

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-101**

Sample Date: 3/23/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 3/24/2020 through 3/30/2020

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%



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 Suite 500
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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"	99.3	100.0	100.0	99.6	0.4	0.4
3/4"	89.3	100.0	100.0	93.9	5.7	6.1
1/2"	49.0	99.4	100.0	70.9	23.0	29.1
3/8"	30.1	77.9	100.0	59.4	11.5	40.6
#4	5.2	15.8	96.9	41.8	17.6	58.2
#8	2.2	6.0	77.6	32.1	9.7	67.9
#16	1.9	4.1	62.0	25.7	6.4	74.3
#30	1.8	3.5	46.6	19.6	6.2	80.4
#50	1.7	3.3	24.1	10.6	9.0	89.4
#100	1.6	3.1	6.3	3.5	7.1	96.5
LBW	1.5	2.8	1.2	1.4	2.1	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.

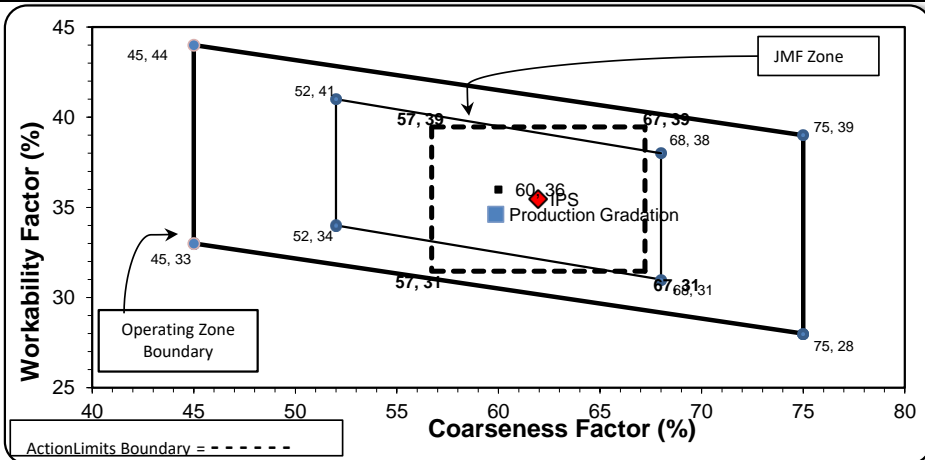
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	60	Workability Factor:	32	Adjusted WF	34.6
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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-32**

Sample Date: 3/23/20 Concrete Grade: DM
 Dates Test Represents: 3/24/2020 through 3/30/2020

Contractor: _____

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	150	0.92	2.62	5.2
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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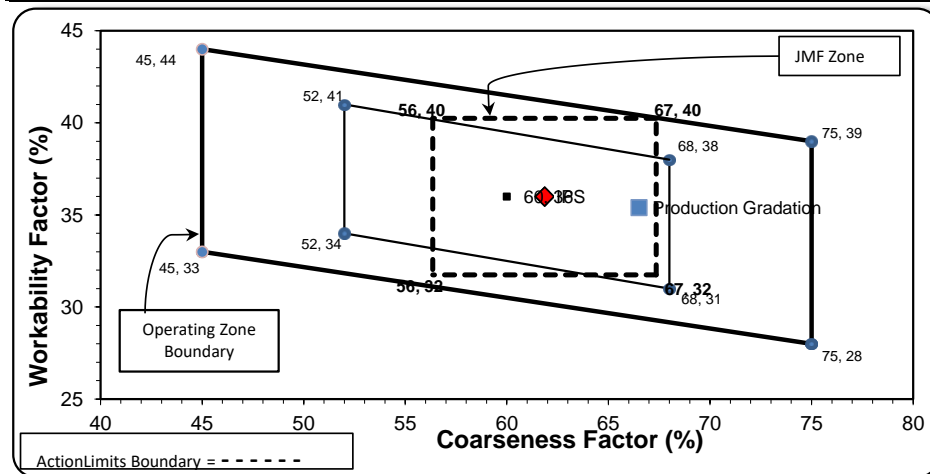
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	98.8	100.0	100.0	99.3	0.7	0.7
3/4"	82.8	100.0	100.0	90.5	8.8	9.5
1/2"	42.9	99.4	100.0	68.4	22.1	31.6
3/8"	21.3	77.9	100.0	55.4	13.0	44.6
#4	3.9	15.8	96.7	41.3	14.1	58.7
#8	2.4	6.0	79.0	32.9	8.3	67.1
#16	2.1	4.1	62.1	26.0	7.0	74.0
#30	2.0	3.5	46.3	19.6	6.3	80.4
#50	1.8	3.3	23.4	10.4	9.2	89.6
#100	1.6	3.1	4.4	2.8	7.6	97.2
LBW	1.3	2.8	0.9	1.2	1.6	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:	67	Workability Factor:	33	Adjusted WF	35.4
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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: 3/23/20 Concrete Grade: DM
 Dates Test Represents: 3/24/2020 through 3/30/2020

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.4
26A	58-003	Stoneco	455	2.71	2.69	15.4
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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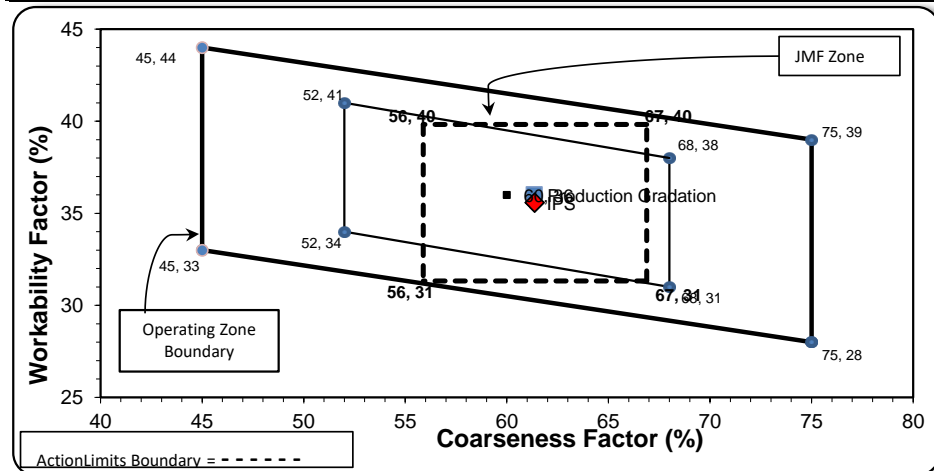
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	82.8	100.0	100.0	91.9	8.1	8.1
1/2"	39.6	99.5	100.0	71.3	20.5	28.7
3/8"	18.4	86.2	100.0	59.2	12.1	40.8
#4	3.0	17.2	95.5	39.6	19.6	60.4
#8	2.3	3.6	85.6	33.5	6.1	66.5
#16	2.0	2.0	58.8	23.1	10.4	76.9
#30	1.8	1.7	40.6	16.2	6.9	83.8
#50	1.7	1.6	17.2	7.5	8.8	92.5
#100	1.6	1.5	2.8	2.0	5.4	98.0
LBW	1.5	1.3	0.7	1.2	0.9	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:	61	Workability Factor:	34	Adjusted WF	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

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Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 3/23/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 3/24/2020 through 3/30/2020

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

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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"	97.1	100.0	100.0	98.6	1.4	1.4
3/4"	72.7	100.0	100.0	86.8	11.8	13.2
1/2"	34.4	99.4	100.0	68.3	18.5	31.7
3/8"	16.9	77.9	100.0	56.9	11.4	43.1
#4	3.3	15.8	97.4	40.7	16.2	59.3
#8	1.6	6.0	84.5	33.6	7.1	66.4
#16	1.2	4.1	69.4	27.4	6.2	72.6
#30	1.0	3.5	50.4	20.1	7.4	79.9
#50	0.9	3.3	21.4	9.0	11.1	91.0
#100	0.8	3.1	3.0	2.0	7.0	98.0
LBW	0.5	2.8	0.6	0.9	1.1	99.1

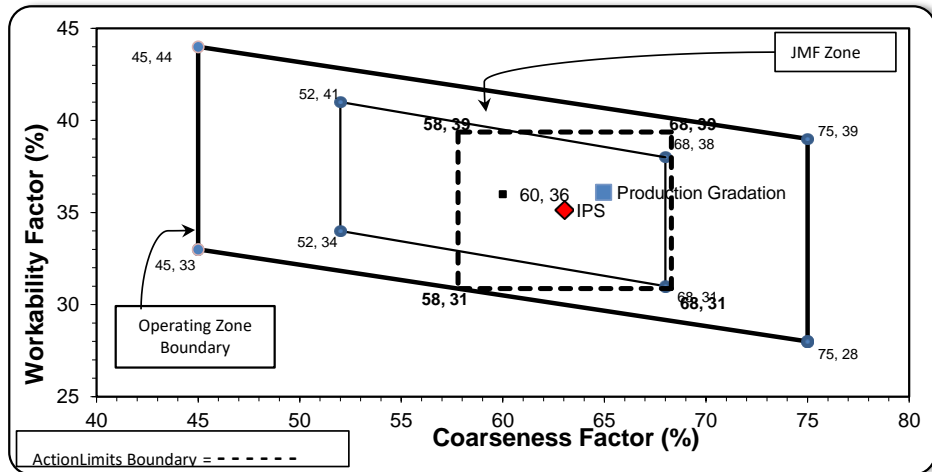
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	34	Adjusted WF	36.1
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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

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Aggregate Optimization Chart

PLANT #: **P-39**

Sample Date: 3/23/20 Concrete Grade: DM
 Dates Test Represents: 3/24/2020 through 3/30/2020

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1555	9.51	2.62	53.5
26A	71-47	Presque Isle	250	1.53	2.62	8.6
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"	99.3	100.0	100.0	99.6	0.4	0.4
3/4"	89.3	100.0	100.0	94.3	5.4	5.7
1/2"	49.0	99.4	100.0	72.6	21.6	27.4
3/8"	30.1	77.9	100.0	60.7	12.0	39.3
#4	5.2	15.8	97.4	41.0	19.7	59.0
#8	2.2	6.0	84.5	33.7	7.3	66.3
#16	1.9	4.1	69.4	27.6	6.0	72.4
#30	1.8	3.5	50.4	20.3	7.3	79.7
#50	1.7	3.3	21.4	9.3	11.1	90.7
#100	1.6	3.1	3.0	2.3	7.0	97.7
LBW	1.5	2.8	0.6	1.3	1.0	98.7

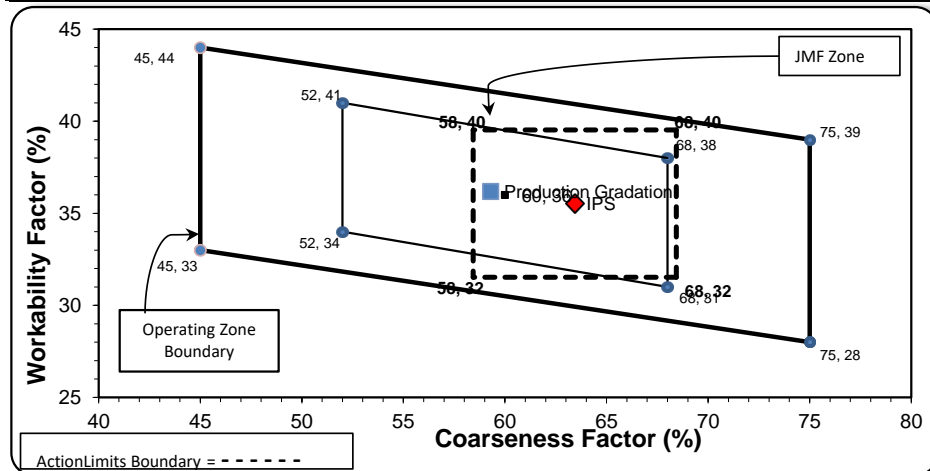
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	59	Workability Factor:	34	Adjusted WF	36.2
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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:
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Approved By:

Aggregate Optimization Chart

PLANT #: **P-02**

Sample Date: 3/23/20 Concrete Grade: **DM**
 Dates Test Represents: 3/24/2020 through 3/30/2020

Contractor: _____

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%



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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"	97.1	100.0	100.0	98.5	1.5	1.5
3/4"	72.7	100.0	100.0	86.1	12.4	13.9
1/2"	34.4	99.4	100.0	66.6	19.5	33.4
3/8"	16.9	77.9	100.0	55.5	11.1	44.5
#4	3.3	15.8	96.7	40.9	14.6	59.1
#8	1.6	6.0	79.0	32.2	8.8	67.8
#16	1.2	4.1	62.1	25.2	7.0	74.8
#30	1.0	3.5	46.3	18.9	6.3	81.1
#50	0.9	3.3	23.4	9.9	9.0	90.1
#100	0.8	3.1	4.4	2.4	7.5	97.6
LBW	0.5	2.8	0.9	0.9	1.5	99.1

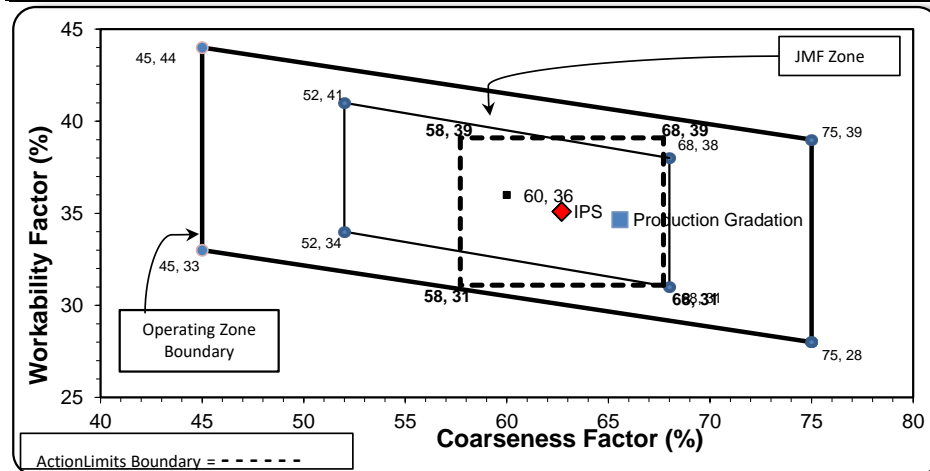
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	66	Workability Factor:	32	Adjusted WF	34.7
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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: