

Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-101**

Sample Date: 10/15/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/16/2018 through 10/22/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	950	5.81	2.62	30.9
IA	71-47	Presque Isle	875	5.35	2.62	28.5
2NS	75-051	Mid-Michigan	1250	7.53	2.66	40.7
Total Wt			3075	18.69		100.0

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

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.6	100.0	100.0	99.6	0.4	0.4
1"	41.2	100.0	100.0	81.8	17.7	18.2
3/4"	13.4	98.8	100.0	72.9	8.9	27.1
1/2"	2.5	86.7	100.0	66.1	6.8	33.9
3/8"	1.6	64.0	100.0	59.4	6.7	40.6
#4	1.2	14.4	99.2	44.8	14.6	55.2
#8	1.1	3.7	82.1	34.8	10.0	65.2
#16	1.0	2.3	64.4	27.1	7.6	72.9
#30	1.0	2.0	46.7	19.9	7.3	80.1
#50	0.9	1.9	22.0	9.8	10.1	90.2
#100	0.9	1.8	5.4	3.0	6.8	97.0
LBW	0.8	1.6	0.8	1.0	2.0	99.0



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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

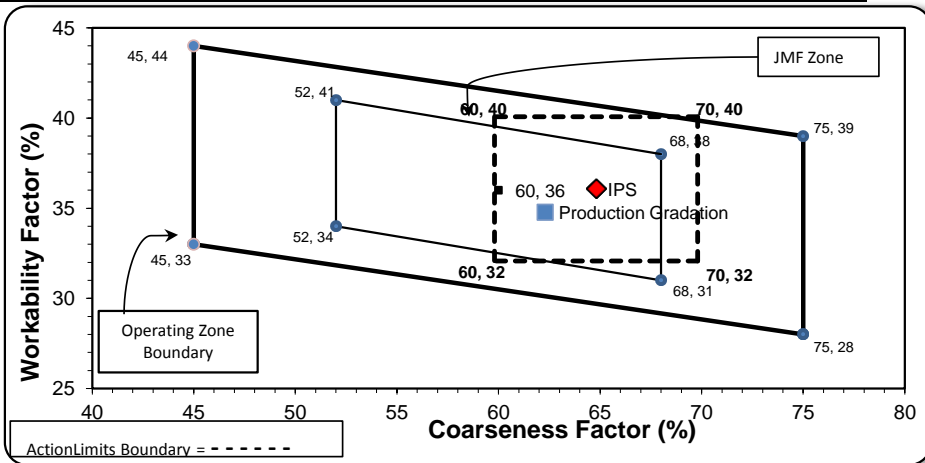
Coarseness Factor:	62	Workability Factor:	35
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Initial Production Sample (IPS)

Coarseness Factor:	65
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Workability Factor:	36
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Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.3	0.7	0.7
1"	83.6	15.7	16.4
3/4"	73.0	10.6	27.0
1/2"	65.1	7.9	34.9
3/8"	58.6	6.5	41.4
#4	45.8	12.8	54.2
#8	36.1	9.7	63.9
#16	28.8	7.3	71.2
#30	21.7	7.1	78.3
#50	10.3	11.4	89.7
#100	3.1	7.2	96.9
LBW	1.3	1.8	98.7



PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-102**

Sample Date: 10/15/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/16/2018 through 10/22/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	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
2NS	38-046	Chelsea	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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



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Sieve	CA	IA	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"	64.9	100.0	100.0	84.6	15.4	15.4
3/4"	39.2	100.0	100.0	73.3	11.3	26.7
1/2"	15.6	93.9	100.0	61.9	11.4	38.1
3/8"	6.7	82.9	100.0	56.0	5.8	44.0
#4	2.5	25.0	100.0	44.0	12.1	56.0
#8	1.7	6.6	88.0	35.8	8.2	64.2
#16	1.5	2.8	64.0	25.8	10.0	74.2
#30	1.3	2.0	43.0	17.5	8.3	82.5
#50	1.3	1.8	22.0	9.3	8.1	90.7
#100	1.2	1.7	5.0	2.7	6.6	97.3
LBW	1.0	1.5	0.6	0.9	1.8	99.1

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

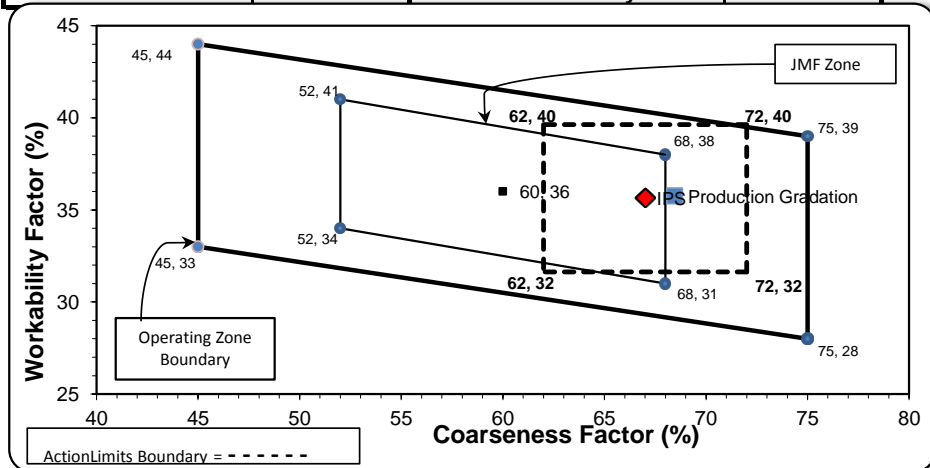
*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.

*% 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

Coarseness Factor: **68** Workability Factor: **36**



Initial Production Sample (IPS)

Coarseness Factor: 67		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"	87.2	12.8	12.8
3/4"	76.6	10.6	23.4
1/2"	64.4	12.2	35.6
3/8"	56.9	7.6	43.1
#4	44.1	12.7	55.9
#8	35.6	8.5	64.4
#16	27.7	8.0	72.3
#30	19.5	8.2	80.5
#50	7.8	11.6	92.2
#100	2.3	5.6	97.7
LBW	0.6	1.6	99.4

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Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-32**

Sample Date: 10/15/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/16/2018 through 10/22/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	920	5.63	2.62	30.0
IA	71-47	Presque Isle	900	5.50	2.62	29.3
2NS	95-13	Smelter Bay	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	93.5	100.0	100.0	98.1	1.9	1.9
1"	44.6	100.0	100.0	83.4	14.7	16.6
3/4"	13.4	98.8	100.0	73.7	9.7	26.3
1/2"	4.9	79.4	100.0	65.5	8.2	34.5
3/8"	3.9	51.8	100.0	57.1	8.4	42.9
#4	2.6	9.1	97.7	43.2	13.8	56.8
#8	2.4	2.9	85.9	36.5	6.7	63.5
#16	2.3	2.1	68.0	29.0	7.6	71.0
#30	2.3	2.0	45.6	19.8	9.1	80.2
#50	2.2	1.9	18.4	8.7	11.1	91.3
#100	2.0	1.7	3.7	2.6	6.1	97.4
LBW	1.6	1.3	0.7	1.1	1.5	98.9

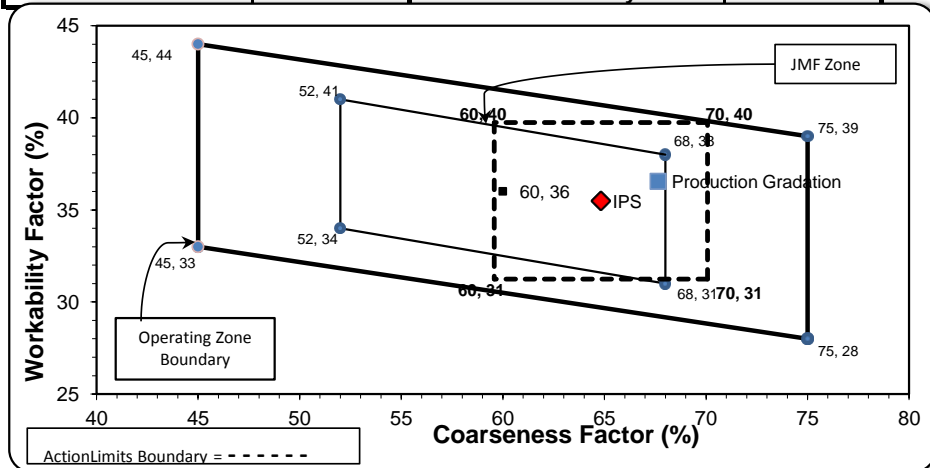
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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



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Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: **68** Workability Factor: **37**



Initial Production Sample (IPS)

Coarseness Factor: **65**
 Workability Factor: **35**

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.4	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:
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Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-36**

Contractor: _____

Sample Date: 10/15/18

Concrete Grade: **P1M**

Dates Test Represents: 10/16/2018 through 10/22/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	920	5.63	2.62	30.0
IA	71-47	Presque Isle	900	5.50	2.62	29.3
2NS	63-92	AA Grange Hall	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



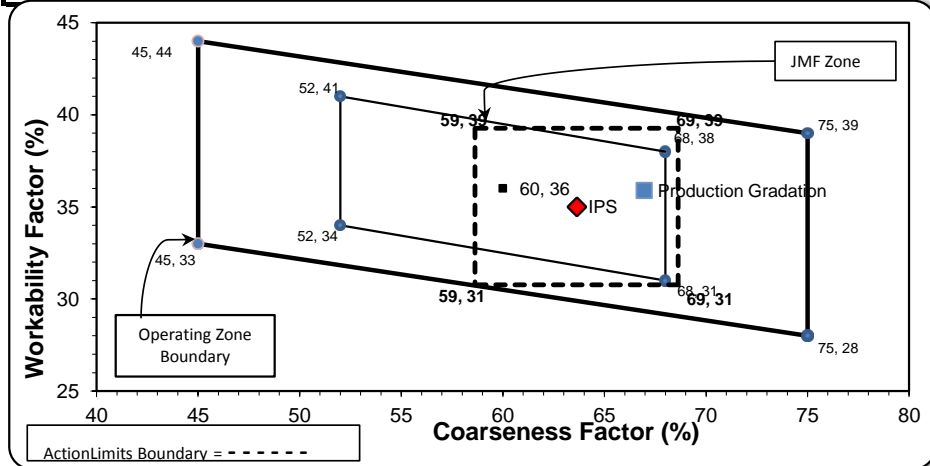
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	93.5	100.0	100.0	98.1	1.9	1.9
1"	44.6	100.0	100.0	83.4	14.7	16.6
3/4"	13.4	98.8	100.0	73.7	9.7	26.3
1/2"	4.9	79.4	100.0	65.5	8.2	34.5
3/8"	3.9	51.8	100.0	57.1	8.4	42.9
#4	2.6	9.1	96.9	42.9	14.2	57.1
#8	2.4	2.9	84.3	35.9	7.0	64.1
#16	2.3	2.1	69.6	29.6	6.2	70.4
#30	2.3	2.0	52.3	22.6	7.1	77.4
#50	2.2	1.9	24.6	11.2	11.3	88.8
#100	2.0	1.7	3.3	2.4	8.8	97.6
LBW	1.6	1.3	0.3	1.0	1.5	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

Coarseness Factor: 67 **Workability Factor:** 36



Initial Production Sample (IPS)

Coarseness Factor: 64
Workability Factor: 35

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.4	0.6	0.6
1"	84.6	14.7	15.4
3/4"	74.4	10.3	25.6
1/2"	66.0	8.4	34.0
3/8"	58.7	7.4	41.3
#4	44.6	14.0	55.4
#8	35.0	9.6	65.0
#16	27.6	7.4	72.4
#30	19.5	8.1	80.5
#50	8.6	11.0	91.4
#100	2.0	6.6	98.0
LBW	0.9	1.1	99.1

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Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: P-39

Sample Date: 10/15/18

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 10/16/2018 through 10/22/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1000	6.12	2.62	32.6
IA	71-47	Presque Isle	750	4.59	2.62	24.4
2NS	63-115	Ray Road	1320	7.98	2.65	43.0
Total Wt			3070	18.69		100.0

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

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.6	100.0	100.0	99.5	0.5	0.5
1"	41.2	100.0	100.0	80.8	18.7	19.2
3/4"	13.4	98.8	100.0	71.5	9.3	28.5
1/2"	2.5	86.7	100.0	65.0	6.5	35.0
3/8"	1.6	64.0	100.0	59.2	5.8	40.8
#4	1.2	14.4	96.0	45.2	14.0	54.8
#8	1.1	3.7	77.7	34.7	10.5	65.3
#16	1.0	2.3	61.1	27.2	7.5	72.8
#30	1.0	2.0	46.6	20.9	6.3	79.1
#50	0.9	1.9	25.6	11.8	9.1	88.2
#100	0.9	1.8	5.7	3.2	8.6	96.8
LBW	0.8	1.6	0.5	0.9	2.3	99.1

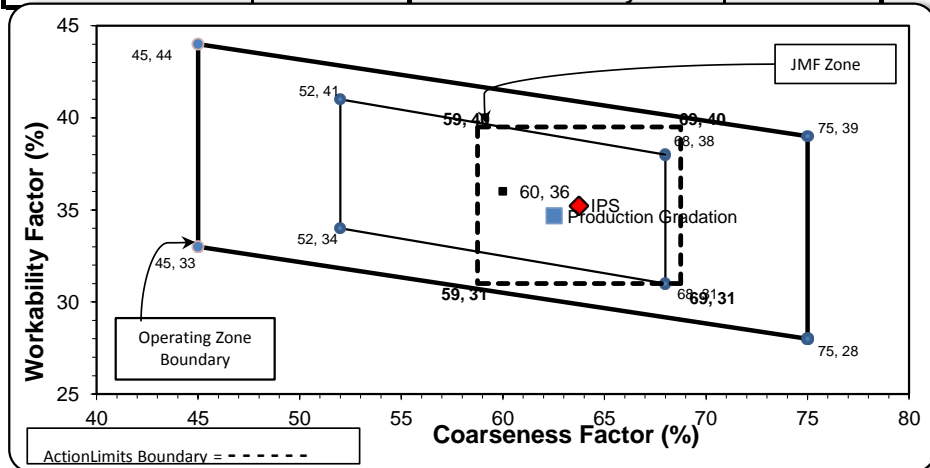


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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

Coarseness Factor: 63 Workability Factor: 35



Initial Production Sample (IPS)

Coarseness Factor: 64
 Workability Factor: 35

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.4	0.6	0.6
1"	84.3	15.1	15.7
3/4"	73.9	10.4	26.1
1/2"	65.7	8.2	34.3
3/8"	58.7	7.0	41.3
#4	45.1	13.6	54.9
#8	35.3	9.8	64.7
#16	28.1	7.2	71.9
#30	21.2	6.9	78.8
#50	10.1	11.1	89.9
#100	3.1	7.0	96.9
LBW	1.4	1.7	98.6

PREPARED BY:
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Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP154ER, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-02**

Sample Date: 10/15/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 10/16/2018 through 10/22/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	920	5.63	2.62	30.0
IA	71-47	Presque Isle	900	5.50	2.62	29.3
2NS	63-92	AA Grange Hall	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



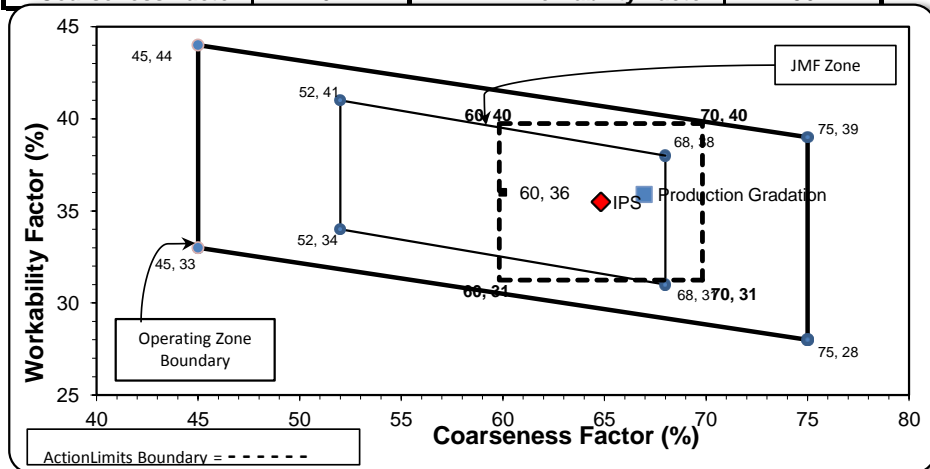
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	93.5	100.0	100.0	98.1	1.9	1.9
1"	44.6	100.0	100.0	83.4	14.7	16.6
3/4"	13.4	98.8	100.0	73.7	9.7	26.3
1/2"	4.9	79.4	100.0	65.5	8.2	34.5
3/8"	3.9	51.8	100.0	57.1	8.4	42.9
#4	2.6	9.1	96.9	42.9	14.2	57.1
#8	2.4	2.9	84.3	35.9	7.0	64.1
#16	2.3	2.1	69.6	29.6	6.2	70.4
#30	2.3	2.0	52.3	22.6	7.1	77.4
#50	2.2	1.9	24.6	11.2	11.3	88.8
#100	2.0	1.7	3.3	2.4	8.8	97.6
LBW	1.6	1.3	0.3	1.0	1.5	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

Coarseness Factor: 67 **Workability Factor:** 36



Initial Production Sample (IPS)

Coarseness Factor: 65 **Workability Factor:** 35

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.4	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: