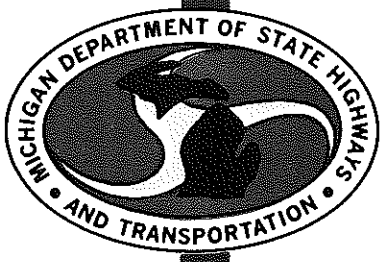
STATISTICAL ANALYSIS OF AGGREGATE BASE COURSE INSPECTION USING AN END RESULT AGGREGATE SPECIFICATION

(Sampling, Testing and Acceptance Procedures)



TESTING AND RESEARCH DIVISION
RESEARCH LABORATORY SECTION

STATISTICAL ANALYSIS OF AGGREGATE BASE COURSE INSPECTION USING AN END RESULT AGGREGATE SPECIFICATION

(Sampling, Testing and Acceptance Procedures)

Wen-Hou Kuo

Research Laboratory Section
Testing and Research Division
Research Project 76 G-222
Research Report No. R-1040

Michigan State Highway Commission
Peter B. Fletcher, Chairman; Carl V. Pellonpaa,
Vice-Chairman, Hannes Meyers, Jr., Weston E. Vivian
John P. Woodford, Director
Lansing, February 1977

Introduction

This is the first interim report prepared for Research Project 76 G-222, "Statistical Analysis of Aggregate Base Course Inspected by End Result Aggregate Specification." This project is divided into three primary phases:

Phase I - The design of sampling, testing and acceptance procedures for Construction Projects M 36021 and I 50062, based on the in-place aggregate acceptance sampling plan recommended by the End Result Aggregate Committee.

Phase II - The training of personnel using the procedures developed in Phase I.

Phase III - The analysis of the aggregate quality of aggregate base course inspected according to procedures designed in Phase I. If it is necessary, the procedures designed in Phase I will be updated.

This report represents Phase I of the research project. Phase II will be started right after the approval of Phase I. Phase III will be started approximately in May of 1977.

The current practice of the Michigan Department of State Highways and Transportation is to inspect aggregate at the production site (stockpile). Since stockpiled aggregate will undergo a "remixing" process when transported to the construction site, and a further one as it is spread over the roadbed by earthmoving and grading machines, the Department is very much concerned about the frequency of accepted stockpiled aggregate not being acceptable after it is in place at the construction site.

The possibility of this occurring is closely related to the characteristics of the implemented stockpile aggregate inspection plan. This subject has been discussed in the report "Aggregate Gradation Quality Control," (MDSHT Research Report R-1024). Generally speaking, the report favors the idea of practicing aggregate inspection at the construction site. Moreover, it is the current trend in the aggregate industry to practice aggregate inspection at the construction site. For the above reasons, the End Result Aggregate Committee was formed to develop in-place aggregate inspection procedures[1].

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[1] Members of End Result Aggregate Committee: James W. Burge, C. D. Church, George H. Gallup, Peter R. Kamarainen, Wen-Hou Kuo, and Donald F. Malott.

Based on the material presented in the report "Aggregate Gradation Quality Control," the committee adopted an inspection plan of so-called 'acceptance sampling by attributing' as a decision rule to accept or reject in-place aggregates. The procedures developed therein shall be used for Construction Projects M 36021 and I 50062. The sampling, testing, and acceptance procedures for these two projects are described in the following sections.

Lot Size

The aggregate base course will be accepted by lots. A lot will consist of an area of 18,000 sq yd. The last lot will be 18,000 sq yd plus any fractional lot less than 9,000 sq yd or will be a fractional lot 9,000 sq yd or more in area. For example, if the width of a two-lane aggregate base course is 51 ft, and if only one lane is constructed at a time, the dimension of a lot is 6,353 ft by 25.5 ft. That is, the width of the construction base in this case is considered to be 25.5 ft because of the construction procedure.

When to Sample

The aggregate will be sampled after it has been placed on the grade and shaped to the approximate final cross-section, but prior to the final compaction.

Sample Size

Each lot will be equally divided into 12 strata as shown in Figure 1. One spot is randomly chosen from each stratum. From each spot, one aggregate sample of 20 to 30 lb is taken. Thus, we have 12 stratified random samples from each lot.

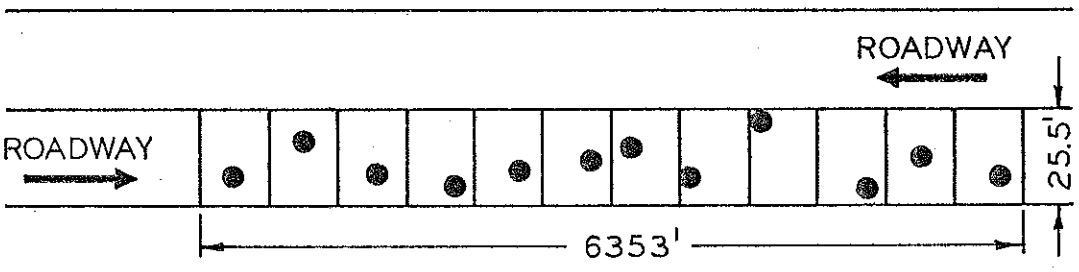

Figure 1. Lot stratification pattern.

Sampling Layouts for Projects M 36021 and I 50062

When a lot is ready to be inspected, the inspector will have to choose 12 spots from which he takes 12 samples. The basic requirement is that the 12 spots should be randomly chosen. In order to fulfill the randomness requirements, the inspector would have to know how to use a table of random numbers and convert the random number to a sample location. This process is time-consuming and is not recommended for field work. For this reason, we shall predesign a package of sampling layouts for each lot size. Every sampling layout indicates 12 random spots from which 12 samples shall be taken. With the help of a package of sampling layouts, the inspector need only use a simple method to choose a sampling layout from the package. The format of sampling layouts is as follows.

The major lot sizes of projects M 36021 and I 50062 are described in Table 1. For each of the six lot sizes a package of 216 sampling layouts is designed by using a random number computer program. Each sampling layout indicates 12 random spots from which samples are to be taken. The location of each spot is indicated by two numbers which are distances to the chosen y-reference and x-reference lines, respectively. The y-reference line is one of two edges transverse to the roadway, while the x-reference line is one of the two edges alongside the roadway.

TABLE 1
LOT SIZE DIMENSION, ft

Project Name	M 36021		I 50062			
Base Width	25.5	22	54	42	30	18.5
Lot Length	6,353	7,364	3,000	3,857	5,400	8,757

The 216 sampling layouts for each lot size described in Table 1 are presented in the Appendix to this report. To make the above explanations more understandable, the sampling layout No. 235 for a lot size 6,353 ft by 25.5 ft is presented in Table 2 and graphically in Figure 2.

Sampling Procedures

When a lot is formed and ready to be inspected, the inspector rolls a die three times. The three numbers shown determine which sampling layout in the package designed for that lot size should be used to sample the aggregate.

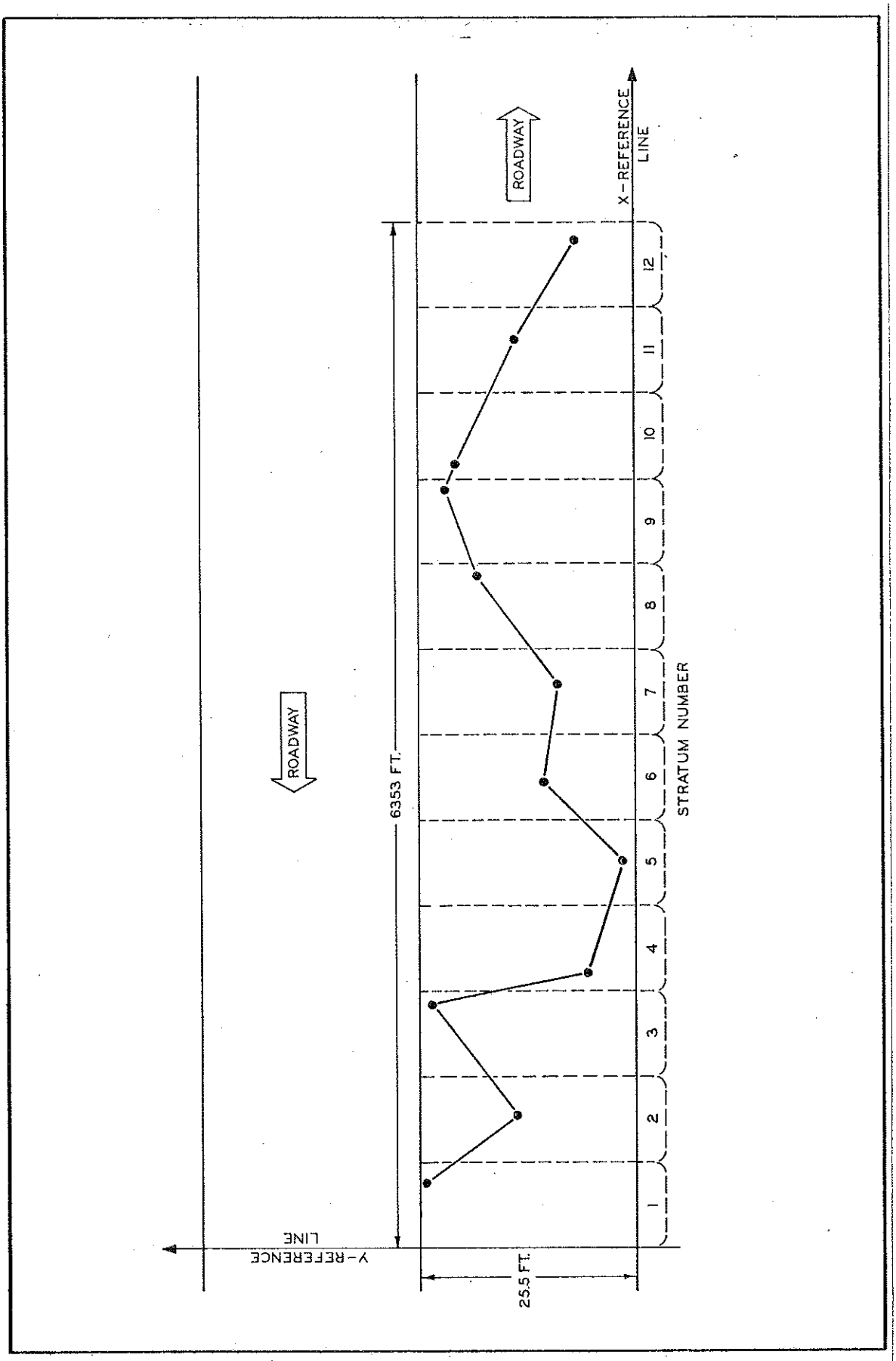

Figure 2. Sampling layout No. 235 (lot size: 6,353 x 25.5 ft).

TABLE 2
SAMPLING LAYOUT NO. 235 FOR
LOT SIZE 6,353 ft BY 25.5 ft

Stratum No.	Distance to Reference Line	
	y-Reference	x-Reference
1	412	24.9
2	817	14.1
3	1,509	24.1
4	1,710	5.6
5	2,394	1.3
6	2,890	10.4
7	3,493	9.1
8	4,169	18.4
9	4,695	21.8
10	4,853	21.3
11	5,658	14.2
12	6,237	6.8

This constitutes the general sampling procedure for a regular lot. Occasionally, an irregular lot will be encountered. The sampling procedure for irregular lots is described in Examples 2 through 4.

Example 1 (regular lot). The width of the base is 25.5 ft. Thus, the length of a regular lot is 6,353 ft according to the definition of lot size (see Table 1). When the lot is formed and ready to be inspected, the inspector rolls a die three times. Suppose that the three numbers are 2, 3, and 5, respectively. Then, sampling layout No. 235 in the package of sampling layouts designed for a lot size of 6,353 ft by 25.5 ft shall be used to sample aggregate from that lot. For this particular layout, 12 spots from which 12 samples shall be taken are shown in Figure 2.

Example 2. The width of the base is 25.5 ft. However, the length of a lot is not 6,353 ft, but x ft. This situation could occur in many ways. For example, if the lot were the last one to be inspected. The sampling procedures for this particular type of irregular lot are described as follows:

1) The inspector rolls a die three times. Suppose that the three numbers are 2, 3, and 5, respectively.

TABLE 3
SAMPLING LAYOUT NO. 235 FOR
LOT SIZE 3,176.5 ft BY 25.5 ft
(Irregular Lot Size)

Stratum No.	Distance to Reference Line	
	y-Reference*	x-Reference
1	206.0	24.9
2	408.5	14.1
3	754.5	24.1
4	865.0	5.6
5	1,197.0	1.3
6	1,445.0	10.4
7	1,746.5	9.1
8	2,084.5	18.4
9	2,347.5	21.8
10	2,426.5	21.3
11	2,829.0	14.2
12	3,118.5	6.8

* Adjusted number.

TABLE 4
SAMPLING LAYOUT NO. 235
FOR EXAMPLE 3
($y = 25.5$ ft, $y_i = 25.5$ ft, $i = 1, \ldots, 11$,
and $y_{12} = 22$ ft)

Stratum No.	Distance to Reference Line	
	y-Reference	x-Reference
1	412	24.9
2	817	14.1
3	1,509	24.1
4	1,710	5.6
5	2,394	1.3
6	2,890	10.4
7	3,493	9.1
8	4,169	18.4
9	4,695	21.8
10	4,853	21.3
11	5,658	14.2
12	6,237	5.9*

* $5.9 = 6.8 \times 22/25.5$

2) Sampling layout No. 235 is identified from the package of sampling layouts designed for lot size 6,353 ft by 25.5 ft.

3) The above layout is adjusted by a factor x/6353. That is, every number corresponding to the distance to the y-reference line is multiplied by the factor x/6353.

4) The adjusted layout is then used to sample the aggregate from that lot.

If x in Example 2 is equal to 3,176.5 ft (half of the regular length), then sampling layout No. 235 for this particular lot size (3,176.5 ft by 25.5 ft) is obtained by multiplying every number in column "y-reference" of Table 2 by the factor 3176.5/6353. The resultant sampling layout is presented in Table 3.

Example 3. Occasionally, the width of the base is not uniform within a lot. In this situation, every number corresponding to the distance to the x-reference line should be properly adjusted. Suppose that the majority of the bases in the area ready to be inspected have a width of y ft. The length of this lot, x_y ft, is determined by considering y ft as the width of the base. Denote y_i ft to be the width of the i-th stratum base of this lot. Then, the sampling procedure for this type of irregular lot is described as follows:

1) When the lot is formed, the inspector rolls a die three times. Suppose that the three numbers are 2, 3, and 5, respectively.

2) Sampling layout No. 235 is identified from the package of sampling layouts designed for lot size x_y ft by y ft.

3) The i-th stratum of the above layout is adjusted to the distance y_i/y. That is, the number corresponding to the distance to the x-reference line in the i-th stratum is multiplied by the factor y_i/y.

4) The adjusted layout is then used to sample aggregate from this lot.

If y in Example 3 is equal to 25.5 ft, then x_y is equal to 6,353 ft. Further, if y_i for i = 1, . . ., 11, is equal to 25.5 ft and y_{12} is equal to 22 ft, then the only number adjusted is the one corresponding to the distance to the x-reference line in stratum 12 and the adjustment factor is 22/25.5. The resulting layout is presented in Table 4.

Example 4. The width of the base is not uniform within a lot. Moreover, the length of the lot is also irregular. In this situation, the sampling layout should be adjusted according to the procedures described in Examples 2 and 3. Suppose that the majority of the bases in the area ready to be inspected have a width of y ft. The length of this lot, based on the width of y ft, should be x_y ft. However, the actual length of this lot is only x ft ($x \neq x_y$). Denote y_i ft as the width of the base of the i-th stratum of this lot. Then, the sampling procedure for this type of lot is described as follows:

1) When the lot is formed, the inspector rolls a die three times. Suppose that the three numbers are 2, 3, and 5, respectively.

2) Sampling layout No. 235 is identified from the package of sampling layouts designed for lot sizes x_y ft by y ft.

3) Every number corresponding to the distance to the y-reference line is multiplied by a factor x/x_y.

4) The number corresponding to the distance to the x-reference line in the i-th stratum is multiplied by a factor y_i/y.

5) The adjusted layout is then used to sample aggregate from that lot.

If y and x in Example 4 are 25.5 ft and 3,176.5 ft, respectively, then x_y is equal to 6,353 ft. Further, if y_i for i = 1, . . ., 11, is equal to 25.5 ft and y_{12} is equal to 22 ft, then the sampling layout No. 235 for this particular lot size can be obtained as follows:

1) Every number shown in column "y-reference" of Table 2 is multiplied by the factor 3176.5/6353.

2) The number shown in column "x-reference" and in row "stratum No. 12" of Table 2 is multiplied by the factor 22/22.5. The resulting layout is presented in Table 5.

Since the test results of each sample affect the acceptance of the lot, every sample should be properly marked with the lot number and stratum number for later reference. For example, if a sample of 20 to 30 lb is taken from the 5th stratum of lot 2, the bag containing this aggregate should be marked 2-5. In general, every bag should be marked i-j, where i is the lot number and j is the stratum number. Of course, the inspector should have a list of lot locations before the construction begins.

TABLE 5
SAMPLING LAYOUT NO. 235
FOR EXAMPLE 4
($x = 3,176.5$ ft, $y = 25.5$ ft, $y_i = 25.5$ ft, $i = 1, \ldots, 11$, and $y_{12} = 22$ ft)

Stratum No.	Distance to Reference Line	
	y-Reference[1]	x-Reference
1	206.0	24.9
2	408.5	14.1
3	754.5	24.1
4	865.0	5.6
5	1,197.0	1.3
6	1,445.0	10.4
7	1,746.5	9.1
8	2,084.5	18.4
9	2,347.5	21.8
10	2,426.5	21.3
11	2,829.0	14.2
12	3,118.5	5.9[2]

[1] Adjusted number.
[2] $5.9 = 6.8 \times 22/25.5$

Testing Procedure

When 12 properly obtained samples are collected from a lot, they should be tested immediately. The testing procedure is described as follows:

1) Every sample should be split into two subsamples by a standard Gilson Sample Splitter.

2) Every two subsamples should be tested by one inspector and one set of sieving equipment. Other testing conditions should be kept the same.

3) The test results of these 12 samples should be recorded in the report form 76 G-222 and sent to the Research Laboratory for the purpose of studying the splitting variation of the Gilson Sample Splitter. The report form is shown in Figure 3.

4) The test results of these 12 samples should be immediately sent to the inspector to facilitate lot acceptance.

TEST REPORT FORM: 76 G-222

Project No. _____ Sample Identification No. _____

		Subsample 1	Subsample 2
Initial Weight			
Weight After Washing			
Weight Loss-By-Washing			
Total Weight Retained On Sieve	1-in.		
	3/4-in.		
	3/8-in.		
	No. 8		
Total Weight Passing the No. 8 Sieve			
Weight of Crushed Material			
Deval Abrasion	Crushed		
	Uncrushed		

Figure 3. Test report form.

Aggregate Quality Classification

When the inspector receives the test results of the 12 samples from a lot, he classifies each sample as defective if it fails to meet any one of the following requirements:

a. Specification of Aggregate Composition:

TABLE 6
SPECIFICATION OF
AGGREGATE COMPOSITION

Sieve Size	Total Percent Passing Each Sieve	
	Lower Limit	Upper Limit
1-in.	100	100
3/4-in.	88	100
3/8-in.	63	87
No. 8	28	52
Loss-By-Washing	3	9*

* If the aggregate is produced entirely by crushing rock, boulders, cobbles, slag, or concrete the maximum limit for loss-by-washing will be increased to 11 percent.

b. The aggregate from the samples shall have a minimum of 25 percent crushed material.

c. The Deval Abrasion values for the uncrushed and crushed material shall not exceed 20 and 30, respectively, for bituminous pavement surfaces (or in the case of concrete pavement surfaces, 40 and 50).

Then, the inspector records the total number of defective samples and checks to see in which of the following four categories the lot falls.

C1) No defective samples.

C2) The number of defective samples is at least one, but less than or equal to six, and none of them has a loss-by-washing exceeding 10 percent[2].

C3) The number of defective samples is more than six, but none of them have a loss-by-washing exceeding 10 percent[2].

C4) There is one defective sample which has a loss-by-washing exceeding 10 percent[2].

The above system can be presented in Figure 4.

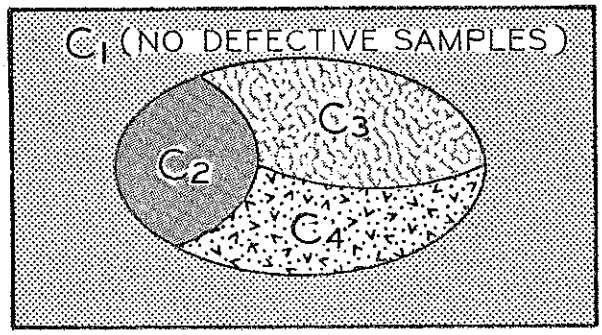

Figure 4. Lot quality system.

Actions Regarding Lot Acceptance

The action to be taken for each categorized lot defined in the previous section is described as follows:

A1) The lot falling in C1 category shall be accepted at 100 percent of the contract unit price.

A2) For lots falling in the C2 category, the contractor may replace the substandard material or may correct the material by blending, provided that the blending method is accepted by the Engineer. When the contractor replaces or corrects the material, the entire lot will be resampled and categorized as it is a new lot. If the contractor does not replace or correct the substandard material, the contract unit price for the lot will be adjusted in accordance with Table 7.

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[2] If the aggregate is produced entirely by crushing, the limit is changed to 12 percent.

TABLE 7
UNIT PRICE SCHEDULE FOR EACH
LOT QUALITY LEVEL

Total Number of Defective Samples in the Lot	Percent of Decrease of Contract Unit Price for the Lot	
	Bituminous Pavement Surface	Concrete Pavement Surface
1	0	0
2	5	5
3	10	10
4	15	15
5	25	25
6	50	50
7 or more	50	pay as subbase (C.I.P.)

A3) For lots falling in the C3 category, in the case of concrete pavement surfaces, the procedure in A2 will be followed, for bituminous pavement surfaces the Engineer will make the decision as to whether the material can remain in place or if corrections of the lot are required.

If the Engineer determines that the material can be left in place with no corrections, and the contractor decides not to correct the substandard material, the payment will be 50 percent of the contract unit price.

If the Engineer determines that the material can be left in place with no corrections, but the contractor wishes to correct the substandard material, the entire lot will be resampled and recategorized as it is a new lot.

If the Engineer decides that the substandard material should be corrected, the entire lot will be resampled and recategorized after it is corrected.

A4) For lots falling in the C4 category, the substandard material shall be removed and replaced with new material. Then, the entire lot will be resampled and recategorized as it is a new lot.

Remarks

Sampling layouts presented in this report are good only for the specified lot size. However, the sampling, testing, and acceptance procedure methodology described in this report can be used without changes for other situations.

APPENDIX

SAMPLING LAYOUTS FOR VARIOUS LOT SIZES

LOT SIZE

6,353 ft x 25.5 ft

LAYOUT NO	STRATUM NUMBER 1	2	3	4	5	6	7	8	9	10	11	12
111	91	1026	1401	2063	2327	2816	3263	3761	4613	4914	5593	5893
	24.6	7.0	3.0	1.6	15.5	16.9	4.1	15.4	9.4	0.1	21.5	1.4
112	231	713	1412	1859	2240	2775	3425	4054	4654	4875	5769	6071
	15.9	16.0	23.9	2.9	21.2	22.5	7.7	24.8	16.2	24.7	8.5	6.6
113	25	661	1066	1708	2175	2848	3509	4033	4573	5026	5684	5927
	13.5	9.2	4.5	7.1	7.6	6.9	13.7	25.0	21.3	5.7	13.9	7.6
114	458	1000	1470	1649	2618	2672	3252	3960	4685	5157	5766	5884
	12.7	6.8	13.0	4.5	16.1	19.9	25.4	1.6	10.6	10.9	2.4	3.0
115	276	559	1127	1638	2365	2857	3705	4166	4509	4790	5688	5977
	16.1	7.9	6.3	22.1	14.4	18.9	15.6	16.6	15.9	18.8	5.4	13.6
116	486	736	1476	1801	2393	2819	3332	3854	4338	4769	5368	6242
	20.5	18.7	23.5	1.1	18.7	12.3	13.9	10.4	7.6	18.3	24.3	15.8
121	123	766	1480	1887	2608	2684	3179	3722	4759	5194	5706	6270
	15.9	14.5	16.8	1.9	11.8	5.9	17.6	1.3	17.0	23.8	5.1	20.0
122	47	962	1383	1855	2185	2824	3394	3990	4516	5227	5316	5839
	22.4	18.1	16.6	10.8	2.2	24.6	0.2	15.6	4.4	10.0	20.6	24.9
123	103	641	1586	2051	2305	2815	3237	3983	4237	5180	5713	6145
	2.4	6.1	13.0	7.6	22.0	10.5	25.5	14.9	23.8	12.7	16.4	22.2
124	77	971	1408	1711	2395	2908	3272	3858	4259	5282	5342	6131
	4.3	3.5	20.5	24.5	24.8	21.5	4.6	23.5	20.7	18.3	22.2	14.1
125	333	1020	1156	1673	2461	2912	3360	4025	4596	5276	5467	6165
	17.6	3.3	14.4	16.4	19.3	21.5	18.8	5.4	17.5	15.4	5.5	14.7
126	412	961	1152	2097	2622	2660	3615	3919	4275	5035	5693	6125
	24.0	18.8	2.5	12.6	16.0	18.8	6.9	1.5	24.7	9.2	14.4	19.8
131	478	726	1141	2117	2349	3169	3523	4137	4391	5061	5777	5918
	4.6	7.5	21.1	10.6	19.4	21.0	22.2	0.7	23.2	15.6	16.5	21.5
132	170	621	1143	1774	2196	3147	3211	4078	4692	4949	5777	6091
	5.0	0.9	14.3	7.9	3.1	2.8	7.8	1.4	17.9	14.4	3.3	0.6
133	292	687	1338	2017	2572	2671	3663	3853	4398	5033	5335	5956
	18.5	25.4	21.9	14.9	21.1	18.2	17.1	21.2	0.4	5.4	23.4	22.1
134	304	557	1529	2077	2336	2848	3504	4194	4459	5036	5781	5894
	19.8	21.0	24.0	8.7	11.3	14.9	6.3	25.5	23.1	19.8	23.9	12.4
135	215	812	1481	1641	2360	2706	3457	4139	4522	4971	5793	5963
	9.2	5.3	20.3	6.0	5.2	18.9	23.2	15.8	18.6	1.0	5.5	5.2
136	386	721	1075	1837	2546	2776	3371	3972	4488	5285	5423	5893
	18.9	3.2	22.2	8.5	20.1	17.8	21.3	21.0	1.6	19.1	14.1	0.4
141	423	764	1064	1876	2206	2841	3473	4206	4457	5116	5513	6000
	18.0	13.1	3.0	24.8	14.8	5.9	21.5	2.1	5.0	19.6	14.7	21.3
142	197	607	1244	1755	2348	2783	3204	3842	4502	5219	5667	6163
	23.4	15.3	17.7	25.2	2.4	4.2	3.9	0.1	5.9	3.2	12.3	22.6
143	466	909	1061	2072	2314	3010	3460	4060	4390	4884	5805	6094
	23.0	13.3	2.5	7.2	12.2	9.3	22.0	1.7	8.5	17.0	6.6	5.1
144	315	693	1061	1803	2536	2804	3495	4152	4700	5216	5457	6175
	17.8	10.9	1.5	2.2	19.7	14.8	23.1	6.6	5.6	11.7	17.0	15.4
145	7	799	1199	2042	2161	3127	3598	3795	4706	4947	5304	6263
	19.0	18.5	25.1	23.1	21.6	9.0	22.5	25.0	9.2	15.7	21.3	4.9
146	102	882	1294	1733	2248	2702	3199	3767	4284	4837	5646	5967
	0.9	16.8	5.4	13.9	17.0	15.3	10.5	5.0	0.3	18.9	17.3	15.6

LAYOUT NO	STRATUM NUMBER 1	2	3	4	5	6	7	8	9	STRATUM NUMBER 10	11	12
151	146	1023	1249	1859	2224	2896	3417	3862	4678	5254	5778	5931
	1.6	21.8	23.6	3.1	22.4	2.9	11.7	5.1	14.9	15.6	0.4	3.7
152	502	718	1535	2015	2435	2824	3701	3862	4282	5045	5304	6187
	17.1	1.4	0.1	12.7	6.3	15.2	8.1	24.4	10.2	9.3	16.2	0.1
153	21	993	1577	2097	2577	2844	3677	4196	4380	4824	5548	5912
	7.1	17.0	14.6	1.5	1.4	10.4	15.4	10.9	10.0	18.4	3.7	18.9
154	16	845	1300	2059	2502	3145	3581	4231	4589	4778	5745	5925
	14.9	8.9	15.9	7.1	24.7	19.5	1.2	20.1	20.8	14.9	21.5	5.2
155	354	626	1354	1876	2600	2904	3266	3790	4540	4896	5394	6075
	6.2	5.9	10.7	23.6	10.0	11.1	8.7	0.2	11.4	13.2	12.3	24.3
156	248	933	1449	2057	2292	3128	3210	3748	4242	5119	5345	6294
	16.4	0.8	1.3	10.9	23.7	18.7	23.9	16.0	10.6	10.8	3.9	15.2
161	150	613	1326	2117	2327	2760	3298	3889	4319	4853	5774	6092
	5.7	17.0	22.6	6.0	23.4	23.0	24.4	6.5	3.1	24.9	3.9	23.0
162	384	973	1149	2087	2526	2826	3315	3916	4383	5176	5785	5980
	12.6	14.4	6.1	16.4	17.1	15.1	3.3	15.9	9.2	1.5	1.2	4.0
163	337	760	1066	1832	2251	2905	3583	4227	4436	5208	5429	6122
	4.4	9.1	1.7	25.5	9.4	14.8	25.2	17.5	3.8	21.5	21.2	17.8
164	193	629	1508	1676	2127	3102	3325	3868	4397	5025	5382	6246
	16.7	2.1	24.7	17.7	6.4	11.3	3.6	16.3	8.3	17.3	10.3	0.0
165	39	623	1309	1742	2124	2706	3646	3935	4518	4946	5576	6337
	4.2	16.1	6.5	22.6	2.3	7.7	23.5	7.3	12.2	12.3	4.1	6.9
166	431	894	1582	1920	2464	2862	3208	3755	4446	5135	5434	6318
	21.3	14.2	12.4	8.5	12.8	9.4	4.8	18.5	5.5	20.3	1.2	24.6
211	317	855	1308	1990	2451	2886	3528	3966	4736	4874	5434	5843
	2.1	23.5	3.5	8.7	4.6	11.0	15.7	17.7	9.3	4.3	21.5	3.6
212	116	628	1578	1697	2122	2814	3509	3814	4353	4906	5760	6101
	12.1	10.8	20.9	3.5	13.5	23.5	5.4	14.4	2.9	1.3	24.3	2.5
213	10	1032	1267	1888	2328	2892	3321	4134	4314	4804	5465	6286
	13.1	9.3	19.1	17.6	21.3	21.2	11.2	9.6	17.0	22.2	13.3	4.3
214	206	699	1077	1744	2316	3063	3580	3882	4649	5108	5328	6169
	12.5	18.1	21.0	8.8	10.6	0.8	16.0	21.9	11.3	11.7	5.2	4.2
215	101	837	1383	1699	2625	2682	3541	3779	4320	5144	5642	5837
	22.0	23.0	2.7	5.0	23.2	6.7	3.1	20.1	9.6	12.5	7.9	7.4
216	450	887	1278	1764	2280	3001	3303	3892	4492	5191	5303	6080
	6.8	14.6	23.9	16.7	3.7	10.6	20.1	18.6	8.9	3.6	17.3	2.3
221	194	889	1203	1691	2338	3105	3695	3941	4691	4974	5610	6337
	17.5	21.4	15.1	2.2	18.2	7.1	8.6	11.6	8.8	14.7	2.0	4.8
222	510	674	1201	1687	2135	2974	3536	3750	4409	5032	5539	6315
	21.1	9.3	17.0	25.3	19.2	11.6	4.2	1.3	7.6	13.4	10.3	9.9
223	326	591	1413	1636	2396	2758	3290	4154	4473	5064	5703	6066
	6.2	21.8	1.5	14.7	0.2	14.6	0.0	2.0	6.5	13.1	11.9	24.3
224	93	758	1093	1790	2616	2944	3704	4193	4309	5259	5610	5899
	6.8	3.4	20.4	6.3	17.8	13.1	6.6	19.4	22.4	0.4	17.9	14.0
225	193	913	1175	1813	2641	2964	3673	3917	4240	5251	5621	6183
	6.9	13.0	15.4	20.8	6.2	20.3	6.7	14.5	20.1	3.9	14.6	18.5
226	172	1024	1373	1676	2211	2932	3399	3852	4736	5117	5634	6297
	9.3	15.1	7.8	24.9	10.9	19.6	5.8	4.1	22.2	2.8	24.9	10.4

LAYOUT NO	STRATUM NUMBER 1	2	3	4	5	6	STRATUM NUMBER 7	8	9	10	11	12
231	2	1011	1075	1815	2565	2877	3314	4097	4316	5174	5538	5982
	24,8	5,2	3,5	21,5	25,1	21,8	6,7	1,9	0,8	24,3	10,7	6,9
232	37	832	1374	1816	2288	3107	3251	4182	4454	5285	5817	6217
	11,5	15,1	25,2	2,0	5,1	11,5	5,3	3,5	12,1	0,6	7,6	11,8
233	327	847	1088	1916	2617	2707	3456	3995	4643	5196	5410	5991
	5,5	15,5	15,3	12,2	14,8	17,2	14,5	24,2	1,8	14,1	1,9	14,1
234	210	539	1567	1830	2207	2998	3448	3718	4445	5040	5789	5869
	11,7	0,1	21,2	11,1	2,2	16,1	10,1	10,5	20,2	18,8	16,0	4,6
235	412	817	1509	1710	2394	2890	3493	4169	4695	4853	5658	6237
	24,9	14,1	24,1	5,6	1,3	10,4	9,1	18,4	21,8	21,3	14,2	6,8
236	118	550	1339	1868	2435	3011	3647	3887	4539	4909	5304	5845
	5,4	3,3	2,2	13,1	5,9	10,1	20,9	18,3	13,4	14,5	21,0	6,8
241	241	1032	1547	1844	2582	2916	3544	3872	4505	5193	5510	6002
	24,9	10,9	21,0	1,8	4,5	4,1	7,1	0,7	5,7	11,2	10,3	8,7
242	53	563	1316	1785	2405	2946	3182	4165	4327	5261	5791	5912
	24,3	13,7	1,3	24,7	7,5	14,0	21,1	24,3	22,5	3,8	8,7	22,8
243	4	779	1410	1964	2177	2985	3635	4229	4672	4953	5374	6161
	13,8	24,9	25,0	9,3	20,9	3,4	2,3	12,0	4,8	19,8	25,1	10,2
244	529	573	1244	1820	2134	2816	3192	4017	4657	5081	5337	5846
	0,8	10,2	15,4	4,2	3,3	19,2	8,0	8,0	17,9	23,6	16,3	23,3
245	146	813	1531	1749	2125	2661	3200	3927	4314	4845	5809	6123
	17,9	16,4	9,6	13,8	11,9	6,6	24,8	13,1	10,7	12,0	13,8	5,6
246	110	1008	1353	1615	2308	2788	3227	3709	4417	5165	5624	6178
	22,3	6,9	10,7	18,1	17,5	3,9	16,8	9,8	20,9	2,4	8,4	0,6
251	405	535	1580	1871	2635	2893	3535	3817	4356	5152	5761	6003
	12,1	8,0	1,1	23,0	24,8	8,1	14,4	7,6	24,4	7,7	23,6	2,9
252	158	924	1389	1781	2291	2779	3467	3971	4243	5140	5426	6214
	3,5	8,8	23,4	23,9	3,4	11,7	9,2	5,5	15,8	0,7	0,6	23,2
253	487	648	1367	1685	2153	2924	3691	4021	4514	5089	5342	6049
	10,3	14,8	15,9	8,4	13,6	12,7	18,8	10,9	3,5	15,4	1,7	8,3
254	112	616	1554	1692	2423	2761	3548	3988	4457	4903	5527	6206
	2,2	5,0	24,2	9,1	4,2	13,0	11,1	8,5	21,2	3,7	23,6	9,3
255	262	699	1550	1614	2194	2668	3560	4137	4569	4997	5750	5997
	7,3	11,7	17,1	25,0	23,1	11,4	1,8	19,5	18,8	3,3	4,2	9,5
256	219	714	1109	1951	2130	2720	3295	4081	4647	5187	5495	6263
	5,0	24,7	4,3	2,1	14,8	7,2	12,6	19,2	13,5	6,9	2,8	9,1
261	12	1040	1459	1732	2169	3159	3574	3887	4632	5009	5795	5922
	3,5	13,8	16,0	23,6	19,8	19,5	1,6	3,6	8,6	10,1	14,7	8,7
262	90	919	1525	2013	2325	2795	3234	4060	4347	5122	5522	6241
	24,8	1,0	3,8	5,7	1,1	10,4	14,1	24,6	9,1	11,9	13,6	2,3
263	194	735	1488	1862	2207	2945	3652	4210	4389	4959	5624	5956
	9,2	17,3	14,1	20,5	11,1	25,4	1,0	1,9	23,3	12,1	11,7	5,3
264	472	1047	1485	1958	2557	3072	3305	4147	4301	5285	5414	6077
	24,9	3,9	5,1	6,2	1,8	3,0	14,2	21,4	24,8	7,7	20,0	0,2
265	199	942	1553	1590	2314	3132	3526	4044	4531	5003	5468	5920
	3,9	2,0	14,3	10,2	15,1	1,8	20,2	11,1	16,1	7,3	2,5	1,2
266	308	669	1190	2065	2447	3030	3474	4231	4601	5100	5473	6038
	2,5	1,0	23,6	7,3	6,2	17,1	16,4	14,4	18,0	16,1	13,2	20,1

LAYOUT NO	STRATUM NUMBER 1	2	3	4	5	6	7	8	9	10	11	12
311	334	538	1463	1777	2645	3081	3381	3904	4511	4834	5755	5927
	3,0	22,8	24,5	5,1	11,7	5,7	24,0	2,5	22,2	8,6	24,6	7,2
312	206	1038	1166	1772	2646	2753	3605	4089	4459	5185	5585	5837
	0,4	11,7	12,0	12,5	16,1	7,0	2,4	12,9	11,6	20,8	16,2	7,8
313	150	923	1064	1763	2234	3175	3218	4076	4598	5191	5427	5855
	2,3	7,5	3,5	24,4	0,9	9,4	0,3	13,8	11,7	23,3	13,0	22,0
314	124	864	1376	1735	2140	2748	3642	4066	4683	5123	5674	6303
	22,8	19,4	13,3	6,0	11,5	11,0	0,8	1,5	19,4	10,6	4,1	13,4
315	523	953	1239	1780	2546	2995	3594	3801	4268	4795	5335	6312
	5,0	24,8	3,9	3,8	15,6	24,7	5,7	11,1	3,6	20,4	16,6	10,8
316	286	720	1187	2092	2477	2866	3577	4074	4366	5112	5413	6211
	7,5	22,8	25,1	9,9	23,2	20,1	20,5	11,8	3,5	9,3	21,9	11,1
321	491	1046	1509	2097	2595	2860	3497	4070	4349	4871	5589	5826
	3,3	4,0	0,8	12,5	12,7	8,8	0,1	4,9	6,4	10,1	25,1	10,4
322	35	768	1226	1706	2522	3016	3206	4099	4524	5155	5315	5910
	8,1	22,3	11,0	13,1	7,6	11,3	3,4	14,8	15,6	15,1	14,1	22,2
323	497	595	1127	2094	2596	2900	3299	3992	4463	4854	5349	5879
	15,9	1,1	20,7	8,6	24,4	11,8	5,6	11,9	15,3	8,8	18,6	4,2
324	428	768	1328	2091	2263	2983	3255	4105	4355	4961	5478	6099
	23,5	18,9	5,3	0,7	7,9	18,2	23,8	16,6	12,2	3,5	4,6	9,5
325	382	855	1544	1896	2361	2840	3264	3955	4734	5162	5572	6342
	4,6	19,6	7,4	3,1	9,7	5,2	3,6	16,9	15,4	16,1	9,7	0,6
326	15	812	1433	1725	2424	2970	3643	3839	4444	5088	5720	5997
	13,5	24,6	8,1	9,3	13,4	9,8	22,6	0,1	6,7	18,3	13,8	24,6
331	79	598	1249	1804	2400	3027	3423	3941	4386	4854	5720	6115
	25,0	19,8	12,0	18,0	16,7	2,5	2,2	9,6	15,7	3,1	1,9	7,9
332	182	640	1223	1923	2546	2727	3652	4154	4715	5086	5480	6191
	20,0	8,7	25,1	1,8	5,0	10,6	18,3	19,5	23,6	19,6	20,1	23,7
333	357	956	1513	1646	2423	2989	3238	3883	4620	5291	5550	6330
	1,1	17,7	19,7	19,0	19,6	12,5	21,2	21,0	11,9	15,2	17,5	9,0
334	498	735	1120	2050	2291	2982	3464	4011	4551	5005	5640	6113
	14,5	8,3	24,1	22,7	4,2	3,3	4,6	12,5	7,0	24,3	16,0	14,0
335	429	908	1328	1631	2531	2823	3696	3928	4651	4989	5630	6063
	14,8	17,5	23,4	25,4	16,0	6,3	18,1	5,8	6,2	6,5	16,4	11,8
336	452	949	1485	2050	2267	2820	3372	3749	4558	4965	5352	6187
	5,9	22,6	12,0	20,7	1,5	22,0	20,2	21,0	15,0	3,4	6,1	20,3
341	393	897	1131	2069	2352	2655	3367	4095	4692	5227	5516	5904
	15,0	5,9	14,2	14,9	2,3	21,8	11,0	4,7	7,2	16,6	11,2	21,9
342	189	898	1075	1724	2254	3064	3302	4037	4664	4904	5543	6202
	0,5	19,3	2,4	2,1	17,6	1,9	6,5	1,3	11,8	21,3	23,2	0,6
343	525	801	1546	1937	2333	2798	3242	3852	4737	5267	5433	6147
	16,3	11,0	15,9	7,4	5,9	1,3	16,2	25,3	9,5	3,9	23,0	15,0
344	237	545	1109	2042	2131	2960	3704	4218	4392	5046	5319	6238
	19,1	5,8	1,5	5,3	17,0	24,0	15,9	17,9	22,8	3,7	10,0	15,0
345	107	738	1389	1609	2441	3042	3418	3718	4464	5147	5605	5962
	23,4	18,3	9,4	18,5	20,5	22,4	3,9	24,0	4,8	21,0	3,5	9,8
346	220	955	1166	1607	2318	2861	3589	3742	4240	4954	5560	5929
	17,4	9,0	12,3	22,6	5,7	10,6	3,9	1,8	13,9	2,5	25,2	12,4

LAYOUT NO	STRATUM NUMBER 1	2	3	4	5	6	STRATUM NUMBER 7	8	9	10	11	12
351	3	990	1273	1790	2498	2658	3277	4149	4238	4973	5389	6181
	11.5	2.7	4.4	14.5	23.9	5.8	25.1	15.3	23.6	20.3	6.1	13.8
352	270	1007	1241	2031	2153	2868	3641	4049	4459	4888	5428	6282
	16.0	16.9	6.9	24.1	6.9	18.8	23.5	17.8	7.0	13.8	8.4	23.1
353	526	1051	1177	1844	2570	2693	3559	3799	4585	4898	5355	6190
	14.2	21.2	0.1	17.3	1.4	21.7	0.3	0.6	4.5	2.7	17.0	17.8
354	374	634	1449	1592	2555	2700	3289	4015	4417	5224	5535	6129
	6.4	8.0	17.7	5.9	17.2	11.5	2.9	22.2	21.4	11.3	23.0	20.3
355	405	975	1509	1737	2342	3158	3466	4063	4645	4777	5456	6021
	13.9	13.8	17.2	6.5	25.4	21.5	10.0	25.2	0.2	0.5	10.1	16.3
356	292	544	1529	2033	2378	2813	3389	3781	4657	5001	5604	5898
	16.0	18.9	18.4	11.8	18.9	21.4	1.7	1.2	21.4	17.7	6.9	9.3
361	48	790	1305	1789	2133	3046	3363	3994	4388	5045	5621	6250
	15.2	22.5	19.0	23.2	9.3	14.8	18.6	3.5	6.7	19.6	18.6	1.1
362	66	1057	1176	2050	2234	3052	3398	3749	4764	4879	5620	6018
	25.1	18.7	2.2	2.0	23.7	22.4	0.3	6.5	23.0	9.2	0.9	15.0
363	76	619	1503	1807	2376	3175	3568	4152	4764	5140	5614	6220
	22.5	15.4	5.0	19.2	2.7	3.5	23.1	3.8	2.3	21.3	22.5	4.8
364	37	606	1237	1811	2538	3072	3624	4006	4470	4989	5709	6288
	17.0	1.2	0.3	0.5	19.7	16.0	13.7	12.7	0.9	10.5	12.8	16.6
365	453	989	1127	1727	2610	2864	3450	4008	4719	5279	5722	5895
	22.7	2.8	20.1	10.3	7.3	4.6	17.1	21.0	17.0	16.2	6.4	17.1
366	390	758	1495	2102	2130	2939	3559	4207	4264	5082	5799	6232
	9.2	10.1	18.6	12.5	0.5	2.4	19.8	1.4	6.1	23.3	1.5	9.2
411	178	670	1190	1641	2118	3143	3493	4032	4620	5243	5657	6032
	25.5	12.4	4.3	0.1	2.6	7.7	23.5	4.5	4.6	18.3	10.4	0.8
412	217	845	1426	1795	2246	2863	3699	3905	4479	4862	5599	5896
	12.2	0.3	16.6	18.4	0.6	14.8	8.0	21.6	8.2	18.0	7.6	14.4
413	215	1051	1506	1744	2199	2730	3433	3991	4431	4933	5346	6161
	5.6	25.1	16.9	5.0	2.4	22.2	19.0	12.4	24.9	10.1	21.0	10.3
414	334	705	1271	1596	2594	3098	3446	3847	4415	5022	5418	6035
	20.1	14.7	8.1	16.6	7.5	12.3	20.6	17.1	24.0	13.5	21.1	12.5
415	113	637	1515	1668	2134	2665	3363	3820	4585	5100	5516	6185
	5.3	0.1	21.0	0.9	15.4	7.3	2.8	7.8	25.1	22.7	7.5	2.7
416	329	964	1299	1879	2244	2984	3556	4024	4700	4767	5713	6095
	7.2	18.0	0.0	15.2	8.1	14.5	8.2	12.4	21.7	16.0	21.3	2.0
421	508	851	1431	1851	2623	2652	3558	3864	4270	5094	5410	6310
	11.6	12.7	16.7	23.7	11.0	19.7	8.9	11.7	8.1	22.7	2.6	4.8
422	417	853	1387	2027	2158	2798	3614	3744	4394	4807	5360	5828
	5.9	21.3	2.5	23.4	14.9	18.5	10.3	15.8	9.8	20.9	8.3	7.3
423	365	895	1579	1645	2376	2882	3563	3998	4509	5018	5584	5830
	18.9	22.8	15.5	12.5	18.0	15.0	8.0	24.9	2.6	16.3	22.7	25.1
424	172	968	1442	1812	2475	3158	3519	3747	4510	5240	5539	6281
	12.1	16.0	4.4	15.5	20.5	4.0	21.4	24.4	3.4	0.9	3.3	9.2
425	110	735	1520	2111	2176	2853	3706	3707	4427	4892	5729	6071
	19.0	11.7	5.9	10.2	0.1	18.3	7.0	1.0	13.8	10.8	6.3	15.5
426	490	924	1086	1629	2489	3007	3705	4003	4686	5201	5456	5950
	23.4	20.7	19.9	22.6	9.8	2.2	4.6	2.4	22.5	8.7	14.7	1.3

LAYOUT NO	STRATUM NUMBER 1	2	3	4	5	6	7	8	9	STRATUM NUMBER 10	11	12
431	36	565	1079	1840	2635	3029	3220	4211	4438	5060	5445	5837
	24.1	3.2	15.5	5.1	16.4	1.4	13.0	21.9	4.4	15.3	0.4	10.7
432	297	891	1230	2116	2273	3084	3554	4068	4689	4817	5795	5846
	7.0	13.1	24.5	18.6	2.8	22.5	23.7	12.3	18.1	10.3	23.9	21.6
433	353	977	1160	1702	2527	2967	3450	4150	4723	5190	5341	6298
	17.2	20.5	11.5	2.5	6.2	0.5	16.3	13.9	9.5	1.1	8.6	12.0
434	198	670	1213	2115	2226	2682	3299	3892	4364	5225	5602	6006
	25.3	0.9	12.1	10.5	0.7	18.1	12.6	12.7	9.4	11.0	14.2	2.9
435	222	676	1161	2094	2468	2806	3428	4186	4281	5039	5790	6277
	11.3	4.3	24.6	18.0	11.7	17.3	17.5	23.5	1.5	1.7	9.5	22.9
436	348	530	1535	1827	2145	2957	3597	4010	4702	5059	5305	6161
	10.7	3.2	19.4	24.9	14.1	14.7	21.5	13.4	21.1	15.7	17.9	6.9
441	23	715	1482	1692	2293	2822	3704	4114	4272	4877	5479	5913
	11.3	22.4	10.1	19.4	24.9	7.6	20.6	8.7	15.5	21.5	20.3	8.3
442	490	655	1093	1661	2464	2991	3297	4072	4718	5069	5816	6317
	4.9	17.9	15.3	17.4	21.3	23.6	22.1	25.2	1.7	25.0	3.7	22.4
443	489	985	1566	1949	2184	3162	3609	4121	4522	5033	5561	6015
	7.7	8.1	8.0	21.0	17.5	10.2	20.4	11.5	0.5	6.7	24.4	4.6
444	45	753	1077	2059	2366	2931	3346	3924	4736	4977	5297	6196
	21.0	1.3	12.8	11.5	7.1	16.3	12.0	8.6	2.5	19.5	11.5	18.4
445	310	586	1446	1981	2263	2702	3600	3848	4317	5091	5655	6267
	0.8	18.9	15.3	23.5	2.8	6.6	7.6	23.4	6.8	6.8	20.4	0.7
446	368	924	1238	1641	2179	3070	3596	4085	4420	5281	5770	6188
	13.4	12.4	20.9	6.1	8.2	13.9	10.1	0.9	4.1	5.9	0.1	22.2
451	128	1027	1480	1830	2237	2851	3680	4015	4300	4856	5450	6007
	5.5	24.7	4.6	4.7	0.3	22.7	17.5	3.5	22.5	17.0	12.5	21.5
452	169	580	1245	1632	2647	3110	3637	4025	4572	5002	5751	6088
	6.3	12.7	14.2	10.4	11.3	9.1	18.8	12.5	4.9	24.4	18.7	17.4
453	239	607	1341	1958	2143	3070	3195	3727	4716	4977	5570	5970
	9.9	11.7	11.5	11.3	7.0	12.6	18.6	23.2	19.6	10.2	18.6	7.0
454	518	730	1283	1725	2128	2666	3408	4059	4738	4913	5370	5888
	23.7	8.5	23.9	1.2	8.7	3.6	5.0	24.6	11.9	15.0	14.0	20.2
455	458	632	1446	2107	2624	2919	3589	4054	4239	5101	5574	6254
	17.0	23.8	11.0	19.9	24.2	9.2	24.6	2.1	5.4	7.5	21.5	21.6
456	368	620	1393	1693	2322	3011	3598	3989	4569	5120	5458	5939
	24.9	2.3	16.8	7.1	9.8	4.6	1.0	11.5	12.6	2.1	13.7	2.0
461	33	687	1517	1684	2599	2707	3532	4113	4661	4855	5443	6310
	14.7	10.3	16.1	2.1	13.7	7.1	18.5	4.0	2.9	6.7	14.1	4.1
462	63	909	1109	1854	2388	2653	3179	3777	4703	4948	5352	5980
	24.4	6.4	21.9	13.3	6.6	9.4	20.3	12.9	2.7	10.1	21.1	14.4
463	256	980	1572	1635	2281	2727	3367	3947	4527	5017	5800	5920
	2.6	18.4	16.9	13.1	13.1	9.1	25.2	22.3	12.1	25.4	11.7	1.4
464	144	676	1544	1870	2125	3145	3615	4135	4526	5127	5787	6204
	12.7	17.3	21.5	18.6	20.7	0.8	16.7	2.4	19.8	16.4	5.5	8.4
465	245	627	1122	2015	2538	2678	3514	4154	4455	5152	5794	6081
	24.7	14.1	13.5	0.5	0.8	9.5	21.4	19.1	1.2	2.8	7.1	18.4
466	189	958	1424	2102	2546	2911	3316	3858	4736	4856	5746	6118
	11.2	2.9	12.2	15.0	3.7	6.3	14.9	8.4	4.4	19.1	11.9	9.3

LAYOUT NO	STRATUM NUMBER 1	2	3	4	5	6	STRATUM NUMBER 7	8	9	10	11	12
511	180	887	1319	2111	2185	2855	3190	3837	4572	5149	5535	6109
	2.9	21.6	16.8	18.9	22.6	14.1	19.0	15.6	6.0	19.4	19.4	20.5
512	366	534	1388	1719	2267	2889	3535	3957	4673	4889	5444	5968
	4.0	2.9	9.0	18.0	23.9	15.4	4.5	6.9	22.4	13.7	10.1	10.1
513	361	637	1072	2080	2209	2876	3676	3766	4645	4808	5660	5946
	10.4	19.8	16.8	10.9	16.8	20.9	12.2	1.8	5.7	18.8	9.2	12.1
514	370	883	1180	2004	2422	2841	3452	3765	4457	4964	5404	5969
	4.1	11.7	15.7	18.7	23.7	11.7	5.5	15.5	10.5	7.6	15.0	17.6
515	312	1028	1415	1847	2632	2708	3434	4167	4256	5210	5640	6276
	15.0	3.0	19.9	20.9	2.7	13.8	20.4	24.9	7.6	0.1	15.2	11.3
516	17	746	1400	1646	2622	3126	3521	3843	4532	5128	5298	5974
	21.6	1.5	14.4	12.4	17.7	16.5	23.8	9.1	9.5	21.5	23.4	20.8
521	50	797	1194	2050	2599	2815	3590	4014	4625	4968	5557	5908
	9.8	3.7	2.5	25.3	19.1	18.4	21.2	21.6	10.2	19.2	3.5	24.9
522	405	921	1329	2003	2259	2953	3301	4044	4729	5125	5769	6129
	13.6	7.2	23.9	0.8	14.6	16.6	1.0	13.9	22.7	0.3	18.6	9.9
523	350	755	1531	1714	2634	2897	3677	3946	4649	5133	5573	5948
	23.0	24.0	10.6	16.9	18.1	16.7	4.7	6.6	22.9	22.2	16.1	22.0
524	359	771	1308	1700	2390	3058	3315	4134	4436	5026	5789	5842
	16.9	20.2	23.4	18.3	22.2	7.0	10.3	20.2	5.9	16.4	19.1	19.5
525	410	1053	1081	1676	2181	2939	3514	3802	4411	5277	5688	5969
	5.1	5.7	22.7	12.3	18.6	1.8	19.7	5.0	14.9	23.2	5.7	9.2
526	349	742	1185	1724	2378	2731	3509	3806	4408	4977	5634	5866
	6.7	21.2	22.4	5.3	6.2	18.6	13.3	24.0	17.0	0.5	19.3	18.4
531	327	737	1129	2095	2489	2840	3283	3788	4497	5062	5303	5899
	2.2	15.6	9.6	7.0	11.1	18.7	9.1	10.4	22.2	13.4	20.5	2.0
532	90	820	1212	1971	2403	2851	3620	4194	4390	5135	5401	6042
	15.0	25.1	21.0	11.9	7.9	6.6	16.4	15.7	13.2	20.2	23.0	2.4
533	454	676	1472	2002	2135	2766	3390	3963	4306	4921	5734	6254
	3.7	9.3	12.3	7.1	20.6	13.2	20.6	17.1	5.7	9.4	24.7	22.7
534	438	763	1121	1947	2318	2750	3327	4021	4500	5254	5437	6155
	0.6	10.3	14.3	17.7	12.5	4.0	17.0	18.8	11.8	9.3	20.6	10.0
535	270	832	1379	1945	2123	3143	3580	4182	4647	4813	5630	6161
	25.1	15.6	8.7	7.9	22.3	23.9	2.3	2.3	20.8	11.7	18.2	19.0
536	36	1049	1112	1912	2143	3088	3244	4119	4532	4982	5483	6166
	4.1	13.1	15.1	6.9	1.5	8.3	18.0	1.1	0.7	18.8	9.1	9.6
541	478	902	1399	1780	2568	2729	3431	3945	4559	5271	5709	6071
	17.3	0.3	3.2	23.8	16.0	4.5	24.8	7.8	9.4	0.5	21.6	12.9
542	482	816	1569	1825	2609	3076	3583	3941	4384	4870	5730	5833
	3.4	3.9	18.4	16.4	10.5	6.2	11.0	14.0	8.5	21.4	5.1	15.6
543	392	606	1242	2095	2601	2676	3683	3762	4533	4929	5333	6146
	11.4	23.4	6.6	15.3	3.7	13.9	10.8	18.5	6.9	19.9	2.0	18.3
544	428	764	1493	1792	2574	2653	3659	3804	4523	4915	5540	5846
	3.6	6.3	9.3	4.7	14.3	11.3	1.7	25.2	25.4	7.8	25.4	24.7
545	132	688	1156	1833	2440	2846	3653	3784	4495	5111	5753	6159
	14.6	25.1	8.4	18.2	24.3	11.1	19.7	17.1	21.7	19.4	22.9	9.4
546	320	933	1494	1912	2316	2727	3299	3872	4386	4878	5651	6221
	5.6	22.2	15.9	0.4	21.2	11.4	4.0	5.6	8.7	19.2	8.9	3.4

LAYOUT NO	STRATUM NUMBER 1	2	3	4	5	6	7	8	9	STRATUM NUMBER 10	11	12
551	226	921	1499	1668	2343	3065	3196	3935	4479	5078	5726	5831
	12.5	7.0	20.0	18.5	14.8	18.9	14.2	13.7	23.0	13.0	3.0	15.2
552	301	789	1268	2023	2631	2950	3504	4125	4537	4774	5412	6205
	4.9	21.7	0.5	20.8	20.6	3.7	0.9	15.6	19.0	12.6	12.8	1.0
553	200	941	1563	1998	2132	2976	3396	3969	4295	4861	5392	6159
	3.2	20.2	6.5	3.7	8.8	18.7	2.5	23.1	11.2	20.8	3.8	10.2
554	281	545	1096	1913	2406	2846	3190	4234	4640	5025	5623	6219
	22.7	20.2	25.3	15.0	11.9	17.4	25.3	9.6	6.1	18.9	17.8	7.7
555	397	739	1368	1912	2353	3127	3331	3970	4305	5106	5689	5880
	11.8	13.2	17.7	14.1	9.6	10.7	20.3	15.4	16.5	22.5	0.2	7.0
556	63	549	1541	1962	2582	3133	3663	3889	4653	5201	5332	6004
	13.9	15.0	2.5	9.9	13.6	20.2	4.9	22.6	9.0	7.0	7.8	15.8
561	139	798	1112	1786	2320	3074	3508	3708	4658	4982	5452	6334
	7.6	23.2	3.8	14.3	20.8	9.3	3.7	19.9	1.1	0.1	0.7	21.7
562	43	854	1338	1596	2234	2981	3337	4101	4489	5062	5304	5872
	10.8	10.1	23.6	0.9	2.4	15.2	7.7	24.6	3.0	14.5	16.3	2.8
563	171	829	1474	2085	2430	2831	3260	4038	4576	5031	5694	6181
	6.0	21.7	8.0	19.6	7.2	25.0	11.6	22.8	22.9	16.4	7.3	12.3
564	367	971	1428	1886	2635	2748	3363	4188	4253	5252	5451	6272
	17.2	2.4	18.8	19.8	9.4	22.8	20.5	3.2	8.8	10.1	12.6	16.8
565	394	803	1583	2088	2306	2923	3221	3968	4341	4912	5736	6096
	22.9	2.4	19.4	16.5	13.1	7.2	8.4	18.6	21.5	1.5	19.9	20.9
566	151	859	1358	1714	2377	2669	3512	3970	4528	5003	5752	6230
	10.4	4.9	21.0	24.2	18.9	22.6	2.5	20.4	2.5	23.2	11.0	5.6
611	290	579	1527	1699	2155	3025	3350	4012	4674	5031	5481	5968
	9.0	4.0	23.7	11.3	6.7	3.2	20.3	8.3	17.6	8.5	7.1	8.6
612	441	1040	1294	1797	2595	2777	3665	3765	4596	4773	5369	5927
	24.7	5.2	14.8	14.3	0.3	10.2	6.2	13.5	9.2	4.3	18.7	1.7
613	463	774	1487	1597	2595	2912	3387	4154	4588	5171	5343	6254
	19.3	17.3	19.8	25.4	9.9	22.6	5.9	23.3	12.8	23.5	23.3	21.1
614	353	782	1173	1744	2182	3015	3501	3771	4410	4851	5785	6030
	11.3	13.4	7.8	23.0	21.3	14.6	12.0	2.9	25.3	4.0	3.2	1.0
615	515	633	1169	1703	2408	3045	3629	3855	4575	4906	5442	6068
	5.7	7.2	5.5	14.6	4.5	16.6	23.9	20.5	21.7	15.6	13.0	22.6
616	137	694	1221	1804	2587	2989	3557	3898	4504	5183	5781	5872
	10.1	18.5	17.9	1.7	10.6	25.3	10.3	19.0	20.7	6.7	4.7	19.2
621	154	855	1150	1695	2170	2710	3360	4089	4554	5238	5638	5960
	22.9	21.8	5.6	16.3	22.3	21.0	12.5	6.4	7.9	0.7	15.2	8.7
622	58	741	1208	1867	2598	2977	3426	4045	4360	4859	5739	6320
	20.3	9.4	3.3	12.4	9.9	8.2	25.2	2.7	25.0	5.7	12.3	19.4
623	347	767	1358	1958	2640	3090	3319	4007	4512	5134	5352	5842
	7.0	8.7	17.0	15.9	11.3	6.4	19.8	7.1	4.4	13.4	3.9	16.8
624	385	558	1066	1989	2182	2986	3448	3762	4528	4965	5359	6206
	4.9	6.2	13.5	10.6	24.1	9.8	3.6	10.5	14.3	13.4	11.2	17.7
625	295	982	1450	1814	2128	3112	3700	3870	4670	5128	5814	6009
	18.0	25.0	22.8	15.7	13.9	20.0	19.2	12.1	9.4	15.6	2.2	8.5
626	374	1006	1297	1764	2134	3064	3536	3954	4571	5250	5413	6084
	2.0	3.1	3.1	9.5	4.2	18.4	3.5	12.2	7.4	8.1	23.0	9.9

LAYOUT NO	STRATUM NUMBER 1	2	3	4	5	6	7	8	9	STRATUM NUMBER 10	11	12
631	274	940	1515	1894	2395	2889	3539	4191	4634	5269	5753	5960
	3.6	0.4	25.4	2.0	18.3	8.1	23.7	19.7	15.5	20.8	10.7	5.4
632	469	612	1579	1734	2184	2726	3376	3728	4752	5221	5571	6084
	13.1	23.6	19.6	14.6	14.4	15.8	17.4	17.8	15.4	19.0	11.1	24.3
633	289	870	1490	1675	2422	3111	3583	3734	4719	4857	5328	6315
	2.5	22.5	20.3	12.6	20.4	7.7	14.5	4.3	19.3	0.3	4.3	21.1
634	330	666	1268	2069	2342	2683	3474	4049	4603	4888	5714	6333
	23.5	10.5	2.4	8.4	22.0	15.2	18.8	0.1	21.6	19.6	8.6	20.7
635	374	754	1433	1689	2286	3019	3656	3795	4670	4993	5627	5879
	21.1	21.6	14.8	25.3	14.1	18.4	15.8	11.5	10.6	5.8	25.5	17.1
636	72	970	1282	1697	2164	3046	3332	3898	4720	5159	5450	6225
	3.3	7.8	8.0	10.1	25.2	9.5	1.0	21.5	18.5	12.0	9.6	19.0
641	409	536	1569	1946	2324	2810	3510	3910	4554	4965	5813	6039
	18.0	3.5	13.6	24.0	13.4	13.8	8.6	21.3	18.1	24.0	13.9	11.4
642	510	531	1528	2108	2188	2772	3658	3753	4364	5244	5534	6265
	16.1	22.6	19.6	7.8	6.8	7.4	9.2	1.3	24.6	20.4	5.8	21.5
643	508	1037	1072	1866	2340	3039	3463	3853	4643	5168	5368	6080
	22.2	13.4	22.2	13.3	2.4	16.0	16.3	16.6	8.7	20.2	12.3	7.3
644	262	557	1294	2085	2245	3001	3579	4233	4419	5000	5356	6121
	1.7	2.1	4.9	17.2	22.1	5.8	11.6	18.7	4.8	20.5	16.7	12.3
645	411	821	1389	1713	2461	3145	3241	3951	4286	4913	5577	5825
	0.8	9.7	19.1	6.4	19.8	2.9	5.2	23.5	20.1	20.8	7.4	24.2
646	328	747	1539	1874	2469	3152	3483	4124	4565	4823	5521	6296
	22.8	0.0	17.6	11.6	11.1	24.6	19.5	3.4	0.4	8.5	10.1	6.3
651	504	655	1411	1829	2446	2810	3236	3730	4538	5178	5515	6079
	13.6	5.2	20.8	12.5	18.5	7.1	6.1	24.1	20.3	3.0	19.7	24.7
652	236	535	1152	1983	2231	3039	3388	4144	4739	5173	5441	6018
	8.0	23.8	11.6	4.7	24.6	0.1	20.5	10.7	9.9	5.0	19.7	20.8
653	248	735	1432	1787	2630	2966	3448	4186	4480	5197	5751	6340
	16.1	15.4	14.1	23.1	11.4	21.7	0.2	22.1	1.1	0.7	6.4	20.1
654	72	1044	1459	1891	2306	3042	3236	3749	4531	5247	5483	6333
	10.3	21.3	4.2	4.6	22.3	23.1	7.6	12.1	2.4	20.4	0.2	21.0
655	355	743	1062	2105	2285	2749	3259	4151	4485	5043	5488	6138
	24.6	20.0	7.2	23.6	19.3	20.4	1.6	4.3	0.6	18.0	13.2	21.7
656	429	860	1519	1861	2325	2872	3479	4205	4744	4985	5716	6241
	11.7	7.3	3.4	18.6	8.0	0.7	0.4	17.0	13.6	6.2	6.9	17.6
661	261	621	1169	1646	2246	2996	3649	3985	4751	5224	5314	6282
	7.2	11.4	23.6	3.0	23.7	15.6	4.7	4.3	4.9	6.5	12.1	16.9
662	301	1001	1144	2012	2507	3171	3356	4163	4240	5160	5511	6160
	14.6	22.4	4.3	5.1	17.6	20.6	8.5	13.8	17.6	23.1	11.6	10.6
663	401	987	1360	1817	2313	3028	3359	3891	4427	4875	5496	6329
	9.3	5.5	12.1	15.4	2.2	25.4	1.8	12.2	6.8	6.2	13.3	20.9
664	314	531	1059	1845	2266	3054	3696	4160	4250	4993	5570	6002
	10.2	3.3	3.4	4.8	10.1	11.2	13.0	13.4	8.2	12.2	16.3	9.4
665	311	565	1497	1680	2391	2918	3329	3739	4487	4886	5655	6202
	4.1	12.5	4.2	9.5	20.4	2.3	17.8	10.5	20.4	19.3	16.2	0.9
666	183	826	1260	1805	2578	3125	3701	4145	4254	5245	5502	5831
	4.7	20.9	6.7	14.6	20.0	2.1	17.5	14.9	9.5	11.9	7.8	25.2