MATERIALS MANAGEMENT
CONTRACT MATERIALS.CONTRACT SAMPLING & TESTING
AUTOMATION SECTION 3220

3220.1 SCOPE. To establish policy on Materials Management.Contract Materials.Contract Sampling and Testing. To define field names and establish policy on the contents of those fields.

3220.1.1 Update access for Materials Management.Contract Sampling and Testing shall be granted to the district personnel as assigned by district management. All other users will be granted query access.

3220.2 GENERAL. Contract Sampling and Testing allows the modification of materials data associated with a contract line item and the contract sampling and testing requirements for that material. The data is used to confirm that adequate sampling and testing has been performed prior to paying the contractor.

3220.2.1 All Prime Contractors and Subcontractors shall submit a list in writing of all producers/suppliers for the Contract to District personnel prior to the creation of the Sampling and Testing requirements. This document shall be required to activate a contract. See sample form Exhibit A. Districts may customize the form to address local needs.

3220.2.2 District Materials Personnel shall then review and modify the Contract Sampling and Testing data to reflect the contract.

3220.3 Contract Sampling and Testing, Materials Tab.

3220.3.1 Conversion Factor is a numerical value which, when multiplied by the material quantity, generates a numerical value which reflects the item quantity contributed by that material. The conversion factor may also need to compensate for differences in unit of measure.

SiteManager needs to know the required number of samples for a given quantity of a line item. SiteManager determines the number of samples by:

$$\frac{[\ \text{Conversion Factor} \times (\ \text{Line Item Quantity} + \text{Change Order Quantity})\ ]}{\text{Frequency}}$$

The Conversion Factor is the multiplier needed to convert **Line Item** units into **Inspected** units.

3220.3.1.1 Example #1a (English)- Line Item= Type 5 Base, 4" thick 10,000 square yards

(Type 5 Base is inspected in tons, 1 sample for every 500 tons).
The Line Item unit is **Square Yards** and the inspected unit is **Tons**
The Conversion Factor needs to convert square yards to tons.
Given: 1" = .0277 yard and 1.8 ton/cubic yard for Type 5 Base

4 inches x .0277 yard = 0.111 yard
0.111 yard x 1.8 tons/cubic yard = 0.2 tons/square yard
Conversion Factor = 0.2

(0.2 x 10,000) / 500 = 4 samples required.

In this example, SiteManager will check for a minimum of four samples.

3220.3.1.2 Example #1b (Metric)-Line Item= Type 5 Base, 100mm thick 10,000 square meters (Type 5 Base is inspected in Megagrams, 1 sample for every 500 Megagrams.

The Line Item unit is **Square Meters** and the inspected unit is **Megagrams**
The Conversion Factor needs to convert square meters to megagrams.

Given: 1mm = .001 meter and 2.14 mg/cubic meter for Type 5 Base
100mm x .001 meter = 0.1 meter
0.1 meter x 2.14 Mg/cubic meter = 0.2 Mg/square meter

Conversion Factor = 0.2

(0.2 x 10,000) / 500 = 4 samples required.

In this example, SiteManager will check for a minimum of four samples.

3220.3.1.3 Example #2-Line Item= Mineral Aggregate (Surface Leveling) 6,000 megagram

This line Item has two component parts: 78% stone and 22% sand.

The units are the same for the Inspected quantity and the line Item quantity, but since the line item has component parts, the conversion factor is the multiplier needed to convert the Line Item into the component part percentages.

$$\frac{[\text{Conversion Factor} \times (\text{Line Item Quantity} + \text{Change Order Quantity})]}{\text{Frequency (Mg)}}$$

Equals

(.78 x 6,000) / 500 = 10 samples of stone

(.22 x 6,000) / 500 = 3 samples of sand

In this example, SiteManager will check for a minimum of ten samples of stone, and three samples of sand.

3220.3.1.4 Example #3- Line Item= Asphaltic Concrete (Type IC) 10,000 square yards

This line Item has four component parts: 5% bitumen, 84% stone, 10% sand, and 1% hydrated lime. In this example, the line item units are different than the inspected units, and there are component parts.

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Given: 0.095 tons/yard for the Bitumen (compacted mixture)
1.876 tons/yard for the Aggregate (compacted mixture)

The total percent of the aggregate is 95%. First recalculate the aggregate weight to 100%, and find the relative weights.

Stone- 84/95 x 100 = 88.4 % 88.4 x 1.876 tons/yard =1.658 tons/yard
Sand- 10/95 x 100 = 10.5 % 10.5 x 1.876 tons/yard =0.197 tons/yard
HL- 1/95 x 100 = 1.1% 1.1 x 1.876 tons/yard =0.021 tons/yard

Then calculate the conversion factor for each component, using the weights determined above, and the estimated thickness.

1.75 inches x .0277 = 0.048 yard

Conversion Factor

Stone-	0.048 yard	x 1.658 tons/cubic yard	= 0.080 tons/square yard	= 0.080
Sand-	0.048 yard	x 0.197 tons/cubic yard	= 0.009 tons/square yard	= 0.009
H.Lime-	0.048 yard	x 0.021 tons/cubic yard	= 0.001 tons/square yard	= 0.001
Bitumen-	0.048 yard	x 0.095 tons/cubic yard	= 0.004 tons/square yard	= 0.004

Stone- 0.080 x 10,000 / 500 = 2 samples
Sand- 0.009 x 10,000 / 500 = 1 sample (any fraction of a sample is rounded up)

The Bitumen and Hydrated lime are shown for calculating purposes only, and are not accepted based on sample and test.

3220.3.2 Approved Source Required box shall be checked if an approved source is required for this material.

3220.3.3 The material shall be assigned to the Item for which it is used.

3220.3.4 Materials which are automatically assigned to an item by the system but do not apply to the target contract must be deleted.

3220.4 Contract Sampling and Testing, Sample and Testing Tab.

3220.4.1 Sample Location shall be the place a representative sample is to be obtained.

3220.4.2 Number of **Samples** per **unit** shall conform to Volume 1 of the Materials Manual, applicable sections of the Construction Manual, or as directed by the State Project Operations Engineer. This number may be adjusted to reflect limited resources for inspection. For significant departure from Material Manual instructions, include justification for the change in the remarks.

3220.4.3 Sample Units shall be the units of measure of the sample to be tested and conform to Volume 1 of the Materials Manual or applicable sections of the Construction Manual. When the choice of units is left to the discretion of the user, the pay unit for the associated bid item is to be applied, if appropriate.

3220.4.4 Sample size shall be the number of units of measure of the sample to be tested and to conform to Volume 1 of the Materials Manual or applicable sections of the Construction Manual. This field may be left blank.

3220.4.5 Sample Responsibility shall be that group of persons who are responsible for obtaining the sample.

3220.4.6 Test Responsibility shall be that group of persons who are responsible for performing the testing of the material.

PRODUCER / SUPPLIER LIST		
Job No.	**Route**	**County**
Contract ID No.	**Contractor**	**R.E.**
Material	**Producer/Supplier**	**Estimate Line Number(s)**
AGGREGATES		
Surfacing		
Base Course		
Rock Base		
Asphalt Millings for Base		
Rock Blanket		
Rock Fill		
Revetment		
Rock for Gabions		
Aggregate for Drainage		
Rock for Ditch Liner		
Granular Backfill		
Porous Backfill		
Select Backfill for MSE Walls		
BITUMINOUS MATERIALS		
Asphalt Mix		
Asphalt Stabilized Perm Base		
Tack or Prime Coat		
Microsurfacing		
READY-MIXED CONCRETE		
Concrete Mix		
Pavement Underseal		
Flowable Backfill		
Cement Stabilized Perm Base		
Curing Materials		
Surface Sealer		
REINFORCING STEEL		
Black		
Epoxy Coated		
Wire Mesh		
Mechanical Bar Splices		
CONCRETE PAVING ACCESSORIES		
Dowel Baskets		
Dowel & Tie Bars		
Curing Materials		
Joint Filler		

Joint Seal		
PRECAST CONCRETE		
Box Culverts		
Retaining Walls		
Sound Walls		
Manholes		
Drop Inlets		
Headwalls		
Bridge Girders		
Bridge Deck Panels		
Traffic Barrier		
DRAINAGE		
Concrete Pipe		
Corrugated Metal Pipe		
Structural Plate Pipe		
Polyethylene Pipe		
PVC Pipe		
Geocomposite Pav't Edge Drains		
Corrugated Steel Underdrain		
Slotted Drain		
Culvert Liner		
Grates & Bearing Plates		
Curved Vane Grates & Frames		
Floodgates		
Curb Inlets		
Manhole Frames & Covers		
SUBCONTRACTORS		
Structural Steel Painting		
Guard Rail / Guard Cable		
Fencing		
Electrical (Signals & Lighting)		
Structural Steel Erection		
Rebar Installation		
Roadside Development:		
Seed		
Fertilizer		
Sod		
Straw Mulch		
Overspray for Mulch		
Asphalt Emulsion for Mulch		
Ag Lime		
Tree Planting		
Erosion & Sediment Control		
Signing		

Pavement Marking		
Dampproofing or Waterproofing		
BRIDGES		
Piling		
Pile Point Reinforcement		
CMP Pile Spacers		
Structural Steel		
Castings		
Bolts		
Bearing Pads		
Anchor Bolts		
Steel Grid Floor		
Diaphragms for Conc I-Girders		
Joint Seals		
Expansion Devices		
Steel Bar Dams		
Earthquake Restrainer Assem.		
Deadman Anchorage Assem.		
Vertical Drain at End Bents		
Slab Drains		
Fabricated Drainage System		
Conduit System		
Aluminum Bridge Rail		
Handrail for Steps		
Bridge Guardrail		
Cathodic Protection System		
Stay-In-Place Forms		
Concrete Wearing Surface		
Epoxy Polymer Concrete Overlay		
Protective Coating for Concrete		
Drilled Shaft Casing		
TRAFFIC CONTROL MATERIALS		
Channelizers		
Directional Indicator Barricades		
Movable Barricades		
Impact Attenuators		
Truck-Mounted Attenuators		
Construction Signs		
Object Markers		
Flasher Signs		
Changeable Message Signs		
Radar Speed Advisory System		
Temp. Signal &/or Lighting System		
Traffic Barrier Delineators		

MISCELLANEOUS MATERIALS		
Drain Markers, R/W Markers & Delineator Posts		
Geotextile Fabrics		
Epoxy Resin Materials		
Concrete for Pavement Overlay		
Mortars or Grouts		
Masonry Protection System		
Graffiti Protection System		
Pipe for Waterline		
Pipe for Sewers		
Timber and/or Lumber		
Reinforced Soil Slope System		
Temporary & Permanent Erosion/Sediment Control Mat'ls		