

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-101**

Sample Date: 10/11/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1560	9.54	2.62	53.6
26A	71-47	Presque Isle	200	1.22	2.62	6.9
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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	88.5	100.0	100.0	93.8	6.2	6.2
1/2"	46.8	98.4	100.0	71.4	22.5	28.6
3/8"	25.7	87.6	100.0	59.3	12.1	40.7
#4	4.4	17.2	99.0	42.7	16.7	57.3
#8	1.7	5.3	82.4	33.8	8.8	66.2
#16	1.5	3.2	65.5	26.9	6.9	73.1
#30	1.4	2.7	49.3	20.4	6.5	79.6
#50	1.3	2.5	26.1	11.2	9.2	88.8
#100	1.3	2.3	7.1	3.7	7.5	96.3
LBW	1.2	2.0	0.8	1.1	2.6	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.

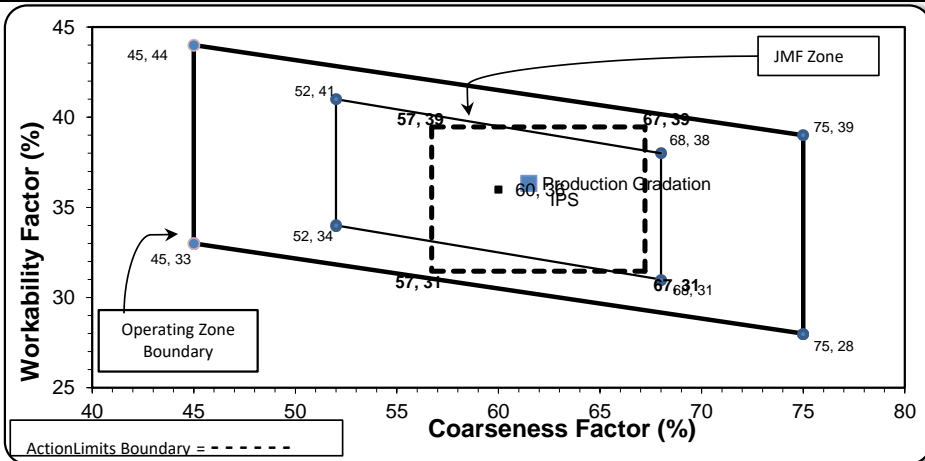
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	61	Workability Factor:	34	Adjusted WF	36.3
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Coarseness Factor:	62
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"	95.0	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: 10/11/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1550	9.23	2.69	52.5
26A	58-003	Stoneco	255	1.52	2.69	8.6
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"	79.2	100.0	100.0	89.1	10.9	10.9
1/2"	42.8	99.6	100.0	70.0	19.1	30.0
3/8"	22.8	86.6	100.0	58.3	11.6	41.7
#4	5.6	9.9	99.1	42.4	16.0	57.6
#8	2.2	2.6	83.6	33.9	8.4	66.1
#16	1.8	1.8	63.5	25.8	8.1	74.2
#30	1.6	1.6	43.1	17.8	8.1	82.2
#50	1.4	1.5	18.0	7.9	9.9	92.1
#100	1.4	1.4	3.9	2.4	5.5	97.6
LBW	1.2	1.2	0.8	1.0	1.3	99.0

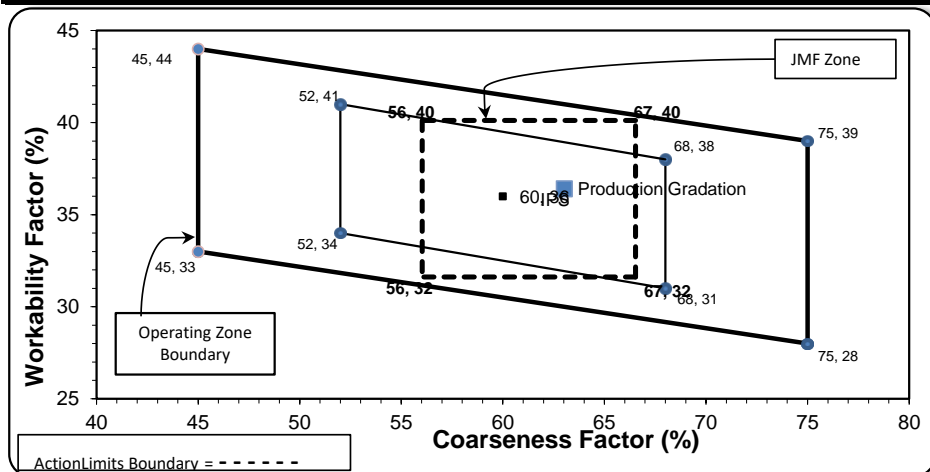
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	63	Workability Factor:	34	Adjusted WF	36.4
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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-32**

Sample Date: 10/11/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1200	7.34	2.62	41.3
26A	71-47	Presque Isle	555	3.39	2.62	19.1
2NS	95-013	Smelter Bay	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"	97.6	100.0	100.0	99.0	1.0	1.0
3/4"	80.9	100.0	100.0	92.1	6.9	7.9
1/2"	37.0	95.6	100.0	73.1	19.0	26.9
3/8"	15.6	81.1	100.0	61.5	11.6	38.5
#4	3.3	17.7	96.4	42.9	18.6	57.1
#8	1.8	5.0	83.5	34.8	8.2	65.2
#16	1.5	2.6	67.9	28.0	6.8	72.0
#30	1.4	2.1	50.2	20.9	7.1	79.1
#50	1.4	1.9	25.0	10.8	10.0	89.2
#100	1.3	1.8	8.2	4.1	6.7	95.9
LBW	0.9	1.5	1.9	1.4	2.7	98.6

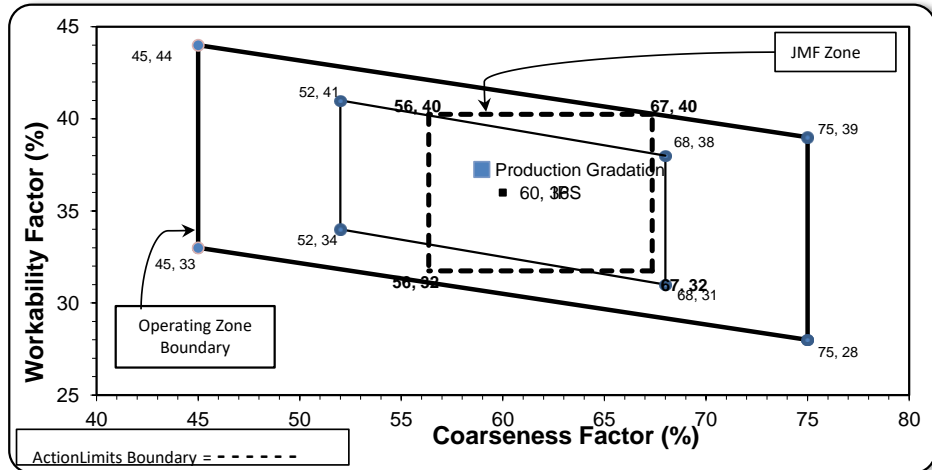
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	59	Workability Factor:	35	37.3	Coarseness Factor:	62
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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"	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: 10/11/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1555	9.26	2.69	52.6
26A	58-003	Stoneco	300	1.79	2.69	10.2
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"	79.2	100.0	100.0	89.1	10.9	10.9
1/2"	42.8	99.6	100.0	69.9	19.2	30.1
3/8"	22.8	86.6	100.0	58.0	11.8	42.0
#4	5.6	9.9	98.9	40.8	17.2	59.2
#8	2.2	2.6	85.2	33.1	7.6	66.9
#16	1.8	1.8	66.7	26.0	7.2	74.0
#30	1.6	1.6	46.9	18.5	7.5	81.5
#50	1.4	1.5	15.8	6.8	11.7	93.2
#100	1.4	1.4	2.1	1.7	5.1	98.3
LBW	1.2	1.2	0.6	1.0	0.7	99.0

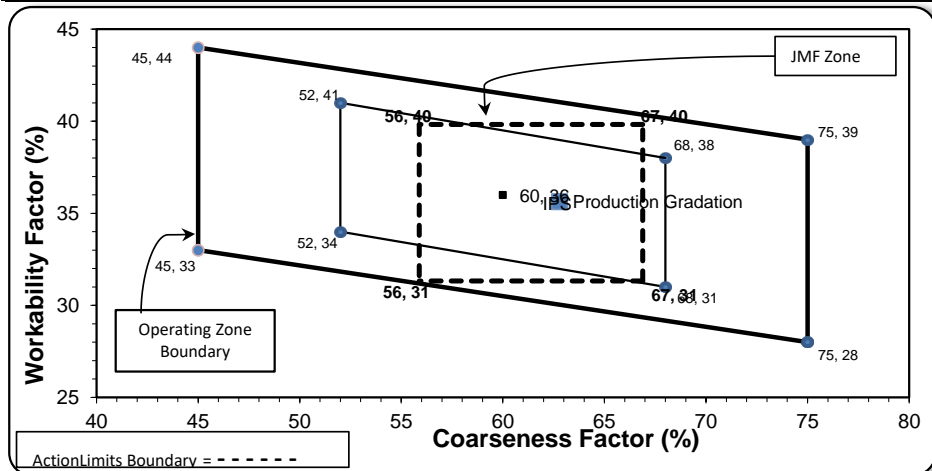
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	63	Workability Factor:	33	Adjusted WF	35.6
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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: 10/11/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

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	350	2.14	2.62	12.0
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"	98.8	100.0	100.0	99.4	0.6	0.6
3/4"	73.1	100.0	100.0	86.5	12.9	13.5
1/2"	31.5	95.6	100.0	65.2	21.4	34.8
3/8"	15.1	81.1	100.0	55.2	10.0	44.8
#4	3.3	17.7	97.9	40.9	14.3	59.1
#8	1.9	5.0	83.4	33.1	7.7	66.9
#16	1.7	2.6	68.1	27.0	6.2	73.0
#30	1.6	2.1	49.6	19.8	7.1	80.2
#50	1.5	1.9	27.6	11.4	8.4	88.6
#100	1.4	1.8	3.4	2.2	9.2	97.8
LBW	1.1	1.5	0.2	0.8	1.4	99.2

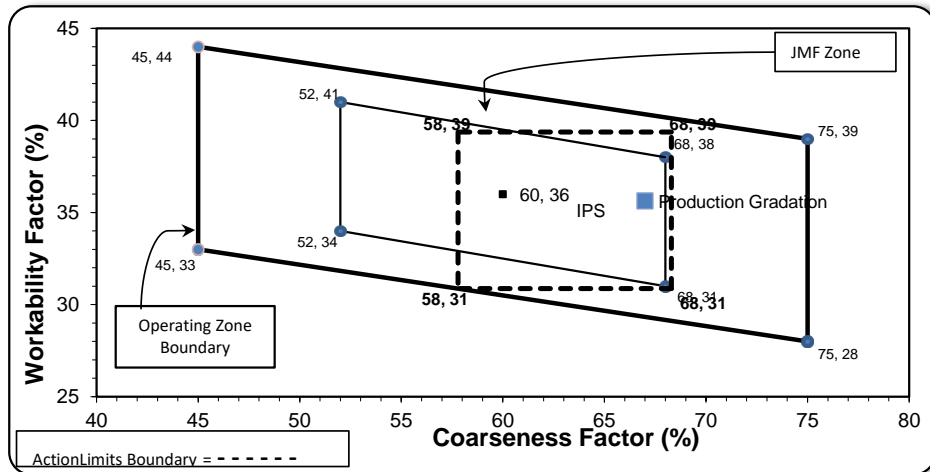
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	67	Workability Factor:	33	Adjusted WF	35.6
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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: 10/11/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1605	9.82	2.62	55.2
26A	71-47	Presque Isle	200	1.22	2.62	6.9
2NS	44-051	Krake Willis Rd	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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	88.5	100.0	100.0	93.6	6.4	6.4
1/2"	46.8	97.0	100.0	70.4	23.2	29.6
3/8"	25.7	86.7	100.0	58.0	12.4	42.0
#4	4.4	20.5	97.1	40.6	17.4	59.4
#8	1.7	6.2	81.2	32.1	8.5	67.9
#16	1.5	3.4	65.8	26.0	6.1	74.0
#30	1.4	2.7	49.4	19.7	6.3	80.3
#50	1.3	2.4	25.4	10.5	9.2	89.5
#100	1.3	2.2	8.4	4.1	6.5	95.9
LBW	1.2	2.1	1.6	1.4	2.6	98.6

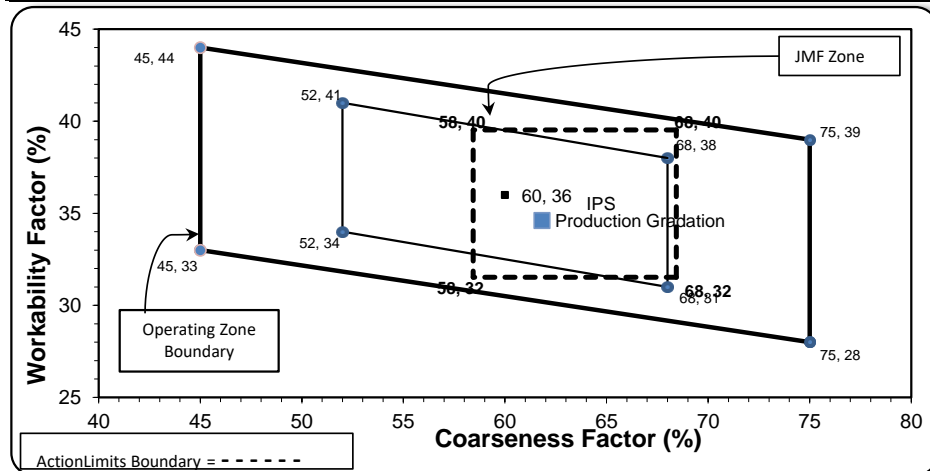
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	62	Workability Factor:	32	Adjusted WF	34.6
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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: 10/11/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 10/12/2021 through 10/18/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1505	9.21	2.62	51.8
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	63-115	Ray Rd	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"	98.8	100.0	100.0	99.4	0.6	0.6
3/4"	73.1	100.0	100.0	86.1	13.3	13.9
1/2"	31.5	95.6	100.0	64.1	22.0	35.9
3/8"	15.1	81.1	100.0	54.1	10.0	45.9
#4	3.3	17.7	96.7	40.2	13.9	59.8
#8	1.9	5.0	80.7	32.1	8.1	67.9
#16	1.7	2.6	66.3	26.3	5.8	73.7
#30	1.6	2.1	51.3	20.5	5.8	79.5
#50	1.5	1.9	28.2	11.7	8.8	88.3
#100	1.4	1.8	6.3	3.3	8.4	96.7
LBW	1.1	1.5	1.0	1.1	2.2	98.9

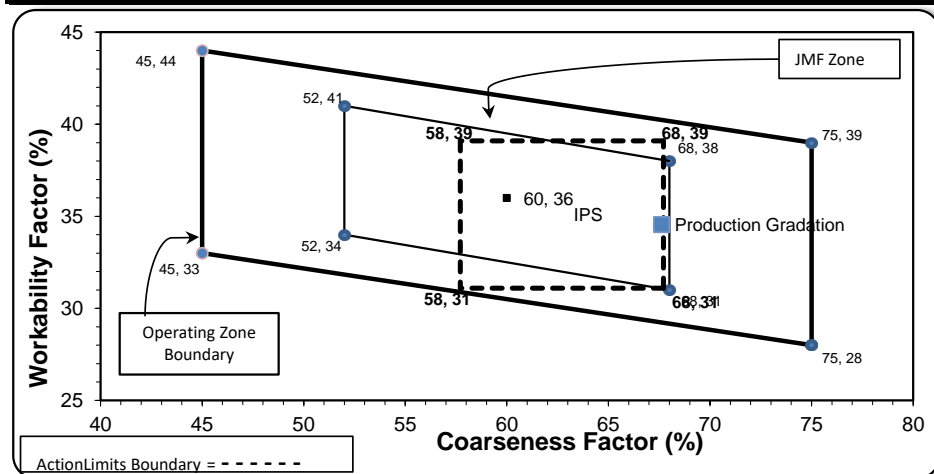
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	68	Workability Factor:	32	34.6	Coarseness Factor:	63
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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"	95.1	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: