

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-101**

Contractor: _____

Sample Date: 6/21/21

Concrete Grade: **DM**

Dates Test Represents: 6/22/2021 through 6/28/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1360	8.32	2.62	46.7
26A	71-47	Presque Isle	400	2.45	2.62	13.7
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"	97.7	100.0	100.0	98.9	1.1	1.1
3/4"	80.7	100.0	100.0	91.0	7.9	9.0
1/2"	30.1	96.7	100.0	66.9	24.1	33.1
3/8"	12.3	88.4	100.0	57.4	9.5	42.6
#4	1.3	25.7	99.0	43.3	14.2	56.7
#8	0.9	6.4	80.6	33.2	10.1	66.8
#16	0.8	2.8	64.3	26.2	7.0	73.8
#30	0.8	2.1	49.5	20.2	5.9	79.8
#50	0.8	1.9	25.9	10.9	9.4	89.1
#100	0.7	1.8	6.9	3.3	7.6	96.7
LBW	0.7	1.6	0.9	0.9	2.4	99.1

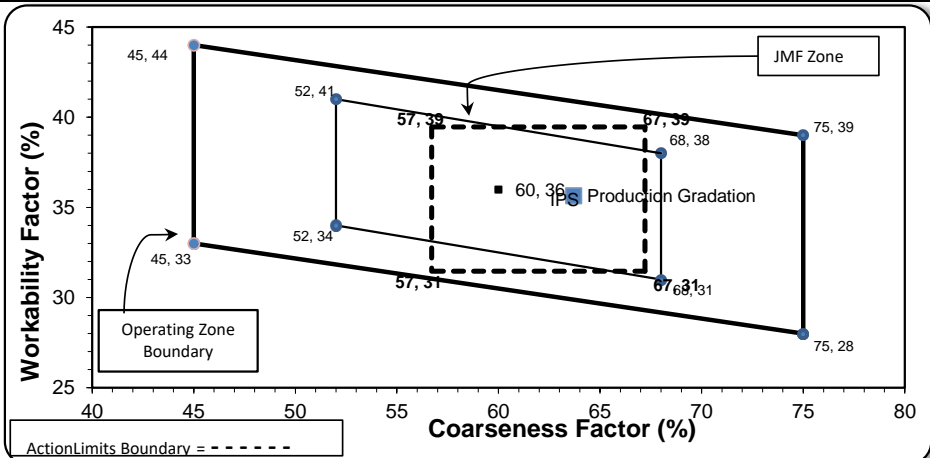
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	64	Workability Factor:	33	Adjusted WF	35.7
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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-20**

Sample Date: 6/21/21 Concrete Grade: **DM**
 Dates Test Represents: 6/22/2021 through 6/28/2021

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%



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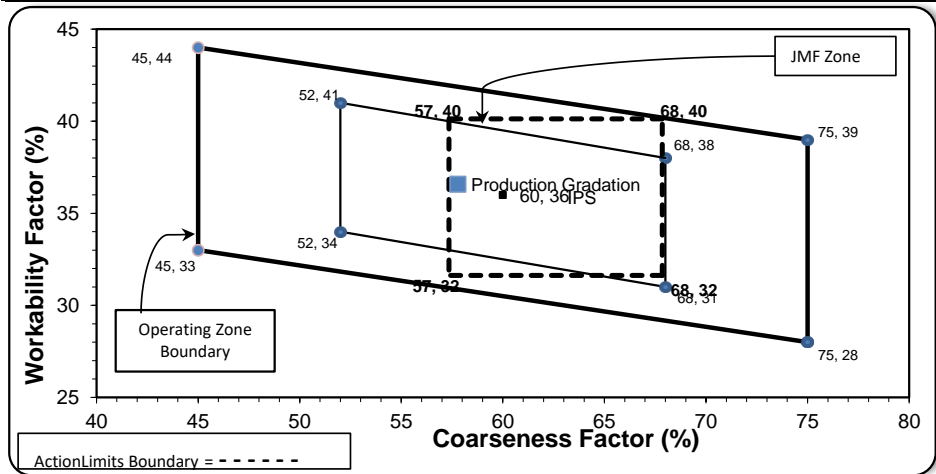
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	99.2	100.0	100.0	99.5	0.5	0.5
3/4"	90.8	100.0	100.0	94.6	4.9	5.4
1/2"	55.5	97.5	100.0	73.8	20.8	26.2
3/8"	35.6	91.5	100.0	61.9	11.9	38.1
#4	7.2	29.0	97.8	42.3	19.7	57.7
#8	3.1	7.9	84.5	34.1	8.2	65.9
#16	2.4	3.4	68.3	27.4	6.7	72.6
#30	2.2	2.4	47.2	19.2	8.1	80.8
#50	2.1	2.2	19.4	8.7	10.6	91.3
#100	2.0	2.0	2.7	2.3	6.4	97.7
LBW	1.8	1.8	0.6	1.3	0.9	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:	58	Workability Factor:	34	Adjusted WF	36.6
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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"	89.2	10.8	10.8
1/2"	68.4	20.8	31.6
3/8"	59.9	8.6	40.1
#4	43.0	16.9	57.0
#8	35.9	7.1	64.1
#16	29.0	6.8	71.0
#30	21.3	7.7	78.7
#50	9.9	11.4	90.1
#100	2.4	7.5	97.6
LBW	1.2	1.2	98.8

PREPARED BY:
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Approved By:

Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 6/21/21 Concrete Grade: DM
 Dates Test Represents: 6/22/2021 through 6/28/2021

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	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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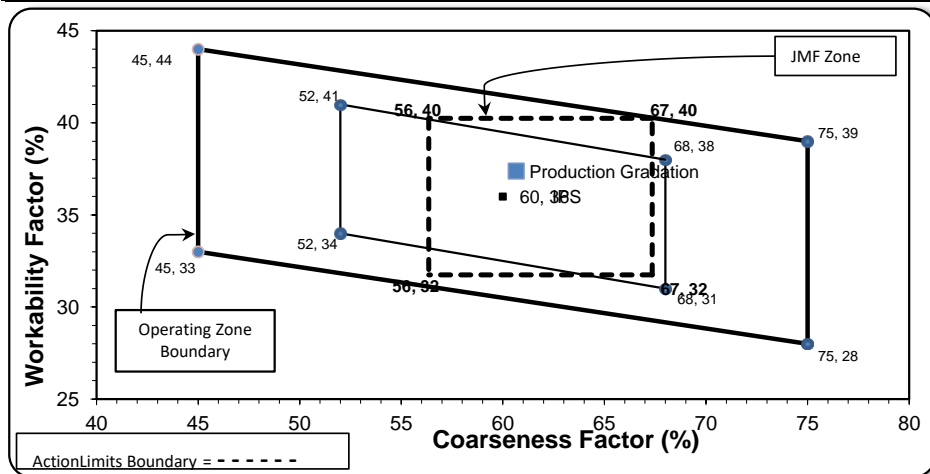
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	98.9	100.0	100.0	99.5	0.5	0.5
3/4"	83.7	100.0	100.0	91.9	7.6	8.1
1/2"	43.4	96.7	100.0	71.4	20.5	28.6
3/8"	23.8	86.1	100.0	60.5	10.9	39.5
#4	4.7	25.3	95.2	42.7	17.8	57.3
#8	2.9	7.4	82.5	34.9	7.8	65.1
#16	2.4	3.9	67.5	28.3	6.6	71.7
#30	2.3	3.0	48.2	20.5	7.8	79.5
#50	2.2	2.6	21.3	9.8	10.7	90.2
#100	2.1	2.1	4.8	3.2	6.6	96.8
LBW	1.6	1.4	1.7	1.6	1.6	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:	61	Workability Factor:	35	Adjusted WF	37.4
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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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Aggregate Optimization Chart

PLANT #: **P-35**

Sample Date: 6/21/21 Concrete Grade: DM
 Dates Test Represents: 6/22/2021 through 6/28/2021

Contractor: _____

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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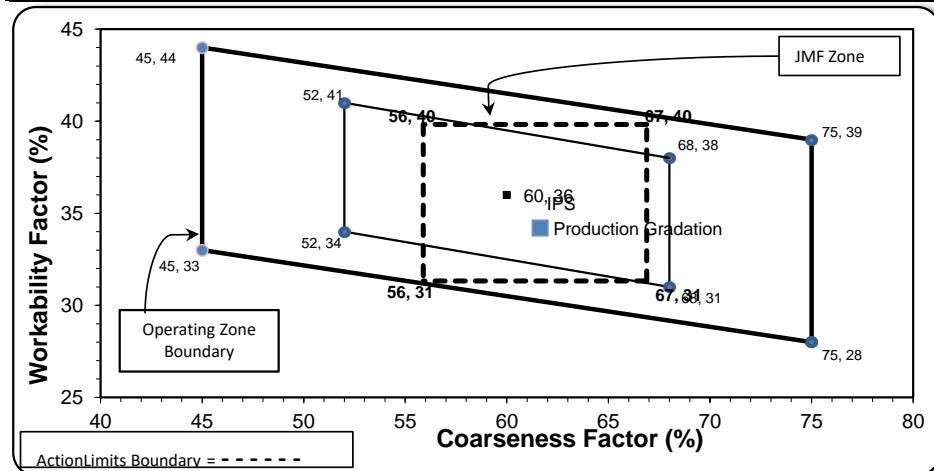
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	99.1	100.0	100.0	99.5	0.5	0.5
3/4"	84.4	100.0	100.0	91.8	7.7	8.2
1/2"	47.9	99.5	100.0	72.5	19.3	27.5
3/8"	24.1	78.8	100.0	57.9	14.6	42.1
#4	3.8	11.9	96.9	39.3	18.6	60.7
#8	1.7	2.4	82.1	31.7	7.6	68.3
#16	1.3	1.3	64.6	24.9	6.8	75.1
#30	1.2	0.9	45.4	17.6	7.2	82.4
#50	1.0	0.8	17.2	7.0	10.6	93.0
#100	0.9	0.7	3.0	1.7	5.3	98.3
LBW	0.8	0.4	1.0	0.8	0.8	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:	62	Workability Factor:	32	Adjusted WF	34.2
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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:
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Approved By:

Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 6/21/21 Concrete Grade: **DM**
 Dates Test Represents: 6/22/2021 through 6/28/2021

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1405	8.59	2.62	48.4
26A	71-47	Presque Isle	400	2.45	2.62	13.8
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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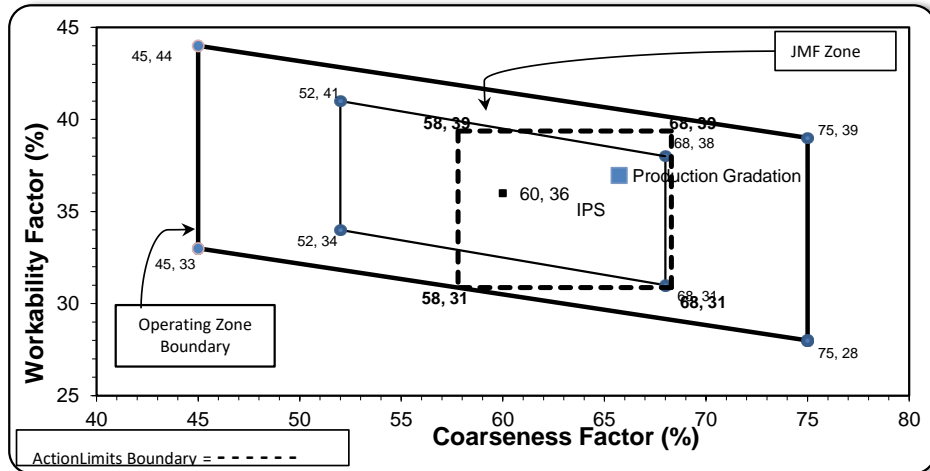
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	99.4	100.0	100.0	99.7	0.3	0.3
3/4"	78.6	100.0	100.0	89.6	10.1	10.4
1/2"	33.9	96.7	100.0	67.6	22.1	32.4
3/8"	14.9	86.1	100.0	56.9	10.6	43.1
#4	3.9	25.3	97.8	42.4	14.5	57.6
#8	3.0	7.4	84.5	34.5	7.9	65.5
#16	2.5	3.9	68.3	27.6	6.9	72.4
#30	2.3	3.0	47.2	19.4	8.2	80.6
#50	2.2	2.6	19.4	8.8	10.6	91.2
#100	2.1	2.1	2.7	2.3	6.4	97.7
LBW	1.7	1.4	0.6	1.2	1.1	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:	66	Workability Factor:	34	Adjusted WF	37.0
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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: 6/21/21 Concrete Grade: **DM**

Dates Test Represents: 6/22/2021 through 6/28/2021

Contractor: _____

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	44-051	Krake Willis Rd	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"	97.7	100.0	100.0	98.8	1.2	1.2
3/4"	80.7	100.0	100.0	90.0	8.8	10.0
1/2"	30.1	96.7	100.0	63.4	26.6	36.6
3/8"	12.3	88.4	100.0	53.4	10.1	46.6
#4	1.3	25.7	97.0	40.1	13.3	59.9
#8	0.9	6.4	80.2	31.5	8.6	68.5
#16	0.8	2.8	64.1	25.0	6.5	75.0
#30	0.8	2.1	47.4	18.6	6.4	81.4
#50	0.8	1.9	24.1	9.7	8.8	90.3
#100	0.7	1.8	7.6	3.4	6.3	96.6
LBW	0.7	1.6	1.5	1.1	2.3	98.9

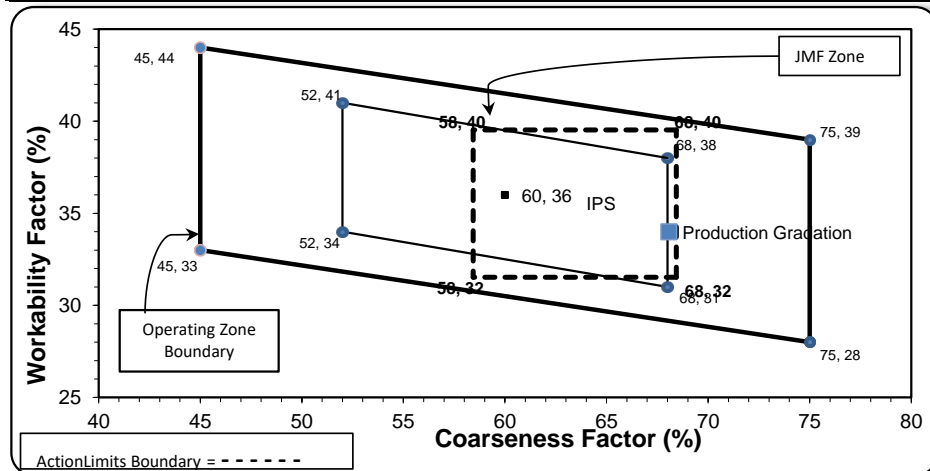
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (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:	31	Adjusted WF	34.0
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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: 6/21/21 Concrete Grade: DM
 Dates Test Represents: 6/22/2021 through 6/28/2021

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	355	2.17	2.62	12.2
2NS	63-115	Ray Rd	1100	6.65	2.65	37.9
Total Wt			2905	17.69		100.0

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



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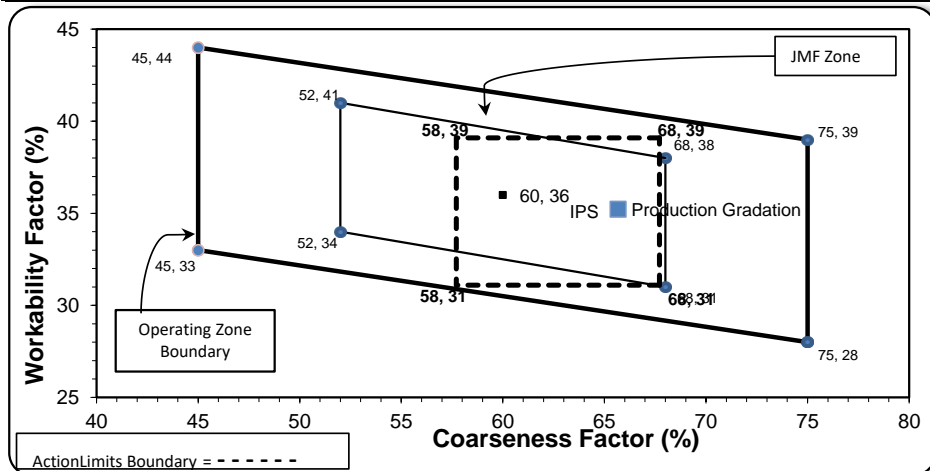
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	99.4	100.0	100.0	99.7	0.3	0.3
3/4"	78.6	100.0	100.0	89.3	10.4	10.7
1/2"	33.9	96.7	100.0	66.6	22.7	33.4
3/8"	14.9	86.1	100.0	55.8	10.8	44.2
#4	3.9	25.3	97.2	41.8	14.0	58.2
#8	3.0	7.4	80.1	32.7	9.1	67.3
#16	2.5	3.9	64.3	26.1	6.7	73.9
#30	2.3	3.0	48.0	19.7	6.4	80.3
#50	2.2	2.6	24.2	10.6	9.1	89.4
#100	2.1	2.1	4.7	3.1	7.5	96.9
LBW	1.7	1.4	0.6	1.2	1.8	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: 66	Workability Factor: 33	Adjusted WF 35.2
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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: