

# 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:-----

Engr. M. Aamir Saeed  
Senior Project Manager,  
IDAP.

Subject: **Testing of Coarse and Fine Aggregates**  
Establishment of Nawaz Sharif Institute of Cancer Treatment and Research,  
Package-A

Dear Sir,

It is with reference to your letter No. SPM(NSICTR)/PACKAGE-A/2024/20847 dated 02-12-2024.  
Please find below the results for the tests conducted on the aggregate samples provided to this  
laboratory through your representative.

## **Coarse Aggregate**

### **Sample # 1**

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

Sieve Size	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	91.19	3.18	0.10	0

### **Sample # 2**

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

Sieve Size	3/4"	1/2"	3/8"	#4
%age Passing	100	84.28	35.59	0.88

### **Mixed Sample**

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

Specific Gravity (oven dried condition)	2.85
Specific Gravity (saturated surface dry condition)	2.86
Apparent Specific Gravity	2.88
Water Absorption (%)	0.37

## 2. 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
$1/2'' + 3/8''$	1002.2	992.9	0.93	0.76
	<b>Total = 0.76%</b>			

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

Grading Used	Los Angeles Abrasion Value (%)
B	15.50

## 4. 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	$3/4$	0	0	0	0
$3/4$	$1/2$	7.55	4.75	8.68	5.46
$1/2$	$3/8$	6.49	1.24	7.81	1.49
$3/8$	$1/4$	4.99	0.61	5.60	0.69
<b>Flakiness Index = 6.60%</b>			<b>Elongation Index = 7.64%</b>		

## 5. Clay Lumps and Friable Particles (ASTM C-142)

Clay Lumps and Friable Particles (%)	0.27
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## 6. Unit Weight (Loose & Rodded); (ASTM C 29/C 29M)

Loose Unit Weight (g/cm <sup>3</sup> )	1.37
Rodded Unit Weight (g/cm <sup>3</sup> )	1.50

## 7. Moisture Content (ASTM C-566)

Moisture Content (%)	0.23
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## Fine Aggregate

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

Sieve Size	$1/2''$	$3/8''$	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	99.13	95.67	90.58	79.59	63.36	26.93	5.53	1.12

**2. Percentage of Fines (ASTM D-1140) Wet Sieving**

Material Finer than #200 Sieve (%)	1.56
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**3. Specific Gravity & Water Absorption (ASTM C-128)**

Specific Gravity (OD)	2.67
Specific Gravity (SSD)	2.69
Apparent Specific Gravity	2.72
Water Absorption (%)	0.76

**4. 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
#4 to #8	100	98.1	1.90	0.10
#8 to #16	100	98.0	2.00	0.22
#16 to #30	100	98.1	1.90	0.31
#30 to #50	100	98.0	2.00	0.73
<b>Total = 1.36%</b>				

**5. Organic Impurities (ASTM C-40)**

Organic Impurities	Nil
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**6. Clay Lumps and Friable Particles (ASTM C-142)**

Clay Lumps and Friable Particles (%)	0.41
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**7. Unit Weight (Loose & Rodded); (ASTM C 29/C 29M)**

Loose Unit Weight (g/cm <sup>3</sup> )	1.40
Rodded Unit Weight (g/cm <sup>3</sup> )	1.61

**8. Moisture Content (ASTM C-566)**

Moisture Content (%)	0.40
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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 Sub Divisional Officer,  
Highway Sub Division, Bhera.

Subject: **Testing of Water Bound Macadam**

Restoration/Improvement of Road from Miani Mian Da Banna Road at Allahabad to Mian Da Bana Station I/C Jagatpur via Graveyard Gulabpur, Kanna, Dhopsari School Colony, Azafi Abadi I/C Links etc., Length = 18.75 km, District Sargodha

Dear Sir,

It is with reference to your letter No. 253/Bhr dated 14-12-2024.

Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 10-01-2025 through your representative.

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

Sieve Size	3"	2 1/2"	2"	1 1/2"	3/4"
%age Passing	100	91.99	50.00	6.00	5.00

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

Specific Gravity (oven dried condition)	2.68
Specific Gravity (saturated surface dry condition)	2.70
Apparent Specific Gravity	2.73
Water Absorption (%)	0.59

## 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"	5009.3	4991.3	0.36	0.31
	Total = 0.31%			

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

Grading Used	Los Angeles Abrasion Value (%)
1	20.50

## 5. 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.)				
3	2 ½	10.61	0.90	35.36	2.99
2 ½	2	8.53	3.79	16.03	7.11
2	1 ½	3.30	1.54	4.76	2.21
1 ½	1	49.90	0.20	19.96	0.08
1	¾	0	0	47.54	0.12
Flakiness Index = 6.43%			Elongation Index = 12.51%		

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. Jawad Qayyum Khan  
Resident Engineer (NESPAK), 4834,  
Sargodha.

Subject: **Testing of Water Bound Macadam**

Restoration/Improvement of Road from Ratto Kala Rajbha to Bhera Dhori Road  
via Abadi Muhammad Ka Thatti Noor I/C Chak 6 ML and 7 ML Links,  
Length = 19.5 km, District Sargodha

Dear Sir,

It is with reference to your letter No. RE/4834/JQK/24/7289 dated 12-12-2024.

Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 10-01-2025 through your representative.

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

Sieve Size	3"	2 1/2"	2"	1 1/2"	3/4"
%age Passing	100	90.00	54.99	7.00	3.00

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

Specific Gravity (oven dried condition)	2.69
Specific Gravity (saturated surface dry condition)	2.70
Apparent Specific Gravity	2.73
Water Absorption (%)	0.52

## 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"	5001.3	4985.0	0.33	0.27
	Total = 0.27%			

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

Grading Used	Los Angeles Abrasion Value (%)
1	19.80

## 5. 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.)				
3	2 ½	0	0	20.00	1.84
2 ½	2	8.07	2.95	20.72	7.57
2	1 ½	0.84	0.42	1.19	0.59
1 ½	1	9.36	0.33	13.85	0.49
1	¾	23.47	0.14	47.00	0.29
Flakiness Index = 3.84%			Elongation Index = 10.78%		

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. Ghulam Rasool Domki  
Resident Engineer,  
NESPAK,  
Mandi Bahauddin.

Subject: **Testing of Water Bound Macadam (WBM)**  
Road Restoration Programme District Mandi Bahaudin  
Restoration/Improvement of Mandi Bahauddin Bypass Near Pindi Purani Road,  
Length = 2.70 km, GS # (1867)

Dear Sir,

It is with reference to your letter No. 4834/RRP/MBD/GRD/67 dated 10-12-2024.  
Please find below the result for the test conducted on the aggregate sample provided to this laboratory on 10-01-2025 through your representative.

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

Grading Used	Los Angeles Abrasion Value (%)
1	21.99

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

Subject: **Testing of Water Bound Macadam**

Dualization of Muzaffargarh Road (Jauharabad Chowk Girote), Length = 25.25 km in  
District Khushab

1. Group-I km No. 0.00 to 8.00 = 8 km
2. Group-II & III km No. 8.00 to 25.25 = 17.25 km

Dear Sir,

It is with reference to your letter No. 4376/JQK/24/7131 dated 16-10-2024.

Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 10-01-2025 through your representative.

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

Sieve Size	3"	2 1/2"	2"	1 1/2"	3/4"
%age Passing	100	91.00	56.99	8.00	2.00

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

Specific Gravity (oven dried condition)	2.68
Specific Gravity (saturated surface dry condition)	2.70
Apparent Specific Gravity	2.73
Water Absorption (%)	0.69

## 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"	5004.3	4983.3	0.42	0.35
	Total = 0.35%			

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

Grading Used	Los Angeles Abrasion Value (%)
1	21.50

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

Best Regards,

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Transportation Engineering Laboratory

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TEL UET

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Ref:-----

Date:-----

Mr. Sheraz Khan  
Resident Engineer,  
ECSP, Mayo Hospital, Lahore.

Subject: **Testing of Coarse Aggregate**

Project: Resident Construction Supervision of Balance Works for Rehabilitation & Renovation of Hospitals Under Specialized Health Care & Medical Education Department Through Health Council / Traditional Mode, Mayo Hospital, Lahore

Dear Sir,

It is with reference to your letter No. ECSP/RE/0021 dated 20-04-2024.

Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 16-01-2025 through your representative.

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

Sieve Size	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	92.73	12.92	0.34	0

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

Specific Gravity (oven dried condition)	2.83
Specific Gravity (saturated surface dry condition)	2.84
Apparent Specific Gravity	2.86
Water Absorption (%)	0.37

## 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
1/2" + 3/8"	1002.3	992.4	0.99	0.92
	Total = 0.92%			

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

Grading Used	Los Angeles Abrasion Value (%)
B	16.67

##### 5. 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	0	0	25.05	1.82
3/4	1/2	4.05	3.24	11.67	9.32
1/2	3/8	4.56	0.57	23.32	2.93
3/8	1/4	25.00	0.09	100.00	0.34
Flakiness Index = 3.90%			Elongation Index = 14.41%		

##### 6. Clay Lumps and Friable Particles (ASTM C-142)

Clay Lumps and Friable Particles (%)	0.18
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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. Sheraz Khan  
Resident Engineer,  
ECSP,  
Mayo Hospital, Lahore.

Subject: **Testing of Fine Aggregate**

Project: Resident Construction Supervision of Balance Works for Rehabilitation & Renovation of Hospitals Under Specialized Health Care & Medical Education Department Through Health Council / Traditional Mode, Mayo Hospital, Lahore

Dear Sir,

It is with reference to your letter No. ECSP/RE/0024 dated 20-04-2024.

Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 16-01-2025 through your representative.

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

Sieve Size	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	99.91	99.59	99.21	98.73	83.38	10.60	2.01

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

Fineness Modulus (%)	1.09
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## 3. Specific Gravity & Water Absorption (ASTM C-128)

Specific Gravity (OD)	2.67
Specific Gravity (SSD)	2.69
Apparent Specific Gravity	2.73
Water Absorption (%)	0.82

## 4. 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
#30 to #50	100.0	98.7	1.30	0.20
Total = 0.20%				

## 5. Organic Impurities (ASTM C-40)

Organic Impurities	Nil
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Best Regards,

Director  
Transportation Engineering Laboratory

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