**Washington State Department of Transportation - Materials Laboratory**
**PO Box 47365 Olympia / 1655 2nd Ave. Tumwater / WA 98504**
**BITUMINOUS SECTION REFERENCE MIX DESIGN VERIFICATION REPORT**

TEST OF: HMA CLASS: SUPERPAVE 12.5 mm — WORK ORDER NO: 006932
DATE REQUESTED: 2/7/07 — REFERENCE NO: 270007
REVIEWED BY: JRD — MIX ID NO: G51432
SR NO: 405 — REFERENCED FROM WORK ORDER NO: 6932
SECTION: TOTEM LK/NE 128TH ST HOV DIRECT ACCESS/FREEWAY STATION — CONTRACTOR: LAKESIDE

VALID FOR 2007

**CONTRACTOR'S MIX DESIGN TEST DATA**

| | | | | | | Specifications |
|---|---|---|---|---|---|---|
| Pb | | 5.5 | 5.9 | 6.5 | | |
| % Gmm @ Nini: | 8 | 84.0 | 85.6 | 86.6 | ≤ | 89.0 |
| % Va @ Ndes: | 100 | 5.2 | 4.1 | 3.0 | Approximate | 4.0 |
| % VMA @ Ndes: | 100 | 15.2 | 15.1 | 15.1 | ≥ | 14.0 |
| % VFA @ Ndes: | 100 | 66 | 73 | 80 | | 65 - 75 |
| % Gmm @ Nmax: | 160 | | 97.2 | | ≤ | 98.0 |
| D/A | | 1.3 | 1.2 | 1.1 | | 0.6 - 1.6 |
| Pbe | | 4.4 | 4.8 | 5.2 | | |
| *Gmm* | | 2.504 | 2.487 | 2.476 | | |
| *Gmb* | | 2.374 | 2.385 | 2.402 | | |
| *Gb* | | 1.036 | 1.036 | 1.036 | | |
| *Gse* | | 2.728 | 2.727 | 2.741 | | |

CONTRACT 6032 ONLY

**STATE MATERIALS LABORATORY VERIFICATION TEST DATA**

| | | | | | | Specifications | Tolerance |
|---|---|---|---|---|---|---|---|
| Pb | | 5.4 | 5.9 | 6.4 | | | ± 0.5% |
| % Gmm @ Nini: | 8 | 84.8 | 84.9 | 86.2 | ≤ | 89.0 | |
| % Va @ Ndes: | 100 | 5.6 | 5.0 | 3.9 | Approximate | 4.0 | 2.5 - 5.5 |
| % VMA @ Ndes: | 100 | 15.9 | 15.9 | 15.9 | ≥ | 14.0 | ≥13.0 |
| % VFA @ Ndes: | 100 | 65 | 69 | 76 | | 65 - 75 | |
| % Gmm @ Nmax: | 160 | | 95.9 | | ≤ | 98.0 | |
| D/A | | 1.3 | 1.2 | 1.1 | | 0.6 - 1.6 | |
| Pbe | | 4.5 | 4.8 | 5.3 | | | |
| *Gmm* | | 2.496 | 2.493 | 2.475 | | | |
| *Gmb* | | 2.356 | 2.369 | 2.380 | | | |
| *Gb* | | 1.036 | 1.036 | 1.036 | | | |
| *Gse* | | 2.714 | 2.734 | 2.735 | | | |

VERIFIED

**STRIPPING EVALUATION**

| | | | | | |
|---|---|---|---|---|---|
| % Anti-Strip: | 0.0% | 0.08% | 0.17% | 0.33% | 0.50% |
| Visual Appearance: | NONE | NONE | NONE | NONE | NONE |
| % Retained Strength: | 91 | 94 | 95 | 104 | 110 |

STATISTICAL

**STATE MATERIALS LABORATORY RECOMMENDATIONS**

| | | |
|---|---|---|
| Asphalt Binder Supplier | **PARAMOUNT** | Remarks: |
| Asphalt Binder Grade | PG70-22 | |
| Percent Binder (Pb) (By Wt. Total Mix) | 5.9 | |
| % Anti-Strip (By Wt. Dry Aggregate) | 0.0% | |
| Type of Anti-Strip | | |
| Mix ID Number | G51432 | |
| Sample Wt. (grams) | 4700 | (Informational Only) |
| Sample Height @ Ndes (mm) | 115.0 | (Informational Only) |
| Ignition Calibration Factor | 0.58 | (Informational Only) |
| Optimum Mixing Temperature | 166° C | |
| Compaction Temperature | 154° C | |
| Rice Density (kg/m$^3$) | 2486 | |

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**BITUMINOUS SECTION REFERENCE MIX DESIGN VERIFICATION REPORT**

TEST OF: AGGREGATE PROPERTIES FOR HMA CLASS: 12.5 mm WORK ORDER NO: 6932
REFERENCE NO: 270007
SECTION: TOTEM LK/NE 128TH ST HOV DIRECT ACCESS/FREEWAY MIX ID NO: G51432

**----------CONTRACTOR'S DESIGN AGGREGATE STRUCTURE AND AGGREGATE TEST DATA----------**

| | | | Combined | Specifications | Tolerance |
|---|---|---|---|---|---|
| Material: | 19.0 - 9.5 | 9.5 - 0 | | | Statistical |
| Source: | A-189 | A-189 | | | |
| Ratio: | 17% | 83% | | | |
| 37.5 mm | | | | | |
| 25.0 mm | | | | | |
| 19.0 mm | 100.0 | 100.0 | 100.0 | 100 | 99 - 100 |
| 12.5 mm | 82.8 | 100.0 | 97.0 | 90 - 100 | 91 - 100 |
| 9.5 mm | 27.1 | 99.3 | 87.0 | MAX 90 | 81 - 90 |
| 4.75 mm | 2.6 | 63.0 | 53.0 | | |
| 2.360 mm | 2.0 | 37.7 | 32.0 | 28 - 58 | 28 - 36 |
| 1.180 mm | 1.8 | 24.4 | 21.0 | | |
| 0.600 mm | 1.7 | 17.2 | 15.0 | | |
| 0.300 mm | 1.6 | 12.6 | 11.0 | | |
| 0.150 mm | 1.5 | 9.1 | 8.0 | | |
| 0.075 mm | 1.2 | 6.8 | 5.8 | 2.0 - 7.0 | 3.8 - 7.0 |
| Gsb Coarse | 2.727 | 2.692 | | | |
| Gsb Fine | | 2.584 | | | |
| Gsb Blend | 2.727 | 2.624 | 2.639 | | |
| Sand Equivalent | | 56 | 56 | 45 MIN. | |
| Uncompacted Voids (FAA) | | | 47 | 44% MIN. | |
| **Course Agg Frac** | | | | | |
| 3/4" square | | | | | |
| 1/2" square | 98 | | 98 | | |
| 3/8" square | 100 | 100 | 100 | | |
| U.S. No. 4 | 100 | 100 | 100 | 90% Double | Face Fracture |

**----------STATE MATERIALS LABORATORY AGGREGATE TEST DATA----------**

| | | | | | |
|---|---|---|---|---|---|
| Gsb Coarse | 2.734 | 2.694 | | | |
| Gsb Fine | | 2.596 | 2.596 | | |
| Gsb Blend | 2.734 | 2.631 | 2.648 | | |
| Sand Equivalent | | 86 | 86 | 45 MIN. | |
| Uncompacted Voids (FAA) | | | 47 | 44% MIN. | |
| **Course Agg Frac** | | | | | |
| 3/4" square | | | | | |
| 1/2" square | 95 | | 95 | | |
| 3/8" square | 95 | 99 | 99 | | |
| U.S. No. 4 | 99 | 99 | 99 | 90% Double | Face Fracture |

Environmental & Engineering Programs: T162 - 1 Remarks:
Construction Engineer---------- X
Accounting Section---------- X
General File---------- X
Bituminous materials Section---------- X
Region: NORTHWEST
Construction Office-- 41 ---------- X
Materials Engineer-- 41 ---------- X
P.E.: D. Haight X(2)

THOMAS E. BAKER P.E.
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Acting Bituminous Materials Engineer
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Date: 7/31/2007