

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

**PLANT #:** **P-102**

Sample Date: 11/19/18

Concrete Grade: **DM**

Contractor: \_\_\_\_\_

Dates Test Represents: 11/20/2018 through 11/26/2018

MDOT No.: \_\_\_\_\_

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1375	8.19	2.69	45.9
26A	58-003	Stoneco	500	2.98	2.69	16.7
2NS	38-046	Chelsea	1120	6.77	2.65	37.4
<b>Total Wt</b>			<b>2995</b>	<b>17.94</b>		<b>100.0</b>

<----- 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"	99.7	100.0	100.0	99.9	0.1	0.1
3/4"	79.8	100.0	100.0	90.7	9.1	9.3
1/2"	37.7	99.6	100.0	71.3	19.4	28.7
3/8"	15.8	85.6	100.0	58.9	12.4	41.1
#4	4.8	22.0	100.0	43.3	15.7	56.7
#8	2.6	5.8	88.0	35.1	8.2	64.9
#16	2.3	2.4	64.0	25.4	9.7	74.6
#30	2.0	1.8	43.0	17.3	8.1	82.7
#50	1.8	1.7	23.0	9.7	7.6	90.3
#100	1.6	1.6	4.0	2.5	7.2	97.5
LBW	1.5	1.4	0.7	1.2	1.3	98.8



**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

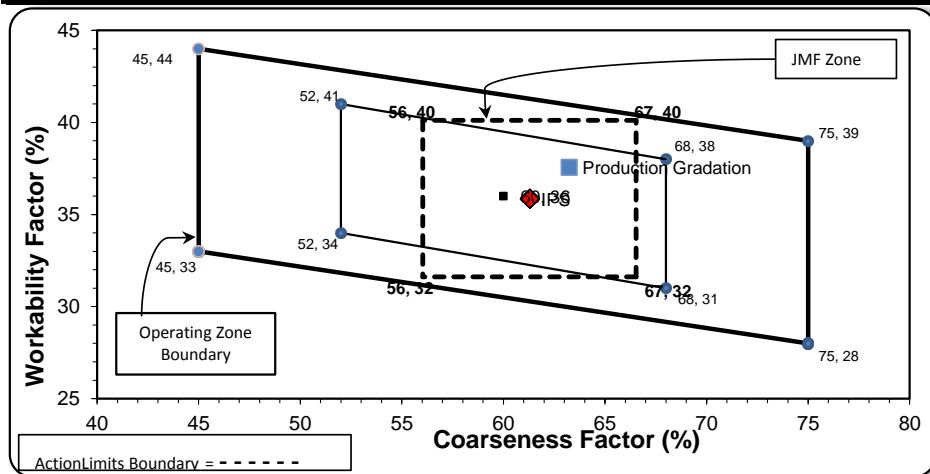
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>63</b>	<b>Workability Factor:</b>	<b>35</b>	<b>Adjusted WF</b>	<b>37.6</b>
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<b>Coarseness Factor:</b>	<b>61</b>
<b>Workability Factor:</b>	<b>36</b>



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

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

**PLANT #:** **P-32**

Sample Date: 11/19/18

Concrete Grade: **DM**

Contractor: \_\_\_\_\_

Dates Test Represents: 11/20/2018 through 11/26/2018

MDOT No.: \_\_\_\_\_

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1300	7.95	2.62	44.1
26A	71-47	Presque Isle	500	3.06	2.62	16.9
2NS	95-13	Smelter Bay	1150	6.95	2.65	39.0
<b>Total Wt</b>			<b>2950</b>	<b>17.96</b>		<b>100.0</b>

<----- 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"	99.5	100.0	100.0	99.8	0.2	0.2
3/4"	84.7	100.0	100.0	93.3	6.5	6.7
1/2"	35.8	98.6	100.0	71.5	21.8	28.5
3/8"	16.4	86.5	100.0	60.9	10.6	39.1
#4	4.4	14.4	98.0	42.6	18.3	57.4
#8	3.8	3.4	85.0	35.4	7.2	64.6
#16	3.6	2.0	68.5	28.6	6.8	71.4
#30	3.5	1.8	47.7	20.4	8.2	79.6
#50	3.4	1.6	20.2	9.6	10.8	90.4
#100	3.2	1.5	3.7	3.1	6.5	96.9
LBW	2.7	1.1	0.5	1.6	1.5	98.4



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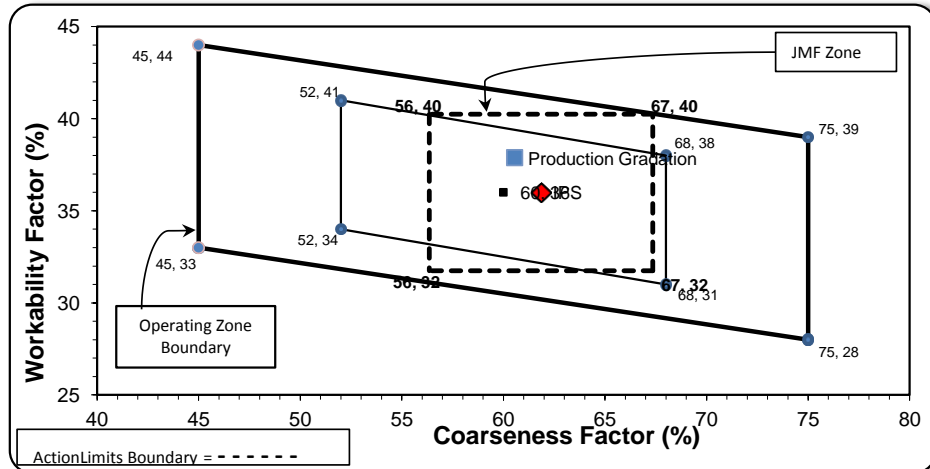
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>61</b>	<b>Workability Factor:</b>	<b>35</b>	<b>Adjusted WF</b>	<b>37.9</b>
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<b>Coarseness Factor:</b>	<b>62</b>
<b>Workability Factor:</b>	<b>36</b>



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

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

**PLANT #:** **P-35**

Sample Date: 11/19/18

Concrete Grade: **DM**

Contractor: \_\_\_\_\_

Dates Test Represents: 11/20/2018 through 11/26/2018

MDOT No.: \_\_\_\_\_

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1440	8.58	2.69	48.2
26A	58-003	Stoneco	350	2.09	2.69	11.7
2NS	81-93	Burmeister	1200	7.28	2.64	40.1
<b>Total Wt</b>			<b>2990</b>	<b>17.95</b>		<b>100.0</b>

<----- 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"	99.7	100.0	100.0	99.9	0.1	0.1
3/4"	79.8	100.0	100.0	90.3	9.6	9.7
1/2"	37.7	99.6	100.0	69.9	20.3	30.1
3/8"	15.8	85.6	100.0	57.8	12.2	42.2
#4	4.8	22.0	97.8	44.1	13.6	55.9
#8	2.6	5.8	81.3	34.6	9.6	65.4
#16	2.3	2.4	61.7	26.2	8.4	73.8
#30	2.0	1.8	41.7	17.9	8.2	82.1
#50	1.8	1.7	15.4	7.2	10.7	92.8
#100	1.6	1.6	2.8	2.1	5.2	97.9
LBW	1.5	1.4	0.7	1.2	0.9	98.8



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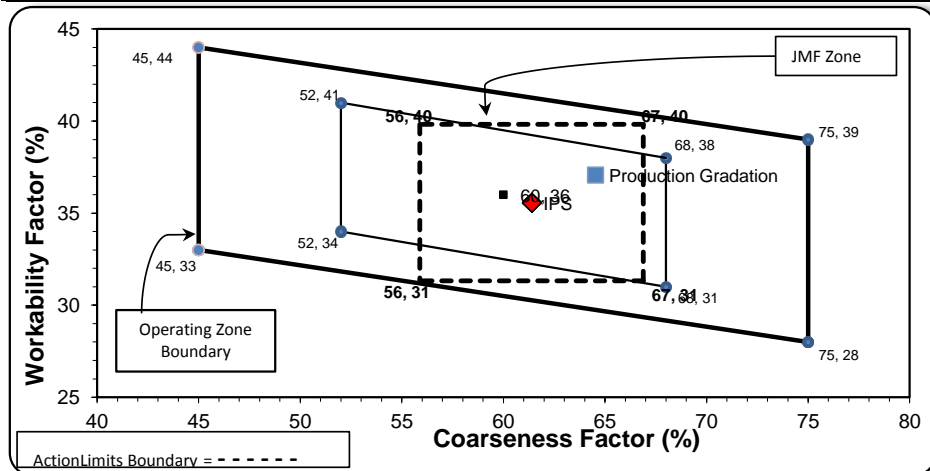
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>65</b>	<b>Workability Factor:</b>	<b>35</b>	<b>Adjusted WF</b>	<b>37.1</b>
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<b>Coarseness Factor:</b>	<b>61</b>
<b>Workability Factor:</b>	<b>36</b>



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

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

**PLANT #:** **P-36**

Sample Date: 11/19/18

Concrete Grade: **DM**

Contractor: \_\_\_\_\_

Dates Test Represents: 11/20/2018 through 11/26/2018

MDOT No.: \_\_\_\_\_

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	47.5
26A	71-47	Presque Isle	400	2.45	2.62	13.6
2NS	63-92	AA Grange Hall	1150	6.95	2.65	39.0
<b>Total Wt</b>			<b>2950</b>	<b>17.96</b>		<b>100.0</b>

<----- 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"	99.8	100.0	100.0	99.9	0.1	0.1
3/4"	80.6	100.0	100.0	90.8	9.1	9.2
1/2"	34.2	98.6	100.0	68.6	22.2	31.4
3/8"	13.9	86.5	100.0	57.3	11.3	42.7
#4	2.2	14.4	97.4	41.0	16.3	59.0
#8	1.5	3.4	84.2	34.0	7.0	66.0
#16	1.4	2.0	68.1	27.5	6.5	72.5
#30	1.3	1.8	48.2	19.7	7.8	80.3
#50	1.2	1.6	19.7	8.5	11.2	91.5
#100	1.2	1.5	2.8	1.9	6.6	98.1
LBW	0.8	1.1	0.3	0.6	1.2	99.4



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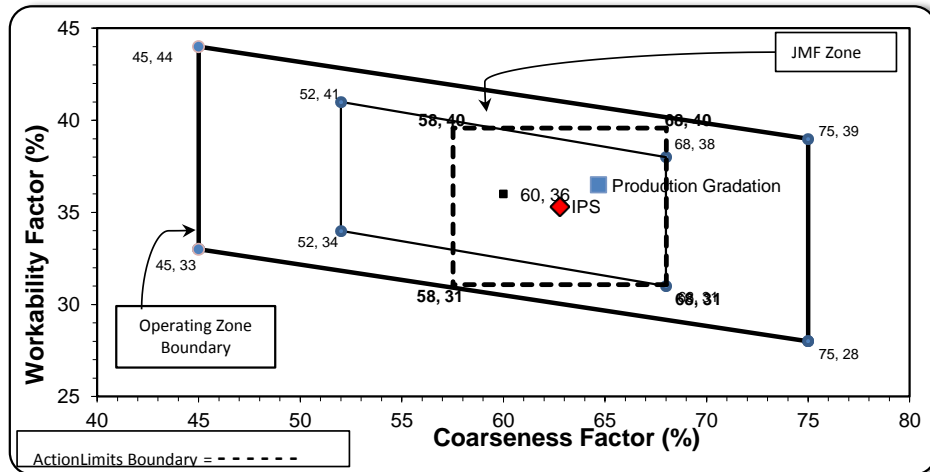
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>65</b>	<b>Workability Factor:</b>	<b>34</b>	<b>Adjusted WF</b>	<b>36.5</b>
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<b>Coarseness Factor:</b>	<b>63</b>
<b>Workability Factor:</b>	<b>35</b>



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.9	0.1	0.1
3/4"	89.1	10.8	10.9
1/2"	71.3	17.8	28.7
3/8"	59.4	11.9	40.6
#4	42.6	16.8	57.4
#8	35.3	7.3	64.7
#16	28.5	6.8	71.5
#30	20.9	7.6	79.1
#50	9.0	12.0	91.0
#100	1.7	7.3	98.3
LBW	0.7	1.0	99.3

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

**PLANT #:** **P-02**

Sample Date: 11/19/18

Concrete Grade: **DM**

Contractor: \_\_\_\_\_

Dates Test Represents: 11/20/2018 through 11/26/2018

MDOT No.: \_\_\_\_\_

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	47.5
26A	71-47	Presque Isle	400	2.45	2.62	13.6
2NS	63-92	AA Grange Hall	1150	6.95	2.65	39.0
<b>Total Wt</b>			<b>2950</b>	<b>17.96</b>		<b>100.0</b>

<----- 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"	99.8	100.0	100.0	99.9	0.1	0.1
3/4"	80.6	100.0	100.0	90.8	9.1	9.2
1/2"	34.2	98.6	100.0	68.6	22.2	31.4
3/8"	13.9	86.5	100.0	57.3	11.3	42.7
#4	2.2	14.4	97.4	41.0	16.3	59.0
#8	1.5	3.4	84.2	34.0	7.0	66.0
#16	1.4	2.0	68.1	27.5	6.5	72.5
#30	1.3	1.8	48.2	19.7	7.8	80.3
#50	1.2	1.6	19.7	8.5	11.2	91.5
#100	1.2	1.5	2.8	1.9	6.6	98.1
LBW	0.8	1.1	0.3	0.6	1.2	99.4



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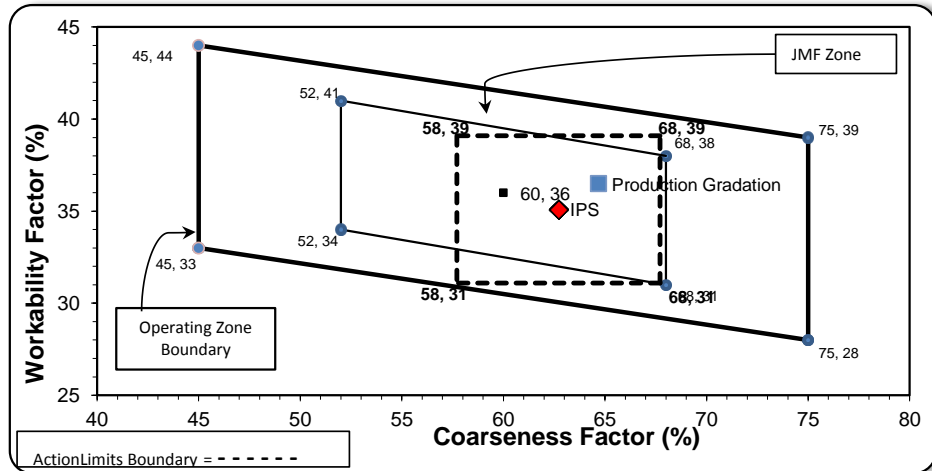
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>65</b>	<b>Workability Factor:</b>	<b>34</b>
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<b>Coarseness Factor:</b>	<b>63</b>
<b>Workability Factor:</b>	<b>35</b>



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: