

Aggregate Optimization Chart

PLANT #: **P-103**

Sample Date: 11/9/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 11/10/2020 through 11/16/2020

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%



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" | 82.2 | 100.0 | 100.0 | 91.0 | 9.0 | 9.0 |
| 1/2" | 44.0 | 98.5 | 100.0 | 71.4 | 19.5 | 28.6 |
| 3/8" | 23.3 | 70.9 | 100.0 | 58.1 | 13.4 | 41.9 |
| #4 | 3.7 | 17.5 | 98.9 | 42.2 | 15.9 | 57.8 |
| #8 | 1.2 | 4.4 | 83.1 | 33.4 | 8.8 | 66.6 |
| #16 | 0.8 | 2.1 | 63.6 | 25.4 | 8.0 | 74.6 |
| #30 | 0.7 | 1.7 | 44.0 | 17.7 | 7.7 | 82.3 |
| #50 | 0.6 | 1.6 | 17.3 | 7.2 | 10.5 | 92.8 |
| #100 | 0.6 | 1.4 | 2.9 | 1.6 | 5.6 | 98.4 |
| LBW | 0.4 | 0.9 | 0.4 | 0.5 | 1.1 | 99.5 |

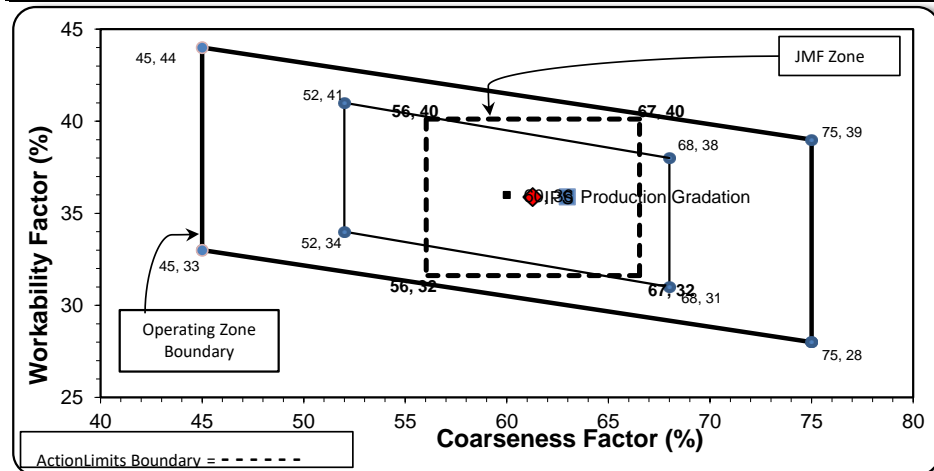
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

| | | | | | |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|
| Coarseness Factor: | 63 | Workability Factor: | 33 | Adjusted WF | 35.9 |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|

| | |
|----------------------------|-----------|
| 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 |

PREPARED BY:
 SM, LLC Technical Service

Approved BY:

Aggregate Optimization Chart

PLANT #: P-20

Contractor: _____

Sample Date: 11/9/20

Concrete Grade: DM

Dates Test Represents: 11/10/2020 through 11/16/2020

MDOT No.: _____

| Agg. Class | Pit # | Source | Weight (SSD) | ft ³ | Specific Gravity | % Contribution |
|-----------------|-------|--------------|--------------|-----------------|------------------|----------------|
| 6AA | 71-47 | Presque Isle | 1555 | 9.51 | 2.62 | 53.5 |
| 26A | 71-47 | Presque Isle | 250 | 1.53 | 2.62 | 8.6 |
| 2NS | 63-92 | Grange Hall | 1100 | 6.65 | 2.65 | 37.9 |
| Total Wt | | | 2905 | 17.69 | | 100.0 |

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



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" | 98.6 | 100.0 | 100.0 | 99.3 | 0.7 | 0.7 |
| 3/4" | 81.1 | 100.0 | 100.0 | 89.9 | 9.4 | 10.1 |
| 1/2" | 35.9 | 98.8 | 100.0 | 65.6 | 24.3 | 34.4 |
| 3/8" | 19.7 | 90.9 | 100.0 | 56.2 | 9.4 | 43.8 |
| #4 | 2.6 | 16.3 | 97.2 | 39.6 | 16.6 | 60.4 |
| #8 | 1.7 | 5.0 | 83.7 | 33.0 | 6.6 | 67.0 |
| #16 | 1.6 | 2.5 | 68.4 | 27.0 | 6.1 | 73.0 |
| #30 | 1.5 | 2.1 | 46.8 | 18.7 | 8.3 | 81.3 |
| #50 | 1.4 | 1.9 | 17.4 | 7.5 | 11.2 | 92.5 |
| #100 | 1.4 | 1.8 | 1.9 | 1.6 | 5.9 | 98.4 |
| LBW | 1.3 | 1.6 | 0.2 | 0.9 | 0.7 | 99.1 |

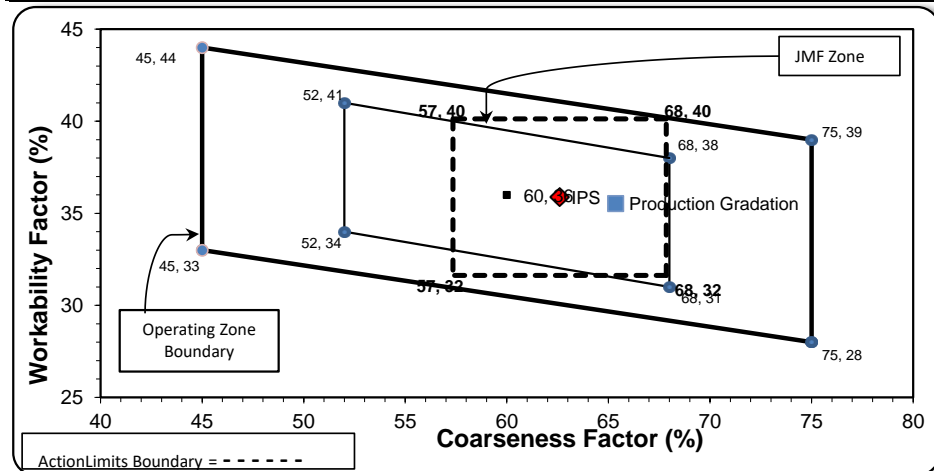
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

| | | | | | |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|
| Coarseness Factor: | 65 | Workability Factor: | 33 | Adjusted WF | 35.5 |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|

| | |
|----------------------------|-----------|
| 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" | 89.2 | 10.8 | 10.8 |
| 1/2" | 68.4 | 20.8 | 31.6 |
| 3/8" | 59.9 | 8.6 | 40.1 |
| #4 | 43.0 | 16.9 | 57.0 |
| #8 | 35.9 | 7.1 | 64.1 |
| #16 | 29.0 | 6.8 | 71.0 |
| #30 | 21.3 | 7.7 | 78.7 |
| #50 | 9.9 | 11.4 | 90.1 |
| #100 | 2.4 | 7.5 | 97.6 |
| LBW | 1.2 | 1.2 | 98.8 |

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 11/9/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 11/10/2020 through 11/16/2020

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 | 150 | 0.92 | 2.62 | 5.2 |
| 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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 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" | 97.0 | 100.0 | 100.0 | 98.3 | 1.7 | 1.7 |
| 3/4" | 80.3 | 100.0 | 100.0 | 89.1 | 9.2 | 10.9 |
| 1/2" | 42.6 | 96.5 | 100.0 | 68.1 | 21.0 | 31.9 |
| 3/8" | 26.3 | 84.6 | 100.0 | 58.5 | 9.6 | 41.5 |
| #4 | 5.6 | 14.3 | 95.1 | 41.5 | 17.0 | 58.5 |
| #8 | 2.5 | 4.4 | 82.8 | 34.4 | 7.1 | 65.6 |
| #16 | 2.3 | 2.9 | 67.3 | 28.1 | 6.3 | 71.9 |
| #30 | 2.2 | 2.5 | 46.5 | 19.8 | 8.3 | 80.2 |
| #50 | 2.0 | 2.5 | 24.4 | 10.9 | 8.9 | 89.1 |
| #100 | 1.9 | 2.5 | 8.6 | 4.6 | 6.3 | 95.4 |
| LBW | 1.5 | 1.7 | 1.1 | 1.4 | 3.2 | 98.6 |

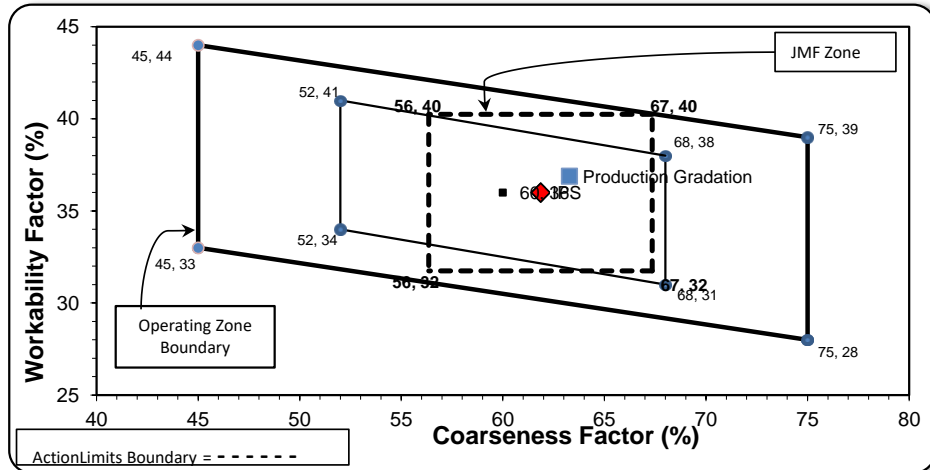
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

| | | | | | |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|
| Coarseness Factor: | 63 | Workability Factor: | 34 | Adjusted WF | 36.9 |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|

| | |
|----------------------------|-----------|
| 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 |

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 11/9/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 11/10/2020 through 11/16/2020

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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 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" | 96.8 | 100.0 | 100.0 | 98.2 | 1.8 | 1.8 |
| 3/4" | 73.9 | 100.0 | 100.0 | 85.6 | 12.7 | 14.4 |
| 1/2" | 38.9 | 96.5 | 100.0 | 66.0 | 19.6 | 34.0 |
| 3/8" | 23.6 | 84.6 | 100.0 | 56.7 | 9.3 | 43.3 |
| #4 | 5.3 | 14.3 | 97.2 | 40.7 | 16.0 | 59.3 |
| #8 | 2.9 | 4.4 | 83.7 | 33.6 | 7.1 | 66.4 |
| #16 | 2.4 | 2.9 | 68.4 | 27.4 | 6.2 | 72.6 |
| #30 | 2.2 | 2.5 | 46.8 | 19.1 | 8.3 | 80.9 |
| #50 | 2.1 | 2.5 | 17.4 | 7.9 | 11.2 | 92.1 |
| #100 | 1.9 | 2.5 | 1.9 | 1.9 | 6.0 | 98.1 |
| LBW | 1.3 | 1.7 | 0.2 | 0.9 | 1.0 | 99.1 |

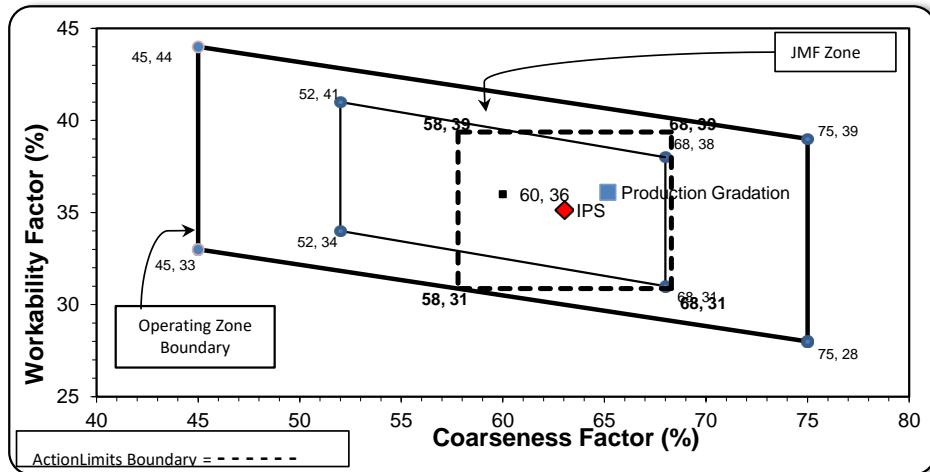
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

| | | | | | |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|
| Coarseness Factor: | 65 | Workability Factor: | 34 | Adjusted WF | 36.1 |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|

| | |
|----------------------------|-----------|
| 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" | 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 |

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-02**

Sample Date: 11/9/20

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 11/10/2020 through 11/16/2020

MDOT No.: _____

| Agg. Class | Pit # | Source | Weight (SSD) | ft ³ | Specific Gravity | % Contribution |
|-----------------|--------|--------------|--------------|-----------------|------------------|----------------|
| 6AA | 71-47 | Presque Isle | 1655 | 10.12 | 2.62 | 57.0 |
| 26A | 71-47 | Presque Isle | 100 | 0.61 | 2.62 | 3.4 |
| 2NS | 63-115 | Ray Rd | 1150 | 6.95 | 2.65 | 39.6 |
| Total Wt | | | 2905 | 17.69 | | 100.0 |

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



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" | 96.8 | 100.0 | 100.0 | 98.2 | 1.8 | 1.8 |
| 3/4" | 73.9 | 100.0 | 100.0 | 85.1 | 13.0 | 14.9 |
| 1/2" | 38.9 | 96.5 | 100.0 | 65.1 | 20.1 | 34.9 |
| 3/8" | 23.6 | 84.6 | 100.0 | 55.9 | 9.1 | 44.1 |
| #4 | 5.3 | 14.3 | 97.9 | 42.3 | 13.7 | 57.7 |
| #8 | 2.9 | 4.4 | 79.9 | 33.4 | 8.8 | 66.6 |
| #16 | 2.4 | 2.9 | 62.6 | 26.2 | 7.2 | 73.8 |
| #30 | 2.2 | 2.5 | 45.8 | 19.5 | 6.8 | 80.5 |
| #50 | 2.1 | 2.5 | 20.4 | 9.4 | 10.1 | 90.6 |
| #100 | 1.9 | 2.5 | 3.4 | 2.5 | 6.8 | 97.5 |
| LBW | 1.3 | 1.7 | 0.4 | 1.0 | 1.6 | 99.0 |

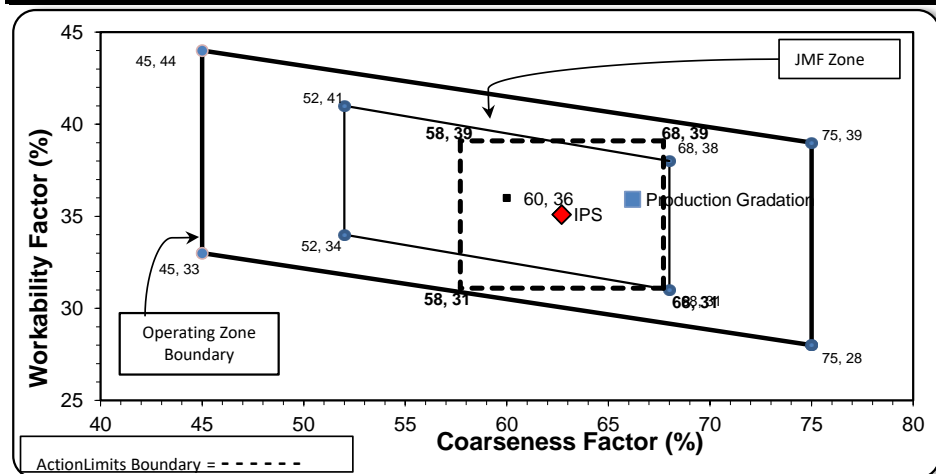
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

| | | | | | |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|
| Coarseness Factor: | 66 | Workability Factor: | 33 | Adjusted WF | 35.9 |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|

| | |
|----------------------------|-----------|
| 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: