Aggregate Optimization Chart

O Batch Plant Gradations

Production Gradation

Production Gradation Report

PLANT #: P-101 Contractor:

Sample Date: 7/18/22 Concrete Grade: DM, 4500HP

Dates Test Represents: 7/19/2022 through 7/25/2022 MDOT No.:

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1460	8.93	2.62	50.2
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	75-051	Mid Michigan	1150	6.93	2.66	39.5
Total Wt			2910	17.69		100.0

01 No.:____

---- Verify this number is 100%

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:

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	98.8	1.2	1.2	
3/4"	83.2	100.0	100.0	91.6	7.3	8.4	
1/2"	37.5	98.7	100.0	68.5	23.1	31.5	
3/8"	21.6	87.3	100.0	59.4	9.2	40.6	
#4	2.5	23.4	99.0	42.8	16.6	57.2	
#8	1.6	5.7	84.1	34.6	8.2	65.4 ı	
#16	1.4	3.4	68.0	27.9	6.7	72.1	
#30	1.3	2.8	51.7	21.4	6.6	78.6	
#50	1.2	2.6	27.8	11.9	9.5	88.1	
#100	1.1	2.4	7.6	3.8	8.1	96.2	
I RW	1 0	2.1	0.0	1.1	2.7	08 Q	

Aggregate Supplier Gradations

*Maximum % Retained must be above the 3/8" sieve.

*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

 $\ensuremath{^{*}\%}$ 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.

Coarseness Factor:	62	Workability Factor:	35	37.1
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 41	57, 39 68, 38 Production Gradation 60, 36s 57, 31 6768,131	75, 28	
40 45 ActionLimits Boundary =	50	Coarseness Factor (%)	75	80

Work	ability Factor:	35	
Sieve	Cumulative	%	Cumulative
Sieve	% Passing	Retained	% 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

62

PREPARED BY: SM, LLC Technical Service Approved By

PLANT #: P-102

Sample Date:

Production Gradation

7/18/22 Concrete Grade: **DM**, **4500HP**

Dates Test Represents:		7/19/2022	tnrougn	7/25/2022		
Agg. Class	Pit#	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.2
26A	58-003	Stoneco	200	1.19	2.69	6.8
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

Contractor:

SUPERIOR

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.

Total Wt		2950	17.68		100.0	< Verify this n	umber is 100%
Sieve 6AA		26	6 A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	10	0.0	100.0	100.0	0.0	0.0
1.5"	100.0	10	0.0	100.0	100.0	0.0	0.0
1"	100.0	10	0.0	100.0	100.0	0.0	0.0
3/4"	83.7	10	0.0	100.0	91.2	8.8	8.8
1/2"	47.0	99	9.9	100.0	71.2	19.9	28.8
3/8"	25.5	85	5.2	100.0	58.6	12.7	41.4
#4	3.9	19	9.8	98.8	42.0	16.6	58.0
#8	1.6	6	.3	83.8	34.0	8.0	66.0
#16	1.5	3	3.1		26.8	7.1	73.2
#30	1.2	2.1		48.5	19.7	7.1	80.3
#50	1.1	1.8		24.4	10.2	9.5	89.8
#100	1.1	1.7		7.4	3.6	6.6	96.4
LBW	0.9	1	.6	1.3	1.1	2.5	98.9

Aggregate Supplier Gradations

Coarseness Factor: 63 **Workability Factor:** 34 36.5 45 45, 44 JMF Zone Workability Factor (%) ■ 601 Production Gradation Operating Zone Boundary 25 45 50 Coarseness Factor (%)⁷⁰ 75 80 ActionLimits Boundary = - - - -

Batch Plant Gradations

Work	ability 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

61

PREPARED BY: SM, LLC Technical Service Approved By

PLANT #:

Sample Date:

Production Gradation

PREPARED BY:

SM, LLC Technical Service

Concrete Grade: DM, 4500HP 7/18/22

			Specific	0/_
7/19/2022	through	7/25/2022		

Dates Test Represents:		7/19/2022	through	7/25/2022		
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.2
26A	58-003	Stoneco	200	1.19	2.69	6.8
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
Total Wt			2950	17.68		100.0

Contractor:

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.5



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

l otal Wt		2950	17.68		100.0 < Verify this number is 100%			
Sieve	6AA	26/	1	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"	83.7	100	0	100.0	91.2	8.8	8.8	
1/2"	47.0	99.	9	100.0	71.2	19.9	28.8	
3/8"	25.5	85.2	2	100.0	58.6	12.7	41.4	
#4	3.9	19.8	3	98.8	42.0	16.6	58.0	
#8	1.6	6.3		83.8	34.0	8.0	66.0	
#16	1.5	3.1		66.2	26.8	7.1	73.2	
#30	1.2	2.1		48.5	19.7	7.1	80.3	
#50	1.1	1.8		24.4	10.2	9.5	89.8	
#100	1.1	1.7		7.4	3.6	6.6	96.4	
LBW	0.9	1.6		1.3	1.1	2.5	98.9	

Aggregate Supplier Gradations

*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.

Coarseness Factor:	63	Workability Factor:	34	
45 45, 44 45, 44 45, 33 Operating Zone Boundary	52, 34	68, 38 60) Production Gradation	75, 39 75, 28	
25	50 55	Coarseness Factor (%)	75	80

Batch Plant Gradations

Work	ability Factor:	36	
Sieve	Cumulative	% Retained	Cumulative % Retained
	% Passing		
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

Approved BY:

Aggregate Optimization Chart

PLANT #: P-12

7/18/22 Sample Date: Dates Test Represents: 7/19/2022

Concrete Grade: DM, 4500HP 7/25/2022 through

MDOT	No.:
------	------

Contractor:

Specific % ft³ Agg. Class Pit# Weight (SSD) Source 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

<---- Verify this number is 100%

SUPER	IOR

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

	i Otai III	2000 17.00		100.0	< verily tills if	umber 13 10070
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"	87.6	100.0	100.0	93.1	6.9	6.9
1/2"	47.3	96.1	100.0	70.7	22.5	29.3
3/8"	22.4	83.6	100.0	56.3	14.4	43.7
#4	2.7	28.9	96.8	41.3	15.0	58.7
#8	1.6	11.1	79.2	32.8	8.5	67.2
#16	1.4	4.7	61.8	25.5	7.3	74.5
#30	1.4	3.3	45.5	19.0	6.5	81.0
#50	1.3	2.8	24.6	10.6	8.4	89.4
#100	1.2	2.7	5.3	2.9	7.7	97.1
LBW	0.9	2.4	0.8	0.9	2.0	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	ions Aggregate Supplier Gradations	Adjusted WF	Intial Producti	on Sample (IPS)
Coarseness Factor: 65	Workability Factor: 33	35.3	Coars	seness Factor:	
7 45		$\neg \top$	Work	ability Factor:	
45, 44	JMF Zone	711	Sieve	Cumulative	
52, 41			Sieve	% Passing	
40]	, 40 68, 40	- 11	2"	100.0	
	68, 38	- 11	1.5"	100.0	
	!	- 11	1"	99.3	
A	■ 60, 36PS Production Gradation	- 11	3/4"	89.0	
Factor (%)	Production Gradation	- 11	1/2"	70.3	
3	<u> </u>	- 11	3/8"	59.9	
45, 33	22	- 11	#4	41.9	
30	68, 32	- 11	#8	35.9	
Operating Zone		- 11	#16	27.8	
As, 33 Operating Zone Boundary	75, 28	- 11	#30	18.9	
> 25			#50	6.3	
	_ 60 _6570 75	80	#100	1.7	
	Coarseness Factor (%) ⁷⁰ 75		LBW	1.0	
ActionLimits Boundary =					

Work	ability Factor:	36	
Sieve	Cumulative	%	Cumulative
Sieve	% Passing	Retained	% 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"	89.0	10.3	11.0
1/2"	70.3	18.7	29.7
3/8"	59.9	10.4	40.1
#4	41.9	18.0	58.1
#8	35.9	6.0	64.1
#16	27.8	8.2	72.2
#30	18.9	8.8	81.1
#50	6.3	12.6	93.7
#100	1.7	4.6	98.3
LBW	1.0	0.7	99.0

Smelter Bay

Total Wt

PLANT #: P-32

Pit#

71-47

71-47

95-013

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

7/18/22 Concrete Grade: DM, 4500HP

7/19/2022	through	7/25/2022		
Source	Weight (SSD)	ft ³	Specific	%
Jource	Weight (SSD)	IL	Gravity	Contribution
Presque Isle	1755	10.73	2.62	60.4
Presque Isle	0	0.00	2.62	0.0

6.95

17.69

2.65

39.6

Contractor:

MDOT No.:



<---- Verify this number is 100%

etained	Cumulative	
	% Retained	

Coarseness Factor:

30701 W. 10 Mile Rd. Suite 500

Farmington Hills, MI 48336

Superior Materials, LLC

					. ,	
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	99.3	0.7	0.7
3/4"	87.3	100.0	100.0	92.3	7.0	7.7
1/2"	53.7	96.1	100.0	72.0	20.3	28.0
3/8"	28.0	83.6	100.0	56.5	15.5	43.5
#4	4.8	28.9	95.6	40.7	15.8	59.3
#8	2.3	11.1	81.6	33.7	7.1	66.3
#16	2.0	4.7	66.7	27.6	6.1	72.4
#30	1.9	3.3	47.8	20.1	7.5	79.9
#50	1.8	2.8	24.1	10.6	9.4	89.4
#100	1.7	2.7	7.7	4.1	6.6	95.9
I BW	1.3	2.4	1.8	1.5	2.6	98.5

*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.

62

*% Retained must be at least 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

 Batch Plant Gradations Aggregate Supplier Gradations **Production Gradation** Adjusted WF Intial Production Sample (IPS) **Workability Factor:** 34 36.2 **Coarseness Factor:** 66

1150

2905

Work	ability 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

Workability Factor (%)	45 T 40 - 35 -	45, 44 45, 33 Operating Zone	52, 41	56,	68, 38 Production Gradation 60, 3BS Production Gradation 68, 38
Work	25	Operating Zone Boundary			75, 28
Ac	40	45 its Boundary =	50	55	Coarseness Factor (%) ⁷⁰ 75 80

Pleasant Lake

Batch Plant Gradations

1150

PLANT #: P-35

Pit#

58-003

58-003

81-019

Sample Date:

Agg. Class

6AA

26A

2NS

Dates Test Represents:

Production Gradation

7/18/22 Concrete Grade: DM, 4500HP

7/19/2022	through	7/25/2022		
Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
Stoneco	1600	9.53	2.69	54.2
Stoneco	200	1.19	2.69	6.8

6.95

2.65

39.0

36.5

MDOT No.:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

Contractor:



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

	Total Wt	2950 17.68		100.0	< Verify this n	umber 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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	83.7	100.0	100.0	91.2	8.8	8.8
1/2"	47.0	99.9	100.0	71.2	19.9	28.8
3/8"	25.5	85.2	100.0	58.6	12.7	41.4
#4	3.9	19.8	98.8	42.0	16.6	58.0
#8	1.6	6.3	83.8	34.0	8.0	66.0 r
#16	1.5	3.1	66.2	26.8	7.1	73.2
#30	1.2	2.1	48.5	19.7	7.1	80.3 r
#50	1.1	1.8	24.4	10.2	9.5	89.8
#100	1.1	1.7	7.4	3.6	6.6	96.4
LBW	0.9	1.6	1.3	1.1	2.5	98.9

Aggregate Supplier Gradations

*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.

Coarseness Facto	r: 63	Workability Factor:	34	
45 45, 44 40 45, 44 45, 33 45, 33 Operating Zo Boundary	ne	68, 38 60, 38 Production Gradation	JMF Zone 75, 39	
Boundary 25 40 45 ActionLimits Boundary = -		5 Coarseness Factor (%)	75, 28 75	80

Work	ability Factor:	36	
Sieve	Cumulative	%	Cumulative
Sieve	% Passing	Retained	% 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

61

PLANT #: P-36

Sample Date:

Production Gradation

7/18/22 Concrete Grade: DM, 4500HP

7/25/2022

Dates Test F	Represents:	7/19/2022	through	7/25/2022		
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

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

36.3

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

	Total Wt	2905	17.69		100.0	< Verify this n	umber is 100%
Sieve	6AA	26	A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100	0.0	100.0	100.0	0.0	0.0
1.5"	100.0	100	0.0	100.0	100.0	0.0	0.0
1"	100.0	100	0.0	100.0	100.0	0.0	0.0
3/4"	87.6	100	0.0	100.0	93.1	6.9	6.9
1/2"	47.3	96	.1	100.0	70.6	22.5	29.4
3/8"	22.4	83	.6	100.0	56.0	14.6	44.0
#4	2.7	28	.9	98.0	40.6	15.4	59.4
#8	1.6	11	.1	84.8	33.8	6.8	66.2 r
#16	1.4	4.	7	70.2	27.7	6.1	72.3
#30	1.4	3.	3	52.8	21.0	6.7	79.0
#50	1.3	2.	8	20.0	8.5	12.5	91.5
#100	1.2	2.	7	3.6	2.2	6.3	97.8
LBW	0.9	2.	4	0.6	0.9	1.3	99.1

Aggregate Supplier Gradations

*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.

63

*% Retained must be at least 8% for the 1" sieve when

a 2" max. size (nom. Max. 1.5") aggregate is used.

Coarseness Fac	ctor: 66	Workability Factor:	34	
45 45, 44 (%) 40 45, 44 (%) 45, 33 Operating Bound	52, 41 52, 34	58, 39	JMF Zone 75, 39	
25 40 45 ActionLimits Boundary		5 Coarseness Factor (%) ⁷⁰	75	80

Batch Plant Gradations

Work	ability 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

PLANT #: P-39

Sample Date:

LBW

Production Gradation

7/18/22 Concrete Grade: DM, 4500HP

Dat	es Test F	Represents:	7/19/2022	through	7/25/2022		
Ag	g. 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

Contractor:

MDOT No.:

2.4

Adjusted WF Intial Production Sample (IPS)



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

		Total Wt	2905	17.69		100.0	< Verify this n	umber is 100%
Sieve	6AA		26	i A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0		100	0.0	100.0	100.0	0.0	0.0
1.5"	100.0		100	0.0	100.0	100.0	0.0	0.0
1"	97.7		100	0.0	100.0	98.7	1.3	1.3
3/4"	83.2		100	0.0	100.0	90.7	8.0	9.3
1/2"	37.5		98	3.7	100.0	65.4	25.3	34.6
3/8"	21.6		87	'.3	100.0	55.8	9.6	44.2
#4	2.5		23	3.4	97.0	39.7	16.1	60.3
#8	1.6		5.	.7	82.7	32.6	7.1	67.4
#16	1.4		3.	4	68.4	26.9	5.7	73.1
#30	1.3		2.	.8	51.6	20.4	6.5	79.6
#50	1.2		2.	.6	25.5	10.5	10.0	89.5
#100	1.1		2.	4	7.5	3.6	6.9	96.4

Aggregate Supplier Gradations

1.3

1.2

35.1

*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.

Coarseness Factor:	66	Workability Factor:	33	
45 45 44 45, 44 45, 33 Operating Zone Boundary	52, 41	58, 40 68, 38 68, 38 Production G		
Operating Zone Boundary 40 45	50 55	60 65 65 Coarseness Factor (%)	75, 28	80
ActionLimits Boundary =				

Work	ability 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

98.8

Coarseness Factor:

PREPARED BY: SM, LLC Technical Service

1.0

O Batch Plant Gradations

7/18/22

PLANT #: P-02

Sample Date:

Production Gradation

Concrete Grade: DM, 4500HP

Dates Test Represents:		7/19/2022	through	7/25/2022		
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

MDOT No.:

Contractor:

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:

35.3

---- Verify this number is 100%

SUPERIOR
MATERIALS

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"	87.6	100.0	100.0	93.1	6.9	6.9
1/2"	47.3	96.1	100.0	70.7	22.5	29.3
3/8"	22.4	83.6	100.0	56.3	14.4	43.7
#4	2.7	28.9	96.8	41.3	15.0	58.7
#8	1.6	11.1	79.2	32.8	8.5	67.2 r
#16	1.4	4.7	61.8	25.5	7.3	74.5
#30	1.4	3.3	45.5	19.0	6.5	81.0 r
#50	1.3	2.8	24.6	10.6	8.4	89.4
#100	1.2	2.7	5.3	2.9	7.7	97.1 a
LBW	0.9	2.4	0.8	0.9	2.0	99.1

Aggregate SupplierGradations

*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.

Coarseness Factor:		65	Workability Factor:	33	
45	45, 44			JMF Zone	$\overline{\mathbb{T}}$
40 (%)		52, 41	58, 39 68, 39 68, 38	75, 39	
Workability Factor (%)	45, 33	52, 34	■ 60, 36 IPS Production Grad	Jation	
	Operating Zone Boundary		58, 31 689,331	75, 28	
25 40 ActionLimits	45 s Boundary =	50 5	Coarseness Factor (%)	75	80

Batch Plant Gradations

Work	ability 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