

Sample Backup Calculations to Support Agreed Unit Price Cost for Replacing RAP Aggregate with Virgin Aggregate

Sample Backup Calculations are based on the following as planned Hot Mix Asphalt:

Contract allows for 25 percent RAP.

Based on RAP Pavement Binder Ratio (RPBR) RAP is now limited to 20 percent

Aggregate 7.00 \$/ton

Asphalt Binder 400.00 \$/ton

RAP Binder Content 6.00 percent

Hot Mix Asphalt target asphalt binder content is 6% Asphalt Content w/25% RAP asphalt binder replacement of 1.5% so virgin binder adjusted to 4.5%

Hot Mix Asphalt target asphalt binder content is 6% Asphalt Content w/20% RAP asphalt binder replacement of 1.2% so virgin binder adjusted to 4.8%

Force Account Markup 15%

Additional Material Costs

Aggregate, \$/ton, Delivered to Hot Plant:

Material	Trucking	Net	Markup 15%	Total
\$7.00	\$3.00	\$10.00	\$1.50	\$11.50

Aggregate Cost, \$/ton of HMA

HMA included 25% RAP reduced to 20% RAP so 5% Increase in Virgin Aggregate

Aggregate Costs Multiplied by Increased Virgin Aggregate Percentage = Cost (\$/ton)

$$\$11.50 \times .05 = \$0.58 \text{ per ton}$$

Asphalt Binder, \$/ton, Delivered to Hot Plant:

Material	Trucking	Net	Markup 15%	Total
\$400.00	\$18.00	\$418.00	\$62.70	\$480.70

Asphalt Binder, \$/ton of HMA

With 25% RAP asphalt binder replacement from RAP = 1.5% (RAP Binder Content of 6.0%)

With 20% RAP asphalt binder replacement from RAP = 1.2%

Virgin binder increase: $1.5\% - 1.2\% = 0.3\%$

Asphalt Binder Cost multiplied by Asphalt Binder Percent per ton of HMA = Cost (\$/ton)

$$\$480.70 \times 0.003 = \$1.44 \text{ per ton}$$

Cost Per Ton of HMA

Total Materials Cost w/ 20% RAP

Aggregate Cost plus Asphalt Binder Costs = Cost (\$/ton)

$$\$0.58 + \$1.44 = \$2.02 \text{ per ton}$$

Note: These values are for example only, and are meant only to show costs to consider for the adjustment calculation. Actual costs will vary from project to project based on asphalt binder content, trucking distances, asphalt binder and aggregate costs.