Quantities

Quantity Documentation

The written evidence to support progress payments, and eventually final payment, consists of "source documents", with appropriate signed and dated calculation sheets, showing the quantities of work completed or accepted. For progress payments on lump sum items, a signed and dated source document must verify the amount of work completed and corresponding to an appropriate lump sum breakdown, or schedule, approved by the Project Manager and generally submitted by the Contractor**.

Source documents must be prepared in a clear manner such that a person, who has never been on the project and knows nothing about the work, should be able to follow on paper what is being paid for and why.

"Source documents" are the field notes, calculations, receipts, invoices, and reports used to determine project pay quantities. Acceptable source documents generally do not exceed a single pay period and shall include the following:

- PROJECT IDENTIFICATION—Sufficient identification on each document to clearly identify on which project the work was done. If the document is large enough, both the project name and contract number should appear on each document, including those documents prepared by the Contractor, supplier, or manufacturer.

- PAY ITEM IDENTIFICATION—Project pay item number(s) and, if appropriate, the item name. The source document must also indicate the proper Participation Indicator (sub-job) to which the work is to be charged if more than one Participation Indicator could be used for that item.

- VALIDATION—Verifying statement that the item was actually installed, performed, remeasured, furnished, completed, received, or accepted.

- SPECIFIC LOCATION OF INSTALLATION—Project station(s) and, when appropriate to clarify or explain measurements, a sketch of the installation to show measurements or As Constructed details. Include additional information, such as bridge number or stream, intersection, street, or road names, if applicable.

- DATES—Date(s) the source document was prepared, validated, checked, and, when appropriate, the dates of the work.

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- SIGNATURES—Signatures of persons that prepared, validated, and checked the document. If the checker finds an error in the original information, the checker should have the original preparer review and confirm the correction. A signature is a person's name written the way that they normally write it. Initials are not acceptable unless the person's signature also appears on or is attached to the document. Source documents shall show the signature of the person making the entries and the names of other members of the crew involved in obtaining the information on the note.

Prepare the source document at the time and place of delivery, performance, installation, or measurement of the pay item. Line out, rather than erase, incorrect entries on a source document. Validate alteration of data by date and signature. If one person makes all of the changes and the affected documents are bound, a single validation statement is sufficient.

The source document does not necessarily need to be on letter size paper or on pre-printed forms, but it must include all required information*.

If it is necessary to copy or combine source documents, identify the original documents as "ORIGINAL" and the copied documents as "COPY". Cross-reference each set to the other, and submit both sets of documents with the project records. Also, submit the originals, when copies are required for documents that are illegible, that need clarification, or when notes are inserted. A scrap of paper with a note on it is not necessarily a source document.

In order to allow the use of computers by field personnel, the following guidelines also apply to computer-generated source documents:

- A signature tied to each person's initials must appear on the document. On documents with single or multiple installations, the dates may be computer-generated. For multiple installations, initials are not required, but an original handwritten signature and date is required for each document. Electronic signatures are not acceptable, since they are not yet legally valid.
- A source document for a Unit Price item normally covers one pay period.
- Calculation methods and input must be checked.
- Formula(s) for calculations must be included and shown on the final quantity source document.
- Summary sheets do not replace final quantity source documents.

Record keeping is extremely important for payment purposes. Accurate records are required to assure proper progress and final payments. The Project Manager must assure that the procedures include the following activities:

- Review plan quantities to verify their accuracy
- Establish quantity documentation methods for progress and final payments
- Organize a user-friendly system for records

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- Use proper validation of source documents
- Use accurate, easy to follow measurement and calculation methods
- Assure that each pay quantity is properly charged to the right Participation Indicator (sub-job)
- Have a second person check all formulas and calculations
- Prepare a summary sheet of pay quantities
- Assemble documents for final records submittal

It is important to remember that Section 00190.00 of the contract specifically states that the Engineer will measure or determine all pay quantities unless otherwise specified. The Project Manager is responsible for measurement and quantity determinations for all pay items.

Contractors and subcontractors are not allowed to document or establish pay quantities. The Project Manager may use some information that is developed by the Contractor or subcontractor to determine pay quantities, but must perform some sort of validation of the Contractor or subcontractor's information. For example:

- Although the Contractor is allowed to complete a Sprinkling Tally Sheet, form 734-3427 or a similar format*, the Inspector must validate the quantity used.
- The subsection below on Weigh Memos and Scale Diary addresses material weighed on Contractor provided scales.
- If the Project Manager uses information prepared by the Contractor's surveyor to calculate pay quantities, the Project Manager must perform some validation of the surveyor's information.

Each pay item must have documentation to support each monthly payment. It is reasonable to expect a reviewer in May to request documentation for a payment made the previous month or many months before**. Do not make any payment without the proper quantity calculations and required quality documents.

Organize the documentation for easy review. Submit in pads as discussed in the Submittal of Final Project Documentation section (37) of this Manual.

For reference, the Exhibits at the end of this section show some examples of quantity documentation. The examples in the Exhibits are:

- A is a simple lump sum schedule of values
- B is a source document for a completed lump sum item
- C and D are installation notes
- E is a sample source document template used by some offices

Measurement

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* **Revised July, 2001**
** **Revised July, 2002**

General measurement requirements are contained in Section 00190.10. These include 0.1 m, 0.1 m^2, 0.1 m^3, 0.01 Mg, and 0.5 hr. Specific measurement requirements may be contained in the individual "Measurement" subsection for each item.

Check Contract Change Orders, Addenda, Special Provisions, Drawings with the project name, Standard Drawings, Supplemental Standard Specifications, and Standard Specifications to assure that the correct measurement is used for each item.

Guidelines for measurement are:

Area, Linear, and Volume

These measurements should normally be supplemented with a field sketch. Each document must be validated to show that the work was performed. Wording, such as "remeasured", "installed", or "constructed", validates the source document in addition to a signature and date.

Vehicle Measure

Document each haul vehicle volume with measurements of the hauling portion to support "Water Level" capacity. Be sure to use the proper mathematical procedure to calculate the volume. If there is doubt, the prismoidal formula works for all cases.

When each load is delivered, verify that the load quantity equals the calculated "Water level" quantity. If it is less than the "Water level" quantity, deduct the quantity less than "Water level". If a load is over the "Water level" quantity, make no adjustment for the extra material. Clearly document this on the tally sheet, if one is used.

If the same number of loader buckets of a material will be loaded into each haul vehicle, determine the average load volume instead of determining the measured capacity of each haul vehicle. Load the same number of full buckets, not leveled, onto a minimum of two haul vehicles. Level, measure, and calculate the volume of each load. The average of the two loads is the pay volume for all loads delivered and accepted.

Document the quantity of each load on a Weigh Memo - Material Receipt, form 734-3082 (see Exhibit F), or on a tally sheet (see Exhibits J(1) and J(2)), including the following:

- Project identification
- Kind of material
- Date
- Signature of receiver (ODOT representative)

- Number or specific identification of haul vehicle
- Location of delivered material (station, mile point, other)
- Date material received if different
- Time of delivery

It is not sufficient documentation to merely report the number of tick marks on a tally sheet for each day.

Also refer to the discussion of Weigh Memos and Scale Diary later in this section of this Manual.

Remember that the Project Manager is responsible for measuring and determining quantity for all pay items. The Contractor is not allowed to document or establish pay quantities.

Mass/Volume Measurement Method Change

If the Project Manager wishes to change the measurement from mass (Mg) to volume (cubic meters) or wishes to change any of the requirements of Section 00190.20*, the Project Manager must execute a Contract Change Order (CCO) to do that. The CCO shall include a credit to ODOT for the Contractor's cost savings related to not providing and operating the scales required by 00190.20.

Determine conversion factors prior to performing the work. Include conversion factor data for each pay item as part of the CCO, consisting of* (Also see Vehicle Measure in this subsection):

- For each type of material, load a minimum of two haul vehicles that can be readily measured.
- Determine the net mass (also gross and tare mass when appropriate) and the volume for each load.
- The average of the loads will establish the conversion factor.

Weighing:

See the discussion on Weigh Memos and Scale Diary later in this section.

Lump Sum:

At the pre-construction conference, the Contractor should submit a breakdown or schedule for lump sum payments. See an example of a lump sum schedule for one item in Exhibit A.

* **Revised July, 2001**

The Project Manager must review the breakdown and make adjustments, if necessary, after discussion with the Contractor. Each progress payment for the lump sum item must relate to and be substantiated by the lump sum breakdown.

Each:

These items must be identified by station or location. Low value items such as delineators, pavement markers, plants, and shrubs are exceptions that may be listed in groups at general locations.

Temporary Striping and Stripe Removal

Remember that the bid prices for these items only apply to the bid quantity. Payment for quantities beyond the bid quantity will be made as specified under Section 00225.93. Remember to address this well before the quantity of work performed approaches the bid quantity.

To continue paying at the bid price beyond the bid quantity, the Project Manager must analyze the cost of the work and justify that the bid price is no more than the cost to perform the work. If the bid price is no more than the cost to perform the work, the Project Manager must include a cost analysis with the item documentation and include it with the project documentation.

If the bid price is more than the cost to perform the work, the Project Manager must either negotiate a new price to be paid under a Contract Change Order or order the work to be performed on an Order for Extra Work to Be Performed on Force Account Basis. When negotiating a Contract Change Order for this, remember that the value paid for the work cannot exceed that calculated on a force account basis, as stated in Section 00195.20(b).[**]

Flagger and Pilot Car Hours:

Refer to the appropriate portions of Section 00225. Record these hours each day on a Flagger and Pilot Car Receipt, form 734-3955 (see Exhibit G) or a similar format that includes all needed information[*]. The Contractor's representative must also sign to show agreement.

Remember that the bid prices for these items only apply to the bid quantity. Payment for quantities beyond the bid quantity will be made as specified under Section 00225.97. Remember to address this well before the quantity of work performed approaches the bid quantity.

To continue paying at the bid price beyond the bid quantity, the Project Manager must analyze the cost of the work and justify that the bid price is no more than

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[**] **Revised July, 2002**

[*] **Revised July, 2001**

the cost to perform the work. If the bid price is no more than the cost to perform the work, the Project Manager must include a cost analysis with the item documentation and include it with the project documentation.

If the bid price is more than the cost to perform the work, the Project Manager must either negotiate a new price to be paid under a Contract Change Order or order the work to be performed on an Order for Extra Work to Be Performed on Force Account Basis. When negotiating a Contract Change Order for this, remember that the value paid for the work cannot exceed that calculated on a force account basis, as stated in Section 00195.20(b).**

Temporary Sign Quantities

Section 00225.81 requires the Project Manager and the Contractor to agree on the quantity of signs that are needed for the project, dependent upon the Contractor's schedule. When those signs are delivered to the project, ODOT will pay for the value of those signs. The cost of installing the signs is included in the Temporary Protection & Direction of Traffic pay item.*

In summary, ODOT will pay at least for the total quantity of signs, that was agreed before work started, at the bid price, whether or not all of the signs were actually used.

Earthwork:

If the digital terrain model is not used to calculate earthwork quantities, field measurements generally consist of field cross sections notes that show both the original ground and the as constructed ground cross section for each section staked.

When earthwork quantities are calculated using the digital terrain model (DTM) method, the following must be included to support the determined quantities:

- Identification of the electronic file where the field data for the quantity has been stored
- A copy of the confidence points and the analysis that verifies the validity of the information used to calculate the quantity (that it represents the intended volumes)
- A calculation check to show that the software is working properly (this is not required if ODOT's mainframe system is used for the calculation because that process is checked centrally)

The Project Manager must assure that the survey methods, formulas, and methods of calculation are all appropriate and correctly done. The Project

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Manager should perform some sort of validation to assure that the quantities are correct and complete. That validation could include:

- If traditional methods (slope staking, average end areas, etc.) were used, assure that:
  1. All appropriate volumes and areas are included
  2. Inappropriate volumes and areas are not included
  3. The measurements do not include obvious mistakes

  Also compare the quantity to the bid quantity and resolve significant differences.
- If DTM or other electronic methods were used, compare the quantity to the bid quantity and resolve significant differences. Also perform some validation of the quantity, which may include the following:
  1. Review a plot of the horizontal limits of earthwork to determine that all appropriate area is included and inappropriate areas are not.
  2. Plot cross-sections at appropriate locations. Review those to assure that only appropriate limits for the earthwork are included and that similar datum planes were used.
  3. Have quantities calculated by station or other small unit. Review those quantities to determine and resolve large fluctuations between units.

Contact the Region Assurance Specialist, the Contract Services Group, or Geometronics for additional information.

Watering*

When watering is included as a pay item in the contract, ODOT must:

- Pay for watering that is done as directed or ordered
- Not pay for watering that is done for a Contractor's responsibility or that is performed and paid under other pay items

Assure that the volume of each haul vehicle is properly determined, unless measurement will be by an approved meter.

The source document for watering work is a Sprinkling Tally Sheet, form 734-3427 or a similar record that includes similar information. If the Contractor enters the information on the source document, assure that:

- Payment is only made for watering done as directed or ordered
- Payment is not made for watering done a Contractor's responsibility or for work paid under another pay item
- The Inspector performs some cursory validation that the pay volumes on the record are appropriate*

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Remember that the bid price for this work only apply up to 125% of the bid quantity. Payment for quantities beyond that quantity will be made as specified under Section 00340.91. Remember to address this well before the quantity of work performed approaches the bid quantity.

To continue paying at the bid price beyond 125% of the bid quantity, the Project Manager must analyze the cost of the work and justify that the bid price is no more than the cost to perform the work. If the bid price is no more than the cost to perform the work, the Project Manager must include a cost analysis with the item documentation and include it with the project documentation.

If the bid price is more than the cost to perform the work, the Project Manager must either negotiate a new price to be paid under a Contract Change Order or order the work to be performed on an Order for Extra Work to Be Performed on Force Account Basis. When negotiating a Contract Change Order for this, remember that the value paid for the work cannot exceed that calculated on a force account basis, as stated in Section 00195.20(b).**

Piling

The source document for piling work is a Pile Record Book, form 734-3485, or a similar format that includes all needed information*. Refer to the contract to determine the information that must be recorded for each pile installed on the project.

Asphalt Cement in Asphalt Concrete Mixture

When asphalt cement is paid separately from the asphalt concrete mixture, the Project Manager must calculate the quantity of asphalt cement to be paid. Use one of the following methods to determine the pay quantity for the asphalt cement in the mixture:

1. Asphalt Inventory (Inventory) Method

Refer to the ODOT Manual of Field Test Procedures for instructions on this method.

Use the Asphalt Inventory Method to compare the asphalt cement quantity determined by tank sticking with the quantity supported by delivery invoices. This method is generally used when all plant production is dedicated to the project, or a supplier has set aside a storage tank to be used exclusively for the project. There can be numerous problems with this method when using commercial plants that furnish asphalt cement mixture to both ODOT and other projects.

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Record tank measurement and delivery invoice quantities on the Daily Asphalt Cement Report, form 734-2043 (see Exhibit H). Weigh and deduct all asphalt cement used for tack or other uses. Also deduct the mass of asphalt cement in rejected mixture, waste, or material not incorporated into the project.

Storage tanks should be level and free of buildups in order to obtain accurate measurements. Check the tank manufacturer's volume conversion charts for accuracy. One method to do that is to compare the invoice quantity to the quantity determined from tank stickings taken before and after delivery.

Check weigh the delivery vehicles occasionally by weighing the delivery vehicle before and after delivery and comparing the delivered quantity to the invoice. Resolve any differences greater than allowed by 00190.20(d). Also refer to the discussion of Check Weighing later in this section of this Manual.

2. Testing Method

Use this method when the inventory method is inappropriate because asphalt mixture is also supplied to others or the mixture contains recycled asphalt pavement (RAP). The following test methods are specified for this purpose (refer to the Manual of Field Test Procedures for test procedures):

- Asphalt Content by Nuclear Method (Calibration according to WAQTC TM 3 and test according to WAQTC TM 4) (This will no longer be used for ODOT projects bid after late 2000.)
- Asphalt Content by Ignition Method (Calibration according to ODOT TM 323 and test according to AASHTO TP53 Method A or Method B with a 60 minute burn time)

Enter the asphalt content test result percentages into the Statistical Testing Input Data sheet in the "Statspec" program. The program uses the asphalt and moisture content means, that appear on the bottom of the Price Adjustment Computation sheet, to calculate the asphalt cement pay quantity. Also refer to the Guide for Using Statspec discussion and Exhibit F in the Quality Price Adjustments section (12-C) of this Manual.

3. Small Quantity Method

When small quantities of mixture are accepted without testing, calculate the quantity of asphalt cement in the mixture by using asphalt cement percentages from one of the following:

- Job Mix Formula
- Batch Weights
- Average as determined from the asphalt inventory or Statspec

Calculate and document quantities on the Daily Asphalt Cement Report, form 734-2043, under “Small Quantity” (see Exhibit H). Refer to the ODOT Manual of Field Test Procedures for instructions on this calculation.

It is very important to note that, no matter which method is used to determine the asphalt cement quantities, the quantities must be calculated daily during production and paid for on the progress estimate for that month. Some contracts contain an asphalt escalation specification (Section 00195.10) that requires ODOT to make an adjustment in payment when the price of asphalt fluctuates significantly. See Fuel and Asphalt Escalation in the Adjustments to Lump Sum and Other Items section (12-E) of this Manual.

If you have questions about measurement of any item, contact your Region Assurance Specialist or the Contract Services Group.

Weigh Memos and Scale Diary

Also refer to above discussion on Vehicle Measure.

When the Contractor provides and uses scales for measuring pay quantities, the scales must meet the requirements of Section 00190.20.

Section 00190.20(d) requires that scales be inspected and tested at various times, but at least every 6 months, by the Department of Agriculture or other appropriate regulatory agency. The Project Manager may request additional inspections if there is any reason to believe that the scales may not be functioning properly.

This work determines the mass (under the Metric system) for pay purposes. For simplicity, this Manual uses the terms “weigh” or “weighing” to* indicate the determination of mass.

Scale Diary

For all projects that have material paid on the mass basis, the Project Manager must prepare a Scale Diary and submit it with the project documentation.

Use a Project Manager’s Diary, form 734-3120, or other comparable format as a scale diary to record scale related information for project records. Record the following information in or attached to the scale diary:

- Appropriate dates and signatures of persons making entries

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* **Revised July, 2001**

- For both project and check weighing scales, include scale location and owner, manufacturer, serial number, type of scale, and maximum capacity

- Scale inspection reports furnished by the Department of Agriculture or a scale service company. See Section 00190.20(d) for frequency of inspection.

- Results of inspections directed by the Project Manager

- Corrective measures taken when an inspection or check weight indicates that the scale is not operating within tolerances

- Dates, hours at the scale, and names of ODOT provided weighers and weigh witnesses

- Dates and times that ODOT, the Contractor, or others were notified of problems that could cause inaccurate weights, and action taken

- Tare masses of haul vehicles and time that the masses were obtained. (See examples in Exhibits I(1) and I(2).) This information is not needed in the diary if tares are obtained for every load.

- Check weighing required by Section 00190.20(f), including a comparison with the appropriate weigh memo

- Check weighing of bulk materials shipped to the project, such as asphalt* cement, lime, or portland cement

Check Weighing

Perform check weighing as required, and at the frequency specified, in Section 00190.20(f). Record the results of the check weighing and the comparison in the scale diary, as indicated in the example below.

CHECK WEIGHING EXAMPLE

	Project or Contractor Scale	Check Scale
Gross	35.84	35.94
Tare	11.97	12.04
Net	23.87	23.90

$$\frac{(23.87) - (23.90) \times 100}{23.87} = 0.1 \text{ percent difference}$$

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Check weighing is not necessary when an ODOT weigh witness observes or performs the weighing procedure.

If observation, the check weighing, or other concern indicates that the scales are not operating within the tolerances specified in Section 00190.20(f), the Project Manager must:

- Immediately order the scale operation to be corrected, and
- Determine which weigh memos were impacted by the incorrect scale operation and resolve that information.

Weigh Memos

The weigher will issue a Weigh Memo for each load of material shipped or delivered to the project. The weigher may use an ODOT Weigh Memo - Material Receipt, form 734-3082, (Weigh Memo) (see Exhibit F) or may use the Contractor or supplier provided format used as a Weigh Memo. Weigh Memos are serially numbered and must contain the following information:

- Project identification
- Kind of material
- Date of weighing
- Net mass (also gross and tare unless material is weighed separately)
- Identification of haul vehicle
- Name of haul vehicle driver
- Name of weigher

The contract requires that mass quantities must be in metric units. If the Contractor's Weigh Memos are automatically printed in English units, the weigher must convert each Weigh Memo to metric units before the material is delivered to the project.

Receipt of Material on the Project

When ODOT's representative verifies delivery of material to the project, the representative will record the following on the Weigh Memo:

- Location of delivered material (station, mile point, other)
- Date material received if different
- Signature of receiver

If any material is rejected on the project, write "REJECTED" and the amount rejected on the Weigh Memo.

Use the following procedure to avoid having the material receiver subjected to the danger of taking tickets from the haul vehicles:

1. On a tally sheet (see examples in Exhibits J(1) and J(2)), material receiver records haul vehicle identification, time, and location for each load delivered.

2. Material receiver periodically (daily or several times per day) gathers Weigh Memos from scale and verifies that vehicles and times correspond to the information on the tally sheet.
3. Material receiver checks the Weigh Memos, calculates the total, and signs the tally sheet.
4. Material receiver submits the Weigh Memos and signed tally sheet to Project Manager.

If a material receiver must work in the construction area, the material receiver will be exposed to vehicle traffic and construction operations. Following are some safety tips for the material receiver and inspectors:

- **Never** walk behind any equipment or haul vehicles.
- **Always** be aware of equipment, haul vehicles, or traffic. At all possible times, face equipment, haul vehicles, and other traffic.
- **Always** wait until haul vehicles are stopped before taking tickets.
- When walking in front of haul vehicles or equipment, **always** walk where the driver or operator can see you and make eye contact. Maintain eye contact until you are in a safe area.
- **Always use common sense.**

Also refer to the following Exhibits:
I(1) and I(2) - Tare Sheet
J(1) and J(2) - Material Tally Sheet

Review Process for Quantity Documentation

Review by Project Manager

The Project Manager must review each source document as it is* prepared to verify that documentation and calculation methods are proper and correct. If a calculation method differs from those required or normally accepted, list it on the Documentation Review Report, form 734-1903.

If the Contractor requests ODOT to release the retainage of a subcontractor, because the subcontractor* has finished its portion of the work, the Project Manager must review the documentation related to that work to allow release of the retainage. That process is shown at the end of the Submittal of Final Project Documentation section (37) of this Manual.

Steps in the review procedure for quantity documentation* include:

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1. Assure that required dates, signatures, contract numbers, locations, etc. are included on each original source document.*. Also assure that the work has been charged to the proper Participation Indicator (sub-job).

2. Prepare and include two adding machine tapes or alternate summation method for all Weigh Memos, tickets, and material receipts to verify that all individual quantities are included in the summation*. Assure that the required date, signature, and contract number are included on adding machine tapes and summaries (also refer to Weigh Memos and Scale Diary earlier in this section).

3. Assure that a separate person has checked all formulas and calculations and has also signed and dated the documents.

4. When material is paid by volume of hauling vehicle, include measurements of the hauling vehicle and calculate the volume for each hauling vehicle. The person measuring the vehicle and calculating the volume must sign and date the document.

5. When conversion factors have been used to compute pay quantities, assure that documentation of the conversion factors is included. The person calculating the conversion must sign and date the document.

6. Verify that proper and correct formulas and procedures were used in each computer-generated source document* and spreadsheet to calculate quantities. Computer calculated quantities must be documented with the original field measure notes along with input and output printouts.

7. Compare the calculated quantity of each item to the bid quantity and resolve significant differences.

8. Ask the theoretical question on each item—"Does this quantity seem appropriate for the work that was actually done on the project?"

9. Assure that all work has been included in the calculated quantity and that the calculated quantity does not include inappropriate areas, volumes, or quantities. This may require some independent verification of quantities. For earthwork volumes, refer to the Measurement of Earthwork discussion earlier in this section of this Manual.

10. Check all lump sum quantity adjustments and supporting documentation.

11. Verify and submit final quantities on a Quantity Ledger Report.

Review by Region Assurance Specialist

The Region Assurance Specialist (RAS) will periodically review project documentation. The frequency of those reviews will be planned and will depend on project size, duration, complexity, and the Project Manager's experience with ODOT projects.

The RAS will review and provide guidance in quantity documentation procedures used to support payments to the Contractor, including:

- Source document must be on file
- Lump sum schedules for progress payment of lump sum items
- Flagger and Pilot Car Receipts or similar format
- Sprinkling Tally Sheets or similar format*
- Accurate, easy to follow measurement and calculation methods
- Calculations and calculation methods* checked by a second person
- Proper source document validations
- For quantities paid by mass, padded material receipts with adding machine tapes, or acceptable alternate method,* summarizing the total quantities
- Scale Diary, including scale certification
- Cost justification for overrun of Flagging, Pilot Cars, Temporary Striping, Stripe Removal, and Watering
- Quantity price adjustments
- Material on Hand payments

At the time of the periodic project review, the RAS will review the quantity documentation to determine whether it fulfills the contract requirements and supports the payments that have been made to the Contractor. The RAS will report any deficiencies to the Project Manager. The RAS will also address the noted deficiencies and their resolution at the next scheduled periodic review.

The RAS will list the following on the Documentation Review Report, form 734-1903 (see Exhibit L in the Quality section (12-B) of this Manual), regarding quantities:

- Agreement to resolution of calculations that are done in a manner different from that specified by contract or from that normally accepted by ODOT
- Calculations for which the Project Manager and RAS are unable to agree on the acceptability of the calculation or method

For acceptance of final project documentation, see the Submittal of Final Project Documentation section (37) of this Manual.

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