

Section 11.4 ASPHALT ADJUSTMENTS

11.4.1 Purpose

This procedure provides guidance for determining the various adjustments associated with asphalt pay items (Pay Quantity Adjustments, Thickness Adjustments, Composite Pay Factor (CPF) Adjustments, Fuel Adjustments, and Bituminous Adjustments). Example calculations are provided in the Attachments at the end of this Chapter. Asphalt As-Built Data collection is also discussed.

11.4.2 Authority

Sections 20.23(3)(a), and 334.048(3), Florida Statutes (F.S.)

11.4.3 References

Standard Specifications for Road and Bridge Construction

11.4.4 Overview of Adjustment Types

Adjustments will be applied to applicable asphalt pay items as indicated in **Table 11.4-1**. Guidance is provided for each adjustment type within the body of this chapter.

On Lump Sum and Design-Build Projects, adjustments are made per **Special Provisions, Section 9-2**. Refer to **CPAM 6.2** for information and examples.

Table 11.4-1

Pay Item	Pay Quantity	Thickness	Final Surface ⁽¹⁾ Deficient Asphalt	CPF	Fuel	Bituminous
Superpave Asphalt Base Courses ⁽⁴⁾	✓		✓	✓	✓	✓ ⁽¹⁾
Composite Base (Asphalt Portion Only)	✓		✓	✓	✓	✓
Superpave Asphalt Concrete Structural Courses	✓		✓	✓	✓	✓
Superpave Asphalt Concrete Friction Courses	✓		✓	✓	✓	✓
Miscellaneous Asphalt ⁽³⁾	✓			⁽²³⁾	✓	✓
Optional Base Courses (White Base Only)		✓	✓		✓	
Asphalt Treated Permeable Base (ATPB)			✓	✓	✓	✓
Driveway Asphalt (previously Turnout Construction Asphalt) ⁽³⁾				⁽²³⁾	✓	✓
Asphalt Membrane Interlayer					✓	✓
Temporary Asphalt ⁽³⁴⁾						

(1) Bituminous Adjustment is applied when “Asphalt Base Only” is specified in the typical section of the plans.
 (2) ~~See CPAM 11.5 for information on final surface Adjustments.~~
 (3)(2) ~~Miscellaneous Asphalt and Driveway Asphalt Base are not tested and are accepted on a visual basis. These pay items will have a CPF of 1 (i.e., no adjustment).~~
 (4)(3) ~~Temporary asphalt is always included in the quantity for another pay item (i.e., Temporary Special Detour (102-2)) and does not get paid separately.~~

11.4.5 Pay Quantity Adjustments

The Department will pay for asphalt placed up to 105% (for projects let before July 2022) and 110% (for projects let July 2022 and after) of the Adjusted Plan Quantity for the following square yard and tonnage pay items indicated in Table 11.4-1:

- ~~Superpave Asphalt Base Course~~
- ~~Composite Base (Asphalt Portion Only)~~
- ~~Superpave Asphalt Concrete Structural Course~~
- ~~Asphalt Concrete Friction Course~~
- ~~Miscellaneous Asphalt~~

Form 675-030-20A, Asphalt Roadway – Daily Report of Quality Control-Automated Version (known as the **QCRR**) automatically calculates the pay quantity adjustments. It is the Contractor's responsibility to ~~shall~~ coordinate with the Project Administrator (PA) (or designee) to verify the Plan Quantity Tonnage and any Engineer directed change(s) to be entered in the QCRR. Once the asphalt is complete, the final QCRR will calculate the Tonnage-Weighted Average G_{mm} (or G_{sb} for Open Graded Friction Course (FC-5)) for each pay item based on the tonnages and mix designs used on the project.

(A) Square Yard Pay Item Adjustments

(1) Superpave Asphalt Base

Superpave Asphalt Base Courses are the only asphalt square yard (SY) pay items. The pay area shall be adjusted not to exceed 105% (for projects let before July 2022) or 110% (for projects let July 2022 and after) of the designed surface area (SY) including engineer changes per **Specification Section 234-9**. Pay quantity adjustments can be positive, negative, or zero, and the adjustment will be automatically shown in the **QCRR**. The pay area (SY) is calculated using the following formulas:

$$\text{Adjusted PQ (TN)} = \frac{(\text{Plan Quantity (SY)}) (\text{Spread Rate (lbs/SY) per Spec. 234-8.1})}{2,000 \text{ Lbs/TN}}$$

$$\text{Pay Area (SY)} = [\text{Surface Area (SY)}] \left(\frac{\text{Actual Quantity Placed (TN)}}{\text{Adjusted Plan Quantity Tonnage}} \right)$$

$$\text{Maximum Pay Area (SY)} = 105\% \text{ or } 110\% \times (\text{Designed Surface Area (SY)})$$

$$\text{Designed Surface Area (SY)} = \text{Plan Quantity} + \text{any engineer approved quantity changes.}$$

NOTE: The Final Pay Area will be the Pay Area or the Maximum Pay Area, whichever is less. Use the formula below to determine the pay quantity adjustment.

Pay Quantity Adjustment (SY) = Final Pay Area (SY) - Designed Surface Area(SY)

See [Attachment 11-4-1](#) for examples of a negative adjustment, a positive adjustment, and an adjustment when the pay area exceeds the maximum pay quantity.

(2) Composite Base

~~Composite Base is a mixture of granular Subbase (White Base) and Superpave Asphalt Base. Composite Base, as described in CPAM 11.3, is paid under pay item number 285-709 thru 285-715 (see Specification 285-3 and Table 285-1).~~

The Granular Subbase has a thickness tolerance and will be cored prior to placing the asphalt base layer ~~per See Specification Sections, 285-3 and 290-4, and CPAM 11.3.~~ There is no pay quantity or thickness adjustment for the granular subbase layer.

Once

~~The Asphalt Base layer is placed per also has a thickness tolerance per Specification Sections 234-85, and payment~~ will be adjusted per **Specification Section 234-9** as seen in [CPAM 11.4.5\(A\)](#) above. The adjustment will automatically be shown in the **QCRR**.

See [Attachment 11-4-1](#) for examples of adjustments to the Superpave Asphalt Base portion.

(B) Tonnage Pay Item Adjustments

Superpave Asphalt Concrete Structural Courses and Miscellaneous Asphalt are the only tonnage pay items that receive pay quantity adjustments. They are final measure pay items, but the original plan quantity will be adjusted to account for the actual G_{mm} or G_{sb} used. Each of these pay items receive a pay quantity adjustment as shown in the **QCRR** and outlined below.

$$\text{Adjusted PQ} = \left(\frac{\text{PQ (TN)} \pm \text{Qty. Revisions}}{\text{Design } G_{mm} \text{ or } G_{sb}} \right) [\text{Tonnage-Weighted Average } G_{mm} \text{ or } G_{sb}]$$

$$\text{Tonnage-Weighted Average } G_{mm} = \frac{(\text{Tons}_{\text{Mix } 1})(G_{mm \text{ Mix } 1}) + (\text{Tons}_{\text{Mix } 2})(G_{mm \text{ Mix } 2}) + (\text{Tons}_{\text{Mix } n})(G_{mm \text{ Mix } n})}{(\text{Tons}_{\text{Mix } 1}) + (\text{Tons}_{\text{Mix } 2}) + (\text{Tons}_{\text{Mix } n})}$$

$$\text{Maximum Pay Tonnage} = 105\% \text{ or } 110\%(\text{Adjusted Plan Quantity})$$

NOTE: The Final Pay Tonnage will be the Tonnage Placed or the Maximum Pay Tonnage, whichever is less. If the Tonnage Placed exceeds the Maximum Pay Tonnage, use the formula below to determine the pay quantity adjustment.

Pay Quantity Adjustment (TN) = Maximum Pay Tonnage – Tonnage Placed

(1) Structural Courses

The plan quantity is determined using the design G_{mm} (2.540 per **Specification Section 334-1.4**). Excluding overbuild, the pay quantity will be based on the quantity placed on the project, limited to 105% (for projects let before July 2022) or 110% (for projects let July 2022 and after) of the adjusted plan quantity for each pay item. See **Specification Section 334-7**.

(2) Friction Courses

The plan quantity is determined using the design G_{mm} (2.540 per **Specification Section 334-1.4**), with exception to open graded friction course (FC-5) which is determined using the design G_{sb} (2.635 per **Specification Section 337-8.2**). The pay quantity for friction course will be based on the quantity placed on the project, limited to 105% (for projects let before July 2022) or 110% (for projects let July 2022 and after) of the adjusted plan quantity. **Specification Section 337-11**.

See [Attachment 11-4-2](#) for examples of adjustments to tonnage pay items.

(3) Miscellaneous Asphalt

The plan quantity is determined based on a spread rate of 100 Lbs/SY per inch of design thickness of asphalt placed over the area shown in the plans. The pay quantity will be based on the quantity placed on the project, limited to 105% (for projects let before July 2022) or 110% (for projects let July 2022 and after) of the adjusted plan quantity.

See [Attachment 11-4-2\(4\)](#) for an adjustment on Miscellaneous Asphalt.

(C) Cubic Yard Pay Item Adjustments

The only Asphalt Cubic Yard Pay Item is Asphalt Treated Permeable Base (ATPB). This pay item does not receive a ~~105% or 110% pay quantity adjustment or thickness adjustment~~Q. ATPB ~~does~~ receive CPF, Fuel, and Bituminous Adjustments (when applicable).

11.4.6 Thickness Adjustments

Non-asphalt Base Courses (white base) ~~listed in **Specifications Section 285**, including Limerock, Shell Base, Shell Rock, Cemented Coquina, or Recycled Concrete Aggregate (RCA), are plan quantity pay items subject to **Specifications Section 9-3.2** square yard pay items.~~ Thickness is calculated in accordance with **Specifications Section 285-7.7**, ~~and deficiencies are resolved per **Specification Section 285-6.2**.~~

A thickness adjustment is applied to the Surface Area (Plan Quantity Area) minus any applicable deficient areas left in place at no pay. The Pay Area will not exceed 105% of the Surface Area (SY). There will be no adjustment for base courses that are constructed using mixed-in-place material.

$$\text{Pay Area (SY)} = [\text{Surface Area} - \text{Deficiency}] \left(\frac{\text{Calculated Avg. Thickness per 285-7}}{\text{Plan Thickness (in)}} \right)$$

$$\text{Maximum Pay Area (SY)} = 105\%(\text{Surface Area})$$

NOTE: The Final Pay Quantity will be the Pay Area or the Maximum Pay Area, whichever is less. Use the formula below to determine the thickness adjustment.

$$\text{Thickness Adjustment (SY)} = \text{Final Pay Quantity (SY)} - \text{Surface Area (SY)}$$

See [Attachment 11-4-3](#) for examples of thickness adjustments.

11.4.7 Adjusted Pay for Deficient Asphalt ~~Straightedge Adjustments~~

~~Quality a~~Adjustments may be required when asphalt is deemed deficient due to poor workmanship. Deficiencies due to Segregation, Straightedge Testing, Cross Slope Deviations, or other workmanship issues can lead to asphalt being removed and replaced at no cost to the Department or asphalt being left in place. Refer to **CPAM 5.10**, **CPAM 11.5** and the **QCRR Corrections** PowerPoint presentation on the State Construction Office Website for information and examples of adjustments for unacceptable pavement.

~~Straightedge Deficiency Adjustment is a quality adjustment due to poor workmanship and is not an adjustment for material failure. See **CPAM 11.5** for Straightedge Deficiency Adjustments.~~

11.4.8 Composite Pay Factor Adjustments

Composite Pay Factor (CPF) adjustments are applied to Superpave Asphalt Base Course, Composite Base (Asphalt Portion Only), Structural Course, Friction Course and Asphalt Treated Permeable Base Courses. The CPF weighs pay factors for each of the quality characteristics for a LOT. Pay factors for dense-graded mixes are determined and weighted in the CPF for density, air voids, asphalt binder content, No. 8 sieve, and No. 200 sieve. Pay factors for open graded friction courses (FC-5) are determined and weighted in the CPF for asphalt binder content, 3/8" sieve, No. 4 sieve, and No. 8 sieve. The Materials Acceptance and Certification (MAC) database calculates these pay factors and the CPF.

CPF adjustments range from 0.75 to 1.05. The Contractor will receive a positive adjustment when the CPF is over 1.00 and a negative adjustment when the CPF is under 1.00. The Contractor will not receive a CPF adjustment when the CPF equals 1.00 or for Partial LOTs where no random sample is obtained. See **Specification Sections 334-8. and 337-12.**

(A) Low Composite Pay Factors in MAC

The Material's Acceptance and Certification (MAC) System flags a CPF less than 0.90 as a Materials Certification (MC) Review finding, and a Material Acceptance Resolution (MAR) will be processed.

A CPF less than 0.90 and greater than or equal to 0.80 is flagged as a Pay Reduction per **Specification** finding in **MAC. It and** is not considered an Exception on the MC Review and the Project Materials Certification Letter.

If a CPF is less than 0.80, follow the requirements in **MAC** and in the **Standard Specifications**. Any actions taken per **Specification 334-5.9.3 – 334-5.9.5** are considered part of the Asphalt Producer QC Program and are not monitored or reported in **MAC**.

(B) Resident Level Responsibilities

The PA and the VT are responsible for verifying the accuracy of the Contractor's Quality Control (QC) Technician's test results entered in the ~~**Material's Acceptance and Certification (MAC)MAC**~~ system.

Collect The CPF reports along with the asphalt ticket packets ~~shall be collected~~within two (2) working days after the closing of a LOT and submitted ~~the~~ the CPF reports electronically

within the **LOT Submittal Package** described in. See **CPAM 11.1 Asphalt LOT Documentation**.

Once a LOT is closed, and it has been determined that a CPF adjustment must be made, ~~the make the~~ adjustment ~~will be made~~ during the month the LOT is closed and payid accordingly on the next progress estimate. Calculate the unit price adjustment and enter the revised unit price adjustment and quantity on the monthly estimate. The **QCRR** should accurately reflect the asphalt placed in each LOT.

~~CPF adjustments in~~ AASHTOware Project Construction (PrC), adjust the unit price by the appropriate CPF and enter ~~will be handled by adjusting the unit price by the appropriate CPF and entering~~ only the difference in unit price, not the complete unit price. LOTs will be grouped together for each unit price adjustment as applicable. See **Attachment 11-4-4(1)**. When the work is completed, use the average CPF of all the LOTs associated with the pay item to apply the final CPF adjustment to the final pay item quantity (calculated as the difference of the Final Pay Area and the plan quantity). Show the adjustments for each ~~the~~ pay item in the **Final Estimates Documentation**.

NOTE: It is recommended to deduct asphalt left in place at no pay due to an Engineering Analysis Report (EAR) from the pay item quantity, rather than make a line-item adjustment, to easily compare final quantities in PrC to the final quantities on the **QCRR**. See **QCRR Corrections** on the State Construction Office Website for an example.

See **Attachment 11-4-4** for CPF Calculations.

(1) CPF Adjustments for Square Yard (SY) Pay Items

The PA is responsible for ensuring the Contractor accurately reports the length and width of area being placed for square yard pay items. The PA is also responsible for comparing the plan quantity to the area placed and determining if plan quantity is in error and warrants an adjustment per **Specifications Section 9-3.2**.

The SY, as reported and verified in the QCRR, will be used to apply the CPF Adjustment when each lot closes. ~~A correction CPF adjustment must be made to ensure CPF adjustments are applied to the Final Pay Area. Use the average CPF of all the LOTs to apply~~ the final CPF adjustment will be applied using the average CPF for to the line-item adjustment final pay item quantity (calculated as the difference of the Final Pay Area and the plan quantity).

See **Attachment 11-4-4(3)** for an example.

(2) Resolution Test Results - Materials Acceptance Resolution (MAR)

In some instances, the PA will require removal and replacement of tonnage within a LOT due to MAR – materials failure. This asphalt may be a partial subplot, an entire subplot, or an entire LOT. The QC Technician should identify the problem before an entire LOT is placed. The asphalt identified to be removed will be milled and replaced with asphalt either from the same LOT or from another LOT. If replaced with asphalt from a different LOT, the original **LOT Submittal Package** will be explained with remarks such as “No Pay” with reference to the new replacement **LOT Submittal Package**. The replacement material is to be paid in the **LOT Submittal Package** at the appropriate CPF for that lot’s production with references and remarks to the defective material **LOT Submittal Package**. Refer to See [Bituminous Certifications & CPF Corrections – Due to Remove and Rreplace Asphalt on the State Construction Office Website](#) for examples on how to properly document MAR conditions.

See [Attachment 11-4-75](#) for an Example of (1) ~~of~~ an e-mail from the District Materials’ Office to the PA with the number of tests and costs, an Example (2) of Resolution Testing Costs, and an Example (3) for reporting Cost Resolution Testing in PrC.

11.4.9 Fuel Adjustments

Fuel adjustments are applied to the pay items indicated in [Table 11.4-1](#), per [Specifications Section 9-2.1.1](#), when the original contract time is more than 120 calendar days.

Refer to [CPAM 5.14](#) for information and instructions on how to apply Fuel Adjustments to Asphalt pay items.

~~11.4.9~~**11.4.10 Bituminous Adjustments**

Bituminous adjustments are applied to the ~~following~~ pay items ~~indicated in **Table 11.4-1**~~, per ~~**Specifications Section 9-2.1.2**~~, when the original contract time is more than 365 calendar days, ~~or~~ the total bid quantity ~~exceeds~~ 5,000 Tons of asphalt.

- ~~• Superpave Asphalt Base~~
 - ~~— When “Asphalt Base Only” is specified on the Typical Section of the plans.~~
 - ~~— On the asphalt portion of a Composite Base item~~
- ~~• Structural Courses~~
- ~~• Friction Courses~~
- ~~• Miscellaneous Asphalt Pavement~~
- ~~• Driveway Asphalt Base~~
- ~~• Asphalt Rubber Membrane Interlayer~~

~~The Department will adjust the bid unit price for bituminous material, excluding cutback and emulsified asphalt, to reflect increases or decreases in the **Asphalt Price Index (API)** of bituminous material from that in effect during the month and year in which the bid was received. Bituminous adjustments will be made only when the current **API (CAPI)** varies by more than 5% of the base **API (BAPI)** established at the month of bid, and only on the portion that ~~exceeds~~ 5%. The contractor will not be given the option to accept or reject the adjustment. Bituminous adjustments will not be made on asphalt ~~exceeding~~ 105 or 110% of the adjusted plan quantity per **Specifications 9-3**.~~

~~(A)~~ **Contractor Responsibilities**

~~It is the Contractor’s responsibility to provide the Department a Certification of Quantities using **Form 700-050-66 – Contractor’s Certification of Quantities Asphalt Mixes with Modified and Unmodified Binders**. The Certification form will be turned in monthly to the PA for payment for all project types (conventional and alternative contracts). Quantities by the Department ~~automatic generation or manual completion~~ **Department’s Fuel & Bituminous Forms** available ~~State Construction Office Website~~ **Estimate Cutoff Dates** are also posted.~~

See ~~**Attachment 11-4-6**~~ for Bituminous Adjustments on Conventional Projects.

All ~~**Certification(s) of Quantities**~~ provided by the Contractor will need to represent the amount of material placed on the project and accepted by the Department during the

~~estimate cutoff period. **Estimate Cutoff Dates** are provided on the State Construction Office website.~~

~~**Attachment 11-4-7** includes an example of how the estimate cutoff dates are to be used in processing the **Certification of Quantities** submitted by the Contractor.~~

~~(B) Resident Level Responsibilities~~

~~The Resident Office (RO) is responsible for making sure that the Contractor submits the bituminous material certification monthly on each project that meets the criteria specified in **Specifications Section 9**. Once the Contractor submits a certification, the RO personnel in charge of the Contract, will spot check the form for quantity errors, indexes, dates, etc.~~

~~The PA is responsible for entering bituminous adjustments as a line item adjustment in PrC. Bituminous adjustments can be positive or negative.~~

~~Refer to **CPAM 5.14** for information and instructions on how to apply Bituminous Adjustments to Asphalt pay items. Also see **Bituminous Certifications & CPF Corrections – Due to Remove and Replace Asphalt** on the State Construction Office Website, and the **Attachments** within this Chapter. See for examples on how to properly document bituminous adjustments.~~

~~11.4.10~~**11.4.11 As-Built Data Requirements**

~~Asphalt As-Built Pavement Data will be collected on **Form 675-030-20A, Contractor's Quality Control Roadway Report (QCRR) - Automated Version**. Refer to **CPAM 5.12** for more information. ~~by submitting this excel file to the State Materials Office by email to the following address: **SM-MACQCRRUpload@dot.state.fl.us** after Final Acceptance.~~ **Form 700-050-12, Asphalt Roadway - As-Built Data**, is not needed for projects using the automated **QCRR**.~~

~~The Resident Office is responsible for ensuring errors found after final acceptance on the **QCRR**, are corrected by the Contractor. The final **QCRR** is to be replaced with the corrected version. The PA will be responsible for ensuring that this data is submitted accurately. Should errors be discovered after submittal, the **QCRR** shall be corrected and resubmit in EDMS and to the State Materials Office with instructions that the form has been revised.~~

~~Projects let before July 2015 using the old **Form 675-020-20, Contractor's Quality Control Roadway Report**, will need to submit **Form 700-050-12, As-Built Pavement**~~

~~**Data** after paving operations are finished to provide a complete record of the composite make-up of the mainline pavement applied to each project (see note below). Once the form(s) have been completed, email the excel file(s) to the State Final Estimates Office. The objective is to provide a Pavement Design Engineer with sufficient information and necessary data to be used for the development and application of proper engineering practices for future roadway development, design, and maintenance.~~

~~**NOTE:** Only reflect pavement data for the mainline (through lane) on **Form 700-050-12, Asphalt Roadway — As-Built Data**. Data for ramps, shoulders, side roads, auxiliary lanes, or non-state road facilities is not needed. The Roadway VT should perform this operation and complete the form to reflect the actual pavement composition.~~

~~11.4.11~~11.4.12 Attachments

[Attachment 11-4-1](#)Adjustments on Square Yard Pay Items

[Attachment 11-4-2](#)Adjustments on Tonnage Pay Items

[Attachment 11-4-3](#)Thickness and Deficiency Adjustments for Optional Base

[Attachment 11-4-4](#)CPF Calculations

[Attachment 11-4-5](#)Resolution Test Results

~~[Attachment 11-4-6](#)Bituminous Adjustments on Conventional Projects~~

~~[Attachment 11-4-7](#)Cutoff Dates on Conventional Projects~~

Attachment 11-4-1 Adjustments on Square Yard Pay Items

(1) Negative Pay Quantity Adjustment with Bituminous, Fuel, and CPF Adjustments

Given:

A conventional project with Superpave Base Asphalt, Type B (12.5), Group 15 (Pay Item 285-715) contains the following criteria:

PQ Area = 46,800 SY

Unit Price = \$50.35 per SY

Design Thickness = 9"

G_{mm} used for PQ determination per **Specification 334-1.4** = 2.540 for Dense Graded Asphalt

The Contractor will lay the 9" in 3 courses: 3" each course

The Design Spread Rate = $G_{mm, design} \times 43.3 \text{ (Lbs/SY-in)} \times \text{thickness (in.)}$

= $2.540 \times 43.3 \text{ (Lbs/SY-in)} \times 9 \text{ (in)} = 989.84 = 990 \text{ Lbs/SY}$

The Target Spread Rate per lift =

$$\frac{990 \text{ Lbs/SY}}{(3)} = 330 \text{ Lbs/SY (based on the Specifications 334-1.4)}$$

From the Asphalt Roadway – Daily Report of Quality Control, three Design Mixes were used and their recorded tonnages:

Mix 1 with 17,451 Tons at G_{mm} of 2.561

Mix 2 with 3,780 Tons at G_{mm} of 2.599, and

Mix 3 with 1,659 Tons at G_{mm} of 2.488

Total Tons Placed on the Project (Tonnage from QCRR) = 22,890 Tons

No changes to PQ area.

What is the Final Pay?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

Solution:

1. The Tonnage-Weighted Average G_{mm} is calculated first.

$$\begin{aligned} \text{Tonnage-Weighted Average } G_{mm} &= G_{mm,avg} \\ &= \frac{(\text{Tons}_{\text{Mix } 1})(G_{mm \text{ Mix } 1}) + (\text{Tons}_{\text{Mix } 2})(G_{mm \text{ Mix } 2}) + (\text{Tons}_{\text{Mix } n})(G_{mm \text{ Mix } n})}{(\text{Tons}_{\text{Mix } 1}) + (\text{Tons}_{\text{Mix } 2}) + (\text{Tons}_{\text{Mix } n})} \\ G_{mm,avg} &= \\ &= \frac{[(17,451 \text{ Tons})(2.561) + (3,780 \text{ Tons})(2.599) + (1,659 \text{ Tons})(2.488)]}{(17,451 \text{ Tons} + 3,780 \text{ Tons} + 1,659 \text{ Tons})} \\ &= (44,692 \text{ Tons} + 9,824.2 \text{ Tons} + 4,127.5 \text{ Tons}) / 22,890 \text{ Tons} \\ &= 2.562 \end{aligned}$$

2. The Adjusted PQ Tonnage is calculated next using $G_{mm,avg}$.

$$\begin{aligned} \text{Adjusted PQ Tonnage} &= \frac{[(\text{PQ Area (SY)} \pm \text{Any Revisions})] \times [t \text{ (in)} \times G_{mm,avg} \times 43.3 \text{ (Lbs/SY-in)}]}{2,000 \text{ Lbs/Ton}} \\ &= \frac{46,800 \text{ SY} \times 9 \text{ in} \times 2.562 \times 43.3 \text{ Lbs/SY-in}}{2,000 \text{ Lbs/Ton}} \\ &= 23,362.8 \text{ Tons} \end{aligned}$$

3. The pay area is then calculated.

$$\begin{aligned} \text{Pay Area (per 234-9)} &= \text{Surface Area} \times \frac{\text{Actual Tonnage Placed}}{\text{Adjusted Plan Quantity}} \\ &= 46,800 \text{ SY} \times \frac{22,890 \text{ TN}}{23,362.8 \text{ TN}} \end{aligned}$$

= 45,853 SY This is the Final Pay Area since 105% Designed Surface Area was not exceeded:

105% Designed Surface Area = 46,800 SY x 1.05= **49,140 SY**

****110% Designed Surface Area on Projects let July 2022 and after.**

$$\text{Pay Adjustment} = \text{PQ Area (SY)} \times \left[\text{Ratio of } \frac{(\text{Tonnage Placed on Project})}{\text{Adjusted PQ Tons}} - 1 \right]$$

$$= 46,800 \text{ SY} \times \left[\frac{22,890 \text{ Tons}}{23,362.8 \text{ Tons}} - 1 \right]$$

$$= 46,800 \text{ SY} \times [- 0.0202]$$

= -947 SY (the QCRR will automatically calculate the - 947 SY (+ or – due to rounding), under the “Pay Quantity Sheet”).

NOTE 2: This is where the PA or Project Personnel will do the line item adjustments:

1. Since there were no Plan Errors or Field Revisions in this example, the Contractor will receive payment for the full PQ Area of 46,800 SY on the line item in PrC for pay item 285-715 (Asphalt Base is a PQ SY pay item).
2. However, due to less asphalt being placed than planned (per **Specifications Section 330-6.1.5**, spread rate within plus or minus 5% of the target spread rate), there will be a pay adjustment. In this case, a minus 2% (the negative ratio of 0.0202) adjustment. This is within the 5% range, and since there were no other deficiencies, the Contractor will be deducted 947 SY: (– 947 SY x \$50.35/SY = – \$47,681.45). This will be entered in PrC manually as a negative Line Item Adjustment.

NOTE: As of January 2023, the spread rate must be within 10% of the target spread rate.

- 2.3. **Bituminous Adjustment:** The Contractor will receive a Bituminous Adjustment for all the asphalt produced and accepted, per **Specifications**, if the Typical Section shows Asphalt Black Base Only. Bituminous adjustments will be paid for the Final Pay Area (in tonnage) for each pay item. If the Typical Section

allows an Option for base (either white or black), a bituminous adjustment will not apply.

For black base only, a manual Correction Bituminous Adjustment will be made at the end of the contract to account for the difference between the tonnage placed and the final pay quantity (in tons).

Correction Bituminous Adjustment Calculation:

Step 1: Convert Final Pay Area (SY) to Tonnage using the tonnage-weighted average G_{mm}

$$\frac{45,853 \text{ SY} \times 9 \text{ in} \times 2.562 \times 43.3 \text{ Lbs/SY-in}}{2000 \text{ lb/TN}} = 22,890 \text{ TN}$$

Step 2: Subtract Final Pay Area in Tonnage from Total Tonnage from QCRR

$$22,890 \text{ TN} - 22,890 \text{ TN} = 0 \text{ TN}$$

(No adjustment is necessary since the contractor did not place all the necessary asphalt for this project)

3.4. Fuel Adjustment: Fuel adjustments will be paid for the Final Pay Area for each pay item. Since we paid the full PQ on the Line Item (46,800 SY), PrC made an automatic Fuel Adjustment for this quantity. Therefore, when the manual – 947 SY deduction is made in PrC, a corresponding manual fuel adjustment will also be made in PrC (to reconcile the Fuel adjustments to the Final Pay Area). The manual fuel adjustment can be calculated using Contractor’s Certification of Fuel Adjustment (DB/LS) Worksheet available on the [State Construction Website](#). (See-Refer to **CPAM 5.14** for Fuel and Bituminous Adjustments.)

4.5. CPF Adjustment: CPF adjustments will be paid for the Pay Area for each pay item. As the project progresses, CPF adjustments will be made for each LOT with the appropriate CPF and corresponding SY (see calculations in [Attachment 11-4-4, \(3\)](#)). If the Contractor reports SY which exceeds the plan quantity, only the plan quantity (including approved Engineer changes) will be paid and used to calculate CPF adjustments. For this example, CPF adjustments will stop at 46,800 SY during construction.

Then a correction CPF adjustment will be made at the end of the project for the negative 947 SY to reconcile the CPF adjustments to the Final Pay Area. The

correction CPF adjustment will be made using the average CPF associated with this pay item. See below.

Example 1a: If **Average** CPF LOTs (for this pay item) = 1.02:

$$1.02 - 1 = 0.02$$

$$0.02 \times \$49.50/\text{SY} = \$0.99/\text{SY}$$

$$\$0.99/\text{SY} \times -947 \text{ SY} = - \$937.53 \text{ (to be deducted as a negative CPF line item adjustment)}$$

Example 2b: If **Average** CPF LOTs (for this pay item) = 0.99:

$$0.99 - 1 = - 0.01$$

$$- 0.01 \times \$49.50/\text{SY} = - \$0.50/\text{SY}$$

$$- \$0.50/\text{SY} \times 947 \text{ SY} = - \$473.50 \text{ (This will also be a negative line item adjustment)}$$

(2) Positive Pay Quantity Adjustment with Bituminous, Fuel, and CPF Adjustments

Given:

A project with Superpave Base Asphalt, Type B (12.5), Group 15 contains the following criteria:

PQ Area = 46,800 SY
Unit Price = \$49.50/SY
Contractor placed 24,340 Tons
No changes to PQ area.
Design Thickness = 9"

Three Design Mixes with recorded tonnages; they are:

Mix 1 with 18,451 Tons at G_{mm} of 2.561
Mix 2 with 4,780 Tons at G_{mm} of 2.599
Mix 3 with 1,109 Tons at G_{mm} of 2.488

What is the Final Pay?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

$$\begin{aligned} \text{Tonnage-Weighted Average } G_{mm} &= \\ &= \frac{[(18,451 \text{ Tons})(2.561) + (4,780 \text{ Tons})(2.599) + (1,109 \text{ Tons})(2.488)]}{(18,451 \text{ Tons}) + (4,780 \text{ Tons}) + (1,109 \text{ Tons})} \\ &= \frac{(47,253 \text{ Tons} + 12,423.2 \text{ Tons} + 2,759.2 \text{ Tons})}{24,340 \text{ Tons}} \\ &= \frac{62,435.4 \text{ Tons}}{24,340 \text{ Tons}} \\ &= 2.565 \end{aligned}$$

$$\begin{aligned} \text{Adjusted PQ (TN)} &= \\ &= \frac{[(\text{PQ Area (SY)} \pm \text{Any Revisions})] \times [(t \text{ (in)} \times G_{mm,avg} \times 43.3 \text{ Lbs/SY-in})]}{2,000 \text{ Lbs/Ton}} \end{aligned}$$

$$= \frac{46,800 \text{ SY} \times (9 \text{ in} \times 2.565 \times 43.3 \text{ Lbs/SY-in})}{2,000 \text{ Lbs/Ton}}$$

$$= 23,390.1 \text{ Tons}$$

$$\text{Pay Area (per 234-9)} = \text{Surface Area} \times \frac{\text{Actual Tonnage Placed}}{\text{Adjusted Plan Quantity}}$$

$$= 46,800 \text{ SY} \times \frac{24,340 \text{ TN}}{23,390.1 \text{ TN}}$$

= 48,700 SY This is the Final Pay Area since 105% Designed Surface Area was not exceeded:

$$105\% \text{ Designed Surface Area} = 46,800 \text{ SY} \times 1.05 = 49,140 \text{ SY}$$

****110% Designed Surface Area on Projects let July 2022 and after.**

$$\text{Pay Adjustment} = \text{PQ Area (SY)} \times \left[\text{Ratio of } \frac{(\text{Tonnage Placed on Project})}{\text{Adjusted PQ Tons}} - 1 \right]$$

$$= 46,800 \text{ SY} \left[\frac{24,340 \text{ Tons}}{23,390.1 \text{ Tons}} - 1 \right]$$

$$= 46,800 \text{ SY} \times 0.0406$$

$$= 1,900 \text{ SY (This will be shown on the QCRR)}$$

NOTE 2: This is where the PA or Project Personnel will do the line item adjustments:

1. Since there were no Plan Errors or Field Revisions in this example, the Contractor will receive payment for the full PQ Area of 46,800 SY in PrC.
2. ~~However, t~~The Contractor placed more asphalt than planned (the 0.0406 is 104%), and since the placement is less than the 105% limit, there will be a pay adjustment. The Contractor will receive a positive Adjustment for the 1,900 SY in PrC as a manual line item adjustment.

3. **Bituminous Adjustment:** The Contractor will receive a Bituminous Adjustment for all the asphalt produced and accepted, per **Specifications**, if the Typical Section shows Asphalt Black Base Only. Bituminous adjustments will be paid for the Final Pay Area (in tonnage) for each pay item. If the Typical Section allows an Option for base (either white or black), a bituminous adjustment will not apply.

For black base only projects, a manual Correction Bituminous Adjustment will be made at the end of the contract to account for the difference between the tonnage placed and the final pay quantity (in tons).

Correction Bituminous Adjustment Calculation:

Step 1: Convert Final Pay Area (SY) to Tonnage using the tonnage-weighted average Gmm

$$\frac{48,700 \text{ SY} \times 9 \text{ in} \times 2.565 \times 43.3 \text{ Lbs/SY-in}}{2000 \text{ lb/TN}} = 24,340 \text{ TN}$$

Step 2: Subtract Final Pay Area in Tonnage from Total Tonnage from QCRR

$$24,340 \text{ TN} - 24,340 \text{ TN} = 0 \text{ TN}$$

(No adjustment is necessary since the contractor did not place all the necessary asphalt for this project)

4. **Fuel Adjustment:** Fuel adjustments will be paid for the Final Pay Area for each pay item. Since we paid the full PQ on the Line Item, PrC made an automatic Fuel Adjustment for this quantity. Therefore, when the + 1,900 SY addition is made in PrC, a corresponding manual fuel adjustment will also need to be made, in PrC (to reconcile the Fuel adjustments to the Final Pay Area). The manual fuel adjustment can be calculated using Contractor's Certification of Fuel Adjustment (DB/LS) Worksheet available on the [State Construction Office Website](#). (~~See~~ [Refer to CPAM 5.14](#) for Fuel Adjustments.)

5. **CPF Adjustment:** CPF adjustments will be paid for the Pay Area for each pay item. The Contractor placed the plan quantity which was accepted on this project. As the project progresses, the CPF adjustments will be made for each LOT with the appropriate CPF and corresponding SY (see calculations in [Attachment 11-4-4\(3\)](#)). If the Contractor reports SY which exceeds the plan quantity shown in the plans, only the plan quantity (including approved Engineer changes) will be paid and used to calculate CPF adjustments. For this example, CPF adjustments will stop at 46,800 SY during construction.
6. A correction CPF adjustment will be made at the end of the project for the positive 1,900 SY to reconcile the CPF adjustments to the Final Pay Area. The correction CPF adjustment will be made using the average CPF associated with this pay item.

(3) Pay Quantity Adjustment when Pay Area Exceeds the Maximum Pay Quantity with Bituminous, Fuel, and CPF Adjustments

Given:

A project with Superpave Base Asphalt, Type B (12.5), Group 15 contains the following criteria:

PQ Area = 46,800 SY
Unit Price: \$ 49.50/SY
Contractor placed Tons = 24,950 Tons
No changes to PQ Area
Design Thickness = 9"

The three Design Mixes used and their recorded tonnages are:

Mix 1 with 18,451 Tons at G_{mm} of 2.561
Mix 2 with 4,780 Tons at G_{mm} of 2.599
Mix 3 with 1,719 Tons at G_{mm} of 2.488

What is the Final Pay?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

Solution:

1. Tonnage-Weighted Average G_{mm} =

$$\begin{aligned} &= \frac{(\text{Tons}_{\text{Mix } 1})(G_{mm \text{ Mix } 1}) + (\text{Tons}_{\text{Mix } 2})(G_{mm \text{ Mix } 2}) + (\text{Tons}_{\text{Mix } n})(G_{mm \text{ Mix } n})}{(\text{Tons}_{\text{Mix } 1}) + (\text{Tons}_{\text{Mix } 2}) + (\text{Tons}_{\text{Mix } n})} \\ &= \frac{[(18,451 \text{ Tons})(2.561) + (4,780 \text{ Tons})(2.599) + (1,719 \text{ Tons})(2.488)]}{(18,451 \text{ Tons}) + (4,780 \text{ Tons}) + (1,719 \text{ Tons})} \\ &= \frac{(47,253 \text{ Tons} + 12,423.2 \text{ Tons} + 4,276.9 \text{ Tons})}{24,950 \text{ Tons}} \\ &= \frac{64,253.1 \text{ Tons}}{24,950 \text{ Tons}} \\ &= 2.563 \end{aligned}$$

$$\begin{aligned} 2. \text{ Adjusted PQ Tons} &= \frac{(\text{PQ Area SY} \pm \text{Any Revisions}) \times [(t \text{ (in)} \times G_{mm, \text{ avg}} \times 43.3 \text{ Lbs/SY-in})]}{2,000 \text{ Lbs/Ton}} \\ &= \frac{(46,800 \text{ SY}) \times [(9 \text{ in} \times 2.563 \times 43.3 \text{ Lbs/SY-in})]}{2,000 \text{ Lbs/Ton}} \\ &= 23,371.9 \text{ Tons} \end{aligned}$$

$$\begin{aligned} 3. \text{ Pay Area (per 234-9)} &= \text{Surface Area} \times \frac{\text{Actual Tonnage Placed}}{\text{Adjusted Plan Quantity}} \\ &= 46,800 \text{ SY} \times \frac{24,950 \text{ TN}}{23,371.9 \text{ TN}} \\ &= 49,960 \text{ SY} \text{ (105\% Design Surface Area was exceeded, so the **Final Pay Quantity will be limited to 49,140 SY**)} \end{aligned}$$

105% Designed Surface Area = 46,800 SY x 1.05= 49,140 SY

****110% Designed Surface Area on Projects let July 2022 and after.**

$$\begin{aligned} 4. \text{ Pay Adjustment} &= \text{PQ Area} \times \left[\text{Ratio of } \frac{\text{Tons Placed}}{\text{Adjusted Quantity}} - 1 \right] \\ &= 46,800 \times \left[\frac{24,950}{23,371.9} - 1 \right] \\ &= 46,800 [0.06752] = 3,160 \text{ SY} \end{aligned}$$

Since the ratio of 0.0675 or 106% is greater than 105%, the Contractor can only receive up to 105% adjustment of the Design PQ Area per **Specifications**.

Therefore, the adjustment limited by the **Specifications** will be:

$$46,800 \times 0.05 = 2,340 \text{ SY (This will be shown on the QCRR)}$$

NOTE 2: This is where the PA or Project Personnel will do the line item adjustments:

1. Since there were no Plan Errors or Field Revisions in this example, the Contractor will receive payment for the full PQ Area of 46,800 SY in PrC.
2. The Contractor will receive a manual line Item Adjustment for the + 2,340 SY in PrC which is the 105% PQ adjustment.
3. For **Bituminous Adjustments**: For Bituminous Adjustments, the Contractor will get paid for all the asphalt produced and accepted, when applicable. Bituminous adjustments will be paid for the Final Pay Area (in tonnage) for each pay item.

For black base only projects, a manual Correction Bituminous Adjustment will be made at the end of the contract to account for the difference between the tonnage placed and the final pay quantity (in tons).

Correction Bituminous Adjustment Calculation:

Step 1: Convert Final Pay Area (SY) to Tonnage using the tonnage-weighted average Gmm

$$\frac{49,140 \text{ SY} \times 9 \text{ in} \times 2.563 \times 43.3 \text{ Lbs/SY-in}}{2000 \text{ lb/TN}} = 24,540.5 \text{ TN}$$

Step 2: Subtract Final Pay Area in Tonnage from Total Tonnage from QCRR

$$24,950 \text{ TN} - 24,540.5 \text{ TN} = 409.5 \text{ TN}$$

Step 3: Apply a manual line item adjustment in PrC to deduct the 409.5 TN using the index for the last month of paving.

Fuel Adjustments: Fuel adjustments will be paid for the Final Pay Area for each pay item. Since we paid the full PQ on the Line Item, PrC made an automatic Fuel Adjustment for this quantity. Therefore, when the 2,340 SY Line Item Adjustment is processed in PrC, a corresponding manual Fuel Adjustment will be made for the additional quantity in PrC (to reconcile the Fuel adjustments to the Final Pay Area). The manual fuel adjustment can be calculated using Contractor's Certification of Fuel Adjustment (DB/LS) Worksheet available on the [State Construction Office Website](#). (~~See~~ [Refer to CPAM 5.14](#) for Fuel Adjustments.)

CPF Adjustment: CPF adjustments will be paid for the Pay Area for each pay item. As the project progresses, the CPF Adjustments will be made for each LOT with the appropriate CPF and corresponding SY (see [Attachment 11-4-4\(3\)](#) for SY pay Items). If the Contractor reports SY which exceeds the plan quantity shown in the plans, only the plan quantity (including approved Engineer changes) will be paid and used to calculate CPF adjustments. For this example, CPF adjustments will stop at 46,800 SY during construction.

A correction CPF adjustment will be made at the end of the project for the positive 2,340 SY to reconcile the CPF adjustments to the Final Pay Area. The correction CPF adjustment will be made using the average CPF associated with this pay item. See Attachment 11-4-1, Example (1)(2).

Attachment 11-4-2 Adjustments to Tonnage Pay Items

(1) No Pay Quantity Adjustment with Bituminous, Fuel, and CPF Adjustments

This example is for a Contract with two FPID's where the Contractor placed less Tonnage than planned. This example is rare but could happen.

Given:

A project with Superpave Asphalt, Traffic Level B, PG 76-22, (Pay Item 334-1-52) contains the following criteria. From the Contract and per **Specifications 334-1.4**, Dense Graded Structural or Friction Courses will use a $G_{mm} = 2.540$ to determine design quantities

Project "A" Plan Quantity Tons show 13,754.3 Tons
Project "B" Plan Quantity Tons show 91.1 Tons
Total PQ Tons from Contract and Plans = 13,845.3 Tons
Total PQ Area (SY) = 173,622 SY
No changes to PQ Area.

Project "A":

Total asphalt placed = 13,345.0 Tons
Three Design Mixes were used per the QCRR:
 Mix 1 with $G_{mm} = 2.599$ at 9,000.0 Tons
 Mix 2 with $G_{mm} = 2.615$ at 2,500.0 Tons
 Mix 3 with $G_{mm} = 2.578$ at 1,845.0 Tons

Project "B":

Total Asphalt placed = 89.2 Tons
One Design Mix was used per the QCRR:
 Mix 1 with $G_{mm} = 2.599$ at 89.2 Tons

Total Tonnage placed on this Contract = 13,345 Tons + 89.2 Tons = 13,434.2 Tons

What is the Final Pay for Project A and Project B?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

Solution:

$$\text{Adjusted PQ Tonnage} = \frac{(\text{Plan Area TN} \pm \text{Any Revisions}) \times (\text{Tonnage-Weighted Average } G_{mm})}{\text{Design } G_{mm}}$$

And the

Tonnage-Weighted Average G_{mm} =

$$\frac{(\text{Tons}_{\text{Mix } 1})(G_{mm \text{ Mix } 1}) + (\text{Tons}_{\text{Mix } 2})(G_{mm \text{ Mix } 2}) + (\text{Tons}_{\text{Mix } n})(G_{mm \text{ Mix } n})}{(\text{Tons}_{\text{Mix } 1}) + (\text{Tons}_{\text{Mix } 2}) + (\text{Tons}_{\text{Mix } n})}$$

On this Contract, Design Mix 1 for Projects A and B was the same, so they can be combined: Design Mix 1 Tonnage = 9,000.0 + 89.2 = 9,089.2 Tons

2. Tonnage-Weighted Average G_{mm} for the Total Contract

$$\begin{aligned} &= \frac{(\text{Tons}_{\text{Mix } 1})(G_{mm \text{ Mix } 1}) + (\text{Tons}_{\text{Mix } 2})(G_{mm \text{ Mix } 2}) + (\text{Tons}_{\text{Mix } n})(G_{mm \text{ Mix } n})}{(\text{Tons}_{\text{Mix } 1}) + (\text{Tons}_{\text{Mix } 2}) + (\text{Tons}_{\text{Mix } n})} \\ &= \frac{[(9,089.2 \text{ Tons})(2.599) + (2,500.0 \text{ Tons})(2.615) + (1,845 \text{ Tons})(2.578)]}{(9,089.2 \text{ Tons}) + (2,500.0 \text{ Tons}) + (1,845.0 \text{ Tons})} \\ &= \frac{(23,622.8 \text{ Tons} + 6,537.5 \text{ Tons} + 4,756.4 \text{ Tons})}{13,434.2 \text{ Tons}} \end{aligned}$$

= 2.599 (Tonnage-Weighted- G_{mm} for the Total Contract)

$$\begin{aligned} 2. \text{ Adjusted Plan Quantity Tons} &= 13,845.3 \text{ Tons} \times \frac{2.599}{2.540} \\ &= 14,166.9 \text{ Tons} \end{aligned}$$

4. Maximum Pay Tonnage = 1.05 x Adjusted Plan Quantity Tons
****1.10 on projects let after July 2022**

= 1.05 x 14,166.9 Tons

= 14,875.2 Tons (*Maximum that will be paid*)

However, the Contractor only placed 13,434.2 Tons total for the Contract, which is less than the Adjusted PQ, and less than the max, so the Contractor will get paid what was placed.

Contractor will get paid for:

Project A = 13,345.0 Tons
Project B = 89.2 Tons

NOTE 2:

1. Since there were no Plan Errors or Field Revisions in this example, the Contractor will receive payment for the tonnage placed as the project progresses in PrC.
2. Since the contractor placed less than 105% there will be no PQ adjustment. If the Contractor placed asphalt that is excessively deficient, follow the necessary requirements under **Specifications Section 330**.
3. **Bituminous Adjustment:** Because Bituminous Adjustments will be made as the project progresses for the actual Tonnage placed, there will be no additional bituminous adjustments required at the end of the contract.
4. **Fuel Adjustments:** Since we paid for the actual tonnage placed, PrC made an automatic Fuel Adjustments for this quantity. Therefore, there will be no additional Fuel Adjustments required at the end of the contract.
5. **CPF Adjustment:** Because CPF Adjustments will be made as the project progresses for the actual Tonnage placed (see [Attachment 11-4-4\(2\)](#)), there will be no additional CPF Adjustments required at the end of the contract.

(2) Negative Pay Quantity Adjustment with Bituminous, Fuel, and CPF Adjustments

Given:

A project with Superpave Asphalt, Traffic Level B, PG 76-22, (Pay Item 334-1-52) contains the following criteria. From the Contract and per **Specifications 334-1.4**, Dense graded Structural or Friction Courses will use a $G_{mm} = 2.540$ for design quantities.

Plan Quantity Tons = 13,845.3 Tons
Total PQ Area (SY) = 173,622 SY

Three Design Mixes were used per the QCRR:

Mix 1 with $G_{mm} = 2.599$ at 9,000.0 Tons:

Mix 2 with $G_{mm} = 2.615$ at 2,500.0 Tons and

Mix 3 with $G_{mm} = 2.578$ at 3,450.0 Tons

Total Tons placed and accepted = 14,950.0 Tons

What is the Final Pay?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

Solution:

1. Tonnage-Weighted Average G_{mm}

$$\begin{aligned} &= \frac{(\text{Tons}_{\text{Mix 1}})(G_{mm \text{ Mix 1}}) + (\text{Tons}_{\text{Mix 2}})(G_{mm \text{ Mix 2}}) + (\text{Tons}_{\text{Mix n}})(G_{mm \text{ Mix n}})}{(\text{Tons}_{\text{Mix 1}}) + (\text{Tons}_{\text{Mix 2}}) + (\text{Tons}_{\text{Mix n}})} \\ &= \frac{[(9,000.0 \text{ Tons})(2.599) + (2,500.0 \text{ Tons})(2.615) + (3,450.0 \text{ Tons})(2.578)]}{(9,000.0 \text{ Tons}) + (2,500.0 \text{ Tons}) + (3,450.0 \text{ Tons})} \\ &= \frac{(23,391 \text{ Tons} + 6,537.5 \text{ Tons} + 8,894.1 \text{ Tons})}{(14,950 \text{ Tons})} \\ &= 2.597 \end{aligned}$$

$$\begin{aligned} 2. \text{ Adjusted PQ Tons} &= \frac{(\text{Plan Area TN} \pm \text{Any Revisions}) \times (\text{Tonnage-Weighted Average } G_{mm})}{\text{Design } G_{mm}} \\ &= \frac{(13,845.3 \text{ Tons} \times 2.597)}{2.540} \\ &= 14,156.0 \text{ Tons} \end{aligned}$$

$$5. \text{ Max Pay Tonnage} = 1.05 \times \text{Adjusted PQ Tons}$$

****1.10 on project let after July 2022**

$$= 1.05 \times 14,156.0 \text{ Tons}$$

$$= 14,863.8 \text{ Tons}$$

NOTE 2: This is where the PA or Project Personnel will do the line item adjustments:

1. Since the tonnage is paid as the project progresses, 14,950.0 Tons will be paid on the pay item.
2. Since the Contractor placed more than the maximum tonnage allowed per **Specifications** (pay up to 105% of the adjusted PQ Tonnage), there will be a negative line item adjustment of 86.2 Tons deducted for the excess tonnage placed. To calculate the extra tonnage placed:

$$\begin{aligned} \text{Deduction for extra tonnage placed} &= \text{Max Pay Tonnage} - \text{Tons Placed} \\ &= 14,863.8 - 14,950.0 = - 86.2 \text{ Tons} \end{aligned}$$

3. **Bituminous Adjustment:** Because Bituminous Adjustments will be made as the project progresses for the actual Tonnage placed, a manual deduction for the corresponding quantity (-86.2 Tons) will be made from the Last Bituminous Certification Sheet. Make a note indicating the reason.
4. **Fuel Adjustments:** Since we paid for the actual tonnage placed, PrC made an automatic Fuel Adjustments for this quantity. Therefore, when the extra tonnage was deducted in PrC, a corresponding manual Fuel Adjustment will be entered in PrC.

5. **CPF Adjustment:** Because CPF Adjustments will be made as the project progresses for the actual Tonnage placed (see [Attachment 11-4-4\(2\)](#)) the tonnage placed over the 105% will be deducted using the average CPF associated with this pay item. Also see [Attachment 11-4-1\(3\)](#).

(3) Pay Quantity Adjustment when Quantity Placed equals the Maximum Pay Quantity with Bituminous, Fuel, and CPF Adjustments (Open Graded FC-5)

Given:

A project with Open Graded Friction Course contains the following criteria. **Specifications Section 337-8.2** states that a $G_{sb} = 2.635$ shall be used. For all the equations previously shown for Tonnage pay items, the G_{mm} will be substituted for G_{sb} . For open graded FC, only one layer of asphalt is placed.

Total PQ Tons from Plans = 13,936.5 Tons

Total PQ Area = 173,622 SY

Three Design Mixes were used per the QCRR:

Mix 1 with $G_{sb} = 2.638$ at 9,000.0 Tons:

Mix 2 with $G_{sb} = 2.640$ at 2,500.0 Tons and

Mix 3 with $G_{sb} = 2.636$ at 3,150.0 Tons

Total Tons placed and accepted on project = 14,650 Tons

What is the Final Pay?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

Solution:

1. Tonnage-Weighted $G_{sb} =$

$$\begin{aligned} &= \frac{(\text{Tons}_{\text{Mix 1}})(G_{\text{mm Mix 1}}) + (\text{Tons}_{\text{Mix 2}})(G_{\text{mm Mix 2}}) + (\text{Tons}_{\text{Mix n}})(G_{\text{mm Mix n}})}{(\text{Tons}_{\text{Mix 1}}) + (\text{Tons}_{\text{Mix 2}}) + (\text{Tons}_{\text{Mix n}})} \\ &= \frac{[(9,000.0 \text{ Tons})(2.638) + (2,500.0 \text{ Tons})(2.640) + (3,150.0 \text{ Tons})(2.636)]}{(9,000.0 \text{ Tons}) + (2,500.0 \text{ Tons}) + (3,150.0 \text{ Tons})} \\ &= \frac{(23,742 \text{ Tons}) + (6,600 \text{ Tons}) + (8,303.4 \text{ Tons})}{(14,650 \text{ Tons})} \\ &= 2.638 \end{aligned}$$

2. Adjusted PQ Tons

$$\begin{aligned} &= \frac{(\text{Plan Area TN} \pm \text{Any Revisions}) \times (\text{Tonnage-Weighted Average } G_{mm})}{\text{Design } G_{mm}} \\ &= \frac{(13,936.5 \text{ Tons} \times 2.638)}{(2.635)} \\ &= 13,952.4 \text{ Tons} \end{aligned}$$

3. Max Pay Tonnage = 1.05 x Adjusted PQ Tons (****1.10 on project let after July 2022**)

$$\begin{aligned} &= 1.05 \times 13,952.4 \text{ Tons} \\ &= 14,650.0 \text{ Tons (Maximum that will be paid)} \end{aligned}$$

The Contractor placed the exact maximum tonnage that ~~we could~~can be paid up to. Therefore, the Contractor will get paid the total tonnage placed which equals ~~up to~~ the Max Pay Tonnage (105%) per Specifications.

The Contractor will receive Fuel and Bituminous adjustments for the total asphalt that was placed and accepted. Also, the CPF, if less than or greater than 1, will be adjusted in PrC manually.

(4) Negative Pay Quantity Adjustment on Miscellaneous Asphalt

Given:

A conventional project has miscellaneous asphalt around guardrail. The project area contains the following criteria. From the Contract and per **Specifications 334-1.4**, Dense graded Structural or Friction Courses will use a $G_{mm} = 2.540$ for design quantities.

Original Plan Area = 800 SY
Original PQ Tons = 80.00 Tons
Final Area = 800 SY
Final Tons = 90.5 Tons

Only one Mix was used per the QCRR with $G_{mm} = 2.544$

What is the Final Pay?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

1. Tonnage-Weighted Average G_{mm}

$$\begin{aligned} &= \frac{(\text{Tons}_{\text{Mix 1}})(G_{\text{mm Mix 1}})}{(\text{Tons}_{\text{Mix 1}})} \\ &= \frac{(90.5 \text{ Tons} \times 2.544)}{(90.5 \text{ Tons})} \\ &= 2.544 \end{aligned}$$

2. Adjusted PQ Tons =

$$\begin{aligned} &= \frac{(\text{Plan Area TN} \pm \text{Any Revisions}) \times (\text{Tonnage-Weighted Average } G_{\text{mm}})}{\text{Design } G_{\text{mm}}} \\ &= \frac{(80.0 \text{ Tons} \times 2.544)}{(2.540)} \\ &= 80.1 \text{ Tons} \end{aligned}$$

3. Max Pay Tonnage = 1.05 x Adjusted PQ Tons (**1.10 on project let after July 2022**)

$$\begin{aligned} &= 1.05 \times 80.1 \text{ Tons} \\ &= 84.1 \text{ Tons (Maximum that will be paid)} \end{aligned}$$

$$\begin{aligned} \text{Pay Adjustment} &= \text{Max Pay Tonnage} - \text{Tons Placed} \\ &= 84.1 \text{ Tons} - 90.5 \text{ Tons} \\ &= - 6.4 \text{ Tons (Deducted from the Bituminous and Fuel reports)} \end{aligned}$$

NOTE 2: There will be **no** CPF adjustment on Miscellaneous Asphalt.

Miscellaneous Asphalt does receive Fuel and Bituminous adjustments per ***Specifications***.

Attachment 11-4-3 Thickness and Deficiency Adjustments for Optional Base (White Base)

(1) Positive Core-Out Calculations

Given:

What is the final pay quantity for a limerock project given the following information? Is a line item adjustment needed?

Plan Thickness = 7.00"
Plan Quantity Area = 8,000 SY
Final Area = 8,000 SY
Actual Average Core-out Report Thickness = 7.50"

Specifications allow a maximum ½" tolerance per **Section 285-7**

Solution:

1. Determine if the thickness exceeds 5%

$$\begin{aligned}\text{Core Out Ratio} &= \frac{(\text{Core Out Thickness} - \text{Plan Thickness})}{\text{Plan Thickness}} \\ &= \frac{(7.50" - 7.00")}{7.00"} \\ &= 0.071428571 \times 100 = 7.1428571\% > 5\%^{**}\end{aligned}$$

**Make sure to use the floating decimal to calculate over or under the 105%.

Since 7.1428571% exceeds the 5% stated in the **Specifications Section 285-8**, the maximum pay area will govern the payment.

2. Determine the Maximum Pay Area

$$\begin{aligned}\text{Maximum Pay Area} &= 1.05 \times \text{PQ Area} \\ &= 1.05 \times 8,000 \text{ SY} \\ &= 8,400 \text{ SY}\end{aligned}$$

3. Thickness adjustment = Maximum Pay Area – PQ Area
= 8,400 SY – 8,000 SY = 400 SY

The Department will pay the Contractor the 8,000 SY area per the plans and can only pay an additional 400 SY for the maximum thickness adjustment per **Specifications**.

400 SY will need to be entered manually as a positive line item adjustment in PrC. Likewise, if the project is eligible for fuel adjustment, a line item adjustment will be entered manually for the fuel based on the price index at the final month of limerock installation.

(2) Negative Core-Out Calculations

Given:

What is the final pay quantity for a limerock project given the following information? Is a line item adjustment needed?

Plan Thickness = 8.00"

Plan Quantity Area = 10,500 SY

Final Area = 10,000 SY

Actual Average Core-out Report Thickness = 7.79" (See Note 1)

Specifications allow a maximum ½" tolerance per **Section 285-7**

Solution:

1. Determine the Core Out Ratio

$$\begin{aligned}\text{Core Out Ratio} &= \frac{(\text{Core Out Thickness} - \text{Plan Thickness})}{\text{Plan Thickness}} \\ &= \frac{(7.79" - 8.00")}{8.00"} = - 0.0262500*\end{aligned}$$

**Since the core out ratio is negative, the 105% does not control.*

2. Determine the Thickness Adjustment Area

Thickness Adjustment Area = Core Out Ratio x Plan Quantity Area

$$= - 0.026250 \times 10,500 \text{ SY}$$

$$= - 275.6 \text{ SY}$$

$$= - 276 \text{ SY (Negative Thickness Adjustment)}$$

The Department will pay the Contractor the 10,500 SY area per plan, and has to manually deduct 276 SY for the negative thickness adjustment.

276 SY will need to be shown as a negative line item adjustment.

A corresponding manual negative fuel adjustment for 276 SY will also need to be done based on the index of the last month of limerock installation.

*Make sure to use the floating decimal on your calculator to come up with either the negative or positive adjustment.

NOTE 1: Any Core-out average less than the plan specified thickness (in this example, anything less than 8") will be considered a negative adjustment.

NOTE 2: Any shy area on the Core-out report is excluded from the Core-out average calculation. Shy areas will need to be corrected by scarifying and adding additional base material. Or if authorized by the Engineer, it may be left in place without correction and at no pay (per **Specifications 285-6.2**). See **Example (3)** for a deficient area left in place with no pay calculation.

(3) Deficient Area Calculation (Area Left in Place with No Pay)

From the last page of the core out report seen below:

FDOT V4.2.2 6/2008 Updated Report and type selection									
CORE-OUT AVERAGES									
PAGE NO 6									
DATE PROC: 2/8/2016									
PROJECT NO. 123456-1-52-01									
ROAD 40									
COUNTY MARION									
DATA IS IN ENGLISH VALUES ARE IN INCHES									
DISTRICT 5									
Date 06/08/2015									
MIN 12.00 MAX 13.00									
STATION	WIDTH	ACTUAL THICKNESS				SPECIFICATION ALLOWANCE			
		LEFT	CENTER	RIGHT	AVERAGE	LEFT	CENTER	RIGHT	AVERAGE
615+02	24		12.20		12.20		12.20		12.20
543+50	24	12.80			12.80	12.80			12.80
542+42	24			12.80	12.80		12.80		12.80
541+20	24		12.50		12.50		12.50		12.50
537+12	24			12.40	12.40		12.40		12.40
537+83	24		12.10		12.10		12.10		12.10
538+38	24	11.90			11.90	*SHY*			
532+40	24	12.40			12.40	12.40			12.40
534+21	24			12.00	12.00		12.00		12.00
535+10	24		12.10		12.10		12.10		12.10
525+95	24			12.30	12.30		12.30		12.30
527+30	24	12.30			12.30	12.30			12.30
529+05	24		12.20		12.20		12.20		12.20
522+45	24			12.00	12.00		12.00		12.00
523+71	24	11.90			11.90	*SHY*			
524+80	24		12.30		12.30		12.30		12.30
519+85	24		12.10		12.10		12.10		12.10
518+70	24			12.00	12.00		12.00		12.00
517+80	24	12.70			12.70	12.70			12.70
JOB AVERAGE			3269.80/	259	12.6247	3242.50/	257		12.6167

On This project, the Plan thickness is 12.5 inches. This report shows two (2) shy areas that will need to be addressed. There are two options for resolution of these areas. The Contractor can choose to correct by scarifying and adding additional base material or, in this case, the Engineer authorized that the area be left in-place at no pay per **Specifications 285-6**.

1st shy core is at Station 538+38

2nd shy core is at Station 523+71

The Length of the deficiency is calculated from the closest non-deficient cores on each side of the deficient core.

In this example:

1st length is from Sta. 537+83 to Sta. 532+40 = 543 Ft.

2nd length is from Sta. 522+45 to Sta. 524+80 = 235 Ft.

Any shy area left in place at No Pay will be excluded from the core out average calculation and a deduction for the shy area will be made to the plan quantity.

NOTE: Preferably, the Contractor, to his advantage, should revisit the shy cores to take additional cores to isolate the area. If this does not occur, the length will be taken from the core out report from the nearest acceptable core of each side of the deficient core which will increase the deducted area.

Given:

What is the final pay quantity for a limerock project given the following information? Is a line item adjustment needed?

Plan Thickness = 12.5 Inches
Actual Average Core-out Report Thickness = 12.6167"
Plan Quantity Area = 30,000 SY
Total Length of Shy Area = 778 Ft.
Total Width of Shy Area = 24 Ft.

Solution:

1. Calculate the Shy Area Left in Place at NO PAY:

$$\text{Shy Area} = \frac{L \text{ (Ft.)} \times W \text{ (Ft.)}}{9 \left(\frac{\text{SF}}{\text{SY}} \right)}$$

$$\text{Shy Area} = \frac{(778 \text{ Ft})(24 \text{ Ft})}{9 \text{ SF/SY}} = 2,075 \text{ SY Deduction}$$

A negative line item adjustment will be applied in PrC for 2,075 SY for the deficient areas.

2. Determine if the thickness exceeds 5%

$$\begin{aligned} \text{Core Out Ratio} &= \frac{(\text{Core Out Thickness} - \text{Plan Thickness})}{\text{Plan Thickness}} \\ &= \frac{(12.62" - 12.50")}{12.50"} \\ &= 0.0096 \times 100 = 0.96\% < 5\%^{**} \end{aligned}$$

**Make sure to use the floating decimal to calculate over or under the 105%.

Since 0.96% is less than the 5% stated in the **Specifications Section 285-8**, the maximum pay area will not govern the payment.

3. Calculate the Thickness Adjustment Area

Since 2,075 SY was a negative adjustment due to area left in place at no pay, we must deduct this area from the PQ Area of 30,000 SY, per **Specifications**.

$$30,000 - 2,075 = 27,925 \text{ SY}$$

$$\begin{aligned} \text{Thickness Adjustment Area} &= \text{Core Out Ratio} \times \text{Plan Quantity Area (less any deducts)} \\ &= 0.0096 \times 27,925 \text{ SY} \\ &= 268 \text{ SY} \end{aligned}$$

Final Quantity:

The entire plan quantity of 30,000 SY will be paid and include 3 line item adjustments. First, a positive line item adjustment of 268 SY will be applied manually in PrC, this is the thickness adjustment. Second, a negative line item adjustment (from Step 1) of 2,075 SY will be applied in PrC manually for the deficient areas.

Third, if the project is eligible for fuel adjustment, a line item adjustment for the net amount (-1,807 SY = 268 SY - 2,075 SY) will be entered manually for the fuel based on the price index at the final month of limerock installation.

Attachment 11-4-4 CPF Calculations

(1) Plan Summary Box for Superpave Asphaltic Concrete (Traffic B)

SUMMARY OF PAVEMENT														
PAY ITEM NO.	PAY ITEM DESCRIPTION	LOCATION		SIDE	AREA ID	LENGTH	WIDTH	UNI T	QUANTITY		TOTAL		DESIGN NOTES	CONSTRUCTION REMARKS
		STA. TO STA.	DESCRIPTION						P	F	P	F		
285-707	OPTIONAL BASE GROUP 07	Sta. 0+00 to 110+25				11250.0	24.0	SY	30000.00	✓	30000.0	✓		No Plan Errors No Field Revisions
														5200 @ .96 CPF*
														12100 @ 0.98 CPF
														12300 @ 1.02 CPF
														400 @ 1.02 CPF
														* See asphalt folder for CPF adjustments
														Typical Section indicates black bas only

(2) CPF Calculation for Tonnage Pay Items

All Plan Summary Box references will be documented as shown in [Attachment 11-4-4\(1\)](#).

(a) If CPF is <0.80 or ≥0.75

Given:

A project with Superpave Asphalt, Traffic Level C, PG 76-22, (Pay Item 334-1-53) contains the following criteria. Calculate the line item adjustment that should be made for the LOT CPF.

LOT 2, CPF is 0.76.
LOT Tonnage = 4,000 Tons
Unit Price = \$50.05/Ton

Solution:

1. Calculate the CPF Difference

$$0.76 - 1.00 = -0.24$$

2. Calculate the CPF Adjustment for the Entire LOT
- 0.24 x \$50.05/Ton = - \$12.01/Ton
- \$12.01/Ton x 4,000 Tons = - \$48,040.00

A negative Line Item Adjustment of \$-48,000 will be applied manually in PrC for LOT 2.

(b) If CPF is > 0.80 and < 1.00

Given:

A project with Superpave Asphalt, Traffic Level C, PG 76-22, (Pay Item 334-1-53) contains the following criteria. Calculate the line item adjustment that should be made for the LOT CPF.

For LOT 3, CPF is 0.98
LOT Tonnage = 4,000 Tons
Unit Price = \$50.05/Ton

Solution:

1. Calculate the CPF Difference

$$0.98 - 1.00 = - 0.02$$

2. Calculate the CPF Adjustment for the Entire LOT

$$- 0.02 \times \$50.05/\text{Ton} = - \$1.00/\text{Ton}$$

$$4,000 \text{ Tons} \times - \$1.00/\text{Ton} = - \$4,000.00$$

A negative Line Item Adjustment of -\$4,000 will be made in PrC for LOT 3.

(c) **If CPF = 1.00**

Given:

A project with Superpave Asphalt, Traffic Level C, PG 76-22, (Pay Item 334-1-53) contains the following criteria. Calculate the line item adjustment that should be made for the LOT CPF.

For LOT 4, CPF is 1.00

LOT Tonnage = 4,000 Tons

Unit Price = \$50.05/Ton

Solution:

1. Calculate the CPF Difference

$$1.00 - 1.00 = 0$$

There is no CPF adjustment at 1.00.

(d) **If CPF is > 1.00 and up to 1.05**

Given:

A project with Superpave Asphalt, Traffic Level C, PG 76-22, (Pay Item 334-1-53) contains the following criteria. Calculate the line item adjustment that should be made for the LOT CPF.

LOT 5, CPF is 1.03

LOT Tonnage = 4,000 Tons

Unit price = \$50.05/Ton

Solution:

1. Calculate the CPF Difference

$$1.03 - 1.00 = 0.03$$

2. Calculate the CPF Adjustment for the Entire LOT

$$0.03 \times \$50.05/\text{Ton} = \$1.5015 = \$1.50/\text{Ton}$$

$$4,000 \text{ Tons} \times \$1.50/\text{Ton} = \$ 6,000.00$$

A positive Line Item Adjustment of \$6,000 will be made in PrC for LOT 5

(3) CPF for Square Yard Pay Items

Given:

A project with Superpave Asphalt Base contains the following criteria. Calculate the line item adjustment that should be made for the LOT CPF. The bid unit price is \$50.35/SY.

For Lot 4: CPF = 1.02

Actual LOT Tonnage per the QCRR = 2,000 Tons

$G_{mm,lot} = 2.562$

Design Area = 4,124 SY, based on G_{mm} of 2.54

Design Thickness = 9"

Solution:

Specification Section 234-9 states that the quantity will be paid as the plan quantity, however the pay area will be adjusted based on the following formula:

$$\text{Pay Area (SY)} = \frac{[\text{Actual Tonnage} \times 2,000 \text{ Lbs/Ton}]}{[t \text{ (in)} \times G_{mm,lot} \times 43.3 \text{ (Lbs/SY-in)}]}$$

$$\text{Pay Area (SY)} = \frac{[2,000 \text{ Tons} \times 2,000 \text{ Lbs/Ton}]}{[9 \text{ in} \times 2.562 \times 43.3 \text{ Lbs/Ton-in}]}$$

$$\text{Pay Area (SY)} = 4,006 \text{ SY}$$

Specification Section 234-9 also states that the maximum pay area shall not exceed 105% of the designed surface area (i.e. plan quantity).

$$\begin{aligned}\text{Max. Pay Area} &= 1.05 \times \text{Designed Surface Area} \\ &= 1.05 \times 4,124 \text{ SY} \\ &= 4,330 \text{ SY}\end{aligned}$$

For final payment purposes, we will use 4,006 SY instead of 4,124 SY for the CPF Adjustment, since it has been adjusted for the actual lot G_{mm} . Since the maximum pay area quantity was not exceeded, it will not need to be used.

$$\begin{aligned}\text{CPF Adjustment for this LOT} &= 1.02 - 1 = 0.02 \\ 0.02 \times \$50.35/\text{SY} &= \$1.01/\text{SY} \\ \$1.01/\text{SY} \times 4,006 \text{ SY} &= \$4,046.06.\end{aligned}$$

This will be a positive CPF Line Item Adjustment equal to \$4,046.06.

NOTE 1: Use [Attachment 11-4-1\(3\)](#) as a reference for deducting CPF's on the last LOT.

(4) CPF for Composite Base (Square Yard Pay Item)

Given:

A project with Composite Base, Pay Item 285-714, contains the following criteria. Calculate the line item adjustment that should be made for the LOT CPF.

Subbase is 4" Limerock and Superpave Asphalt Base SP12.5 of 6.5"

Design Area Paved = 11,191 SY (based on Gmm of 2.54)

CPF = 0.89

Information from the QC Roadway Report:

LOT 6 = 4,000 Tons

Lot Gmm = 2.562

Unit price = \$92.00/SY for pay item 285-714

Solution:

1. Calculate the CPF Difference

$$0.89 - 1.00 = -0.11$$

2. The unit price includes the 4" subbase plus the 6.5" of asphalt. In this case a unit price for the asphalt will need to be calculated. The Limerock Subbase does not receive an adjustment, (see **Specification 290**)

Total Thickness = 4" + 6.5" = 10.5"

$$\frac{\$92.00 \times 6.5"}{10.5"} = \$56.95 \quad \text{Unit Price for the asphalt portion of the pay item}$$

3. Calculate the Pay Area (SY)

$$\text{Pay Area (SY)} = \frac{[\text{Actual Tonnage} \times 2,000 \text{ Lbs/Ton}]}{[t \text{ (in)} \times G_{\text{mm,lot}} \times 43.3 \text{ (Lbs/SY-in)}]}$$

$$\text{Pay Area (SY)} = \frac{[4,000 \text{ Tons} \times 2,000 \text{ Lbs/Ton}]}{[6.5 \text{ in} \times 2.562 \times 43.3 \text{ Lbs/Ton-in}]}$$

$$\text{Pay Area (SY)} = \mathbf{11,095 \text{ SY}}$$

Specification Section 234-9 also states that the maximum pay area shall not exceed 105% (for projects let before July 2022) and 110% (for projects let July 2022 and after) of the designed surface area (i.e. plan quantity including engineer approved changes).

$$\begin{aligned}\text{Max. Pay Area} &= 1.05 \times \text{Designed Surface Area} \\ &= 1.05 \times 11,191 \text{ SY} \\ &= 11,751 \text{ SY}\end{aligned}$$

(For final payment purposes, we will use 11,095 SY instead of 11,191 SY for the CPF Adjustment, since it has been adjusted for the actual lot G_{mm}). The maximum pay area will not be used since it was not exceeded.

4. Calculate the CPF Adjustment for the Entire LOT

$$\begin{aligned}- 0.11 \times \$56.95/\text{SY} &= - \$6.26/\text{SY} \\ 11,095 \text{ SY} \times - \$6.26/\text{SY} &= - \$69,454.70\end{aligned}$$

A negative Line Item Adjustment of \$69,454.70 will be made in PrC for LOT 6.

NOTE: Use [Attachment 11-4-1\(3\)](#), as a reference for deducting the CPF at the end of the asphalt placement by using the average CPF for all the LOTs that included this pay item, to calculate the adjustment.

(5) Composite Base for Cubic Yard Pay Items

Asphalt treated permeable base is measured and paid for in cubic yards. Therefore, the quantity can be obtained from the Asphalt Roadway – Daily Report of Quality Control. Calculate the adjustment given the information below.

Given:

LOT 3, CPF of 1.05
Total Tonnage LOT 3 = 1,623.55 Tons;
Total Square Yards LOT 3 = 9,494.13 SY
Volume = 1,055 CY
Unit Price is \$240.05/CY

Solution:

1. Calculate the CPF Difference

$$1.05 - 1.00 = 0.05$$

2. Calculate the CPF Adjustment for the Entire LOT

$$0.05 \times \$240.05/\text{CY} = \$12.00/\text{CY}$$

$$1,055 \text{ CY} \times \$12.00/\text{CY} = \$12,660.00$$

A positive Line Item Adjustment will be made for \$12,660 in PrC for LOT 3

(6) CPF Documentation for Multiple FIN Projects, Under One Contract

All CPF's for asphalt produced and accepted for a particular item shall be reported under the lead FIN (see exception below). The quantities for each FIN will be determined by the PA, as the prorated amount determined from the pay item breakout as provided in the plan set. This will be done by taking the total tons shown for each FIN and dividing it by the total tons for the Contract, then multiplying this amount by the total tons placed for each CPF. This shall be done during the month the LOT is closed out and paid accordingly on the monthly progress estimate.

Given:

Project "A" shows 10,385.5 tons
Project "B" shows 21,466.0 tons
Total for Contract = 31,851.5 tons
Tons placed = 32,561.0 tons

CPF @ 105% (Lots 1, 3, & 10) = 9,650.0 tons
CPF @ 102% (Lots 2, 5, 6, 7, 8, & 9) = 20,923.0 tons
CPF @ 98% (Lot 4) = 1,988.0 tons

Calculate the tonnage for each CPF in Project "A" and Project "B".

Solution:

Project "A":

The tonnage for each CPF is determined by dividing the total Project "A" tonnage by the total tonnage for the entire contract and multiplying by the total tons for each CPF.

$$\text{CPF @ 105\%: } \left(\frac{10,385.5 \text{ tons}}{31,851.5 \text{ tons}} \right) (9,650 \text{ tons}) = 3,146.5 \text{ tons}$$

$$\text{CPF @ 102\%: } \left(\frac{10,385.5 \text{ tons}}{31,851.5 \text{ tons}} \right) (20,923.0 \text{ tons}) = 6,822.2 \text{ tons}$$

$$\text{CPF @ 98\%: } \left(\frac{10,385.5 \text{ tons}}{31,851.5 \text{ tons}} \right) (1,988.0 \text{ tons}) = 648.2 \text{ tons}$$

Project "B":

Likewise, the tonnage for each CPF is determined by dividing the total Project “B” tonnage by the total tonnage for the entire contract and multiplying by the total tons for each CPF.

$$\text{CPF @ 105\%: } \left(\frac{21,466.0 \text{ tons}}{31,851.5 \text{ tons}} \right) (9,650 \text{ tons}) = 6,503.5 \text{ tons}$$

$$\text{CPF @ 105\%: } \left(\frac{21,466.0 \text{ tons}}{31,851.5 \text{ tons}} \right) (20,923 \text{ tons}) = 14,100.8 \text{ tons}$$

$$\text{CPF @ 105\%: } \left(\frac{21,466.0 \text{ tons}}{31,851.5 \text{ tons}} \right) (1,988 \text{ tons}) = 1,339.8 \text{ tons}$$

Contract Summary:

Verify the tonnages for each corresponding CPF for both Project “A” and Project “B” sum together to equal the contract tonnages used.

Total CPF @ 105% = 3,146.5 + 6,503.5 = 9,650.0 tons ✓

Total CPF @ 102% = 6,822.2 + 14,100.8 = 20,923.0 tons ✓

Total CPF @ 98% = 648.2 + 1339.8 = 1,988.0 tons ✓

NOTE 1: This may be done on Federal Aid participating and Non-Federal Aid participating projects. These pro-rated amounts shall be shown in a file attached electronically to the **Plan Summary Box** along with the calculations, or the calculation could be shown at the bottom of the **Plan Summary Box** for Construction Remarks and calculations.

NOTE 2: For this example: 32,561.0 tons placed by Contractor is within the 105% maximum of the adjusted plan quantity for the pay item, which is allowed per **Specifications** for conventional projects.

Exception: When an item is shown only on one FIN number, those tons will be reported on that FIN number. If the same pay item is shown on multiple FINs, but each has a different unit price, treat as different pay items.

Attachment 11-4-5 Resolution Test Results

(1) E-Mail from District Material's Office to the PA with No. of Tests and Costs

Daniel Day

From: Daniel Day
Sent: Thursday, May 21, 2015 @ 2:49 PM
To: Howard Jump (howard.jump@dot.state.fl.us)
Cc: J. Corley; Bill Blass; etc., etc.
Subject: FIN # 41109815201 LOT 6 Resolution Results

Howard,

Attached are the Resolution results for LOT 6 on the above-mentioned project. The Resolution results **DO NOT** compare with QC results. Therefore, acceptance and payment for the LOT with respect to density will be based on Resolution results.

Cost for the Resolution testing should be deducted from the monthly estimate (see below).

For each subplot, the Resolution results for average Roadway Gmb should replace the QC results for average Roadway Gmb, and most likely change the density value, Individual Pay Factor, and the Composite Pay Factor. Any new values should be compared to the Master Production Range as well as the criteria of 334-5.9.5 to determine acceptance.

- Please do not approve the QC or RT samples for this LOT. The resolution lab will approve these samples.
- Resolution cost (- \$31.60 per core x 9 cores = - \$ 84.40)

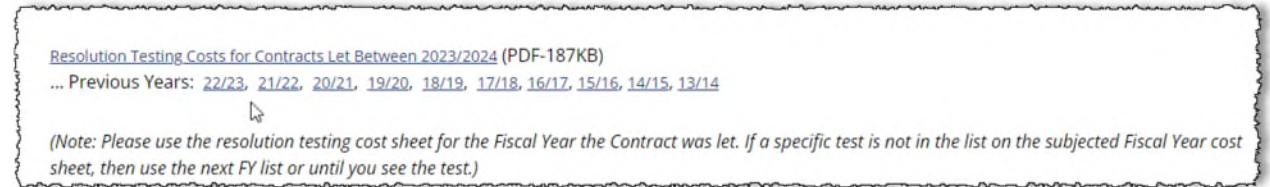
Thanks
Daniel Day
Assistant District Bituminous Manager
Florida Department of Transportation
100 N. Day Road (MS 20)
Deland, Florida 33333
380-555-5550 (office)

(2) Resolution Testing Costs on Website

The cost of resolution testing, if performed by the Department and favors the VT results, will be deducted from the Contractor's next progress estimate.

The resolution testing fees are based on the year the Contract was let. For example, if a Contract was let in January 2010 and a resolution test was done in January 2011, the January 2010 year pricing index would be used.

~~Resolution Testing The eCosts of the testing can be found at the following URL within the 'Resolution Testing Costs for Contracts Let Between...' link on the State Materials Office Website under Documents and Publications.~~



<https://www.fdot.gov/materials/navigation/documents.shtm>

Florida Department of Transportation Resolution Testing Costs Year 2017-2018 Rates		
Bituminous Lab		
Test Name	Quantity	Test Cost
Bulk specific gravity of Compacted Bituminous Mixtures (FM 1-T166)	Per roadway core or gyratory pill	\$42.89
Ignition Oven Method (FM5-563)	Per asphalt content	\$117.84
Max specific gravity (FM1-T209)	Per average of two flasks	\$144.50
Superpave Gyratory Compaction (AASHTO T312-04)	Per pair of gyratory pills	\$160.88
Ignition Oven (FM 5-563) and Mechanical Analysis (FM1-T030)	Per gradation	\$153.71
Soil Lab		
Test Name	Quantity	Test Cost
Consolidation (AASHTO T 216)	Per sample	\$281.08
Direct Shear (AASHTO T 236)	Per sample	\$237.50
Dry Gradation (AASHTO T 27)	Per sample	\$50.95
Hydrometer (AASHTO T 88)	Per sample	\$120.15
LBR (FM 5-515)	Per sample	\$339.75
Liquid Limit (AASHTO T 89)	Per sample	\$46.74
Modified Proctor (AASHTO T 180)	Per sample	\$102.00
Moisture Content (AASHTO T 265)	Per sample	\$12.50

Florida Department of Transportation Resolution Testing Costs Year 2023-2024 Rates		
Bituminous Lab		
Test Name	Quantity	Test Cost
Bulk specific gravity of Compacted Bituminous Mixtures (FM 1-T166)	Per roadway core or gyratory pill	\$57.37
Ignition Oven Method (FM5-563)	Per asphalt content	\$137.09
Max specific gravity (FM1-T209)	Per average of two flasks	\$139.19
Superpave Gyratory Compaction (AASHTO T312-04)	Per pair of gyratory pills	\$107.00
Ignition Oven (FM 5-563) and Mechanical Analysis (FM1-T030)	Per gradation	\$207.50
Soil Lab		
Test Name	Quantity	Test Cost
Consolidation (AASHTO T 216)	Per sample	\$353.90
Direct Shear (AASHTO T 236)	Per sample	\$301.11
Dry Gradation (AASHTO T 27)	Per sample	\$71.39
Hydrometer (AASHTO T 88)	Per sample	\$132.98
LBR (FM 5-515)	Per sample	\$349.84
Liquid Limit (AASHTO T 89)	Per sample	\$57.01
Modified Proctor (AASHTO T 180)	Per sample	\$132.70
Moisture Content (AASHTO T 265)	Per sample	\$16.37
Organic (AASHTO T267)	Per sample	\$42.95

(3) Reporting Cost of Resolution Testing in PrC

User-Generated Dollar-Based Item Adjustments

Advanced Showing 1 of 1

Select Project Items...
0 marked for deletion | 0 changed

Proj Item Num - Proj/Category	Item Description	Amount
0085 - TR1E6915201/0200	ASPHALT CONCRETE FRICTION COURSE,TRAFFIC B, FC-9.5, PG	-284.40

Adj ID	Type	Other Item Adjustment Type	Comments	WO Disco...
0002	Other Item Adj	RTC - Resolution Testing Costs	Course aggregate gradation resolution test for	

Type ▼
Other Item Adjustment

Other Item Adjustment Type * ▼
RTC - Resolution Testing Costs

Amount ▼

Work Order Discovery Date ▼

Comments ▼

Function
Dollar-Based

Last Updated By
dotlcn982au

Last Updated Date
10/19/2022 10:39:58 AM

Additional Item Information

Reference Item Code	Unit of Measure
0337 7 80	TN
Contract Item Line Number	Unit Price
0120	130.00000
Supplemental Description	

Within the Remarks window, specify what the test was for. In this case, it is 'Coarse Aggregate Gradation Resolution Test for Lot 6'. The cost of the Resolution Testing will be determined by the Materials Office as shown in the email in [Attachment 11-4-5, Example \(1\)](#).

Attachment 11-4-6 Bituminous Adjustments on Conventional Projects

(1) Form 700-050-66 – Set-Up Sheet by Contractor

Contractor's Certification of Quantities Asphalt Mixes with Modified and Unmodified Binders (Conventional Projects) Certification No. <u>18</u>			
Financial Project ID: <u>12345615201</u>			
Contractor: <u>Mr. ED'S ASPHALT CO., INC.</u>			
Contract Number: <u>T1234</u>			
From (Mo/Day/Yr): <u>05/22/19</u>		To (Mo/Day/Yr): <u>06/11/19</u>	
Asphalt Mixes with Unmodified Binders (PG 67 & Lower)			
Pay Item Number: <u>337-3</u>	tonnage Placed: <u>1000.0</u>		
Pay Item Number: <u>334-1</u>	tonnage Placed: <u>1000.0</u>		
Pay Item Number: _____	tonnage Placed: _____		
Additional Gallons (ARMI*): <u>500.0</u>			
Base Index Month: <u>Jan-18</u>	Base Asphalt Price Index: <u>1.5514</u>		
Current Index Month: <u>Jun-19</u>	Current Asphalt Price Index: <u>2.2010</u>		
		Asphalt Index Difference: <u>0.5720</u>	
Asphalt Mixes with Modified Binders (PG 76 & higher)			
Pay Item Number: <u>337-7</u>	tonnage Placed: <u>1000.0</u>		
Pay Item Number: <u>334-1</u>	tonnage Placed: <u>1000.0</u>		
Pay Item Number: _____	tonnage Placed: _____		
Base Index Month: <u>Jan-18</u>	Base Polymer Price Index: <u>2.0485</u>		
Current Index Month: <u>Jun-19</u>	Current Polymer Price Index: <u>2.7946</u>		
		Polymer Index Difference: <u>0.6437</u>	
Asphalt Material (ASPHALT TREATED PERMEABLE BASE)			
Pay Item Number: <u>334-1</u>	tonnage Placed: <u>500.0</u>		
Base Index Month: <u>Jan-18</u>	Base Asphalt Price Index: <u>1.5514</u>		
Current Index Month: <u>Jun-19</u>	Current Asphalt Price Index: <u>2.2010</u>		
		Asphalt Index Difference: <u>0.5720</u>	
Navigation and Printing Functions			
<input type="button" value="Go To Main Sheet"/>		<input type="button" value="Go To Last Month Sheet"/>	
<input type="button" value="Save As Month Sheet"/>		<input type="button" value="Remove Last Month Sheet"/>	
Effective January 2007 Letting FORM: 700-050-66 (2/09/2017)			

~~(2) Form 700-050-66 – Contractor’s Certification of Quantities~~

STATE OF FLORIDA, DEPARTMENT OF TRANSPORTATION FORM 700-050-66
CONSTRUCTION
2/17

CONTRACTOR'S CERTIFICATION OF QUANTITIES
ASPHALT MIXES WITH MODIFIED AND UNMODIFIED BINDERS
(CONVENTIONAL PROJECTS) **CERTIFICATION NO.**
18

FINANCIAL PROJECT ID. 12345615201
 CONTRACTOR Mr. ED'S ASPHALT CO., INC.
 CONTRACT NO. T1234

PERIOD REPRESENTED BY CERTIFICATION:
 FROM (MO/DAY/YF) 05/22/13 TO (MO/DAY/YR) 06/11/13

ASPHALT MIXES WITH UNMODIFIED BINDERS (PG 67 & LOWER)

BASE PRICE INDEX: 1.5514 CURRENT PRICE INDEX: 2.2010 INDEX DIFFERENCE: 0.5720

	TONNAGE	GALLONS	MONTHLY PAYMENT
PAY ITEM NUMBER <u>337-3</u>	<u>1,000.0</u>	<u>14,563</u>	<u>\$8,333.47</u>
PAY ITEM NUMBER <u>334-1</u>	<u>1,000.0</u>	<u>14,563</u>	<u>\$8,333.47</u>
PAY ITEM NUMBER _____	_____	_____	_____
GALLONS OF ASPHALT CEMENT USED IN MIX: *		<u>29,138</u>	<u>\$16,666.94</u>
ADDITIONAL GALLONS (ARMI):		<u>500</u>	<u>\$286.00</u>
TOTAL GALLONS:		<u>29,638</u>	
TOTAL MONTHLY PAYMENT:			<u>\$16,952.94</u>

ASPHALT MIXES WITH MODIFIED BINDERS (PG 76 & HIGHER)

BASE PRICE INDEX: 2.0485 CURRENT PRICE INDEX: 2.7346 INDEX DIFFERENCE: 0.6437


	TONNAGE	GALLONS	MONTHLY PAYMENT
PAY ITEM NUMBER <u>337-7</u>	<u>1,000.0</u>	<u>14,563</u>	<u>\$9,378.07</u>
PAY ITEM NUMBER <u>334-1</u>	<u>1,000.0</u>	<u>14,563</u>	<u>\$9,378.07</u>
PAY ITEM NUMBER _____	_____	_____	_____
TOTAL GALLONS OF POLYMER USED IN MIX: *		<u>29,138</u>	
TOTAL MONTHLY PAYMENT:			<u>\$18,756.14</u>

ASPHALT MATERIAL (ASPHALT TREATED PERMEABLE BASE)

BASE PRICE INDEX: 1.5514 CURRENT PRICE INDEX: 2.2010 INDEX DIFFERENCE: 0.5720

	TONNAGE	GALLONS	MONTHLY PAYMENT
PAY ITEM NUMBER <u>334-1</u>	<u>500.0</u>	<u>3,497</u>	<u>\$2,000.28</u>
TOTAL MONTHLY PAYMENT:			<u>\$2,000.28</u>

I certify that, based on my personal knowledge and well-founded belief following my own reasonable investigation, the tonnage and gallons (metric tonne and liters) represented by this Certification are true and correct.



 Contractor's Authorized Agent

 Name of Company and e-mail address

~~Attachment 11-4-7 Cutoff Dates on a Conventional Project~~

~~The cutoff date for Progress Estimate #18 is June 9, 2019. See the snapshot of the cutoff dates that are listed on the State Construction Website below.~~

~~The Contractor's Certification of Quantities should reflect all material placed and accepted from May 20, 2019, thru June 9, 2019, (day after cutoff date of previous month to cutoff date of present month). On Conventional Projects, the Contractor will use **Form 700-050-66**, the **Certification of Quantities for Bituminous Material**. On this Form, the June bituminous index will be used. Once the Contractor fills out the Set-Up sheet and clicks on the "Form 66" tab (located at bottom of the Excel Spreadsheet) the form will appear filled out with quantities for pay. The Contractor will digitally sign this form and submit it to the PA monthly for payment. See Attachment 11-4-6, Example (1) and (2) for an example of **Form 700-050-66**, the **Certification of Quantities for Bituminous Material** filled out by a Contractor for a Conventional Project~~

~~EXAMPLE OF THE CUT-OFF DATES FOR 2019 ON THE STATE CONSTRUCTION WEBSITE~~

2019		
January 20, 2019	February 17, 2019	March 17, 2019
April 21, 2019	May 19, 2019	June 9, 2019 (2nd Sunday)
July 21, 2019	August 18, 2019	September 15, 2019
October 20, 2019	November 10, 2019 (2nd Sunday)	December 15, 2019