Pavement Materials & Design

Design Aggregate structure for Project

Dr. Hamza Alkuime

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Gradation Chart

Data Presenting methods

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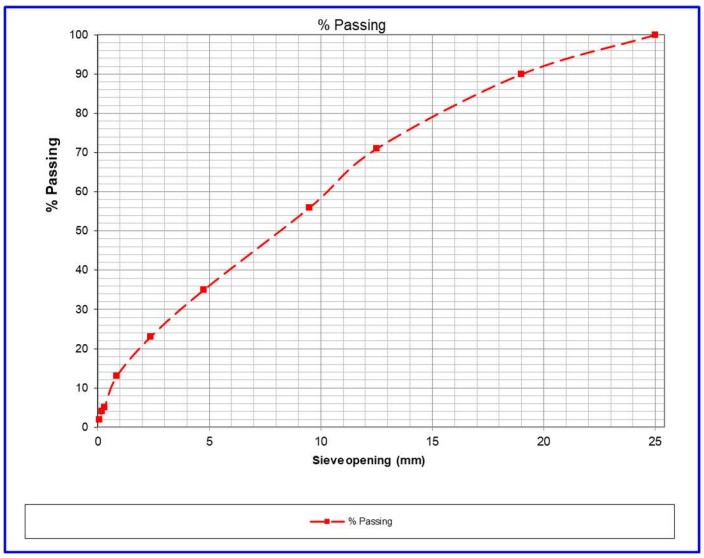
Gradation chart

% Passing Vs. Sieve opening (mm)



Sieve opening (mm)	% Passing
25.0	100
19.0	90
12.5	71
9.5	56
4.8	35
2.4	23
0.850	13
0.300	5
0.180	4
0.075	2

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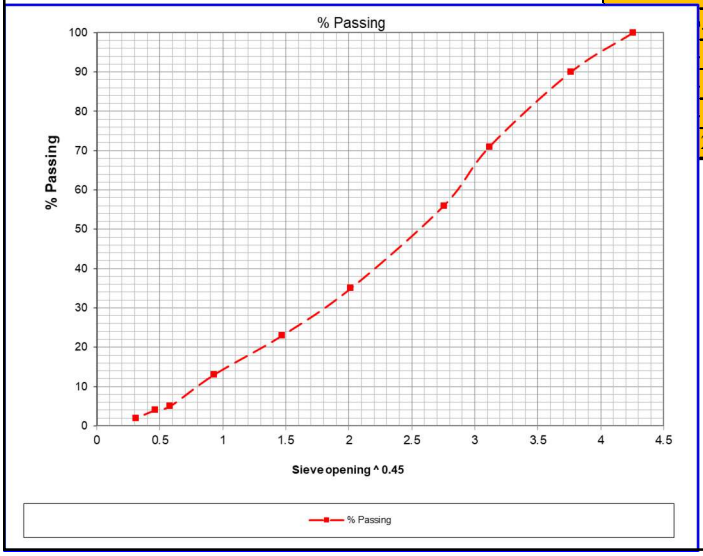
Gradation chart

% Passing Vs. Sieve opening ^ 0.

Sieve Size	Sieve opening (mm)	Sieve opening ^ 0.45	% Passing
1"	25.0	4.257	100
3/4"	19.0	3.762	90
1/2"	12.5	3.116	71
3/8"	9.5	2.754	56
No. 4	4.8	2.016	35
. 8	2.4	1.472	23
20	0.850	0.929	13
50	0.300	0.582	5
80	0.180	0.462	4
200	0.075	0.312	2



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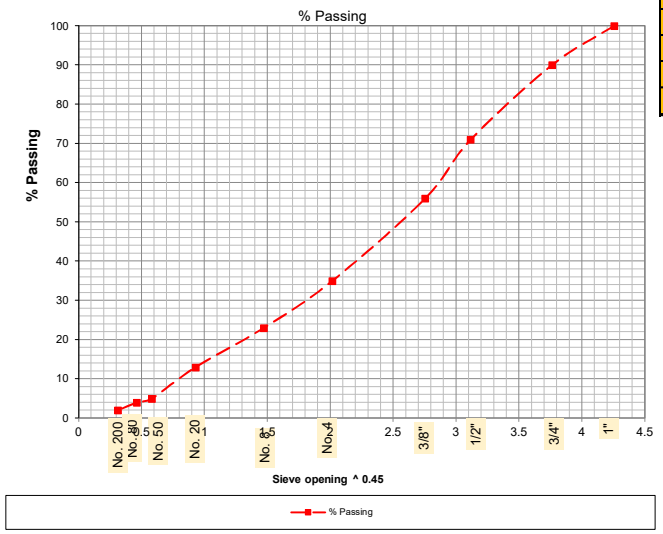
Gradation chart

% Passing Vs. Sieve opening ^ 0.45 and Sieve size



Sieve Size	Sieve opening (mm)	Sieve opening ^ 0.45	% Passing
1"	25.0	4.257	100
3/4"	19.0	3.762	90
1/2"	12.5	3.116	71
3/8"	9.5	2.754	56
No. 4	4.8	2.016	35
No. 8	2.4	1.472	23
No. 20	0.850	0.929	13
No. 50	0.300	0.582	5
No. 80	0.180	0.462	4
No. 200	0.075	0.312	2

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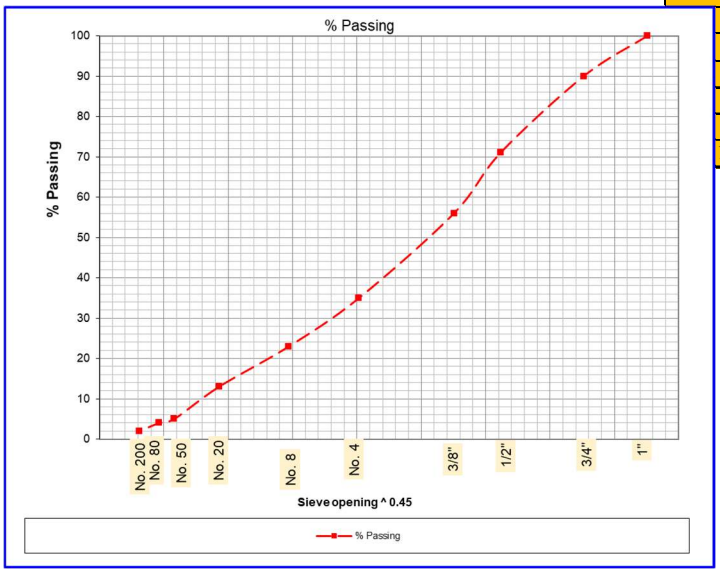
Gradation chart

% Passing Vs. Sieve size



Sieve Size	Sieve opening (mm)	Sieve opening ^ 0.45	% Passing
1"	25.0	4.257	100
3/4"	19.0	3.762	90
1/2"	12.5	3.116	71
3/8"	9.5	2.754	56
No. 4	4.8	2.016	35
No. 8	2.4	1.472	23
No. 20	0.850	0.929	13
No. 50	0.300	0.582	5
No. 80	0.180	0.462	4
No. 200	0.075	0.312	2

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Design Aggregate structure for Project

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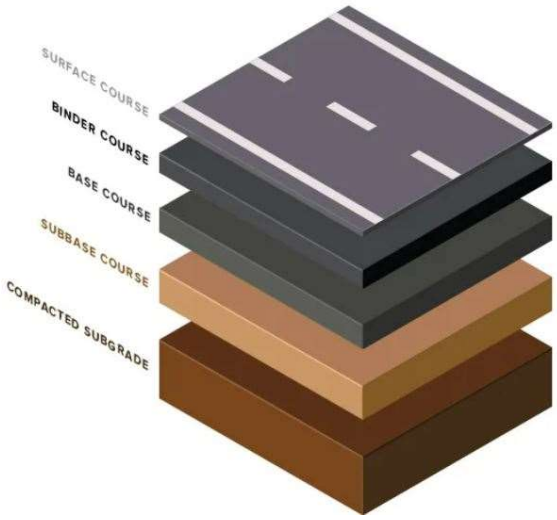
Project details

- Road location : The Hashemite University
- Pavement system
  - *Surface (Wearing) asphalt course*
  - *Binder asphalt Course*
  - *Base Course*
  - *Subbase Course*
  - *Subgrade*
- Traffic level
  - *Heavy Traffic*



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Check Specifications for aggregate

Asphalt Layers

Sieve Designation	Heavy Traffic		Medium & Light Traffic	
	Binder Course	Wearing Course	Binder Course	Wearing Course
1 1/2"	-	-	-	-
1 "	100	100	100	100
3/4"	70 - 100	90 - 100	70 - 100	90 - 100
1/2"	53 - 90	71 - 90	53 - 90	71 - 90
3/8"	40 - 80	56 - 80	40 - 80	56 - 80
No. 4	30 - 56	35 - 56	30 - 56	35 - 65
No. 8	23 - 38	23 - 38	23 - 49	23 - 49
No.20	13 - 27	13 - 27	14 - 43	14 - 43
No.50	5 - 17	5 - 17	5 - 19	5 - 19
No.80	4 - 14	4 - 14	4 - 15	4 - 15
No.200	2 - 8	2 - 8	2 - 8	2 - 8

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Determine the required specification for the Project

Control Points

Sieve Designation	Heavy Traffic	
	Binder Course	Wearing Course
1 1/2"	-	-
1 "	100	100
3/4"	70 - 100	90 - 100
1/2"	53 - 90	71 - 90
3/8"	40 - 80	56 - 80
No. 4	30 - 56	35 - 56
No. 8	23 - 38	23 - 38
No.20	13 - 27	13 - 27
No.50	5 - 17	5 - 17
No.80	4 - 14	4 - 14
No.200	2 - 8	2 - 8

			Control Pts.	
Sieve Size	Sieve opening (mm)	Sieve opening ^ 0.45	Lower C.P	Upper C.P
1"	25.0	4.257	100	100
3/4"	19.0	3.762	90	100
1/2"	12.5	3.116	71	90
3/8"	9.5	2.754	56	80
No. 4	4.8	2.016	35	56
No. 8	2.4	1.472	23	38
No. 20	0.850	0.929	13	27
No. 50	0.300	0.582	5	17
No. 80	0.180	0.462	4	14
No. 200	0.075	0.312	2	8

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Determine the required specification for the Project

Restricted Zone

			Res. Zone	
Sieve Size	Sieve opening (mm)	Sieve opening ^ 0.45	Res. Zone	Res. Zone
1"	25.0	4.257		
3/4"	19.0	3.762		
1/2"	12.5	3.116		
3/8"	9.5	2.754		
No. 4	4.8	2.016		
No. 8	2.4	1.472	34	34
No. 20	0.850	0.929	19	24
No. 50	0.300	0.582	12	12
No. 80	0.180	0.462		
No. 200	0.075	0.312		

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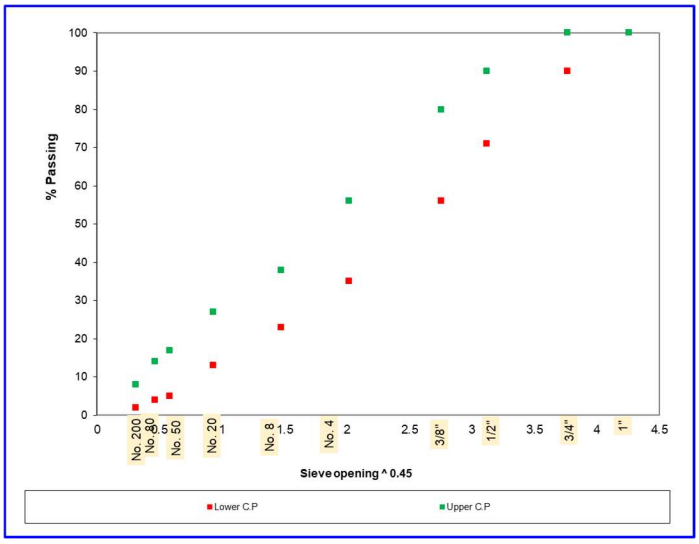
Plotting C. P



		Control Pts.	
Sieve Size	Sieve opening ^ 0.45	Lower C.P	Upper C.P
1"	4.257	100	100
3/4"	3.762	90	100
1/2"	3.116	71	90
3/8"	2.754	56	80
No. 4	2.016	35	56
No. 8	1.472	23	38
No. 20	0.929	13	27
No. 50	0.582	5	17
No. 80	0.462	4	14
No. 200	0.312	2	8

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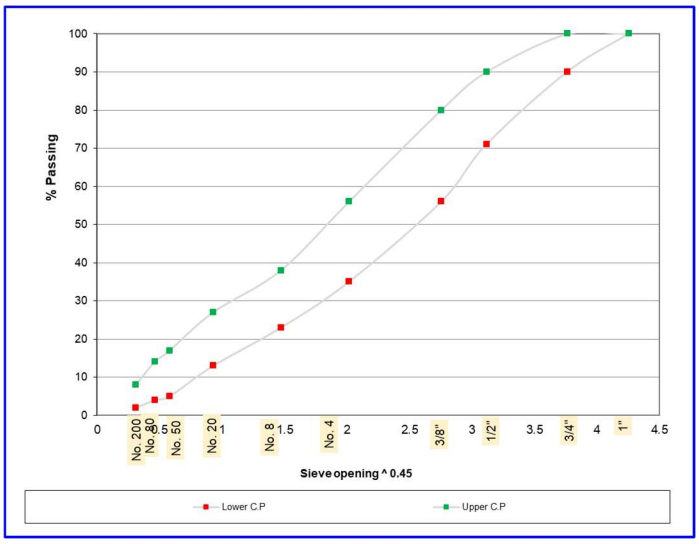
Plotting C. P _lines



		Control Pts.	
Sieve Size	Sieve opening ^ 0.45	Lower C.P	Upper C.P
1"	4.257	100	100
3/4"	3.762	90	100
1/2"	3.116	71	90
3/8"	2.754	56	80
No. 4	2.016	35	56
No. 8	1.472	23	38
No. 20	0.929	13	27
No. 50	0.582	5	17
No. 80	0.462	4	14
No. 200	0.312	2	8

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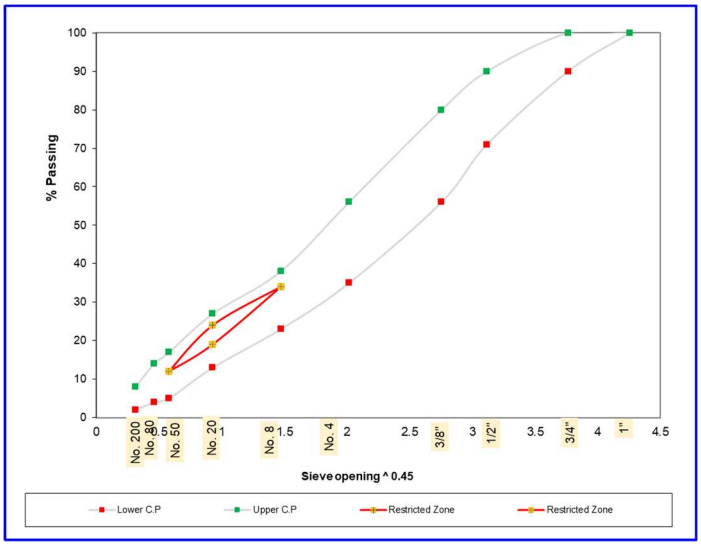
Plotting the Restricted zone



			Res. Zone	
Sieve Size	Sieve opening (mm)	Sieve opening ^ 0.45	Res. Zone	Res. Zone
1"	25.0	4.257		
3/4"	19.0	3.762		
1/2"	12.5	3.116		
3/8"	9.5	2.754		
No. 4	4.8	2.016		
No. 8	2.4	1.472	34	34
No. 20	0.850	0.929	19	24
No. 50	0.300	0.582	12	12
No. 80	0.180	0.462		
No. 200	0.075	0.312		

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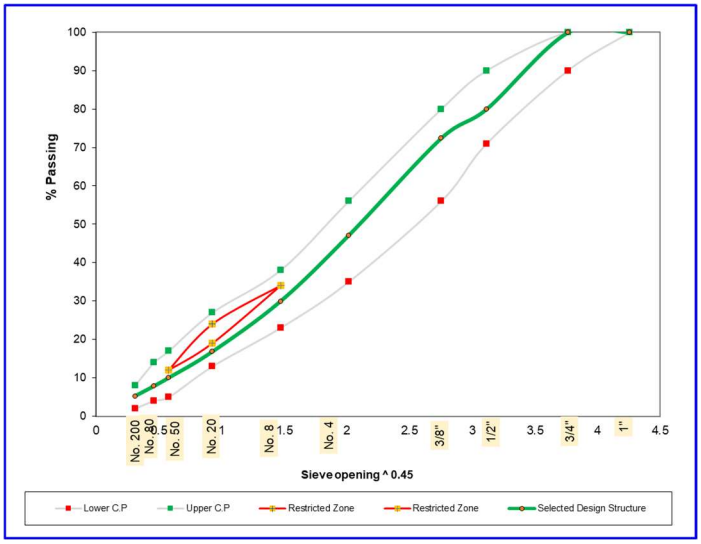
Select Design Aggregate Gradation



			Selected Design Structure
Sieve Size	Sieve opening (mm)	Sieve opening ^ 0.45	
1"	25.0	4.257	100
3/4"	19.0	3.762	100
1/2"	12.5	3.116	85
3/8"	9.5	2.754	72
No. 4	4.8	2.016	47
No. 8	2.4	1.472	30
No. 20	0.850	0.929	17
No. 50	0.300	0.582	10
No. 80	0.180	0.462	8
No. 200	0.075	0.312	5

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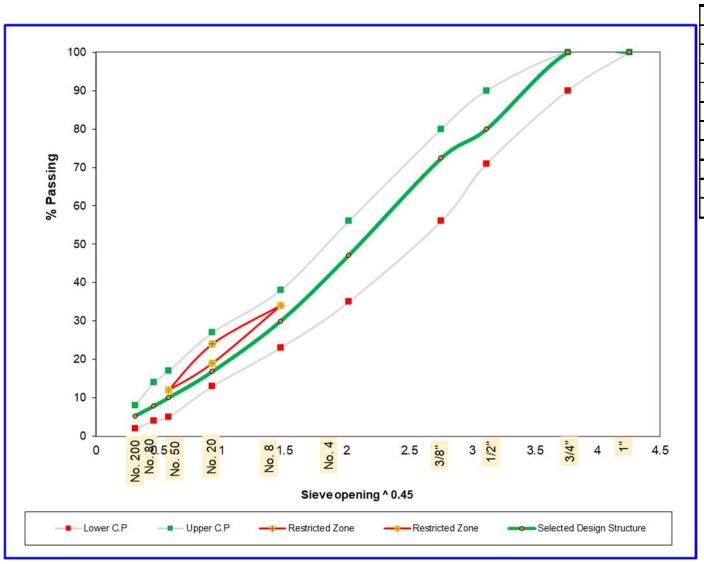
Select Design Aggregate Gradation

Properties



			Selected Design Structure
Sieve Size	Sieve opening (mm)	Sieve opening ^ 0.45	
1"	25.0	4.257	100
3/4"	19.0	3.762	100
1/2"	12.5	3.116	85
3/8"	9.5	2.754	72
No. 4	4.8	2.016	47
No. 8	2.4	1.472	30
No. 20	0.850	0.929	17
No. 50	0.300	0.582	10
No. 80	0.180	0.462	8
No. 200	0.075	0.312	5

Max	19
NMAS	12.5
% C	53
% Fine	42
% Filler	5

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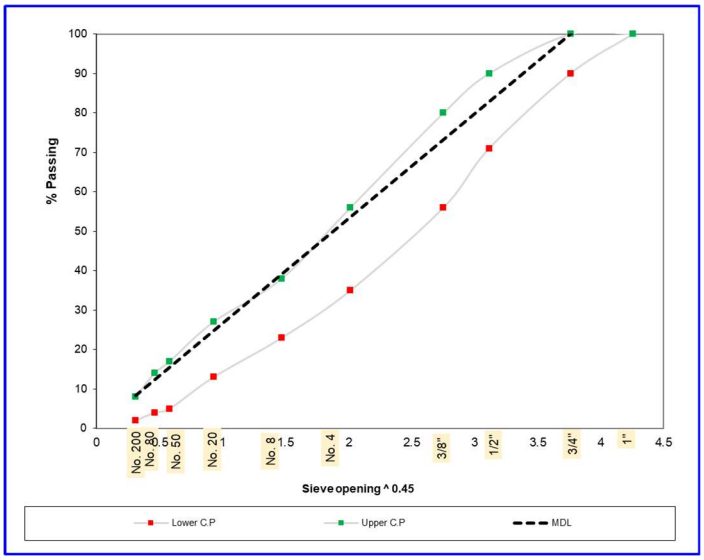
Add the Maximum Density Line



Sieve Size	Sieve opening (mm)	Sieve opening ^ 0.45	MDL
1"	25.0	4.257	
3/4"	19.0	3.762	100
1/2"	12.5	3.116	83
3/8"	9.5	2.754	73
No. 4	4.8	2.016	54
No. 8	2.4	1.472	39
No. 20	0.850	0.929	25
No. 50	0.300	0.582	15
No. 80	0.180	0.462	12
No. 200	0.075	0.312	8

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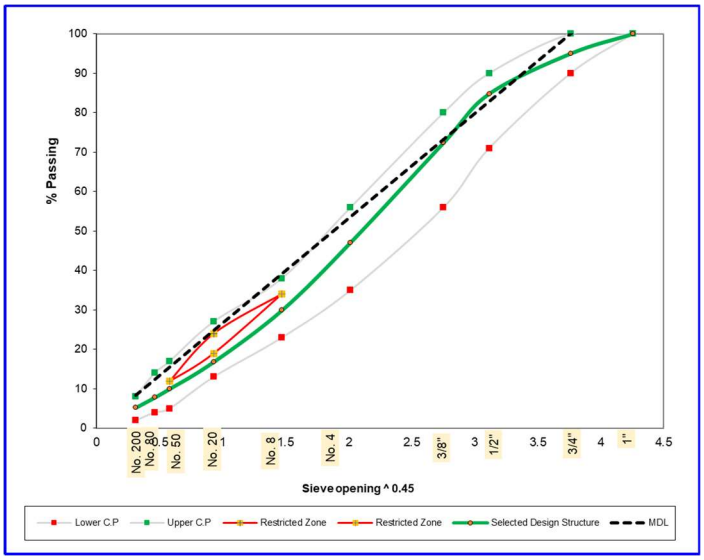
Add the Maximum Density Line



Sieve Size	Sieve opening (mm)	Sieve opening ^ 0.45	MDL
1"	25.0	4.257	
3/4"	19.0	3.762	100
1/2"	12.5	3.116	83
3/8"	9.5	2.754	73
No. 4	4.8	2.016	54
No. 8	2.4	1.472	39
No. 20	0.850	0.929	25
No. 50	0.300	0.582	15
No. 80	0.180	0.462	12
No. 200	0.075	0.312	8

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