Birzeit university – Faculty of engineering and technology

Civil engineering department

Transportation planning

ENCE5572

Subdivision project

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Done by group "7" :

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↓ Introduction:

In this project, we planned a lot of land using AutoCAD by dividing it into regular shapes of Parcels and according to the specifications given in the project paper. Every Parcel is connected by one or more roads and connected directly or indirectly to the main road. We designed the roads mainly based on the amount of excavation and backfilling and the extent of the road's compatibility with the contour lines.

We assumed that each owner has one complete lot of land, and when planning, we did not take the ownership lines into consideration, so that after planning it is not a condition that each owner takes the location of the parcels that he had before, but all owners must take a fixed percentage of the original lot.

↓ Tasks done in the project

- at the beginning, we made sure that the area of the plot of land supplied to our group was between 200 and 250acres. The area of our lot was 260.260 acres, we consulted Dr. Faisal in this regard and he told us that it is acceptable.

- We removed all extra lines from the lot, and kept the contour lines, project plot borders, parcel borders and the agricultural roads.

- We calculated the area for each specific parcel within the project, and we also calculated the area of agricultural roads. Then we compared the area of the total plot of the project with the area of the sum of the parcels and agricultural roads. We had an error of 3.01 m^2, because the polyline lines didn't exactly match the existing lines to find the area.

- We distributed the error to all 53parcels,Each Parcel took an error according to its area (proportion and proportion).

- After modification, we made sure that the area of each Parcel does not exceed 10 acres. Since the parcels that had area larger than 10 acres, we divided them into more than one. (To be fair between all groups when redistributing land to the owners).

- We started planning the main road, we put it outside the project lot, Adjacent to the right side of the property, with a width 25 meters also a simple vertical profile design and typical cross section were done as in. We took into account the slope and the convenient accessibility of minor streets When we choose the location for it. Figure "1" shows the vertical profile of the main road
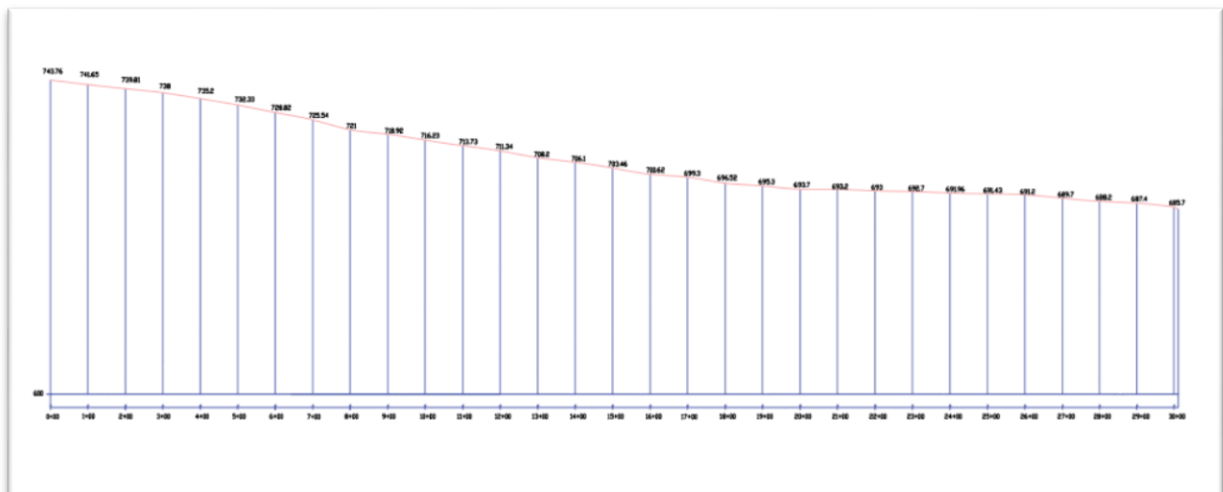

Figure "1"

and figure "2" shows its cross section .
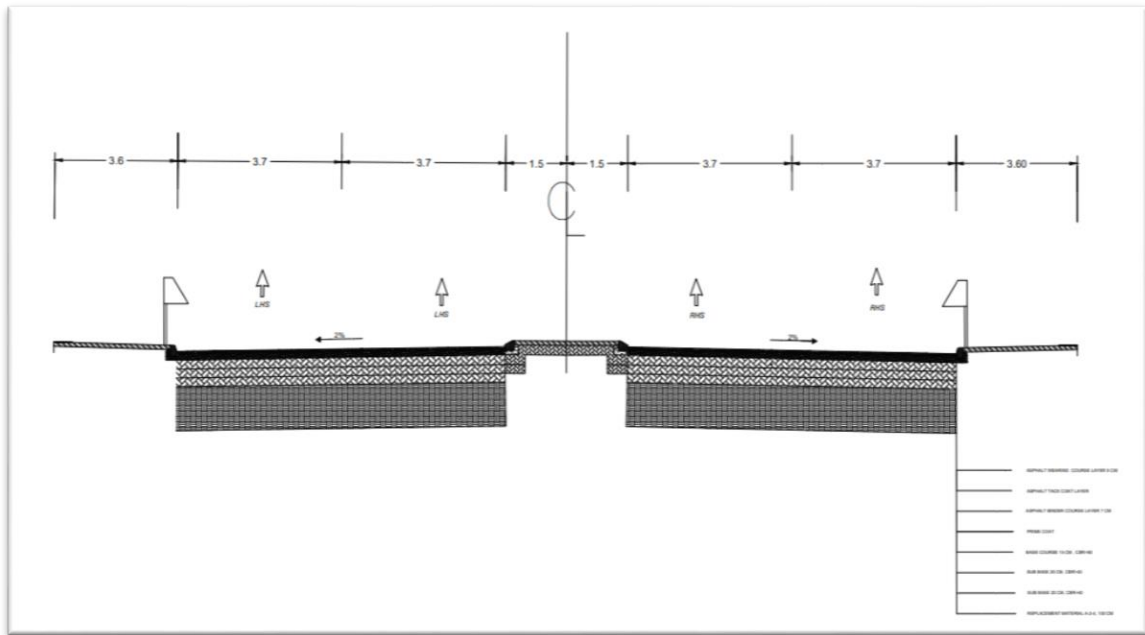
Figure "2"

- We considered that the parcels does not exist now, and we began to study the property with the presence of the main road and contour lines only in order to begin locating the sub-roads. We followed the contour lines as much as possible when placing the roads (Most of the roads have a slope between 1to 6 percent, except for some of them reaching 10.6 percent), so the issue of excavation and backfilling does not exceed what is permitted. (3m cut and 1m fill for main road and we assumed that we are using natural existing contour lines)) Most of the roads were 12 meters wide, except for some roads that were 14. We took into account the general shape of the roads and avoided many winding and curving so that their use would be easy.
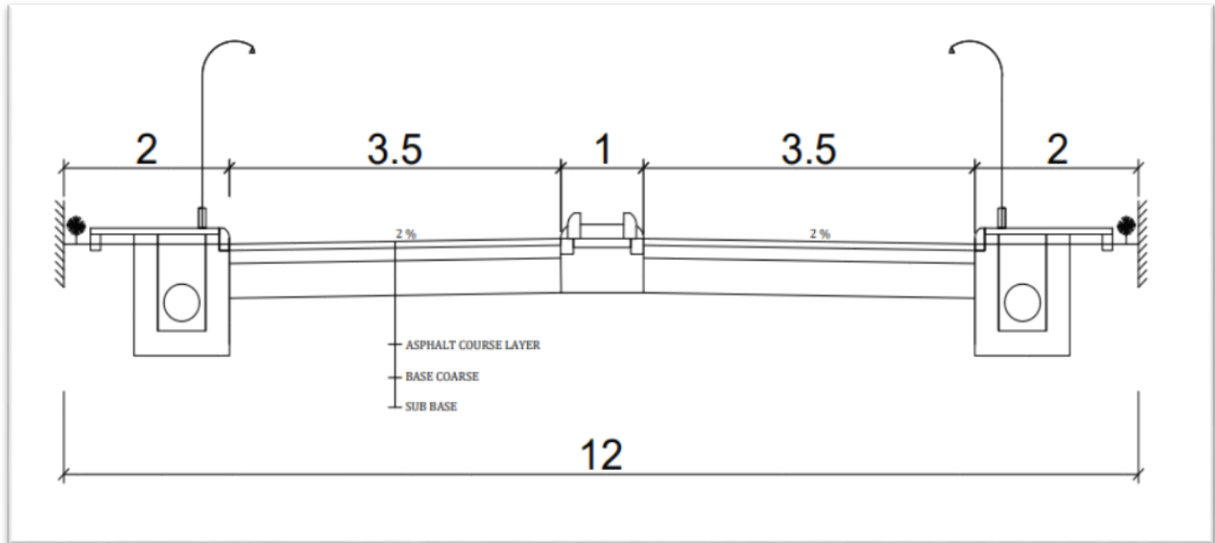
Figure "3" : a 12 meters road typical cross section.
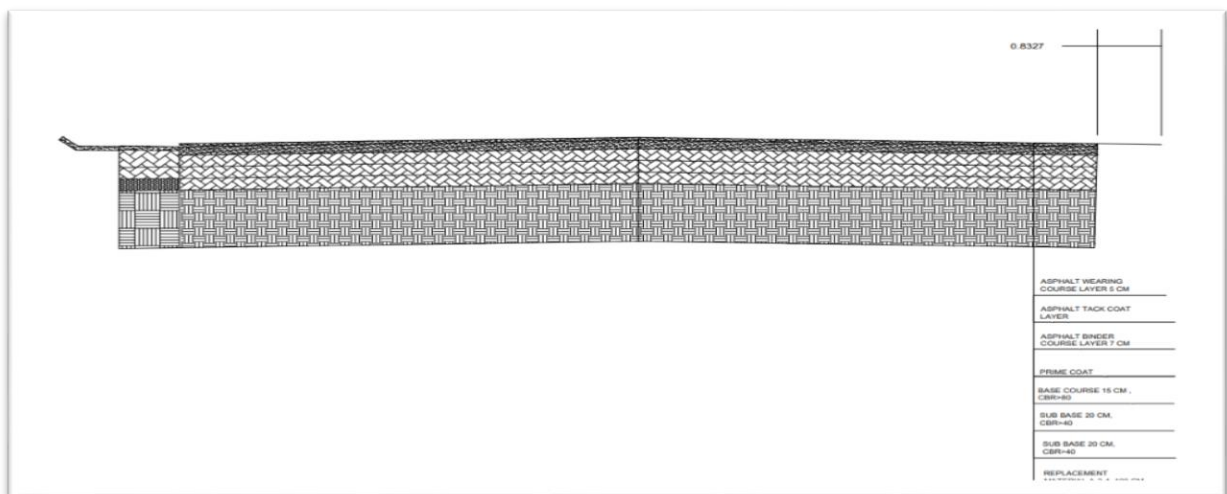
Figure "3" : a 14 meters road typical cross section.

- After completing the laying of the sub-roads initially, we made sure that each lot of land was connected to at least one road, and we added more roads that meet this purpose in order to ensure the accessibility for every single parcel. We also added roads in order to control the area of land according to the classifications(A, B, C and D) as required in the project paper.

- After completing the layout of roads, we started dividing the lot according to the classifications mentioned in the project paper (A, B, C and D). We started with the parcels for commercial use © and placed it next to the main road, then the Parcel of Class D and then Class C. And the remaining land was planned to be classified as parcel A and public areas. We took into account the frontage distance, area and number (or percent) of parcels for each classification. After completing the planning, we made sure that the lands of Class B occupy 10 to 20 percent of the private lands(In our project, it occupied 12.5 percent).

- For the commercial area, we have an 18 meters setback, that is used as a parking and two-way road. This organization ensures no traffic congestion in the area in front of the commercial buildings, and, safer, easier, and accessible parking, that provides higher LOS.

- We numbered all the parcels that we divided by categories. Then we calculated the area of each parcel to ensure that it matches the specifications stipulated in the project. We also calculated the area of the roads and then made sure that the sum of the areas of parcels, public areas and roads s is equal to the area of the lot before planning. We had a small error(0.03 square meter, no need for correction) resulting from the mismatch of the lines or from the duplication(a small possibility, but it is possible).

- To calculate the area cut off from each owner, we sum up the area of public area and the area of roads, (We cut 27.73% from each owner).

- Based on this, we redistributed the parcels to the owners, so that each owner took an area= 0.727*original area whether by taking it as a separate parcels or sharing it with other owners.

Appendix A:

Table (1): Area of parcels before planning

parcel num	area(m^2)
31	5842.75
34	2960.00
97	13066.75
92	5888.30
93	7521.40
89	7435.67
94	3576.64
95	3009.72
96	22786.48
101	17580.91
102	10840.42
98	6121.96
113	2412.45
114	1443.65
115	1498.66
142	715.20
143	2037.46
144	1414.00
117	4573.43
111	5985.74
109	4759.04
108	1911.71
107	1637.47
110	4263.23
103	2101.38
104	12638.00
105	8814.17
106	8258.25
148	4125.67
149	5950.57
147	17865.82
150	2024.23
151	5445.00
1	735.81
2	5229.11
3	8056.91

4	6001.05
5	1126.15
6	865.95
7	658.20
8	6840.16
9	3747.96
10	1603.16
11	1702.26
12	874.49
13	2891.30
14	996.80
15	1477.67
16	1126.42
17	2114.46
18	1500.45
19	545.33
SUM	254599.77

Table (2): Area of ag.road.

ag.road	area
1	4399.65
2	226.57
3	207.96
4	216.41
5	107.49
6	134.43
7	365.61
SUM	5658.12

Appendix B:

Area of parcels after planning

Table (1): Area parcels A.

Parcels A	Area(m^2)
1	598.05
2	595.44
3	599.19
4	599.98
5	599.03
6	599.06
7	599.35
8	599.58
9	599.04
10	596.83
11	595.59
12	604.36
13	598.04
14	599.50
15	599.72
16	599.42
17	599.38
18	599.43
19	599.37
20	599.68
21	599.21
22	599.70
23	599.80
24	599.95
25	590.12
26	597.35
27	599.06
28	599.44
29	548.07
30	557.42
31	598.82
32	561.32
33	525.29

34	544.15
35	580.66
36	587.45
37	587.00
38	572.33
39	516.41
40	507.53
41	515.20
42	542.71
43	573.00
44	538.84
45	512.55
46	536.66
47	570.57
48	524.90
49	501.79
50	550.56
51	544.93
52	510.94
53	567.39
54	512.28
55	593.67
56	533.66
57	559.39
58	592.08
59	592.12
60	570.15
61	591.42
62	528.46
63	592.34
64	554.81
65	599.62
66	577.91
67	575.33
68	527.48
69	533.24
70	594.67
71	588.42
72	522.95
73	518.6
74	503.67

75	542.33
76	592.88
77	599.81
78	560.9
79	507.49
80	504.77
81	598.87
82	594.07
83	563.07
84	509.79
85	530.42
86	519.01
87	573.71
88	506.74
89	550.18
90	593.01
91	525.91
92	511.23
93	526.65
94	524.15
95	536.95
96	591.1
97	556.44
98	511.19
99	525.97
100	554.3
101	533.2
102	536.38
103	563.01
104	539.06
105	516.37
106	520.6
107	596.72
108	566.58
109	598.2
110	607.1
111	599.32
112	572.7
113	578.64
114	597
115	571.33

116	545.1
117	512.77
118	554.01
119	546.43
120	558.49
121	540.13
122	500.00
123	598.90
124	510.56
125	586.33
126	501.78
127	585.00
128	565.46
129	572.70
130	572.76
131	576.00
132	598.57
133	578.83
134	588.87
135	599.62
136	595.75
137	599.80
138	599.99
139	599.56
140	578.00
141	599.66
142	599.93
143	586.00
144	598.49
145	586.00
146	597.74
147	553.51
148	567.70
149	532.24
150	568.43
151	599.94
152	566.00
153	590.93
154	599.59
155	597.57
156	596.44

157	577.00
158	598.61
159	598.79
160	565.00
161	598.32
162	592.81
163	505.14
164	524.55
165	523.88
166	500.00
167	500.69
168	506.48
169	503.62
170	552.45
171	578.88
172	570.16
173	538.24
174	563.90
175	596.30
176	542.84
177	592.30
178	510.64
179	579.26
180	593.06
181	599.48
182	519.99
183	603.41
184	591.06
185	504.69
186	506.47
187	585.79
188	501.60
189	589.35
190	545.96
191	577.88
192	501.13
193	595.50
194	554.96
195	545.62
196	505.84
197	558.61

198	524.07
199	529.96
200	506.91
201	574.73
202	568.49
203	525.86
204	526.18
205	529.68
206	537.71
207	517.98
208	535.38
209	524.96
210	569.18
211	565.87
212	590.35
213	570.98
214	533.56
215	534.21
216	617.33
217	524.56
218	546.50
219	541.70
220	528.78
221	541.51
223	507.08
224	547.16
225	516.52
226	538.40
227	517.34
228	567.76
229	551.03
230	576.54
231	515.51
232	552.02
233	510.93
234	566.25
235	505.91
236	500.00
237	506.90
238	545.60
sum	132707.80

Table (2): Area of parcels B.

Parcels B	Area(m^2)
1	1093.77
2	1081
3	1313
4	1086
5	951.45
6	1029.26
7	952
8	967.74
9	917.34
10	959.92
11	1072.47
12	981.73
13	1017.59
14	983.51
15	1059.68
16	1079
sum	16545.46

Table (3): Area of parcels C.

Parcels C	Area(m^2)
1	2990.5
2	2992.42
3	2979.13
4	2808.75
5	2479.9
6	2706.5
7	2705.11

8	2707.1
9	2529.31
sum	24898.72

Table (4): Area of parcels D.

Parcels D	Area(m^2)
1	2085.66
2	2856
3	2945
4	1965
sum	9851.66

Table (5): Area of public places.

Public area	Area(m^2)
stadium	3667.62
hospital	2087.65
mosque	1572.72
municipality	1615
school	3916.4
sum	12859.39

Appendix C :

reparcelling

coefficient=	0.28

remaining percentage after division =	0.72

Table (1)

parcels before planning		parcels after planning
parcel num	area(m^2)	area(m^2)
31	5842.82	4222.66
34	2960.03	2139.24
97	13066.90	9443.57
92	5888.37	4255.58
93	7521.49	5435.85
89	7435.76	5373.89
94	3576.68	2584.90
95	3009.75	2175.18
96	22786.74	16468.18
101	17581.11	12706.03
102	10840.55	7834.56
98	6122.03	4424.45
113	2412.48	1743.52
114	1443.67	1043.35
115	1498.68	1083.11
142	715.21	516.89
143	2037.48	1472.51
144	1414.02	1021.92
117	4573.48	3305.30
111	5985.81	4326.00
109	4759.10	3439.44
108	1911.73	1381.63
107	1637.49	1183.43
110	4263.28	3081.11
103	2101.40	1518.70

104	12638.15	9133.70
105	8814.27	6370.15
106	8258.35	5968.38
148	4125.72	2981.69
149	5950.64	4300.58
147	17866.03	12911.94
150	2024.25	1462.95
151	5445.06	3935.20
1	735.82	531.78
2	5229.17	3779.17
3	8057.00	5822.87
4	6001.12	4337.06
5	1126.16	813.89
6	865.96	625.84
7	658.21	475.69
8	6840.24	4943.50
9	3748.00	2708.72
10	1603.18	1158.63
11	1702.28	1230.25
12	874.50	632.01
13	2891.33	2089.59
14	996.81	720.40
15	1477.69	1067.94
16	1126.43	814.08
17	2114.48	1528.16
18	1500.47	1084.40
19	545.34	394.12
sum	254602.71	184003.67

Table (2) :

parceling of commercial area (parcleC)								
befor parceling				after parceling				
parcel num	area	percentage of orginal area	area	parcel num	area	parcel num take it	percentage of share	
4	4337.06	100	4337.06	**C1**	2990.5	**147**	100%	
5	813.89	100	813.89	**C2**	2992.42	**147**	100%	
6	625.84	100	625.84	**C3**	2979.13	**147**	100%	
7	475.69	100	475.69	**C4**	2808.75	**115,143,142,19,147**	115=8%,143=52.3%,142=18.3%,19=14%,147=7.4%	
12	632.01	100	632.01	**C5**	2479.9	**6,7,12,115**	6=20.2%,7=19.5%,12=25.3%,115=35%	
115	1083.11	100	1083.11	**C6**	2706.5	**89,5**	89=65%,5=30%,6=5%	
142	516.89	100	516.89	**C7**	2705.11	**89**	100%	
147	12911.94	71.04	9172.64	**C8**	2707.1	**4,89**	4=67%,89=33%	
19	394.12	100	394.12	**C9**	2529.31	**4**	100%	
89	5373.89	100	5373.89					
143	1472.51	100	1472.51					
sum	28636.94		24897.64					

Table (3) :

parceling of vilas area(parcleB)							
-							-
befor parceling				after parceling			
parcel num	area	percentage of orginal area	area	parcel num	area	parcel num take it	percentage of share
106	5968.38	18	1074.309	**B1**	1093.77	**13**	100%
105	6370.15	100	6370.154	**B2**	1081	**105**	100%
13	2089.59	100	2089.593	**B3**	1313	**105**	100%
103	1518.70	100	1518.704	**B4**	1086	**105**	100%
104	9133.70	60	5480.221	**B5**	951.45	**105**	100%
sum	25080.53		16532.98	**B6**	1029.26	**13,105,106,104**	13=96.7%,105=2%,106=0.2%,104=1.2%
-				**B7**	952	**105**	100%
-				**B8**	967.74	**105**	100%
-				**B9**	917.34	**104,103**	104=52%,103=48%
-				**B10**	959.92	**104**	100%
-				**B11**	1072.47	**106**	100%
-				**B12**	981.73	**104**	100%
-				**B13**	1017.59	**104**	100%
-				**B14**	983.51	**104**	100%
-				**B15**	1059.68	**104**	100%
-	-	-	-	-	**B16**	1079	**103**	100%

Table (4) :

parceling of residential area(parcleA,D)								
befor parceling				after parceling				
parcel num	area	percentage of orginal area	area	parcel num	area	parcel num take it	percentage of share	
31	4222.66	100	4222.66	**D1**	2085.66	**8,15,96,16,17,151,9,3**	8=30%,15=18%,96=6%,16=5%,17=7%,151=9%150=8%,3=15%	
34	2139.24	100	2139.24	**D2**	2856	**98,101,147,106,107,96,2,150**	98=16%,101=8%,147=15%,106=4%,107=3%,96=25%,2=20%,150=9%	
97	9443.57	100	9443.57	**D3**	2945	**8**	100%	
92	4255.58	100	4255.58	**D4**	1965	**11,10,104,110,97,14,149,102**	11=18%,10=5%104=17%,110=6%,97=8%,14=25%,149=9%,102=12%	
93	5435.85	100	5435.85	**A1**	598.05	**16**	5%	
94	2584.90	100	2584.90	**A2**	595.44	**17**	100%	
95	2175.18	100	2175.18	**A3**	599.19	**17**	100%	
96	16468.18	100	16468.18	**A4**	599.98	**151**	100%	
101	12706.03	100	12706.03	**A5**	599.03	**151**	100%	
102	7834.56	100	7834.56	**A6**	599.06	**151**	100%	
98	4424.45	100	4424.45	**A7**	599.35	**151**	100%	
113	1743.52	100	1743.52	**A8**	599.58	**151**	100%	
114	1043.35	100	1043.35	**A9**	599.04	**151**	100%	
144	1021.92	100	1021.92	**A10**	596.83	**150**	100%	
117	3305.30	100	3305.30	**A11**	595.59	**150**	100%	
111	4326.0	100	4326.0	**A12**	604.	**150**	100%	

	0		0			36	
109	3439.44	100	3439.44	**A13**	598.04	**14**	100%
108	1381.63	100	1381.63	**A14**	599.50	**15**	100%
107	1183.43	100	1183.43	**A15**	599.72	**149**	100%
110	3081.11	100	3081.11	**A16**	599.42	**149**	100%
104	9133.70	40	3653.48	**A17**	599.38	**149**	100%
106	5968.38	82	4894.07	**A18**	599.43	**149**	100%
148	2981.69	100	2981.69	**A19**	599.37	**149**	100%
149	4300.58	100	4300.58	**A20**	599.68	**149**	100%
147	12911.94	28.96	3739.30	**A21**	599.21	**149**	100%
150	1462.95	100	1462.95	**A22**	599.70	**148**	100%
151	3935.20	100	3935.20	**A23**	599.80	**148**	100%
1	531.78	100	531.78	**A24**	599.95	**148**	100%
2	3779.17	100	3779.17	**A25**	590.12	**148**	100%
3	5822.87	100	5822.87	**A26**	597.35	**147**	100%
8	4943.50	100	4943.50	**A27**	599.06	**147**	100%
9	2708.72	100	2708.72	**A28**	599.44	**147**	100%
10	1158.63	100	1158.63	**A29**	548.07	**147**	100%
11	1230.25	100	1230.25	**A30**	557.42	**18**	100%
14	720.40	100	720.40	**A31**	598.82	**147**	100%
15	1067.94	100	1067.94	**A32**	561.32	**147**	100%
16	814.08	100	814.08	**A33**	525.29	**18**	100%
17	1528.16	100	1528.16	**A34**	544.15	**106**	100%

18	1084.40	100	1084.40		**A35**	580.66	**107**	100%
Sum	158300.22		142573.05		**A36**	587.45	**107**	100%
					A37	587.00	**106**	100%
					A38	572.33	**106**	100%
					A39	516.41	**106**	100%
					A40	507.53	**106**	100%
					A41	515.20	**106**	100%
					A42	542.71	**106**	100%
					A43	573.00	**109**	100%
					A44	538.84	**106**	100%
					A45	512.55	**106**	100%
					A46	536.66	**109**	100%
					A47	570.57	**109**	100%
					A48	524.90	**104**	100%
					A49	501.79	**104**	100%
					A50	550.56	**109**	100%
					A51	544.93	**110**	100%
					A52	510.94	**104**	100%
					A53	567.39	**110**	100%
					A54	512.28	**102**	100%
					A55	593.67	**109**	100%
					A56	533.66	**102**	100%
					A57	559.39	**110**	100%

					A58	592.08	**109**	100%
					A59	592.12	**148**	100%
					A60	570.15	**104**	100%
					A61	591.42	**110**	100%
					A62	528.46	**102**	100%
					A63	592.34	**110**	100%
					A64	554.81	**104**	100%
					A65	599.62	**108**	100%
					A66	577.91	**104**	100%
					A67	575.33	**104**	100%
					A68	527.48	**102**	100%
					A69	533.24	**102**	100%
					A70	594.67	**102**	100%
					A71	588.42	**102**	100%
					A72	522.95	**102**	100%
					A73	518.60	**102**	100%
					A74	503.67	**102**	100%
					A75	542.33	**102**	100%
					A76	592.88	**102**	100%
					A77	599.81	**108**	100%
					A78	560.90	**101**	100%
					A79	507.49	**102**	100%
					A80	504.77	**102**	100%

					A81	598.87	**102**	100%
					A82	594.07	**102**	100%
					A83	563.07	**101**	100%
					A84	509.79	**101**	100%
					A85	530.42	**101**	100%
					A86	519.01	**101**	100%
					A87	573.71	**101**	100%
					A88	506.74	**101**	100%
					A89	550.18	**101**	100%
					A90	593.01	**101**	100%
					A91	525.91	**101**	100%
					A92	511.23	**101**	100%
					A93	526.65	**101**	100%
					A94	524.15	**101**	100%
					A95	536.95	**101**	100%
					A96	591.10	**101**	100%
					A97	556.44	**101**	100%
					A98	511.19	**101**	100%
					A99	525.97	**101**	100%
					A100	554.30	**101**	100%
					A101	533.20	**101**	100%
					A102	536.38	**101**	100%
					A103	563.01	**101**	100%

						A104	539.06	101	100%
						A105	516.37	9	100%
						A106	520.60	98	100%
						A107	596.72	98	100%
						A108	566.58	98	100%
						A109	598.20	98	100%
						A110	607.10	98	100%
						A111	599.32	98	100%
						A112	572.70	96	100%
						A113	578.64	96	100%
						A114	597.00	98	100%
						A115	571.33	9	100%
						A116	545.10	9	100%
						A117	512.77	9	100%
						A118	554.01	9	100%
						A119	546.43	96	100%
						A120	558.49	96	100%
						A121	540.13	96	100%
						A122	500.00	96	100%
						A123	598.90	96	100%
						A124	510.56	96	100%
						A125	586.33	96	100%
						A126	501.78	96	100%

						A127	585.00	**96**	100%
						A128	565.46	**96**	100%
						A129	572.70	**96**	100%
						A130	572.76	**96**	100%
						A131	576.00	**96**	100%
						A132	598.57	**96**	100%
						A133	578.83	**96**	100%
						A134	588.87	**96**	100%
						A135	599.62	**96**	100%
						A136	595.75	**96**	100%
						A137	599.80	**96**	100%
						A138	599.99	**96**	100%
						A139	599.56	**96**	100%
						A140	578.00	**96**	100%
						A141	599.66	**96**	100%
						A142	599.93	**96**	100%
						A143	586.00	**96**	100%
						A144	598.49	**96**	100%
						A145	586.00	**97**	100%
						A146	597.74	**97**	100%
						A147	553.51	**97**	100%
						A148	567.70	**97**	100%
						A149	532.24	**97**	100%

					A150	568.43	**97**	100%
					A151	599.94	**97**	100%
					A152	566.00	**97**	100%
					A153	590.93	**97**	100%
					A154	599.59	**97**	100%
					A155	597.57	**97**	100%
					A156	596.44	**97**	100%
					A157	577.00	**97**	100%
					A158	598.61	**97**	100%
					A159	598.79	**97**	100%
					A160	565.00	**31**	100%
					A161	598.32	**97**	100%
					A162	592.81	**31**	100%
					A163	505.14	**31**	100%
					A164	524.55	**31**	100%
					A165	523.88	**31**	100%
					A166	500.00	**31**	100%
					A167	500.69	**31**	100%
					A168	506.48	**31**	100%
					A169	503.62	**34**	100%
					A170	552.45	**34**	100%
					A171	578.88	**2**	100%
					A172	570.16	**2**	100%

					A173	538.24	34	100%
					A174	563.90	2	100%
					A175	596.30	2	100%
					A176	542.84	34	100%
					A177	592.30	2	100%
					A178	510.64	95	100%
					A179	579.26	95	100%
					A180	593.06	93	100%
					A181	599.48	2	100%
					A182	519.99	1	100%
					A183	603.41	93	100%
					A184	591.06	93	100%
					A185	504.69	95	100%
					A186	506.47	93	100%
					A187	585.79	93	100%
					A188	501.60	93	100%
					A189	589.35	93	100%
					A190	545.96	93	100%
					A191	577.88	95	100%
					A192	501.13	94	100%
					A193	595.50	93	100%
					A194	554.96	94	100%
					A195	545.62	94	100%

					A196	505.84	**113**	100%
					A197	558.61	**94**	100%
					A198	524.07	**113**	100%
					A199	529.96	**113**	100%
					A200	506.91	**10**	100%
					A201	574.73	**10**	100%
					A202	568.49	**11**	100%
					A203	525.86	**11**	100%
					A204	526.18	**117**	100%
					A205	529.68	**117**	100%
					A206	537.71	**117**	100%
					A207	517.98	**117**	100%
					A208	535.38	**117**	100%
					A209	524.96	**117**	100%
					A210	569.18	**111**	100%
					A211	565.87	**111**	100%
					A212	590.35	**111**	100%
					A213	570.98	**111**	100%
					A214	533.56	**111**	100%
					A215	534.21	**111**	100%
					A216	617.33	**111**	100%
					A217	524.56	**92**	100%
					A218	546.50	**92**	100%

					A219	541.70	**92**	100%
					A220	528.78	**92**	100%
					A221	541.51	**92**	100%
					A223	507.08	**92**	100%
					A224	547.16	**92**	100%
					A225	516.52	**92**	100%
					A226	538.40	**3**	100%
					A227	517.34	**3**	100%
					A228	567.76	**3**	100%
					A229	551.03	**3**	100%
					A230	576.54	**3**	100%
					A231	515.51	**3**	100%
					A232	552.02	**3**	100%
					A233	510.93	**144**	100%
					A234	566.25	**3**	100%
					A235	505.91	**114**	100%
					A236	500.00	**114**	100%
					A237	506.90	**144**	100%
					A238	545.60	**3**	100%

Appendix D:

Table (1): slope for roads

Road num	slope
1	1
2	5.2
3	2.9
4	1
5	5.5
6	3.8
7	1
8	1
9	1
10	2.9
11	4.6
12	2.8
13	10.6
14	5.6
15	5.6
16	8
17	8
18	2.2
19	1
20	1.6
21	1.9
22	1.9
23	3.5
24	1
25	1.2
26	7.5
27	7.9
28	1
29	7
30	10.4