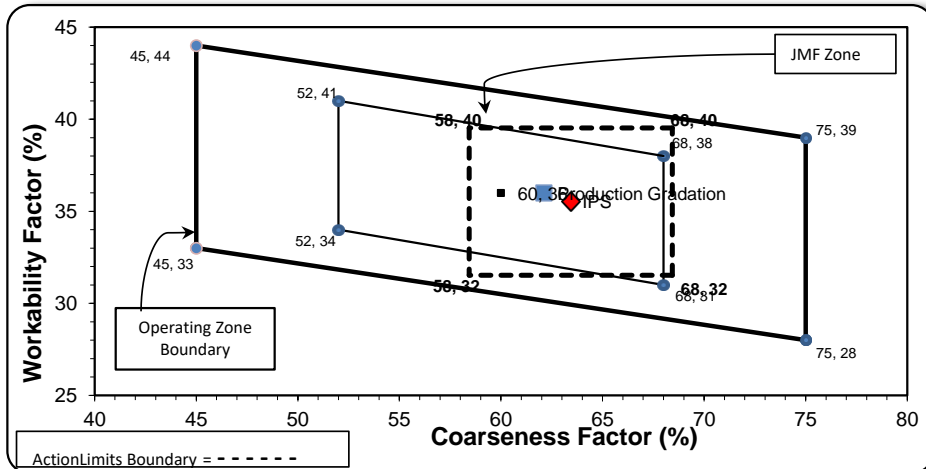
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (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:	33	Adjusted WF	36.0
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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**

Sample Date: 4/13/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 4/14/2020 through 4/20/2020

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"	67.9	100.0	100.0	83.7	14.7	16.3
1/2"	27.6	97.3	100.0	63.0	20.7	37.0
3/8"	13.4	87.8	100.0	54.8	8.2	45.2
#4	2.4	25.4	98.2	42.0	12.7	58.0
#8	1.7	7.4	80.3	32.9	9.2	67.1
#16	1.5	3.4	63.9	26.0	6.9	74.0
#30	1.4	2.8	48.2	19.7	6.2	80.3
#50	1.2	2.5	24.6	10.4	9.3	89.6
#100	1.1	2.3	4.2	2.4	8.0	97.6
LBW	0.8	1.8	0.7	0.9	1.6	99.1

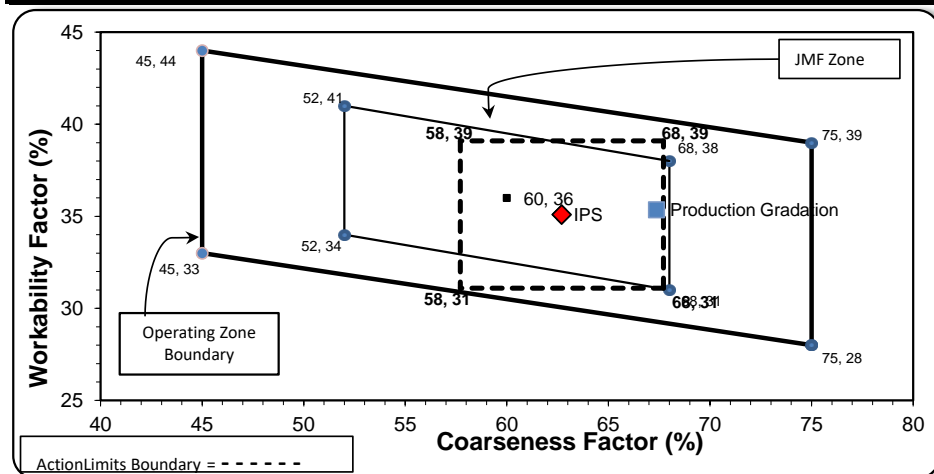
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	67	Workability Factor:	33	Adjusted WF	35.4
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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: