GUIDELINES FOR SAMPLING OF AGGREGATE MATERIALS

1. SCOPE

1.1 The purpose of these guidelines is to outline procedures and requirements for sampling of granular, coarse, and fine aggregate materials for quality assurance testing.

2. GENERAL

2.1 Whether stockpile, delivery, or road sampling has been chosen, the procedure for obtaining a sample must be strictly adhered to. All samples must be taken and submitted for testing by personnel trained in the sampling of materials.

3. SAMPLING EQUIPMENT

When sampling aggregates for gradation testing, the following equipment is required:

3.1 Tile spade with attached side walls (Figure 1)

3.2 Sample containers

3.3 Random number tables

3.4 Sample Data Sheets and tags (Figure 2)

3.5 Tape measure

4. SAMPLING LOCATION

Acceptable locations for sampling are:

4.1 From existing stockpiles.

4.2 From stockpiles during their construction, provided:

i) The stockpile is built in layers 1 m thick, or less, and

ii) Material does not spill over the edges of the stockpile

4.3 At the location and time of loading onto, or unloading from, the delivery vehicles (Delivery Sampling)

4.4 From the work after placement but prior to compaction (Road Sampling)

Note: When taking sublot samples within a lot, it is recommended that stockpile, delivery, or road samples are not combined in the same lot.

5. SAMPLING DURING STOCKPILE CONSTRUCTION

5.1 It is a requirement of stockpile sampling that a front-end loader be used to obtain the sample. The front-end loader will be required to dig as close as practical to the full depth of the levelled lot or sublot at the location indicated by a random number calculation. This material is then placed on the ground and levelled by blading it with the bucket to a height of between 0.3 to 0.5 m.

5.2 The random area method must be used, first, to obtain the location within the levelled lot or sublot from where the front-end loader will obtain the material to be sampled; and, second, to determine the location within the area of the material placed and levelled by the front-end loader from where the actual sample is to be taken.

5.3 Obtain the sample from the location determined by random numbers within the levelled bucketful by excavating the material as deep as possible with a tile spade, ensuring that the sample is not mixed with the underlying material.

5.4 Never shake or jiggle the spade to remove excess material when filling the sample bag as this may spill a portion of the sample causing segregation.

6. SAMPLING EXISTING STOCKPILES

6.1 Truly random samples cannot be obtained from a stockpile after it is built because only the outside of the stockpile can be effectively sampled. In addition, segregation often occurs with coarser particles accumulating on the outside of the pile.

6.2 Sampling from an existing stockpile should only be done when no other alternative is available.

6.3 When required, samples should be obtained by excavating into the stockpile with a front-end loader, obtaining three bucketfuls across the open face, then dumping each bucket on top of one another, mixing, and then blading it with the bucket to a height of between 0.3 to 0.5 m. At least three samples from random locations of the sample area should be obtained.

6.4 Never shake or jiggle the spade to remove excess material when filling the sample bag as this may spill a portion of the sample causing segregation.

Note: Testing requirements must be understood before sampling clear stones and fine aggregate. Some of these materials may have been treated (lime, etc.), which makes testing to the specification impractical. These types of materials must be sampled before treatment.

7. DELIVERY SAMPLING

7.1 Delivery sampling is carried out at the location where the delivery vehicles are being loaded from a stockpile, at the point of discharge from a delivery vehicle, or from a uniform pit face of subbase or subgrade aggregate (Granular B Type 1, or Select Subgrade Material). Delivery samples should not be taken at locations where aggregates are loaded directly from a variable pit face. Judgment will be necessary in determining whether or not a pit face is uniform. If it is felt that the gradation of the material is similar along the open pit face, the face will be assessed as being

uniform. Examples of uniform pit faces are predominantly sand deposits or stratified materials having horizontal layers of finer and coarser strata with no obvious silt layers. If the open face of a pit exhibits irregular stratification with pockets, random seams, and lenses of dissimilar material, the face will be deemed variable and delivery sampling from the pit face will not be valid.

7.2 For delivery sampling, either the random time or the random quantity method may be used to select that portion for the aggregate to be sampled. The procedure for securing a delivery sample is as follows: as the selected delivery vehicle is being loaded (in the case of random quantity method) or at the random time (in the case of random time method), the operator of the front-end loader should place the a bucketful of material on the ground after each bucket that goes into the truck or delivery vehicle. The sample material (minimum three buckets) is then mixed and levelled by blading it with the bucket so that the thickness of the levelled-off aggregate pile is between 0.3 and 0.5 m.

7.3 The levelled surface of the load may be somewhat irregular in shape. Nevertheless, the actual location of the sample within the levelled surface should be decided by the random area method. Reworking of this load of material should be minimized.

7.4 Obtain the sample from the location given by the random number calculation by excavating the material as deep as possible with the tile spade, ensuring that the sample is not mixed with the underlying material.

7.5 Never shake or jiggle the spade to remove excess material when filling the sample bag as this may spill a portion of the sample causing segregation.

8. ROAD SAMPLING

8.1 Road sampling is carried out after the aggregates have been placed and spread, but prior to watering, grading, or compaction. Either the random time method or the random quantity method may be used to select the portion of aggregate to be sampled. In the case of random time, the sample shall be taken from the material of the first delivery vehicle arriving after the calculated time. The exact location of the sample from the spread vehicle load should be determined by the random area method, by measuring out the longitudinal position and the offset distance indicated by the random numbers.

8.2 Take the sample from the designated area outlined by using a suitable template (e.g. sample bag). Always place the sample bag so that the longer side is at right angles to the direction in which the discharge vehicle was moving. If the random sampling locations are too close to the edge of the aggregate lift, then sample from the edge towards the middle of the lift.

8.3 Obtain the sample by lifting the material with the tile spade from the full depth of the lift to be sampled, being careful not to include any material from the underlying lift. For thin lifts, it may be necessary to increase the size of the sampling template. Do this by staying parallel to the original template lines.

8.4 Never shake or jiggle the spade to remove excess material when filling the sample bag as this may spill a portion of the sample causing segregation.

8.5 No attempts must be made to select or avoid obvious areas where segregation, dirt, or other fault in the as-delivered material may be evident by inspection. Random numbers should not be manipulated to affect the location of the samples, to include areas of contamination, segregation, or other apparent faults with the material. The sample must be taken where the random numbers direct. If the material is being placed in a manner that does not allow road sampling, then either a change in the method of operation or another sampling location will have to be selected.

8.6 The sampling area must remain undisturbed from any watering, grading, and compaction equipment until the sample has been taken. Samples taken after the material has been driven over, or otherwise manipulated, will not be used for acceptance testing of any kind. Obvious signs of contamination (clay, sand, etc.) of the as-delivered material from equipment will require a different area to be sampled.

9. RANDOM SAMPLING PROCEDURES

Random sampling means choosing samples in such a manner that each portion in the lot has an equal probability of being selected.

Random number tables must be used to carry out random sampling. Random number tables may be selected from published tables or generated by computation, and displayed in three-digit decimal form. An example of a random number table is given in Figure 3. (The random numbers are grouped in sets of four to facilitate their use in testing of four sublots within a lot.) In selecting numbers, a pencil or pen should be arbitrarily stabbed onto a sheet of random numbers with the eyes closed. The group of numbers closest to the location should be chosen for the first lot. Successive random numbers should be picked by following a systematic pattern until all of the numbers are used. If more random numbers are required, the procedure above should be repeated, using another table. The random numbers used for each lot should be recorded in a sampling diary.

9.1 RANDOM SAMPLING ON TIME BASIS

9.1.1 This method applies to road or delivery sampling when it is more practical to estimate the time it will take to load, or to deliver to the work, the quantity of aggregate representing a lot.

9.1.2 For example, if it is estimated that 3,000 t of a particular material will be loaded and delivered during the next two days, this time may be used as a lot. One sublot, thus, will contain 750 t. If the total working time in two days is, say, 16 hours, one sublot will take about four hours or 4 x 60 = 240 minutes. The two days will then be divided into the four sublot times as follows: FIRST DAY 8 a.m. to 12 noon = first sublot; 1 p.m. to 5 p.m. = second sublot; SECOND DAY 8 a.m. to 12 noon = third sublot; 1 p.m. to 5 p.m. = fourth sublot. In this example, a one-hour down time (lunch) between 12 noon and 1 p.m. has been assumed.

9.1.3 A group of four random numbers is selected and each of these numbers is multiplied by the time in minutes required for one sublot, in this case, 240 minutes. Since all random numbers are decimal digits, the products of the multiplication will always be less than the total time to deliver one sublot. The four products are added to the starting times of each sublot, giving the random times for the samples. In this example, if the random numbers selected were 0.584, 0.216, 0.233, and 0.805, the products and the actual sampling times would be as shown in Table 1.

Table 1 - Example of Random Sampling on Time Basis

Sublot	Calculations	Starting Time	Sampling Time
1st	0.584 x 240 = 140 min.	8 a.m.	10:20 a.m.
2nd	0.216 x 240 = 52 min.	1 p.m.	1:52 p.m.
3rd	0.233 x 240 = 56 min.	8 a.m.	8:56 a.m.
4th	0.805 x 240 = 193 min.	1 p.m.	4:13 p.m.

9.1.4 The samples should be taken as close as possible to the times calculated.

9.1.5 Random sampling on a time basis will be fairly easy in the case of continuous, uninterrupted haulage. When the delivery is intermittent or irregular, which is often the case, it will be difficult to predetermine the time necessary to load or to deliver the material for one lot. In this situation, the time to deliver a lot should be estimated by assuming a frequency of loading that would not likely be exceeded.

9.1.6 Assuming that, with irregular delivery, there will not likely be more than 2,000 t delivered in one day, a 4,000 t lot size can be established as two days delivery. By the method explained earlier in this section, the random times for sampling should be calculated, preferably for more than one day (for the whole week, if practical). If, at the time of sampling, the sampler arrives at the appropriate place and there is no truck at the determined time or within a reasonable waiting period, one sample may be skipped and the time extended for the lot accordingly. If this practice is employed, it is important that the actual lot size not exceed the allowable maximum size. After the sampling and testing is completed, the actual lot size must be determined by computing, from the weigh tickets, the quantity of material delivered for the applicable time period.

9.2 RANDOM SAMPLING ON QUANTITY (TONNAGE) BASIS

9.2.1 This method is applicable to road or delivery sampling only. In situations when it is simpler to determine the lot size by the number of truck loads, random samples may be selected according to truck load. This method will require close communication between the sampler and the weigher and checker, especially if delivery is intermittent.

9.2.2 The procedure for this sampling plan is as follows. Determine how many truck loads are required to haul the aggregate representing one lot. If the maximum lot size is 4,000 t, and the average truck load is 30 t, then one lot will consist of approximately 132 truck loads. The sublots will also be determined by the number of truck loads so that the first sublot is represented by the first 33

truck loads, the second by truck loads 34-66, the third by 67-99, and the fourth by 100-132. Random numbers are multiplied by the number of truck loads in a sublot to establish the particular truck load from where the random sample should be obtained. In this example, if the random numbers selected were 0.217, 0.181, 0.721, and 0.347, the actual sampling would be as shown in Table 2.

Table 2 - Example of Random Sampling on Quantity (Tonnage) Basis

Sublot	Calculations	Last Truck in Previous Sublot	Truck Load to be Sampled
1st	0.217 x 33 = 8th load	+0	8th
2nd	0.181 x 33 = 6th load	+33	39th
3rd	0.721 x 33 = 24th load	+66	90th
4th	0.347 x 33 = 12th load	+99	111th

9.2.3 Always round the calculation up to the next truck load.

9.2.3 In the case of road sampling, the sample will be collected from the truck load after it is placed in the work, but prior to watering, grading and compaction. For delivery sampling, the sample will be obtained as the randomly selected truck is loaded. As in the case of Random Sampling on Time Basis, the actual lot size should be determined from weigh records.

9.3 RANDOM SAMPLING ON AREA BASIS

9.3.1 This method must be used for sampling during stockpiling to establish the sampling location within the levelled sublot. This method may also be used for road sampling to determine the location of the sample within the area of the spread truck load. For delivery sampling and sampling during the construction of a stockpile, the random area method will be used to define the location within the bucketful, levelled by the front-end loader, where the sample will be obtained.

9.3.2 The exact location of a sample within a given area should be determined by two random numbers selected from a Random Number Table or generated by computation.

9.3.3 For example, during road sampling of Granular A placed in a road widening where the selected truck load was placed 2 m wide, 45 m long, with an uncompacted thickness of 150 mm, two random numbers are chosen as 0.406 and 0.035. The first number is used to determine the longitudinal distance from the beginning of the spread load, and the second number is used to determine the offset from the edge of the load.

9.3.4 The sampling location calculation is:

0.406 x 45 m = 18.3 m from the start of spread; and

0.035 x 2 m = 0.07 m from edge of spread.

10. FREQUENCY OF SAMPLING

10.1 The frequency of sampling is governed by the size of the lot or sublot as determined in the contract documents. One sample is obtained from each lot or from each sublot where the lot is divided into sublots.

10.2 If each lot is to be evaluated separately for acceptance, rejection, or adjusted payment, it is necessary to record the quantities in each lot. The weigh tickets should be used for this purpose where possible. Otherwise, the production rate could be used as a basis for estimating the quantities.

11. SAMPLE SIZE

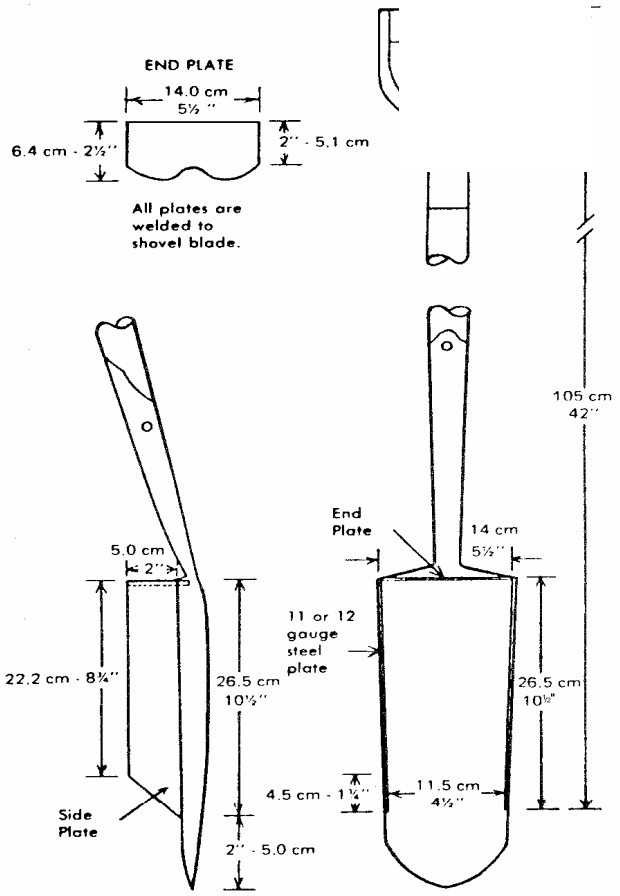
11.1 Field samples obtained from stockpile, delivery. or road samples should provide sufficient mass of material to conduct the necessary gradation and/or physical quality tests. Table 3 contains minimum field sample masses that are expected to furnish reasonable quantities for most routine testing. A standard MTO canvas sample bag will hold approximately 25-30 kg of material.

Table 3 - Sample Size

Material	Minimum Mass of Field Samples (kg)
Granular A, Granular M	25
Granular B, SSM	50
Granular B, SSM (100% passing 26.5 mm sieve)	25
19 mm Clear stone	15
37.5 mm Clear stone	30
13.2 mm Clear stone	10
10 mm Clear stone	10
Fine aggregate	10

12. SHIPPING SAMPLES

Samples should be placed in clean bags or containers free of particles from previous samples that are constructed to prevent the loss of any part of the material or contamination or damage to the contents during shipment. The containers should be sufficiently strong and must be securely fastened. Metal or cardboard containers are unacceptable. To ensure ease of handling, a container should not contain more than 30 kg of material. Proper identification should be included both inside and outside of the sample container. An example of an identification tag which requires suitable information is shown in Figure 2.



The shovel handle should follow local safety restrictions and be appropriate for use.

The shovel size is appropriate for materials of a 100 mm maximum in size. Materials larger than this will require a larger shovel.

Figure 1 - Tile Spade with Attached Walls

Ministry of Transportation Ontario

SAMPLE DATA SHEET

Contract or W. P. _____ Dist. _____ Hwy. _____
Work and location _____
_____
Milita Sheet _____ Source No. _____
Inv. Code No. _____ Co-Ord. _____ E-- _____ N
Source Name or Owner _____
County _____ Twp. _____ Lot _____ Con. _____
Source location _____
_____
_____

SAMPLE FROM : Channelled face ☐, Test pit ☐, Into Stockpile ☐, Out of Stockpile ☐,
Stopped belt ☐, End of belt ☐, Power Auger ☐, Bin ☐, Road ☐, Hand auger ☐,
Diamond drill core ☐, Other _____ ☐.
Date of prod. of s'pile _____ Quantity in s'pile _____ tonnes
AT: Hole, face, station _____ Dist. to _____ Is mat'l. washed ? _____
DEPTH: From _____ m to _____ m Total depth _____ m
Formation _____
STRIPPING REQUIRED: A , B & M _____ m H.L. & Conc. _____ m
Est. cum. % st. ret. ____ > 150 _____ > 100 _____ > 65 _____ > 25 _____ > 5 (mm)

Intended use _____
History of use _____
M.T.O. Soil Classification _____
TYPE OF SAMPLE: Precont. eng. ☐, Prelim. cont. ☐, Early prod. ☐, Prod. cont. ☐,
Mix design ☐, Commercial ☐, Other _____ ☐.
Type of mix design req'd. _____
FIELD OPTION: Suitable for _____ Borderline for _____
Unsuitable for _____ No. of bags in sample _____
Remarks _____
_____
_____

DATA FORWARDED: Sketch ☐, Field notes ☐.

Sampled by _____ Date _____
Field sample no. _____ Date rec'd. _____
Lab. sample no. _____ Date req'd . _____
Result to _____ Fax No. _____

TEST REQUIRED P. N. ☐, Soundness ☐, L.A. Abr. ☐, Abs. & Dr. ☐,
% Crush ☐, % Flats ☐, W. P. 75 μm ☐, Organic ☐, Micro - Deval C. A. ☐,
Gradation ☐, Moisture ☐, Proctor ☐, P. I . ☐, Hydrometer ☐, Attrition ☐,
A. A. V. ☐, P. S. V. ☐, Micro - Deval F. A. ☐, Chem. Anal. ☐, A. M. Bar ☐.
Freeze - Thaw ☐, Insoluble Residue ☐.

Special tests : _____

PH-D-10 94 - 05

Figure 2 - Granular Aggregate Sample Data Sheet

0.067	0.296	0.041	0.623	0.126	0.883	0.766	0.412	0.591	0.868	0.841	0.889	0.232	0.807
0.026	0.939	0.353	0.268	0.279	0.525	0.677	0.115	0.149	0.899	0.163	0.731	0.635	0.382
0.626	0.942	0.945	0.304	0.422	0.347	0.826	0.984	0.879	0.522	0.055	0.793	0.664	0.575
0.109	0.785	0.355	0.474	0.887	0.192	0.518	0.181	0.669	0.780	0.094	0.345	0.575	0.587
0.815	0.588	0.911	0.438	0.170	0.174	0.470	0.011	0.465	0.896	0.118	0.223	0.660	0.612
0.559	0.530	0.441	0.779	0.966	0.730	0.503	0.478	0.285	0.659	0.126	0.075	0.876	0.908
0.306	0.542	0.986	0.095	0.733	0.283	0.722	0.756	0.319	0.005	0.952	0.448	0.197	0.042
0.213	0.033	0.525	0.414	0.250	0.269	0.758	0.978	0.808	0.098	0.789	0.169	0.885	0.556
0.893	0.008	0.014	0.505	0.242	0.106	0.513	0.396	0.897	0.062	0.160	0.701	0.237	0.891
0.342	0.410	0.652	0.034	0.507	0.610	0.015	0.072	0.315	0.980	0.025	0.588	0.185	0.137
0.768	0.696	0.692	0.928	0.969	0.705	0.423	0.539	0.263	0.487	0.168	0.546	0.136	0.062
0.644	0.023	0.249	0.364	0.922	0.882	0.973	0.642	0.820	0.517	0.604	0.727	0.324	0.714
0.322	0.431	0.499	0.370	0.010	0.758	0.627	0.749	0.831	0.298	0.845	0.934	0.487	0.875
0.136	0.300	0.314	0.919	0.774	0.321	0.483	0.918	0.841	0.704	0.519	0.589	0.387	0.025
0.544	0.579	0.218	0.281	0.141	0.068	0.156	0.088	0.676	0.678	0.066	0.310	0.041	0.933
0.120	0.113	0.724	0.434	0.091	0.071	0.712	0.773	0.059	0.688	0.962	0.649	0.929	0.722
0.661	0.461	0.513	0.343	0.744	0.408	0.811	0.102	0.450	0.356	0.705	0.032	0.667	0.512
0.390	0.468	0.134	0.927	0.809	0.316	0.098	0.290	0.448	0.464	0.872	0.628	0.358	0.029
0.407	0.217	0.342	0.624	0.343	0.138	0.506	0.285	0.027	0.360	0.675	0.678	0.153	0.187
0.006	0.692	0.471	0.147	0.969	0.823	0.611	0.227	0.594	0.102	0.965	0.848	0.822	0.705
0.166	0.432	0.001	0.964	0.950	0.168	0.451	0.373	0.917	0.135	0.974	0.945	0.665	0.059
0.565	0.306	0.006	0.303	0.049	0.888	0.493	0.672	0.616	0.207	0.719	0.466	0.997	0.268
0.517	0.657	0.625	0.313	0.871	0.918	0.533	0.279	0.972	0.621	0.905	0.879	0.249	0.105
0.841	0.978	0.697	0.294	0.772	0.368	0.726	0.559	0.961	0.849	0.238	0.374	0.528	0.243
0.283	0.001	0.405	0.229	0.283	0.730	0.767	0.075	0.613	0.083	0.014	0.912	0.876	0.742
0.117	0.740	0.412	0.670	0.203	0.100	0.652	0.177	0.649	0.856	0.392	0.787	0.946	0.255
0.944	0.864	0.898	0.071	0.259	0.072	0.121	0.954	0.958	0.897	0.979	0.578	0.061	0.772
0.189	0.852	0.265	0.903	0.739	0.991	0.724	0.485	0.217	0.809	0.458	0.197	0.928	0.862
0.164	0.564	0.401	0.105	0.915	0.659	0.510	0.643	0.102	0.405	0.082	0.901	0.417	0.841
0.441	0.702	0.681	0.062	0.756	0.474	0.241	0.881	0.471	0.314	0.078	0.382	0.114	0.626
0.790	0.482	0.643	0.072	0.786	0.750	0.919	0.420	0.281	0.825	0.601	0.033	0.563	0.592
0.302	0.856	0.889	0.637	0.208	0.601	0.315	0.323	0.155	0.059	0.391	0.759	0.479	0.304
0.228	0.013	0.739	0.346	0.474	0.895	0.050	0.339	0.707	0.199	0.442	0.336	0.132	0.520
0.033	0.841	0.416	0.710	0.786	0.652	0.599	0.787	0.907	0.292	0.891	0.584	0.370	0.285
0.184	0.125	0.234	0.084	0.753	0.962	0.627	0.102	0.004	0.989	0.557	0.972	0.850	0.545
0.369	0.700	0.738	0.001	0.609	0.361	0.307	0.343	0.277	0.030	0.145	0.623	0.100	0.647
0.992	0.399	0.574	0.625	0.273	0.328	0.545	0.593	0.055	0.382	0.059	0.561	0.030	0.776
0.425	0.571	0.675	0.299	0.989	0.005	0.774	0.376	0.201	0.354	0.877	0.892	0.200	0.814
0.525	0.712	0.021	0.911	0.303	0.369	0.751	0.412	0.315	0.133	0.699	0.977	0.621	0.601
0.797	0.225	0.360	0.977	0.923	0.570	0.761	0.604	0.546	0.924	0.968	0.440	0.148	0.455
0.226	0.721	0.819	0.211	0.593	0.382	0.580	0.511	0.410	0.749	0.358	0.359	0.760	0.946
0.162	0.280	0.182	0.850	0.357	0.673	0.764	0.323	0.120	0.435	0.327	0.306	0.856	0.373
0.133	0.489	0.710	0.779	0.374	0.248	0.172	0.286	0.471	0.386	0.262	0.167	0.642	0.252
0.081	0.314	0.532	0.640	0.896	0.492	0.876	0.700	0.225	0.310	0.785	0.470	0.322	0.728
0.302	0.795	0.993	0.447	0.120	0.344	0.452	0.433	0.056	0.282	0.946	0.942	0.863	0.829
0.447	0.702	0.813	0.831	0.863	0.399	0.346	0.509	0.989	0.126	0.179	0.950	0.513	0.924
0.717	0.657	0.018	0.110	0.753	0.239	0.362	0.029	0.733	0.905	0.248	0.341	0.201	0.262
0.070	0.513	0.043	0.546	0.342	0.780	0.792	0.548	0.981	0.995	0.517	0.700	0.890	0.937
0.524	0.281	0.692	0.643	0.084	0.103	0.468	0.438	0.350	0.790	0.622	0.151	0.326	0.778
0.576	0.447	0.519	0.625	0.913	0.676	0.099	0.105	0.455	0.057	0.883	0.491	0.636	0.892
0.945	0.951	0.202	0.923	0.597	0.020	0.566	0.959	0.868	0.243	0.946	0.019	0.800	0.648
0.481	0.280	0.171	0.299	0.297	0.501	0.869	0.600	0.943	0.243	0.034	0.616	0.981	0.970
0.103	0.145	0.045	0.342	0.016	0.416	0.070	0.246	0.154	0.317	0.370	0.332	0.549	0.408
0.992	0.032	0.140	0.156	0.178	0.387	0.830	0.153	0.558	0.417	0.401	0.362	0.689	0.088
0.834	0.113	0.552	0.376	0.013	0.591	0.874	0.001	0.895	0.093	0.427	0.301	0.589	0.439
0.297	0.961	0.640	0.517	0.099	0.989	0.039	0.704	0.580	0.248	0.973	0.912	0.987	0.703
0.106	0.575	0.300	0.114	0.444	0.592	0.159	0.521	0.439	0.746	0.210	0.282	0.581	0.037
0.287	0.058	0.221	0.700	0.627	0.030	0.267	0.085	0.992	0.704	0.733	0.142	0.847	0.856
0.541	0.077	0.412	0.123	0.212	0.406	0.904	0.901	0.125	0.843	0.327	0.577	0.049	0.528
0.374	0.369	0.501	0.744	0.149	0.579	0.724	0.967	0.170	0.944	0.156	0.881	0.428	0.845
0.293	0.874	0.948	0.814	0.857	0.799	0.822	0.284	0.856	0.567	0.817	0.569	0.885	0.205
0.469	0.129	0.180	0.068	0.173	0.644	0.059	0.548	0.162	0.859	0.586	0.171	0.123	0.832
0.224	0.512	0.806	0.657	0.172	0.587	0.706	0.616	0.802	0.824	0.647	0.574	0.689	0.455
0.700	0.773	0.553	0.115	0.788	0.722	0.001	0.796	0.165	0.329	0.256	0.873	0.066	0.116

- The numbers in this table were generated using the @RAND function random number generator from the spreadsheet application Lotus 1-2-3 Release 4 for Windows.

Figure 3 - Random Number Table*

SAMPLE DATA SHEET

Contract or W. P.: _____ District: _____ Hwy: _____

Work and location _____

Source Name or Owner: _____ Source No.: _____

County: _____ Twp: _____ Lot: _____ Con.: _____

Source location: _____

_____

_____

SAMPLED FROM: ☐ Road ☐ Out of Stockpile ☐ Into Stockpile ☐ Test pit

☐ Stopped belt ☐ End of belt ☐ Bin ☐ Power Auger ☐ Channelled face

Other: _____

TYPE OF SAMPLE: ☐ QA Other: _____

No. of bags in sample: _____

Sampled by: _____ Date: _____

Field sample no.: _____ Date recd.: _____

Lab. sample no.: _____

Result to: _____ Fax No.: _____

TEST REQUIRED: ☐ Gradation ☐ Moisture ☐ %Crush ☐ Freeze -Thaw

☐ % Flats ☐ Micro-Deval C. A ☐ Micro-Deval F. A ☐ W.P. 75 micron

☐ Soundness ☐ Abs. & Dr. ☐ P. N. ☐ Organic ☐ Hydrometer

☐ Attrition ☐ A.A.V ☐ P.S.V. ☐ Chem. Anal. ☐ Insoluble Residue

☐ Proctor ☐ A.M. Bar

Special tests: _____

_____
