

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-101**

Sample Date: 11/22/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 11/23/2021 through 11/29/2021

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%



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 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"	99.0	100.0	100.0	99.5	0.5	0.5
3/4"	82.8	100.0	100.0	90.8	8.7	9.2
1/2"	40.7	96.8	100.0	68.0	22.8	32.0
3/8"	22.6	83.2	100.0	57.4	10.6	42.6
#4	3.5	12.6	98.5	41.7	15.7	58.3
#8	2.1	3.8	80.4	33.2	8.5	66.8
#16	1.9	2.3	62.6	25.9	7.2	74.1
#30	1.7	1.9	46.4	19.4	6.5	80.6
#50	1.6	1.7	25.0	10.9	8.5	89.1
#100	1.5	1.6	7.4	3.8	7.0	96.2
LBW	1.3	1.3	0.7	1.1	2.8	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.

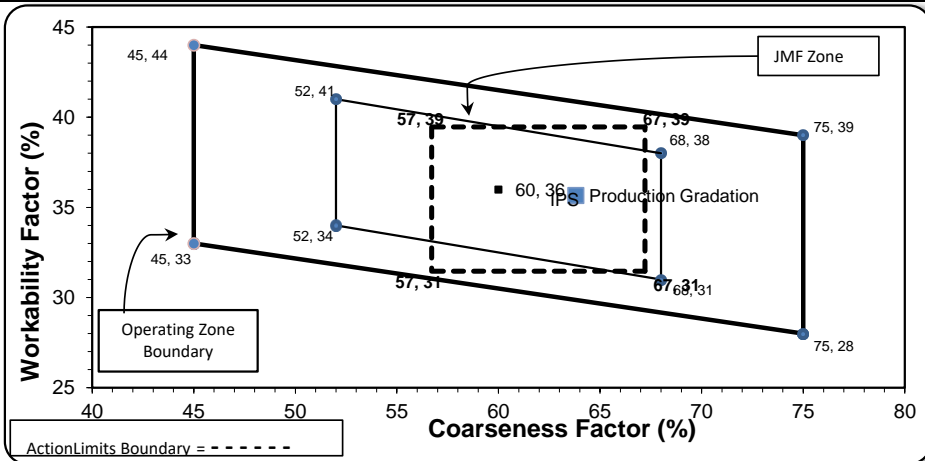
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	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-102**

Sample Date: 11/22/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 11/23/2021 through 11/29/2021

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"	89.3	100.0	100.0	94.6	5.4	5.4
1/2"	47.0	99.8	100.0	73.1	21.5	26.9
3/8"	24.2	86.6	100.0	60.1	12.9	39.9
#4	4.3	16.0	99.7	42.6	17.5	57.4
#8	1.5	5.3	86.2	34.9	7.8	65.1
#16	1.3	2.8	65.2	26.3	8.5	73.7
#30	1.1	1.9	44.7	18.2	8.2	81.8
#50	1.0	1.6	18.7	8.0	10.2	92.0
#100	0.9	1.5	3.7	2.1	5.9	97.9
LBW	0.7	1.3	0.6	0.7	1.3	99.3

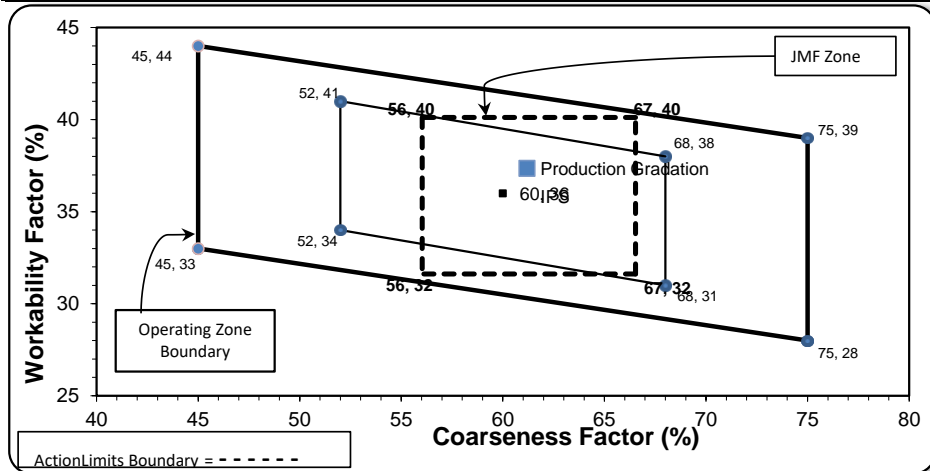
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	61	Workability Factor:	35	37.4
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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

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 SM, LLC Technical Service

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Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 11/22/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 11/23/2021 through 11/29/2021

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	300	1.83	2.62	10.3
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"	95.0	100.0	100.0	97.5	2.5	2.5
3/4"	76.2	100.0	100.0	88.1	9.4	11.9
1/2"	33.3	95.0	100.0	66.1	22.0	33.9
3/8"	19.5	82.1	100.0	57.8	8.2	42.2
#4	3.7	16.7	95.7	41.5	16.4	58.5
#8	1.8	4.7	82.3	34.0	7.5	66.0
#16	1.5	2.4	67.3	27.6	6.3	72.4
#30	1.4	1.9	48.8	20.2	7.4	79.8
#50	1.4	1.7	25.5	11.0	9.2	89.0
#100	1.3	1.5	8.1	4.0	7.0	96.0
LBW	0.9	1.1	1.4	1.1	2.9	98.9

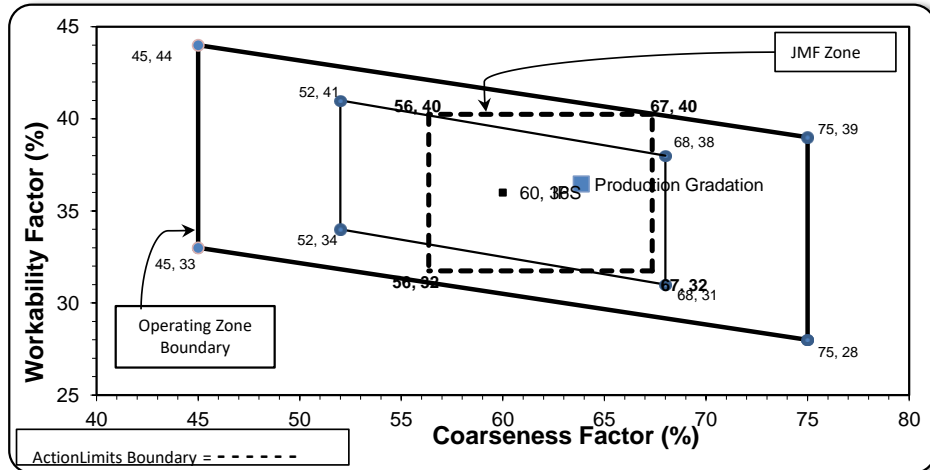
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	64	Workability Factor:	34	Adjusted WF	36.5
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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: 11/22/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 11/23/2021 through 11/29/2021

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"	89.3	100.0	100.0	94.4	5.6	5.6
1/2"	47.0	99.8	100.0	72.1	22.3	27.9
3/8"	24.2	86.6	100.0	58.8	13.3	41.2
#4	4.3	16.0	98.7	40.6	18.1	59.4
#8	1.5	5.3	85.2	33.0	7.6	67.0
#16	1.3	2.8	67.0	25.9	7.1	74.1
#30	1.1	1.9	46.6	18.1	7.8	81.9
#50	1.0	1.6	16.3	6.8	11.4	93.2
#100	0.9	1.5	2.8	1.7	5.1	98.3
LBW	0.7	1.3	1.0	0.9	0.8	99.1

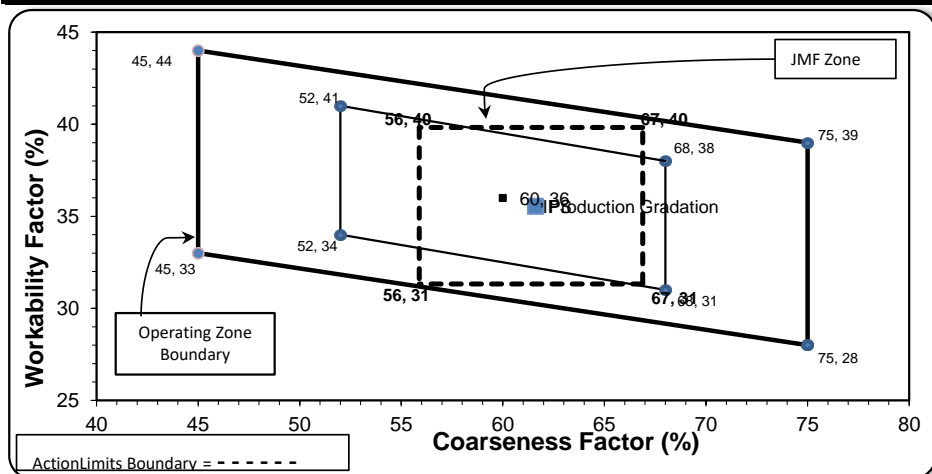
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	62	Workability Factor:	33	Adjusted WF	35.5
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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

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Approved By:

Aggregate Optimization Chart

PLANT #: **P-39**

Sample Date: 11/22/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 11/23/2021 through 11/29/2021

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	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"	99.0	100.0	100.0	99.4	0.6	0.6
3/4"	82.8	100.0	100.0	90.5	9.0	9.5
1/2"	40.7	96.8	100.0	67.0	23.5	33.0
3/8"	22.6	83.2	100.0	56.1	10.9	43.9
#4	3.5	12.6	97.5	39.7	16.4	60.3
#8	2.1	3.8	83.4	33.0	6.7	67.0
#16	1.9	2.3	67.7	26.8	6.2	73.2
#30	1.7	1.9	50.0	20.0	6.8	80.0
#50	1.6	1.7	25.0	10.5	9.5	89.5
#100	1.5	1.6	4.4	2.6	7.9	97.4
LBW	1.3	1.3	0.1	0.8	1.8	99.2

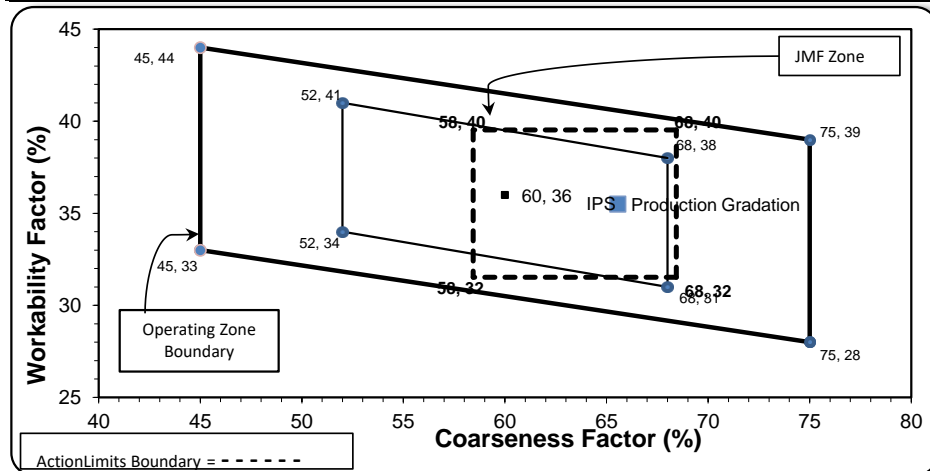
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	66	Workability Factor:	33	Adjusted WF	35.5
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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: 11/22/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 11/23/2021 through 11/29/2021

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	63-115	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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 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"	65.1	100.0	100.0	83.1	15.8	16.9
1/2"	30.0	95.0	100.0	65.5	17.7	34.5
3/8"	11.1	82.1	100.0	54.5	10.9	45.5
#4	2.6	16.7	96.6	40.1	14.4	59.9
#8	2.0	4.7	78.7	31.4	8.7	68.6
#16	1.9	2.4	61.7	24.6	6.8	75.4
#30	1.9	1.9	46.1	18.6	6.0	81.4
#50	1.8	1.7	27.8	11.6	7.0	88.4
#100	1.7	1.5	6.4	3.5	8.2	96.5
LBW	1.0	1.1	0.9	1.0	2.5	99.0

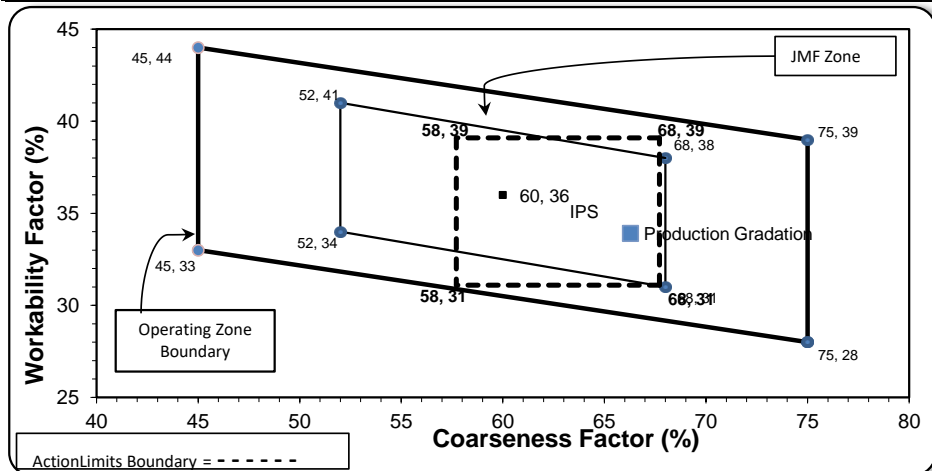
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	66	Workability Factor:	31	Adjusted WF	33.9
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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: