

# Transportation Engineering Laboratory (TEL)

Department of Civil Engineering (CED)

UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)

LAHORE – 54890 (PAKISTAN)



Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref.:-----

Date:-----

Mr. Jawad Qayyum Khan  
Resident Engineer (NESPAK), 4376,  
Sargodha.

Subject: **Testing of Water Bound Macadam**  
Restoration / Improvement of Road from 33 Phattak to Kot Momin I/C Kot Momin  
Bypass, Length = 32.70 km

Dear Sir,

It is with reference to your letter No. 4376/JQK/24/7224 dated 13-11-2024.  
Please find below the results for the tests conducted on the WBM sample provided to this  
laboratory on 06-12-2024 through your representative.

## 1. Sieve Analysis (ASTM C-136)

| Sieve Size   | 3"  | 2 1/2" | 2"    | 1 1/2" | 1" | 3/4" | 1/2" | 3/8" | #4 |
|--------------|-----|--------|-------|--------|----|------|------|------|----|
| %age Passing | 100 | 51.76  | 35.83 | 1.88   | 0  | 0    | 0    | 0    | 0  |

## 2. Specific Gravity & Water Absorption (ASTM C-127)

|  |      |
|--|------|
| Specific Gravity (oven dried condition)            | 2.74 |
| Specific Gravity (saturated surface dry condition) | 2.76 |
| Apparent Specific Gravity                          | 2.79 |
| Water Absorption (%)                               | 0.63 |

## 3. Sodium Sulphate Soundness (ASTM C-88)

| Sieve Size  | Weight of Fraction Before Test (gm) | Weight of Fraction After Test (gm) | Percentage Passing Designated Sieve After Test | Weighted Percentage Loss |
|-------------|-------------------------------------|------------------------------------|--|--------------------------|
| 2" + 1 1/2" | 5010.3                              | 4988.4                             | 0.44   | 0.22                     |
|             | Total = 0.22%                       |                                    |  |                          |

## 4. Los Angeles Abrasion Value Test (ASTM C-131/535)

| Grading Used | Los Angeles Abrasion Value (%) |
|--------------|--------------------------------|
| 1            | 20.30                          |

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director  
Transportation Engineering Laboratory

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TEL UET

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Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref.:-----

Date:-----

Mr. Ghulam Rasool Domki  
Resident Engineer,  
NESPAK,  
Sargodha.

Subject: **Testing of Water Bound Macadam (WBM)**

Road Restoration Programme

District Mandi Bahaudin

Dear Sir,

It is with reference to your letter No. 4834/RRP/MBD/GRD/47 dated 25-11-2024.

Please find below the result for the test conducted on the WBM sample provided to this laboratory on 06-12-2024 through your representative.

## Los Angeles Abrasion Value Test (ASTM C-131/535)

| Grading Used | Los Angeles Abrasion Value<br>(%) |
|--------------|-----------------------------------|
| 1            | 21.10                             |

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director  
Transportation Engineering Laboratory

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Ref.:-----

Date:-----

The Assistant Resident Engineer,  
16 City of Project,  
Package # I (Jhelum).

Subject: **Testing of Coarse Aggregate (Margalla Crush)**  
Project: Construction of Kala Gujran Park in Jhelum City Under PCP Package-I

Dear Sir,

It is with reference to your letter No. ARE/JHE-KGP/MC-14 dated 05-12-2024.  
Please find below the results for the test conducted on the crush sample provided to this laboratory on 23-12-2024 through your representative.

## Sieve Analysis (ASTM C-136)

| Sieve Size   | 1"  | $\frac{3}{4}$ " | $\frac{1}{2}$ " | $\frac{3}{8}$ " | #4   |
|--------------|-----|-----------------|-----------------|-----------------|------|
| %age Passing | 100 | 40.28           | 23.79           | 6.17            | 0.06 |

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director  
Transportation Engineering Laboratory

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Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref.:-----

Date:-----

Mr. Shoaib Farooq  
Deputy Project Manager,  
Etimaad Engineering (Pvt.) Limited,  
Lahore.

Subject: **Testing of Fine Aggregates (Sand)**

Dear Sir,

It is with reference to your letter No. EEL/OGDCL/341093/002 dated 24-12-2024.

Please find below the results for the tests conducted on the aggregate samples provided to this laboratory through your representative.

## **Sample - 001**

### **1. Sieve Analysis (ASTM C-136)**

| Sieve Size   | 3/8" | #4  | #8    | #16   | #30   | #50   | #100 | #200 |
|--------------|------|-----|-------|-------|-------|-------|------|------|
| %age Passing | 100  | 100 | 99.89 | 97.45 | 84.28 | 37.36 | 6.26 | 1.00 |

### **2. Fineness Modulus (ASTM C-142)**

|                      |      |
|----------------------|------|
| Fineness Modulus (%) | 1.75 |
|----------------------|------|

### **3. Specific Gravity & Water Absorption (ASTM C-128)**

|                           |      |
|---------------------------|------|
| Specific Gravity (OD)     | 2.65 |
| Specific Gravity (SSD)    | 2.67 |
| Apparent Specific Gravity | 2.70 |
| Water Absorption (%)      | 0.80 |

## **Sample - 002**

### **1. Sieve Analysis (ASTM C-136)**

| Sieve Size   | 3/8" | #4  | #8    | #16   | #30   | #50   | #100 | #200 |
|--------------|------|-----|-------|-------|-------|-------|------|------|
| %age Passing | 100  | 100 | 99.91 | 99.22 | 90.18 | 43.10 | 6.59 | 0.65 |

### **2. Fineness Modulus (ASTM C-142)**

|                      |      |
|----------------------|------|
| Fineness Modulus (%) | 1.61 |
|----------------------|------|

### 3. Specific Gravity & Water Absorption (ASTM C-128)

|                           |      |
|---------------------------|------|
| Specific Gravity (OD)     | 2.64 |
| Specific Gravity (SSD)    | 2.66 |
| Apparent Specific Gravity | 2.69 |
| Water Absorption (%)      | 0.72 |

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director  
Transportation Engineering Laboratory

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Ref.:-----

Date:-----

Mr. Shoaib Farooq  
Deputy Project Manager,  
Etimaad Engineering (Pvt.) Limited,  
Lahore.

Subject: **Testing of Coarse Aggregates**

Dear Sir,

It is with reference to your letter No. EEL/OGDCL/341093/003 dated 24-12-2024.

Please find below the results for the tests conducted on the aggregate samples provided to this laboratory through your representative.

## **Sample - 006**

### **1. Sieve Analysis (ASTM C-136)**

| Sieve Size   | 1"  | 3/4"  | 1/2"  | 3/8" | #4 |
|--------------|-----|-------|-------|------|----|
| %age Passing | 100 | 91.88 | 13.65 | 0.22 | 0  |

### **2. Specific Gravity & Water Absorption (ASTM C-127)**

|  |      |
|--|------|
| Specific Gravity (oven dried condition)            | 2.74 |
| Specific Gravity (saturated surface dry condition) | 2.75 |
| Apparent Specific Gravity                          | 2.76 |
| Water Absorption (%)                               | 0.25 |

### **3. Flakiness & Elongation Index (BS 812: Part 105)**

| Sieve Size               |                | Individual Flakiness Index (%) | Weighted Flakiness Index (%) | Individual Elongation Index (%) | Weighted Elongation Index (%) |
|--------------------------|----------------|--------------------------------|------------------------------|---------------------------------|-------------------------------|
| Passing (in.)            | Retained (in.) |                                |                              |                                 |                               |
| 1                        | 3/4            | 45.66                          | 3.71                         | 73.31                           | 5.95                          |
| 3/4                      | 1/2            | 7.58                           | 5.93                         | 9.89                            | 7.74                          |
| 1/2                      | 3/8            | 8.33                           | 1.12                         | 10.96                           | 1.47                          |
| 3/8                      | 1/4            | 0                              | 0                            | 0                               | 0                             |
| Flakiness Index = 10.76% |                |                                | Elongation Index = 15.16%    |                                 |                               |

### **Sample - 008**

#### **1. Sieve Analysis (ASTM C-136)**

|                     |     |       |      |      |    |
|---------------------|-----|-------|------|------|----|
| <b>Sieve Size</b>   | 1"  | 3/4"  | 1/2" | 3/8" | #4 |
| <b>%age Passing</b> | 100 | 68.53 | 0    | 0    | 0  |

#### **2. Specific Gravity & Water Absorption (ASTM C-127)**

|   |      |
|---|------|
| <b>Specific Gravity (oven dried condition)</b>            | 2.74 |
| <b>Specific Gravity (saturated surface dry condition)</b> | 2.75 |
| <b>Apparent Specific Gravity</b>                          | 2.76 |
| <b>Water Absorption (%)</b>                               | 0.33 |

#### **3. Flakiness & Elongation Index (BS 812: Part 105)**

| <b>Sieve Size</b>              |                       | <b>Individual Flakiness Index (%)</b> | <b>Weighted Flakiness Index (%)</b> | <b>Individual Elongation Index (%)</b> | <b>Weighted Elongation Index (%)</b> |
|--------------------------------|-----------------------|---------------------------------------|-------------------------------------|--|--------------------------------------|
| <b>Passing (in.)</b>           | <b>Retained (in.)</b> |                                       |                                     |  |                                      |
| 1                              | 3/4                   | 7.92                                  | 2.49                                | 8.25                                   | 2.60                                 |
| 3/4                            | 1/2                   | 8.81                                  | 6.03                                | 9.58                                   | 6.56                                 |
| <b>Flakiness Index = 8.52%</b> |                       |                                       | <b>Elongation Index = 9.16%</b>     |  |                                      |

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director  
Transportation Engineering Laboratory

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Ref:-----

Date:-----

Mr. Abid Rauf  
Resident Engineer,  
NESPAK.

Subject: **Testing of Bitumen – AASHTO Standard (M-20) NRL**  
Annual Development Programme (ADP) 2024-25  
Improvement of Jhang T.T.S Road from Shakarganj Sugar Mill to Toba Tek Singh  
Motorway Interchange, District Jhang and T.T.S, Taking Length = 18.0 km  
(ADP No. 1828)

Dear Sir,

It is with reference to your letter No. 4834/103/AR/01/102-A dated 06-01-2025.  
Please find below the results of tests conducted on the bitumen samples provided to this  
laboratory on 24-01-2025 through your representative.

| Sr. # | Laboratory Tests                        | Sample # 1 | Sample # 2 |
|-------|---|------------|------------|
| 1     | Penetration (ASTM D-5)                  | 60 Units   | 60 Units   |
| 2     | Penetration of Residue (ASTM D-5)       | 53 Units   | 54 Units   |
| 3     | Softening Point (ASTM D-36)             | 49.2°C     | 49.7°C     |
| 4     | Flash Point (ASTM D-92)                 | 310°C      | 305°C      |
| 5     | Specific Gravity Value (ASTM D-70)      | 1.025      | 1.021      |
| 6     | Solubility (ASTM D-2042)                | 99.80%     | 99.80%     |
| 7     | Thin Film Oven Test Value (ASTM D-1754) | 0.476%     | 0.477%     |
| 8     | Loss on Heating Value (ASTM D-6)        | 0.470%     | 0.469%     |

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Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref:-----

Date:-----

The Sub Divisional Officer,  
Highway Sub Division,  
Jhang.

Subject: **Testing of Bitumen**

Improvement of Jhang Toba Tek Singh Road from Shakarganj Sugar Mill to Toba Tek Singh Motorway Interchange, Length = 24.00 km, District Jhang & Toba Tek Singh (ADP No. 1828)

Dear Sir,

It is with reference to your letter No. 940 dated 24-12-2024.

Please find below the results of tests conducted on the bitumen sample provided to this laboratory on 28-01-2025 through your representative.

| Sr.# | Laboratory Tests            | Results      |
|------|-----------------------------|--------------|
| 1    | Penetration (ASTM D-5)      | 92 Units     |
| 2    | Ductility (ASTM D-113)      | Above 100 cm |
| 3    | Softening Point (ASTM D-36) | 44.7°C       |
| 4    | Flash Point (ASTM D-92)     | 290°C        |

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Director  
Transportation Engineering Laboratory

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