

# **DRAINAGE AND WALL ITEMS**

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## OVERVIEW

Drainage and Wall Items have different documentation requirements for each unit of measure (UOM). All Drainage and Wall Items must be counted, measured, calculated and/or based on plan. Documentation examples for a few selected Drainage and Wall Items are illustrated in this chapter. Some minor modifications may be required to show the unusual circumstances that may occur with different items, but the general format should be followed. If there are items which cannot be documented according to the following examples, contact the Construction Admin Services Section for assistance.

When material samples are taken for the Materials Division labs, refer to the [AWP Sample Records](#) document for details.

## SURVEY CREW CHIEF'S RESPONSIBILITIES – DRAINAGE AND WALL ITEMS

- When survey data is used as support for payment, any survey data output/reports from Trimble Business Center (TBC) should be formatted to accurately represent the points (data) collected and a description of what the data represents.
- Email ALL TBC survey data output/reports to the Office Engineer. Use the naming convention: Stakeout Data YYYY-MM-DD Inspectors Initials, (e.g. Stakeout Data 2017-03-19 BLF) in the email Subject line.

## DAILY WORK REPORT (DWR) – AWP

1. Create a DWR in AWP daily to document the survey activity. Refer to Chapter 5, Daily Work Reports, in the [AWP User Guide With Materials](#) for details.
2. Record the following required information in the General tab (Figure 14-1):
  - DWR Date
  - Inspector
  - Weather
  - Low Temp and High Temp
  - Remarks: Select the General Remark Type and enter an overview of survey activities for the day (Figure 14-2).

Contract: 03779 - CHIP SEAL WITH SEAL COAT Save ?

General

**DWR Date \***  
03/16/2020

**Inspector \***  
GFisk  
Fisk Glen

**Weather**  
01 - Clear

**Rainfall Amount**  
-

**Low Temperature**  
32

**High Temperature**  
49

**Number of Remarks**  
0

**Federal Project Number**

**State Project Number**

**Entered By**  
-

**Entered Date**

**Approval Date**

**Approved By**

**Remarks**

Type *	Remarks *
01 - GENERAL	"BD" 19+21.80 Construct Type 3 D.I. 59.5' Lt. H=3.45' Install 18"x76' RCP w/safety slope end section Lt. Install Class 150

Figure 14-1: Survey Crew Chief DWR General Tab

"BD" 19+21.80 Construct Type 3 D.I. 59.5' Lt. H=3.45' Install 18"x76' RCP w/safety slope end section Lt. Install Class 150 Rip Rap apron Lt. Connect to earthen ditch. For stakeout data see email: stakeout data 2019-6-7 CAW

Apply

Figure 14-2: Survey Crew Chief General Remarks Expanded

- Complete a final review of the DWR, Save and Approve it.

## INSPECTOR'S RESPONSIBILITIES – DRAINAGE AND WALL ITEMS

- Use the Agreement Estimate report as a reference to ensure that items and quantities are paid in the correct category (AEB).
- Use the Structure List - Drainage Sheet (Figure 14-3), located in the Contract plans, and the Standard Plans, to help identify items, quantities, descriptions and locations.

														PROJ. NO.	STATE	PROJECT NO.	COUNTY	SHEET								
														0	NEVADA	STP 01000103	CLARK	193-87								
														<b>STRUCTURE LIST-DRAINAGE</b>												
														DESCRIPTION	STATION TO STATION											
															<b>NOTE: ALL LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED BY THE ENGINEER</b>											
															2.00	2.00	377	1	72	61	1.02	6	14	7	CONSTRUCT TYPE 3 DI, 59.50' LT, H=3.45' INSTALL 18" X 72.33' RCP W/SAFETY SLOPE END SECTION LT. INSTALL CLASS 150 RIPRAP APRON LT. CONNECT TO EARTHEN DITCH (SEE SHEET SD-19)	"BD" 19+21.80
																	377	30	60	0.99	7	11			CONSTRUCT TYPE 3 DI, 59.50' LT, H=3.35' INSTALL 18" X 30.00' RCP CONNECT TO STRUCTURE 2.1 (SEE SHEET SD-19)	"BD" 19+54.30
																	377	30	59	0.98	7	10			CONSTRUCT TYPE 3 DI, 59.50' LT, H=3.26' INSTALL 18" X 30.00' RCP CONNECT TO STRUCTURE 2.2 (SEE SHEET SD-19)	"BD" 19+88.37
																	367	63	176	2.28	12	21			CONSTRUCT TYPE 11 DI, 59.50' LT, H=3.26', L=12' INSTALL 18" X 69.03' RCP CONNECT TO STRUCTURE 2.3 (SEE SHEET DS-19)	"BD" 20+58.36

Figure 14-3: Example of a Structure List – Drainage

- Review the following for accuracy:
  - Special Provisions
  - Supplemental Notices
  - Change Orders

*Note: When any changes are made to an item, reference the Change Order number in the DWR item posting remarks.*

- Turn in ALL Drainage and Wall Item Calculation Sheets to the Office Engineer.

## DAILY WORK REPORT (DWR) – MOBILE INSPECTOR

1. Create a DWR in Mobile Inspector daily to document the activity being monitored. Refer to the [Mobile Inspector User Guide](#) for details on using this application.
  - Report Details – daily activities
  - Item Postings – item(s) and quantity(s)
  - Equipment – type, number and hours used
  - Personnel – title and hours
2. Record the following required information in the Report Details window (Figure 14-4):
  - **Date**
  - **Weather**
  - **Low Temp and High Temp**
  - **Attachments:** (N/A) Send ALL photos via email.
  - **Remarks:** Select the appropriate Remark Type. Verify with the Resident Engineer on what information is required.

Figure 14-4: DWR Report Detail Window

3. Record the following required information in the New Item Postings window:
  - **Item:** Select the appropriate Project/Catg., if item is in more than one Project/Catg. – Refer to the AEB report.
  - **Contractor:** ALWAYS the Prime Contractor (Subs are not allowed).
  - **Qty:** Based on plan, measurements and calculations
  - **Material Set:** Select appropriate value (if applicable)
  - **Location:** Line Designation
  - **Station From/To:** Refer to Contract plans.
  - **Offset Type:** Enter the LT, RT, or CL.
  - **Offset Dist.:** Enter if known.
  - **Comments:** Must show calculations when appropriate, refer to Calculation Sheet when appropriate (refer to Appendix B, Calculation Formulas, in this Manual for a Calculation Sheet example), other information relevant to item posting, and explanations when Attention Flag is checked.
  - **Attention Flag:** Use to bring attention to Resident Engineer and Office Engineer for overruns and plan errors. Must enter Attention Comments.

**NOTES for Drainage and Wall item postings:**

- If an each item has a specific location/station callout in the plans, then a separate posting will be done. It should NOT be grouped in a posting.
- If each items do NOT have a location/station callout but are grouped in a table or structure list, then they can be combined in one posting.
- When installing slotted corrugated metal pipe drains and pipes with end sections, care should be taken when measuring for payment. Do not include the length of the end section in the measurement (refer to the Standard Plans).
- Prior to excavation operations ensure survey of surfaces are complete in the event of re-measurement and/or re-calculation requests made by the Contractor or Resident Engineer.
- Quantities for structure excavation, granular backfill, concrete, reinforcing steel, and structural steel may be based on planned quantity, unless the length of pipe or RCB placed differs three feet (3') or more from plan quantity. All quantities effected by the difference must be recalculated or prorated based on the original quantities, with an explanation and cross-reference to the DWR Posting of where the item was either lengthened or shortened three feet (3') or more. See Appendix B, Calculation Formulas, for examples of calculations and prorations. Example of a structure excavation proration:

Pipe plan = 40 LFT

Pipe field measure = 45 LFT

Structure Excavation plan = 120 CUYD

$45 \div 40 = 1.125 \times 120 = 135$  CUYD new quantity for structure excavation

- Refer to Figure 14-5 through Figure 14-12 for examples of Drainage and Wall Item postings with different UOM.

**New Item Posting**

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**Item:** STRUCTURE EXCAVATI... ▼

**Contractor:** Q&D CONSTRUCTION INC ▼

**Qty:**  CUYD

**Authorized:** 4,561.250 CUYD

**Total Posted:** 951.480 CUYD

**Location:** "BW" 19 + 21.80

**Station From:**  +

**Offset Type:**

**Offset Dist:**

**Station To:**  +

**Offset Type:**

**Offset Dist:**

**Measured:**

**Comments:**

$76' \times 6' \times 20' / 27 = 337.78$  CUYD

$[1/2 (16 \times 16) \times 2] \times 76 / 27 = 720.59$  CUYD

(1:1 Safety Slope)

$337.78 + 720.59 = 1058.37$  CUYD

3866 remaining

**NOTES for Drainage and Wall CUYD/CUFT (Figure 14-5):**

- Payment for CUYD items will be based on plan quantity or field measurements and calculations if different than plan.
- Calculations for CUYD =  $L \times W \times D \div 27$
- Calculations for CUFT =  $L \times W \times D$
- Location: Enter the Line Designation
- Offset Type: Enter the LT, RT, or CL.
- Offset Dist: Enter if known
- Sig. Fig. = .01
- In no case will the payment for any area exceed the net amount without authorized changes and/or final measurement.

**Figure 14-5: DWR Item Posting - Drainage and Wall CUYD**

**New Item Posting**

**Item:** RIPRAP (CLASS 300) ▾

**Contractor:** Q&D CONSTRUCTION INC ▾

**Qty:** 52.72 CUYD  
 Authorized: 234.350 CUYD  
 Total Posted: 41.320 CUYD

**Location:** "BW" 19 + 21.80

**Station From:** [ ] + [ ]

**Offset Type:** LT

**Offset Dist:** [ ]

**Station To:** [ ] + [ ]

**Offset Type:** [ ]

**Offset Dist:** [ ]

**Measured:** [ ]

**Comments:**  
 260' x 7.3 x .75 / 27 = 52.72 CUYD

3965 remaining

Figure 14-6: DWR Item Posting - Drainage and Wall CUYD

NOTES for Drainage and Wall CUYD/CUFT (Figure 14-6):

- Riprap items must be field measured with calculations.
- Calculation for CUYD = L x W x D ÷ 27
- Calculation for CUFT = L x W x D
- Location: Enter the Line Designation
- Offset Type: Enter the LT, RT, or CL.
- Offset Dist: Enter if known
- Sig. Fig. = .01

**New Item Posting**

**Item:** 18-INCH METAL END SE... ▾

**Contractor:** Q&D CONSTRUCTION INC ▾

**Qty:** 1.00 EACH  
 Authorized: 8.000 EACH  
 Total Posted: 2.000 EACH

**Location:** "BW" 19 + 21.80

**Station From:** [ ] + [ ]

**Offset Type:** LT

**Offset Dist:** [ ]

**Station To:** [ ] + [ ]

**Offset Type:** [ ]

**Offset Dist:** [ ]

**Measured:** [ ]

**Comments:**  
 Item complete for this installation.  
 See plan sheet SD-18  
 Counted

3941 remaining

Figure 14-7: DWR Item Posting - Drainage and Wall EACH

NOTES for Drainage and Wall EACH (Figure 14-7):

- Payment for EACH items will be based on field count.
- Location: Enter the Line Designation
- Offset Type: Enter the LT, RT, or CL.
- Offset Dist: Enter if known
- Sig. Fig. = .01



**New Item Posting**

**Item:** 18-INCH REINFORCED C... ▼

**Contractor:** Q&D CONSTRUCTION INC ▼

**Qty:** 76.00 LFT  
 Authorized: 365.000 LFT  
 Total Posted: 0.000 LFT

**Location:** "BW" 19 + 21.80

**Station From:** [ ] + [ ]

**Offset Type:** LT

**Offset Dist:** [ ]

**Station To:** [ ] + [ ]

**Offset Type:** [ ]

**Offset Dist:** [ ]

**Measured:**

**Comments:**  
 Pipe extended due to an obstruction found in the field. See plan sheet SD-18 Note: 10  
 Item complete for this installation.

3876 remaining

Figure 14-8: DWR Item Posting - Drainage and Wall LFT

**NOTES for Drainage and Wall LFT (Figure 14-8):**

- Payment for LFT items will be based on field measurements.
- Location: Enter the Line Designation
- Offset Type: Enter the LT, RT, or CL.
- Offset Dist: Enter if known
- Sig. Fig. = .01

**New Item Posting**

**Item:** REINFORCING STEEL ▼

**Contractor:** SIERRA NEVADA CONSTR... ▼

**Qty:** 61.00 LB  
 Authorized: 456.000 LB  
 Total Posted: 0.000 LB

**Location:** "BW" 19 + 21.80

**Station From:** [ ] + [ ]

**Offset Type:** LT

**Offset Dist:** [ ]

**Station To:** [ ] + [ ]

**Offset Type:** [ ]

**Offset Dist:** [ ]

**Measured:**

**Comments:**  
 Paid plan qty. per plan sheet SD-18 Note: 22.  
 The extended length of the pipe did not affect this item.

3895 remaining

**Attention:**

**Attention Comments:**  
 See email: 2020-7-8 CAW

233 remaining

Figure 14-9: DWR Item Posting – Drainage and Wall LB

**NOTES for Drainage and Wall LB (Figure 14-9):**

- Payment for POUND (LB) items will be based on plan quantity (per Subsection 505.04.01, *(Reinforcing Steel) Measurement*, of the Standard Specifications or the Standard Plans) or field measurements and calculations if different than plan. Include Standard Plan Table reference callouts.
- If a pound item comes in a container or bag, you must take a picture of the label on the delivered container and email it to your Office Engineer for backup to confirm the quantity of the container.
- Location: Enter the Line Designation
- Offset Type: Enter the LT, RT, or CL.
- Offset Dist: Enter if known
- Sig. Fig. = .01
- Check the Attention Flag to notify the Office Engineer there's email that belong with this Item Posting.

**New Item Posting**

**Item:** REINFORCING STEEL

**Contractor:** Q&D CONSTRUCTION INC

**Qty:** 155.00 LB  
 Authorized: 130,734.000 LB  
 Total Posted: 0.000 LB

**Location:** "REW" 731 + 99.18

**Station From:** [ ] + [ ]

**Offset Type:** RT

**Offset Dist:** 68.95'

**Station To:** [ ] + [ ]

**Offset Type:** [ ]

**Offset Dist:** [ ]

**Measured:**

**Comments:**  
 Plan Qty for Ty. 2 DI = 115 lbs.  
 Addition 4'  
 Per 2017 Standard Plans pg. R-43 (R-4.2.1) for rate  
 (lbs/ft.). 10lbs x 4ft. = 40lbs.  
 115lbs + 40lbs = 155lbs  
3841 remaining

**Attention:**

**Attention Comments:**  
 DI walls had to be raised addition 4ft. to match  
 roadway elevation change.  
180 remaining

Figure 14-10: DWR Item Posting – Drainage and Wall LB

- NOTES for Drainage and Wall LB (Figure 14-10):
- Payment for POUND (LB) items will be based on plan quantity (per Subsection 505.04.01, (*Reinforcing Steel*) *Measurement*, of the Standard Specifications or the Standard Plans) or field measurements and calculations if different than plan.
  - Give a detailed explanation when payment differs from plan.
  - Location: Enter the Line Designation
  - Offset Type: Enter the LT, RT, or CL.
  - Offset Dist: Enter if known
  - Sig. Fig. = .01
  - Check against Bill of Material in the Standard Plans.

**New Item Posting**

**Item:** STRUCTURAL STEEL GRATES

**Contractor:** SIERRA NEVADA CONSTRU...

**Qty:** 117.00 LB  
 Authorized: 351.000 LB  
 Total Posted: 0.000 LB

**Location:** "BW" 35 + 35.00

**Station From:** [ ] + [ ]

**Offset Type:** RT.

**Offset Dist:** [ ]

**Station To:** [ ] + [ ]

**Offset Type:** [ ]

**Offset Dist:** [ ]

**Measured:**

**Comments:**  
 DI Type 7, 2020 STD Plan pg. 79, Detail # DS-38  
3952 remaining

Figure 14-11: DWR Item Posting – Drainage and Wall LB

- NOTES for Drainage and Wall LB (Figure 14-11):
- Payment for POUND (LB) items will be based on plan quantity (per the Standard Plans) or field measurements and calculations if different than plan. Include Standard Plan Table reference calculations.
  - Location: Enter the Line Designation
  - Offset Type: Enter the LT, RT, or CL.
  - Offset Dist: Enter if known
  - Sig. Fig. = .01

**New Item Posting**

**Item:** GEOTEXTILE (CLASS 2) ▼

**Contractor:** Q&D CONSTRUCTION INC ▼

**Qty:** 7.00 SQYD

Authorized: 55.000 SQYD  
Total Posted: 22.200 SQYD

**Location:** "RW" 19 + 21.80

**Station From:**   +  

**Offset Type:** RT

**Offset Dist:**  

**Station To:**   +  

**Offset Type:**  

**Offset Dist:**  

**Measured:**

**Comments:**

7'x 9' / 9 = 7.00 SQYD  
Completed for this installation.  
See plan sheet SD-18

3920 remaining

NOTES for Drainage and Wall SQYD/SQFT (Figure 14-12):

- Payment for SQYD and SQFT items will be based on field measurements and calculations.
- Items related to sound and MSE walls (walls, concrete stain, etc.) that have a UOM of SQYD may be paid to plan. If different than plan, calculations are required.
- Calculation for SQYD =  $L \times W \div 9$
- Calculation for SQFT =  $L \times W$
- Location: Enter the Line Designation
- Offset Type: Enter the LT, RT, or CL.
- Offset Dist: Enter if known
- Sig. Fig. = .01

**Figure 14-12: DWR Item Posting – Drainage and Wall SQYD/SQFT**

4. Record the following required information in the New Equipment window (Figure 14-13 and Figure 14-14):
  - **Contractor:** Actual contractor performing the work (include subs).
  - **Type:** Select from the Equipment list
  - **Used:** How many of each type.
  - **Hours Used:** Total hours in use.
  - **Comments:** Details of the type of equipment (e.g., diesel, HP, model, make). Include equipment attachment information if applicable.

**New Equipment**

**Contractor:** LAS VEGAS PAVING C... ▼

**Type:** LOADER / BACKHOE /... ▼

**Used:** 1

**On Site:**  

**Hours Used:** 8

**Hours Idle:**  

**Comments:**

Bobcat 256C, Skid Steer, Diesel, 82HP, 1350lbs with an Auger Loader, attachment, 15C w/12" bit

506 remaining

**Figure 14-13: DWR Equipment Entry**



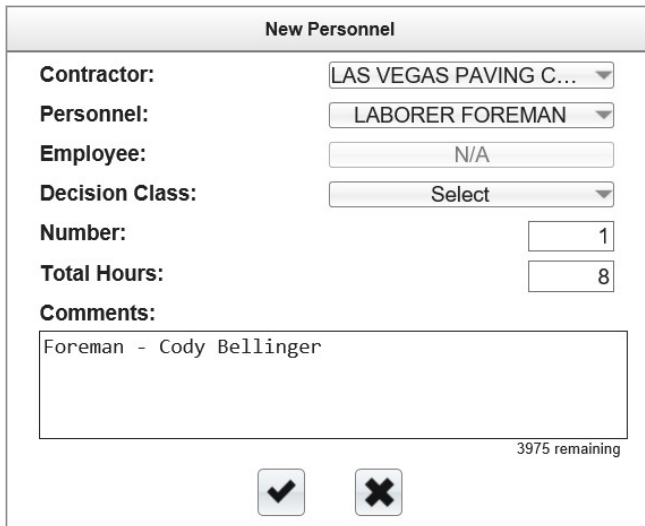
**Add Equipment**

**Contractor:** LAS VEGAS PAVING CORPORATION  
**Type:** LOADER / BACKHOE / WHEEL LOADER / SKID STEER  
**Used:** 1  
**Hours Used:** 8.000  
**Comments:**  
 Bobcat 256C, Skid Steer, Diesel, 82HP, 1350lbs with an Auger Loader, attachment, 15C w/12" bit

Figure 14-14: DWR Equipment List

5. Record the following required information in the New Personnel window (Figure 14-15 and Figure 14-16):
- **Contractor:** Actual contractor performing the work (include subs).
  - **Type:** Select from the Personnel list.
  - **Number:** How many of each title.
  - **Total Hours:** Total hours worked.
  - **Comments:** Details of personnel type (e.g., foreman w/name, laborer, truck driver).



**New Personnel**

**Contractor:** LAS VEGAS PAVING C...  
**Personnel:** LABORER FOREMAN  
**Employee:** N/A  
**Decision Class:** Select  
**Number:** 1  
**Total Hours:** 8  
**Comments:**  
 Foreman - Cody Bellinger

3975 remaining



 

Figure 14-15: DWR Personnel Entry







Add Personnel	
<b>Contractor:</b> LAS VEGAS PAVING CORPORATION <b>Description:</b> LABORER <b>Number:</b> 3 <b>Total Hours:</b> 8.000	 
<b>Contractor:</b> LAS VEGAS PAVING CORPORATION <b>Description:</b> OPERATING ENGINEER <b>Number:</b> 2 <b>Total Hours:</b> 8.000	 
<b>Contractor:</b> LAS VEGAS PAVING CORPORATION <b>Description:</b> LABORER FOREMAN <b>Number:</b> 1 <b>Total Hours:</b> 8.000 <b>Comments:</b> Foreman - Cody Bellinger	 

Figure 14-16: DWR Personnel List

- Complete a final review of the DWR, lock the report, and Sync Data.

**Note:** When a Mobile Inspector DWR is completed, locked and Synd Data is completed, the information is uploaded into an AWP DWR, where it is reviewed and Approved for processing progress payments.

## DAILY WORK REPORT (DWR) – AWP EDITS

The Officer Engineer reviews each Inspector's DWRs for required entries and accuracy. If edits are needed on a DWR, the Inspector who created it may be required to log into the AWP program on a computer (not the iPad) and complete the edits. Refer to Chapter 5, Daily Work Reports, Section, Editing a Mobile Inspector DWR, in the [AWP User Guide With Materials](#) for details.

## OFFICE ENGINEER'S RESPONSIBILITIES – DRAINAGE AND WALL ITEMS

- Collect all Material Certifications. Scan and save them to the Contract Files\Materials\03 Cert & Test Reports\3.# directory. Each Material Certification must have the contract ID, bid item and represented quantity entered. Hand-written entries are acceptable for the contract ID, bid item and quantity.
  - Name the scanned certificate file(s) with the contract ID, Material Code Name & description - CERT (e.g., 03904 M6100160 Riprap - CERT.pdf). The Material Code Name and description is found in the NDOT Power BI, AWP Reports, Certification Tracking report.
- Create an AWP Materials Cert Sample Record for each Material Certification received. Refer to the [AWP Cert Sample Record Creation](#) document and Chapter 24, Progress Payments, in this Manual for details.
- Save emails containing TBC survey stakeout report/data in the appropriate Contract Files\Contract\09 Survey directory.
- Save Drainage and Wall items general information photos in the appropriate Contract Files\Contract\03 Multimedia\3.# Photos directory.
- Save Drainage and Wall items Pound label photos to the appropriate Contract Files\Contract\07 Estimates directory to confirm the quantity of the bundle.

- Review Drainage and Wall Item calculation sheets for accuracy and save electronically in the appropriate Contract Files\Contract\07 Estimates\7.# Calc Sheets directory using this naming convention: DWR YYYY-MM-DD Inspectors Initials, (e.g. DWR 2016-03-19 KMM).
- Distribute executed copies of Change Orders to Inspectors.

## DAILY WORK REPORT (DWR) – AWP

When a Mobile Inspector DWR is locked by an Inspector, the information is uploaded into an AWP DWR. Refer to Chapter 5, Daily Work Reports, in the [AWP User Guide With Materials](#) for details.

- Verify the following:
  - Information in the Remarks
  - Information in the Contractor On Site tab
  - Information in the Contractor Equipment tab
  - Information in the Contractor Personnel tab
  - Items are paid correctly according to the contract documents (e.g., plans, supplemental notices, Change Orders).
  - Item quantities
  - Quantities in postings are documented to the correct Significant Figure (.01)
  - Material Set is correct.
  - Stations and Line Designations in the Locations
  - Calculations are correct.
  - Comments reference calculation sheets, if applicable.

**Note:** Length does not always equal the difference between the beginning and ending station. Sometimes there is a curve or an obstacle that will affect the distance. Always check with the Inspector before assuming the calculations are incorrect.

- Approve the DWR if everything is correct.
- If there are edits required, the Office Engineer may complete them and add a DWR Note with their name, date, and details of the correction. The DWR can then be Approved.
- If there are edits which need to be completed by the Inspector who created the DWR, the Inspector will be required to log into the AWP program on a computer (not the iPad) to complete the edits.
- Review the edited DWR and Approve.