

# Aggregate Optimization Chart

# Production Gradation Report

**PLANT #:** P11

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

Sample Date: 10/21/23

Concrete Grade: P1M, 3500HP

Dates Test Represents: 10/3/2023 through 10/9/2023

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



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

Aggr. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	Contribution %
CA	71-47	Presque Isle	660	4.04	2.62	21.5
IA	71-47	Presque Isle	1210	7.40	2.62	39.4
2NS	95-013	Smelter Bay	1200	7.26	2.65	39.1
<b>Total Wt</b>			<b>3070</b>	<b>18.70</b>		<b>100.0</b>

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.5	100.0	100.0	99.5	0.5	0.5
1"	31.5	100.0	100.0	85.3	14.2	14.7
3/4"	7.1	97.9	100.0	79.2	6.1	20.8
1/2"	3.2	81.9	100.0	72.1	7.1	27.9
3/8"	2.9	57.8	100.0	62.5	9.6	37.5
#4	2.6	11.6	97.5	43.2	19.3	56.8
#8	2.4	3.6	84.8	35.1	8.2	64.9
#16	2.3	2.6	69.4	28.6	6.4	71.4
#30	2.2	2.5	51.6	21.6	7.0	78.4
#50	2.0	2.2	24.5	10.9	10.8	89.1
#100	1.7	2.1	6.6	3.8	7.1	96.2
LBW	1.3	1.7	1.5	1.5	2.2	98.5

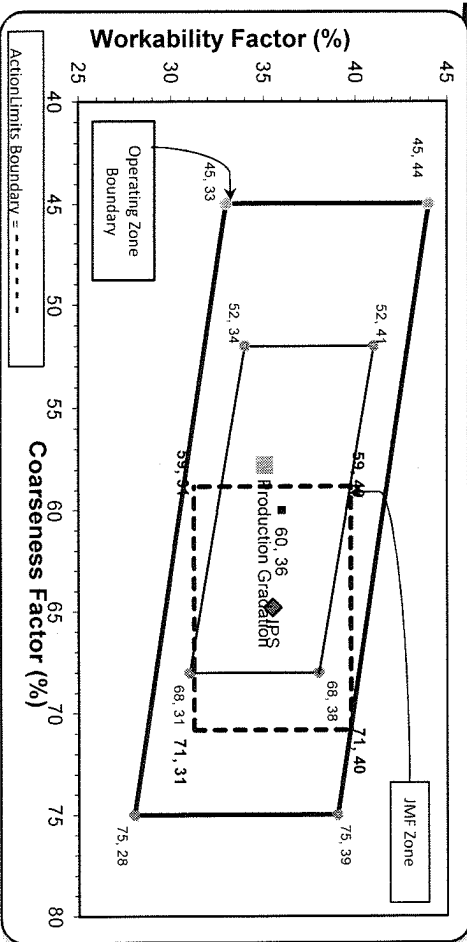
\*Maximum % Retained must be above the 3/8" sieve.  
\*Any two adjacent sieves must equal 10% except max.  
nom. max. #100 and #200 sieves.  
\*% Retained must be at least 4% for each sieve except max.  
nom. max. #100 and #200 sieves.  
\*\*% Retained must be at least 8% for the 1" sieve when a 2" max.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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Initial Production Sample (IPS)

Coarseness Factor: 58 Workability Factor: 35

Coarseness Factor: 65 Workability Factor: 36



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.0	0.6	0.6
1"	84.0	15.3	16.0
3/4"	73.5	10.5	26.5
1/2"	65.2	8.2	34.8
3/8"	58.2	7.1	41.8
#4	44.1	14.1	55.9
#8	35.5	8.6	64.5
#16	29.1	6.4	70.9
#30	21.9	7.3	78.1
#50	9.6	12.2	90.4
#100	2.6	7.1	97.4
LBW	1.0	1.6	99.0

PREPARED BY:  
SM, LLC Technical Service

Approved By: \_\_\_\_\_



**Plant** S11-Onsite Jefferson

**Product** 7919-COARSE AGG P1M LS

**Name/Title** Doug Storey / QC Technician

**Period:** 10/01/2023 - 10/07/2023

**Report Date** 10/07/2023

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	97.5	%	
	1" (25mm)	31.5	%	
	3/4" (19mm)	7.1	%	
	1/2" (12.5mm)	3.2	%	
	3/8" (9.5mm)	2.9	%	
	#4 (4.75mm)	2.6	%	
	#8 (2.36mm)	2.4	%	
	#16 (1.18mm)	2.3	%	
	#30 (.6mm)	2.2	%	
	#50 (.3mm)	2.0	%	
	#100 (.15mm)	1.7	%	
	#200 (75µm)	1.4	%	
	Wash Loss (#200/75um)	1.3	%	0-2
	Total Moisture	1.51	%	



Plant S11-Onsite Jefferson

Product 7920-INTERMED AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 10/01/2023 - 10/07/2023

Report Date 10/07/2023

Procedure	Sieve/Test	Result	Unit	Intermed Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	97.9	%	
	1/2" (12.5mm)	81.9	%	
	3/8" (9.5mm)	57.8	%	
	#4 (4.75mm)	11.6	%	
	#8 (2.36mm)	3.6	%	
	#16 (1.18mm)	2.6	%	
	#30 (.6mm)	2.5	%	
	#50 (.3mm)	2.2	%	
	#100 (.15mm)	2.1	%	
	#200 (75µm)	1.8	%	
	Wash Loss (#200/75µm)	1.7	%	0-3
	Total Moisture	3.92	%	



Plant S11-Onsite Jefferson

Product 1022-2NS GR

Period: 10/01/2023 - 10/07/2023

Name/Title Doug Storey / QC Technician

Report Date 10/07/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.5	%	95-100
	#8 (2.36mm)	84.8	%	65-95
	#16 (1.18mm)	69.4	%	35-75
	#30 (.6mm)	51.6	%	20-55
	#50 (.3mm)	24.5	%	10-30
	#100 (.15mm)	6.6	%	0-10
	#200 (75µm)	1.7	%	
	FM	2.66		2.6-3
	Wash Loss (#200/75um)	1.5	%	0-3
	Total Moisture	4.82	%	

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **12**

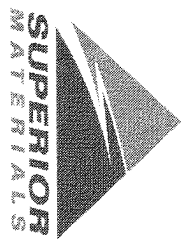
Sample Date: **10/2/23**

Dates Test Represents: **10/3/2023** through **10/9/2023**

Concrete Grade: **P1M, 3500HP**

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

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



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

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

Agg. Class	Pit #	Source	Weight (ssd)	ft <sup>3</sup>	Specific Gravity	Contribution %
CA	71-47	Presque Isle	820	5.02	2.62	26.7
IA	71-47	Presque Isle	1050	6.42	2.62	34.2
2NS	63-115	Ray Rd	1200	7.26	2.65	39.1
		<b>Total Wt</b>	<b>3070</b>	<b>18.70</b>		<b>100.0</b>

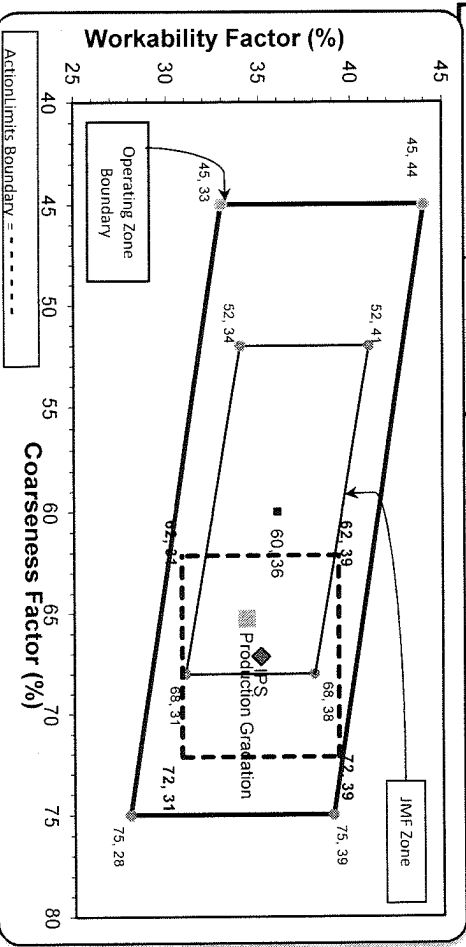
  

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.6	100.0	100.0	98.6	1.4	1.4
1"	24.5	100.0	100.0	79.8	18.7	20.2
3/4"	4.8	97.6	100.0	73.8	6.1	26.2
1/2"	2.1	76.0	100.0	65.6	8.1	34.4
3/8"	1.9	51.3	100.0	57.1	8.5	42.9
#4	1.9	12.2	96.3	42.3	14.8	57.7
#8	1.8	5.0	82.2	34.3	8.0	65.7
#16	1.8	3.8	67.9	28.3	6.0	71.7
#30	1.7	3.5	52.7	22.3	6.1	77.7
#50	1.6	3.3	25.1	11.4	10.9	88.6
#100	1.4	3.0	5.7	3.6	7.7	96.4
LBW	1.0	2.5	0.6	1.4	2.3	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

Coarseness Factor: **65** Workability Factor: **34**



Initial Production Sample (IPS)

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.6	0.4	0.4
1"	83.9	15.7	16.1
3/4"	74.0	9.8	26.0
1/2"	63.7	10.3	36.3
3/8"	56.4	7.3	43.6
#4	43.0	13.4	57.0
#8	35.1	7.9	64.9
#16	29.0	6.1	71.0
#30	20.9	8.0	79.1
#50	8.1	12.8	91.9
#100	1.6	6.5	98.4
LBW	0.9	0.8	99.1

Coarseness Factor: **67**

Workability Factor: **35**

PREPARED BY:  
SM, LLC Technical Service

Approved By: \_\_\_\_\_



**Plant** S12-Onsite Southfield

**Product** 7919-COARSE AGG P1M LS

**Period:** 10/01/2023 - 10/07/2023

**Name/Title** Doug Storey / QC Technician

**Report Date** 10/07/2023

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	94.6	%	
	1" (25mm)	24.5	%	
	3/4" (19mm)	4.8	%	
	1/2" (12.5mm)	2.1	%	
	3/8" (9.5mm)	1.9	%	
	#4 (4.75mm)	1.9	%	
	#8 (2.36mm)	1.8	%	
	#16 (1.18mm)	1.8	%	
	#30 (.6mm)	1.7	%	
	#50 (.3mm)	1.6	%	
	#100 (.15mm)	1.4	%	
	#200 (75µm)	1.2	%	
	Wash Loss (#200/75um)	1.0	%	0-2
	Total Moisture	0.12	%	



Plant S12-Onsite Southfield

Product 7920-INTERMED AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 10/01/2023 - 10/07/2023

Report Date 10/07/2023

Procedure	Sieve/Test	Result	Unit	Intermed Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	97.6	%	
	1/2" (12.5mm)	76.0	%	
	3/8" (9.5mm)	51.3	%	
	#4 (4.75mm)	12.2	%	
	#8 (2.36mm)	5.0	%	
	#16 (1.18mm)	3.8	%	
	#30 (.6mm)	3.5	%	
	#50 (.3mm)	3.3	%	
	#100 (.15mm)	3.0	%	
	#200 (75µm)	2.7	%	
	Wash Loss (#200/75um)	2.5	%	0-3
	Total Moisture	1.10	%	



Plant S12-Onsite Southfield

Product 1022-2NS GR

Period: 10/01/2023 - 10/07/2023

Name/Title Doug Storey / QC Technician

Report Date 10/07/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.3	%	95-100
	#8 (2.36mm)	82.2	%	65-95
	#16 (1.18mm)	67.9	%	35-75
	#30 (.6mm)	52.7	%	20-55
	#50 (.3mm)	25.1	%	10-30
	#100 (.15mm)	5.7	%	0-10
	#200 (75µm)	0.9	%	
	FM	2.70		2.6-3
	Wash Loss (#200/75um)	0.6	%	0-3
	Total Moisture	3.85	%	



# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-32**

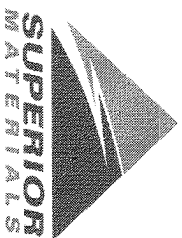
Sample Date: **10/2/23**

Dates Test Represents: **10/3/2023** through **10/9/2023**

Concrete Grade: **P1M, 3500HP**

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

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



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

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

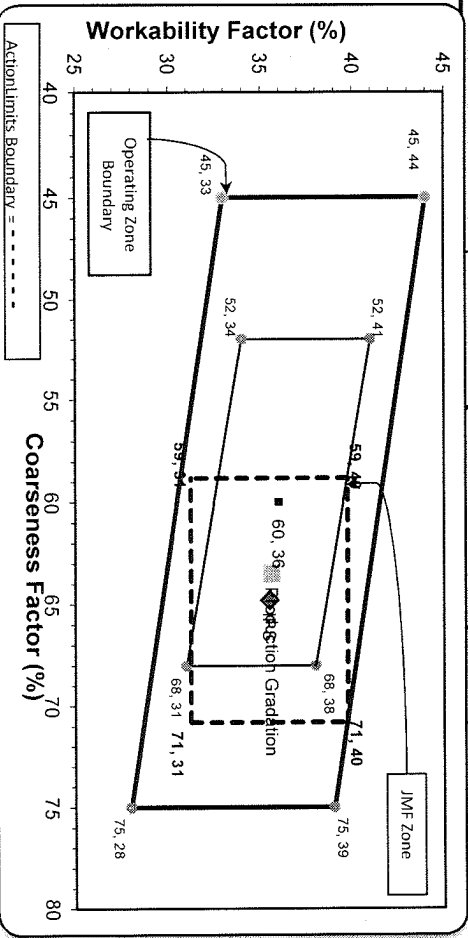
Agg. Class	Pit #	Source	Weight (ssd)	ft <sup>3</sup>	Specific Gravity	Contribution %
CA	71-47	Presque Isle	660	4.04	2.62	21.5
IA	71-47	Presque Isle	1210	7.40	2.62	39.4
NNS	95-013	Smelter Bay	1200	7.26	2.65	39.1
		<b>Total Wt</b>	<b>3070</b>	<b>18.70</b>		<b>100.0</b>

Sieve	CA	IA	NNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	92.8	100.0	100.0	98.5	1.5	1.5
1"	34.7	100.0	100.0	86.0	12.5	14.0
3/4"	8.1	97.4	100.0	79.2	6.7	20.8
1/2"	2.8	74.9	100.0	69.2	10.0	30.8
3/8"	2.1	49.7	100.0	59.1	10.1	40.9
#4	1.9	8.9	96.9	41.8	17.3	58.2
#8	1.8	3.9	86.2	35.6	6.2	64.4
#16	1.8	3.1	71.5	29.6	6.1	70.4
#30	1.7	2.9	52.6	22.1	7.5	77.9
#50	1.7	2.7	24.4	11.0	11.1	89.0
#100	1.5	2.6	7.0	4.1	6.9	95.9
LBW	1.2	2.2	1.3	1.6	2.5	98.4

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Coarseness Factor: **63** Workability Factor: **36**



Initial Production Sample (IPS)

Coarseness Factor: **65** Workability Factor: **36**

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.0	0.6	0.6
1"	84.0	15.3	16.0
3/4"	73.5	10.5	26.5
1/2"	65.2	8.2	34.8
3/8"	58.2	7.1	41.8
#4	44.1	14.1	55.9
#8	35.5	8.6	64.5
#16	29.1	6.4	70.9
#30	21.9	7.3	78.1
#50	9.6	12.2	90.4
#100	2.6	7.1	97.4
LBW	1.0	1.6	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.

PREPARED BY:  
SM, LLC Technical Service

Approved By: \_\_\_\_\_

# Edw. C. Levy Co.

JMT  
 8911 W. Jefferson  
 Detroit, 48209  
 (313) 429-2429

**Plant** 958-JMT  
**Product** 7919-COARSE AGG P1M LS PI  
**Period:** 10/01/2023 - 10/07/2023

**Name/Title** Doug Storey / QC Technician  
**Report Date** 10/07/2023

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	92.8	%	
	1" (25mm)	34.7	%	
	3/4" (19mm)	8.1	%	
	1/2" (12.5mm)	2.8	%	
	3/8" (9.5mm)	2.1	%	
	#4 (4.75mm)	1.9	%	
	#8 (2.36mm)	1.8	%	
	#16 (1.18mm)	1.8	%	
	#30 (.6mm)	1.7	%	
	#50 (.3mm)	1.7	%	
	#100 (.15mm)	1.5	%	
	#200 (75µm)	1.3	%	
	Wash Loss (#200/75µm)	1.2	%	0-2
	Total Moisture	1.1	%	

Plant 958-JMT  
 Product 7920-INTERMED AGG P1M LS PI  
 Period: 10/01/2023 - 10/07/2023

Name/Title Doug Storey / QC Technician  
 Report Date 10/07/2023

Procedure	Sieve/Test	Result	Unit	Intermed Agg P1M LS PI Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	97.4	%	
	1/2" (12.5mm)	74.9	%	
	3/8" (9.5mm)	49.7	%	
	#4 (4.75mm)	8.9	%	
	#8 (2.36mm)	3.9	%	
	#16 (1.18mm)	3.1	%	
	#30 (.6mm)	2.9	%	
	#50 (.3mm)	2.7	%	
	#100 (.15mm)	2.6	%	
	#200 (75µm)	2.3	%	
	Wash Loss (#200/75um)	2.2	%	0-3
	Total Moisture	2.9	%	

Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Name/Title Doug Storey / QC Technician

Period: 10/01/2023 - 10/07/2023

Report Date 10/07/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.9	%	95-100
	#8 (2.36mm)	86.2	%	65-95
	#16 (1.18mm)	71.5	%	35-75
	#30 (.6mm)	52.6	%	20-55
	#50 (.3mm)	24.4	%	10-30
	#100 (.15mm)	7.0	%	0-10
	#200 (75µm)	1.6	%	
	FM	2.61		2.6-3
	Wash Loss (#200/75um)	1.3	%	0-3
	Total Moisture	2.9	%	

# Aggregate Optimization Chart

# Production Gradation Report

PLANT #: **P-102**

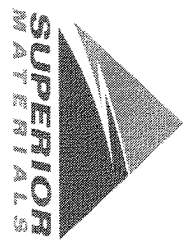
Sample Date: **10/21/23**

Dates Test Represents: **10/3/2023** through **10/9/2023**

Concrete Grade: **P1M, 3500HP**

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

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



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

<--- Verify this number is 100%

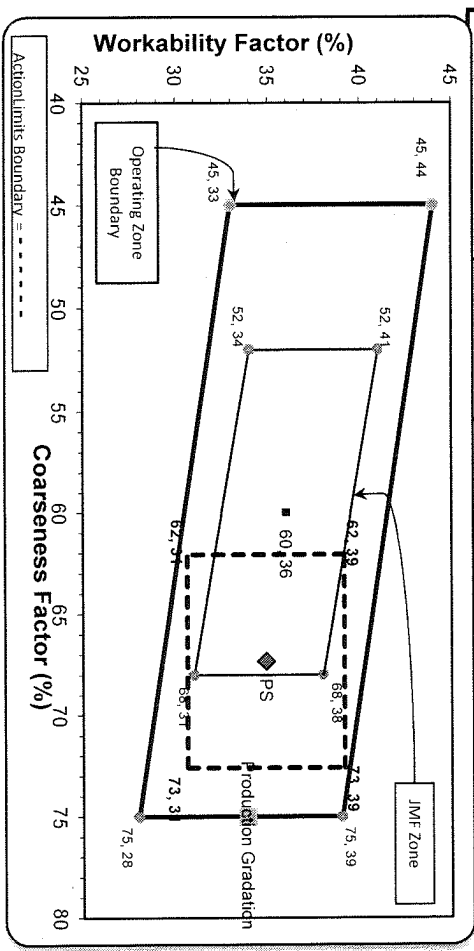
Agg. Class	Pit #	Source	Weight (ssd)	ft <sup>3</sup>	Specific Gravity	Contribution %
CA	58-003	Stoneco	1370	8.16	2.69	43.9
IA	58-003	Stoneco	550	3.28	2.69	17.6
NNS	81-019	Pleasant Lake	1200	7.26	2.65	38.5
<b>Total Wt:</b>			<b>3120</b>	<b>18.70</b>		<b>100.0</b>

Sieve	CA	IA	NNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.0	100.0	100.0	99.1	0.9	0.9
1"	36.8	100.0	100.0	72.2	26.9	27.8
3/4"	8.4	100.0	100.0	59.8	12.5	40.2
1/2"	2.7	82.9	100.0	54.3	5.5	45.7
3/8"	1.5	64.0	100.0	50.4	3.9	49.6
#4	1.3	11.6	98.5	40.5	9.9	59.5
#8	1.2	3.6	85.1	33.9	6.6	66.1
#16	1.1	2.3	65.7	26.2	7.7	73.8
#30	1.0	1.9	46.2	18.5	7.6	81.5
#50	1.0	1.7	21.5	9.0	9.5	91.0
#100	0.9	1.7	4.8	2.5	6.5	97.5
LBW	0.7	1.5	1.3	1.1	1.5	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

Coarseness Factor: **75** Workability Factor: **34**



Initial Production Sample (IPS)

Coarseness Factor:	Workability Factor:	% Retained	Cumulative % Retained
<b>67</b>	<b>35</b>	0.0	0.0
2"		0.0	0.0
1.5"		0.0	0.0
1"		14.5	14.5
3/4"		12.1	26.6
1/2"		12.4	39.0
3/8"		4.8	43.8
#4		13.1	56.9
#8		8.2	65.1
#16		5.5	70.6
#30		7.8	78.4
#50		13.4	91.9
#100		5.9	97.8
LBW		0.8	98.6

PREPARED BY:  
 SM, LLC Technical Service

Approved By: \_\_\_\_\_



**Plant** S102-Superior Novi  
**Product** 7919-COARSE AGG P1M LS  
**Period:** 10/01/2023 - 10/07/2023

**Name/Title** Doug Storey / QC Technician  
**Report Date** 10/07/2023

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	98.0	%	
	1" (25mm)	36.8	%	
	3/4" (19mm)	8.4	%	
	1/2" (12.5mm)	2.7	%	
	3/8" (9.5mm)	1.5	%	
	#4 (4.75mm)	1.3	%	
	#8 (2.36mm)	1.2	%	
	#16 (1.18mm)	1.1	%	
	#30 (.6mm)	1.0	%	
	#50 (.3mm)	1.0	%	
	#100 (.15mm)	0.9	%	
	#200 (75µm)	0.8	%	
	Wash Loss (#200/75um)	0.7	%	0-2
	Total Moisture	0.91	%	



Plant S102-Superior Novi

Product 1051-6AA LS

Name/Title Doug Storey / QC Technician

Period: 10/01/2023 - 10/07/2023

Report Date 10/07/2023

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	100.0	%	95-100
	3/4" (19mm)	77.2	%	
	1/2" (12.5mm)	30.7	%	30-60
	3/8" (9.5mm)	11.4	%	
	#4 (4.75mm)	2.4	%	0-8
	#8 (2.36mm)	1.8	%	
	#16 (1.18mm)	1.6	%	
	#30 (.6mm)	1.5	%	
	#50 (.3mm)	1.4	%	
	#100 (.15mm)	1.3	%	
	#200 (75µm)	1.18	%	
	Wash Loss (#200/75µm)	1.0	%	0-2
	Total Moisture	1.92	%	



Plant S102-Superior Novi  
Product 7920-INTERMED AGG P1M LS  
Period: 10/01/2023 - 10/07/2023

Name/Title Doug Storey / QC Technician  
Report Date 10/07/2023

Procedure	Sieve/Test	Result	Unit	Intermed Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	
	1/2" (12.5mm)	82.9	%	
	3/8" (9.5mm)	64.0	%	
	#4 (4.75mm)	11.6	%	
	#8 (2.36mm)	3.6	%	
	#16 (1.18mm)	2.3	%	
	#30 (.6mm)	1.9	%	
	#50 (.3mm)	1.7	%	
	#100 (.15mm)	1.7	%	
	#200 (75µm)	1.6	%	
	Wash Loss (#200/75um)	1.5	%	0-3
	Total Moisture	1.42	%	