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GENERAL

RECORD KEEPING

Keeping accurate and complete records of contract work quantities is an important responsibility of SDDOT Project Engineers and Inspectors. Contract work is measured and paid for as contract items. Contract items are measured for payment as units of count, length, area, volume, weight, time, or as a lump sum. Project Engineers and Inspectors determine, by measurement and calculation, the quantities of the various contract items actually performed by the Contractor. In doing so, they must create a clear and easily followed trail back to the original measurement or calculation for each contract item.

CONSTRUCTION MANAGEMENT SYSTEM

Each contract can consist of multiple projects and numerous contract items, with a complex array of tiered components, project specifications, material requirements, schedules and deadlines, and financial information. The Construction Management System (CMS) was developed to assist SDDOT personnel with managing this information. It is made up of two sub-systems: the Construction Measurement and Payment (CM&P) System and the Material Sampling and Testing (MS&T) System.

RECORDING WORK AS ITEM INSTALLATIONS

Each contract item is identified with a line number that is specific to its order on the contract, and a Standard Bid Item (SBI) Number that is specific to the type of work included in that item. As work progresses on a project, SDDOT personnel inspect and measure the accomplished work and record the measurements and observations in the CMS. Quantities of work that are accomplished for each contract item are recorded in the CM&P System as Item Installations. For most contract items, Item Installations should be recorded daily. Some contract items normally require many days for completion and will require many Item Installations.

The *Construction Measurement and Payment System User Guide* provides instructions for recording work as Item Installations. The following is an example of the *Item Installation* panel of the *Record Work* window in the CM&P System.

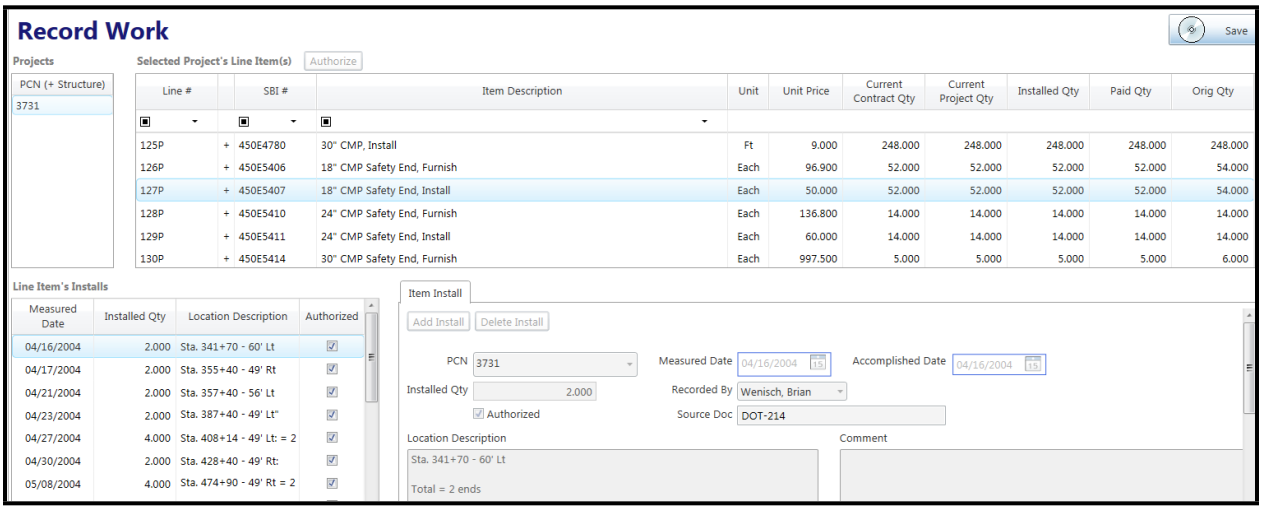


Figure 1. *Item Installation* panel of the *Record Work* window in the CM&P System

This example is one of eighteen Item Installations for this contract item. Please note that the quantities displayed at the top of the panel to the right of the Unit Price are system-calculated cumulative totals as of the time that the window is being viewed.

All applicable fields on the *Item Installation* panel should be completed for each Item Installation. The **Install Qty** is the item quantity measured or estimated for that given Item Installation. The **Accomplished Date** is the actual date that the measured or estimated quantity of work was accomplished. The **Source Doc** field identifies the electronic or paper record of the measurement or calculation. The **Location Description** field provides location information that is appropriate for the specific contract item, such as a station or structure. This field may also include other information or comments that are tied to the specific location. The **Comment** field should include any other details that explain or affect the installation quantity, and clarify whether the quantity is the result of a field measurement, scale weights, a count, estimate, survey or a calculation based on measured dimensions.

Individual *Item Installation* quantities should not be altered after they have been authorized for payment.

Certain items will be impractical to measure accurately as the work progresses, so the quantities recorded in progress Item Installations must be based on estimates. Excavation items generally fit this category. The method used for estimating should be noted in the **Comment** field. When work on the item is complete, a final Item Installation must be made to correct any differences between the Installation totals and the final measured quantity. The final Item Installation quantity will be the difference between the previously installed quantities and the final measured or calculated quantity, with an explanation in the **Comment** field about how the final quantity was arrived at.

For other contract items, such as pipe culvert, flagging, and pilot car, a discrete quantity is associated with a specific location or installation date, and each Item Installation represents an accurate measurement. If an individual Item Installation quantity is found to be incorrect after it has been authorized for payment, an additional Item Installation with the same **Accomplished**

Date should be created. The quantity for this additional installation will be the difference between the actual and incorrect quantity. The reason for and date of the change should be stated in the **Comment** field.

If plan quantity is the basis of payment, the final Item Installation should indicate whether this was specified by plan note, special provision or *Specifications for Roads and Bridges* (Specifications) and should include a statement that the work was satisfactorily completed in accordance with the plans.

If changes are required for contract items where plan quantity is the specified basis of payment, measurements made to document changes that increase or decrease quantities should be recorded in the Item Installations and identified as changed quantities. The reason for the change, such as plan error or plan change, must be described in the applicable change order. “As-built” and “Normal variation” are not appropriate reasons.

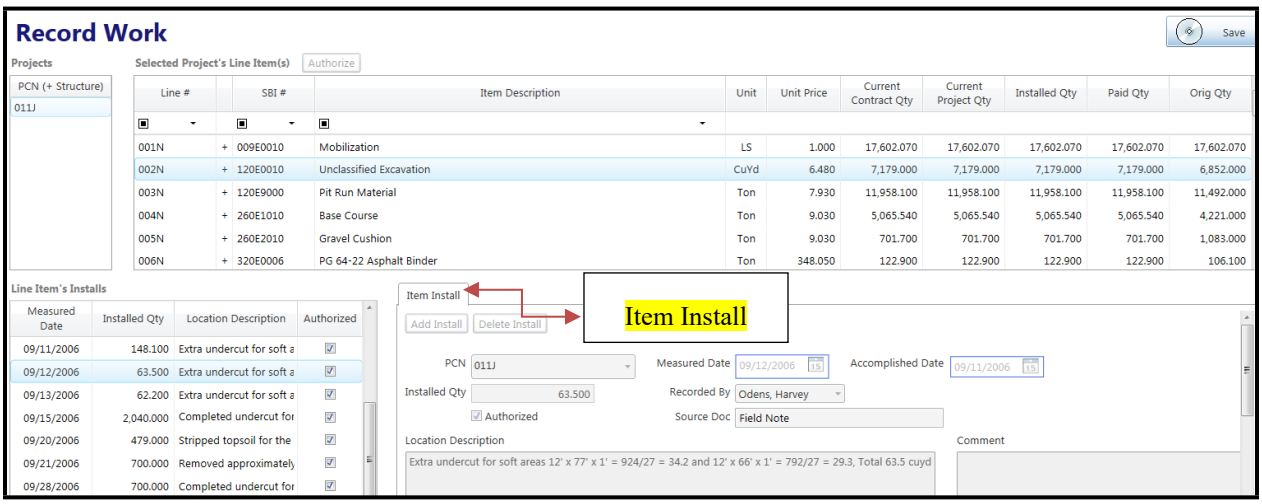


Figure 2. Item Installation documenting quantity change from original plan quantity

For the contract item in this example, there are thirteen Item Installations documenting quantities where extra depth of excavation was required. The total of these Item Installations accounts for the difference between original plan quantity and final pay quantity.

Overall, information in the Item Installations should be sufficiently complete to enable a person unfamiliar with the project to understand how the installed quantity was arrived at.

SOURCE DOCUMENTS

A **source document** is an electronic or paper record of measurements and calculations of contract item quantities. Each source document should include the contract item description, the location of installation (if applicable), the necessary measurements and calculations, the date, and the name of the person preparing the record.

If a source document is a paper record such as a pipe note, weight ticket, cross section, field note, or an annotated copy of a plan sheet, the document must be described in the **Source Doc** field of the Item Installation. Paper source documents must be signed and dated by the person

making the measurements. Erasures and white out must not be used on source documents. Corrections must be clearly noted as such.

If the Item Installation in the CM&P System is the source document, "CMP" should be entered into the **Source Doc** field. The **Location Description** and/or **Comment** fields must include all measurements, calculations and sufficient detail to show how the installation quantity was arrived at. As with paper source documents, corrections must be clearly noted as such.

Source documents are to be retained by the Area Office in accordance with the SDDOT *Construction Project Filing* Policy. Copies of certain source documents will be submitted to the Finals Review Specialist in accordance with Chapter 8 (*Final Quantity and Payment Review*) of this manual, or upon request of the Finals Review Specialist.

QUANTITY CHECKING

The Contractor is paid for work as it is performed. Progress payments are typically based on unpaid quantities of work recorded as Item Installations as of the date that a pay estimate is prepared. Quantity calculations or estimates should be checked independently before the quantity is paid on a progress pay estimate. The **Authorize Qty** checkbox on the Item Installation panel indicates that the Project Engineer has agreed with the recorded quantities.

Final total quantities for each contract item should be checked by Area staff before preparation of the final contract change order. It is highly recommended that a Project Engineer who is not assigned to the project double check source documentation and final pay quantities. The Item Installation *Detail* report, which tabulates and summarizes project work recorded as Item Installations, should be printed and reviewed as part of the Area's finaling process. The report is found by following this menu path in the CM&P System: **Reports, Record Work, Item Install Detail.** Click **OK** to generate the report for the entire contract.

07/10/2018 Item Installation Detail Page 1 of 3

SD19 N Grade 15-25 with Foothills Contracting, Inc.

Main Project # P-BRF 0019(15)15 **Main PCN** 3731 Yankton Area --> Heiman, Kevin

SD19 FROM SD46 SOUTH

Line No	Units	Description	Unit Price	Contract Qty	Installed Qty	Authorized Qty
127P	Each	18" CMP Safety End, Install	$50.000	52.000	52.000	52.000

PCN	Inspector	Accomplished	Installed	Authorized	Source Doc
3731	Wenisch, Brian **Location** Sta. 341+70 - 60' Lt Total = 2 ends	04/16/2004	2.000	2.000	DOT-214
	Wenisch, Brian **Location** Sta. 355+40 - 49' Rt Total = 2 ends	04/17/2004	2.000	2.000	DO
	Wenisch, Brian **Location** Sta. 357+40 - 56' Lt Total = 2 ends	04/21/2004	2.000	2.000	DOT-214
	Wenisch, Brian **Location** Sta. 387+40 - 49' Lt"	04/23/2004	2.000	2.000	DOT-214

This is the contract quantity as of the most recent change order.

Figure 3. Excerpt from an Item Installation Detail report, page 1 of 324 total pages

STANDARD BID ITEM GROUPS

Measurement and payment for contract items must be made in accordance with the project plans and special provisions, Section 9 of the *Specifications,* and the methods of measurement and payment set forth in the *Specifications* for each Standard Bid Item Group. Project personnel should check the plan notes, special provisions and *Specifications* for the required method of measurement for each contract item and use the specified method to measure quantities. A change in the unit or the method of measurement changes the contract and must be approved in a contract change order.

Each contract item is identified with a Standard Bid Item Number that is specific to the type of work included in that item. There are several thousand Standard Bid Item Numbers. What follows is additional guidance for documenting quantities of specific types of contract items, organized by Standard Bid Item (SBI) Groups. This is intended as guidance only. Please refer to the *Specifications*, special provisions, and plans for project requirements.

SBI GROUP 009: MEASUREMENT AND PAYMENT

Extra Haul of Materials: Extra haul is paid under the bid item Extra Haul at the unit rate per ton-mile specified in the Price Schedule for Miscellaneous Items. Extra haul will be added by change order when, through no fault of the Contractor, the average haul for a material is greater than the average haul shown in the plans. The plans average haul equals the haul units

shown in the plans for a material divided by the plan quantity of the material. Applicable materials are subgrade, subbase, base course and surfacing materials (including clay and filler).

Extra haul may be required because of changes in the plans or because material cannot be secured and used as shown on the plans. Payment for extra haul will be full compensation for moving equipment, delays in operation, additional labor, equipment and other costs involved. The pay quantity will be the number of tons of affected material times the increased average haul for that material.

See also Extra Haul under the SBI Group 120.

Extra and Force Account Work: See page 69 of this section.

Mobilization: For construction projects, payment for the original contract item (Bid Item Number 009E0010) is automatically made by the CM&P system on a schedule established in the Specifications. Quantity changes to this bid item must not be made by staff other than CMS programmers. Bid Item Number 009E0010 must not be used for any item other than the original contract mobilization.

If additional mobilizations are required due to added work or contract changes, Mobilization 1 (Bid Item Number 009E0197), Mobilization 2 (Bid Item Number 009E0198) and Mobilization 3 (Bid Item Number 009E0199) can be added by CCO. Payments are not made automatically for these items.

SBI GROUP 100: CLEARING AND GRUBBING

If the contract includes an item for clearing and grubbing trees and stumps on a unit price per each basis, the actual count of such trees and stumps removed and disposed of are recorded as Item Installations. When the contract stipulates that payment will be made for “Clearing” on a lump sum basis, a statement must be made in the final Item Installation **Comment** field that the work was satisfactorily completed in accordance with plans.

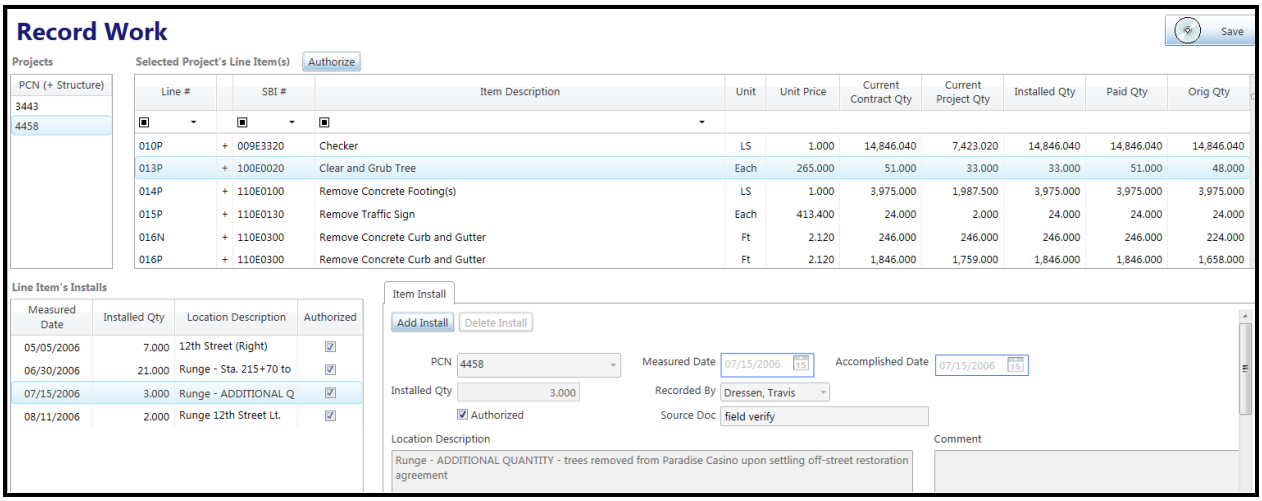


Figure 4. Daily Item Installation for Clear and Grub Trees item

SBI GROUP 110: REMOVAL OF STRUCTURES AND OBSTRUCTIONS

If work is done on a lump sum basis, a statement must be made in the final Item Installation that the work was satisfactorily completed in accordance with plans. If the contract specifies payment on a unit basis, measurements or counts will be recorded as Item Installations.

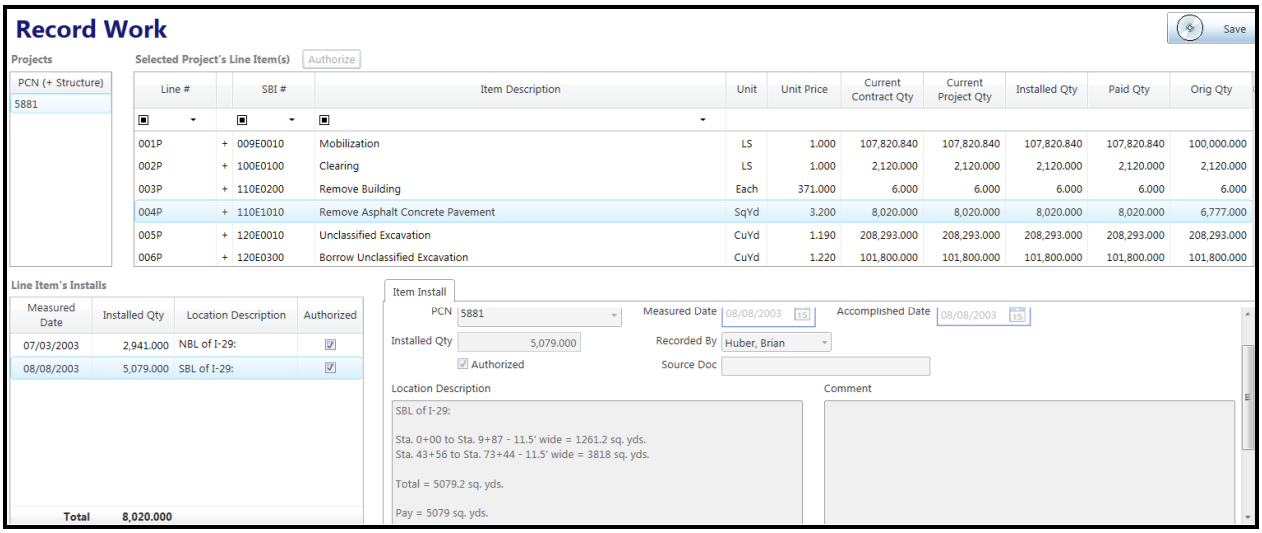


Figure 5. Daily Item Installation for pavement removal

SBI GROUP 120: ROADWAY AND DRAINAGE EXCAVATION AND EMBANKMENT CONSTRUCTION

Unclassified Excavation, Final Cross Sections taken in Field: If final cross sections are taken in the field, the source documentation for excavation will be cross sections and volume computations. The final quantity for the bid item Unclassified Excavation will be determined as specified in the plans and the *Earthwork Manual.* The following is an example of a final Unclassified Excavation Item Installation.

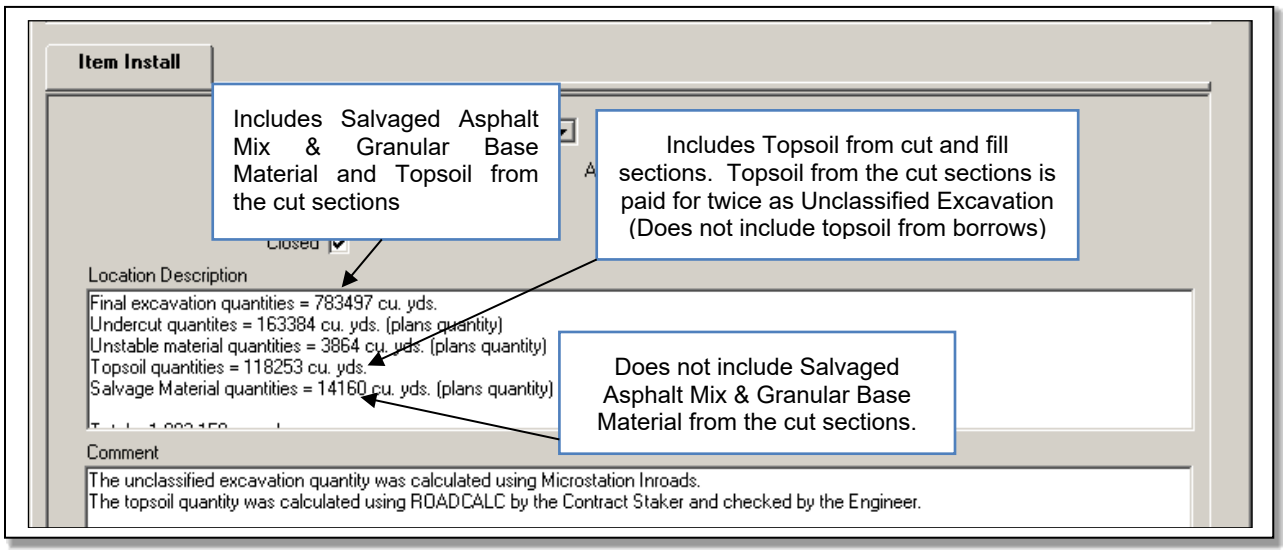


Figure 6. Final Item Installation for Unclassified Excavation showing quantity details

The final Item Installation should provide a breakout of quantities that have been added together to arrive at the final total unclassified excavation quantity. Unless otherwise specified in the plans, the following are paid for as Unclassified Excavation and will be added together to arrive at the final total Unclassified Excavation pay quantity:

- Excavation from final cross sections: In the Table of Unclassified Excavation, the plans Excavation volume has been reduced by the volume of in place surfacing that will be removed. However, when final cross sections are taken in the field, the volume of salvaged material from the cut sections will be included in the cuts on the final cross sections.

- Undercut: Plan quantity will be added unless changes are ordered by the Engineer. Undercutting is also paid for under the bid item Undercutting.

- Unstable Materials: Plan quantity will be added unless changes are ordered by the Engineer.

- Topsoil: The measured quantity of Topsoil from the roadway will be added. This means that topsoil from the cut sections will be paid for twice as Unclassified Excavation, since it will also be included in the cuts on the final cross sections. Topsoil from borrows are not paid for as Unclassified Excavation and will not be included here. Topsoil is also paid

for under the bid item Placing Topsoil.

- Excavation for RCBC Installation: Plan quantity will be added unless changes are ordered by the Engineer.

- Excavation for Deep Pipe and RCBC Removal: Plan quantity will be added unless changes are ordered by the Engineer.

- Areas designated as Muck Excavation that can be removed with similar equipment and procedures as Unclassified Excavation: Such areas will be paid for under the Unclassified Excavation bid item instead of the Muck Excavation bid item.

- Salvaged Asphalt Mix and Granular Base Material: The volume of Salvaged Asphalt Mix and Granular Base Material will be paid for once under the Unclassified Excavation bid item. The plans volume of Salvaged Asphalt Mix and Granular Base Material from the fill sections and from off-alignment roadways will be added. Salvaged Asphalt Mix and Granular Base Material from the cut sections will not be added because the actual volume is already included in the cuts on the final cross sections. Salvaged Asphalt Mix and Granular Base Material is also paid for by weight under the bid item Salvage and Stockpile Asphalt Mix and Granular Base Material.

Unclassified Excavation, Plans Quantity Specified: If specified by plan note or written agreement, plan quantity will be the measurement for payment. If plan quantity is paid for Unclassified Excavation in accordance with a plan note or written agreement, this should be stated in the final Item Installation. An example follows. Measurements made to document changes that increase or decrease quantities should be recorded in the Item Installations and identified as changed quantities.

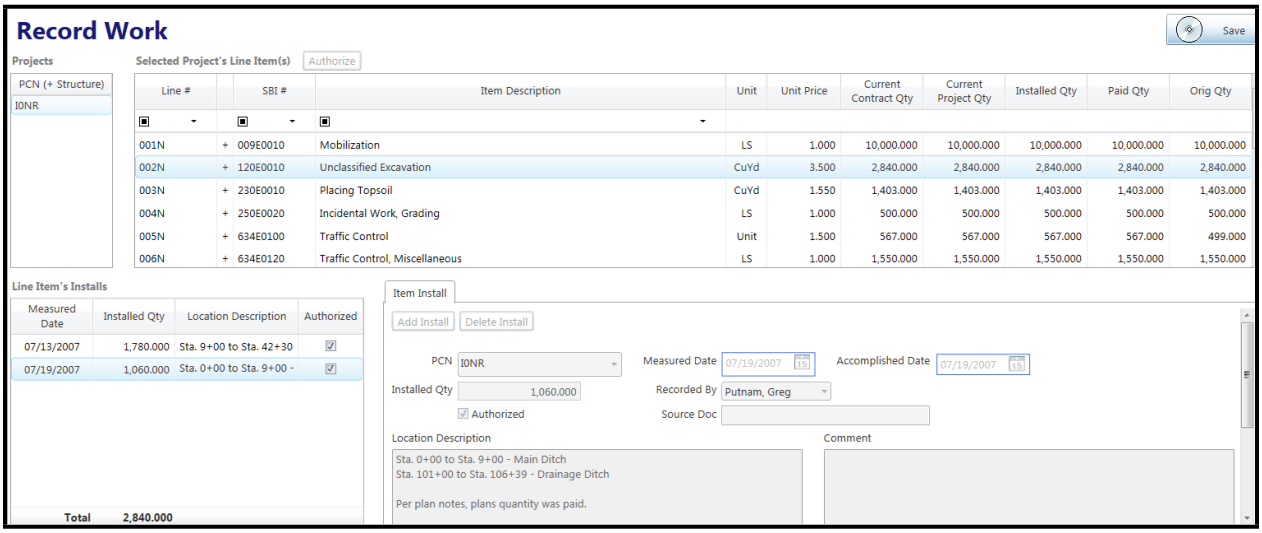


Figure 7. Final Item Installation for Unclassified Excavation, plans quantity paid in accordance with plan note

Unclassified Excavation, Alternative Measurement: If alternative methods involving three-dimensional measurements or measurement in the hauling vehicle are accepted by the Engineer, the methods will be described and the calculations shown in the Item Installation.

Undercutting (bid item): Plan quantity will be the basis of payment unless changes are ordered by the Engineer. Measurements and calculations made to document increased or decreased quantities should be recorded in the Item Installation. Undercutting is also paid under the Unclassified Excavation bid item, if applicable.

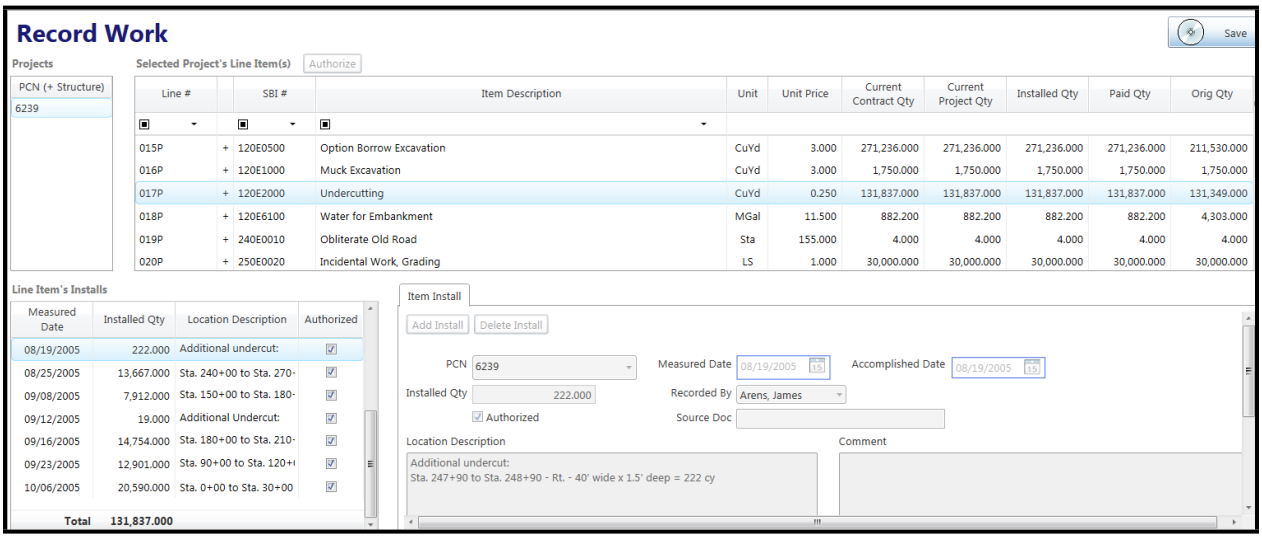


Figure 8. Daily Item Installation for Undercutting Item documenting quantity in excess of plan quantity

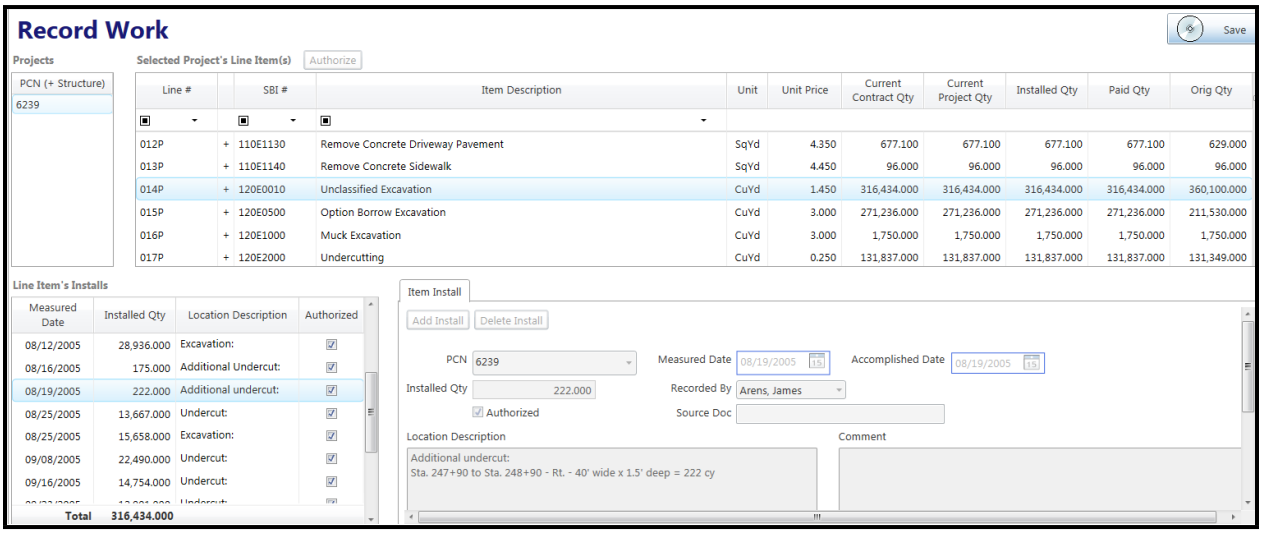


Figure 9. Daily Item Installation for Unclassified Excavation item, documenting undercut quantity in excess of plan quantity

Select Subgrade Topping: Plan quantity will be the basis of payment and the source document will be the plans. Measurements and calculations made to document increased or decreased quantities should be recorded in the Item Installation and identified as changed quantities.

Option Borrow Excavation: Cross Sections and volume computations are the source documentation. For quantities of topsoil stockpiled and re-spread on optioned borrow sources, the stockpile cross sections are the source documentation. The final Item Installation should provide a breakout of total excavation and topsoil quantities for each pit. Topsoil stockpiled from the borrow source will be re-spread and paid for under the bid items Option Borrow Excavation and Placing Topsoil.

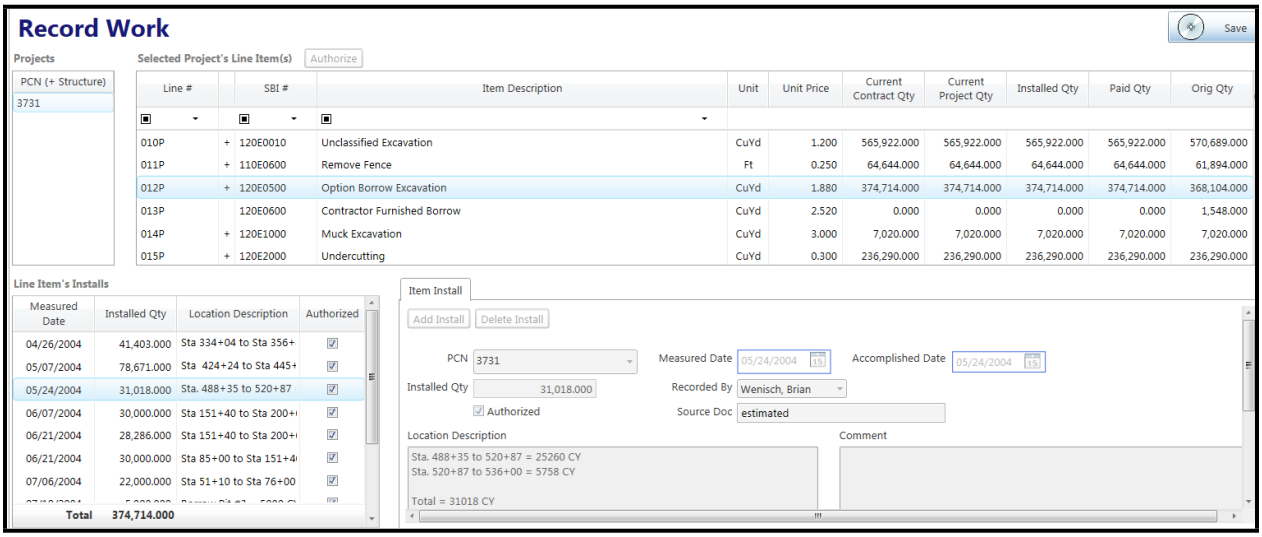


Figure 10. Daily Item Installation for Option Borrow Excavation, quantities estimated.

all Items for Pay Item - 029P : Option Borrow Excavation

Measured Date	Installed Qty	Authorized Qty	Location Description
09/24/2010	20,000.000	20,000.000	estimate
11/05/2010	30,000.000	30,000.000	paid additional estimated 30,000 CuYd Will pay remaining qty once borrows are measured.
05/06/2011	10,592.000	10,592.000	Measured Qty for Borrow 1 & 2 Borrow #1 = 16703 CuYds Borrow #2 = 43889 CuYds
07/03/2012	73,809.000	73,809.000	Quantities for Option Borrows are as follows: Pit #1 - 16,703 CuYds Pit #2 - 43,899 CuYds Pit #3 - 0 CuYds Pit #4 - 41,261 CuYds Pit #5 - 2,698 CuYds Pit #6 - 29,840 CuYds Total = 134,401 CuYds
07/03/2012	15,830.400	15,830.400	Quantities for Option Borrow Topsoil are as follows: Pit #1 - 3,445.7 CuYds Pit #2 - 3,252.7 CuYds Pit #3 - 631.3 CuYds Pit #4 - 6,598.4 CuYds Pit #5 - 261.8 CuYds Pit #6 - 1,640.5 CuYds Total = 15,830.4 CuYds

Figure 11. Option Borrow Excavation installations with summary breakouts by pit for borrow dirt and topsoil

Contractor Furnished Borrow: Cross Sections and volume computations are the source documentation. All of the Contractor's costs, including restoration of the borrow source and placement of topsoil, are incidental to the unit price per cubic yard of Contractor Furnished Borrow.

Borrow Unclassified Excavation: Cross Sections and volume computations are the source documentation. Topsoil stockpiled from the borrow source will be re-spread and paid for under the bid items Borrow Unclassified Excavation and Placing Topsoil.

Extra Haul: If the Contractor is required to haul material from another balance into the balance where work is taking place, the necessary extra haul will be paid under the bid item Extra Haul at the unit price per cubic yard station established in the applicable *Special Provision for Price Schedule for Miscellaneous Items*. Extra haul quantity is computed as the required distance less the average project haul distance shown in the plans, multiplied by the quantity of material hauled. Records must be kept of where the material is obtained and where it is placed, and how the material quantities were tracked. An example extra haul computation follows.

Material obtained from Sta. 530+25 to Sta. 534+25

Material placed from Sta. 515+00 to Sta. 518+00

Cubic Yards Hauled the Extra Distance: 2500 CY

Average Project Haul Distance (from plans): 6.315 Stations

530+25
534+25
1064+50 106,450/2 = 53,225

515+00
518+00
1033+00 103,300/2 = 51,650

(53,225 – 51,650)/100 = 1575/100 = 15.75 Stations = Required Haul Distance

Required Haul Distance	15.750 Sta.
Average Project Haul Distance	6.315 Sta.
Extra Haul Distance	9.435 Sta.

2500 CY X 9.435 Sta. = 23,587.5 CYSta. = Extra Haul Item Quantity

Figure 12. Extra Haul item quantity calculation

Water: Detailed guidance on measuring and recording water used on a project is provided in the SDDOT Earthwork Manual, beginning on page 2-49, or page 49 of the PDF file. The number of tank loads of water hauled and the volume per load should be recorded in the daily Item Installations. An example of an Item Installation for water follows.

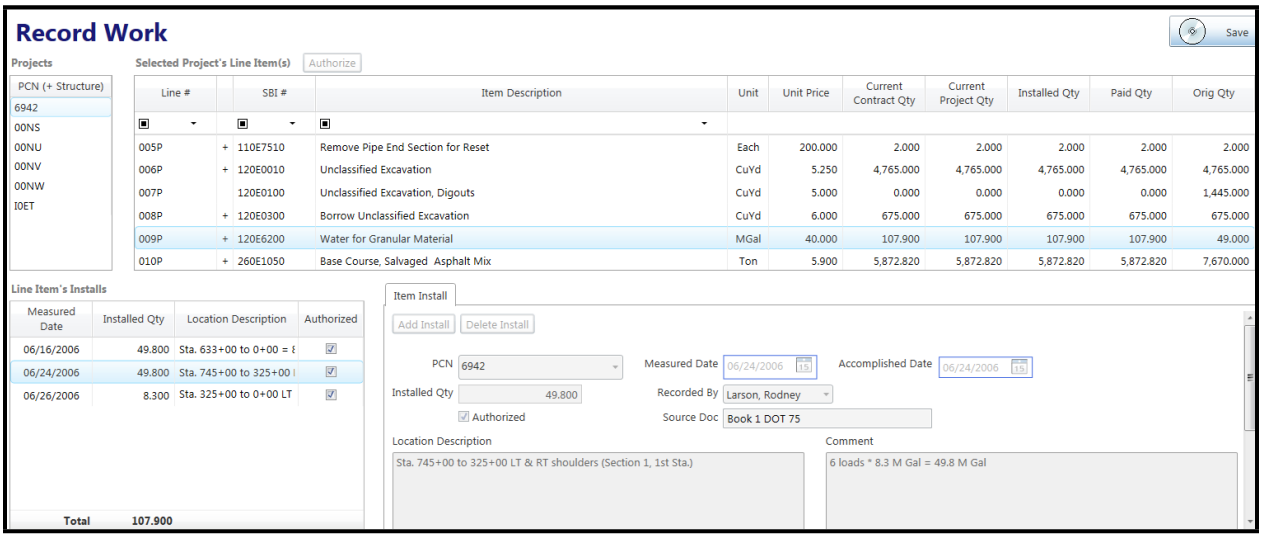
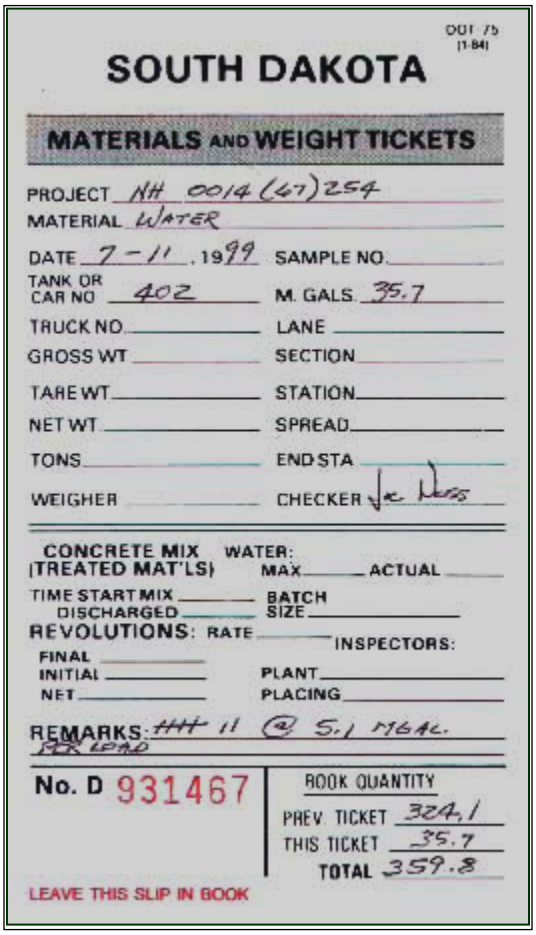


Figure 13. Item Installation for Water for Granular Material

If the CM&P System is the source document for water, the Item Installation must also include the Water Tank Stamp ID number. SDDOT field personnel can provide a printout of the **Item Installation Detail** Report for the contract item at a frequency to be agreed upon by SDDOT personnel and the Contractor.

If the South Dakota Materials and Weight Tickets (DOT 75) are the source documentation, a ticket is made for all water used each day. The Water Tank Stamp ID number and capacity must be included on the ticket. The original ticket is retained as source documentation and a duplicate is given to the Contractor. An example follows.



DOT 75
(1-84)

SOUTH DAKOTA

MATERIALS AND WEIGHT TICKETS

PROJECT NH 0014 (67) 254
MATERIAL WATER
DATE 7-11, 1999 SAMPLE NO.
TANK OR CAR NO 402 M. GALS. 35.7
TRUCK NO. LANE
GROSS WT SECTION
TARE WT STATION
NET WT SPREAD
TONS END STA
WEIGHER CHECKER Joe Ness

CONCRETE MIX (TREATED MAT'LS) WATER: MAX ACTUAL
TIME START MIX DISCHARGED BATCH SIZE
REVOLUTIONS: RATE INSPECTORS:
FINAL
INITIAL PLANT
NET PLACING

REMARKS: HHT 11 @ 5.1 MGAL. PER LOAD

No. D 931467

BOOK QUANTITY
PREV. TICKET 324.1
THIS TICKET 35.7
TOTAL 359.8

LEAVE THIS SLIP IN BOOK

Figure 14. Example of DOT 75 ticket for water

If water is applied by irrigation sprinklers, the quantity of water applied will usually be measured by a meter. Daily meter readings should be recorded in the Item Installation.

SBI GROUP 205: DUST CONTROL

Dust Control Chlorides: For each load, the concentration as determined by the Central Testing Laboratory and the actual weight of the solution applied should be documented in the Item Installations. An example follows.

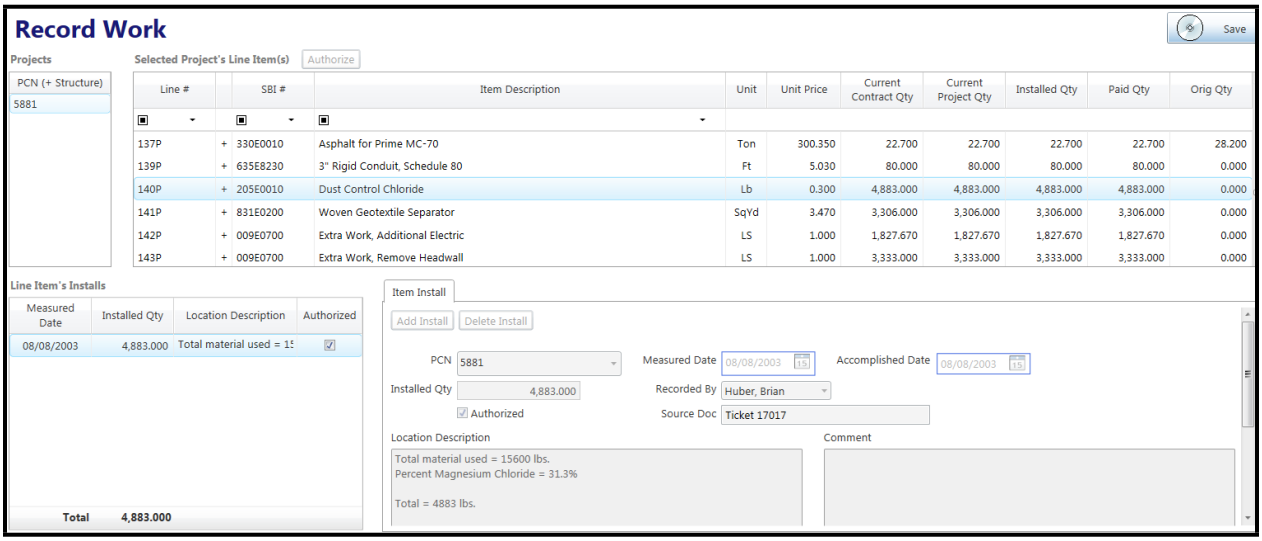


Figure 15. Item Installation for Dust Control Chloride

Water: See SBI Group 120.

SBI GROUP 210: ROADWAY SHAPING

The Item Installation should state the work was completed in accordance with the plans. If changes are ordered, measurements/beginning and ending stations should be entered into the Item Installation.

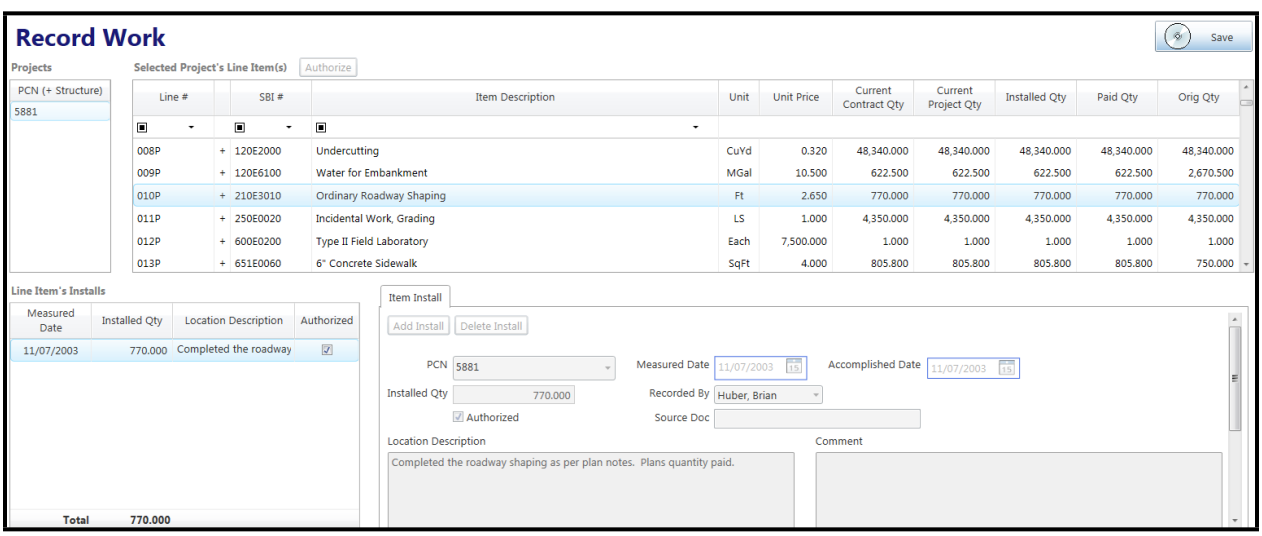


Figure 16. Item Installation for Roadway Shaping

SBI GROUP 230: SALVAGING, STOCKPILING AND PLACING TOPSOIL

Salvaged Topsoil: If such removal is designated on the plans or directed by the Engineer, the stockpile cross sections and volume computations will be the source documentation. Topsoil salvaged from contractor furnished borrow sources will be incidental to the unit price for the bid item Contractor Furnished Borrow. Topsoil salvaged from option borrow sources will be paid for under the bid item Option Borrow Excavation (SBI Group 120). Topsoil salvaged from designated borrow sources will be paid for under the bid item Borrow Unclassified Excavation (SBI Group 120). All other salvaged topsoil will be paid under the bid item Unclassified Excavation (SBI Group 120). The payment will be full compensation for excavation and stockpiling. Quantities of salvaged topsoil recorded under these bid items should be broken out in the Item Installations.

Placing Topsoil: The source documentation will be the cross sections and volume computations for material removed from the stockpiles and placed on designated areas. Topsoil placed on contractor furnished borrow sources will be incidental to the unit price for the bid item Contractor Furnished Borrow Excavation. Placement of other topsoil will be paid at the contract unit price per cubic yard for the bid item Placing Topsoil. The Item Installations should differentiate between quantities of topsoil placed on the roadway and at borrow sources. An example of a final Item Installation follows.

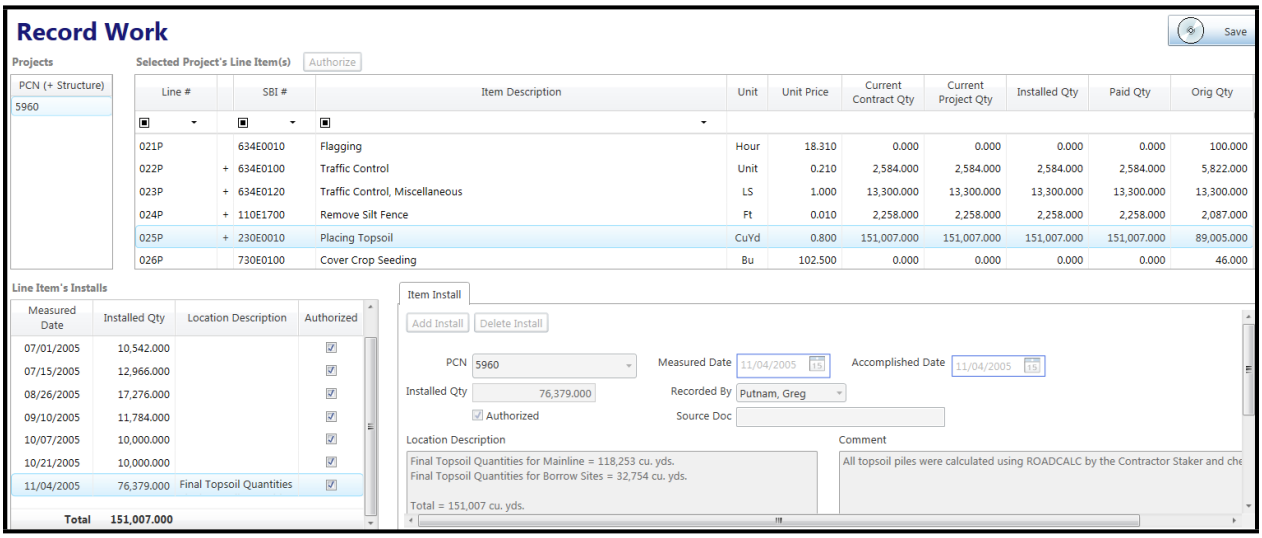


Figure 17. Final Item Installation for Placing Topsoil with breakout for borrow sites

SBI GROUP 240: OBLITERATING OLD ROADS

Daily measurements/ beginning and ending stations should be entered into the Item Installation.

SBI GROUP 250: INCIDENTAL WORK

A description of the work and a statement that the work was completed in accordance with the plan must be entered in the Item Installation.

SBI GROUP 260: GRANULAR BASES AND SURFACING

Weight tickets are the source documentation. Daily totals should be recorded in the Item Installations.

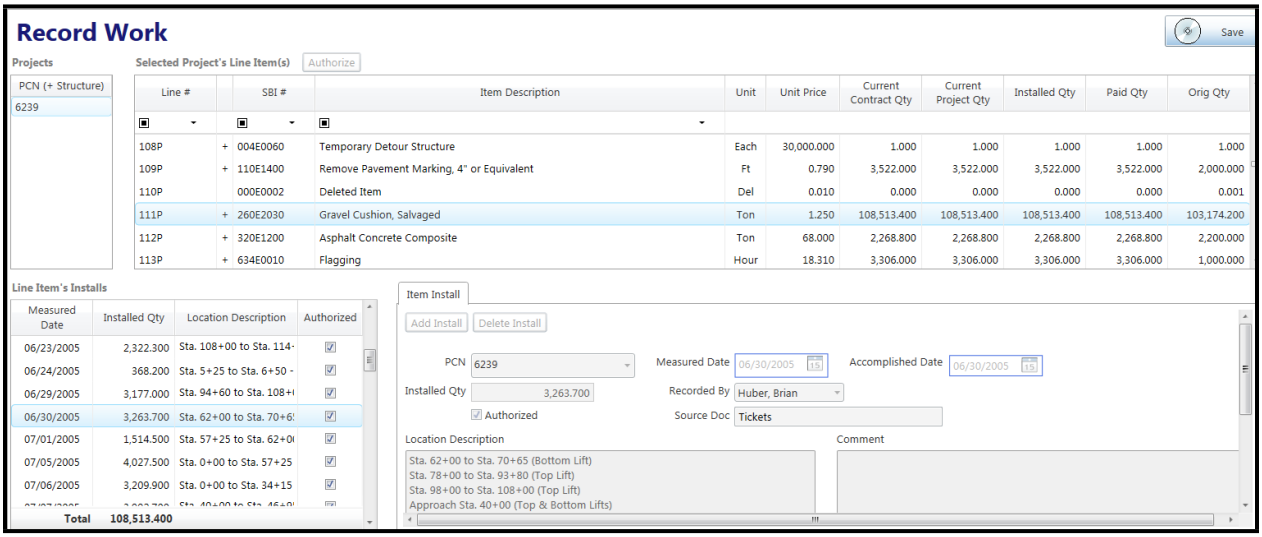


Figure 18. Daily Item Installation for Gravel Cushion, Salvaged

SBI GROUP 270: SALVAGING, PROCESSING AND STOCKPILING GRANULAR BASE AND ASPHALT CONCRETE MIX MATERIALS

Salvage and Stockpile Asphalt Concrete Mix and Granular Base Material will be measured to the nearest .1 ton at the time it is hauled to the road. Weight tickets are the source documentation. Daily totals should be recorded in Item Installations for the bid item Salvage and Stockpile Asphalt Concrete Mix and Granular Base Material

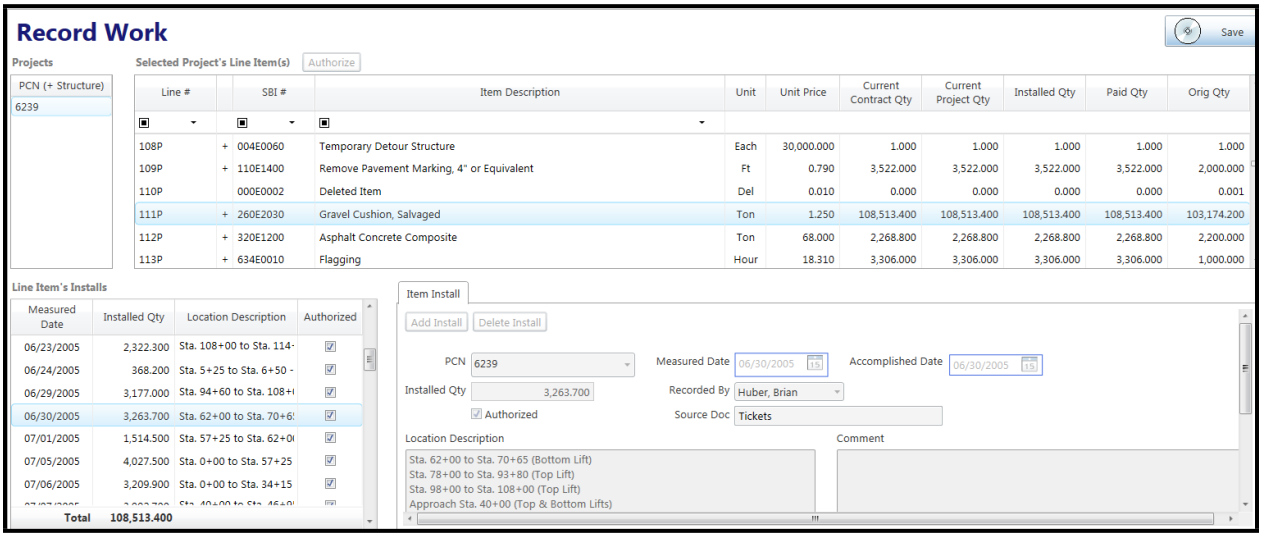


Figure 19. Daily Item Installation for Salvage and Stockpile Asphalt Mix and Granular Base Material (also installed as Gravel Cushion, Salvaged, Figure 18)

Material stockpiled for future use will be measured in the stockpile and converted to tons using a factor of 1.50 tons per Cu. Yd. The stockpile cross sections and computations will be the source documentation.

The volume of salvaged asphalt mix and granular base material will be paid for once under the bid item Unclassified Excavation. The volume from the fill sections will be the volume specified in the plans. The volume from the cut sections will be included in the final cross sections from the cuts. See Unclassified Excavation in SBI Group 120 for details.

SBI GROUP 280: PROCESS IN PLACE SURFACING

Plans quantity will be the basis of payment, unless changes are ordered by the Engineer. A statement should be made in the Item Installation that the work was satisfactorily completed in accordance with plans. If changes are ordered by the Engineer, dimensions of added areas should be included in the Item Installation.

SBI GROUP 320: ASPHALT CONCRETE, GENERAL

DOT 89 Forms: The source documentation for asphalt concrete produced at mobile plants will be weight tickets in combination with information recorded on the **Bitumen Content**

Determination (Form DOT 89) in the MS&T System. Instructions for completing the DOT 89 are included in Section 314 of the SDDOT Materials Manual.

An example of the DOT 89 in the MS&T System is included on the following page. The form includes a **Road Waste** field. If there is road waste, the road waste quantity must be entered into this field in order for the system to calculate the asphalt binder content of the road waste and generate a valid **Project Summary of Bitumen Applied (DOT 74)** report as described later in this chapter. If a quantity is entered into the **Road Waste** field, the final quantity to be entered into the **To Road** field must be the to-road ticket total minus the **Road Waste** quantity. It is important to check the final **To Road** and **Produced** entries to assure that they are correct after entering **Road Waste**.

The DOT 89 also includes a **Gallons at Start** checkbox under Item E and a **Left in Storage** checkbox under Item M. These boxes must be checked at the beginning and end respectively of each uninterrupted use of the storage tank. If the tank was used in the production of material that is not included in the total **Produced** quantity on the DOT 89s, these checkmarks would be required. The checkmarks are necessary for the system to generate a valid DOT 74, because tank contents at the beginning and end of each continuous use must be taken into account. It is not necessary to un-prepare the DOT 89 in order to add these check marks.

Sample ID 2218078 **BITUMEN CONTENT DETERMINATION** **DOT-89**
File No. **9-14**

Report No. 01
County Marshall PCN/PROJECT 04AV P 6435(18)
Test Date 08/29/2015 Inspector Severson, Adam Contractor BITUMINOUS PAVING INC
Percent Bitumen Desired 5.2 - 5.8 Percent Used by Test 5.5
Bitumen Type 320E0005 - PG 58-34 Asphalt Binder

TANK METHOD

A. Beginning Specific Gravity of Bitumen @ 60 F	1.029
B. Beginning Weight Per Gallon @ 60 F	8.570
C. Temperature of Bitumen in Tank When Check Starts	290
D. Weight Per Gallon of Bitumen at Temperature	7.902
E. Gallons in Tank When Check Starts (calibrated stick)	2515
Gallons at Start (at start of tank use)	☑
F. Weight of Bitumen in Tank (start check) (D x E / 2000)	9.94
G. Weight of Bitumen Added to Tank(s)	102.14
H. Temperature of Bitumen in Tank When Check Ends	290
I. Gallons in Tank When Check Ends (calibrated stick)	5776
J. Ending Specific Gravity of Bitumen @ 60 F	1.029
K. Ending Weight Per Gallon @ 60 F	8.5695
L. Weight Per Gallon at Temperature	7.901
M. Weight of Bitumen in Tank (end check) (I x L / 2000)	22.82
Left in Storage (at end of tank use)	☐
N. Weight of Bitumen Used (F + G - M)	89.26
O. Weight of Mix Produced (Tons)	1623.16
P. Percent Bitumen in Mix (N / O x 100)	5.50

Gallons at Start checkbox

Left in Storage checkbox

G.	Load #	Invoice #	Tons
	1	190021783	25.44
	2	190021803	25.89
	3	190021829	25.96
	4	190021869	24.85

Summary of Mix Produced			Bitumen	
To Road	1615.16	Tons	88.82	Tons
Plant Waste		Tons		Tons
Road Waste	8.00	Tons	0.44	Tons
To Others		Tons		Tons
Produced	1623.16	Tons		

REMARKS

Figure 20. Example of DOT 89 form

Bitumen Content Summary Report: A report summarizing the information on the DOT 89s is available in the MS&T System and is found by following the menu path: **Reports, Test, Bitumen Content Summary (DOT 89).** This report also shows the calculated asphalt binder quantities for each day, as well as the calculated number of tons of asphalt binder present in the storage tank at the beginning and end of each day.

SD Department of Transportation
Bitumen Content Summary (DOT-89)

Contract: 4982 **Date Let:** 01/21/2015
PCN: 04AV (Main)
Project(s): P 6435(18) (Main)
County: Marshall
Location: Fm SD10, 8 W of SD27 at Britton, S 4 mi. on 415 Ave (Co. Rd 11) to 114 St
Type of Work: Asphalt Concrete Surfacing
Contractor: BITUMINOUS PAVING INC **Length:** 0 miles
Engineer: Ben Ganje **Area:** Aberdeen Area

Bitumen Type: 320E0005 - PG 58-34 Asphalt Binder
Material: Class E Asphalt Concrete

Report No.	Test Date	Pct Bit	Mix/Bit	To Road	Plant Waste	Road Waste	To Others	Mix Produced	Bitumen in Tank Start Check	Bitumen in Tank End Check	Tank Ind
01	08/29/2015	5.50	Mix:	1,615.16	0.00	8.00	0.00	1,623.16	9.94 ✓	22.82	
			Bit:	88.82	0.00	0.44	0.00	89.26			
02	08/31/2015	5.49	Mix:	2,423.60	0.00	4.00	0.00	2,427.60	22.82	89.98	
			Bit:	133.11	0.00	0.22	0.00	133.33			
03	09/01/2015	5.55	Mix:	2,248.46	0.00	30.77	0.00	2,279.23	89.98	87.82	
			Bit:	124.80	0.00	1.71	0.00	126.51			
04	09/02/2015	5.52	Mix:	2,439.86	0.00	3.00	0.00	2,442.86	87.82	78.82	
			Bit:	134.74	0.00	0.17	0.00	134.91			
05	09/03/2015	5.57	Mix:	1,298.62	0.00	13.00	0.00	1,311.62	78.82	18.30 ✓	
			Bit:	72.30	0.00	0.72	0.00	73.02			
			Total Mix:	10,025.70	0.00	58.77	0.00	10,084.47			
			Total Bit:	553.77	0.00	3.26	0.00	557.03			

One un-interrupted use of the tank

Figure 21. Bitumen Content Summary (DOT-89) report generated in the MS&T System; note checkmarks at the beginning and end of continuous use of the tank.

If the tank is in continuous, uninterrupted use, the actual number of tons of bitumen in the storage tank will remain constant from the end of one day to the beginning of the next, regardless of changes in temperature, volume and specific gravity. Therefore, the calculated number of tons of bitumen shown in the **Bitumen in Tank End Check** column of this report should be the same as the calculated number of tons of bitumen shown in the **Bitumen in Tank Start Check** column for the next working day. Differences between the end and beginning weight of bitumen in the tank on consecutive days of uninterrupted use are indicative of errors on the DOT 89. Such errors may affect the calculation of bitumen content and asphalt binder pay quantities. The Project Engineer should contact the Bituminous Engineer for assistance with finding and correcting these errors.

Daily Item Installations: The daily Item Installation for an asphalt concrete item should be the **To Road** quantity for that item recorded on the DOT 89, which is the final quantity of asphalt concrete placed on the road after deduction of road waste. The Item Installation should include an explanation for any asphalt concrete quantities that differ from the DOT 89 for that day or that are not documented on a DOT 89. An example of a daily Item Installation follows.

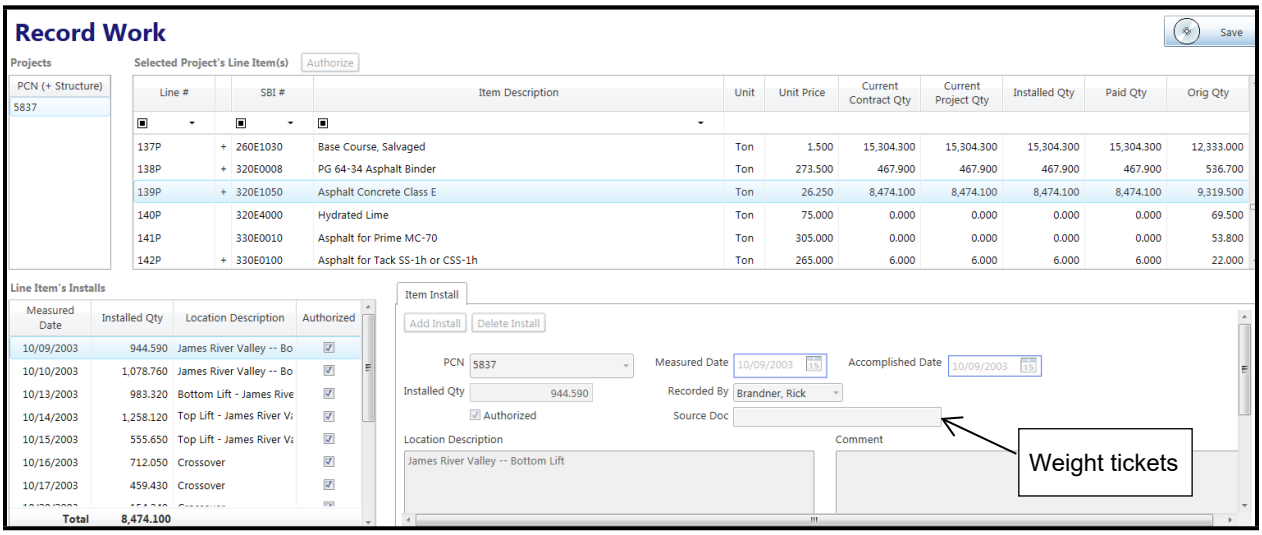


Figure 22. Daily Item Installation for Asphalt Concrete Class E corresponding to DOT 89 Report Number 001 in the two previous figures

Total asphalt concrete and asphalt binder payment quantities must be re-evaluated after any changes or corrections to the DOT 89s.

QC/QA Price Adjustments: Price adjustments made in accordance with the pay factor calculations in Section 320.4 of the *Special Provision for Quality Control/Quality Assurance Specifications for Asphalt Concrete Pavement* will be made on the Price Adjustment Maintenance Panel of the Pay Estimate Window by selecting the radio button for **Incentive/Disincentive** and choosing **QC/QA** from the drop-down table. An example follows. The **Detailed Explanation** field should indicate the lot or lots for which the incentive is calculated.

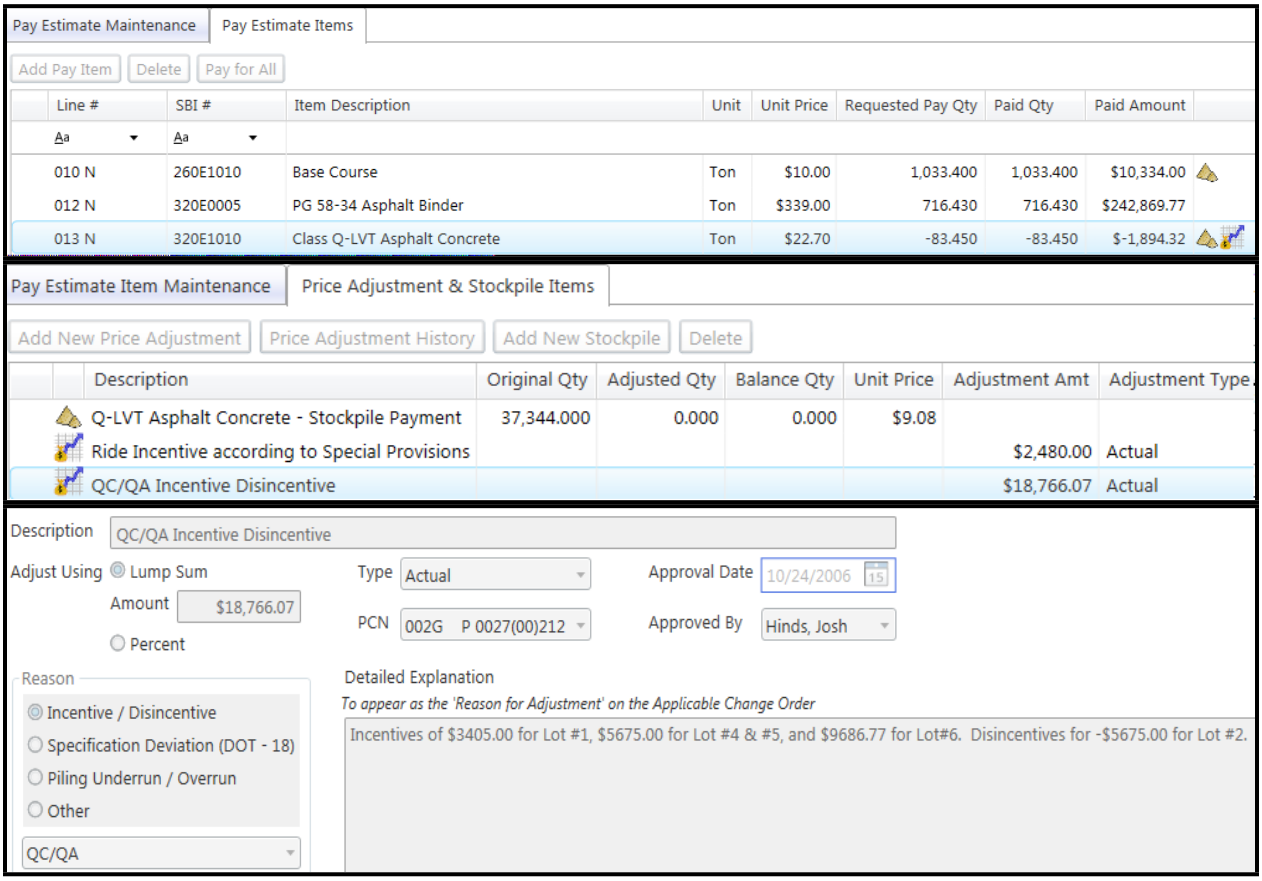


Figure 23. Price Adjustment for pay factor calculations

As with all price adjustments, information entered into the **Reason** field will appear on the pay estimate, and information entered into the **Detailed Explanation** field will appear on the change order to which the adjustment is assigned.

Price Adjustments for Flexible Pavement Smoothness: Price adjustments made in accordance with the *Special Provision for Flexible Pavement Smoothness* are calculated and provided to the Project Engineer by the Pavement Engineer in the Office of Materials and Surfacing. These adjustments are made on the Price Adjustment Maintenance Panel of the Pay Estimate Window by selecting the radio button for **Incentive/Disincentive** and choosing **Smoothness** from the drop-down table. An example follows.

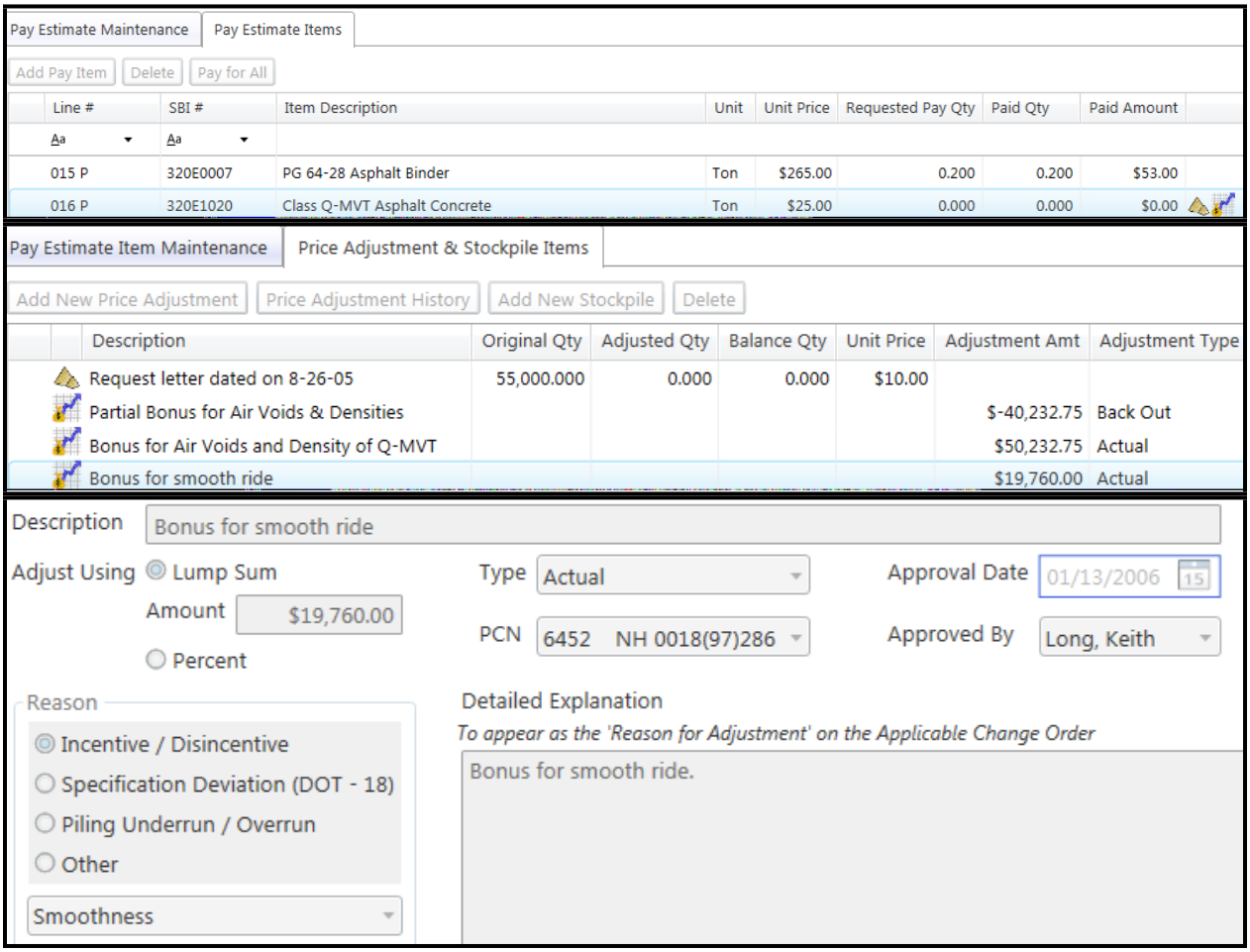


Figure 24. Price Adjustment for flexible pavement smoothness incentive

As with all price adjustments, information entered into the **Reason** field will appear on the pay estimate, and information entered into the **Detailed Explanation** field will appear on the change order to which the adjustment is assigned.

ASPHALT BINDER (MOBILE PLANTS)

Daily Item Installations: Daily Item Installation quantities should be calculated based on the quantity of asphalt concrete installed on the project that day, multiplied by the total quantity of asphalt binder used that day, and divided by the total quantity of asphalt concrete produced that day. The **Bitumen Content Summary** report shown in Figure 21 displays the system-calculated quantity of asphalt binder for each DOT 89. The final Item Installation should correct the total quantities based on the **Project Summary of Bitumen Applied (DOT 74)** report described later in this chapter.

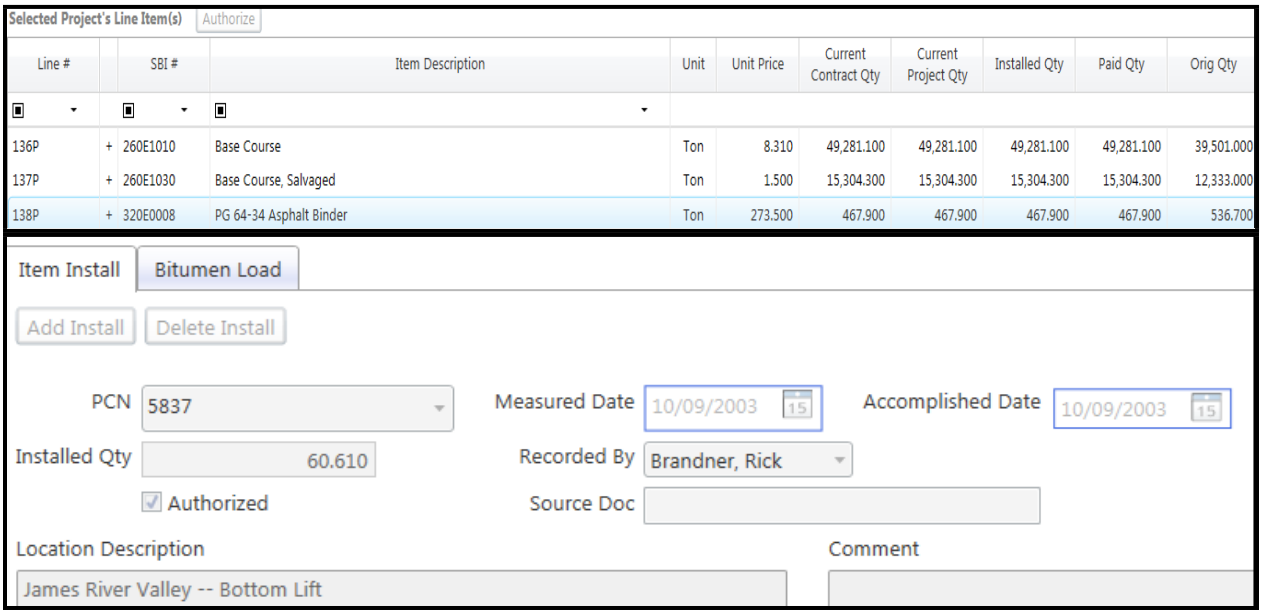


Figure 25. Daily Item Installation for Asphalt Binder.

In the preceding example, the installed quantity is equal to the calculated Bitumen "To Road" quantity shown in **Figure 21** for DOT 89 Report Number 001.

Item Installations for quantities of asphalt concrete (and associated asphalt binder) that are not documented on a DOT 89 should be clearly identified, since these quantities will not be included on the DOT 74 or **Bitumen Content Summary** reports for the project. The Item Installation Comments should explain why the material was not documented on a DOT 89.

Final Quantity Calculation: The source documentation for asphalt binder quantities will be asphalt binder weight tickets in combination with information recorded on the DOT 89. The final total asphalt binder quantity is calculated as the sum of weight tickets for all loads of asphalt binder brought to the asphalt plant, plus asphalt binder present in the storage tank at the beginning of the project, minus quantities that are wasted, used off-contract or left in the tank at the end of the project. If asphalt production is interrupted and the tank used elsewhere, asphalt binder in the tank at the beginning of the interruption and at the time of work resumption is taken into account based on checkmarks place in the **Gallons at Start** and **Left in Storage** checkboxes over the course of the project.

Total asphalt binder quantities are calculated on the **Project Summary of Bitumen Applied (Report DOT 74)**. The DOT 74 is compiled by the MS&T System using information entered on the DOT 89's, and is found by following the menu path: **Reports, Test, Project Summary of Bitumen/Lime Applied (DOT 74). Figure 26** is an example of the DOT 74 generated by the MS&T System.

11/19/2015

DOT-74
(10/2002)

SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

PROJECT SUMMARY OF BITUMEN APPLIED

PROJECT P 6435(18) COUNTY Marshall PCN 04AV

SUPPLIER(S) CONTRACTOR BITUMINOUS PAVING INC, ORTONVILLE MN

STARTING DATE 08/29/2015 COMPLETION DATE 09/03/2015

BITUMEN TYPE PG 58-34 ASPHALT BINDER AREA ENGINEER Dwight, Phil

Weigh Ticket No. *		NET TONS BY GRADE			REMARKS
Date	Commerical Carrier	Load #	Load Qty	Running Total	
			9.94	9.94	At Start of Tank Use
					Class E Asphalt Concrete
08/29/2015	190021783	1	25.44	35.38	
08/29/2015	190021803	2	25.89	61.27	
08/29/2015	190021829	3	25.96	87.23	
08/29/2015	190021869	4	24.85	112.08	
08/31/2015	190021720	5	25.27	137.35	
08/31/2015	190021753	6	25.66	163.01	
08/31/2015	190021840	7	25.92	188.93	
08/31/2015	190021868	8	25.31	214.24	
08/31/2015	190021877	9	24.87	239.11	
08/31/2015	190021879	10	24.47	263.58	
08/31/2015	190021881	11	24.51	288.09	
08/31/2015	190021908	12	24.48	312.57	
09/01/2015	190021917	13	24.86	337.43	
09/01/2015	190021921	14	24.89	362.32	
09/01/2015	190021943	15	25.15	387.47	
09/01/2015	190021945	16	24.90	412.37	
09/01/2015	190021949	17	24.55	436.92	
09/02/2015	190021904	18	24.76	461.68	
09/02/2015	190021907	19	24.71	486.39	
09/02/2015	190021925	20	24.97	511.36	
09/02/2015	190021964	21	26.01	537.37	
09/02/2015	190021957	22	25.46	562.83	
09/03/2015	190021984	19	12.50	575.33	
Sub-Total (Tons)				575.33	
Plant Waste				0.00	
Road Waste				3.26	
To Others				0.00	
Left In Storage				18.30	
Net Total Tons				553.77	

These numbers should be equal, or within .05 tons

Inspector Date

Figure 26. Project Summary of Bitumen Applied (DOT 74) report generated in the MS&T System

The load information is compiled by the MS&T System from the loads entered on the DOT 89s. The **Plant Waste**, **Road Waste** and **To Others** are calculated and totaled by the system based on quantities and bitumen percentages on each DOT 89. The number of tons **At Start of Tank Use** and **Left In Storage** are the system-calculated totals for all continuous uses of the tank. For the final amount remaining in the tank at the end of the project, see the final DOT 89 or the **Bitumen Content Summary** report.

Note that the final Running Total of load quantities (575.33 tons) in the preceding example is equal to the Sub-Total immediately below it. The DOT 74 is valid only if these numbers are within .05 tons. If they are not, the **Net Total Tons** on the DOT 74 may not be correct. The Engineer should review the DOT 89s to make sure that the **Gallons at Start** and **Left in Storage** boxes are checked at the beginning and end respectively of each uninterrupted use of the tank. The Project Engineer should also review the **Bitumen Content Summary** report for differences between the end and beginning weight of bitumen in the tank on consecutive working days as described previously.

Asphalt binder is included in the unit price per ton for Asphalt Concrete for Haul Road Restoration and Asphalt Concrete Composite. If Asphalt Concrete for Haul Road Restoration or Asphalt Concrete Composite are contract items and are produced concurrently with a mix for which DOT 89s are required, these quantities should be clearly identified on the DOT 89s and care should be taken not to pay for the asphalt binder. The mix quantities can be included in the **To Other** field on the DOT 89 to avoid including the asphalt binder in the **Net Total Tons** on the DOT 74.

Excess Asphalt Binder: Quantities of asphalt binder in excess of the asphalt content listed on the job mix formula plus 0.3% tolerance will not be accepted for payment. Quantities on the DOT 74 are actual quantities of asphalt binder used, and have not been reduced for excess asphalt binder. Excess quantities can be deducted from the individual Item Installation quantity or can be recorded as negative Item Installations with an explanation of how the quantity was arrived at. This is a quantity issue and is treated separately from and in addition to a price adjustment for the specification deviation.

LIME

The DOT 74 and **Lime Content Summary** reports are generated by the MS&T System based on the DOT 33Q forms and are comparable to the forms for asphalt binder. They are found by following the same menu path. Alternate methods for determining the amount of lime used must be approved by the Engineer.

SBI GROUP 324: ASPHALT CONCRETE COMPOSITE

The source documentation for asphalt concrete composite will be weight tickets in combination with records of quantities wasted or used off-contract. The daily ticket totals should be recorded in the Item Installations.

Asphalt binder is included in the unit price per ton for asphalt concrete composite. If asphalt concrete composite is produced concurrently with a mix for which DOT 89s are required, these quantities should be clearly identified on the DOT 89s and care should be taken not to pay for the asphalt binder.

SBI GROUP 330: PRIME, TACK, FOG, AND FLUSH SEAL COATS

The source documentation for asphalt items in this group will be weight tickets in combination with records of quantities wasted, left over, and used off-contract. This information should be entered in the Bitumen Load tab of the Item Installation panel. An example follows.

Selected Project's Line Item(s) Authorize

Line #	SBI #	Item Description	Unit	Unit Price	Current Contract Qty	Current Project Qty	Installed Qty	Paid Qty	Orig Qty
139P	+ 320E1050	Asphalt Concrete Class E	Ton	26.250	8,474.100	8,474.100	8,474.100	8,474.100	9,319.500
140P	320E4000	Hydrated Lime	Ton	75.000	0.000	0.000	0.000	0.000	69.500
141P	330E0010	Asphalt for Prime MC-70	Ton	305.000	0.000	0.000	0.000	0.000	53.800

Item Install | Bitumen Load

Add Load | Delete Load

Load #	Date Delivered	Ticket #	Load Lbs	Project Lbs	Wasted	Left In Storage	Used Off Project	Load Desc
1	10/09/2003	598894	54,100	54,100	0	0	0	
2	10/09/2003	598914	50,260	50,260	0	0	0	

Figure 27. Bitumen Load tab of the Item Installation panel for MC-70 Asphalt for Prime.

A DOT 74 report is generated in the CM&P System using this information. The report can be viewed by single clicking the applicable contract item in the *Record Work w*indow and then following the menu path: **Reports, Summary of Bitumen Applied (DOT 74**). The following is an example of the report.

SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

DOT-74
(09/2001)

PROJECT SUMMARY OF BITUMEN APPLIED

PROJECT NH 0083(15)88 COUNTY Lyman PCN 5861
SUPPLIER(S) CONTRACTOR BORDER STATES PAVING, INC., FARGO ND
STARTING DATE 06/24/2006 COMPLETION DATE 08/21/2007
BITUMEN TYPE SS-1H OR CSS-1H ASPHALT FOR FLUSH SEAL AREA ENGINEER Dean VanDeWiele

Weigh Ticket No. *		NET POUNDS BY GRADE			REMARKS
Date	Commercial Carrier	Load #	Load Qty	Running Total	Start of Project
06/23/2006	589167787	1	33,880	33,880	
Sub-Total-Pounds			33,880	33,880	
Deductions Rejected					
Wasted				0	
Used Off Project				22,960	
Net Total Pounds				10,920	
Net Total Install Tons				5.50	
Total Install Qty				5.50	
Difference				**0.00**	

Should not be more than .05

Figure 28. DOT 74 report generated in the CM&P System for SS-1H Asphalt for Flush Seal

Please note that the **Difference** of 0.00 at the end of the report indicates that the total installed quantity and quantity calculated on the DOT 74 are the same. The reason for differences greater than .05 ton should be investigated and resolved.

Selected Project's Line Item(s) Authorize

Line #		SBI #	Item Description	Unit	Unit Price	Current Contract Qty	Current Project Qty	Installed Qty	Paid Qty	Orig Qty
037P	+	330E0010	MC-70 Asphalt for Prime	Ton	336.250	80.800	80.800	80.800	80.800	117.100
038P	+	330E0100	SS-1h or CSS-1h Asphalt for Tack	Ton	313.340	509.800	509.800	509.800	509.800	389.200
039P	+	330E0210	SS-1h or CSS-1h Asphalt for Flush Seal	Ton	427.610	5.500	5.500	5.500	5.500	5.200

Item Install | Bitumen Load

Add Install | Delete Install

PCN 5861 | Measured Date 01/24/2007 | Accomplished Date 01/24/2007

Installed Qty 0.660 | Recorded By Larson, Rodney

☑ Authorized | Source Doc

Location Description | Comment

This is a correction of plus 0.66 tons added to installed quanity after final calculations

Figure 29. Final Item Installation for Asphalt for Flush Seal (see preceding DOT 74)

Selected Project's Line Item(s) Authorize

Line #		SBI #	Item Description	Unit	Unit Price	Current Contract Qty	Current Project Qty	Installed Qty	Paid Qty	Orig Qty
037P	+	330E0010	MC-70 Asphalt for Prime	Ton	336.250	80.800	80.800	80.800	80.800	117.100
038P	+	330E0100	SS-1h or CSS-1h Asphalt for Tack	Ton	313.340	509.800	509.800	509.800	509.800	389.200

Item Install | Bitumen Load

Add Install | Delete Install

PCN 5861 | Measured Date 01/25/2007 | Accomplished D

Installed Qty -71.948 | Recorded By Falcon, Elodio

☑ Authorized | Source Doc

Location Description

All of the above installations are based on shot records and were for estimate payments only. The Actual and Final payment for Asphalt for Tack is 509.8 Tons, this install will

Figure 30. Final Item Installation for Asphalt for Tack

The source documentation for blotting sand and sand for flush seal will be weight tickets, and daily totals should be entered as Item Installations.

SBI GROUP 332: COLD MILLING ASPHALT CONCRETE

Cold milled asphalt concrete is not measured for payment unless changes are ordered. Plan quantity will be used and a statement must be made in the Item Installation that the work was satisfactorily completed in accordance with plans. If changes from the plan quantity are ordered, these areas will be measured and the measurements entered in the Item Installation.

SBI GROUP 350: ASPHALT CONCRETE CRACK SEALING

The manufacturer's weights of the sealant will be accepted as the basis for measurement and payment, and the weights should be entered in the Item Installation.

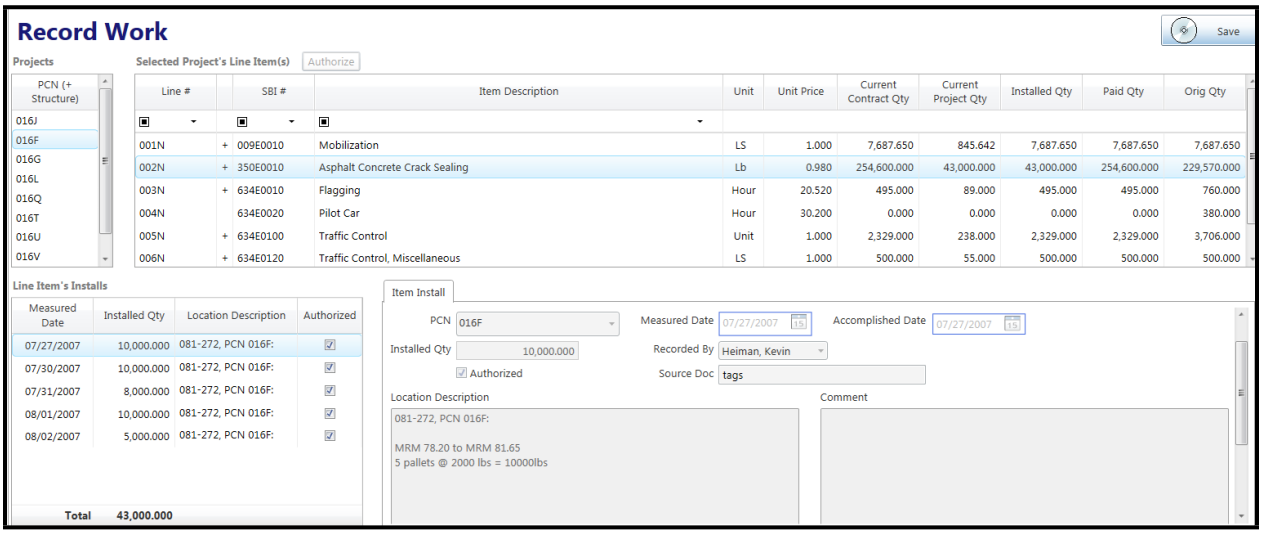


Figure 31. Item Installation for Asphalt Concrete Crack Sealing

SBI GROUP 360: ASPHALT SURFACE TREATMENT

The source documentation for asphalt items will be weight tickets in combination with records of quantities wasted, left over, and used off-contract. This information should be entered in the **Bitumen Load** tab of the **Item Installation** Panel. A DOT 74 report is generated in the CM&P System using this information. The report can be viewed by single clicking the applicable contract item in the **Record Work** Window and then following the menu path: **Reports, Summary of Bitumen Applied (DOT 74**). See examples under SBI Group 330.

The source documentation for Cover Aggregate will be weight tickets. Daily totals should be entered into the Item Installation.

SBI GROUP 370: COLD RECYCLING OF ASPHALT CONCRETE

Plan quantity will be the basis of payment for cold recycling unless changes are ordered by the Engineer, and a statement must be made in the Item Installation that the work was satisfactorily completed in accordance with plans. If changes from the plan quantity are ordered in writing by the Engineer, these areas will be measured and the measurements entered into *the* Item Installation.

The source documentation for Asphalt for Cold Recycling will be weight tickets in combination with records of quantities wasted, left over, and used off-contract. This information should be entered in the **Bitumen Load** tab of the **Item Installation** panel. A DOT 74 report is generated in the CM&P System using this information. The report can be viewed by single clicking the applicable contract item in the **Record Work** window and then following the menu path: **Reports, Summary of Bitumen Applied (DOT 74).** See examples under SBI Group 330.

SBI GROUP 380: PORTLAND CEMENT CONCRETE PAVEMENT

Daily Paving Reports: The source documentation for Portland Cement Concrete Pavement (PCCP) will be the Daily Paving Report (DOT 98), which must be completed at the end of each day's paving. Instructions for completing the Daily Paving Reports are included in the SDDOT Concrete Paving Manual beginning on page 7-115. The form is available for electronic completion in the MS&T System.

Daily Item Installations: Daily quantities must be recorded as Item Installations. The pavement width and start and stop stations should be provided. If there are differences between an Item Installation quantity and the daily quantity on the corresponding DOT 98, the reason for the difference should be provided in the Item Installation.

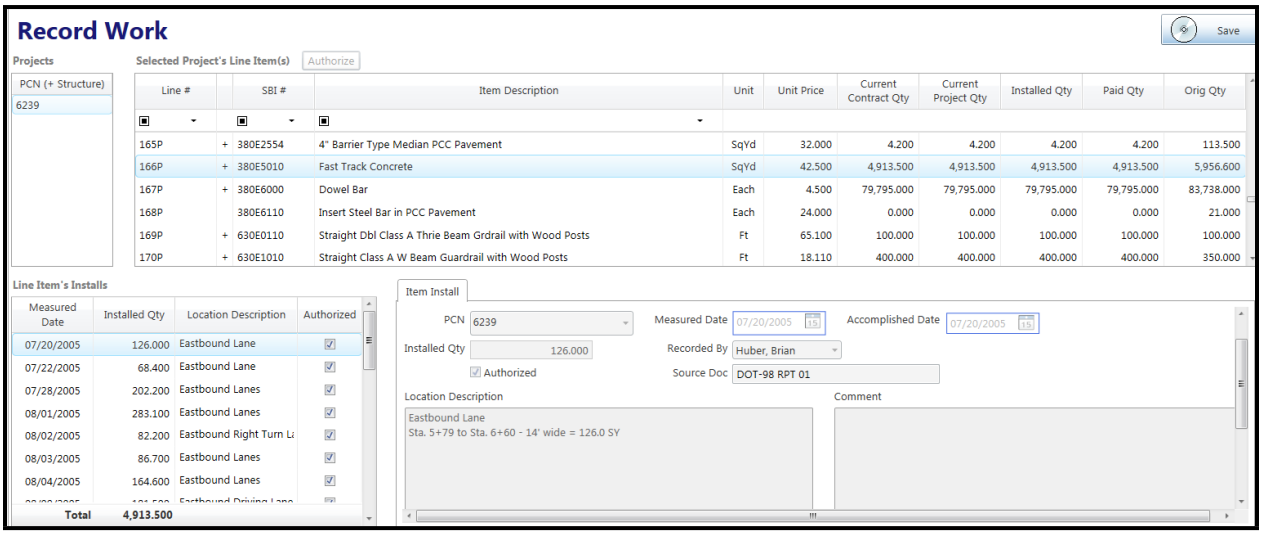


Figure 32. Item Installation for PCCP

Price Adjustments for Smoothness: If specified by plan note, PCC Pavement prices will be adjusted for smoothness. Price adjustments must be calculated in accordance with the

applicable Special Provision for PCC Pavement Smoothness and/or Specifications Section 380.3.O.2. The plan note will specify the locations to be profiled and the method. An example follows.

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	IM 0909(69)390	F5	F115

PAVEMENT SMOOTHNESS

Interstate 90 West Bound Lanes from Sta. 49+70 (1st) through Sta. 114+20.7 (3rd) shall be tested for smoothness with a Contractor furnished and operated 25 foot California style profilograph in accordance with Section 380.3 O 2 of the Standard Specifications.

Exit 396 Ramps H and B shall be tested for smoothness with a Contractor furnished and operated 25 foot California style profilograph in accordance with the Special Provision for PCC Pavement.

Figure 33. Plan note specifying location and method of PCCP smoothness testing

In the preceding example, a portion of the project is to be profiled in accordance with the Specifications and a portion is to be profiled in accordance with the Special Provision for Pavement Smoothness. The price adjustments must be calculated using an appropriate spreadsheet for each. Spreadsheet templates for calculating the price adjustments are available at M:\DOT\Common\All DOT Forms\ DOT Forms 201-300\Spread Sheets. These spreadsheets were developed assuming that the entered profile indices are in inches per mile, and that adjustments were made by the profilograph software for segments greater or less than a tenth of a mile. If this is not the case, the formulas in the lane average column will need to be changed to interpolate/extrapolate so that the calculated lane average will be in inches per mile.

Price adjustments for PCC Pavement smoothness must be made to the appropriate contract item using the **Price Adjustment Maintenance** panel of the **Pay Estimate** window. An example follows.

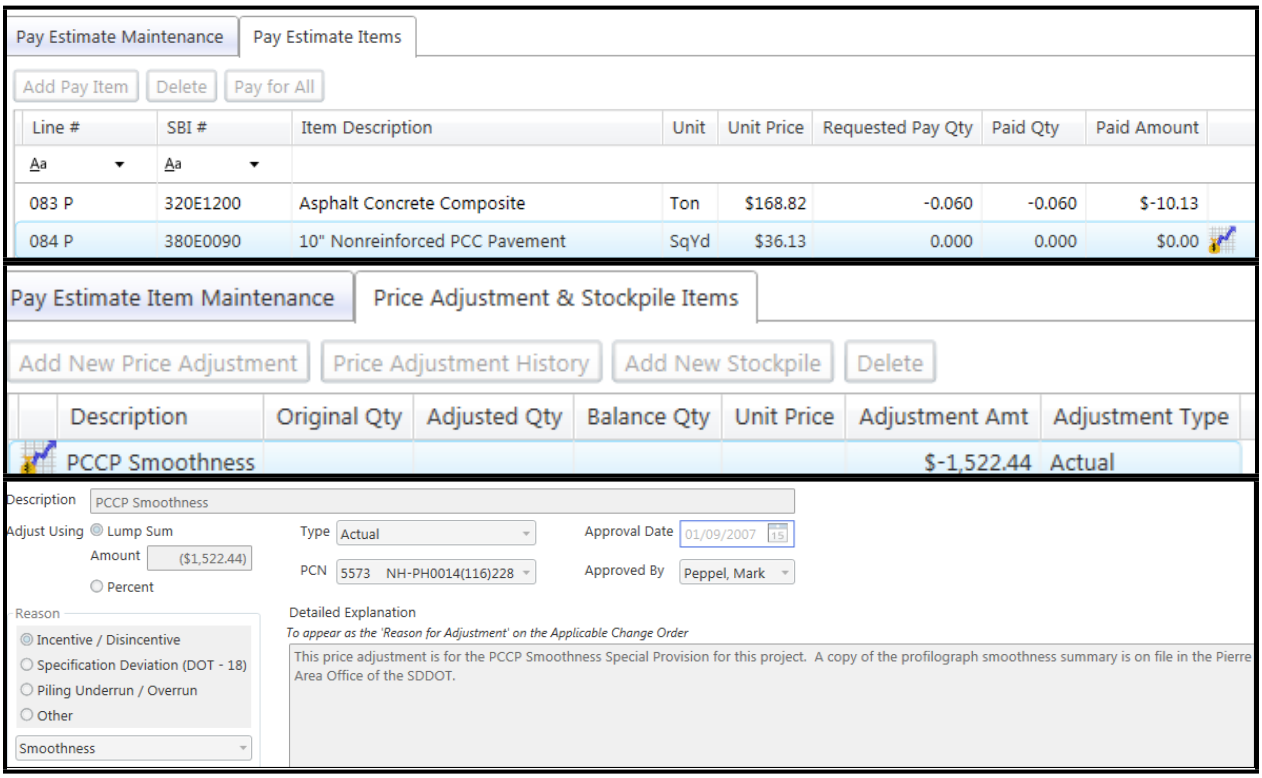


Figure 34. Price Adjustment for PCCP Smoothness.

As with all price adjustments, text information entered into the **Reason** text field will appear on the pay estimate, and information entered into the **Detailed Explanation…** field will appear on the change order to which the adjustment is assigned.

Dowel Bar Assemblies: Payment will be based on plan quantity unless changes are ordered in writing. A statement must be made in the Item Installation that the work was satisfactorily completed in accordance with plans. If changes are ordered, the changed quantities should be noted in the Item Installation.

SBI GROUP 390: CONCRETE SPALL REPAIR

Measurements should be entered into the Item Installation.

SBI GROUP 391: UNDERSEALING

PCC Drill Holes: The count should be included in the Item Installation.

PCC Pavement Undersealing: Portland cement will be the only material measured for payment. One bag of cement (94 Pounds) will equal one cubic foot. The count should be entered in the Item Installation.

Deflection Testing: The test locations (before and after undersealing) should be included in the Item Installation.

SBI GROUP 392: PAVEMENT JACKING

PCC Pavement Jacking Slurry: Portland cement will be the only material measured for payment. One bag of cement (94 Pounds) will equal one cubic foot. The count should be entered in the Item Installation.

PCC Pavement Jacking Foam: Weights should be entered into the Item Installation.

SBI GROUP 393: CRACKING AND SEATING OF PCC PAVEMENT

PCC Cracking and Seating: Dimensions and area calculations must be entered in the Item Installation.

Cored or sawed samples: The count should be entered in the Item Installation.

SBI GROUP 410: STEEL STRUCTURES

Structural steel is paid for at the lump sum contract price. A statement should be entered into the Item Installation that the work was completed in accordance with plans. If changes in the work are ordered, the payment will be adjusted as set forth in the Specifications, and the calculations should be entered into the Item Installation for the changed quantity.

SBI GROUP 411: SHOP PAINTING

Measurement will not be made. Plan quantity will be the basis of payment and a statement should be entered into the Item Installation that the work was completed in accordance with plans.

SBI GROUP 412: BRIDGE FIELD PAINTING, REPAINTING, AND PAINT RESIDUE CONTAINMENT

Measurement will not be made. Plan quantity will be the basis of payment and a statement should be entered into the Item Installation that the work was completed in accordance with plans.

SBI GROUP 420: STRUCTURE EXCAVATION

Field measurement for structure excavation quantities will not be made unless the Department determines that measurement is warranted. A statement should be entered into the Item Installation that the work was completed in accordance with plans. If the Engineer orders changes that require measurement, measurements of the changed areas should be entered into the Item Installation for the appropriate contract item as set forth in the Specifications.

SBI GROUP 421: BOX, PIPE AND PLATE PIPE CULVERT UNDERCUTTING

Plans quantity will be the basis of payment unless additional undercutting is directed by the Engineer. A statement should be entered into the Item Installation that the work was completed in accordance with plans. When additional undercutting is required, measurements of the changed areas should be entered into the Item Installation.

SBI GROUP 430: BRIDGE END BACKFILL

Plans quantity will be the basis of payment and a statement should be entered into the Item Installation that the work was completed in accordance with plans.

SBI GROUP 440: STRUCTURAL PLATE PIPE AND PIPE ARCHES

Measurements must be entered into the Item Installation.

SBI GROUP 450: PIPE CULVERTS

Pipe Notes: The source document for pipe culvert is the Pipe Note (DOT 214 Form). A separate pipe note is completed for each pipe. It is important that information on the pipe note be complete. The size and type of pipe and the installation location must be clearly shown on each note. Instructions for filling out and using pipe notes are included on page 2-7 of the *Pipe Installation Manual*.

Details about the pipe quantities delivered and installed are documented on the fourth page of the pipe note, which includes separate columns for section length and the number of sections. Pay quantities for pipe culvert are calculated by multiplying the nominal length of the sections by the number of sections used. By specification, when an installation requires that a section of pipe be cut, the length will be the actual length required, rounded up to the nearest even 2 feet. Pipe ends, elbows and Tees are also documented on the pipe note. An example of the fourth page of a pipe note follows.

HEAT NO. OR DATE	CLASS OR GAUGE	NUMBER OF SECTIONS	LENGTH OF SECTIONS	DATE RELEASED	DATE INSTALLED
7/05/06	CL 4	11	8'	7/07/06	8/21/06
7/06/06	CL 4	1	8'	7/07/06	8/21/06
6/29/06	CL 4	1	8"	7/07/06	8/21/06
7/07/06	CL 4	11	8"	7/07/06	8/22/06
6/29/06	CL 4	1	8"	7/07/06	8/22/06
7/06/06	CL 4	1	8"	7/07/06	8/22/06
6/29/06	CL 4	1	4"	7/07/00	8/23/06

PIPE COMPANY Hanson
COMPANY LOCATION Sioux Falls
TOTAL INSTALLED 68' X 18" RCP ARCH
INSTALLATION COMPLETE 8/23/06
Ken P [illegible]
PIPE INSPECTOR

Figure 35. Fourth page of pipe note

Other Documentation: Alternative documentation in spreadsheet format will be acceptable for pipe extensions on slope flattening projects if the lengths of pipe sections and number of sections for each location are recorded either on the spreadsheet or in the Item Installation in the CM&P System. Manufacture and release dates for reinforced concrete pipe, heat numbers for corrugated metal pipe, and pipe company must still be documented and retained in the project file, as well as any other relevant information that would have otherwise been included on the pipe note.

Item Installations: The Item Installations should clearly show the quantity of pipe at each location. An example follows.

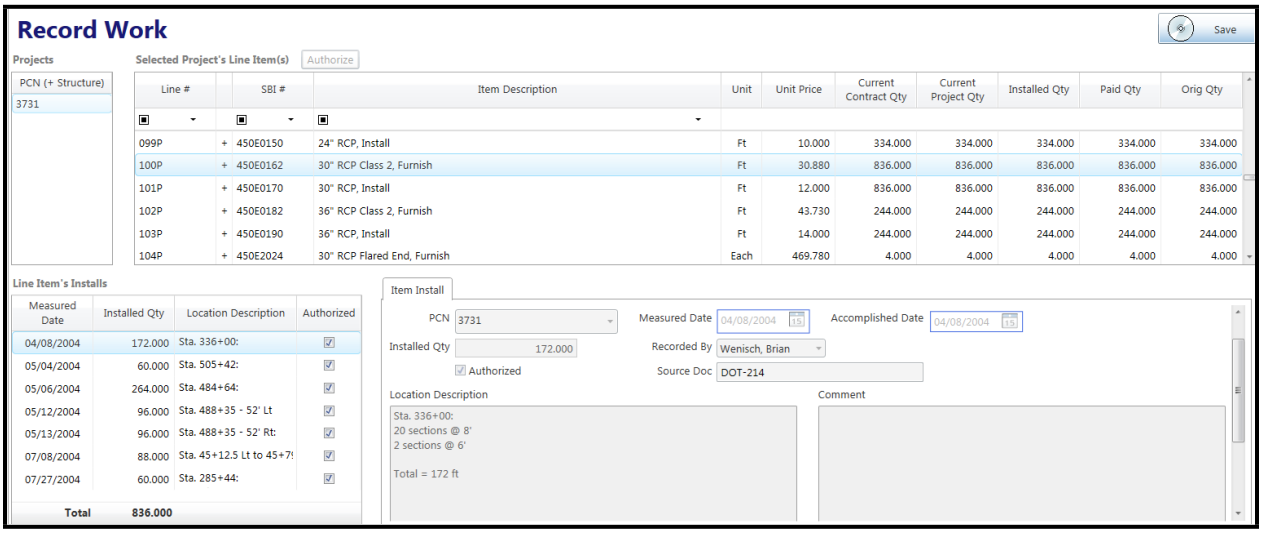


Figure 36. Item Installation for pipe culvert

SBI GROUP 460: STRUCTURAL CONCRETE

Structural concrete will be measured in accordance with the neat line dimensions shown on the plans unless changes are ordered in writing. If changes are ordered, computations of the changed quantities should be included in *the* Item Installation.

03/15/2018 Item Installation Detail Page 1 of 1

Hwy52-Lake. with Reede Construction, Inc.

Main Project # P-PH 3052(4)332 **Main PCN** 6239 Yankton Area --> Rothschadl, Greg

SD52 FM SD50 TO YANKTON

Line No	Units	Description	Unit Price	Contract Qty	Installed Qty	Authorized Qty
208P	CuYd	Class A45 Concrete, Box Culvert	$314.830	272.300	272.300	272.300

PCN	Inspector	Accomplished	Installed	Authorized	Source Doc
6239	Huber, Brian	05/19/2005	45.400	45.400	
	Location				
	Sta. 20+92.0 Str. No. 68-061-206 Estimated for the Floor of Outlet Barrel Section = 45.4 cy				
	Huber, Brian	05/25/2005	45.400	45.400	
	Location				
	Sta. 20+92.0 Str. No. 68-061-206 Estimated for the Floor of Middle Barrel Section = 45.4 cy				
	Huber, Brian	06/02/2005	45.400	45.400	
	Location				
	Sta. 20+92.0 Str. No. 68-061-206 Estimated for the Wall & Lid of Outlet Barrel Section = 45.4 cy				

Figure 37. Item Installation Detail report for structural concrete, summarizing six Item Installations

SBI GROUP 462: CONCRETE FOR INCIDENTAL CONSTRUCTION – CLASS M(I)

Class M (I) concrete will be measured in accordance with the neat line dimensions shown on the plans unless changes are ordered in writing. A statement should be entered into the Item Installation that the work was completed in accordance with the plans. If changes are ordered, computations of the changed quantities should be included in the Item Installation.

SBI GROUP 463: POLYMER MODIFIED ASPHALT GROWTH JOINT AND ASPHALT BRIDGE JOINT

Measurements should be entered into the Item Installation.

SBI GROUP 465: DRILLED SHAFT CONSTRUCTION

Class A45 (A31) Concrete, Drilled Shaft and Drilled-In-Foundation Excavation: The plan quantity will be the basis of payment unless a change is ordered in writing. If a change is ordered, measurement will be according to neat line dimensions specified in the change and the calculation should be entered into the Item Installation.

Permanent Casing: Measurements should be entered into the Item Installation.

Crosshole Sonic Log (CSL) Test: The count should be entered into the Item Installation.

SBI GROUP 470: RAILING

Plans quantity will be the basis of payment. A statement should be entered into the Item Installation that the work was completed in accordance with the plans.

SBI GROUP 480: REINFORCING STEEL

Plan quantity will be the basis of payment unless there are revisions to the plans. The source document for reinforcing steel will be the shipping documents in conjunction with the Inspector's observations in the Item Installations that bars were placed in accordance with the plans.

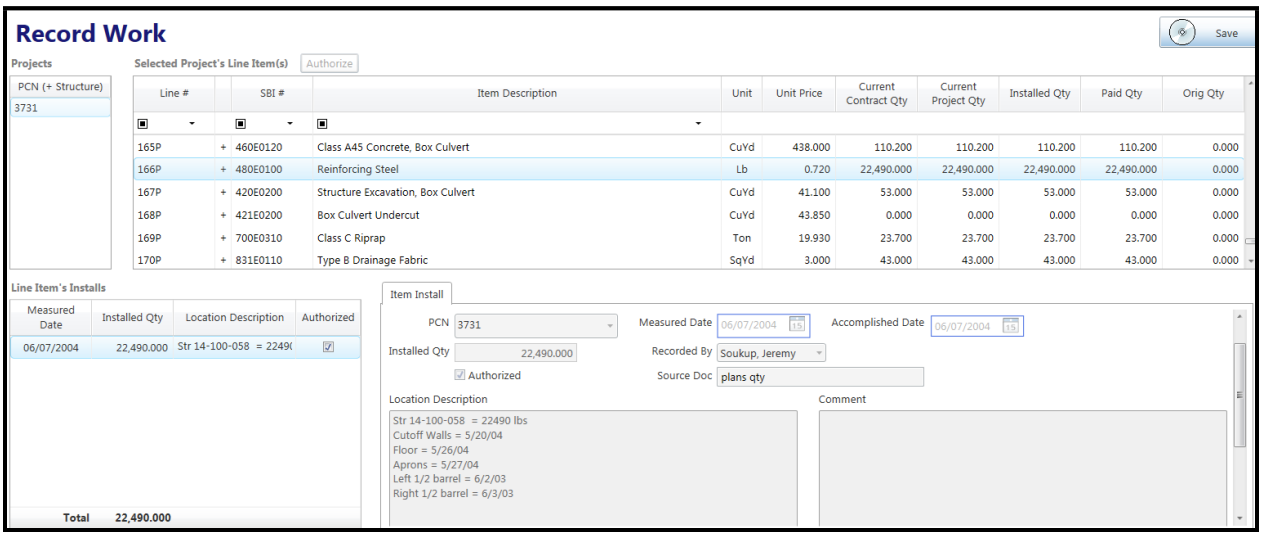


Figure 38. Item Installation for Reinforcing Steel

SBI GROUP 491: EPOXY CHIP SEAL

Remove Rubberized Asphalt Chip Seal, Bridge Deck Grinding, Abrasive Blasting of Bridge Deck, Epoxy Chip Seal: Measurement will not be made for these items. The plan quantity will be the basis of payment. A statement should be entered into the Item Installation that the work was completed in accordance with the plans.

Remove and Replace Deteriorated Concrete: Measurements and area calculations should be recorded in the Item Installation.

SBI GROUP 510: TIMBER, PRESTRESSED AND STEEL PILES

Pile Reports: The source documentation for test pile quantity is the Inspector's Test Pile Report (DOT 203). The source documentation for bearing pile quantity is the Pile Inspector's Report (DOT 204). Instructions for completing pile reports are included in Chapter 5 of the SDDOT Structures Construction Manual.

Test Piles: The Item Installation should list the total footage for each unit of the structure. The pay quantity for each test pile will be either the actual length of test pile remaining in the completed structure or plan quantity, whichever is greater. Percentage price adjustments are not made for underrun or overrun of test pile.

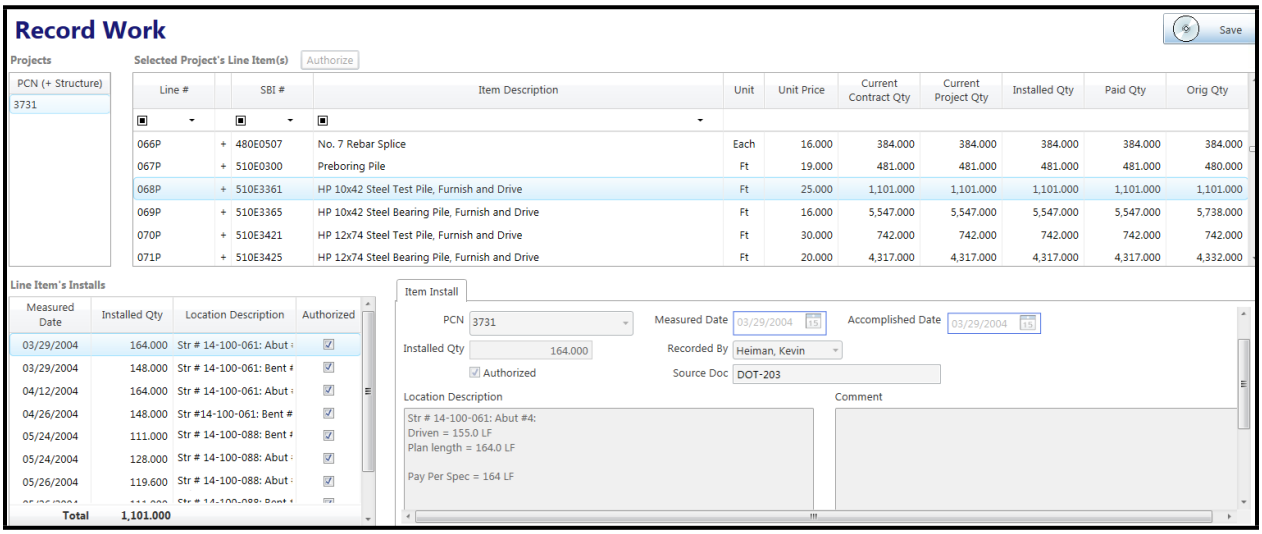


Figure 39. Item Installation for Test Pile

Bearing Piles: The Item Installations should list the total footage for each unit of the structure. The pay quantity will be the actual length of bearing pile remaining in the completed structure.

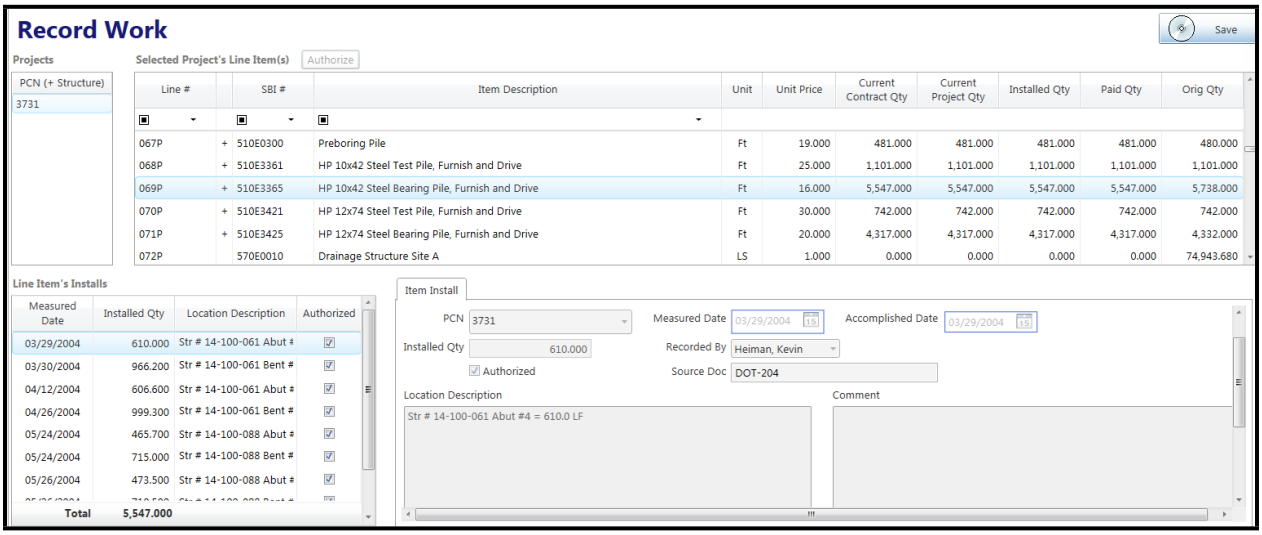


Figure 40. Item Installation for Bearing Pile

If the Contractor is entitled to receive compensation for bearing pile underrun or overrun in accordance with Section 510.5.B of the Specifications, price adjustments will be made using the radio button for **Piling Underrun/Overrun** the **Price Adjustment Maintenance** Panel of the **Pay Estimate** window. An example follows.

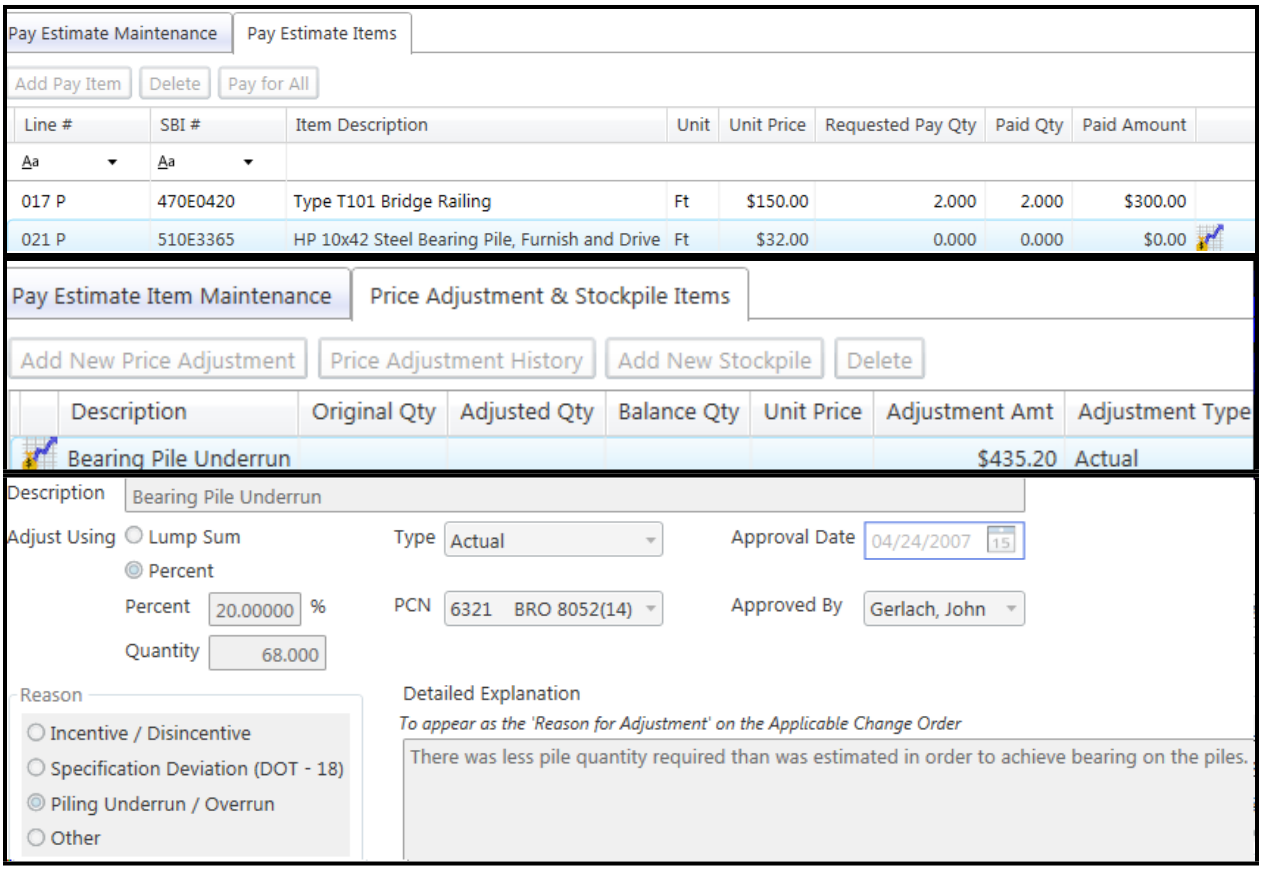


Figure 41. Price adjustment for bearing pile underrun

Preboring Piling: The source documentation will be the DOT 203 and DOT 204. The Item Installation should list the total footage for each particular unit of the structure.

SBI GROUP 530: GALVANIZED METAL BIN-TYPE RETAINING WALLS

Plan quantity will be the basis of payment unless changes are ordered by the Engineer. A statement should be entered into the Item Installation that the work was completed in accordance with plans. If the Engineer orders changes, measurements of the changed areas should be entered into the Item Installation

SBI GROUP 550: BRIDGE DECK PREPARATION AND RESURFACING

Type 1A Type 2A Type 1B Type 1C Type 1D and Type B Removal: Measurements should be entered into the Item Installation.

Class A45 (A31) Concrete Fill: Source documents will be ticket batch printouts, cross sections or net truck weight tickets (theoretical volume based upon 150 pounds per cubic foot). Daily totals should be entered into the Item Installation.

Latex Modified Bridge Deck Overlay: Source documents will be batch ticket printouts of the cement used and the yield tests performed. Daily totals should be entered into the Item Installation.

Low Slump Dense Concrete Bridge Deck Overlay: Source documents will be mixer cement meter readings supported by yield tests. Daily totals should be entered into the Item Installation.

Finishing and Curing: Measurements should be entered into the Item Installation.

SBI GROUP 560: PRECAST/PRESTRESSED CONCRETE

Prestressed Concrete Beam, Furnishing Precast Box Culvert, and Installing Precast Box Culvert: Measurement will not be made. Plan quantity will be the basis of payment. A statement should be entered into the Item Installation that the work was completed in accordance with plans.

Furnishing and Installing Precast Box Culvert End Sections: The number and location must be entered into the Item Installation. One end section will be considered to be all of the individual pieces required to construct one end of the box culvert.

SBI GROUP 570: DRAINAGE STRUCTURE OPTIONS

The Drainage Structure Site A, B, etc. will be paid for at the contract lump sum price and will not be measured. Option items that comprise the drainage structure site will be measured and documented according to the related plan and specification requirements. The individual items and unit prices contained in the structures options bid schedule sheets will be used to adjust the lump sum contract unit price for each drainage structure when there are underruns or overruns and such adjustment explained in the Item Installation.

SBI GROUP 600: FIELD LABORATORY

The source document will be the Field Laboratory Inspection Record (DOT 50). The Item Installation should include a statement regarding completion of inspections and acceptance for payment.

SBI GROUP 601: HAUL ROADS

Haul road repair items will be reimbursed at the unit prices contained in the applicable Special Provision Regarding Price Schedule for Miscellaneous Items. For items other than dust control, the Item Installation should state whether the quantity paid is the state's 50% share, or if the haul road is a state road.

The source documentation for Asphalt Concrete, Haul Road Restoration, will be weight tickets in combination with records of quantities wasted and used off-contract. Asphalt binder is included in the unit price per ton for Asphalt Concrete, Haul Road Restoration. If Asphalt Concrete, Haul Road Restoration, is produced concurrently with a mix for which DOT 89s are

required, these quantities should be clearly identified on the DOT 89s and care should be taken not to pay for the asphalt binder.

SBI GROUP 610: CATTLE GUARDS

The count for each location should be entered into the Item Installation.

SBI GROUP 620: RIGHT-OF-WAY FENCING

Measurements or counts by location should be entered in the Item Installation.

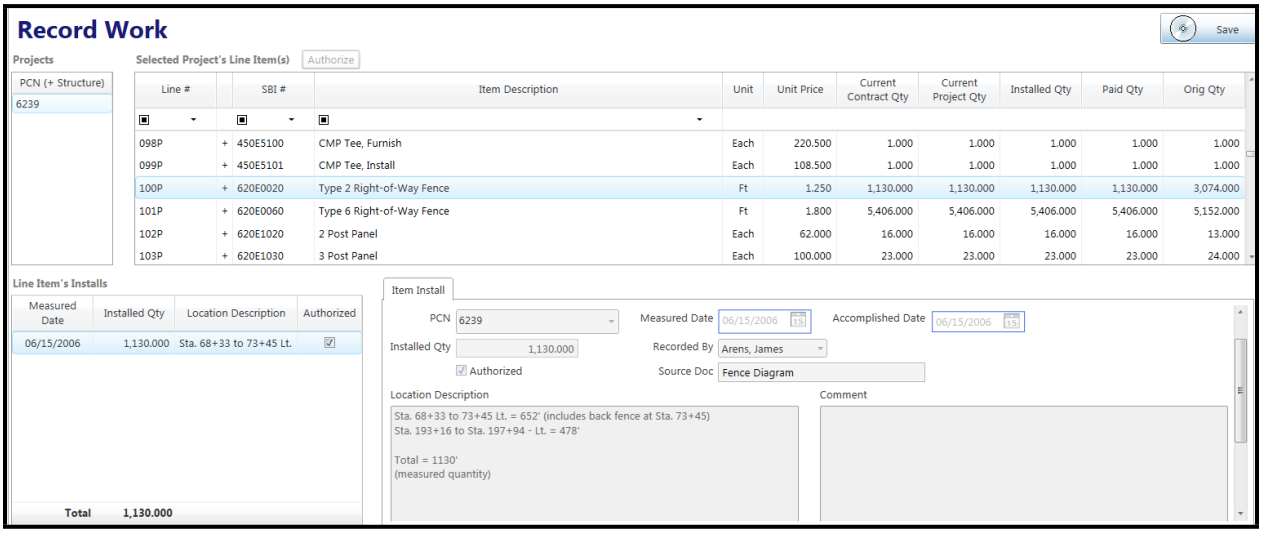


Figure 42. Item Installation for Right-of-Way Fence.

The “Fence Diagram” source document in this case was an annotated sheet from the grading plans.

SBI GROUP 621: CHAIN LINK FENCING

Measurements by location should be entered in the Item Installation.

SBI GROUP 629: THREE CABLE GUARDRAIL

Measurements or counts for each location should be entered in the Item Installation.

SBI GROUP 630: STEEL BEAM GUARDRAIL

Measurements or counts for each location should be entered in the Item Installations.

SBI GROUP 631: RIGHT OF WAY MONUMENTS

The count for each location should be entered in the Item Installations.

SBI GROUP 632: HIGHWAY SIGNS AND DELINEATORS

Measurements or counts should be entered in the Item Installations.

SBI GROUP 633: PAVEMENT MARKING

Measurements or counts should be entered in the Item Installations. An example follows.

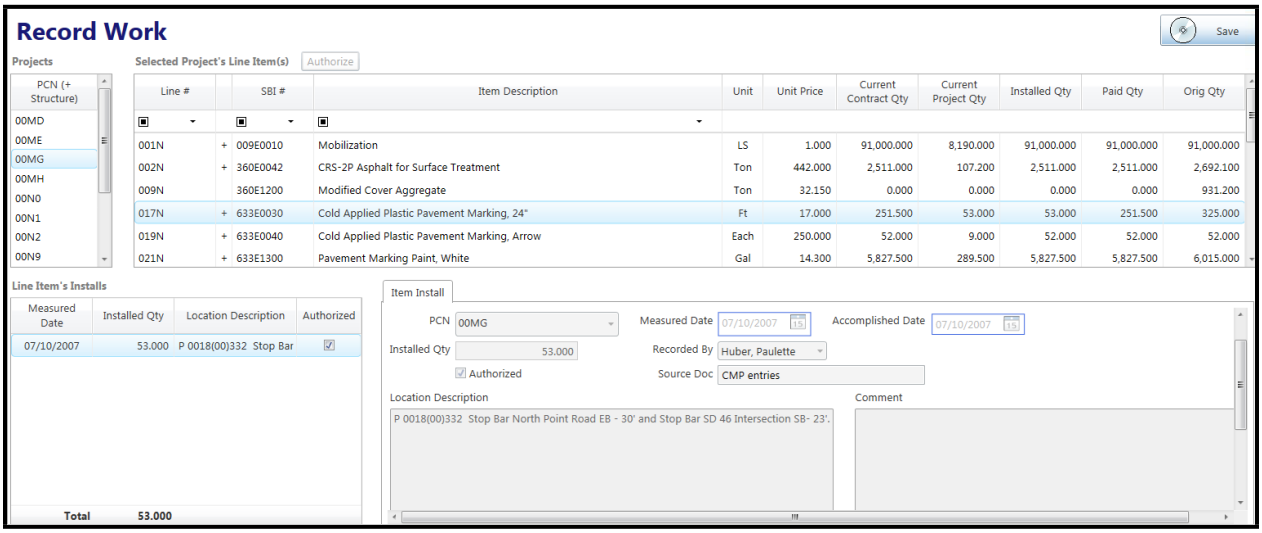


Figure 43. Daily Item Installation for Pavement Marking

Incentive/disincentive payments made in accordance with a *Special Provision for Durable Pavement Markings* will be made on the Price Adjustment Maintenance panel of the Pay Estimate window. Select the radio button for **Incentive/Disincentive** and choose **Retroreflectivity** from the drop-down table. An example follows.

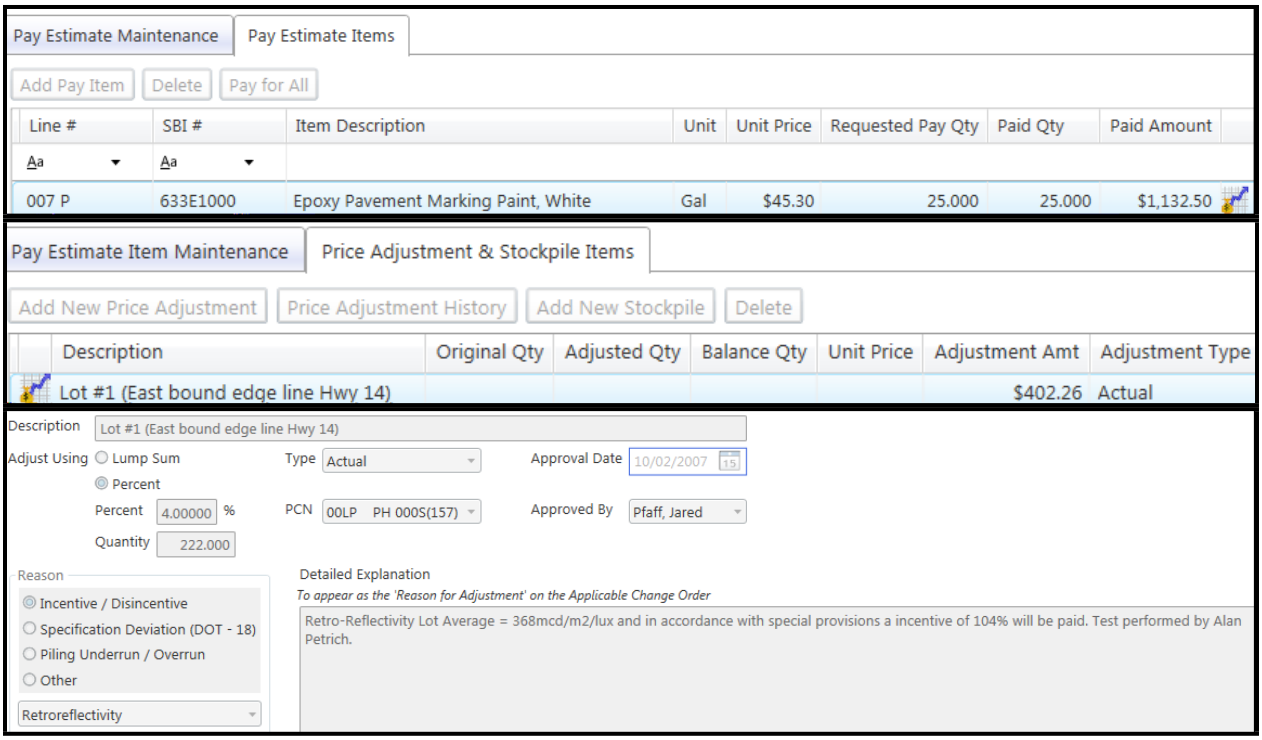


Figure 44. Price adjustment for incentive/disincentive for retro-reflectivity

SBI GROUP 634: TRAFFIC CONTROL

Traffic control will be inventoried throughout the duration of the project and the inventory entered into the Item Installations. The inventory must include a record of the number, type and unit value of signs and channelizing devices. The inventory for flagging must include the start and stop times and the number of flaggers for each day. The inventory for pilot car hours must include the start and stop times each day.

03/15/2018 Item Installation Detail Page 1 of 1

Str & Appr Grading (Prstr Bulb Tee) with HEAVY CONSTRUCTORS, INC.

Main Project # BRO 8052(37) **Main PCN** 6365 Rapid City Area --> Reimann, Kent

In Owanka Over Box Elder Creek

Line No	Units	Description	Unit Price	Contract Qty	Installed Qty	Authorized Qty
019P	Unit	Traffic Control	$4.600	510.000	510.000	510.000

PCN	Inspector	Accomplished	Installed	Authorized	Source Doc
6365	Wiege, Steve	10/18/2006	510.000	510.000	

Location

R11-2 2@27 = 54
W1-3 2@34 =68
W1-6 2@24 = 48
W13-1 2@16 = 32
W20-1 2@34 = 68
6 - barricades @40 = 240

Comments

No object markers, end road works used. Large arrows and reverse turns were eliminated and only half quantity used.

Subtotal: 510.000 510.000

Figure 45. Item Installation Detail report for Traffic Control Item (Signs)

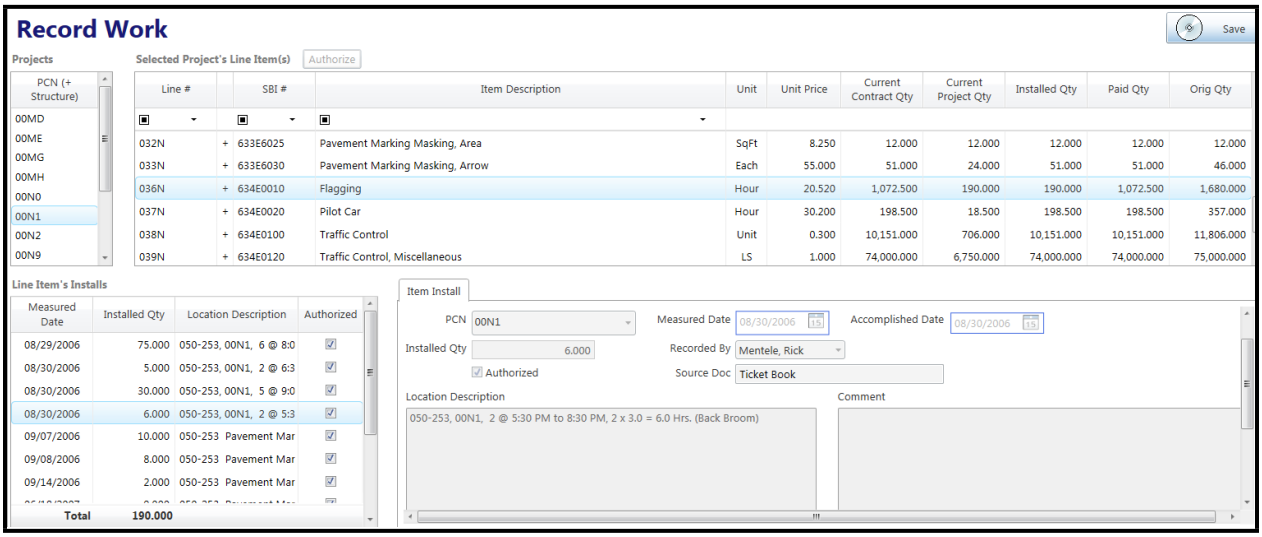


Figure 46. Daily Item Installation for Flagging

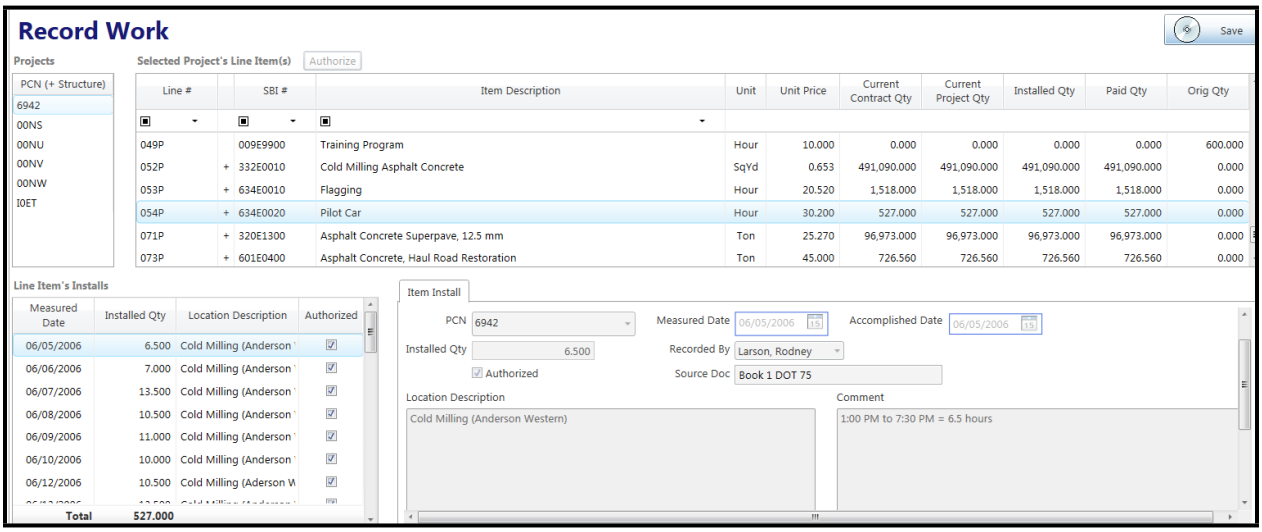


Figure 47. Daily Item Installation for Pilot Car

If the CM&P System is the source document for flagging and pilot car, SDDOT field personnel can provide a printout of the **Item Installation Detail** report for the contract item at a frequency to be agreed upon by SDDOT personnel and the Contractor. If the South Dakota Materials and Weight Ticket (DOT 75) is the source document, this is typically provided to the Contractor at the end of each day.

Measurement for temporary traffic signals is per site for short-term temporary traffic signals (span wire systems) and per each for portable temporary traffic signals (signal trailers).

SBI GROUP 635: TRAFFIC SIGNALS AND ROADWAY LIGHTING

Electrical Conduit, Electrical Power Cable, and Traffic Signal Control Cable: Plan quantity will be the basis of payment unless changes are ordered by the Engineer. A statement should be entered into the Item Installation that the work was completed in accordance with the plans. An example of an **Item Installation Detail** report for an electrical conduit contract item follows.

03/15/2018 Item Installation Detail Page 1 of 1

GRADING, PCCP, CURB with T&R Contracting Inc

Main Project # NH-PH 0012(89)289 **Main PCN** 5946 Aberdeen Area --> Peterson, Mark

US12 FM 5TH STREET TO DAKOTA IN ABERDEEN & THE INTERSECTION OF US12/STATE

Line No	Units	Description	Unit Price	Contract Qty	Installed Qty	Authorized Qty
119P	Ft	2" Rigid Conduit, Schedule 40	$2.050	13,870.000	13,870.000	13,870.000

PCN	Inspector	Accomplished	Installed	Authorized	Source Doc
5946	Peterson, Mark	05/16/2005	5,440.000	5,440.000	cmp
	Location Act- 50% payment for 5th St. Intersection				
	Peterson, Mark	06/13/2005	5,440.000	5,440.000	cmp
	Location Act - all conduit installed on 5th St. intersection				
	Peterson, Mark	07/11/2005	300.000	300.000	cmp
	Location Act - Washington St. Intersection				
	Peterson, Mark	07/11/2005	300.000	300.000	cmp
	Location Act - Kline St. Intersection				
	Peterson, Mark	08/08/2005	355.000	355.000	
	Location Act - State St. INtersectioon				

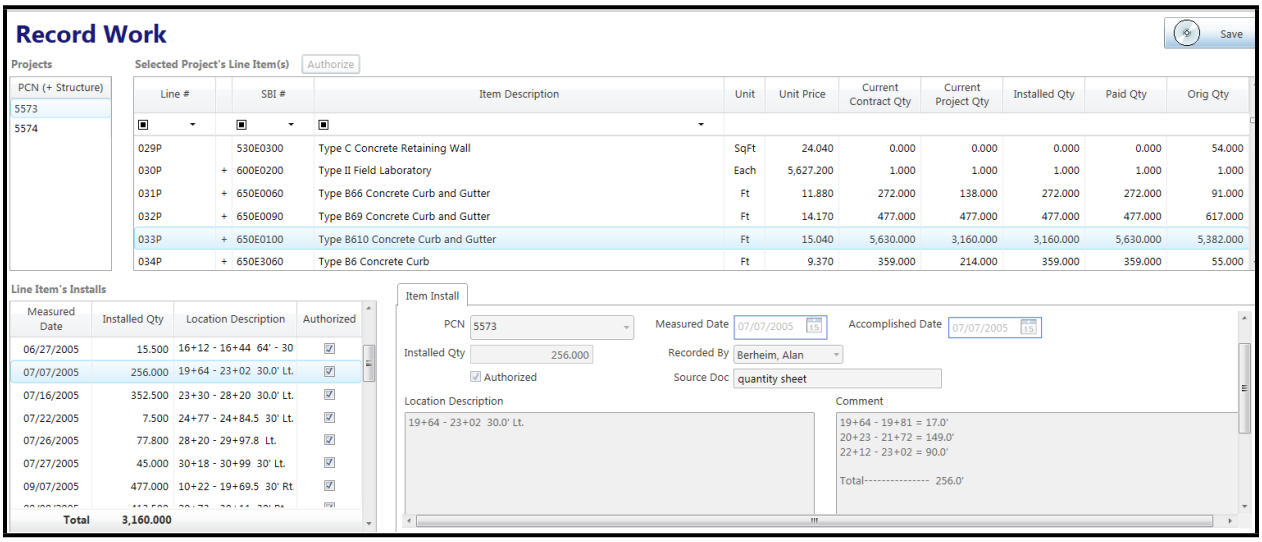
Figure 48. Item Installation Detail report for electrical conduit item

Concrete footings: Measurements must be entered into the Item Installations.

Junction Boxes, Electrical Service Cabinets, Traffic Signal Poles, Roadway Lighting Poles, Luminaries, Traffic Signal Controllers, Detector Units, Detector Loops and Traffic Signal Heads: Actual counts must be entered into the Item Installations.

SBI GROUP 650: CONCRETE CURB AND GUTTER

Measurements should be entered into the Item Installations. An example follows.



Record Work

Save

Projects

PCN (+ Structure)
5573
5574

Selected Project's Line Item(s) Authorize

Line #		SBI #	Item Description	Unit	Unit Price	Current Contract Qty	Current Project Qty	Installed Qty	Paid Qty	Orig Qty
029P		530E0300	Type C Concrete Retaining Wall	SqFt	24.040	0.000	0.000	0.000	0.000	54.000
030P	+	600E0200	Type II Field Laboratory	Each	5,627.200	1.000	1.000	1.000	1.000	1.000
031P	+	650E0060	Type B66 Concrete Curb and Gutter	Ft	11.880	272.000	138.000	272.000	272.000	91.000
032P	+	650E0090	Type B69 Concrete Curb and Gutter	Ft	14.170	477.000	477.000	477.000	477.000	617.000
033P	+	650E0100	Type B610 Concrete Curb and Gutter	Ft	15.040	5,630.000	3,160.000	3,160.000	5,630.000	5,382.000
034P	+	650E3060	Type B6 Concrete Curb	Ft	9.370	359.000	214.000	359.000	359.000	55.000

Line Item's Installs

Measured Date	Installed Qty	Location Description	Authorized
06/27/2005	15.500	16+12 - 16+44 64' - 30	☑
07/07/2005	256.000	19+64 - 23+02 30.0' Lt.	☑
07/16/2005	352.500	23+30 - 28+20 30.0' Lt.	☑
07/22/2005	7.500	24+77 - 24+84.5 30' Lt.	☑
07/26/2005	77.800	28+20 - 29+97.8 Lt.	☑
07/27/2005	45.000	30+18 - 30+99 30' Lt.	☑
09/07/2005	477.000	10+22 - 19+69.5 30' Rt	☑
Total	3,160.000		

Item Install

PCN 5573 Measured Date 07/07/2005 Accomplished Date 07/07/2005

Installed Qty 256.000 Recorded By Berheim, Alan

☑ Authorized Source Doc quantity sheet

Location Description

19+64 - 23+02 30.0' Lt.

Comment

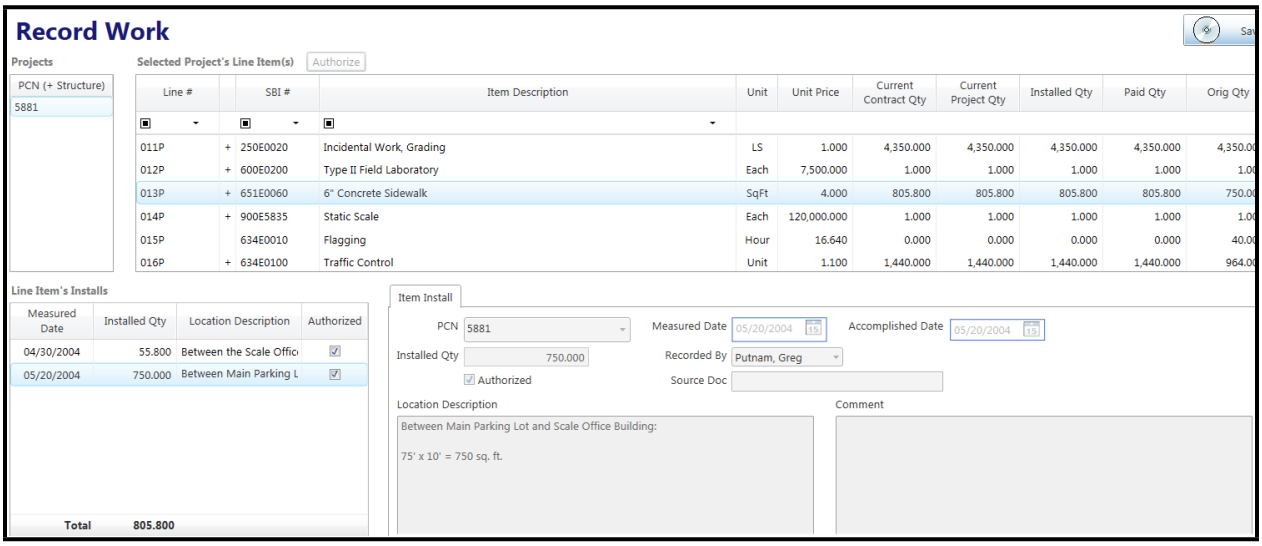
19+64 - 19+81 = 17.0'
20+23 - 21+72 = 149.0'
22+12 - 23+02 = 90.0'

Total---------- 256.0'

Figure 49. Example of Item Installation for Concrete Curb and Gutter.

SBI GROUP 651: CONCRETE SIDEWALK

Dimensions and area computations must be entered into the daily Item Installations. An example follows.



Record Work

Projects

PCN (+ Structure)
5881

Selected Project's Line Item(s) — Authorize

Line #		SBI #	Item Description	Unit	Unit Price	Current Contract Qty	Current Project Qty	Installed Qty	Paid Qty	Orig Qty
011P	+	250E0020	Incidental Work, Grading	LS	1.000	4,350.000	4,350.000	4,350.000	4,350.000	4,350.00
012P	+	600E0200	Type II Field Laboratory	Each	7,500.000	1.000	1.000	1.000	1.000	1.00
013P	+	651E0060	6" Concrete Sidewalk	SqFt	4.000	805.800	805.800	805.800	805.800	750.00
014P	+	900E5835	Static Scale	Each	120,000.000	1.000	1.000	1.000	1.000	1.00
015P		634E0010	Flagging	Hour	16.640	0.000	0.000	0.000	0.000	40.00
016P	+	634E0100	Traffic Control	Unit	1.100	1,440.000	1,440.000	1,440.000	1,440.000	964.00

Line Item's Installs

Measured Date	Installed Qty	Location Description	Authorized
04/30/2004	55.800	Between the Scale Offic	☑
05/20/2004	750.000	Between Main Parking L	☑
Total	805.800		

Item Install

PCN 5881 — Measured Date 05/20/2004 — Accomplished Date 05/20/2004

Installed Qty 750.000 — Recorded By Putnam, Greg

☑ Authorized — Source Doc

Location Description: Between Main Parking Lot and Scale Office Building:

75' x 10' = 750 sq. ft.

Comment

Figure 50. Daily Item Installation for concrete sidewalk item

SBI GROUP 670: DROP INLETS

The counts should be entered in the Item Installation for each location.

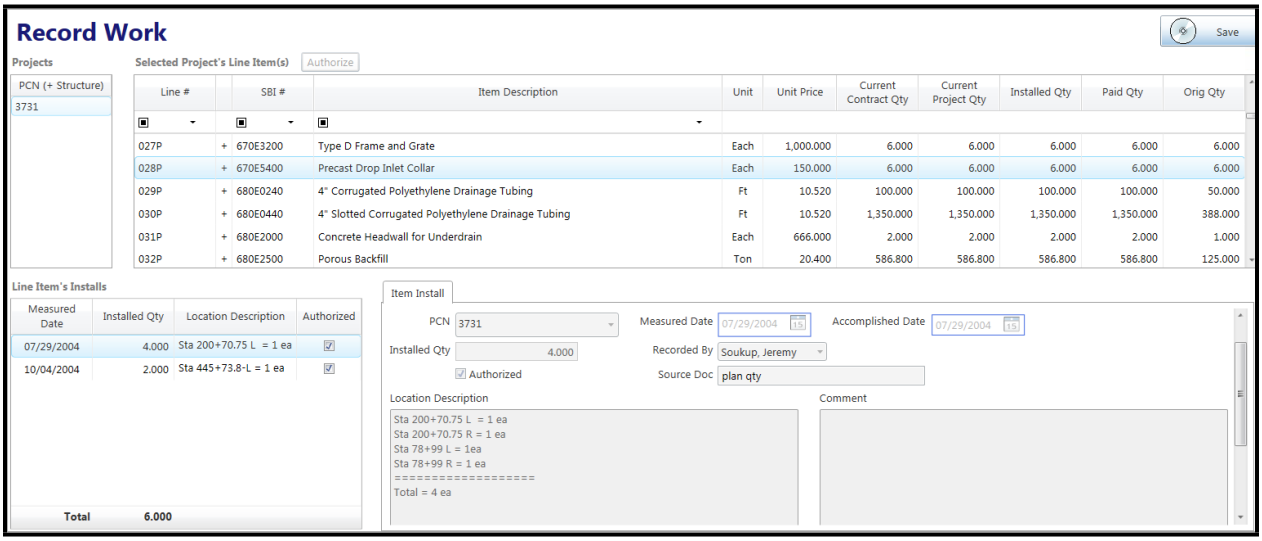


Figure 51. Item Installation for drop inlet item

SBI GROUP 671: MANHOLES

The counts should be entered in the Item Installation for each location.

SBI GROUP 680: UNDERDRAINS

Porous Backfill: The source document will be the weight ticket and the daily totals entered in the Item Installations.

Underdrain Pipe: Measurements for each location should be entered in the Item Installations.

Concrete Outlet Headwall: The count for each location should be entered in the Item Installation.

SBI GROUP 700: RIPRAP

Riprap: The source document will be the weight tickets. Daily totals should be entered into the Item Installations.

When the quantity calls for cubic yards, the daily Item Installations should show the number of truck loads and capacity per truck. Truck box measurements and capacity computation should be entered into the Item Installation for the date on which that truck was first used.

Drainage Fabric: Plans quantity will be the basis of payment unless changes are ordered in writing. Dimensions for changed areas should be entered in the Item Installations.

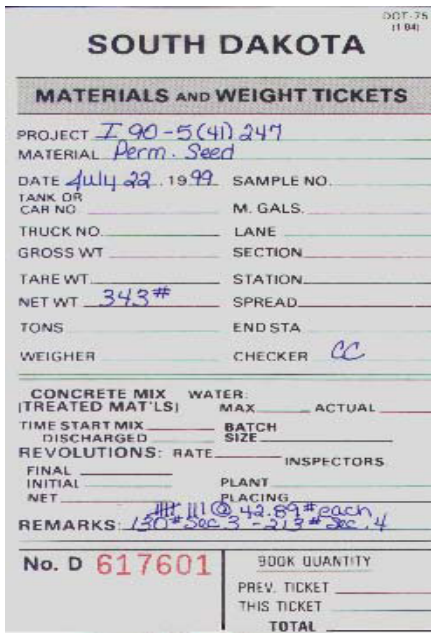
SBI GROUP 720: BANK AND CHANNEL PROTECTION GABIONS

Payment will be based on plans quantity, unless changes are ordered in writing by the Engineer.

SBI GROUP 730: SEEDING

Refer to Chapter 1 of the *SDDOT Erosion Control Manual* for detailed guidance on documenting and measuring quantities of seed.

Normally the seed will be furnished in bags and several bags of seed will be used each day. The quantity of seed to be paid for should be documented daily on the Item Installation. Bag tags, commercial weigh tickets, and DOT 75 tickets must be retained as source documentation as applicable. An example of a DOT 75 follows.


DOT-75 (1-94)

SOUTH DAKOTA

MATERIALS AND WEIGHT TICKETS

PROJECT I 90-5(41) 247
MATERIAL Perm. Seed
DATE July 22, 1999 SAMPLE NO.
TANK OR CAR NO M. GALS.
TRUCK NO. LANE
GROSS WT SECTION
TARE WT STATION
NET WT 343# SPREAD
TONS END STA
WEIGHER CHECKER CC

CONCRETE MIX (TREATED MAT'LS) WATER: MAX ACTUAL
TIME START MIX DISCHARGED BATCH SIZE
REVOLUTIONS: RATE INSPECTORS
FINAL
INITIAL PLANT
NET PLACING
REMARKS: ~~HH~~ III @ 42.89# each 130# Sec. 3 - 213# Sec. 4

No. D 617601 BOOK QUANTITY
PREV. TICKET
THIS TICKET
TOTAL

Figure 52. Materials and Weight Ticket (DOT 75) for permanent seed

Permanent seed is measured and paid for in pounds of pure live seed to the nearest whole pound. Pure Live Seed quantities based on information shown on the bag tag must be entered into the Item Installation. Calculation due to re-testing should be noted.

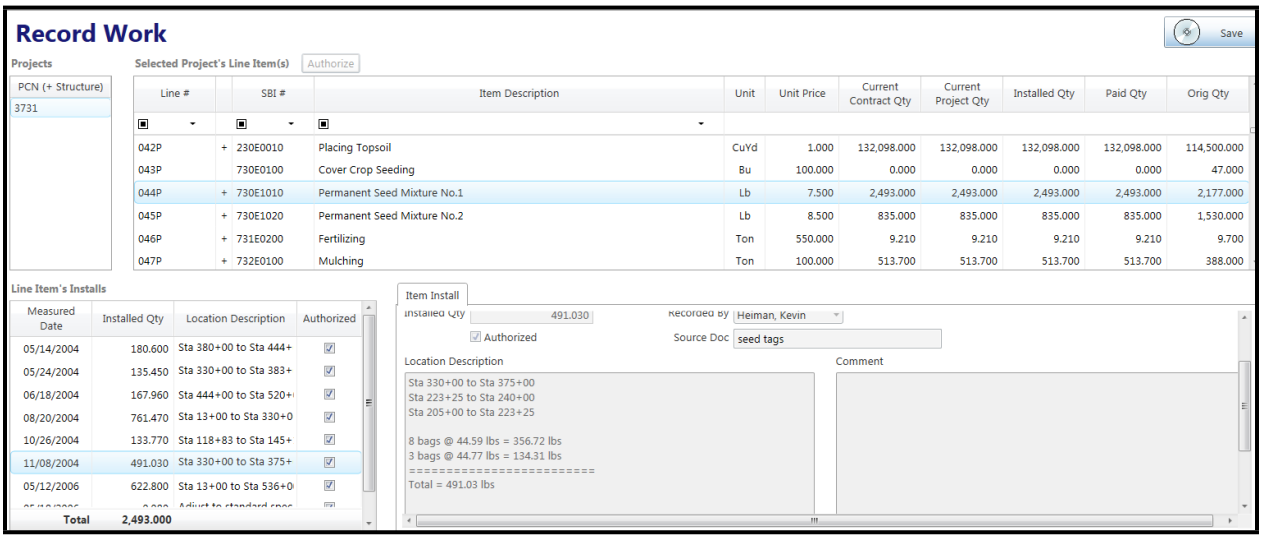


Figure 53. Item Installation for Permanent Seed

Cover crop seeding is measured per bushel of bulk seed. If seed is delivered in one-bushel sacks, the count should be entered into the Item Installation. If the seed is delivered in bulk quantities, the bulk weight and conversion should be entered into the Item Installation.

SBI GROUP 731: FERTILIZING

Bag tags, commercial weight tickets, and DOT 75 Forms must be retained as source documentation. The daily total quantities should be recorded as Item Installations.

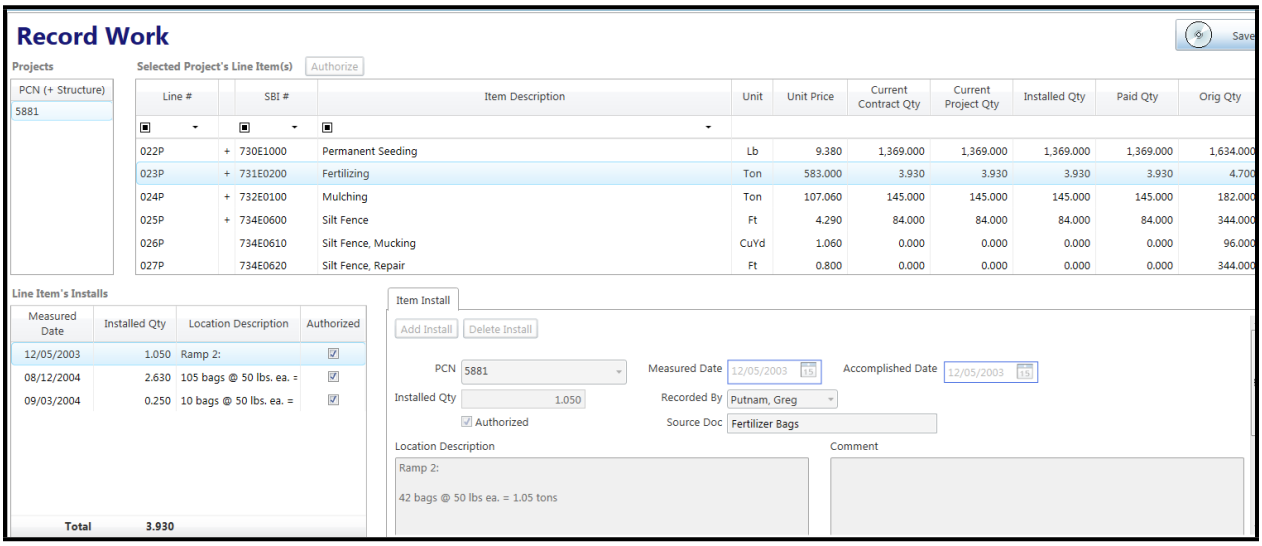


Figure 54. Item Installation for Fertilizing

SBI GROUP 732: MULCHING

Refer to the *SDDOT Erosion Control Manual* for detailed guidance on measuring and documenting quantities of mulch. The weight tickets are the source documentation for the payment of the mulch. Daily quantities must be entered in the Item Installations.

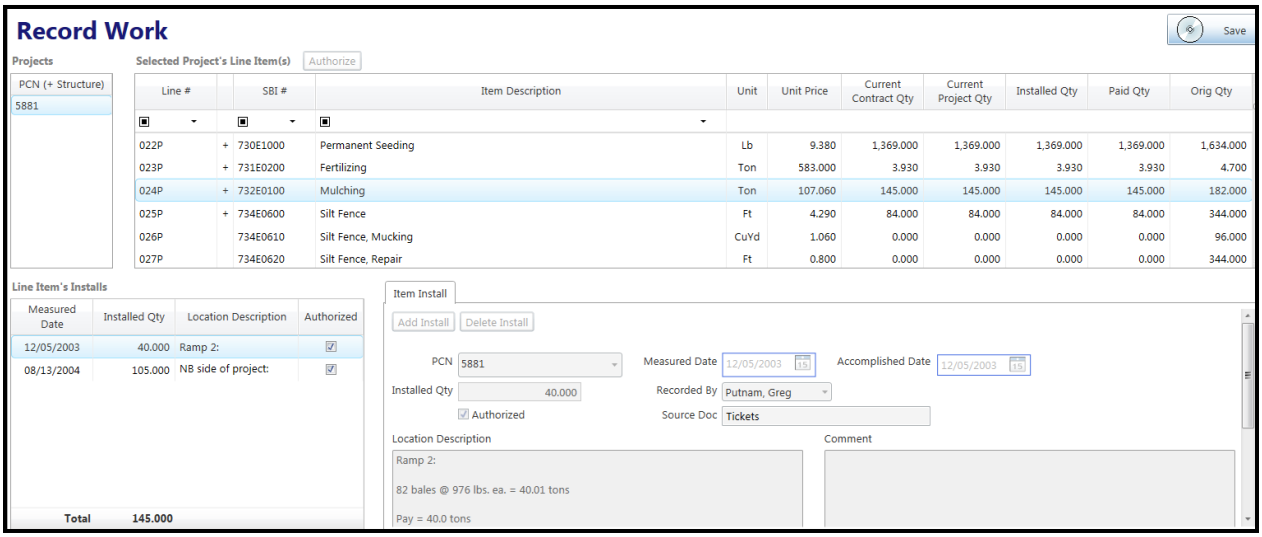


Figure 55. Item Installation for mulching

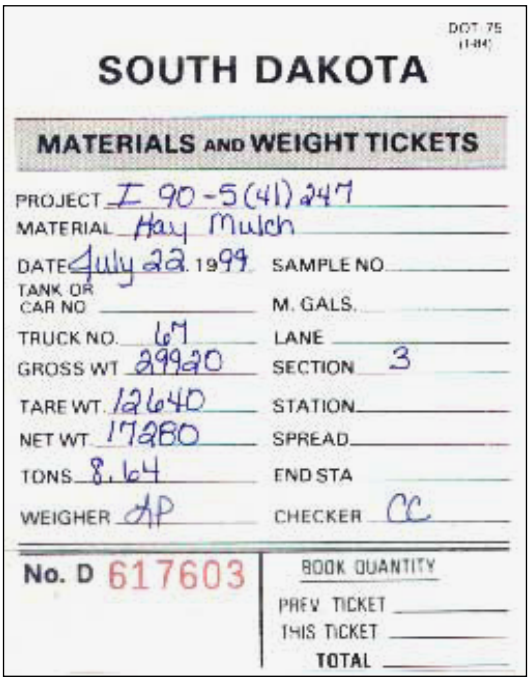


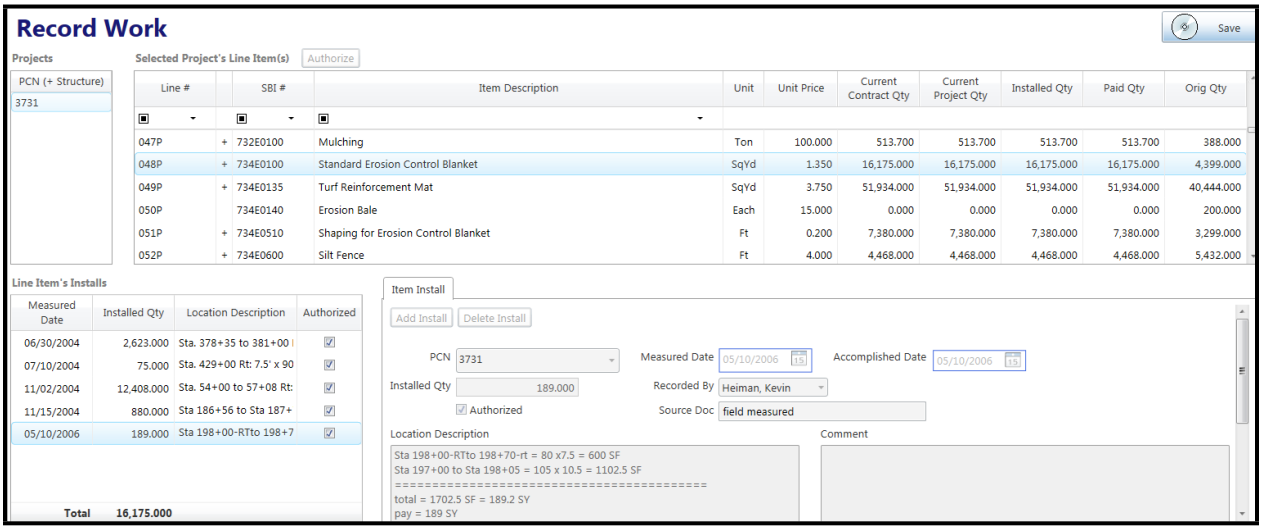
Figure 56. Materials and Weight Ticket for Hay Mulch

SBI GROUP 733: SODDING

Measurements should be entered into the Item Installations.

SBI GROUP 734: EROSION CONTROL AND WATER POLLUTION CONTROL

Measurements and/or counts should be entered into the Item Installations.



Record Work

Save

Projects

PCN (+ Structure)
3731

Selected Project's Line Item(s) — Authorize

Line #		SBI #	Item Description	Unit	Unit Price	Current Contract Qty	Current Project Qty	Installed Qty	Paid Qty	Orig Qty
047P	+	732E0100	Mulching	Ton	100.000	513.700	513.700	513.700	513.700	388.000
048P	+	734E0100	Standard Erosion Control Blanket	SqYd	1.350	16,175.000	16,175.000	16,175.000	16,175.000	4,399.000
049P	+	734E0135	Turf Reinforcement Mat	SqYd	3.750	51,934.000	51,934.000	51,934.000	51,934.000	40,444.000
050P		734E0140	Erosion Bale	Each	15.000	0.000	0.000	0.000	0.000	200.000
051P	+	734E0510	Shaping for Erosion Control Blanket	Ft	0.200	7,380.000	7,380.000	7,380.000	7,380.000	3,299.000
052P	+	734E0600	Silt Fence	Ft	4.000	4,468.000	4,468.000	4,468.000	4,468.000	5,432.000

Line Item's Installs

Measured Date	Installed Qty	Location Description	Authorized
06/30/2004	2,623.000	Sta. 378+35 to 381+00	☑
07/10/2004	75.000	Sta. 429+00 Rt: 7.5' x 90	☑
11/02/2004	12,408.000	Sta. 54+00 to 57+08 Rt:	☑
11/15/2004	880.000	Sta 186+56 to Sta 187+	☑
05/10/2006	189.000	Sta 198+00-RTto 198+7	☑
Total	16,175.000		

Item Install

Add Install — Delete Install

PCN: 3731 — Measured Date: 05/10/2006 — Accomplished Date: 05/10/2006

Installed Qty: 189.000 — Recorded By: Heiman, Kevin

☑ Authorized — Source Doc: field measured

Location Description:

Sta 198+00-RTto 198+70-rt = 80 x7.5 = 600 SF
Sta 197+00 to Sta 198+05 = 105 x 10.5 = 1102.5 SF
==========
total = 1702.5 SF = 189.2 SY
pay = 189 SY

Comment

Figure 57. Item Installation for erosion control blanket

SBI GROUP 740: CRUSHED AGGREGATE FOR MAINTENANCE STOCKPILES

The source document will be the weight tickets. Daily totals should be entered into the Item Installations.

FORCE ACCOUNT

RECORD KEEPING

When the State and the Contractor cannot agree upon a price for performing extra work, the work will be measured and paid on a Force Account basis. Force Account work must be measured and documented in accordance with Section 9.5 of the Standard Specifications. Force account work is paid using SBI Number 009E0710 "Extra Work, FA".

Authorization for Force Account work must be obtained from the Area Engineer. If authorization for Force Account is granted, the Project Engineer must have either an approved Extra Work Authorization (EWA) or a completed Construction Change Order (CCO) in the CM&P System prior to the Contractor performing the work.

The EWA or CCO will include the following:

1. An estimate of total cost.
2. A statement that labor rates will be actual rates based on the Contractor's payrolls.
3. A statement that equipment rates will be set forth in the current online EquipmentWatch Cost Recovery (formerly Rental Rate Blue Book). The Finals Review Specialist will assist with establishing rates.
4. A statement that payment for materials will be based on actual costs as evidenced by invoices furnished by the Contractor.
5. The locations of work, reasons for the work, procedures to follow, and other information necessary to describe the change.
6. A statement that stipulates whether modifications to contract time will be made based on the Force Account work. If contract time is modified, include justification and describe in detail what is being changed.

When Force Account work is performed, the following items must be documented:

- All contractor employees working on the Force Account work item by name, classification, pay rate and exact number of hours worked (must be supported by payrolls for the time period that covers the Force Account work).
- All contractor-owned equipment used for the Force Account work (actual use and standby time).
- All rented equipment required for Force Account work (must be supported by invoices).
- All materials incorporated into the Force Account work (must be supported by invoices or affidavits as described in Section 9.5).

The requirements for record keeping will vary with the type of work being completed. The Inspector needs to keep accurate, informative and complete records. The following forms are required for documenting the work and calculating labor, materials, and equipment costs:

- Form DOT210 - Daily Labor Record
- Form DOT210A - Weekly Labor Record
- Form DOT211 - Daily Equipment Record
- Form DOT212 - Daily Materials Record
- Summary Page (no form number)

The numbered forms can be found in Word format at M:\DOT\Common\All DOT Forms\DOT Forms 201-300. The forms are also available in Excel spreadsheet format at M:\DOT\Common\All DOT Forms\ DOT Forms 201-300\Spread Sheets.

Other required documentation will be certified payrolls and receipts for material purchases and equipment rental. An example of required record keeping for Force Account work is found on Page 2-13 of the Earthwork Manual.

LABOR

When arriving at a rate of pay for Contractor employees who are paid on a salary basis, use the corresponding hourly rate or prorate the time worked between contract work and force account work with no overtime. The vehicle used by the foreman will be determined an administrative vehicle and will be paid the same number of hours allowed for the foreman. Labor time will be rounded to the nearest 1/2 hour at the end of each day.

The Project Engineer should confirm that the number of hours entered into the Form DOT210 for each employee each day is supported by the payroll record for that day.

EQUIPMENT RATES

Equipment rates to be used in the DOT 211 form for construction equipment owned by the Contractor are obtained from the EquipmentWatch Cost Recovery (formerly Rental Rate Blue Book), by EquipmentWatch, a division of Penton Business Media, Inc., to which the SDDOT subscribes as an on-line service.

Because the SDDOT pays for only one registered user, only the Finals Review Specialist can obtain rental rates. However, the Project Engineer can use the on-line EquipmentWatch Cost Recovery to locate the correct configuration for each piece of equipment and provide this information to the Finals Review Specialist, along with the Model Year and the project and PC number.

The Project Engineer can access the on-line EquipmentWatch Cost Recovery and initiate an equipment search at the following address:

https://app.equipmentwatch.com/search?products=%5B%22CG%22%5D.

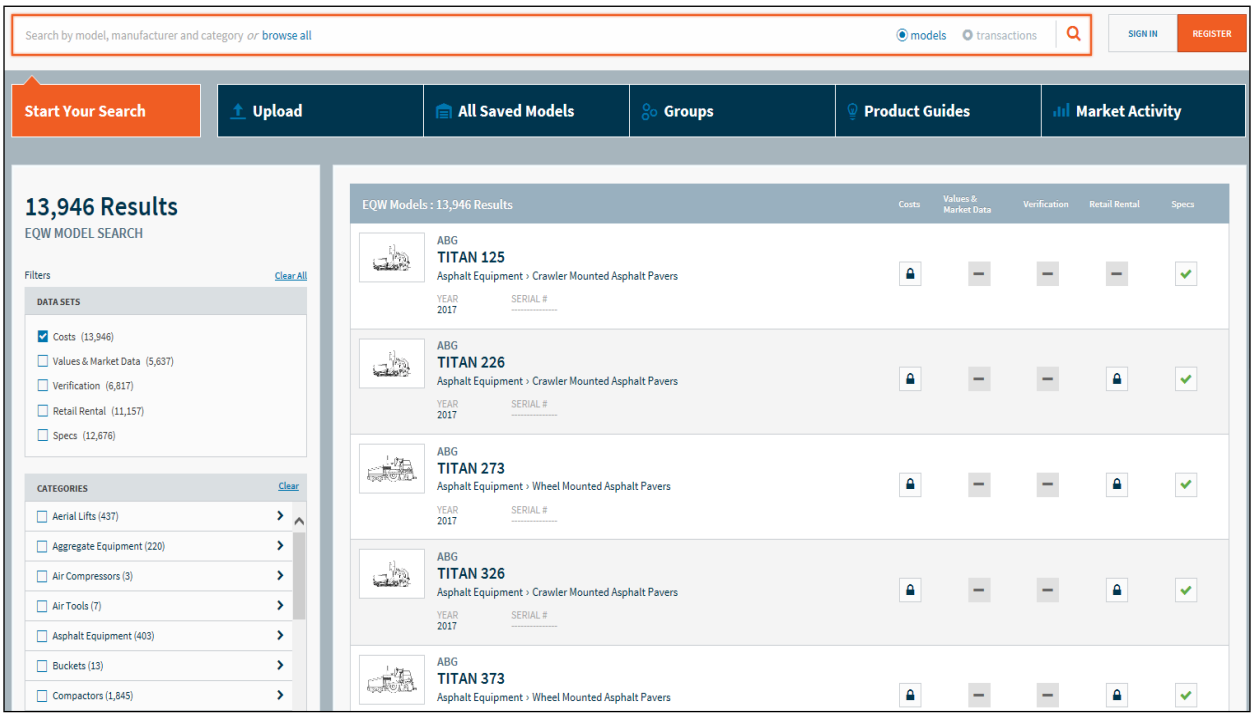


Figure 58. On-line EquipmentWatch Cost Recovery

The equipment configuration is found by either:

- entering search criteria in the **Search** box located on the top of the page or
- making successive selections starting in the **Select a Category** area on the left side of this page until the correct type of equipment is located.

For the following types of equipment, the search is most efficiently performed by using the **Search** box and entering the manufacturer and complete model number:

- earthmoving (graders, loaders, bare industrial tractors, backhoes, scrapers, dozers)
- excavators
- compactors (except hand-held)
- self-propelled aerial lifts
- cranes
- pile driving hammers/extractors
- self-propelled pavement brooms, pavement sweepers and pavement breakers
- mechanical drive, electric drive and articulated rear dump trucks
- prime movers
- wheel mounted and crawler mounted asphalt pavers, wheel mounted and crawler mounted pavement millers, asphalt pickup machines, reclaimers/stabilizers and road wideners

If there is more than one configuration for a model, it will then be necessary to select a configuration.

For most other equipment, information is not manufacturer and model specific. The search can

be accomplished by selecting successive categories and subcategories until the configuration is found that most closely matches the specifications of the equipment. The information needed to complete this search depends upon the equipment type. Some common examples are:

- For pickup trucks:
  - fuel type (gasoline or diesel),
  - axle configuration (2 WD or 4 WD),
  - cab type (conventional or crew),
  - ton rating
  - horsepower

- For truck tractors and flatbed trucks:
  - fuel type (gasoline or diesel)
  - axle configuration (count of all wheels on the truck "X" count of only those wheels that are driven by engine power; duals count as one wheel)
    Example: 4 X 2 = Four wheels, two driven by the engine
  - gross vehicle weight rating in pounds (manufacturer's number)
  - horsepower

- For on-highway rear dump trucks:
  - fuel type (gasoline or diesel)
  - axle configuration (see truck tractors)
  - gross vehicle weight rating in pounds (manufacturer's number)
  - struck capacity in cubic yards
  - horsepower

- For on-highway water tankers:
  - fuel type (gasoline or diesel)
  - tank capacity in gallons
  - horsepower
- For portable rotary screw air compressors:
  - fuel type (gasoline or diesel)
  - air delivery rate in cubic feet per minute

- For generator sets:
  - fuel type (gasoline or diesel)
  - prime output in KW
  - enclosure (open or closed)—only if output is greater than 17 KW

Because of the numerous combinations of equipment categories and subcategories, it is not possible to provide a comprehensive list. For example, equipment rates for trailers are not manufacturer and model specific. The selections necessary to arrive at a configuration for a hydraulic removable gooseneck equipment trailer are illustrated on the following pages:

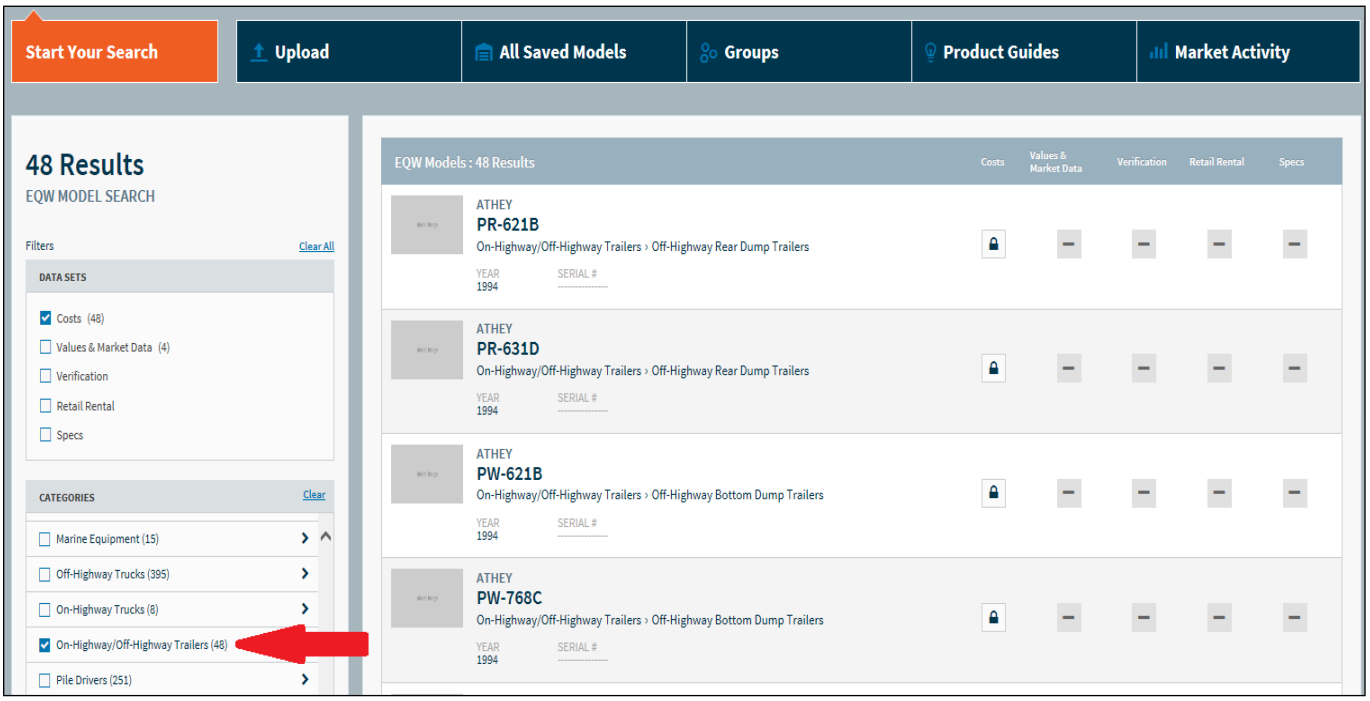


Figure 59. Select a Category

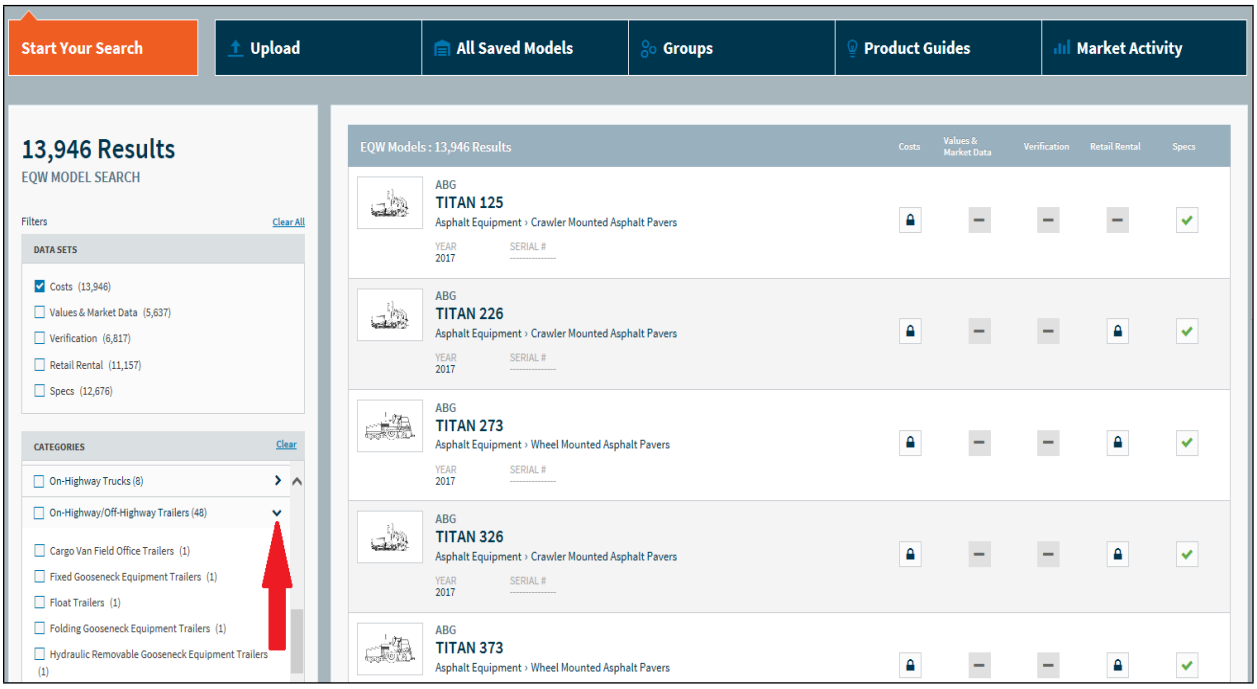


Figure 60. Select a Subcategory

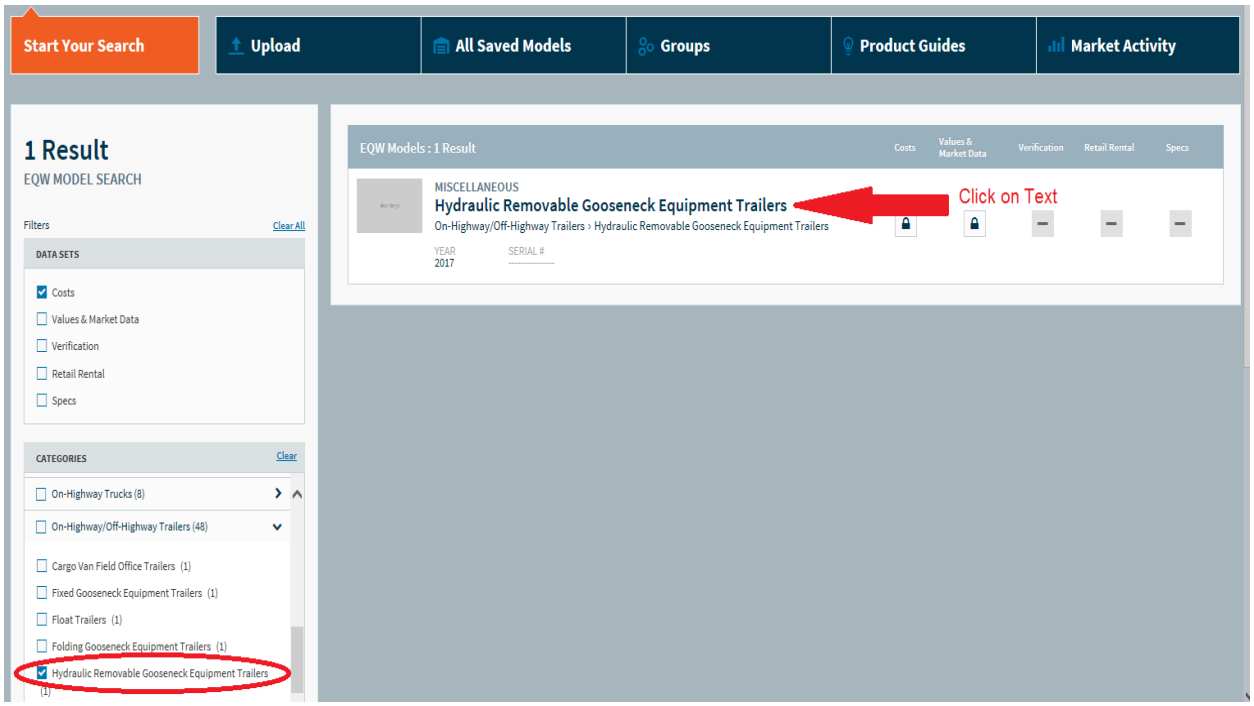


Figure 61. Select a Configuration

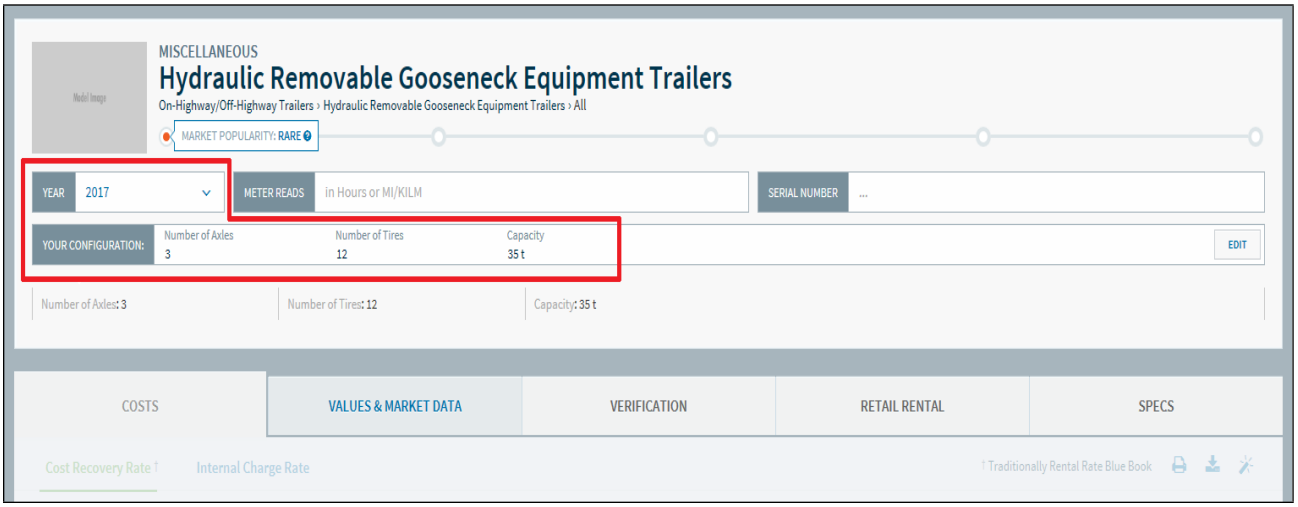


Figure 62. Check & Confirm Configuration

This page would also be the final result for model-specific searches. The Project Engineer can print this page and send it to the Finals Review Specialist with the request for equipment rental rates. The Finals Review Specialist will provide a memo to the Project Engineer listing the force account rates for each piece of equipment.

PAYMENT

The Project Engineer will make partial payments to the Contractor based on work performed under the Force Account bid item added by CCO. Upon completion of the work, the Force

Account bid item will be adjusted to the final quantity on a subsequent CCO based on the required documentation satisfactorily submitted.

ROYALTY PAYMENTS

REQUESTING PAYMENTS TO LANDOWNERS

If the contract proposal includes an *Agreement to Sell Materials (*DOT 44B), the SDDOT will pay the landowner for borrow removed from the property, loss of use, re-vegetation and crop damage at the rates stipulated in the agreement. The Project Engineer initiates payment to a landowner by sending an E-mail to the Finals Review Specialist, copied to the Engineering Supervisor, requesting that a payment be made. The following completed Excel form should be attached.

REQUEST TO FINALS ENGINEER FOR ROYALTY PAYMENT

I am requesting that the following payment be made now in accordance with an Agreement to Sell Materials:

Main Project and PC Number

Pit # PLSS Description

Public Land Survey System: ¼ ¼ Sec. T. R.

Owner
Address

Cumulative figures for this agreement only:

Borrow		cy @	$0.00	$	-
Borrow		cy @	$0.00	$	-
Borrow		cy @	$0.00	$	-
Loss of Use		acres@	$0 *	$	-
Re-vegetation		acres@	$0	$	-
Crop Damage		acres@	$0	$	-
Cumulative total for this agreement				$	-
Less previous payments				$	-
Requested payment amount				**$**	**-**

Cumulative numbers for this agreement

* 0 years @ $0 per acre per year

This is a: Final ☐ Interim ☐ payment for this agreement.
This is a: Final ☐ Interim ☐ payment for this project.

Project Engineer requesting payment
Date

Comments

Calculated total cubic yards from lines 12, 13 and 14: 0

M:\DOT\Common\All DOT Forms\DOT Forms 201-300\Spread Sheets\Royalty_request.xls

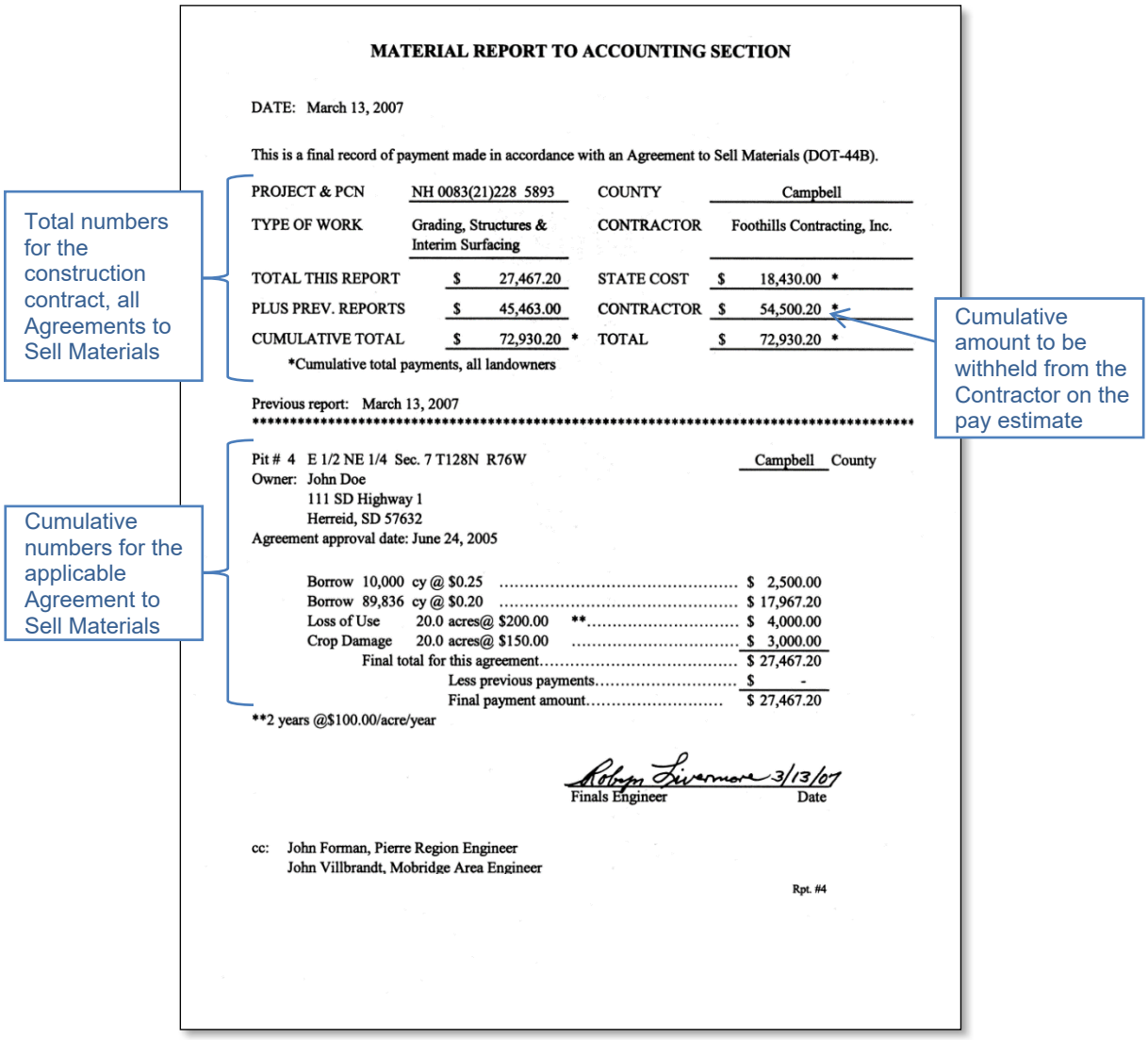
Figure 63. Request for royalty payment

When requesting a progress payment, the Project Engineer must take care that cumulative progress payments do not exceed the anticipated final cumulative payment for each landowner and that topsoil stockpiled and re-spread at the site is not included in the borrow quantity.

MATERIAL REPORTS

The Finals Review Specialist will verify that the payment amounts are calculated in accordance with the applicable Agreement to Sell Materials, and prepare a voucher for the current payment amount and a Material Report to Accounting Section. An example of a Material Report follows. Payment information for the project as a whole is tracked in the top portion of the Material

Report. The **State Cost** is the cumulative amount that is the SDDOT's portion of the payments. The **Contractor** amount is the cumulative amount to be withheld from the Contractor. Payment information for the specific borrow pit is tracked in the lower portion of the Material Report.



MATERIAL REPORT TO ACCOUNTING SECTION

DATE: March 13, 2007

This is a final record of payment made in accordance with an Agreement to Sell Materials (DOT-44B).

PROJECT & PCN	NH 0083(21)228 5893	COUNTY	Campbell
TYPE OF WORK	Grading, Structures & Interim Surfacing	CONTRACTOR	Foothills Contracting, Inc.
TOTAL THIS REPORT	$ 27,467.20	STATE COST	$ 18,430.00 *
PLUS PREV. REPORTS	$ 45,463.00	CONTRACTOR	$ 54,500.20 *
CUMULATIVE TOTAL	$ 72,930.20 *	TOTAL	$ 72,930.20 *

*Cumulative total payments, all landowners

Previous report: March 13, 2007

****

Pit # 4 E 1/2 NE 1/4 Sec. 7 T128N R76W Campbell County
Owner: John Doe
111 SD Highway 1
Herreid, SD 57632
Agreement approval date: June 24, 2005

Borrow 10,000 cy @ $0.25		$ 2,500.00
Borrow 89,836 cy @ $0.20		$ 17,967.20
Loss of Use 20.0 acres@ $200.00	**	$ 4,000.00
Crop Damage 20.0 acres@ $150.00		$ 3,000.00
Final total for this agreement		$ 27,467.20
Less previous payments		$ -
Final payment amount		$ 27,467.20

**2 years @$100.00/acre/year

Robyn Livermore 3/13/07
Finals Engineer Date

cc: John Forman, Pierre Region Engineer
John Villbrandt, Mobridge Area Engineer

Rpt. #4

Figure 64. Material Report to Accounting Section

PAYMENT PROCESS

The Finals Review Specialist will send the Material Report and Voucher to the SDDOT Finance Office. Personnel in the SDDOT Finance Office process the payment and send the paperwork to the State Auditor's Office for approval. A check is generated by the Auditor's Office and mailed to the landowner by the SDDOT Finance Office, along with a copy of the Material Report and voucher.

The SDDOT Finance Office cannot process the payment unless the landowner is listed as a vendor in the MSA accounting system. If the landowner is not on the vendor list, SDDOT

Finance personnel will mail the landowner a blank W-9 form and place the payment on hold until the form is completed and returned. Payment status can be tracked by anyone with access to the MSA system. Each SDDOT Area Office has at least one staff member with access to the system.

WITHHOLDING ROYALTIES FROM PAY ESTIMATES

Payments made for loss of use, re-vegetation and crop damage are borne by the SDDOT. Payments for borrow material are withheld from the Contractor using the **Pay Estimate Maintenance** panel of the **Pay Estimate** window.

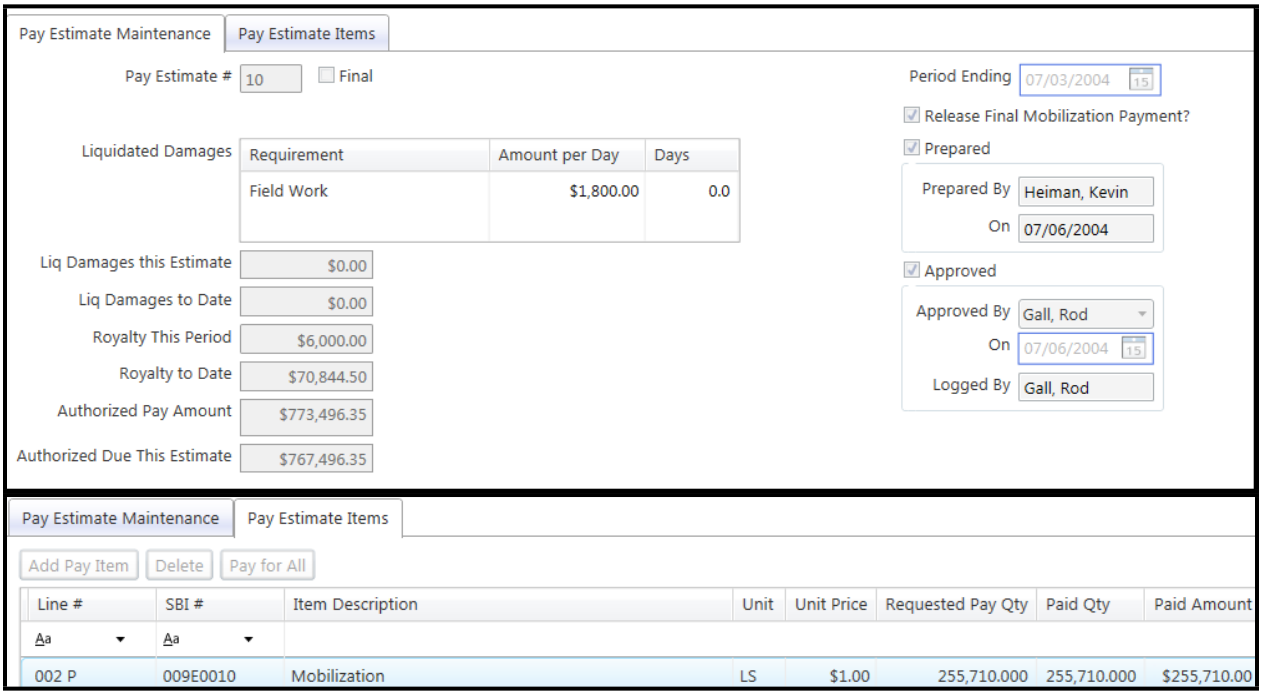


Figure 65. Royalty withheld on Pay Estimate Maintenance panel of the Pay Estimate window

The Project Engineer enters the amount to be withheld on the pay estimate into the **Royalty This Period** field. In the example above, royalties in the amount $6,000.00 were withheld on Pay Estimate #10, and a total $70,844.50 had been withheld up to and including that pay estimate. Royalties should be withheld over the course of the project.

When finaling the project, the **Royalty To Date** amount on the **Pay Estimate Maintenance** panel for the final pay estimate must be equal to the **Contractor** amount on the final Material Report for the project. **Note: The same procedure is followed for payments made in accordance with an *Agreement to Deposit Excess Embankment Material*.**

LIQUIDATED DAMAGES

FAILURE TO COMPLETE ON TIME

Liquidated damages must be withheld in accordance with Specifications Sections 8.6 and 8.7, applicable special provisions for contract time and plan notes. Liquidated damages are withheld from a pay estimate using the **Pay Estimate Maintenance** panel of the **Pay Estimate** window in the CM&P System, as shown below:

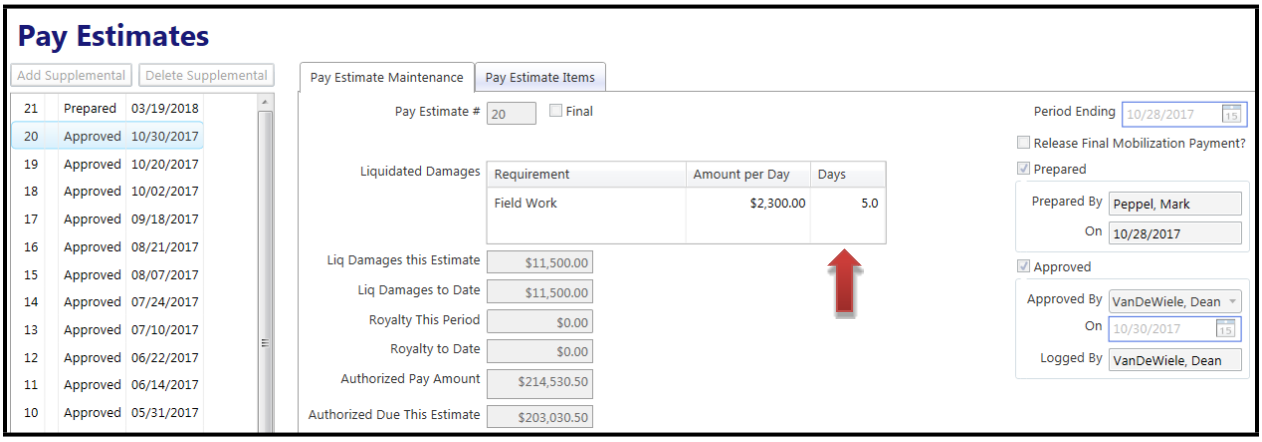


Figure 66. Liquidated damages for failure to complete on time withheld on the Pay Estimate Maintenance panel of the Pay Estimate window

The number of days of liquidated damages to be withheld from a pay estimate is entered by the Project Engineer into the **Liq Damage Days** field. The system will calculate the **Liq Damages this Estimate** by multiplying **Liq Damage Days** by the **Liq Damage Per Day Amount.** In the example above, 5 days of liquidated damages were withheld on Pay Estimate #20.

The **Liq Damage Per Day Amount** field will default to the per day amount established in the Specifications, but it can be adjusted on a pay estimate-by-pay estimate basis for those projects where multiple per day amounts have been established by plan note or special provision. The CM&P System tracks the number of days of liquidated damages, and it is important that the count be accurate. Only the actual number of days and exact established per day amounts will be used. The number of liquidated damage days and per day amount must not be averaged or weighted.

The final total number of days of liquidated damages withheld on the contract must be supported by the day count in the Bi-weekly Progress Reports and extensions of contract time by Change Order.

If a Special Provision for Contract Time provides for incentive/distinctive for contract time, the distinctive is addressed using SBI Number 009E1000, and is not withheld as liquidated damages.

FAILURE TO COMPLY WITH ON-THE-JOB TRAINING (OJT) REQUIREMENTS

See Chapter 6 for details regarding the On-the-job training (OJT) program requirements and the

basis for withholding liquidated damages. Liquidated damages for failure to comply with OJT program requirements are withheld as a price adjustment to the Training Program contract item. An example follows.

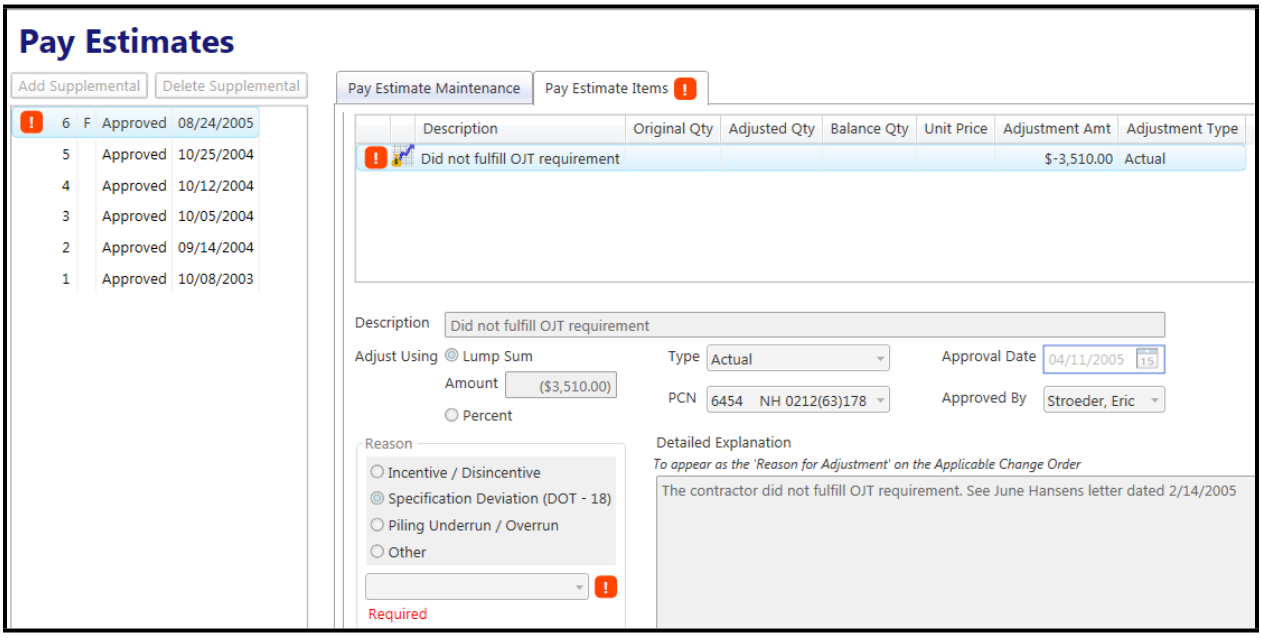


Figure 67. Liquidated damages for failure to comply with OJT requirements withheld as a price adjustment to the Training Program item

FAILURE TO PROPERLY UTILIZE DISADVANTAGED BUSINESS ENTERPRISES (DBE)

See Chapter 5 for details regarding DBE program requirements and the basis for withholding liquidated damages. Liquidated damages for failure to properly utilize disadvantaged business enterprises are withheld as a price adjustment to the Mobilization contract item. (The Project Engineer should contact CMS Help for assistance with this.) An example follows.

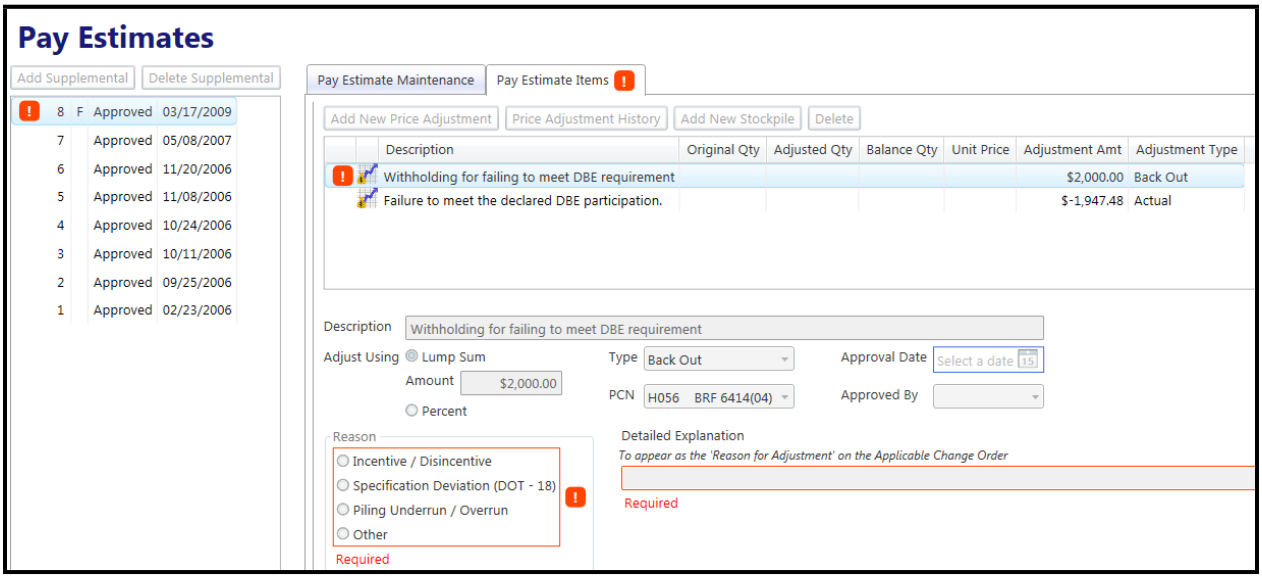


Figure 68. Liquidated damages for failure to comply with DBE requirements withheld as a price adjustment to the Mobilization item

TRACKING CONTRACT TIME

GENERAL

Every contract let for SDDOT construction work specifies the time allowed for the work to be performed (contract time). General contract time requirements are included in Specifications Section 8.6. Additional contract-specific requirements are included in special provisions for contract time and in plan notes. A contract may include one or more interim completion requirements in additional to overall completion requirements.

SDDOT personnel must determine compliance with contract time requirements by consistently tracking and recording contractor activities and site conditions for each day of the contract. Compliance is measured by counting working days and/or calendar days in accordance with the specifications, special provisions, and plan notes.

Days counted after the original contract time requirements will be referred to as overrun days. All days counted after a fixed contract completion date are overrun days. If a contract requires that work be completed within a specified number of working or calendar days, any days counted in excess of that specified number will be overrun days.

Overrun days may or may not result in liquidated damages or disincentives being withheld from the Contractor, depending upon whether applicable time extensions are granted by contract change order.

Substantial Completion: Contracts may include a substantial completion requirement. Unless otherwise specified, the work is substantially complete when all lanes are open to unimpeded traffic and the Contractor's work will not impede traffic again. The substantial completion requirement may be a fixed calendar date and/or a specified number of calendar or working days.

Field Work Completion: All contracts will include a field work completion requirement by which all contract work, including clean-up, must be complete. The field work completion requirement may be a fixed calendar date and/or a specified number of calendar or working days.

The substantial completion requirement, if included in the contract, must be met before days are counted on the field work completion requirement.

CONTRACT TIME IN THE CM&P SYSTEM

Day counts, site conditions and contractor activities are recorded in the CM&P system Bi-weekly Progress Report window. Substantial and Field Work completion requirements will be entered automatically under the Manage Contract Time tab.

In addition to the Bi-weekly Progress Report, the Engineer sends the Bi-weekly Day Count Report and the Work Day Cover Letter to the Contractor every two weeks when contract time is counted. By specification, the Contractor will then be allowed one week to file a written protest.

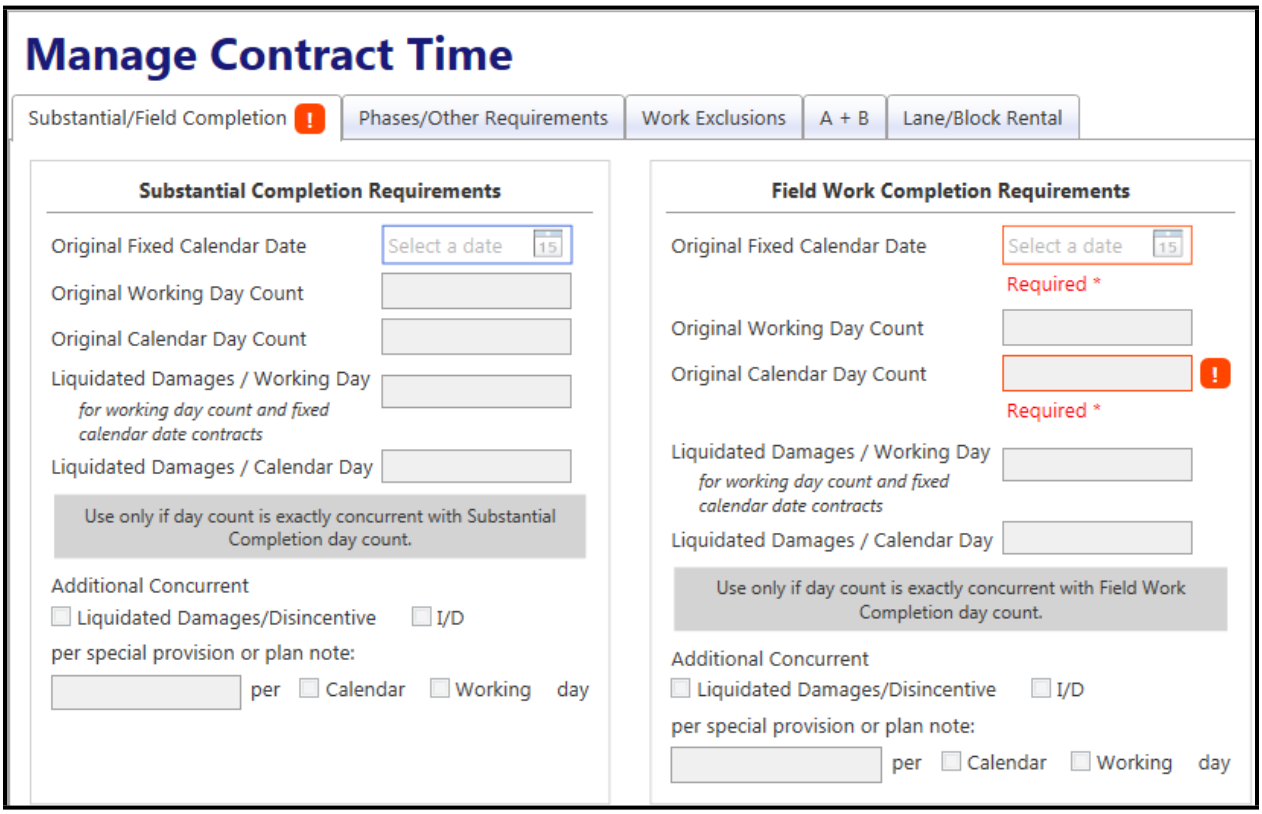


Figure 69. Field Work and Substantial Completion Requirements in the Contract Time Requirements Window

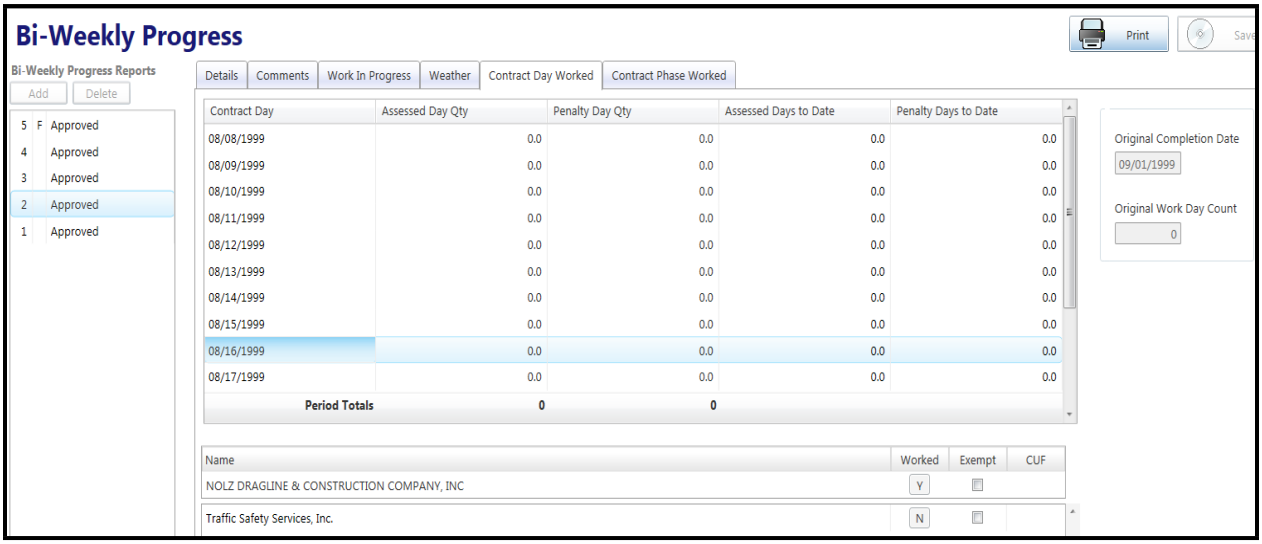


Figure 70. Field Completion Day Count Tab in the Bi-weekly Progress Report Window

INTERIM COMPLETION REQUIREMENTS

If the contract includes a special provision or plan note with interim completion requirements, the Project Engineer must add each requirement in the CM&P system as a phase at the outset of the project. Any interim requirement should be added, even if it is not specifically described as a "phase". To add a contract phase, click the **Contract** icon on the **Main Toolbar** and then click the **Phase** icon**.** Click the **Add** button and enter data about the contract phase. Once the phases have been added in the system, phase working days are recorded on the **Contract Phase Day Worked** panel of the **Bi-Weekly Progress Report** window.

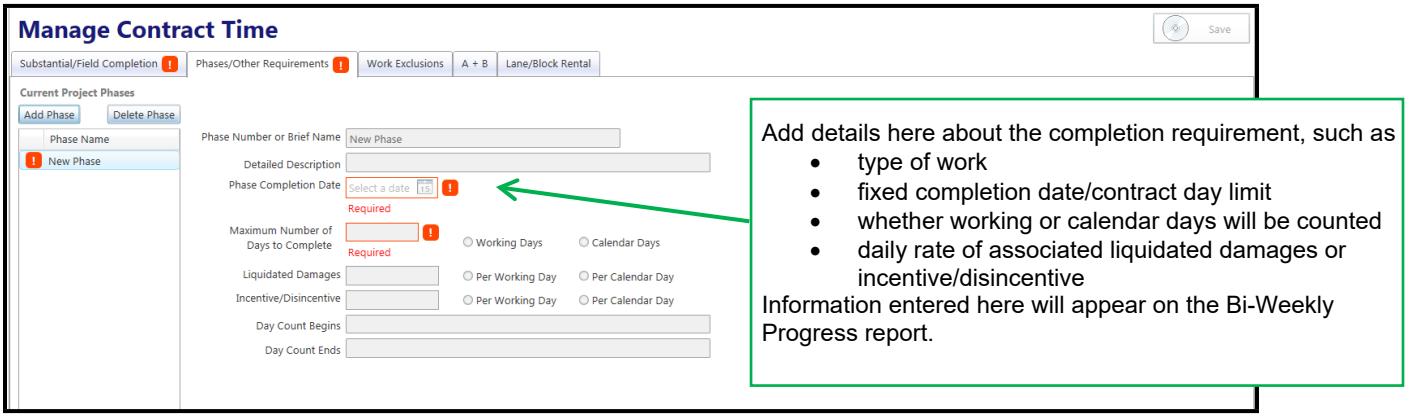


Figure 71. Manage Contract Time Phase Window for setting up interim requirements

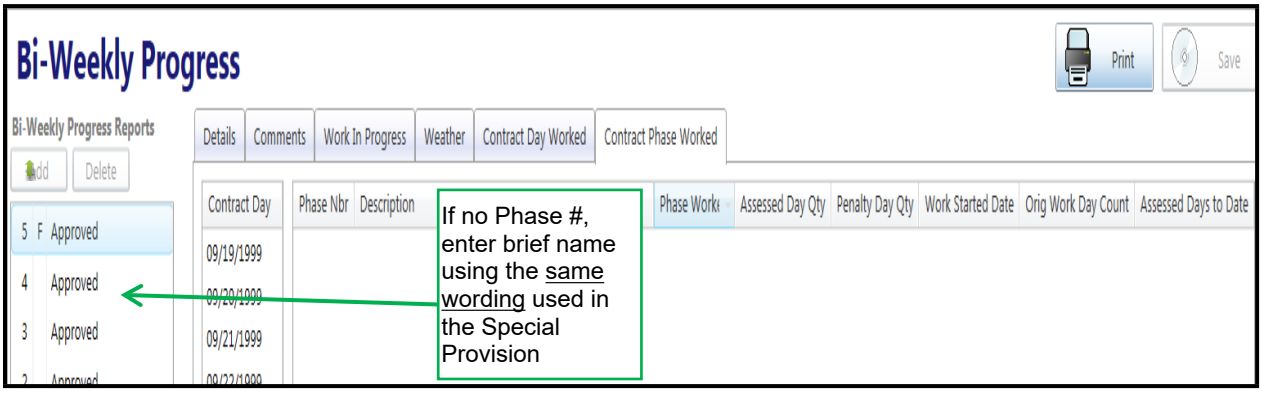


Figure 72. Contract Phase Day Worked Tab in the Bi-weekly Progress Report Window

SDDOT PUBLICATIONS

Guidance for measuring and documenting project work is also provided in these SDDOT publications:

- Concrete Paving Manual
- Concrete Plants Manual
- Earthwork Manual
- Pipe Installation Manual
- Erosion Control Manual
- Materials Manual
- Structures Manual
- Survey Manual
- SDDOT Forms
- SDDOT Memorandums
- SDDOT Policies