Contract Administration Manual

APRIL 2017

SECTION 102 – BIDDING REQUIREMENTS AND CONDITIONS

102.03 Examination of Plans, Specifications, and Project Site. Pre-bid meetings provide value to both contractors and the Department on large or complex projects. Contractors can learn about unusual or unique project features, and get answers to questions prior to bid submittal. The Department is also provided one last chance to evaluate and improve, if necessary, the contract's ability to be bid and constructed.

ITD Standard Specifications For Highway Construction (SSHC) Subsection 102.03 is explicit that *"If the Department discovers any information, specifications, plans, data, or important interpretations that identify the bidding process is deficient, the Department will provide this data to all bidders as addenda. Bidders must acknowledge receipt of addenda."* This specification requires that **any changes resulting from a pre-bid meeting that will be contractually binding must be in the form of an addendum.**

The Department will allow at least three calendar weeks between a pre-bid meeting and a bid opening, so there is ample time to issue an addendum. The Department will mark minutes from pre-bid meetings with "FOR INFORMATION ONLY" and distribute the minutes to plan holders at least 10 calendar days before bid opening.

SECTION 103 – AWARD AND EXECUTION OF CONTRACT

103.04 Contract Bonds. The Engineer may make changes in the work or add extra work within the contract scope without notice to the sureties (bonding companies) (ITD Standard Specifications For Highway Construction (SSHC) 104.02, Contract Revisions). If the contract value increases through the issuance of change orders or quantity variances, the bond still covers the contract work performed. The fees paid by the Contractor for payment and performance bonds are based upon a percentage of the actual contract value. Some bonding companies adjust their fees when the project is completed. For example, if large value change orders occur, the Contractor may make a request for the Department to issue a change order to cover bond fee increases. This is acceptable, provided the Contractor supports the request with bonding company invoices (SSHC 109.03.C.5.d).

Following the decision to award the contract, performance and payment bond forms are included with other documents and forwarded to the successful bidder for execution by the Contractor, Surety Company, or government obligation representative. Contracting Services will verify that the bonds, along with other documents, are fully executed and incorporated in the contract before the contract is authorized and signed by the Department's authorized representative.

Performance Bond (See Figures 103.04-1 and 2). A performance bond guarantees and ensures contract completion. Idaho Code 54-1926 [insert Code Reference] requires a performance bond on all Department contracts, regardless of size. The bond amount is for 100% of the contract amount. A surety company authorized to conduct business in Idaho must execute each bond. Government obligations may be used and must be delivered to the Department for safe keeping before contract award.

Following the decision to award the contract, contract bond forms are included with other documents and forwarded to the successful bidder for execution by the Contractor, Surety Company, or government obligation representative. Contracting Services (CS) will assure that the bond, along with other documents, is fully executed and incorporated into the contract before the contract is signed by the Department's authorized representative. The Department's official copy of the contract bond is filed along with other original documents at the District office. Government obligations are filed with the State Treasurer or a bank acceptable to the State Treasurer, with a Safe Keeping Receipt (Figure 103.04.2) delivered to the Department.

Payment Bond (See Figures 103.04-3 and 4). The payment bond (Idaho Code 54-1926) guarantees and ensures that the contractor will pay every claimant who has furnished labor, materials, and rental equipment, as well as pay all taxes when due (required by Title 63, Chapter 15, Idaho Code, in the prosecution of the contract).

A payment bond is required on Department contracts regardless of size. The bond amount is 100% of the contract amount. A surety company authorized to conduct business in Idaho must execute each bond. Government obligations are filed with the State Treasurer or a bank acceptable to the State Treasurer, with a safe keeping receipt (Figure 103.04.3) delivered to the Department.

Following the decision to award the contract, payment bond forms are included with other documents and forwarded to the successful bidder for execution by the Contractor, Surety Company, or government obligation representative. Contracting Services will assure that the bond, along with other documents, is fully executed and incorporated in the contract before the contract is authorized and signed by the Department's authorized representative.

Idaho Code 54-1927 provides any supplier of material, labor, or equipment who has not been paid in full within 90 days after the last of these services were furnished the right to sue on the payment bond for the amount or balance unpaid. In cases of subcontracts, the statute indicates that if a material, labor, or equipment supplier furnished these services to a subcontractor where no contractor relationship is expressed or implied with the contractor, the claimant shall not have the right of action unless the claimant has given written notice to the prime Contractor within 90 days from the date the last labor, equipment, or supplies were furnished. The claimant must notify the prime Contractor by a registered or certified letter.

Idaho Code 54-1927 also addresses the statute of limitations that can vary with each instance. Department personnel must not interpret the law for outside individuals. Suppliers and other entities that request such information should be referred to the law for their own interpretation or that of their attorney. When inquiries about the interpretation or procedures to follow concerning a payment bond are made, they should be referred to the District Engineering Manager.

Title 63, Chapter 15, Idaho Code states in part that "the Contractor will pay promptly, when due, all taxes (other than on real property), excises, and license fees due to the State, its subdivisions, and municipal and quasi-municipal corporations therein accrued or accruing during the term of the contract". The payment bond also ensures payment of these taxes.

The Department will provide a copy of the bond and the contract to anyone or their representative making an allegation with an affidavit that labor, material or both has been supplied and that payment has not been made. Standard copying charges may be assessed in accordance with the Financial Services Manual. If a certified copy of the bond is requested, the Engineer can make the certification. The certification statement may be written on the back of the document as follows:

> "I (Engineer's name) certify this document is a true copy from contract (insert number).
>
> Signed (Engineer's signature)"

SURETY

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, That we «CONTRACTOR», (Change "Corporation" to "Partnership" or "Sole Proprietor" if necessary)A CORPORATION, as Principal, and__________________ as Surety are held and firmly bound unto the State of Idaho in the penal sum of

«WORDED_CONTRACT_AMOUNT»

($«NUMERICAL_CONTRACT_AMOUNT») lawful money of the United States, which sum is agreed to be the maximum liability hereunder, well and truly to be paid, and for the payment of which we and each one of us bind ourselves, our heir, executors, administrators and assigns, jointly and severally, firmly by these presents. The condition of the instrument is such, that whereas the Principal has entered into a certain agreement, hereto attached, with the State of Idaho, dated ____________________________, 20______, for the work of «JOB_DESCRIPTION»; «LOCATION»; known as (Type either "Idaho" or "Idaho Federal Aid") Project No. «PROJECT_NO», Contract No. «CONTRACT_NO», in «COUNTY» County, Key No. «KEY_NO».

NOW, THEREFORE, If the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said contract and any extensions thereof that may be granted by the State, with or without notice to the Surety and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then this obligation to be null and void, otherwise to remain in full force and effect.

PROVIDED, However, that this bond is executed pursuant to the provisions of the Public Contracts Bond Act, and all liabilities on this bond shall be determined in accordance with said provisions to the same extent as if set forth in full herein.

IN WITNESS WHEREOF, the Principal and Surety have executed this instrument to become effective on the date of the contract agreement as set forth above.

CONTRACTOR (Sole Proprietors or Partnerships):

	(Contractor Name)
(Address)	(Address)
(City, State, Zip)	(City, State, Zip)
By:________________ (Signature)	By:________________ (Signature)
(Print Name)	(Print Name)
Title (Partner)	Title (Sole Proprietor/Partner)
Dated	Dated

CONTRACTOR (Corporation):

Attest:	(Principal)	
By:________________ (Signature)	(Address)	(AFFIX CORPORATE SEAL)
(Print Name)	(City, State, Zip)	
	By:________________ (Signature)	
	(Print Name)	
DATED:________________	(Title)	

CORPORATE SURETY:

	(Surety)	
	(Address)	(AFFIX CORPORATE SEAL)
	(City, State, Zip)	
	By:________________ (Signature)	
	(Print Name)	
DATED:________________	(Title)	
	ATTACH POWER OF ATTORNEY	

RESIDENT AGENT:

By:________________ (Signature)	DATED:________________
(Print Name)	
(Address)	
(City, State, Zip)	

Figure 103.04.1: Surety Performance Bond

GOVERNMENT OBLIGATION

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, That we «CONTRACTOR»,(Change "Corporation" to "Partnership" or "Individual" if necessary) A CORPORATION, as Principal, and____________________ as Pledgor of government obligations and the government obligations described herein, are held and firmly bound unto the State of Idaho in the penal sum of

«WORDED_CONTRACT_AMOUNT»

($«NUMERICAL_CONTRACT_AMOUNT») lawful money of the United States, which sum is agreed to be the maximum liability hereunder, well and truly to be paid, and for the payment of which we and each one of us bind ourselves, our heirs, executors, administrators and assign, jointly and severally, firmly by these presents.

The condition of this instrument is such, that whereas the Principal has entered into a certain agreement, hereto attached, with the State of Idaho, dated the ____ day of __________________, 20__, for the work of «JOB_DESCRIPTION»; «LOCATION»; known as (Type either "Idaho" or "Idaho Federal Aid") Project No. «PROJECT_NO», Contract No. «CONTRACT_NO», in «COUNTY» County, Key No. «KEY_NO».

NOW, THEREFORE, If the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract and any extensions thereof that may be granted by the State, with or without notice to the Pledgor and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the Pledgor being hereby waived, then this obligation to be null and void, otherwise to remain in full force and effect.

PROVIDED, However, that this bond is executed pursuant to the provisions of the Public Contracts Bond Act, and all liabilities on this bond shall be determined in accordance with said provisions to the same extent as if set forth in full herein.

PLEDGE

To secure payment and performance of all obligations contained herein, ________________________________ (Pledgor), does hereby grant unto the State of Idaho a security interest in and assigns, transfers, pledges and delivers to the State of Idaho government obligations as described in the following paragraph and furthermore that said government obligations meet the criteria set forth in Idaho Code, Section 54-1901, are in an amount equal at fair market value to the total amount of this bond and are not currently pledged or otherwise encumbered or obligated. Pledgor further authorizes the State of Idaho to collect or sell the described government obligations if Principal defaults in any of the obligations contained herein.

Government obligations pledged are described as follows: (see note below)

____

____

____

IN WITNESS WHEREOF, the Principal and Pledgor have executed this instrument to become effective on the date of the contract agreement as set forth above.

CONTRACTOR (Individual or Partnership):

(SEAL)

________________________________ ________________________________

(Principal) (Principal)

________________________________ ________________________________

________________________________ ________________________________

(Business Address) (Business Address)

________________________________ ________________________________

Dated

____

CONTRACTOR (Corporation):

Attest: ______________________________

By:______________________________ ______________________________
(Signature)

______________________________ ______________________________
(Print Name) (Business Address)

______________________________ ______________________________
(City) (AFFIX
______________________________ By:______________________________ CORPORATE
(Signature) SEAL)

____
(Print Name)

DATED:______________________ ______________________________
(Title)

Note: Description must include the obligation type, CUSIP No., par value, fair market value, and maturity date.

PLEDGOR:

Attest: ______________________________
(Pledgor)
By:______________________________ ______________________________
(Signature)

______________________________ ______________________________
(Print Name) (Business Address)

______________________________ ______________________________
(City) (AFFIX
______________________________ By:______________________________ CORPORATE
(Address) (Signature) SEAL)

____
(Print Name)

DATED:______________________ ______________________________
(Title)

Figure 103.04.2: Government Obligation Performance Bond

SURETY

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, That we «CONTRACTOR», (Change "Corporation" to "Partnership" or "Sole Proprietor" if necessary)A CORPORATION, as Principal, and__________________ as Surety are held and firmly bound unto the State of Idaho in the penal sum of

«WORDED_CONTRACT_AMOUNT»

($«NUMERICAL_CONTRACT_AMOUNT») lawful money of the United States, which sum is agreed to be the maximum liability hereunder, well and truly to be paid, and for the payment of which we and each one of us bind ourselves, our heir, executors, administrators and assigns, jointly and severally, firmly by these presents. The condition of the instrument is such, that whereas the Principal has entered into a certain agreement, hereto attached, with the State of Idaho, dated ____________________________, 20_______, for the work of «JOB_DESCRIPTION»; «LOCATION»; known as (Type either "Idaho" or "Idaho Federal Aid") Project No. «PROJECT_NO», Contract No. «CONTRACT_NO», in «COUNTY» County, Key No. «KEY_NO».

NOW, THEREFORE, If the said Principal shall pay all claimants supplying labor or materials to him or his subcontractors in the prosecution of the work provided for in said contract, and any and all authorized modifications of said contract that may hereafter be made, notice of which modifications to the Surety being hereby waived and shall pay all taxes when due, as required by Title 63, Chapter 15, Idaho Code, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, However, that this bond is executed pursuant to the provisions of the Public Contracts Bond Act, and all liabilities on this bond shall be determined in accordance with said provisions to the same extent as if set forth in full herein.

IN WITNESS WHEREOF, the Principal and Surety have executed this instrument to become effective on the date of the contract agreement as set forth above.

CONTRACTOR (Sole Proprietors or Partnerships):

	______________________________ (Contractor Name)
______________________________ (Address)	______________________________ (Address)
______________________________ (City, State, Zip)	______________________________ (City, State, Zip)
By:___________________________ (Signature)	By:___________________________ (Signature)
______________________________ (Print Name)	______________________________ (Print Name)
______________________________ Title (Partner)	______________________________ Title (Sole Proprietor/Partner)
______________________________ Dated	______________________________ Dated

CONTRACTOR (Corporation):

Attest:	______________________________ (Principal)	
By:___________________________ (Signature)	______________________________ (Address)	(AFFIX CORPORATE SEAL)
______________________________ (Print Name)	______________________________ (City, State, Zip)	
	By:___________________________ (Signature)	
	______________________________ (Print Name)	
DATED:________________________	______________________________ (Title)	

CORPORATE SURETY:

	______________________________ (Surety)	
	______________________________ (Address)	(AFFIX CORPORATE SEAL)
	______________________________ (City, State, Zip)	
	By: ___________________________ (Signature)	
	______________________________ (Print Name)	
DATED: ________________________	______________________________ (Title)	
	ATTACH POWER OF ATTORNEY	

RESIDENT AGENT:

By:___________________________ (Signature)	DATED: ________________________
______________________________ (Print Name)	
______________________________ (Address)	
______________________________ (City, State, Zip)	

Figure 103.04.3: Surety Payment Bond

GOVERNMENT OBLIGATION

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, That we «CONTRACTOR»,(Change "Corporation" to "Partnership" or "Individual" if necessary) A CORPORATION, as Principal, and____________________ as Pledgor of government obligations and the government obligations described herein, are held and firmly bound unto the State of Idaho in the penal sum of

«WORDED_CONTRACT_AMOUNT»

($«NUMERICAL_CONTRACT_AMOUNT») lawful money of the United States, which sum is agreed to be the maximum liability hereunder, well and truly to be paid, and for the payment of which we and each one of us bind ourselves, our heirs, executors, administrators and assign, jointly and severally, firmly by these presents.

The condition of this instrument is such, that whereas the Principal has entered into a certain agreement, hereto attached, with the State of Idaho, dated the ____ day of ___________________, 20__, for the work of «JOB_DESCRIPTION»; «LOCATION»; known as (Type either "Idaho" or "Idaho Federal Aid") Project No. «PROJECT_NO», Contract No. «CONTRACT_NO», in «COUNTY» County, Key No. «KEY_NO».

NOW, THEREFORE, If the said Principal shall pay all claimants supplying labor or materials to him or his subcontractors in the prosecution of the work provided for in said contract, and any and all authorized modifications of said contract that may hereafter be made, notice of which modifications to the Pledgor being hereby waived and shall pay all taxes when due, as required by Title 63, Chapter 15, Idaho Code, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, However, that this bond is executed pursuant to the provisions of the Public Contracts Bond Act, and all liabilities on this bond shall be determined in accordance with said provisions to the same extent as if set forth in full herein.

PLEDGE

To secure payment and performance of all obligations contained herein, ________________________________ (Pledgor), does hereby grant unto the State of Idaho a security interest in and assigns, transfers, pledges and delivers to the State of Idaho government obligations as described in the following paragraph and furthermore that said government obligations meet the criteria set forth in Idaho Code, Section 54-1901, are in an amount equal at fair market value to the total amount of this bond and are not currently pledged or otherwise encumbered or obligated. Pledgor further authorizes the State of Idaho to collect or sell the described government obligations if Principal defaults in any of the obligations contained herein.

Government obligations pledged are described as follows: (see note below)

____

____

____

IN WITNESS WHEREOF, the Principal and Pledgor have executed this instrument to become effective on the date of the contract agreement as set forth above.

CONTRACTOR (Individual or Partnership):

(SEAL)

________________________________	________________________________
(Principal)	(Principal)
________________________________	________________________________
________________________________	________________________________
(Business Address)	(Business Address)
________________________________	________________________________

Dated

____

CONTRACTOR (Corporation):

Attest: ______________________________

By:______________________________ ______________________________
(Signature)

______________________________ ______________________________
(Print Name) (Business Address)

______________________________ ______________________________
(City) (AFFIX
______________________________ By:___________________________ CORPORATE
(Signature) SEAL)

____
(Print Name)

DATED:_______________________ ______________________________
(Title)

____

Note: Description <u>must</u> include the obligation type, CUSIP No., par value, fair market value, and maturity date.

PLEDGOR:

Attest: ______________________________
(Pledgor)
By:______________________________ ______________________________
(Signature)

______________________________ ______________________________
(Print Name) (Business Address)

______________________________ ______________________________
(City) (AFFIX
______________________________ By:___________________________ CORPORATE
(Address) (Signature) SEAL)

____
(Print Name)

DATED:_______________________ ______________________________
(Title)

____

Figure 103.04.4: Government Obligation Payment Bond

SECTION 104.00 - SCOPE OF WORK

104.02 Contract Revisions. The Engineer has the right to make changes in the work, eliminate work or add extra work within the general scope of the contract. The Contractor is contractually required to perform change order work. Contract revisions are issued using a change order (ITD-0400). Once the change order has been executed by the Department, the document modifies and becomes part of the contract, and carries the same legal force as the original contract.

Advance approval of contract revisions shall be given by the delegated approval authority. Use the ITD-2317, Record of Change Order Authorization to document approval. The only signature required on an ITD-2317 is that of the approval authority.

Table 104.02.1 below presents the contract revision approval authority for both the ITD-2317 and ITD-0400 forms for all ITD projects. Some changes (as noted on Table 104.02.1) also require prior approval by FHWA on Federal-aid projects.

Table 104.02.1: Change Order Approval Authority

Change Type	**Approval Authority**	**FHWA Prior Approval Federal-aid Project of Interest Contracts**	**FHWA Prior Approval All Federal-aid Contracts**
Changes in the horizontal geometry of a roadway section (including revisions involving addition, deletion, relocation, or structural design of major structures, alignment, or typical section on main roads, ramps, and frontage roads or cross roads.	District Engineer	Yes	No
Revisions in conflict with approved standards, including new technologies for which no standards have been approved.	District Engineer	Yes	No
Changes in approved access provisions (Interstate and NHS routes).	District Engineer	Yes	Yes for Interstates No for NHS
Change in specifications.	District Engineer	Yes	No
Work allowed to remain in place with or without price adjustment.	District Engineer	Yes	No
Dispute Resolutions: <= $100,000* <=$1,000,000 >$1,000,000	 Resident Engineer District Engineer Chief Engineer	Yes for change orders	No

* The actual amount up to the maximum authority to be delegated by the District Engineer.			
Changes, which would result in elimination of, or delay to, environmental mitigation measures or commitments on Federal-Aid and State-funded projects covered under a FHWA-approved environmental document.	District Engineer	Yes	Yes
Changes or extra work resulting in an increase or decrease in costs : <= $100,000* <=$1,000,000 >$1,000,000 * The actual amount up to the maximum authority to be delegated by the District Engineer.	Resident Engineer District Engineer Chief Engineer	Yes for change orders >= to $100,000	No
Changes in contract plans beyond the general scope and intent of the original contract, including revisions to project limits (if changes to project limits must have an FHWA approved ITD 2101 in place before the work begins).	District Engineer	Yes	Yes
Contract Time Extensions	District Engineer Resident Engineer	Yes for change orders > 10 days ≤ 5 days	No
Utility and Railroad Change Orders	District Engineer	No	No

Engineering Errors (only used for errors that are determined to fall outside normal standard of professional care) – These costs are non-participating on Federal-aid contracts.	District Engineer	No	No
Contract specifications modification or deletion.	District Engineer	Yes	No
Contract specification additions.	District Engineer	Yes	No

When the Contractor proposes a change to the contract, the Contractor shall complete and submit the ITD-2884 Request for Change (RFC), to justify the change along with any other information requested by the Engineer.

Contractor-requested changes should be evaluated for merit based on whether it is a benefit to the Department, the traveling public, and the taxpayers.

The Contractor is required to supply specific information to the Engineer regardless of whether the change is initiated by either the Engineer or the Contractor. Refer to ITD Standard Specifications For Highway Construction (SSHC) 104.02 for requirements. Requests by the Engineer to the Contractor should be made in writing and include a specified time for when the information is to be returned.

The Engineer will determine and document contract revision time and cost impacts per ITD SSHC 108.07 and 109.03, respectively.

The Contractor cannot be held responsible for any delays in work or additional costs if a specified time for when the information is to be submitted has not been included in the request letter.

Submit a separate change order for each individual change or operation and include all items of work, adjustment, changes in plans or specifications, etc. to entirely cover the new work. If the new work includes contract items at contract prices, include this information in the change order. Do not include other work items or changes that are unrelated.

> *Example: a change in specifications on crushed aggregate is warranted and a price adjustment is needed on this item. At the same time, an unplanned pipe must be installed at a particular location and there is no contract bid price for the pipe. Both conditions require a Change Order; however, they are entirely unrelated, so each must be submitted as a separate change order.*

104.02.01 Issuing an Avoid Verbal Order (AVO) for a Change Order. If the change order has not yet been fully executed but has been approved, the Engineer may issue an order for the Contractor to proceed with the revised work using Form ITD-2055, Avoid Verbal Order (AVO). The order must be complete, correct, clear and concise for the work to be performed, along with the method of measurement and basis of payment. The AVO may be hand written, provided it is legible.

Prepare an AVO as follows:

- The message may be prepared and signed by the Engineer's representative. The Contractor's representative receiving the message must also sign the AVO.
- The yellow copy remains with the Contractor's representative; the Engineer retains the white and pink copies. Send a copy of the original white copy to the Contractor's home office to ensure their management is aware of this communication.

It is important that the Contractor officially acknowledge receipt of an AVO by requiring a signature and date from the Contractor's representative with a "hard copy" transmitted to his main office for documentation purposes. Claims investigations have revealed, in too many instances, that no record is available confirming the Contractor received an AVO.

The Contractor must sign and date the AVO.

An AVO example is at the end of this section (Example 104.02-1).

104.02.02 Preparing the ITD-2317 Record of Change Order Authorization. The ITD-2317 must include the following:

- The reason for the change order. Provide enough detail so a third party who is unfamiliar with the project can understand why the change order is needed.
- General description of the work to be performed (i.e. scope of work).
- Estimated Cost (final pricing from the Contractor is not required).
- Estimated time impacts (final schedule analyses are not required).

Changes involving project environmental documents require approval from those having authority for the environmental document. Similarly, changes that might affect the operations of Ports of Entry (POE) should be made only after consultation and concurrence with the POE Manager.

The individuals being consulted (including FHWA on FHWA Projects of Interest or local agencies on local agency projects) and approval dates must be completed on the ITD-2317 to advise management that appropriate specialists have been brought into the decision-making process for the change. Include all elements of the proposed change in the discussion with the specialists including cost and time. A proposed change may have technical merits, but the high cost impacts may negate any potential benefits.

Advance approval of contract revisions must be given by the delegated approval authority. The approval authority and the date of said approval should be shown in the "discussed with ________" column. Written documentation (e.g. signature on the ITD-2317) should be obtained from the individual indicating approval.

Record of Change Order Authorization (ITD 2317) examples are at the end of this section (Example 104.02-2 through 104.02-7).

104.02.03 Preparing the ITD-0400. Because a change order modifies or supplements the contract, write in a manner so that interpretation of the work is not misunderstood.

If any aspect of the proposed contract revision changes after the 2317 is approved, but before the 0400 is finalized, the 2317 should be revised to reflect the changes, so there is a clear record that the approval authority(s) and subject matter experts are still in concurrence with the proposed changes.

The ITD-0400 authorization date will normally be the date on which the Contractor was ordered to do the work. This is not the date from the ITD-2317 “Date Authorized by the Approval Authority”. It is the date the actual order was given (either written or verbal) to the Contractor.

The Change Order should list as applicable:

- Description of the Work
- Material Requirements, including material acceptance requirements if applicable
- Construction Requirements
- Method of Measurement
- Basis of Payment (including a pricing table)
- Contract Time Adjustment.

Every change order must address cost and time even if it is a no cost change order or time has not been affected. Include a statement as to how agreed prices and lump sum item costs were justified, with back up (i.e. Contractor's detailed cost estimate, ITD's independent cost estimate, and written documentation of negotiations) in the change order file. The independent cost estimate could be based on average bid prices, prices from similar projects or a force account (i.e. materials, equipment and labor) analysis. Use force account procedures when an agreed price cannot be arrived at through normal negotiation or when work quantities are difficult to estimate. Address the time in the change order narrative. In the space for adjustment in contract time (located in the lower left hand corner) complete the time adjustment as applicable.

The space for adjustment in contract time must be filled in. The space provides for "time adjustments," not "time extensions". Documentation from the project schedule, including updates, is required for justifying a time adjustment. Contract time can be decreased or increased as the change warrants **only** if the critical path is impacted. Written documentation of time impact negotiations should be placed in the change order file.

Consider and resolve time adjustments when the change order is initiated. If the change cannot be accomplished concurrently with the controlling operations, or affects the critical path, then a time adjustment should be made.

Changing the materials specifications (i.e. price adjustment) is an acceptable practice **only** under certain limited circumstances such as materials placed in non-critical areas and materials that don’t meet specs, but will still perform as intended based on an engineering and risk analyses.

In the event that a change in the general scope of work per Table 104.02.1 is contemplated, the following must be accomplished:

- Identify the proposed work is truly needed
- Perform a re-evaluation of the environmental document if required
- Verify the ROW is adequate for the proposed change(s)

- Update the Erosion Control Plan or the SWPPP if required
- Check other Project Permit requirements (404, 401, Etc.)

When contract revisions will be performed after substantial completion or with interim completion dates, employ and document a method of time accounting to control the duration of the work. Specify in the change order the time allocation and liquidated damages that are associated with the change order work.

Number change orders consecutively, beginning with number 01 for each contract. If work involved in a previous change must be amended, complete a new change order and assign a new number.

Attachments may be necessary to supplement a change order. These documents must be legible prints showing all data necessary to properly describe the work. Attach the documents to each change order copy. A Professional Engineer licensed in the State of Idaho must stamp and endorse drawings that require Engineer certification.

104.02.04 Formatting the ITD-0400. Capitalize, underline, and begin main headings at the left margin. When more than one heading is necessary, use all that apply. Use one or more of the main headings:

- CHANGE IN PLANS
- CHANGE IN SPECIFICATION
- ADDED SPECIFICATION
- DELETED SPECIFICATION
- CHANGE IN PLANS AND SPECIFICATIONS
- MATERIALS LEFT ON HAND
- QUANTITY VARIANCE
- ACCEPTANCE PER 105.03
- RESOLUTION OF A DISPUTE
- CONSULTANT ERROR AND OMMISSION
- VALUE ENGINEERING CHANGE PROPOSAL
- CHANGE IN SCOPE
- OTHER.

104.02.05 Naming ITD-0400 Contract Pay Items (WinCAPs only). Change order items are tracked by item number(s). The item number(s) or name(s) given to Change Order item(s) must be kept uniform from project to project.

Change order items that are not already provided for in the contract shall use the following numbering method. The number consists of:

- An alpha designator for the type of work.

  C - CHANGE ORDER (the majority of change orders will use this designation)

  F - FORCE ACCOUNT (used when ITD SSHC 109.03.C.5 is applicable)

  M - MATERIALS ON HAND (used when ITD SSHC 109.06 is applicable)

  ML – MATERIALS LEFT ON HAND (used when ITD SSHC 109.07 is applicable)

  U – UTILITY (used only for ITD-0403 change orders).

  N – For federal-aid contracts, an “N” alpha designator must be included preceding the alpha designators whenever the item has been **conclusively determined on a case-by-case basis** that it is a non-participating (i.e. Federal-aid dollars will not be used) cost. For example, materials left on hand costs are always non-participating on federal aid contracts.

- A number for the Change Order after the alpha designator. Always use at least two digits (e.g. 01, 09, 13, 27)
- The item number had the revised work been included in the original contract, a contract item designator. The entire coding or naming of the change order item cannot exceed 25 characters.

Naming Examples:

- A new item for Superpave HMA Pavement, Class SP4, established by Change Order No. 9 would be designated as: C09-405-320A Superpave SP4.
- Change Order No. 10 for adding work to dig a ditch by Force Account could be designated as: F10 - Ditch Digging.
- Change Order No. 5, a new item for plantmix pavement as requested by the local agency to place on local streets outside of federal-aid project limits would be designated as: NC05-405-10A Local Roads.

Items included in a change order are either in the original contract bid documents or an earlier change order will continue to use the established pay item number, provided the unit price remains the same.

Change Order (ITD-0400) examples are at the end of this section (Example 104.02-8 through 104.02-12).

104.02.06 Handwritten changes to the ITD-0400. Whoever makes the change will provide documentation of that change through an initial and date next to the change. The ITD-0400 can become evidence in a dispute. Proper identification of the person making a change, and the date of that change, are critical to the Department's record keeping process and the authenticity of the document. Changes made by the Department to a document after signature by the Contractor may present problems in terms of legality and is not recommended.

104.02.07 Contractor's Signature on the ITD-0400. Obtain the Contractor's original signature on two copies of the change order or facsimile signature on one copy before the approval authority signature. T**he Contractor is required to return the signed or unsigned change order(s) to the Engineer within five business days**. If the Contractor does not agree to the change order and refuses to sign, the specifications also require the Contractor to provide a written explanation for refusal. The change order may then be issued unilaterally. A unilaterally issued change order is an effective order given to the Contractor. If the executed change order is contested by the Contractor, use certified mail with return receipt requested.

104.02.08 Local Agency's signature on the ITD-0400. The Local Public Agency (LPA) must be aware of and signatory to all change orders on local projects. Consult with the LPA in accordance with Section 640.00 of the "Guidelines for Local Public Agency Projects", and the applicable State/Local Agreement.

104.02.09 Claim Settlement. Contractor claim settlements are to be paid by change order. Claim settlement change orders should be paid by the District immediately after the change order is executed to avoid post judgment interest.

104.02.10 Preparing a Utility Agreement Change Order. Complete an ITD-2317 for all Utility Change Orders. The ITD-0403, Utility Agreement Change Order, is used to make any change in the original utility agreement, or to facilitate utility work not covered by an agreement. Refer to CA Manual 105.07 for a more thorough discussion of Utility and Railroad Agreement Change Orders and other actions that may be required because of such change orders. The District Engineer approves all utility change orders.

Utility change orders are to be numbered separately from Construction Change Orders. Begin with number 01 for each contract and number consecutively.

Utility Agreement Change Order (ITD-0403) examples are at the end of this section (Examples 104.02-13 and 104.02-14).

All utility change order work is subject to Buy America if Federal Aid funds were expended on the project, including those projects that are state funded but a NEPA document was completed for the project.

104.02.11 Constructive Change. Any conduct by the Engineer (or a representative authorized to order changes), which is not a written change order, but which has the effect of requiring the Contractor to perform work different from that prescribed by the contract terms, could constitute a constructive change order. If the Contractor gives written notice that a constructive change has occurred, the Engineer will evaluate the change, and if in agreement, initiate and process a written Change Order if in agreement after evaluation.

104.02.12 Consultant Designs - Errors or Omissions Change Orders. Costs for design errors or omissions in contract documents are either recoverable or non-recoverable. Costs are considered non-recoverable if the consultant followed the work scope, followed established Departmental procedures and design standards, and practiced due diligence ("standard of care") in trying to prevent mistakes during design. For example, a problem may appear as substandard consultant design work when the problem could have been because of restrictions in the consultant's work scope or based on information and direction provided by the Department.

If the design consultant prepared the plans and other contract documents in accordance with Department standards, procedures, consultant agreement, and adhered to professional standards, the consultant cannot be held accountable.

However, cost can be recoverable if the errors and omissions result from the following:

- Substandard Design – the design does not meet the standards and criteria established by the Department and referenced in the scope of services, federal regulations or other normal standards, accepted principles and practices.
- Defective Special Provision – the special provision does not specify the necessary requirements or imposes requirements that cannot be reasonably attained.
- Deficient Site Investigation – the investigation did not adequately identify all features, including subsurface features, resulting in adverse impacts to project construction.
- Contract errors, omissions and conflicts that materially affect construction.
- Work was completed according to the plans but was incorrect and must be redone.

To clarify recoverable and non-recoverable costs, the following two instances are used as examples:

Instance A: The consultant's plans failed to show guardrail on an embankment that would require protection in accordance with the Design Manual. The Department and local government determine that guardrail is required and the consultant is so informed. Subsequently, since there was no guardrail in the contract, the Resident Engineer negotiates a fair and equitable price for the guardrail and a Change Order is prepared.

Instance B: The consultant's plans specify spread footing for the abutments of a small single-span bridge. Apparently, the foundation investigation was improper, as the gravel layer on which the spread footing was to be founded amounted to a very thin layer that is unacceptable for supporting the abutments. The consultant and other department personnel are contacted. After additional investigation, it is agreed that the spread footing design must be abandoned in favor of a pile-supported foundation. Consequently, the excavations must be backfilled and the backfill compacted in preparation for driving piling. A Change Order is prepared to cover the backfilling and the foundation design changed to piling.

The situation described in Instance A is one in which the consultant would not normally be expected to share in the construction cost. It is assumed that the negotiated price did not result in any greater total cost to the project than would have occurred had the item been included in the original plans; therefore, no assessment should be made against the consultant.

The situation described in Instance B, however, is one in which additional costs were incurred to perform corrective work that was the result of a recoverable design error or omission. The extra work resulted in no benefit to the project. Therefore, the consultant is liable for the costs of excavating between the newly established abutment grade and the originally designed footing grade, as well as backfilling and compaction. The cost of piling should not be considered the consultant's liability.

The following steps should be followed by the Engineer to identify and recover error and omission costs from the consultant:

1) Evaluate the error or omission to see if it is recoverable. The criteria to use are:
    a) The error is clearly a design oversight
    b) The error caused the project cost to increase above the amount considered necessary had the design been correct in the first place (e.g. work has to be removed and redone)
    c) Project Development provided verification that restrictions in the consultant's work scope, and information or direction provided by the Department did not cause what may appear as substandard design work.
2) At the first indication of a potential design error and omission, take the following actions (the project development verification may not be received immediately):
    a) Immediately notify the consultant (in writing) of the error
    b) Give the consultant every opportunity to participate in a solution and to take corrective action
    c) Record the work using force account procedures and photographs, and document all decisions and actions
    d) Determine the increased construction cost of the corrective action
    e) Provide the consultant a letter detailing the cost for the corrective action with a deadline for a response and potential repayment.

Before initiating recovery, the District Engineer must approve all potential recovery against engineering consultants for design errors and omissions costs. The cost for correcting an error and/or omissions is based on comparison with the actual first-time cost if the design had been initially correct. First-time costs, as well as routine variations in estimated quantities, are not considered recoverable costs. If supportable, costs may include that which the Department may have incurred to resolve changes in the contract documents, additional engineering and inspection costs, and Contractor delay costs.

The Resident Engineer shall then correspond with the consultant setting forth the basis of the recovery. If the consultant disagrees and further action is necessary, the Department shall contact the Legal Section.

On locally-sponsored projects, the sponsor shall pursue restitution for errors and omissions from their consultant. The sponsor needs to be informed at the earliest possible date of an error or omission that could increase their cost. In the event the error or omission results in costs for which the consultant is judged responsible, the Engineer will assure that the payment received is credited to the project.

NON-PARTICIPATING Change Orders are change orders that are written to compensate the Contractor for correction of consultant engineering errors and omissions (where recovery of costs is being pursued). When the consultant is billed and payment is received, the Engineer will ensure that payment is credited to the project.

104.02.13 Contract Revision Types. There are six contract revision types:

1) Extra work ITD SSHC 104.02.B
2) Differing Site Conditions ITD SSHC 104.02.C
3) Suspensions of work ordered by the Engineer ITD SSHC 104.02.D
4) Significant Changes in the Character of the Work ITD SSHC 104.02.E
5) Eliminated Contract Pay Items ITD SSHC 104.02.F
6) Utility Facilities ITD SSHC 105.07.

104.02.14 Extra Work. Force Account for extra work is used for unknown quantities which make it difficult to agree upon a price, or where the Contractor and the Engineer cannot agree on a price. Force account is also used when the nature of the work makes it impossible to arrive at an agreed price, or when detailed records are needed, such as on potential claim issues. Use a contingency amount (CA), not lump sum (LS) when the actual cost cannot be reasonably estimated.

The Contractor is entitled to overhead and profit per ITD SSHC 109.03.C for extra work performed by a subcontractor. This fee is based on the total cost of work performed regardless of the number of subcontractors needed. The Contractor is not to receive any additional markups over and above what is specified in SSHC 109.03.C. The overhead and profit must be a separate cost item on the change order.

Do not accept change order pricing that does not also include documentation of the subcontractor detailed price proposal (i.e. under their letterhead and over their signature).

104.02.15 Differing Site Condition. A change order must be prepared to cover equitable adjustment in costs and time when differing site conditions are encountered and the Contractor has followed the procedures previously discussed.

1) Type 1 Differing Site Condition

Per ITD SSHC 104.02.C: *"During the progress of work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract…"*

A Type 1 differing site condition is a circumstantial change that involves an existing condition at the site of work that materially differs from the conditions represented in the contract (specifications and plans) documents, **which was not anticipated by either the Department or the Contractor**. In highway construction, most differing site conditions involve subsurface materials such as soil, rock, groundwater, underground facilities, and debris. The Contractor must prove that actual site conditions encountered differ materially (or significantly) from what the Department represented. To determine the merits of a Type 1 Differing Site Condition, the Engineer must first determine what was actually represented in the contract documents. The project plans, as-built plans from previous projects, soils reports and boring data, and any other documents that were available to the Contractor at the time of bidding must all be reviewed. At this stage the Engineer is trying to ascertain what the Department represented **at the time of bidding**. If the Department did not provide any site information, then no Type 1 Differing Site Condition exists because no conditions were represented.

The most difficult step is determining if the contract documents do indicate that conditions encountered differ materially from representations made by the contract, because there is no widely accepted definition of what is materially different. Usually only conditions that significantly change how the Contractor should have performed the work are considered materially different. The Engineer should consult with experts in the construction industry and with ITD's own in-house subject matter experts who are experienced in the type of work under issue.

Next, if the conditions are determined to be materially different, the Engineer must determine if the Contractor should have relied on the site information provided by the Department. Disclaimers and other contract language can sometimes negate reliance on site conditions provided in the contract documents. A site visit by the Contractor or the Contractor's past experience on similar projects may also negate reliance. If reliance was justified, then the Contractor may be able to recover.

2) Type 2 Differing Site Condition

When the contract does not clarify the existing conditions at the site of work, then a Type 2 differing site condition exists only "…*if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract, are encountered at the site*…" (see ITD SSHC 104.02.C)

This is a much broader definition of a differing site condition and applies to industry practices in general. For example, if a Contractor is installing pipe and the Department provides no soils information on the pipe run, then the Contractor must deal with whatever soil type and groundwater conditions are encountered at the site. If the Contractor expected firm clay and encounters loose, running sand, there is no relief since loose, running sand is not an unusual condition in pipe work. However, if the Contractor uncovered an old railroad line in the middle of a desert, then some relief would be available to the Contractor since old railroad lines are not normally encountered in pipe work in remote areas.

The Department must not withhold any information it has on site conditions to inquiring contractors. In cases in which the Department does not fully know the site conditions, contractors must adequately determine their risk and bid accordingly.

Whether the condition encountered fits a Type 1 or Type 2 Differing Site Condition, **prompt written notification** must be given by the party discovering the differing site condition to the Engineer. The Engineer must **promptly** investigate the conditions and **promptly** notify the Contractor in writing whether or not a differing site condition exists. If a differing site condition exists the contract is adjusted accordingly by change order.

The Contractor has the right to disagree and pursue a construction claim under ITD SSHC 105.16.

104.02.16 Eliminated Contract Pay Items. The Engineer will immediately issue a written order (a change order, letter, or AVO) to the Contractor to eliminate any items of work from the contract if it is found that these items are unnecessary for the proper completion of the work. A change order should be used to formalize the change when major items of work are eliminated, and wherever cost and time concerns become uncertain.

If the Contractor has incurred costs for the eliminated items, reimbursement for actual work completed and the costs incurred shall be paid by a change order. Reimbursement requests for lost overhead and profits are evaluated on a case-by-case basis.

Although items of work may be eliminated, the Contractor is still required to finish the remaining work on the project. Contract items that have unusually high unit bid prices should not be eliminated solely for the purpose of saving money.

104.02.17 Permanent erosion and sediment control plans, measures and specifications are often based on project environmental commitments. A change order is required if any modifications are made to contract requirements for temporary and permanent sediment and erosion control measures or vegetation establishment. This includes adding revised plan(s) or measure(s) to the contractual requirements.

The Resident Engineer must consult with the District Environmental Planner before implementing any changes. Consultation with the Headquarters Environmental Section may also be necessary. In addition, the Resident Engineer shall consult with the Department's Roadside Program Manager whenever erosion control modifications may affect the establishment of permanent seeding, sodding or plantings. All parties must respectively ensure that adequate time is given for review of the proposed change(s) and that their responses are timely.

In preparing SWPPP's, contractors may sometimes use contract plans as a base document to show that the temporary sediment and erosion control measures they are planning to use comply with NPDES requirements. Contractors also sometimes make revisions to the contract plans when preparing the SWPPP.

Revisions to contract plans should be reviewed by the Engineer of Record for concurrence. A change order may need to be issued if revisions to the contract plans are accepted as part of the SWPPP process, depending on whether engineered features have been affected (e.g. size and location of siltation ponds).

It is recommended that the Engineer of Record who stamped the plan sheet(s) re-stamp revisions made to contract plan sheet(s), so that he/she remains in responsible charge. Otherwise, if the modified contract plans are not re-stamped, the authorizing individual, by signing the change order, is accepting responsibility for the change(s). Therefore, the RE should not approve contract document engineering changes that have not been re-stamped.

104.02.18 Examples 104.02-1 through 14. Examples of a completed AVO, six ITD-2317s, five ITD-0400s and two ITD-0403's are on the following pages. All forms must be properly signed to be effective.

Use the most current electronic version of these forms to ensure correct content, approval signatures and distribution.

Example 104.02-1

ITD 2055 (Rev. 7-08)

Avoid Verbal Order (Speed Letter)

itd.idaho.gov Idaho Transportation Department

Mr. Contractor	Superintendent, Acme, Inc.
From Elmer Hardworker	Title Principle Inspector, ITD Residency 1
Subject / Project Number Replace Delineators / Key # 12345, SH 30, E City Limits to Jct 20	

Message

Remove existing delineators and install new Type 1R or Type 2R delineators as marked in the field. Provide material and work in accordance with Standard Drawing G-3 (copy attached) and Section 617 of the the Standard Specifications.

Per our conversation and Engineer's approval today an estimated quantity of 92 Type 1R delineators and 27 Type 2R delineators will be measured in place. The installed unit price for the Type 1R is agreed at $17.13 and $17.93 for Type 2R. Overhead and Profit will be computed in accordance with Subsection 109.03.C.4.

Contract time will be extended by one working day.

6/6/14

Reply

Example 104.02-2

Record Of Change Order Authorization

ITD 2317 (Rev. 07-13)

This form must be completed and approved before beginning this work. See *Contract Administration Manual Subsection 104.02* for specific instructions. (Access the form fields and check boxes below by tabbing from field to field)

Lead Key Number	Lead Project Number	Location (same as described on contract cover)
91969	STP-2691(969)	Abbey Rd., Jerome Co.

Contractor	Date This Form Filled In	Change Order Number
EMI	3-18-13	17

Resident Engineer	Requested By (Contractor requests - attach RFC with this form)
Geoff Emerick	ITD

Nature and Reason for Revision

To complete this field, click inside the box below. If desired, after completing this section on-line and it extends to more than one page, press the Enter key as many times as necessary to move the next block of boxes to the bottom of the last page.

ACCEPTANCE PER 105.03

REASON FOR CHANGE: The geotextile of one lot (Tencate Geosynthetics) failed to meet the specification in the grab tensile and puncture strength test areas.

WORK DESCRIPTION: The Engineer will allow Tencate geotextile to be left in place with a 35% price adjustment of the material cost only. This is only to be applied to the quantity represented by the failing tests per the ITD Lab Operations Manual Section 330.10.

ESTIMATED COST: A price reduction of 35% is being applied to the material cost, in accordance with the schedule in Subsection 330.10 of the Lab Operations Manual, for the installed quantity represented by the failing tests. The agreed price includes labor plus the reduced material cost. The documentation is on file with the project records.

PRICING:

Item	Item Name	Quantity	Unit	Unit Price	Item Total
C07640-015A	Subgrade Separation Geotextile TY II	(3,277.78)	SY	$1.77	($5,801.67)
C17640-015A	Subgrade Separation Geotextile TY II	3,277.78	SY	$1.47	$4,818.34
			Net Estimated Decrease		($983.33)

ESTMATED TIME IMPACTS: No contract time adjustment is warranted for this work.

Specific Date Work is to Start - if estimated, enter date then ("est.")	Total Estimated Change	Time Adjustment
3-19-13	☐ + ☒ – $ 983.33	☐ Yes ☒ No

Consultation With	Date	Concurrence Yes	Concurrence No
Geoff Emerick, TFRE	3/18/13	☒	☐
George Martin, EM	3/18/13	☒	☐
		☐	☐

Consultation With	Date	Concurrence Yes	Concurrence No
		☐	☐
		☐	☐
FHWA:		☐	☐

FHWA prior approval? ☐ Yes ☐ No ☒ N/A

Approval Authority	Date Authorized by Approval Authority	Approval Authority's Signature
☐ CE ☒ DE ☐ RE	3-18-13	

Distribution: ☒ Dist. 4 Engr. ☒ Dist. 4 Engineering Mgr ☒ Resident Engr. Geoff Emerick ☒ DRI
☒ DMC (electronic to: HQ.ChangeOrders) ☐ FHWA (Projects of Interest)
☒ Other Civil Engineering, Inc.

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Example 104.02-3

Record Of Change Order Authorization

ITD 2317 (Rev. 07-13)

This form must be completed and approved before beginning this work. See *Contract Administration Manual Subsection 104.02* for specific instructions. (Access the form fields and check boxes below by tabbing from field to field)

Lead Key Number	Lead Project Number	Location (same as described on contract cover)
30173	IM-99-3(011)973	I-99, Abbey Road to East IC

Contractor	Date This Form Filled In	Change Order Number
EMI	8-08-13	11

Resident Engineer	Requested By (Contractor requests - attach RFC with this form)
Alan Parsons	ITD

Nature and Reason for Revision

To complete this field, click inside the box below. If desired, after completing this section on-line and it extends to more than one page, press the Enter key as many times as necessary to move the next block of boxes to the bottom of the last page.

CHANGE IN PLANS

REASON FOR CHANGE: This change order is to repair structural defects and address safety concerns for the traffic crossing this structure. The work includes replacing the bridge bearings and compression seal joints. Repair is critical for the problems to be resolved before further deterioration occurs potentially necessitating a load reduction.

WORK DESCRIPTION: Repair the Snake River Bridge per the attached Bridge Repair Drawings, Bridge Special Provisions, and other associated work as directed.

ESTIMATED COST: The Contractor provided a cost breakdown for the extra work. The Engineer used force account analysis and compared these unit item prices to the Department average bid prices. The subcontractor has completed contract work on the project and will need to remobilize his crews and equipment including costs for the superintendent, management, toilets, etc. The bridge removal cost is associated with increased width and depths required to remove the deteriorated material.

PRICING:

Item	Item Name	Quantity	Unit	Unit Price	Item Total
C11A	10-61 Rigid Mortar	9	CY	$3,405.82	$30,652.38
F11B	SWPPP Contingency (Includes River Protection)	5,000	CA	$5,000.00	$5,000.00
F11C	Weather Protection Contingency	15,000	CA	$1.00	$15,000.00
C11D	Prime Contractor Overhead and Profit	14,450	CA	$1.00	$14,450.00
C11S501-06B	Compression Seal Joint	193	FT	$99.00	$19,107.00
C11S501-35A	SP Bridge, Partial Removal of Bridge	57	SY	$1,370.00	$78,090.00
C11S501-40A	SP Bridge, Elastomeric Concrete Header	4.67	CY	$12,200.00	$56,974.00
C11S501-55A	Bridge Bearings and Steel Beam Seats	6	EA	$4,155.00	$24,930.00
C11S612-20A	Rem. & Reset Concrete Guardrail	1,000	FT	$35.00	$35,000.00
C11Z629-05A	Mobilization	1	LS	$19,008.45	$19,008.45
			Total Estimated Increase		$298,211.83

ESTIMATED TIME IMPACTS: Rapid Mortar will be used instead of CL 40A to reduce the time by 3 weeks. The required 10-day cure time is eliminated since the Rapid Mortar cure time is much shorter. Also, on-ramp traffic requires 2 phases of bridge work, further justifying the Rapid Mortar. Reducing the CPM time by 3 weeks minimizes potential winter weather impacts to the project and traffic. The Contractor's proposed schedule shows completion by November 25th which is 45 working days beyond the contract completion date. The documentation is on file with the project records. The Department will increase Contract Time by 45 Working Days.

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Example 104.02-3

Record Of Change Order Authorization

ITD 2317 (Rev. 07-13)

Lead Key Number	Lead Project Number	Location (same as described on contract cover)
30173	IM-99-3(011)973	I-99, Abbey Road to East IC

Contractor	Date This Form Filled In	Change Order Number
EMI	8-08-13	11

Specific Date Work is to Start - if estimated, enter date then ("est.")	Total Estimated Change	Time Adjustment
9-27-13	☒ + ☐ – $ 298,211.83	☒ Yes ☐ No

Consultation With	Date	Concurrence Yes	Concurrence No
Alan Parsons, TFRE	8-05-13	☒	☐
Roger Waters, EM-	8-08-13	☒	☐
David Gilmour, HQ Res. Ctr.	8-05-13	☒	☐

Consultation With	Date	Concurrence Yes	Concurrence No
		☐	☐
		☐	☐
FHWA:		☐	☐

FHWA prior approval? ☐ Yes ☐ No ☒ N/A

Approval Authority	Date Authorized by Approval Authority	Approval Authority's Signature
☐ CE ☒ DE ☐ RE	8-19-13	

Distribution: ☒ Dist. 4 Engr. ☒ Dist. 4 Engineering Mgr ☒ Resident Engr. Alan Parsons ☒ DRI

☒ DMC (electronic to: HQ.ChangeOrders) ☐ FHWA (Projects of Interest)

☒ Other Civil Engineering, Inc.

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Example 104.02-4

Record Of Change Order Authorization

ITD 2317 (Rev. 07-13)

This form must be completed and approved before beginning this work. See *Contract Administration Manual Subsection 104.02* for specific instructions. (Access the form fields and check boxes below by tabbing from field to field)

Lead Key Number	Lead Project Number	Location (same as described on contract cover)
91969	STP-2691(969)	Abbey Rd., Jerrome Co.

Contractor	Date This Form Filled In	Change Order Number
EMI	5-06-13	14

Resident Engineer	Requested By (Contractor requests - attach RFC with this form)
Geoff Emerick	ITD

Nature and Reason for Revision

To complete this field, click inside the box below. If desired, after completing this section on-line and it extends to more than one page, press the Enter key as many times as necessary to move the next block of boxes to the bottom of the last page.

QUANTITY VARIANCE

REASON FOR CHANGE: Directed Surveying will exceed 125% of the original estimate. A price adjustment was requested for the quantity exceeding 125%.

WORK DESCRIPTION: This change order adjusts the Contract Unit Price for S105-05A Directed Surveying 2-Person Crew and S105-05D Directed Surveying Office Computations for quantities exceeding 125% of the original Contract amount.

ESTIMATED COST: The Engineer has reviewed Contractor provided costs based on a force account analysis and found them justified.

PRICING:

Item	Item Name	Quantity	Unit	Unit Price	Item Total
S105-05A	Directed Surveying 2-Person Crew	12.5	HRS	$0.00	$0.00
S105-05D	Directed Surveying Office Computations	12.5	HRS	$0.00	$0.00
C14S105-05A	Directed Surveying 2-Person Crew	26.0	HRS	$110.00	$2860.00
C14S105-05D	Directed Surveying Office Computations	20.0	HRS	$38.50	$770.00
			Total Estimated Increase		$3630.00

ESTIMATED TIME IMPACTS: No contract time adjustment is warranted for this work.

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Example 104.02-4

Record Of Change Order Authorization

ITD 2317 (Rev. 07-13)

Lead Key Number	Lead Project Number	Location (same as described on contract cover)
91969	STP-2691(969)	Abbey Rd., Jerrome Co.

Contractor	Date This Form Filled In	Change Order Number
EMI	5-06-13	14

Specific Date Work is to Start - if estimated, enter date then ("est.")	Total Estimated Change	Time Adjustment
5-13-13	☒ + ☐ − $ 3,630.00	☐ Yes ☒ No

Consultation With	Date	Concurrence Yes	Concurrence No	Consultation With	Date	Concurrence Yes	Concurrence No
Geoff Emerick, TFRE	5/3/13	☒	☐			☐	☐
George Martin, EM	5/3/13	☒	☐			☐	☐
		☐	☐	FHWA:		☐	☐

FHWA prior approval? ☐ Yes ☐ No ☒ N/A

Approval Authority	Date Authorized by Approval Authority	Approval Authority's Signature
☐ CE ☐ DE ☒ RE	5-03-13	

Distribution: ☒ Dist. 4 Engr. ☒ Dist. 4 Engineering Mgr ☒ Resident Engr. Geoff Emerick ☒ DRI

☒ DMC (electronic to: HQ.ChangeOrders) ☐ FHWA (Projects of Interest)

☒ Other Civil Engineering, Inc.

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Example 104.02-5

Record Of Change Order Authorization

ITD 2317 (Rev. 07-13)

This form must be completed and approved before beginning this work. See *Contract Administration Manual Subsection 104.02* for specific instructions. (Access the form fields and check boxes below by tabbing from field to field)

Lead Key Number	Lead Project Number	Location (same as described on contract cover)
71971	DHP-NH-IR-CM-F-0071(971)	Fillmore East

Contractor	Date This Form Filled In	Change Order Number
Capricorn, Inc.	6-19-13	29

Resident Engineer	Requested By (Contractor requests - attach RFC with this form)
Aaron Baron	ITD

Nature and Reason for Revision

To complete this field, click inside the box below. If desired, after completing this section on-line and it extends to more than one page, press the Enter key as many times as necessary to move the next block of boxes to the bottom of the last page.

CHANGE IN SPECIFICATION

REASON FOR CHANGE: This project was designed using the Hveem method of paving specifications. Since then, the Department has adopted Superpave HMA paving requirements. This change is a no-cost change order as both the Department and the Contractor are set up to meet the current Superpave paving specifications.

WORK DESCRIPTION: Delete references to items 405-005A, 405-160A, 405-170A, and 405-230A and replace them with the attached May 2010 Special Provision - Superpave Hot Mix Asphalt (HMA) Pavement. Complete the work as shown on the plans or as established. The Engineer will allow RAP at Level 1 as shown on the Superpave Special Provision.

ESTIMATED COST: The Engineer has reviewed the agreed prices for Superpave HMA Pavement and found they compare favorably with similar work. The documentation is on file with the project records.

PRICING:

Item	Item Name	Quantity	Unit	Unit Price	Item Total
405-005A	Plant Mix Pavement Class I	(38,305.49)	Tonnes	$42.00	($1,608,830.58)
405-160A	PG 58-28 Asphalt for Plant Mix	(1,155.03)	Tonnes	$745.00	($860,497.35)
405-170A	PG 64-28 Asphalt for Plant Mix	(882.00)	Tonnes	$760.00	($670,320.00)
405-230A	0.5% Anti Strip Add. For Plant Mix	(2,207.03)	MTOA	$9.00	($19,863.27)
C29S405-20A	SuperPave HMA Pavement Including Asphalt and Additives ¾" Agg. Class SP-4 (58-28)	22,218.00	Tonnes	$81.30	$1,806,323.40
C29S405-30A	SuperPave HMA Pavement Including Asphalt and Additives ¾" Agg. Class SP-4 (64-28)	16,089.00	Tonnes	$84.10	$1,353,084.90
			Net Estimated Decrease		($102.90)

ESTIMATED TIME IMPACTS: No contract time adjustment is requested or warranted with this change order.

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Example 104.02-5

Record Of Change Order Authorization

ITD 2317 (Rev. 07-13)

Lead Key Number	Lead Project Number	Location (same as described on contract cover)
71971	DHP-NH-IR-CM-F-0071(971)	Fillmore East

Contractor	Date This Form Filled In	Change Order Number
Capricorn, Inc.	6-19-13	29

Specific Date Work is to Start - if estimated, enter date then ("est.")	Total Estimated Change	Time Adjustment
8-12-13	☐ + ☒ – $ 102.90	☐ Yes ☒ No

Consultation With	Date	Concurrence Yes	Concurrence No
Aaron Baron, RE	4/24/13	☒	☐
Tom Dowd, EM	4/26/13	☒	☐
Duane Allman, HQ DMC	6/17/13	☒	☐

Consultation With	Date	Concurrence Yes	Concurrence No
Gregg Allman, DME	4/26/13	☒	☐
		☐	☐
FHWA: Larry Dahlstrom	6/21/13	☒	☐

FHWA prior approval? ☒ Yes ☐ No ☐ N/A

Approval Authority	Date Authorized by Approval Authority	Approval Authority's Signature
☐ CE ☒ DE ☐ RE	5-06-13	

Distribution: ☒ Dist. 1 Engr. ☒ Dist. 1 Engineering Mgr ☒ Resident Engr. Aaron Baron ☒ DRI
☒ DMC (electronic to: HQ.ChangeOrders) ☒ FHWA (Projects of Interest) Larry Dahlstrom
☐ Other

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Example 104.02-6

Record Of Change Order Authorization

ITD 2317 (Rev. 07-13)

This form must be completed and approved before beginning this work. See *Contract Administration Manual Subsection 104.02* for specific instructions. (Access the form fields and check boxes below by tabbing from field to field)

Lead Key Number	Lead Project Number	Location (same as described on contract cover)
10123	A010(123)	SH-67, EB Ramps to Atlantic Ave.

Contractor	Date This Form Filled In	Change Order Number
Disraeli Construction, Inc.	7-05-13	U01

Resident Engineer	Requested By (Contractor requests - attach RFC with this form)
Tom Dowd	ITD

Nature and Reason for Revision

To complete this field, click inside the box below. If desired, after completing this section on-line and it extends to more than one page, press the Enter key as many times as necessary to move the next block of boxes to the bottom of the last page.

CHANGE IN PLANS

REASON FOR CHANGE: On June 4th, 2013 representatives of District 3 and SWLABR Railroad (hereafter known as the "Railroad") met on site to review the railroad crossing at station 75+10 of SH-66 (Identified as AAR/DOT Crossing # 999999C) to discuss the construction and traffic control for the mill & inlay project where it meets the railroad crossing. At this meeting, it was discovered that the rubber planking of the crossing was wearing away in the wheel paths so that if the new pavement was placed adjacent to the planking it would cause the new pavement to rut out quickly to the same pattern that now exists. It was decided in order to prevent the ruts from reoccurring, the rubber planking that was approximately 25 years old needed to be replaced with precast insulated concrete planking; which is now commonly used at all railroad-road crossings. The Residency requested a pricing and time proposal from the Railroad.

This work was not contemplated during project development, therefore no Railroad Agreement was executed between ITD and the railroad owner to define work to be accomplished by the Railroad.

GENERAL DESCRIPTION: This change incorporates the work of replacing the railroad crossing by the Railroad. The Railroad shall coordinate a proposed schedule of work and durations with the State and the Contractor. The work shall be incorprated into the Contractor's project schedule, and shall be performed under the protection of the Contractor's project traffic control.

All materials (precast concrete panels, ties, tie plates, rails, spikes and anchors, and any other required materials) shall be provided by the Railroad and shall meet Railroad specifications. The Railroad shall provide the State with a letter certifying all materials meet or exceed the Railroad's standard specifications for quality.

The Railroad shall provide all labor and equipment to remove and dispose of old planking, remove and dispose of any unacceptable anchors, spikes, rails, and tie plates, remove and dispose of any unacceptable ties and ballast materials, and deliver and replace necessary ballast, ties, tie plates, rails, spikes and anchers, and deliver and install precast insulated concrete planking panels. Work shall be performed to Railroad company standards.

The Railroad, at its determination, may provide inspection, security, flagging, or other protective services as necessary for the protection of Railroad property or operations whenever there are Contractor operations on Railroad property.

The Contractor shall provide any and all necessary traffic control equipment, materials, and traffic control maintenance and roadway flaggers to safely protect the work zone.

(See the attached Change Order U01, Appendix A for contractor requirements for insurance before working on Railroad property.)

(See the attached Change Order U01, Appendix B for the Contractor's traffic control requirements.)

ESTIMATED COST: Submitted pricing includes all costs incurred directly or indirectly by the Railroad as a result of this change order. The Department will pay for accepted quantities pending Railroad invoice as follows:

PRICING:

Item	Item Name	Quantity	Unit	Unit Price	Item Total
U01XING	Replace Railroad Crossing Planking	1	CA	$90,000.00	$90,000.00
			Net Estimated Increase		$90,000.00

ESTIMATED TIME IMPACTS: The Railroad shall have (6) days to complete this work from the date their work begins. This work shall be performed concurrently with critical path items within the Contractor's schedule.

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Example 104.02-6

Record Of Change Order Authorization

ITD 2317 (Rev. 07-13)

Lead Key Number	Lead Project Number	Location (same as described on contract cover)
10123	A010(123)	SH-67, EB Ramps to Atlantic Ave.

Contractor	Date This Form Filled In	Change Order Number
Disraeli Construction, Inc.	7-05-13	U01

Specific Date Work is to Start - if estimated, enter date then ("est.")	Total Estimated Change	Time Adjustment
7-13-13	☒ + ☐ – $ 90,000.00	☐ Yes ☒ No

Consultation With	Date	Concurrence Yes	Concurrence No	Consultation With	Date	Concurrence Yes	Concurrence No
Tom Dowd, RE-1	7/3/13	☒	☐			☐	☐
Felix Pappalardi, EM	7/3/13	☒	☐			☐	☐
Jack Bruce, ROW	7/8/13	☒	☐	FHWA:		☐	☐

FHWA prior approval? ☐ Yes ☐ No ☒ N/A

Approval Authority	Date Authorized by Approval Authority	Approval Authority's Signature
☐ CE ☒ DE ☐ RE	7-10-13	

Distribution: ☒ Dist. 3 Engr. ☒ Dist. 3 Engineering Mgr ☒ Resident Engr. Tom Dowd ☒ DRI

☒ DMC (electronic to: HQ.ChangeOrders) ☐ FHWA (Projects of Interest) ____________

☐ Other ____________ ____________ ____________

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Example 104.02-7

Record Of Change Order Authorization

ITD 2317 (Rev. 07-13)

This form must be completed and approved before beginning this work. See *Contract Administration Manual Subsection 104.02* for specific instructions. (Access the form fields and check boxes below by tabbing from field to field)

Lead Key Number	Lead Project Number	Location (same as described on contract cover)
21470	A010(456)	Leeds Way

Contractor	Date This Form Filled In	Change Order Number
Substitute, Inc.	7-10-13	U01

Resident Engineer	Requested By (Contractor requests - attach RFC with this form)
Bob Pridden	ITD

Nature and Reason for Revision

To complete this field, click inside the box below. If desired, after completing this section on-line and it extends to more than one page, press the Enter key as many times as necessary to move the next block of boxes to the bottom of the last page.

CHANGE IN PLANS

REASON FOR CHANGE: This change order is to compensate MCA Utilities for installing a pole, guying and dead ends to de-energize a span of primary transmission line, and remove existing anchors to allow bridge construction. This includes the installation of anchor plates and reattachment of guy wires at new location. The existing guy wires were relocated due to interference with the MSE wall soil reinforcement. MCA Utilities moved the pole once according to plans but it was discovered later that the guy wires were still interfering with construction, so the pole required moving a second time. This change order also includes utility service hookup fees for interstate illumination.

WORK DESCRIPTION: This change order is to compensate MCA Utilities for installing a pole, guying and dead ends to de-energize a span of primary transmission line, and remove existing anchors to allow bridge construction. This includes the installation of anchor plates and reattachment of guy wires at new location. This change order also includes utility service hookup fees for interstate illumination.

Materials shall meet MCA Utilities specifications.

Construction shall meet MCA Utilities specifications.

ESTIMATED COST: Submitted pricing includes all costs incurred directly or indirectly by MCA Utilities as a result of this change order. The Department will pay for accepted quantities pending utility invoice as follows:

PRICING:

Item	Item Name	Quantity	Unit	Unit Price	Item Total
U01 Pole Locate	Relocate Utility Pole & Line	1	LS	$7,597.32	$7,597.32
			Net Estimated Increase		$7,597.32

ESTIMATED TIME IMPACTS: There is no change in total contract time.

Page 1 of 2

Example 104.02-7

Record Of Change Order Authorization

ITD 2317 (Rev. 07-13)

Lead Key Number	Lead Project Number	Location (same as described on contract cover)
21470	A010(456)	Leeds Way

Contractor	Date This Form Filled In	Change Order Number
Substitute, Inc.	7-10-13	U01

Specific Date Work is to Start - if estimated, enter date then ("est.")	Total Estimated Change	Time Adjustment
8-01-13	☒ + ☐ – $ 7,597.32	☐ Yes ☒ No

Consultation With	Date	Concurrence Yes	Concurrence No	Consultation With	Date	Concurrence Yes	Concurrence No
Bob Pridden, RE- 3	7/8/13	☒	☐			☐	☐
Kit Lambert, EM	7/10/13	☒	☐			☐	☐
		☐	☐	FHWA:		☐	☐

FHWA prior approval? ☐ Yes ☒ No ☐ N/A

Approval Authority	Date Authorized by Approval Authority	Approval Authority's Signature
☐ CE ☐ DE ☒ RE	7-08-13	

Distribution: ☒ Dist. 3 Engr. ☒ Dist. 3 Engineering Mgr ☒ Resident Engr. Bob Pridden ☒ DRI

☒ DMC (electronic to: HQ.ChangeOrders) ☒ FHWA (Projects of Interest) Pete Townshend

☐ Other

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Example 104.02-8

Change Order

Idaho Transportation Department

ITD 0400 (Rev.03-13)
itd.idaho.gov

Paying Through: ☐ WinCaps ☒ SiteManager

See Contract Administration Manual Section 104.02

Key Number	Project Number	Contract Number
91969	STP-2691(969)	XXXX

Authority Number	Location
R92669	Abbey Rd., Jerome Co.

Contractor's Name	Change Order Number	Date of Contractor Authorization
EMI	17	3-18-13

You are ordered to perform the work described or incorporated below in accordance with the Contract or as amended by this change order. The cost to perform this work includes all labor, equipment, materials, overhead, and all other incidental costs associated with completing the work.

Description of Work If no description is provided herein, the work description found in other accompanying documents is incorporated by this reference. Further, even if a description is provided herein, the work description in other accompanying documents is incorporated by this reference.

ACCEPTANCE PER 105.03

Description: The Engineer will allow Tencate geotextile to be left in place with a 35% price adjustment of the material cost only. This is only to be applied to the quantity represented by the failing tests per the ITD Lab Operations Manual Section 330.10.

Materials Requirements: No change.

Construction Requirements: No change.

Method of Measurement: The Engineer will measure acceptably completed quantities of Subgrade Separation Geotextile TY II in accordance with 640.04.

Basis of Payment: A price reduction of 35% is being applied to the material cost, in accordance with the schedule in Subsection 330.10 of the Lab Operations Manual, for the installed quantity represented by the failing tests. The agreed price includes labor plus the reduced material cost. The documentation is on file with the project records. The Department will pay for accepted quantities at the agreed unit price as follows:

Item	Item Name	Quantity	Unit	Unit Price	Item Total
C07640-015A	Subgrade Separation Geotextile TY II	(3,277.78)	SY	$1.77	($5,801.67)
C17640-015A	Subgrade Separation Geotextile TY II	3,277.78	SY	$1.47	$4,818.34
			Net Estimated Decrease		($983.33)

Contract Time Accounting: No contract time adjustment is warranted for this work.

Page 1 of 2

Example 104.02-8

Change Order

Idaho Transportation Department

ITD 0400 (Rev.03-13)
itd.idaho.gov

Key Number	Project Number	Contract Number
91969	STP-2691(969)	XXXX

Authority Number	Location
R92669	Abbey Rd., Jerome Co.

Contractor's Name	Change Order Number	Date of Contractor Authorization
EMI	17	3-18-13

By reason of this change, contract time will be adjusted by

0 ☒ Working Days ☐ Calendar Days

We agree that if this Change Order is approved, we will perform the work described or incorporated as shown above and be compensated at the prices specified.

Contractor's Signature	Date

City, County, or Highway District Agency's Name

Authorized Representative's Signature	Title	Date

Approved for State of Idaho

Authorized Representative's Signature	Title	Date

Page 2 of 2

Example 104.02-9

Change Order

Idaho Transportation Department

ITD 0400 (Rev.03-13)
itd.idaho.gov

Paying Through: ☐ WinCaps ☒ SiteManager

See Contract Administration Manual Section 104.02

Key Number	Project Number	Contract Number
30173	IM-99-3(011)973	XXXX

Authority Number	Location
R311973	I-99, Abbey Road to East IC

Contractor's Name	Change Order Number	Date of Contractor Authorization
EMI	11	8-19-13

You are ordered to perform the work described or incorporated below in accordance with the Contract or as amended by this change order. The cost to perform this work includes all labor, equipment, materials, overhead, and all other incidental costs associated with completing the work.

Description of Work If no description is provided herein, the work description found in other accompanying documents is incorporated by this reference. Further, even if a description is provided herein, the work description in other accompanying documents is incorporated by this reference.

CHANGE IN PLANS

Description: Repair the Snake River Bridge per the attached Bridge Repair Drawings, Bridge Special Provisions, and other associated work as directed.

Materials Requirements: Use 10-61 Rapid Mortar instead of Class 40A Concrete as shown on the plans. Meet the requirements of the attached Special Provisions and Bridge Repair Drawings.

Construction Requirements: Install 10-61 Rapid Mortar in accordance with the manufacturer's written recommendations. Meet the requirements of the attached Special Provisions and Bridge Repair Drawings.

Method of Measurement: The Engineer will measure acceptably completed quantities as follows: 1) 10-61 Rapid Mortar by the cubic yard. 2) SWPPP Contingency and Weather Protection Contingency by Actual Quantity used. 3) Other items of work as specified on the attached Special Provisions.

Basis of Payment: The Contractor provided a cost breakdown for the extra work. The Engineer used force account analysis and compared these unit item prices to the Department average bid prices. The subcontractor has completed contract work on the project and will need to remobilize his crews and equipment including costs for the superintendent, management, toilets, etc. The bridge removal cost is associated with increased width and depths required to remove the deteriorated material. The Department will pay for accepted quantities at the agreed unit prices as follows:

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Example 104.02-9

Change Order

Idaho Transportation Department

ITD 0400 (Rev.03-13)
itd.idaho.gov

Key Number	Project Number	Contract Number
30173	IM-99-3(011)973	XXXX

Authority Number	Location
R311973	I-99, Abbey Road to East IC

Contractor's Name	Change Order Number	Date of Contractor Authorization
EMI	11	8-19-13

Item	Item Name	Quantity	Unit	Unit Price	Item Total
C11A	10-61 Rigid Mortar	9	CY	$3,405.82	$30,652.38
F11B	SWPPP Contingency (Includes River Protection)	5,000	CA	$5,000.00	$5,000.00
F11C	Weather Protection Contingency	15,000	CA	$1.00	$15,000.00
C11D	Prime Contractor Overhead and Profit	14,450	CA	$1.00	$14,450.00
C11S501-06B	Compression Seal Joint	193	FT	$99.00	$19,107.00
C11S501-35A	SP Bridge, Partial Removal of Bridge	57	SY	$1,370.00	$78,090.00
C11S501-40A	SP Bridge, Elastomeric Concrete Header	4.67	CY	$12,200.00	$56,974.00
C11S501-55A	Bridge Bearings and Steel Beam Seats	6	EA	$4,155.00	$24,930.00
C11S612-20A	Rem. & Reset Concrete Guardrail	1,000	FT	$35.00	$35,000.00
C11Z629-05A	Mobilization	1	LS	$19,008.45	$19,008.45
			Total Estimated Increase		$298,211.83

Contract Time: Rapid Mortar will be used instead of CL 40A to reduce the time by 3 weeks. The required 10-day cure time is eliminated since the Rapid Mortar cure time is much shorter. Also, on-ramp traffic requires 2 phases of bridge work, further justifying the Rapid Mortar. Reducing the CPM time by 3 weeks minimizes potential winter weather impacts to the project and traffic. The Contractor's proposed schedule shows completion by November 25th which is 45 working days beyond the contract completion date.

The Department will increase Contract Time by 45 working days.

By reason of this change, contract time will be adjusted by

45 ☒ Working Days ☐ Calendar Days

We agree that if this Change Order is approved, we will perform the work described or incorporated as shown above and be compensated at the prices specified.

Contractor's Signature		Date
City, County, or Highway District Agency's Name		
Authorized Representative's Signature	Title	Date

Approved for State of Idaho

Authorized Representative's Signature	Title	Date

Page 2 of 2

Example 104.02-10

Change Order

Idaho Transportation Department

ITD 0400 (Rev.03-13)
itd.idaho.gov

Paying Through: ☐ WinCaps ☒ SiteManager

See Contract Administration Manual Section 104.02

Key Number	Project Number	Contract Number
91969	STP-2691(969)	XXXX

Authority Number	Location
R92669	Abbey Rd., Jerome Co.

Contractor's Name	Change Order Number	Date of Contractor Authorization
EMI	14	5-10-13

You are ordered to perform the work described or incorporated below in accordance with the Contract or as amended by this change order. The cost to perform this work includes all labor, equipment, materials, overhead, and all other incidental costs associated with completing the work.

Description of Work If no description is provided herein, the work description found in other accompanying documents is incorporated by this reference. Further, even if a description is provided herein, the work description in other accompanying documents is incorporated by this reference.

QUANTITY VARIANCE

Description: This change order adjusts the Contract Unit Price for S105-05A Directed Surveying 2-Person Crew and S105-05D Directed Surveying Office Computations for quantities exceeding 125% of the original Contract amount.

Materials Requirements: No Change.

Construction Requirements: No Change.

Method of Measurement: No Change.

Basis of Payment: The Engineer has reviewed Contractor provided costs based on a force account analysis and found them justified. The Department will pay for accepted quantities of work at the contract unit price and as follows:

Item	Item Name	Quantity	Unit	Unit Price	Item Total
S105-05A	Directed Surveying 2-Person Crew	12.5	HRS	$0.00	$0.00
S105-05D	Directed Surveying Office Computations	12.5	HRS	$0.00	$0.00
C14S105-05A	Directed Surveying 2-Person Crew	26.0	HRS	$110.00	$2860.00
C14S105-05D	Directed Surveying Office Computations	20.0	HRS	$38.50	$770.00
			Total Estimated Increase		$3630.00

Contract Time: No contract time adjustment is warranted for this work.

Page 1 of 2

Example 104.02-10

Change Order

Idaho Transportation Department

ITD 0400 (Rev.03-13)
itd.idaho.gov

Key Number	Project Number	Contract Number
91969	STP-2691(969)	XXXX

Authority Number	Location
R92669	Abbey Rd., Jerome Co.

Contractor's Name	Change Order Number	Date of Contractor Authorization
EMI	14	5-10-13

By reason of this change, contract time will be adjusted by

0 ☒ Working Days ☐ Calendar Days

We agree that if this Change Order is approved, we will perform the work described or incorporated as shown above and be compensated at the prices specified.

Contractor's Signature	Date

City, County, or Highway District Agency's Name

Authorized Representative's Signature	Title	Date

Approved for State of Idaho

Authorized Representative's Signature	Title	Date

Page 2 of 2

Example 104.02-11

Change Order

Idaho Transportation Department

ITD 0400 (Rev.03-13)
itd.idaho.gov

Paying Through: ☐ WinCaps ☒ SiteManager

See Contract Administration Manual Section 104.02

Key Number	Project Number	Contract Number
71971	DHP-NH-IR-CM-F-0071(971)	XXXX

Authority Number	Location
R031971	Fillmore East

Contractor's Name	Change Order Number	Date of Contractor Authorization
Capricorn, Inc.	29	6-24-13

You are ordered to perform the work described or incorporated below in accordance with the Contract or as amended by this change order. The cost to perform this work includes all labor, equipment, materials, overhead, and all other incidental costs associated with completing the work.

Description of Work If no description is provided herein, the work description found in other accompanying documents is incorporated by this reference. Further, even if a description is provided herein, the work description in other accompanying documents is incorporated by this reference.

CHANGE IN SPECIFICATION

Description: Delete references to items 405-005A, 405-160A, 405-170A, and 405-230A and replace them with the attached May 2010 Special Provision - Superpave Hot Mix Asphalt (HMA) Pavement. Complete the work as shown on the plans or as established. The Engineer will allow RAP at Level 1 as shown on the Superpave Special Provision.
Change the Standard Specification as follows:
On page 493, Subsection 703.12 – Aggregate Source Approval
Delete the first 2 test requirements of Part 2 and substitute the following:

Preparing and Determining the Density of Hot-Mix-Asphalt (HMA)
Specimen by Means of Gyratory Compactor……………………..…AASHTO T 312
Superpave Volumetric Design for Hot-Mix-Asphalt (HMA)…………AASHTO R 35

Materials Requirements: Meet the Requirements of Superpave HMA Pavement.

Construction Requirements: Meet the Requirements of Superpave HMA Pavement. Change pavement lift thickness shown on the typical section to 30 mm sacrificial lift (leveling course), 70 mm second lift, and a 75 mm final lift.

Method of Measurement: The Engineer will measure the acceptably completed quantity of work as follows: 1) Superpave HMA Pavement and Asphalt by the tonne. The Engineer will not accept batch weights as a method of measurement. The Engineer will include the weight of the aggregate, asphalt, and any additives in the mixture for the weight of accepted Superpave HMA Pavement quantity.

Basis of Payment: The Department will calculate any bonus to be paid or deducted for QC/QA based on the original contract unit bid price of $ 42.00. This will keep the maximum allowable bonus to be paid or deducted as set forth in the original Contract. The Engineer has reviewed the agreed prices for Superpave HMA Pavement and found they compare favorably with similar work. The Department will pay for accepted quantities at agreed prices as follows:

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Example 104.02-11

Change Order

ITD 0400 (Rev.03-13)

Idaho Transportation Department

itd.idaho.gov

Key Number	Project Number	Contract Number
71971	DHP-NH-IR-CM-F-0071(971)	XXXX

Authority Number	Location
R031971	Fillmore East

Contractor's Name	Change Order Number	Date of Contractor Authorization
Capricorn, Inc.	29	6-24-13

Item	Item Name	Quantity	Unit	Unit Price	Item Total
405-005A	Plant Mix Pavement Class I	(38,305.49)	Tonnes	$42.00	($1,608,830.58)
405-160A	PG 58-28 Asphalt for Plant Mix	(1,155.03)	Tonnes	$745.00	($860,497.35)
405-170A	PG 64-28 Asphalt for Plant Mix	(882.00)	Tonnes	$760.00	($670,320.00)
405-230A	0.5% Anti Strip Add. For Plant Mix	(2,207.03)	MTOA	$9.00	($19,863.27)
C29S405-20A	SuperPave HMA Pavement Including Asphalt and Additives ¾" Agg. Class SP-4 (58-28)	22,218.00	Tonnes	$81.30	$1,806,323.40
C29S405-30A	SuperPave HMA Pavement Including Asphalt and Additives ¾" Agg. Class SP-4 (64-28)	16,089.00	Tonnes	$84.10	$1,353,084.90
			Net Estimated Decrease		($102.90)

Time: No contract time adjustment is requested or warranted with this change order.

By reason of this change, contract time will be adjusted by

0 ☒ Working Days ☐ Calendar Days

We agree that if this Change Order is approved, we will perform the work described or incorporated as shown above and be compensated at the prices specified.

Contractor's Signature		Date
City, County, or Highway District Agency's Name		
Authorized Representative's Signature	Title	Date

Approved for State of Idaho

Authorized Representative's Signature	Title	Date

Page 2 of 2

Example 104.02-12

Change Order

Idaho Transportation Department

ITD 0400 (Rev.03-13)
itd.idaho.gov

Paying Through: ☐ WinCaps ☒ SiteManager

See Contract Administration Manual Section 104.02

Key Number	Project Number	Contract Number	
10456	A010(456)	XXXX	
Authority Number	Location		
R081969	!-99, Gary IC to Ten Mile RD		
Contractor's Name		Change Order Number	Date of Contractor Authorization
Atco, Inc.		42	7-15-13

You are ordered to perform the work described or incorporated below in accordance with the Contract or as amended by this change order. The cost to perform this work includes all labor, equipment, materials, overhead, and all other incidental costs associated with completing the work.

Description of Work If no description is provided herein, the work description found in other accompanying documents is incorporated by this reference. Further, even if a description is provided herein, the work description in other accompanying documents is incorporated by this reference.

CHANGE IN PLANS

Description: This Change Order provides for the installation of a sign overlay upgrade with Type 4 reflective sheeting to the Exit only portions of the overhead sign structures for the project.

Materials Requirements: Materials shall meet the requirements of Subsections 616.02 and 712.02. The overlay shall consist of a minimum 0.063 sheet aluminum panel with type 4 reflective sheeting per ASTM D 4956. The overlay shall be sized to the full dimensions of the yellow exit only portions of the sign structures per the plans.

Construction Requirements: The sheet aluminum overlay shall be pop-riveted on the overhead sign structures to completely cover the yellow exit only portion of the four overhead sign structures at stations 2020+15 LT, 2125+20 Lt , 2047+00 Lt, and 2073+70 LT.

Method of Measurement: The Engineer will measure acceptably completed items as follows: Item C42-616-010A Overlay Type B will be measured by the square foot. Item C42-104A Prime's OH & Profit compensates the Contractor per 109.03 of the Contract.

Basis of Payment: The Department will pay for accepted quantities at contract unit prices as follows:

Pricing: Asterisked (*) items identify work by subcontractor.

Item	Item Name	Quantity	Unit	Unit Price	Item Total
C42-616-010A	Overlay Type B*	130	SF	$13.91	$1,808.30
C42-104A	Prime's OH & Profit	1	CA	$180.83	$180.83
				Net Estimated Increase	$1,989.13

Contract Time: Project substantial completion has been granted. Work shall be complete within three (3) working days from when the signs are delivered to the project. Liquidated damages for failure to complete this work within three (3) shall be $175.00 per day.

Page 1 of 2

Example 104.02-12

Change Order

ITD 0400 (Rev.03-13)

Idaho Transportation Department

itd.idaho.gov

Key Number	Project Number	Contract Number
10456	A010(456)	XXXX

Authority Number	Location
R081969	!-99, Gary IC to Ten Mile RD

Contractor's Name	Change Order Number	Date of Contractor Authorization
Atco, Inc.	42	7-15-13

By reason of this change, contract time will be adjusted by

0 ☒ Working Days ☐ Calendar Days

We agree that if this Change Order is approved, we will perform the work described or incorporated as shown above and be compensated at the prices specified.

Contractor's Signature		Date
City, County, or Highway District Agency's Name		
Authorized Representative's Signature	Title	Date

Approved for State of Idaho

Authorized Representative's Signature	Title	Date

Page 2 of 2

Example 104.02-13

Utility Agreement Change Order

ITD 0403 (Rev. 07-13)
itd.idaho.gov

Paying Through: ☐ WinCaps ☒ SiteManager

(See Contract Administration Manual Section 104.02 and 105.07)

Key Number	Project Number		Contract Number	Work Authority
10123	A010(123)		XXXX	R51967
Location		Change Order Number	Name of Utility Company	Date
SH-67, EB Ramps to Atlantic Ave.		U01	SWLABR Railroad	7-10-13

The above named utility company is hereby directed to make the herein described changes from the plans and estimate or do the following work not included in the plans and estimate of the utility agreement with the State of Idaho.

Change Requested By	Change Submitted By
ITD	Tom Dowd

Description of additional work to be done, materials required, and estimate of cost to be paid by the State. (Attach plans, estimate, and explanation furnished by the utility company.)

Description of additional work to be done, materials required, and estimate of the cost to be paid by the State.
(Attach plans, estimate, and explanation furnished by the railroad company.)

This change incorporates the work of replacing the railroad crossing, by SWLABR Railroad (hereafter known as the "Railroad") at project expense during project construction. The Railroad shall coordinate a proposed schedule of work and durations with the State and the Contractor. The work shall be incorporated into the Contractor's project schedule, and be performed under the protection of the Contractor's project traffic control.

(See the attached Change Order U01, Appendix A for contractor insurance requirements before working on Railroad property.)

All Materials (precast concrete panels, ties, tie plates rails, spikes, and anchors, and any other required materials) shall be provided by the Railroad, and shall meet Railroad specifications. The Railroad shall provide the State with a letter certifying that all materials meet or exceed the Railroad's standard specifications for quality.

The Railroad shall provide all labor and equipment to remove and dispose of old planking, remove and dispose of any unacceptable anchors, spikes, rails, and tie plates, remove and dispose of any unacceptable ties and ballast materials, and deliver and replace necessary ballast, ties, tie plates, rails, spikes, and anchors, and deliver and install precast, insulated concrete planking panels. Work shall be performed to Railroad company standards.

The Railroad, at its determination, may provide inspection, security, flagging, or other protective services as necessary for the protection of Railroad property or operations whenever there are Contractor operations on Railroad property.

The Contractor shall provide any and all necessary traffic control equipment, materials, and traffic control maintenance and roadway flaggers to safely protect the work zone. (See the attached Change Order U01, Appendix B for the Contractor's traffic control requirements.)

Work, including railroad flagging or other protective services, will be paid for on a time/materials/equipment basis under Contingency Item U01XING. The railroad shall submit proof of costs to the State for reimbursement under this item, including acceptable direct and indirect administration costs.

Traffic control items, including all traffic control maintenance, equipment, materials and roadway flaggers will be paid for under their respective contract items as extensions of contract quantities at contract prices or as detailed in the Contractor's Change Order U01, "Railroad Crossing Additional Requirements".

The Department will pay for accepted quantities pending Railroad invoice as follows:

Item	Item Name	Quantity	Unit	Unit Price	Item Total
U01XING	Replace Railroad Crossing Planking	1	CA	$90,000.00	$90,000.00
			Net Estimated Increase		$90,000.00

The Railroad shall have six (6) days to complete this work from the date their work begins.

Example 104.02-13

We, the undersigned utility company, hereby agree that if this proposal is approved, we will perform the work detailed above and accept payment at the prices shown for the respective items in accordance with the terms of the original agreement, except as herein provided.

Utility Company Representative's Authorized Signature	Title	Date
Local Jurisdiction Action		
Approved For (name of city, county, or highway district)		
Authorized Representative's Signature	Title	Date
Idaho Transportation Department Action		
Chief Engineer or Authorized Representative's Signature	Title	Date

Note: This Change Order is not effective until approved by the chief engineer or an authorized representative.

Example 104.02-14

Utility Agreement Change Order

ITD 0403 (Rev. 07-13)
itd.idaho.gov

Paying Through: ☐ WinCaps ☒ SiteManager

(See Contract Administration Manual Section 104.02 and 105.07)

Key Number	Project Number		Contract Number	Work Authority
21470	A010(456)		XXXX	R51670
Location		Change Order Number	Name of Utility Company	Date
Leeds Way		U01	MCA Utilities	7-10-13

The above named utility company is hereby directed to make the herein described changes from the plans and estimate or do the following work not included in the plans and estimate of the utility agreement with the State of Idaho.

Change Requested By	Change Submitted By
ITD	Bob Pridden

Description of additional work to be done, materials required, and estimate of cost to be paid by the State. (Attach plans, estimate, and explanation furnished by the utility company.)

CHANGE IN PLANS

Description: This change order is to compensate MCA Utilities for installing a pole, guying and dead ends to de-energize a span of primary transmission line, and remove existing anchors to allow bridge construction. This includes the installation of anchor plates and reattachment of guy wires at new location. This change order also includes utility service hookup fees for interstate illumination.

Materials: Per MCA Utilities specifications.

Construction Requirement: Per MCA Utilities specifications.

Method of Measurement: The Engineer will measure acceptably completed work by the lump sum (LS), per invoice.

Basis of Payment: The Department will pay for acceptable quantities pending utility invoice as follows:

Item	Item Name	Quantity	Unit	Unit Price	Item Total
U01 Pole Locate	Relocate Utility Pole & Line	1	LS	$7,597.32	$7,597.32
			Net Estimated Increase		$7,597.32

Contract Time: There is no change in total contract time.

We, the undersigned utility company, hereby agree that if this proposal is approved, we will perform the work detailed above and accept payment at the prices shown for the respective items in accordance with the terms of the original agreement, except as herein provided.

Utility Company Representative's Authorized Signature	Title	Date
Local Jurisdiction Action		
Approved For (name of city, county, or highway district)		
Authorized Representative's Signature	Title	Date
Idaho Transportation Department Action		
Chief Engineer or Authorized Representative's Signature	Title	Date

Note: This Change Order is not effective until approved by the chief engineer or an authorized representative.

SECTION 105.00 – CONTROL OF WORK

Department representatives should produce correspondence in accordance with Administrative Policy A-06-02 and the ITD Style and Communications Guide located in the DES contracting services sharepoint under Documents. Treat e-mail messages the same as an ITD-0500. Carbon copy (i.e. cc) the appropriate individuals. Write e-mail messages in a professional manner.

Place pertinent communications in the official project file in ProjectWise. Pertinent communications include:

- The construction contract documents.
- Federal and State regulations pertaining to the contract.
- Disputes that impact the contract or have the potential to escalate to a significant or sensitive issue.
- Change orders or potential change orders.
- Expenditure of Department funds.

105.01 Authority of the Engineer and Suspension of Work. The Engineer may suspend, delay, or interrupt the Contractor's operation at his or her discretion. The suspension must be in writing. If such suspension or delay is for an unreasonable time, and the Contractor's costs are increased by an unreasonable delay, prepare a change order to pay for the increased costs in accordance with ITD Standard Specifications for Highway Construction (SSHC) 104.02.D and 109.03.D. Keep accurate force account records as supporting documentation. The Contractor is required to send written notice to the Engineer when the Contractor considers a delay or interruption unreasonable. The notice must be received within 7 calendar days of the receipt of notice to resume work in accordance with SSHC 104.02.D. Written notice for the Contractor to resume work is also required.

Write the reason for the delay in the space provided on the appropriate form.

105.02 Plans and Working Drawings. The Contractor must have a copy of the contract and a complete set of plans and approved working drawings at the project site at all times. Make this requirement clear at the preconstruction conference. Also discuss submittal requirements for working drawings including the additional requirements for structures and submittal timeframes.

Retain the consultants who designed the project to check and approve working drawings on those projects or project portions which they designed. The District Engineer, or the District-appointed consultant agreement administrator, and the local sponsor (if one is involved) will be responsible for negotiating a supplemental agreement with the consultant for construction engineering. The Consultant Administration Unit (CAU) will process the supplemental agreement. The consultant cannot be requested to do this work without a supplemental agreement.

An ITD 2101, Project Authorization and Agreement, must be approved for obligating increased funds in construction engineering (CE) to cover the estimated cost of the agreement before authorizing the consultant to proceed with any work. Consultant work done on construction projects before approval of an ITD 2101 will not be eligible for federal-aid participation.

Once authorized, the Engineer will transmit project documents from the Contractor to the consultant and from the consultant back to the Contractor.

105.03 Conformity with Plans and Specifications.

Non-specification material or work that will perform as intended may be accepted with a price adjustment based on engineering judgment. A price adjustment may be applied by the Engineer based on engineering judgment. The Engineer must document the basis of acceptance in writing. Accept material and work under this condition by change order except as described below.

When price adjustments are specified ITD SSHC 502.01.B and Laboratory Operations Manual, these provisions must be followed instead of the preceding procedure.

105.04 Coordination of Contract Documents.

The intent of contract documents is to work together and read as a whole. Discrepancies between the contract documents are addressed in ITD SSHC 105.04. The Contractor is obligated to immediately notify the Engineer when a conflict, error, or omission is discovered so the Engineer has the opportunity to make corrections and interpretations as necessary.

105.07 Utility Facilities (Including Railroads).

The Engineer must be familiar with the work to be done by the various utility/railroad companies and the time limits, including material delivery, needed to complete the work. He or she must make this information available to the Contractor as part of the bid package.

Railroad orientation and safety training is mandatory **before** entering railroad right-of-way. Details regarding the required orientation and safety training can be found at the following link. District and consultant personnel should contact the district training specialist and ITD HQ personnel should contact the HQ training specialist for instructions on how to obtain the required training.

105.07.01 Notice to Proceed with Work. On all projects, utility adjustment work cannot be performed until written authority to proceed is issued by the Idaho Transportation Board. Any necessary utility/railroad agreements will be issued by the District Engineer. Verify that copies of the utility/railroad agreements for work at State expense are in the Engineer's office, and examined before the utility/railroad company starts work so that inspection requirements are met.

Before allowing work by utilities or railroads that involve or is intended to involve Federal-aid participation, the Engineer should verify that an approved ITD 2101 obligates funds for such work. If authorization is not obtained before work performance, the work may not be eligible for federal-aid participation.

105.07.02 Preparation. Performance of the Contractor's work may be delayed because utilities or railroads fail to remove, relocate or alter their facilities when scheduled. Every effort should be made to invite the utility/railroad company to the preconstruction conference so their schedule for doing the work can be discussed and incorporated into the Contractor's CPM schedule.

The Engineer should take the following actions to prevent delays:

1) During project advertisement, contact the utility/railroad representative listed in the proposal to ensure that they are the correct contact and aware that the project will soon be let.
   a) Verify that they have a copy of the plans and specifications, and that their facilities are correctly shown to the best of their knowledge.
   b) Determine how much advance notification is needed from the Contractor for ordering materials and scheduling, and how much time they will need to complete the work.
   c) Discuss work requirements.
   d) Discuss the billing procedure shown on the agreement.
   e) Discuss where and when recovered materials can be inspected.
   f) Ensure that the Utility/Railroad Company shall notify the Department of work completion.
   g) Emphasize to the utility/railroad representative that any proposed modification from that shown on the plans and agreement shall be bilaterally approved in advance by change order. Deviation from the plans and agreement without such prior approval will remove that portion of the work from any financial obligation by the State of Idaho or FHWA.
2) When notice of award is sent to the successful bidder, share the information obtained from the utility/railroad during project advertisement with the Contractor. This information should be provided to the Contractor for inclusion in the CPM schedule.
3) Invite utility/railroad owner representative to the preconstruction conference and include their work as a topic. It is recommended that this discussion occur early in the conference to reduce their representatives' time commitment.

At the preconstruction conference, the Engineer shall:

1) Discuss the items outlined above.
2) Emphasize that it is the Contractor's responsibility to coordinate the work which includes:
   a) **Timely** prior notification of when utilities/railroads need to perform their work, and
   b) Providing utility companies and railroads sufficient notice and time in the schedule to do the work.
3) Inform the Contractor that if delays occur because of their company's failure to properly communicate and coordinate with the utilities or railroads (e.g. untimely notification, not enough time given to utilities/railroads to accomplish their work) it will be considered a non-excusable delay in accordance with ITD SSHC 108.07.E.
4) Adequately document in the meeting minutes the necessary utility/railroad notification and work schedule requirements.
5) Ensure the CPM schedule shows utility/railroad work as activities and verify that their representatives agree with the durations shown. Verify the Contractor's communication protocol

satisfies utility/railroad communication requirements for schedule adjustments and updates. This can be accomplished by the following:

a) Include as a topic during the preconstruction meeting, regular weekly progress meetings, or both
b) Open discussion with the utility or railroad representatives.

Remember that there is no contractual relationship between the Contractor and the utilities/railroad. The preceding activities help facilitate communications between the Contractor and the utility/railroad.

At the preconstruction conference, document that the Contractor understands that the communication, coordination and scheduling must be with the utility/railroad **owner** throughout the project and not the utility/railroad **subcontractor.** Utility/railroad owners could justifiably claim that they were unaware of project requirements and therefore are not liable for project delay costs. If delays occur at no fault of the Contractor, and the Contractor has done everything possible to mitigate the delay impacts, an adjustment to the contract; i.e. time and costs, may be justified as an excusable, compensable delay in accordance with ITD SSHC 108.07.D. The FHWA will participate in utility compensable delay costs, provided that:

- Utilities were either relocated and/or adjusted before advertising for bids, or necessary coordination was arranged with the appropriate utility companies to avoid causing any delay to the construction contractor;
- The approved procedures in the Department's utility accommodation policy were followed in making arrangements for utility relocation and/or adjustment;
- The construction work was actually delayed by the utility work through no fault of the construction contractor;
- The Department exercised reasonable efforts to control the situation.

Take the following actions at the first indication of project delays due to utility/railroad work:

- Discuss the situation with the Contractor. Verify that the Contractor has been complying with ITD SSHC 105.07. If the Contractor indicates that the delay will have an impact to the project, remind the Contractor of their duty to mitigate damages and provide written notice of project delay to both the Department and the utility/railroad **owner**.
- If applicable, contact the utility/railroad **owner** and discuss the potential project delay. Follow up with written correspondence documenting the discussion. The correspondence should indicate that the Department may pursue reimbursement for costs associated with the delay from the utility/railroad company if it is deemed that the utility/railroad company caused the delay.
- If it is deemed that the utility/railroad company is at fault, contact ITD's Legal Section to determine which actions, if any, should be pursued to recover delay costs from the utility/railroad company.

105.07.03 Construction. The Engineer should maintain frequent contact with the utility/railroad company regarding any changes in operations such as delays to equipment, forces, or schedule.

The Engineer must:

1) Oversee inspection of utility/railroad work for compliance with plans and agreement requirements. One individual should be assigned the responsibility for inspection and completion of "utility and railroad records." That person:
   a) Inspects the work in sufficient detail to ensure that the exact work contemplated by the agreement is accomplished.
   b) Determines that only authorized work is charged to the State.
   c) Determines that credit is received for salvaged material.
   d) Maintains proper records. Fill out an adequate diary, ITD-0025 Standard Construction Diary, to support the work. The diary entries for actual cost agreements should be complete enough to cover:
      i. the utility/railroad company's personnel and equipment;
      ii. date work started and stopped;
      iii. verification of work done, activity, and for posting to the utility/railroad ledger.
   e) Reference marks can be used in the reporting portion of the diary so office staff is alerted to record pertinent information in the ledger. Diaries maintained for fixed-cost, lump-sum agreements do not require as much detail as actual cost agreements. The records should support work accomplished and necessary information to be posted in the utility/railroad ledger, and ensure that proposed work in the agreement was completed. Copies of daily work orders or other reports can be obtained from the utility/railroad company to further support the work.
   f) Inspect recovered materials before disposal per Utility/Railroad Agreement. The method used for inspecting recovered materials should be arranged with the company supervisor. Most utility/railroad companies have a limited stockpile area for recovered materials; therefore, they usually salvage or dispose of materials on a daily basis. Reviewing daily retirement reports for disposition of recovered material can satisfy inspection requirements. Normally, the company will dispose of any material classified as junk. Make sure junk is not reused on the project.
2) Complete and Oversee Utility Change Orders:
   a) If there are changes from the plans or agreement for utility/railroad work to be done at Department expense, a utility change order (ITD-0403) must be approved and executed before the work begins. When the utility or railroad company desires to have work performed by the Contractor or his subcontractor at unit bid prices, an ITD-0403 must be initiated to remove the work from the utility agreement. The utility or railroad company then prepares an ITD-0400 authorizing the Contractor to perform the work.
   b) Approval from the District Engineer is required on the ITD-2317. The ITD-0403 must be signed by the District Engineer or an authorized utility/railroad representative. Send a copy of the executed change order to the Contracting Services Engineer.

   c) Reflect these changes on as-built drawings before the project is closed out.
   d) Verify funds are obligated on an ITD 2101 for any additional cost for utility/railroad work before the work begins.
3) Review and pay billings from the utility/railroad companies:
   a) Utility/railroad companies shall submit billing(s) to the Engineer for reimbursement of facility relocation costs in accordance with a Utility/Railroad Agreement. Supporting cost documentation shall be provided for Actual Cost Agreements. If there are changes in the scope of work, extra work, or major changes in the planned work covered by the approved agreement, plans, and estimates, then reimbursement will be limited to costs covered by an approved utility change order modifying the agreement.
   b) Billing(s) and supporting cost documentation are to be reviewed by the Engineer for obvious errors or discrepancies with the understanding that ITD personnel are not necessarily experts in utility/railroad work.
   c) Questions regarding billings are to be directed to the billing company. Any billing disputes or adjustments are to be resolved with the company before final payment.
   d) Established rates for overhead, equipment and other items may be obtained from the Department's Internal Review section. An audit, by Internal Review, of either the billings or billing procedures of a utility/railroad company can be requested at any time by the District.
   e) Payments are to be made by the District in accordance with the railroad or utility agreement and the Financial Services Manual. The District prepares an Invoice and Tracking form that in turn will generate a warrant from the State Controller.
   f) Payments are to be made within 60 days in accordance with §67-2302 of Idaho Code or as specified by the agreement. Otherwise, the billing utility or railroad company may assess a late fee and/or interest charge.
   g) Payments are to be reviewed by the District Records Inspector in accordance with Section V of the District Record Inspector Manual.

105.07.04 Post Construction. Generate a new utility permit to cover each utility (excluding railroads) that crosses or occupies the right-of-way of a project. The utility permit requirement applies to all utility installations, regardless of whether covered by a utility agreement or not. A permit is required for existing facilities relocated at company expense, even though the proposed new locations are shown on the construction plans. Existing facilities not relocated and remaining within the highway right-of-way after construction also require permits unless those facilities are covered by existing utility permits.

Utility permit preparation is the Engineer's responsibility. Finalize the permit before receiving the final billing from the company and after the utility work is complete so that the exact location of the utility is known. The policy for the accommodation of utilities is defined in the Guide for Utility Management manual. Processing and maintaining utility permits is the District's responsibility.

Review claims by a utility or railroad company for additional money in regard to an agreement with the company. Some agreements, like railroad agreements, require that ITD reimburse the company for additional costs or losses. Generally, a claim is evaluated by the District for payment, the same as the procedure used for Contractor's claims including appeals. A claim may be paid by an insurance company or bonding company associated with the project, or by ITD.

Obtaining funding for any claim payments is a district responsibility. Claim payments are made in accordance with the Financial Services Manual. No retained amount is withheld from a claim payment.

Final payments and any retained amount withheld from previous payments are paid in full in accordance with the Financial Services Manual and Section V of the District Record Inspector Manual. An ITD-1865, Utility Railroad Fiscal Final Review Report, is prepared by the Engineer and submitted to the District Records Inspector with the final billing. Send these forms to the Financial Services Controller with a copy to the Contracting Services Engineer. Instructions for completing the form are shown on the reverse side of the form. An audit by Internal Review of either the billings or billing procedures of the railroad or utility company can be requested through the ITD-1865. Generally, audits are not conducted on agreement amounts less than $200,000 or for agreements where the actual cost exceeds the estimated amount by less than 15% or $50,000.

105.07.05 Local Forces and Railroad Projects by Agreement (Non-Bid Projects). The District will generate the plans, estimate, and the ITD 2101. A copy of the Railroad Agreement is provided to Financial Services so the project can be considered contractual with the Federal Highway Administration via the ITD 2101. The District will send an Authorization to Proceed letter to the railroad owner with the original signed agreement after funding approval.

105.08 Construction Stakes, Lines, and Grades.

Unless otherwise specified, initial surveying is provided by the Engineer in accordance with ITD SSHC 105.08. Other lines and grades needed to perform the work such as offset points, string lines for surface courses, location of dowel baskets, tie bars, saw lines, stripe spotting, etc., are the Contractor's responsibility. The Engineer will provide copies of necessary notes or drawings to accomplish the work.

The Engineer will provide roadway centerline and a benchmark for bridges, and an accessible control line and benchmark for other major structures such as retaining walls. The Engineer will also set structure centerline and benchmarks for minor structures and culverts. The Contractor is responsible for supplementary lines and grades.

The Engineer will spot check survey work performed by the Contractor. Surveying errors are to be corrected at no additional cost to the Department.

105.08.01 Monuments. The Engineer or the Contractor's surveyor shall set public land corners, street monuments, and right-of-way monuments from references provided by a Professional Land Surveyor licensed in the State of Idaho.

Before final acceptance of projects that include contract surveying work, a Professional Land Surveyor licensed in the State of Idaho shall certify that street monuments, right-of-way monuments, and public land corners are recorded in accordance with Title 55, Chapter 16 of Idaho Code for perpetuation and filing. For all other projects, the Department is responsible for survey monument work. The Engineer should address the status of this work in the final inspection report.

105.09 Authority of the Engineer. Title 23 CFR 635.105 entrusts the Department with the responsibility for construction of Federal-aid projects. The Department is not relieved of this responsibility when authorizing a local public agency (LPA) or other federal agency, or when employing a consultant to provide construction engineering and inspection (CE&I) services, unless specifically allowed by a Department-local stewardship agreement, State-local agreement, or memorandum of understanding. The regulation requires the Department to employ a full-time Engineer to be in responsible charge of these projects.

The Engineer in immediate and responsible charge shall:

1) Be aware of the day-to-day operations on the project
2) Be aware of and involved in decisions, including those for changes and extra work, and supplemental agreement requirements for consultants
3) Ensure inspector qualifications, assignments and job performance meet project requirements
4) Visit the project on a frequency that is commensurate with the magnitude and complexity of the project.

105.10 Duties of the Inspector. Personnel working on Department projects must be qualified in accordance with CA Section 114. Inspectors must take care that they do not “alter or waive the contract requirements, issue instructions contrary to the contract, or direct the Contractor’s work.” Such actions can lead to constructive changes to the contract. Inspectors should not allow work to continue if it is not in compliance to the contract.

105.11 Inspection of Work. Materials incorporated in a project and the details of the work are subject to inspection by the Engineer. The Contractor is to provide the necessary access and information, so the Engineer can inspect the work and materials. See ITD SSHC 105.11 for requirements.

Project inspection and materials testing are important and necessary activities to guarantee the desired quality of highway construction. The inspection activities, however, also represent a large portion of the cost of construction engineering. The Department will ensure that an adequate construction inspection staff is available to control the work and to eliminate unnecessary work.

Construction/Materials (CM) Section reviewer(s) will periodically review projects under construction to assist the District and promote statewide contract administration uniformity.

The CM reviewer will hold a closeout conference with the Engineering Manager, or a delegate, at the end of all inspections and before publishing the report and document the results of this discussion, and with whom, at the end of the inspection report. If it is not practical to hold the closeout conference while still in the field, it may be held by telephone or e-mail correspondence after returning to the office.

If any other unit of government, political subdivision, or utility is going to pay for a portion of the work being done, they have the right to inspect the work under their jurisdiction. If they have any suggestions as to work or materials, their comments are to be submitted to the Engineer, since the Department administers the contract.

Maintenance personnel should be provided an opportunity to identify potential problems. The Engineer should review the work with the maintenance foreman who will maintain the finished project. During this review, the Engineer should explain any unusual features of the project and ask for maintenance suggestions.

The Engineer will notify the Headquarters Bridge Engineer and Geotechnical Engineer before the substructure completion on any new bridge construction project that includes any substructure part constructed in the water or that will be underwater. This notification will allow for an underwater inspection of structures that might be scour critical, and provide corrective actions before project completion. In addition, the Engineer will review newly constructed bridges with the Bridge Inspection Engineer. During this review, the Engineer will point out any problem areas noted during construction. The Bridge Inspection Engineer should note any areas that will require follow-up during routine bridge inspections. Diary entries of these reviews should be made showing dates, participant's names, suggestions, and problems discussed.

105.13 Load Regulations. The Contractor, subcontractor, and materials suppliers must follow legal load regulations when material is hauled on public roads beyond the project limits. Use the Motor Carrier Services web page to obtain the Department's legal allowable gross load chart and 129,000 lb. legal allowable load chart:

http://itd.idaho.gov/wp-content/uploads/2016/07/LegalAllowableGrossLoadsChart.pdf

http://itd.idaho.gov/wp-content/uploads/2016/07/129kLegalAllowableLoadsChart.pdf

or

http://itd.idaho.gov/wp-content/uploads/2016/07/RoutesApproved_129k.pdf (which shows the 129k approved routes that may be used)

Use the charts to calculate the total gross legal weight allowed for each vehicle configuration and take into account applicable "Notes, Explanations and Restrictions". When calculating axle spacing to determine legal weight, round up or down to the nearest foot (e.g. six inches or more – round up to the next foot). Interior axle spacing must also be measured to determine allowable weights on the axle combinations involved.

Idaho law requires that owner/operators obtain an overlegal permit or establish intent to obtain an overlegal permit by contacting the Overlegal Permit office before moving a vehicle on a public road.

Check vehicle registration to ensure that trucks are licensed to carry their legal allowable weight. (Some trucks will be registered for weights exceeding legal allowable gross loads or practical axle loadings.) Do not allow vehicles to exceed legal gross weight and axle weights unless registered to haul this weight.

All highways are limited to 80,000 lb. gross weight unless an excess weight permit is obtained or the route is approved for 129k loads.

The Department has the discretion to reduce the maximum allowed listed weight limits to reduce the potential for damage to public roads, bridges and the project.

In addition to enforcing legal load regulations, control the loads hauled within project limits in connection with other operations such as earthwork, borrow and delivered materials (e.g. hotmix or concrete). The Engineer should also review bridges on potential haul routes to assess their condition, and if they are H-15 or lessor design. A list of posted bridges on the State Highway System that have load restrictions is on the Motor Carrier Services web page containing the legal allowable gross loads chart.

Operation of combinations of vehicles exceeding legal length limits, but that do not exceed 105 ft. permit limit, are allowed on routes designated by the Idaho Transportation Board. The following are legal length limits:

http://www.itd.idaho.gov/dmv/poe/LegalWidthHeightLength.htm

If the Contractor obtains permission from a County to haul over-legal loads and/or over-length on county roads, the Engineer should request a copy of the agreement. Review the agreement before authorizing the Contractor to proceed.

The Engineer, accompanied by the Contractor, should arrange an inspection of public haul roads before starting hauling operations. Governmental and county representatives should be present when inspecting their routes. Everyone involved should be encouraged to take before and after pictures, and document the inspection.

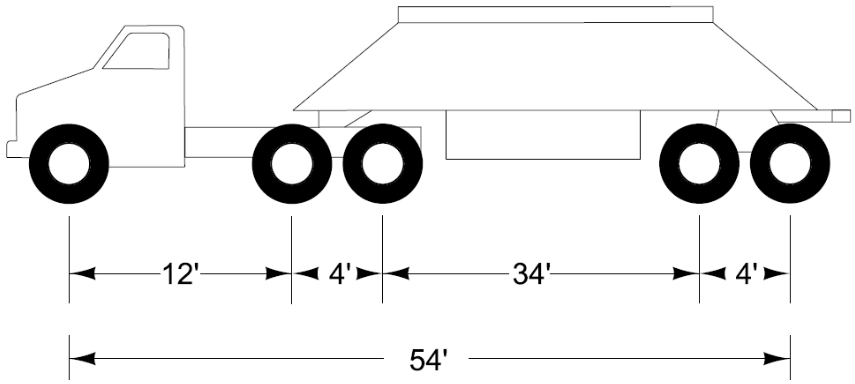
To satisfy the requirements of ITD SSHC 105.14.C, Maintenance of Public Haul Roads, a final inspection should be made of the restored haul roads with concerned parties present. The Engineer should document this inspection and advise the Contractor in writing of deficiencies.

105.13.01 Hauling Over-Legal Loads within Construction Projects. The Contractor is allowed to haul unlimited weights on the subgrade providing no damage is caused to structures, roadway, or other construction types. However, the Contractor can only haul legal weight on the sub-base, base and surfacing courses, unless otherwise granted written permission by the Engineer.

105.13.02 Examples of Computing Legal Weights. Following are examples of two different truck-trailer combinations for which legal weights are calculated.

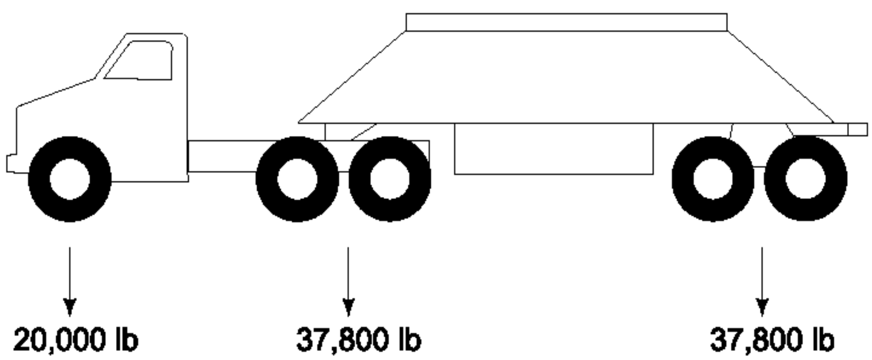
Example #1: The Resident tells the Contractor that legal weights will be hauled. The Contractor wants to know what the legal weights will be for the configuration they are using. The Engineer can show them the following sample diagrams and verify the following information: 1. A copy of the vehicle registration to see what they are registered for (vehicles must be registered for the legal gross weight they can carry). 2. Does the carrier have overlegal permits (if needed). 3. Axle spacing's of the vehicle configuration to determine legal weight that can be carried.

Sample Vehicle



1. 49-1001(9)

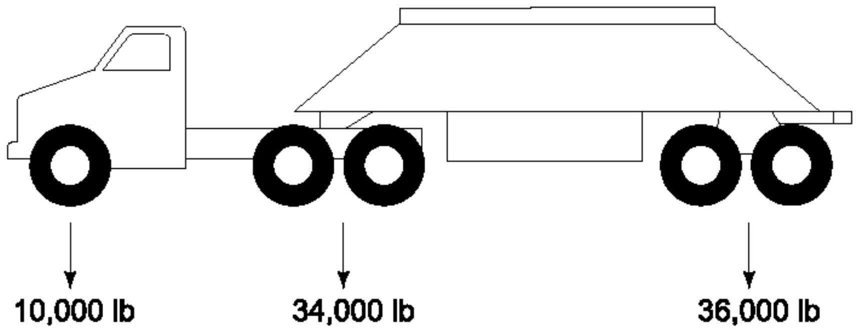
From the legal allowable gross loads chart 49-1001(9) columns K & L the maximum gross weight is 80,000 lbs. for non-interstate routes with any commodity. A tandem axle may go up to a maximum of 37,800 lbs. and the steer axle weight is figured at 600 lbs. per inch width of tire.



20,000 lb+ 37,800 lb+ 37,800 lb= 95,600 lb

This is not a legal weight and is 15,600 lbs. over the gross legal weight of 80,000 lbs. Therefore, it would be necessary to reduce individual axle and tandem loading to achieve a gross weight of 80,000 lbs. or less.

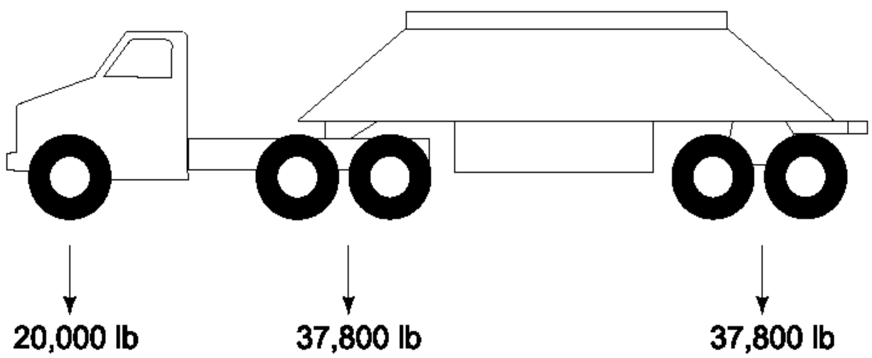
Practical load on the front axle is 10,000 lbs. So 70,000 lbs. would need to be distributed over the two tandem axles, not exceeding 37,800 lbs. on either tandem.



10,000 lb+ 34,000 lb+ 36,000 lb= 80,000 lb

2. 49-1001(2):

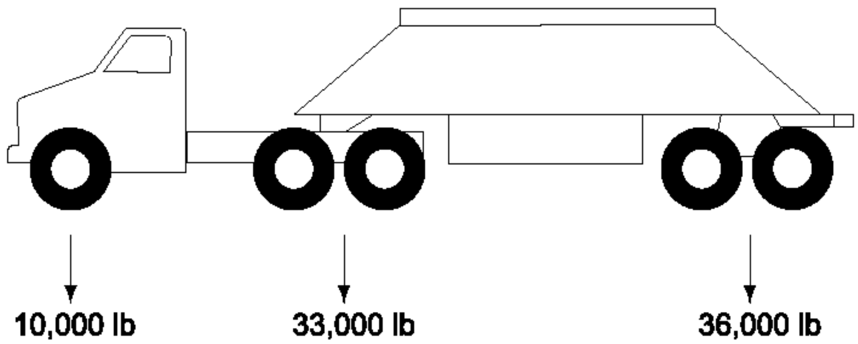
From the legal allowable gross loads chart 49-1001(2) columns A & B the maximum gross weight is 79,000 lbs. for interstate routes with exempt commodities (listed on back of chart). A tandem axle may go up to a maximum of 37,800 lbs. and steer axle weight is figured at 600 lbs. per inch width of tire.



20,000 lb+ 37,800 lb+ 37,800 lb= 95,600 lb

This is not a legal weight and is 16,600 lbs. over the gross legal weight of 79,000 lbs. Therefore, it would be necessary to reduce individual axle and tandem loading to achieve a gross weight of 79,000 lbs. or less.

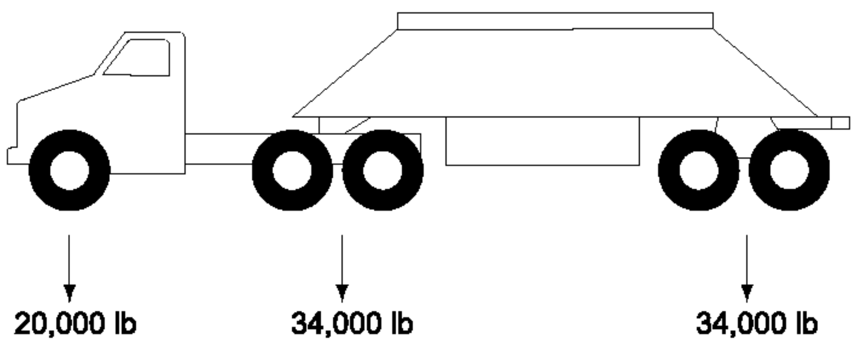
Practical load on the front axle is 10,000 lbs. So 69,000 lbs. would need to be distributed over the two tandem axles, not exceeding 37,800 lbs. on either tandem.



10,000 lb+ 33,000 lb+ 36,000 lb= 79,000 lb

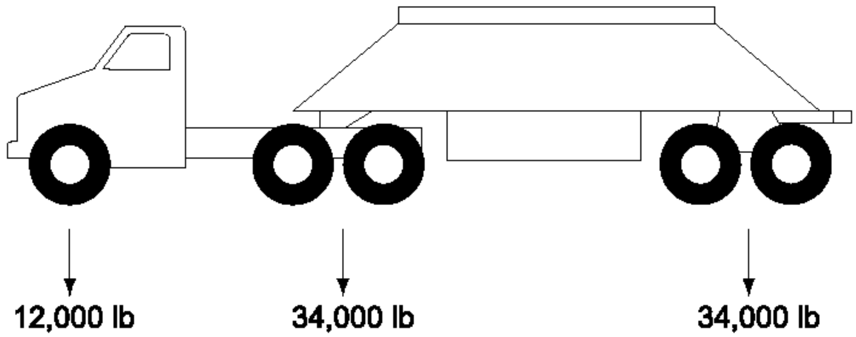
3. 49-1001(1)

From the legal allowable gross loads chart 49-1001(1) columns C thru J the maximum gross weight is 105,500 lbs. for interstate routes and non-interstate routes. A tandem axle may go up to a maximum of 34,000 lbs. and steer axle weight is figured at 600 lbs. per inch width of tire. They must also meet the internal bridge weights from groups of axles to groups of axles.



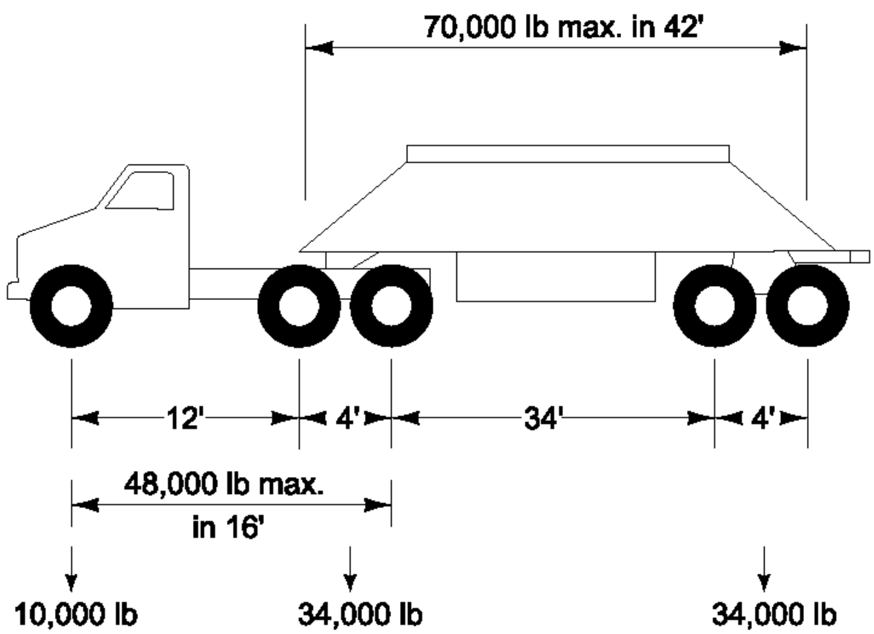
20,000 lb+ 34,000 lb+ 34,000 lb= 88,000 lb

This exceeds the maximum legal weight of 80,000 lbs. by 8,000 lbs. Therefore, the individual and tandem axle loadings will need to be reduced to stay within the 80,000 lb. weight allowance. The front axle must be reduced to practical loading of 12,000 lb.



12,000 lb+ 34,000 lb+ 34,000 lb= 80,000 lb

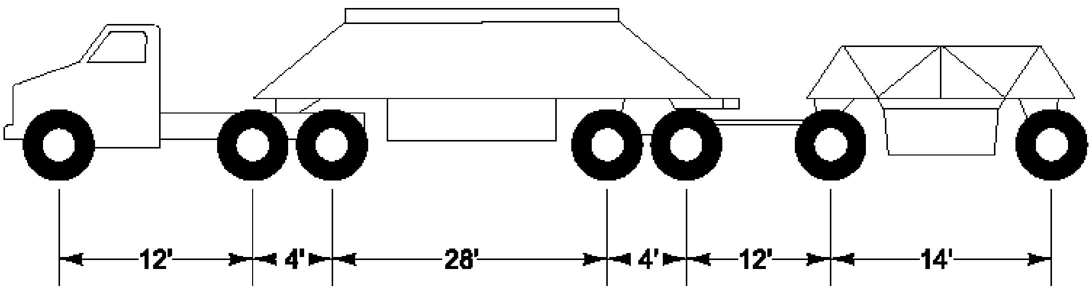
This looks okay and maybe we can add more to the front axle, but when using 49-1001(1) all axle combinations have to be checked.



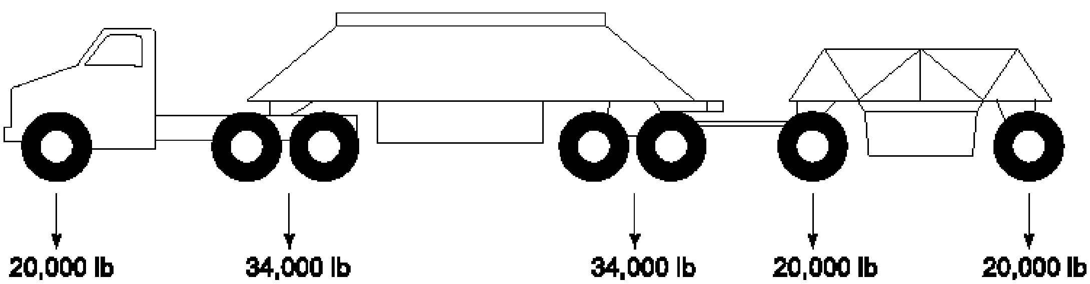
In 16 ft., three axles can only have 48,000 lbs. and two tandem axles can only carry 68,000 lbs. under 49-1001(1). Therefore, the truck is okay. In 42 ft., four axles can have 70,000 lbs. but cannot exceed legal axle weights; in this case 34,000 lbs. on tandems. 49-1001(2) and (9) will allow greater weights on the tandem axles. The front axle could carry 3,500 lbs. additional load and be legal. However, the front axle cannot exceed 600 lbs. per inch of tire width.

In the above example, use of either 49-1001(2) and (9) or 49-1001(1) give about the same results, except that 49-1001(1) results in a more strict adherence to axle legal weights. No tolerances are allowed. If there are any questions concerning axle weight distribution, actual loaded truck axle weights should be determined. Not every truck-trailer combination must be weighed. However, a few representative loads should be checked to determine actual single and tandem axle weights, as well as the gross vehicle weight.

Example #2: Compute the legal gross weights and axle weights for truck, semi-trailer, and pup trailer combination to determine the legal allowable weights. The Contractor's vehicles are registered for 106,000 lbs. Loads can be hauled on interstate and non-interstate highways. Contractor's hauling units are as follows:

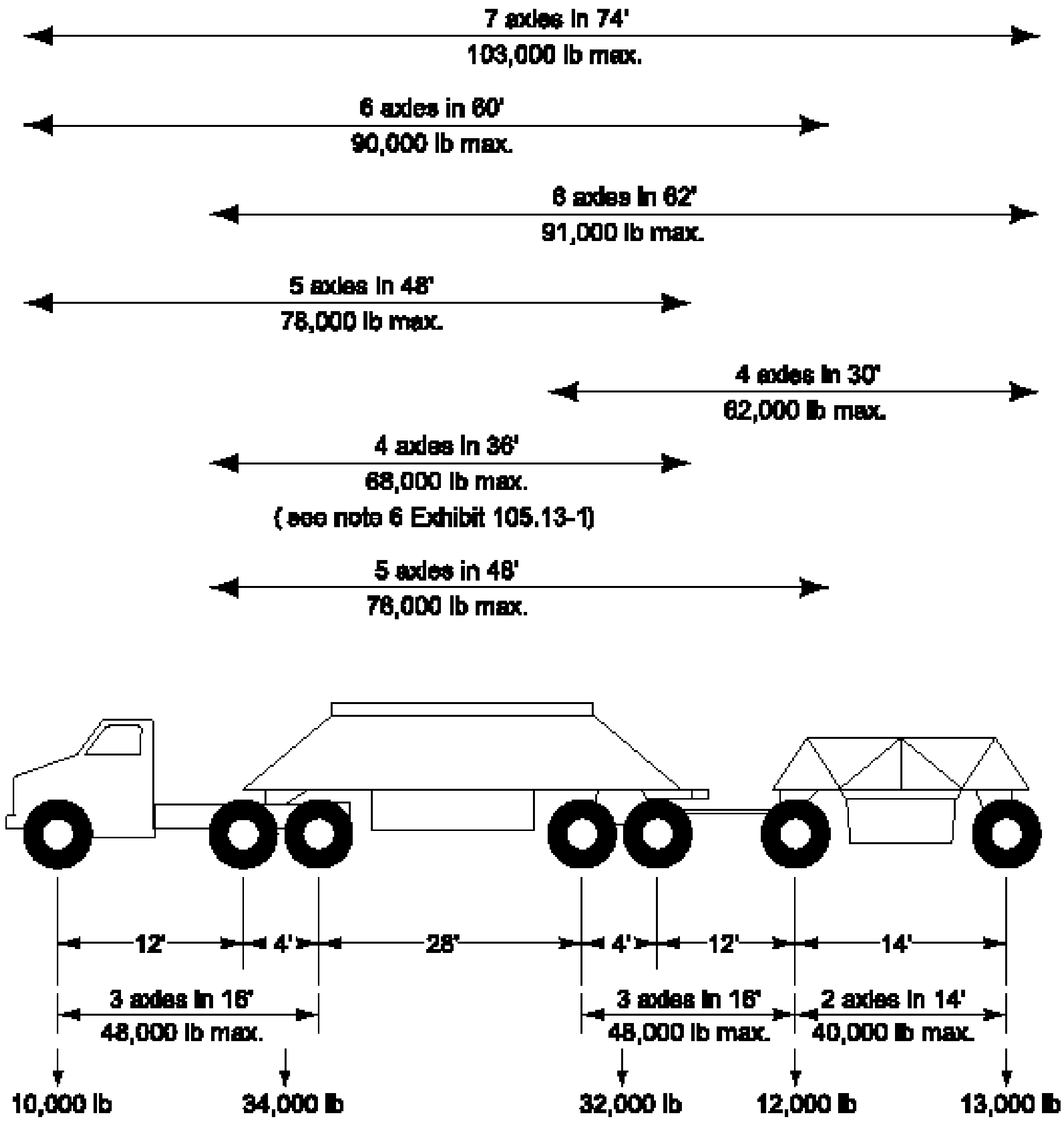


Solution: 49-1001(1) has to be used, since the maximum weight exceeds both the 79,000 lbs. and 80,000 lbs. weight limits.



20,000 lb+ 34,000 lb+ 34,000 lb+ 20,000 lb+ 20,000 lb= 128,000 lb

For an overall axle length of 74ft, the total gross load for 7 axles is 103,000 lbs. Obviously, the loaded truck in the example above is too heavy with a total gross weight that exceeds 103,000 lbs. by 25,000 lbs., and it would exceed various combinations of the axles. Using 49-1001(1) to check axle combinations, the following is obtained:



The overall spacing is usually not a problem, unless a short wheel base tractor is used. Also the critical areas are the internal bridge measurements for axles 2-5 and 4-7.

The diagram above shows what would be a legal weight loading for this vehicle. Various small changes could be made, but axle loading, combination axle loading, and total gross loading must meet 49-1001(1) requirements to be acceptable. No tolerances are allowed. If there are any questions concerning axle weight distribution, actual loaded truck axle weights should be determined.

For additional assistance and information contact the Overlegal Permit office at (208) 334-8420 or 1-800-662-7133.

105.14 Maintenance During Construction.

105.14.01 Snow Removal. Snow Removal is not the Contractor's responsibility unless it has been made part of the contract either through a special provision or by change order.

105.14.02 Maintenance of the Work. Maintenance of work is the Contractor's responsibility until the work is accepted in accordance with SSHC 105.14.

105.14.03 Maintenance of Public Haul Roads. The Contractor is required to maintain public highways and streets over which contract materials are hauled. Hauling over the State Highway System is not normally a problem. However, hauling over locally administered roads and streets can result in rapid deterioration of these facilities, due to their reduced structural capacities. ITD SSHC 105.14.C requires the Contractor to restore such public haul roads to a condition equal to that which existed when hauling started. Typical questions that arise when the local agency demands repair of their facilities are as follows:

- What was the condition of the facility before the Contractor's hauling operation began?
- Did other heavy loads contribute to the deterioration?
- What constitutes restoration to an equally-as-good condition?

The Contractor should be encouraged to meet with the local road officials before hauling to discuss these points. The Engineer should take a series of photographs or video log of the roadway before and after hauling.

105.14.04 Maintenance of Traffic. The Contractor must maintain the road for use by traffic, either on the roadway through the construction site, or on approved temporary detours.

Adequate maintenance of traffic includes the following:

- Dust control
- Sufficient roadway width to safely accommodate the traffic volume
- A reasonably smooth surface that will not result in vehicle or tire damage
- Roadway horizontal and vertical alignment features to safely accommodate traffic
- Proper and sufficient traffic control devices (i.e. adequate delineation, channelization or both are employed to guide motorists safely day and night).

The roadside must be reasonably free of unnecessary obstacles that are not properly protected. Require the Contractor to park equipment and store materials behind the guardrail **and** beyond the clear zone or thirty feet from the traveled way, whichever is greater.

105.14.05 Maintenance of Temporary Detours. ITD SSHC 105.14.E allows the Contractor to request detours constructed and maintained by the Contractor instead of carrying traffic through the construction areas. The Contractor is responsible for detour construction and maintenance costs. However, if it can be shown that the detour can result in substantial cost savings to the Department, it may be appropriate to revise the specifications by change order, allowing Contractor payment for items other than traffic control. Evaluation of environmental impacts is necessary when considering detour requests, to assure that regulatory requirements are met.

105.15 Acceptance.

105.15.01 Prefinal Inspection. Prefinal inspection will be arranged by the Engineer before project completion and before the Contractor's equipment is removed. The prefinal inspection should be scheduled far enough in advance to allow stakeholders to attend. Notify involved entities, such as:

- Contractor
- District Engineer
- District Engineering Manager
- Construction/Materials Engineer
- District Maintenance Engineer
- FHWA (FHWA Projects of Interest)
- Port of Entry (when applicable)
- Local Agencies (when applicable).

Inform the Contractor in writing of the prefinal inspection results.

105.15.02 Final Inspection. The Contractor must notify the Engineer upon physical completion of the work. The Engineer will then conduct a final inspection. Schedule the final inspection to allow all interested agencies or stakeholders to attend. Send copies of the letter to the Contractor confirming the final inspection date to the stakeholders listed for the prefinal inspection. Make a final inspection to determine the acceptability of the work and immediately notify the Contractor in writing of the results. Do not declare the work complete until deficiencies have been corrected.

105.15.03 Final Acceptance. Final acceptance occurs after the Engineer declares the work is complete and the Contractor has submitted all documents, certificates, and proofs of compliance. The District Engineer writes the final acceptance letter.

The final acceptance letter should contain the following:

****

Date:

Contractor's Name and Address Re: Project No.

Location

Contract No.

Key No.

County/City

Dear ______:

In accordance with Subsection 105.15 of the Standard Specifications, a final inspection of the captioned project was made on __________. During the inspection, it was found that all construction items provided for and contemplated by the contract were completed satisfactorily.

I, therefore, accept this project on behalf of the State (and county, if involved).

Work started on this project on ___________ and the completion date was ________________.

Sincerely,

[Signed]

DISTRICT ENGINEER'S NAME

cc: CONSTRUCTION/MATERIALS, DMATLS, R/W, FHWA, DRI, EM, OM, RE

****

Figure 105.15.03.1: Final Acceptance Letter

The final acceptance letter should refer to any guarantee or warranty remaining in effect after the completion date.

Copies of the prefinal inspection and final acceptance letter should be sent to the following:

- Local Public Agency (on Local Sponsored or LPA projects)
- Construction/Materials Engineer
- Right-of-Way Manager
- Local Highway Technical Assistance Council (LHTAC on Local Sponsored projects)
- Federal Highway Administration (FHWA Projects of Interest)

- Applicable District distribution.

A final inspection should also be made by an FHWA representative on FHWA Projects of Interest. Generally, the FHWA will participate at the same time as other agencies, but may choose to do so at a different time. All FHWA concerns must be addressed before the Engineer declares the work complete.

105.16 Administrative Resolution Process for Disputes.

A dispute is a disagreement between the Contractor and the Department over the need to revise the contract. Resolving a dispute involves ascertaining the relevant facts, determining responsibilities and compensating the Contractor if merit (entitlement) exists, or refusing compensation with clear reasons when no merit exists.

The District Engineer is responsible for administering the dispute resolution process, and makes the initial determination whether a dispute by the Contractor will be contested by the Department, or will be resolved by the change order process.

Unrelated claims must be processed separately. The term unrelated means that the basis (entitlement) for the claim is different. Do not allow the Contractor to submit a written claim, or notice of intent to claim, with more than one entitlement issue. One entitlement issue, such as redesign of the road alignment, can cause several different types of damages (quantum) such as increased labor cost, increased equipment costs, increased time, etc., but all the damages must be caused by that one entitlement issue. This way, each claim issue will require its own notice of intent to claim and will have an individual schedule regarding submittal and review times.

The Department only processes disputes through the prime Contractor. Subcontractors must go through the prime if they have a dispute. The prime Contractor must certify the subcontractor's dispute before the Department will review the dispute.

105.16.01 Project Documentation. Accurate and complete documentation is the key to successfully settle claims. Generally, the side with the best documentation prevails in the majority of claims.

Documentation includes the original contract documents, any addenda, project schedules, pay estimates, construction diaries, sampling and testing results, laboratory reports, pay records, change orders, memorandums, meeting minutes, and correspondence. One of the very best forms of documentation is a picture (i.e. photographs or video).

Concurrent documentation is often a major factor in determining the weight or impact of a given document during administrative and legal considerations. Documentation at the time of occurrence will likely have more validity than documents prepared weeks or months after the fact.

An approved baseline Critical Path Method (CPM) schedule and monthly CPM updates are critical to protecting the Department's interests in the event of a claim.

Project personnel should contemporaneously document (e.g. construction diaries, meeting minutes, correspondence) the claim and describe events or record their observations of the situation at the time of occurrence, and take dated photographs or video of the conditions. The documentation should be objective and professional, relating to the facts, without bias or opinions. Keep accurate force account records of the operations to eliminate subsequent arguments related to work costs. During progress of the disputed work, make regular agreements with the Contractor for the labor, equipment or materials quantities per SSHC 109.03.C.5.

105.16.02 Contractor Recordkeeping during Disputed Work. The Contractor bears the burden of proving both entitlement and damages. Per SSHC 105.16, the Contractor is required to provide the District Engineer with daily records of actual costs and time incurred performing the disputed work. The Contractor must provide copies of these records to the District Engineer during performance of disputed work (daily if necessary) so that they can be verified contemporaneously.

It is the Contractor's responsibility to keep complete records of claim costs, and it is the Department's responsibility to review and verify the records as the costs are accrued. The purpose is to verify the labor and equipment hours and material costs that the Contractor is claiming as extra costs, whether or not entitlement is eventually found.

Review the Contractor's records as received, with notations indicating any conflicts or inconsistencies with the Department's project records, as well as any discussions held with the Contractor regarding discrepancies. If the Contractor fails to provide contemporaneous records, notify the Contractor in writing of their obligation under the contract to keep such records and provide them to the Department.

105.16.03 Contractor Notice. SSHC 105.16 requires the Contractor to provide a timely notice of intent to file a construction claim to the District Engineer. The purpose of this notice is to allow the Department the opportunity to mitigate the impacts, or begin documenting the impacts and actual costs associated with the claim. The Contractor's rights may be waived if timely notice is not given and the Department's position has been compromised.

To manage a claim effectively, enforce the notice requirement. If the Contractor indicates verbally during the prosecution of the work that added costs are being incurred, or changes to the contract are occurring, the Resident Engineer should instruct the Contractor to provide the required written notice of the intent to file any claims using an ITD-2055 Avoid Verbal Order (AVO) which includes the Contractor's acknowledgement of receipt. The AVO should make clear to the Contractor that adequate written notice of intent to file a construction claim is required if the claim is to be considered by the Department.

Even if notice is not received as required by the specification, the Contractor's rights may not be waived. In most instances the Department is aware of the claim even though timely notice is not given. Waivers are usually only enforceable if timely notice has not been received and the Department's position has been compromised. The Department's position is compromised if the District Engineer is unable to reasonably verify the Contractor's claimed costs. If the District Engineer cannot reasonably verify the cost then the District Engineer cannot justify payment, even if there is entitlement.

105.16.04 Contractor Supplemental Information to Notice. Per SSHC 105.16, the Contractor is required to provide supplemental information within 15 calendar days of the written notice. This supplement defines the entitlement issue and the critical elements of the claim, and provides additional facts which may aid in early claim resolution. The supplemental information must include:

1) Date of the dispute giving rise to the claim
2) Nature and circumstances causing the dispute
3) Contract provisions that support the claim
4) Estimated cost of the claim and supporting calculations
5) An analysis of the schedule showing schedule changes, disruptions and delays.

The District Engineer should also request the Contractor to provide timely updates to the above information if the circumstances causing the claim to continue. This is required by SSHC 105.16.

105.16.05 Formal Claim Submittal and Certification. The Contractor is required to submit full and final documentation to support the claim no later than 60 calendar days following the date the claim has fully matured (see SSHC 105.16 for the required documentation). On some claims, such as a delay claim, the Contractor might say the delay will have a ripple effect and will have impact damages until the end of the project thus extending the maturity date. Per SSHC 105.16, impact damages may be submitted later as separate claims if and when they occur. The possibility of impact damages shall not delay the submittal of full and final documentation of claims with direct damages.

The Contractor must provide a signed and notarized certified statement along with the submittal. See SSHC 105.16 for the required language. A subcontractor must submit a dispute through the Contractor. The prime Contractor must certify the subcontractor’s dispute before the Department will review the dispute. Do not accept a submittal directly from a subcontractor.

105.16.06 Contractor’s Right to be Heard. Per SSHC 105.16, at the discretion of the District Engineer and upon timely request by the Contractor, the District Engineer and Contractor shall meet to discuss the claim, ask and respond to questions, and suggest possible resolutions.

The opportunity to make oral presentations should be offered to the Contractor. The appropriate project personnel should be present at these meetings so that they can verify and/or question what the Contractor is saying.

If this meeting is requested by the Contractor, it should be scheduled after the Contractor’s claim submittal has been reviewed and a preliminary decision has been made. Explain to the Contractor that this meeting is not a negotiation session but rather an opportunity to verbalize and clarify. It is the Contractor’s meeting. Request the Contractor to provide an agenda and have the proper Department personnel in attendance. These meetings have been very helpful in clarifying the claim for both parties.

105.16.07 District Engineer Review. Make sure the submittal is complete. Review the Contractor's claim submittal as soon as it is received for completeness. At a minimum, the Contractor is required to provide all of the information specified in SSHC 105.16. If the Contractor has not provided all of the necessary information, make a request in writing for the missing information and send to the Contractor.

Review for completeness as soon as possible. The review timeline begins as soon as the formal submittal is received. If the submittal is incomplete, the written request will stop the timeline until the additional information is received or the Contractor indicates that it is not available.

Keep in mind at all times that the purpose is to **review** the Contractor's submittal, not guess or interpret. Do not try to figure out how the Contractor came up with the submitted data or what the Contractor is trying to say. Request the Contractor to clarify the submittal, or portions of it, if it is unclear.

Review of a claim involves two key elements: entitlement (which refers to the merits of a claim) and quantum (which refers to the time and costs involved). The entitlement element of the claim involves answers to the questions: What has changed? Who caused the change? The quantum element answers the questions: What then were the impacts from the change? What were the costs?

The initial source of information and facts are contained in the Contractor's submittal.

Also review Department records to determine if the facts presented by the Contractor can be verified and to determine if the Contractor's information is incomplete or misleading. Some of the most important types of documentation are excerpts from the contract documents specifically related to the claim. Ascertain exactly what the contract says with respect to the dispute. Identify and reference all pertinent drawings, notes, specifications, and special provisions. Identify any relevant additional information and any conflicting information. Separate the facts into three categories:

1) Those the Department and the Contractor agree on
2) Those which are unsubstantiated or incomplete- these need to be clarified
3) Those which are disputed by the Department.

For disputed facts, identify what the correct facts are believed to be, with references to backup documentation.

Keep the following questions in mind when reviewing the Contractor's submittal:

1) Did the Contractor provide the required (e.g. timely) notice of intent to claim?
2) If the Contractor did not provide the required notice, was the Department aware that there was a claim?
3) If the Contractor did not provide the required notice and the Department was not aware there was a claim, was the Department harmed in any way?

4) Was there a change to the original contract requirement that led to the claim?

5) Who or what caused the identified change?

6) Were the impacts unexpected or unreasonable?

7) Could the Contractor have avoided any adverse impacts through proper action?

8) Was it reasonable to have anticipated the identified changes at the time of bid?

9) Did the Contractor attempt to mitigate the claim or its effects?

10) Was complete claim documentation provided in the timeframe outlined in the contract as specified in SSHC 105.16?

11) Has the Contractor met their burden of proof? It is a well-established principle of contract law that the claimant (typically the Contractor) bears the burden of proving entitlement, damages (quantum) and causation by a preponderance of evidence. The claimant does not have to prove the case with absolute certainty or beyond a shadow of doubt. The Contractor must show: (1) a contractual or legal basis for the claim, (2) that the claimed damages are a reasonably accurate representation of the actual damages and, (3) that the claimed damages were caused by the entitlement issue.

The District Engineer may consult with the Resident Engineer as needed throughout the review process for concurrence and completeness.

The District Engineer should prepare a written analysis in support of the District Engineer's decision, and to ensure all relevant documentation has been reviewed. If any new claim documentation becomes available after the District Engineer's decision is issued, it will be reviewed at the district level and the District Engineer's decision amended as required before a claim appeal will be considered by the Chief Engineer. Figure 105.16.08.1 provides a suggested outline.

105.16.08 District Engineer Decision. The District Engineer must issue a written decision within the time frames specified in SSHC 105.16. The decision should be sent to the Contractor via certified mail, return receipt requested.

Lack of response within the time frames (unless extended based on mutual agreement) is an automatic denial decision, and the Contractor may proceed to the next level of review.

If full or partial entitlement is found, a change order should be issued as soon as possible in accordance with SSHC 104.02.

The following figure illustrates the DE decision format:

CLAIM TITLE:

Claim Amount:

Project:

Contractor:

Subcontractor (if applicable)**:**

Claim Review by:

Review Date (provide both start and end dates)**:**

THE DISPUTE

Give a brief description of the dispute here including the amount of money and/or contract time the Contractor is requesting. Most of the details about the claim will be dealt with elsewhere in the analysis.

CHRONOLOGY

NOTICE

Based on the Chronology of Events and the contract, determine if proper notice of intent to claim was given.

ENTITLEMENT

Review the Contractor's submittal and pick out the sentences or paragraphs where it is most clearly described what the contractor is alleging. These are the allegations that the Department needs to respond to. It is best to use contractor quotes as the allegations but they can be paraphrased. Do not attempt to interpret or clarify the allegation. There should be enough allegations listed to completely cover the entitlement issue.

Respond to each of the contractor's allegations by clearly and concisely stating the District Engineer's position using the contract and project documentation in support.

Allegation #1:

Response #1:

Allegation #2:

Response #2:

Etc.

QUANTUM

This portion addresses the amount of money and/or contract time the Contractor is requesting.

Contractor's Request:

Response:

FINDINGS SUMMARY

Give the bottom-line findings of entitlement and quantum here. Don't restate the details already given under ENTITLEMENT and QUANTUM.

<u>EXHIBITS</u>

Exhibit A – Chronology of Events. This is the most important part of the claim analysis. It is a summary of key events (dates and short description). The review will be based on the information in this section.

Exhibit B – Cost Analysis. This is for the contractor's claim costs and our verification of those costs. If we do not agree with the contractor on some of the costs, this is the section for explaining why we agree or disagree. Use this section to verify whether or not the contractor's claim costs are reasonably accurate and in accordance with the contract, (i.e., Blue Book rates, allowable mark-ups, etc.). If the contractor kept daily records of extra hours and costs and submitted them daily per contract, then the dispute should be minimized.

Exhibit C – Documentation. This section is for copies of any documentation that is important in support of the analysis. The documentation should be referenced, where appropriate, in the body of the claim analysis, including other exhibits, especially Exhibit A. The documentation should be placed in chronological order.

Etc.

Figure 105.16.08.1: DISTRICT ENGINEER DECISION FORMAT

105.16.09 Chief Engineer Review. If the Contractor disagrees with the District Engineer's decision, the decision may be appealed to the Chief Engineer. The Chief Engineer will review the appeal based on the information provided by both the District Engineer and the Contractor. The Chief Engineer will review the Contractor's appeal basis against the District Engineer's analysis and render a decision <u>only</u> if a new perspective is presented that could show the initial claim analysis was deficient.

When a claim is appealed to the Chief Engineer, the District Engineer assembles the written decision and other documents as a claim package, and submits it to the Chief Engineer. The claim package should include at least the following:

1) **DE decision letter.** The DE's decision letter to the Contractor.

2) **DE written analysis.** Include the following:

   a) **Claim Summary -** Include title, amount claimed, project name, contractor, subcontractors, person doing the review, and date of review.

   b) **The Dispute -** Summary of what the contractor's claim is about.

   c) **Chronology -** Detailed timeline of events related to the claim.

d) **Notice -** Summary of notice time frame given by the Contractor.

e) **Entitlement** - Detailed analysis of entitlement broken into the different allegations the contractor has made related to the claim. The analysis should discuss the specifications and contract requirements that either support the contractors' claim or support the Department's position about the claim. At the end of the entitlement section, state the conclusion of entitlement.

f) **Quantum** - Detailed review of the costs submitted by the Contractor. State what the Contractor's request is and the information received from the Contractor to verify the costs. If the Contractor has not submitted documentation to verify costs, the individual conducting the analysis should do an independent verification of costs based on best available knowledge about the work and costs being disputed. At the end of the quantum section, state the conclusion of quantum.

g) **Findings Summary** – Summarize entitlement and quantum findings without restating details.

h) **Exhibits** (if needed) - Details regarding the chronology, cost analysis or other relevant documentation are put into the Exhibits section. Any other needed exhibits are put at the end of this section.

The Chief Engineer will review both the Contractor's submittal and the claim package supplied by the District Engineer, and render a written decision within the timeframes specified in SSHC 105.16, unless a time extension is mutually agreed upon.

105.16.10 FHWA Review and Federal-Aid Participation. On FHWA Projects of Interest, the FHWA must be kept informed about the details and handling of claims at all stages of review.

Federal-aid participation must be based on the requirements of 23 CFR 635.124. Federal-aid participation in non-NHS project claim settlements must be based on the allowable cost principles of OMB Circular A-87.

105.16.11 Audits. The Department has the right to perform inspections and audits. As part of the Contractor's submittal, SSHC 105.16 requires that the Contractor identify the amount and provide justification for several categories (e.g. labor, material, and equipment costs).

Typically, the Contractor's submittal will include cost summary sheets showing the costs broken into the specified categories. Usually the Contractor's claimed field cost summaries can be verified by the Resident Engineer by reviewing the daily records that the Contractor submitted for review during the disputed work, or by reviewing the project's own cost records and diaries. However, where the Contractor's claim costs cannot be verified by the project records, the contract allows the Department access to all the Contractor's and Subcontractor's cost records pertaining to the claim. The auditor can be a Department employee or a consultant. The records to which the Contractor may be asked to allow ITD access are listed in SSHC 105.16.

105.16.12 Dispute Review Board. If the dispute has not already been heard by a Dispute Review Board (DRB), and the Contractor wishes to appeal the Chief Engineer's written decision, the Contractor may request a hearing by a DRB in accordance with SSHC 105.19. If the dispute has already been heard by a DRB, the Chief Engineer's decision is the end of the administrative process. At this point, the Contractor may request mediation or bring the dispute in Idaho state court in accordance with SSHC 105.18.

105.16.13 Dispute Avoidance. Good communication is particularly important to prevent disputes; therefore, maintain open lines of communication, especially between the project staff and the Contractor. If at any time a problem arises that cannot be resolved at the District Engineer's level, hold a meeting involving the Contractor's personnel, project and other District staff and, if appropriate, headquarters staff. Record and distribute copies of any decisions reached at such meetings to all concerned parties.

The best way to handle disputes is to prevent or avoid conditions and situations from which claims are likely to arise. The following methods can be used to minimize the number and severity of claims:

1) Participate in the final design review, especially the special provisions, for clarity, bidability, and constructability. Suggested corrections should be transmitted to the Design/Construction Engineer. The Design/Construction Engineer and staff should follow through to ensure the suggestions and corrections are addressed.
2) Provide a complete and accurate set of plans and specifications. The Design/Construction Engineer should review these documents before advertisement. If problems are noted, addendums should be issued.
3) Correct or adjust plan and specification errors or inconsistencies that may be discovered in advance of work being performed. This may require negotiations and issuance of contract change orders.
4) Listen to the Contractor's alternatives. An alternative method, equipment, or materials may give equal or better results.
5) Explain if necessary, the reasons why the plans or specifications require a specific performance, method, or end result.
6) Stay advised of the Contractor's continuing plans of operation. Knowing the Contractor's plans help with deployment of personnel and other resources and can avoid delay of the work. Ensure that the CPM schedule is accurately updated and in accordance with the contract. The initial schedule must comply with the terms of the contract which includes meeting contract milestones and completion dates. Contract work should not begin until the initial (baseline) CPM is approved.
7) Promote preoperational conferences with the Contractor. Preoperational conferences held in advance of major phases of the construction provide ideal opportunities for the Contractor to communicate how the work will be accomplished and the Resident Engineer to communicate how the work will be inspected and accepted.
8) Avoid directing the Contractor's work or personnel.
9) Maintain adequate records of the work, progress, contractor's resource deployment, and conditions affecting the work. Maintain complete job diaries. Use letters or AVO's to confirm

verbal orders to the Contractor. Take photographs or video before and during construction and document location, date, subject, project identification, and person taking the photo or video.

105.16.14 Consultants. Sometimes hiring a claims consultant can assist in the reviews because of time constraints, the specialty nature of the work involved, complexity of the claim, or a high dollar value of the claim. If a consultant is considered for claims management or analysis, the Engineer will contact Legal for assistance.

105.16.15 Claims Tracking. The Claims Tracking System is designed to keep all levels of management informed about all construction claims. It is designed to capture pertinent claim administration events. It is not designed to contain details of the claim. The RE provides updates to the Engineering Manager Construction/Materials when the claim is at the DE and CE level (including disputes that are being presented to DRB's) for monthly reporting to ITD senior management. All claims are archived by the RE once the claim has been resolved.

SECTION 106.00 – CONTROL OF MATERIAL

106.01 Source of Supply and Quality Requirements. See ITD Standard Specifications For Highway Construction (SSHC) 106.01 for requirements.

106.02 Ordering, Producing, and Delivering Materials. Document all purchased material quantity approvals per SSHC 106.02.

106.03 Samples, Tests, and Cited Specifications. Residency personnel should be familiar with current test methods and Minimum Testing Requirements, and they should be discussed at the preconstruction meeting. When a test method is revised during the course of a project, the latest version must be used through the remainder of the project. Revised test methods that significantly impact the Contractor should be evaluated and may require a change order.

District staff should complete materials sampling, testing, and the receipt of required manufacturer's construction materials certifications in a timely and accurate manner. Perform tests and obtain samples as defined in the Department's Quality Assurance (QA) Manual. Perform Independent Assurance (IA) testing as required and as defined by the Independent Assurance Program in the Department's QA Manual. When testing is based on a quantity frequency, ensure that testing is distributed throughout to represent the total material quantity. Withhold payment to the Contractor for any material for which the required acceptance sampling, testing, and/or certification have not been accomplished.

When the Department performs quality and/or acceptance testing, transmit the test results to the Contractor in a timely manner.

Report failing test results promptly and formally to the Contractor so that: 1) they are aware that the material is subject to rejection, and 2) they have the opportunity to make adjustments to ensure future contract quality requirements will be met.

Acceptance, verification and IA is used as evidence that the project materials are in accordance with the contract requirements, and is reported in the Material Summary Report (see below). See the Department's QA Manual for requirements. Include exceptions in the Materials Certification letter.

Sampler, Tester, and Laboratory Qualifications. When applicable, both Contractor and Department personnel must have current Western Alliance for Quality Transportation Construction (WAQTC) qualifications and per CA Manual Section 114 for materials sampling and testing. Testing facilities must be qualified as required by the Department's laboratory qualification program. Both the Engineer and the inspection staff have the responsibility to monitor compliance. The Engineer will include personnel and laboratory qualifications as a preconstruction meeting topic and confirm personnel and laboratory qualifications.

Require a listing from the Contractor (and certifications for the file) of all personnel who will be performing materials sampling and testing. Verify current qualifications using the Department's website, and place the listing and verification documentation in the project file for both Department and Contractor personnel.

For testing facilities, verify that the laboratory's qualification is current and that the laboratory logbook is maintained. The logbook must contain equipment calibration data for the test methods to be used and IA documentation.

Inspection staff must verify personnel and laboratory qualifications. After the project begins, verify and update the project file with information and data for new personnel or testing facilities. Also, periodically spot-check personnel and laboratory qualifications to verify that they are still current, and update the project file accordingly.

The Engineer will verify that all personnel and laboratories are currently qualified and documented in the project file.

Random Sampling Schedules and Times. When applicable, obtain test samples using stratified random sampling. Stratified means that the sampling is based on the given minimum testing requirement frequencies and a separate random number must be obtained for each testing frequency quantity. The purpose is to avoid introducing sampler bias in selecting when and where (if applicable) to obtain material samples for testing. For samples obtained on the roadway, the random number can be the same for both material quantity and roadway location. Random location determination includes both length and width. See any WAQTC course book under the section Random Sampling of Construction Material for random sample location procedures.

A random sampling system can include the following:

- A random number generator on a hand-held calculator, tablet, or cell phone.
- A random number table (contained in any of the Department's sampler and tester qualification course books).

It is acceptable to generate the random numbers for the entire project at the project start.

Quality Assurance Special Provision (QASP) – General. The Quality Assurance Special Provisions (QASP) modifies SSHC 106.03 requirements regarding materials testing and acceptance. Under the QASP, both the Contractor and Department perform materials testing, with acceptance based in part on Department material quality analysis using statistical methods. The Department retains the right to test materials at any time and to require the removal of defective material.

The QASP should also be a subject at the preconstruction meeting and other applicable preoperational conferences. Additional topics to address include:

- Verification that Contractor is meeting minimum testing requirements.
- Completing and presenting acceptance and verification test results by the next calendar day. Also discuss methods of data transfer.
- Re-testing criteria requirements (check test).

- Just-in-time procedures for providing the Contractor with acceptance testing sampling schedules and times that will allow the Contractor adequate time to schedule sampling and testing personnel. The Contractor will not be provided with verification testing sampling schedules and times.
- Verification evaluation – failing t-test procedures.
- IA of Contractor acceptance testing.
- Dispute Resolution.
- 0.75 and 0.85 pay factor decision criteria.
- Defective material.
- Any changes from previous specification versions.

Quality Control and Acceptance Testing. Both the Department and Contractor must complete and present acceptance test results no later than the next calendar day. **Enforcement of this requirement is very important.** Process adjustments and administration decisions are made based on test results. Failure to provide timely test results can result in rejectable or inferior material being placed. Do not allow work to proceed if the Contractor is not completing and presenting test results by the next calendar day.

Table 106.03-1 of the QASP shows the material quality characteristics that must be tested for each bid item, including the test method, minimum testing frequency, and test location. The table also identifies who (Contractor or Department) is responsible for the quality characteristic testing.

Verify that all test results are recorded on Department forms. Do not accept test results as final if the forms are not completed properly. Check for:

- WAQTC qualification numbers recorded for both sampler and tester.
- Tests are correctly numbered and identified as quality control or acceptance. Ensure acceptance tests are numbered sequentially.
- Form header information correctly filled out with project number, bid item, and quantity of material the test represents.
- For test results showing the material did not meet specifications, ensure that the forms document: "… the nature, number, and type of deficiencies found; the quantities approved and rejected; and the nature of corrective action taken, as appropriate."

In addition to quality control and acceptance testing, the Contractor is also required to keep run charts for each quality characteristic that is used in statistical analysis. Run charts are plots of the test result data in sequence and aid in identifying material trends. Verify and require that the Contractor is maintaining run charts.

Together, the test results and the run charts are an initial indication of material quality. Review test results (across at least three consecutive tests) and run charts for material that is:

- Not within specification upper and lower limits – Discuss need for production adjustments with the Contractor.
- Not consistently trending within upper and lower specification limits or has wide variability in the test result data points – Discuss with the Contractor regarding what is being done to rectify problems with production consistency.
- Trending close to either the upper and lower specification limits – Discuss with the Contractor whether production adjustments must be made and, if not, advise that there may be a detrimental impact on pay factors resulting in rejectable material and payment deductions.
- Trending upwards or downwards across test results – Discuss with the Contractor regarding what is being done to rectify problems with production consistency.
- Document Contractor discussions.

Review each acceptance test result as soon as it is received for the quality characteristics listed below. These characteristics are subject to retesting criteria requirements (check test):

- Fracture
- Sand Equivalent
- Cleanness Value
- 100 percent passing
- 97-100 percent passing
- 95-100 percent passing.

Verify and ensure that the Contractor is following the specification requirements for tests that show results outside the specification limits. The Contractor can do this by:

- Immediately obtaining another sample and retesting for the failing quality characteristic – If the check test was not obtained, discuss with the Contractor the reasons why, and inform the Contractor that a stop production order will be issued if non-compliance continues. An acceptable reason for not obtaining a check test is if the time to complete the test method exceeds the time when the next random sample was obtained. In this case, the next random sample also serves as the check test.
- If the check test failed, and:
  1) If the Contractor did not suspend production and make adjustments to the process, discuss with the Contractor the reasons why, and inform the Contractor that a stop production order will be issued if non-compliance continues.
  2) If the Contractor suspended production and made adjustments to the process, the adjustments must be documented on the check test form to show corrective actions taken.

Retain samples as required for all acceptance gradation and asphalt binder content testing. See the QASP for requirements. Only split samples are to be used in third party dispute resolution. Dispute resolution is further discussed in SSHC 106.07.

All test samples must be obtained randomly (see Random Sampling Schedules and Times). Within each testing frequency quantity, a separate random number must be obtained for each quality characteristic. The Contractor is responsible for generating random sample schedules and times for quality control testing. In accordance with the QASP, **for all acceptance testing, "…** ***sampling schedules and times will be determined by the Engineer using a random sampling system***." This includes the Contractor's acceptance testing as well as the State's acceptance and verification testing. Document the random numbers in the construction diary including when the numbers were given to the Contractor.

Inform the Contractor of the random number in advance of when the acceptance test sample will be obtained, so that qualified personnel are on hand. It is the Contractor's responsibility to ensure that there are qualified personnel available to obtain the sample when the random number is reached. Stop production if the Contractor's personnel are not available to obtain the sample. Under no circumstances should the Department obtain the sample for the Contractor.

Verification Testing. 23 CFR 637.207 requires the Department to validate the Contractor's acceptance testing by verification testing. The Department must submit the verification test results to the Contractor no later than the next calendar day. Use acceptance testing point of sampling and test methods per Table 106.03-1 of the QASP for verification testing. Verification samples are obtained by random sampling, based on generated random numbers.

Minimum verification sampling frequency is two samples per lot (see the quality analysis section for lot discussion) and **no more** than two per day. The Department is not required to take more than two verification samples per day.

Once the test results are obtained, verify and evaluate the Contractor's acceptance test results. The verification evaluation is an ongoing cumulative basis. As succeeding test results are received they are added to **all** the previous test results and then reevaluated.

Perform the evaluation using Departmental computer programs. The program will indicate whether the t-test passes or fails. Perform the verification evaluation on a daily basis, as production may be affected by the outcome.

If the t-test shows passing, the acceptance test results can be grouped into lots for quality analysis. If the t-test fails, immediately do the following:

1) Check that data entry is correct.

2) Plot the acceptance test results and the verification test results separately to determine if the differences can be attributed to sampler and testing variation. If the two data plots look very similar, the t-test failure is probably an erroneous result (e.g. false failure). False failures are also very likely to occur at the beginning of the project simply because sample sizes are so small.

3) Verify that the Contractor has turned in all acceptance test results, and that all verification test results are being used.
4) If the differences are not attributed to items 1 through 3, stop production and assess test procedures including methods and equipment, calculations and any other information to ensure that methods are correct and equipment is calibrated and working properly. Get IA involved if necessary.
5) If differences still cannot be resolved, consider third party dispute resolution using the retained split samples.
6) Discuss potential contract time adjustments with the Contractor.

Quality Analysis. Quality analysis applies to both Contractor and State acceptance test results.

Quality analysis begins after:

- Acceptance test results are completed and submitted by the Contractor, or completed by the State.
- Verification evaluation has been performed when the Contractor performs the acceptance testing.
- A verification evaluation failing t-test has been satisfactorily resolved (i.e. the source of differences were resolved).

Quality analysis is used to establish the pay factor, which is determined by the material quality level. Quality level is based on what percent of material is likely to be within specification upper and lower limits, and consistent material production (i.e. low test result variability). Apply statistical methods and, as with verification evaluation, use Departmental computer programs to do the necessary calculations. Contact the headquarters Construction/Materials Section for additional information.

Quality level analysis is **not** performed for an item if the total project quantity has an overall given testing quantity of two tests or less. However, testing is **still** required by the State. **Be aware** that quantity underruns and overruns, either caused by quantity variations or change orders, may alter the required number of tests. Ensure that samples are still obtained at the given testing frequencies shown in Table 106.03-1 of the QASP based on **actual** project quantities. Material acceptance is based on passing test results when quality level analysis is not performed.

Unlike verification evaluation, which is cumulative, acceptance test results are grouped into lots for quality analysis. The specifications define the criteria for grouping test results into lots. Use the following method in conjunction with the QASP to group test results into lots:

Lot size is based on number of acceptance tests obtained during a work shift. Minimum lot size is three acceptance tests.

Example:

Work Shift	No. of Tests	Tests in Lots	Comments

Work Shift	No. of Tests	Tests in Lots	Comments
1	2	0	Tests are grouped with the following work shift.
2	4	6	Work shift 1 and 2 are combined.
3	9	9	These are the minimum tests needed for a lot.
4	3	3	There are the minimum tests needed for a lot.
5	1	0	Criteria 3: Tests are grouped with the following day.
6	8	9	Criteria 1 and 3: Work shift 5 and 6 are combined
7	2	0	Criteria 2: Tests are grouped with the following day.
8	5	9	Work shifts 7, 8, and 9 are combined.
9	2	0	Tests are grouped with the previous day.

It is very important upper and lower specification limits are correct in the statistical analysis, since production decisions, acceptance, and payment are based on the calculated resultant pay factors. Not all quality characteristics are subject to statistical analysis. Quality characteristics subject to statistical analysis are shown in the QASP.

For aggregates other than plant mix, the upper and lower specification limits are defined by the gradation tolerances specified in SSHC 703 - Aggregates. Always verify whether the Special Provisions modified these tolerances. An exception is for SSHC 403 and 404 materials.

For plant mix aggregates, the upper and lower specifications are determined as follows:

1) Determine the single percent passing gradation from the job-mix formula.
2) Determine the upper and lower specification limits in accordance with SSHC 405.03 F.
3) Check to see whether the determined tolerances are within the maximum and minimum control points specified in SSHC 703.05. If:
   - Yes. Use the limits as calculated in item 2 above.
   - No. Use the control point limits as specified in SSHC 703.05.

   Example for SP-1 and SP-2: The 1-inch sieve target gradation is 92. The SSHC 405.03.J tolerance is plus or minus 5. The control point maximum and minimum is 90 to 100. Per SSHC 405.03.J the calculated gradation range is 87 to 97. However, per SSHC 703.05 the lower specification limit is 90 instead of 87 because the bottom control point range was exceeded. The upper specification limit remains at 97 because it is within the control point range.
4) Only the sieves that are marked with an asterisk (*) in SSHC Table 703.05-1 are used in quality analysis for SP-1 and SP-2 mixes.

See SSHC 405 and the QASP for asphalt binder content and density upper and lower specification limits.

Pay Factor Decision Criteria. As with verification evaluation, pay factors must be calculated as soon as possible after test results are received. Production decisions are made based on the pay factor quality analysis results. See the specifications for decision criteria.

Independent Assurance. As with quality control, acceptance, and verification testing, IA is based on given frequencies of material quantities although at greater intervals (typically one IA test for every 20 acceptance and verification tests). IA must be scheduled among all projects in the District. Refer to the Department's QA Manual for testing frequencies. Keep track of quantities and production rates so that the district Materials Section can be notified sufficiently in advance to prevent missing IA minimum frequencies because of conflicting project schedules.

106.04 Certification of Materials.

Certain materials and fabricated items or small quantities of miscellaneous non-critical materials may be accepted based on a manufacturer's certification. The QA Manual outlines the minimum testing requirements and items that may be accepted by certification. Standard Specifications, Plans, Special Provisions etc. may also indicate certification requirements. The headquarters Construction/Materials Section should approve certification for new materials or products other than those specified.

All certifications must be signed by a person having quality control responsibility for the company that manufactures, fabricates, or supplies the material. All certifications must reference the project and contract pay item description and number. Make sure that all required certifications are received before the material covered by the certification is incorporated into the work.

Buy America. Materials and products that contain steel must be certified that the steel was manufactured in USA. Certification must be provided before permanent incorporation of these materials into the project. Materials that are only temporarily used or rented during construction, but not permanently incorporated into the work, do not require certification.

Specific Buy America Provision requirements can be found in the ITD QA Manual Subsection 230.03.

106.06 Storage and Handling of Material.

The storage and handling of materials is required to be in accordance with the manufacturer's recommendations. All materials must be stored and handled in a manner that maintains its quality. The following examples are typical materials storage issues that require monitoring and correction when they occur:

- Stockpiles should be constructed on an adequate floor to prevent contamination from the subgrade and should be provided with separation between adjacent stockpiles to prevent mixing. Additionally, individual stockpiles should be constructed in layers as described in SSHC 106.11 to prevent segregation.

  Per SSHC 703.05, inspectors should check the amount of minus ½" material being fed to the crusher for plant mix aggregate to verify that not more than 10% of the naturally occurring minus ½" material remains in the material used to produce aggregate stockpiles.

- Reinforcing bars shall be separated from corrosive elements such as earth or other material that will cause increased reactivity. Steel reinforcing bars should be placed on wooden blocks that are spaced so that at no time does reinforcing steel touch the ground. Prevent epoxy coating from being damaged or removed from the reinforcing bar. Coated bars should not be handled or moved more than necessary to prevent damage to the coatings.
- Paint and other chemical compounds should be stored in a secure location and in a temperature-controlled environment in accordance with the manufacture's written instructions.
- Geotextile rolls should remain inside their protective covers until the geotextile is placed in the work and the covers should be kept from being torn or damaged.

106.07 Test Result Dispute Resolution. Dispute resolution is valid only if there are discrepancies between Contractor and Department testing (see SSHC 106.07). The Engineer evaluates on a case-by-case basis whether the evidence shows the discrepancies are significant. Dispute resolution applies to the quality characteristics identified in Table 106.03-1 of the QASP as well as acceptance test strip testing. Dispute resolution is a three part process: 1) Initiation, 2) Process, and 3) Third-Party Resolution.

The Contractor must provide written notice with supporting documentation within three working days of receiving the disputed test results or the process is waived. However, be aware of constructive notice. Constructive notice means that if the Department knows that the Contractor thinks something is wrong with the test results (e.g. they are verbally complaining about the test results after receiving them), they are effectively notifying the Department that they are disputing the results.

It is difficult to enforce the three-day written notice time limit if the Department is aware there is a problem (e.g. the Contractor has verbally complained). To avoid constructive notice, ask the Contractor if they are disputing the results. If:

- Yes. Write an Avoid Verbal Order (AVO) to the Contractor reminding them that they have three days to provide written notice with supporting documentation or the process is waived.
- No. Write an AVO to the Contractor stating that it is understood that they are not disputing the test results.

Remember that the disputed differences must meet the specification criteria and the Contractor is responsible for providing the evidence. Causes for rejecting dispute resolution procedures may include:

- The Contractor simply does not like the test results without any supporting evidence.
- The Contractor's personnel or laboratories were not qualified.

If the discrepancies meet the specification criteria, the Contractor and Department will then work together to resolve them. The same techniques are used as when the verification evaluation test indicates failing (see discussion under verification testing). Split samples are not to be used at this stage of the process.

Finally, if the Contractor and Department still cannot resolve differences, third party resolution is used based on a mutually agreed upon work plan. The work plan could include the third party evaluating what the source of the differences is and/or testing the retained split samples (see discussion under the quality control and acceptance testing section).

Third party results are final, which means their results are used, and not the Department's or the Contractor's. See the specification for cost and time adjustment criteria.

106.09 Material Sources. All materials incorporated into a project, whether temporary or permanent, must come from an approved source. Refer to the Department's Materials Manual - Section 270 and Quality Assurance Manual - Section 270 for additional guidance regarding material sources.

For Department-owned or controlled sources, the Engineer should:

- Be familiar with the contract requirements and source plat to assure compliance with all stipulations and conditions.
- Be familiar with the materials source plat to determine the source boundaries and designated work areas.
- Control the source operation to prevent material waste or theft, unsightly or hazardous conditions, and unnecessary stripping or overburden handling on future projects.
- Be aware that plans or specifications may not allow a Contractor to request a change to use a Contractor-provided source.

Designated Sources. Designated materials sources are listed in the contract by number and location, and are Department owned or controlled. If a designated source is listed in the contract, and the Contractor requests to use a Contractor-provided source, the following requirements must be satisfied:

- Meet all requirements for Contractor-provided sources.
- Perform all special requirements upon which approval is contingent per the source approval letter.
- Considerations such as length of haul, differences in unit weight, asphalt content, additive requirements, etc., must be evaluated and adjusted as necessary to ensure there is no additional cost to the Department. Any resulting changes in plans or specifications will be by change order.

Contractor-Provided Sources. A Contractor-provided source is a material source that is not a designated source and includes Department-owned or controlled sources. The Contractor is responsible for acquisitions and must submit a written request and receive written approval before use of Contractor-provided sources in accordance with the contract requirements. Time is of the essence in material source approval, especially where new and untested sources are concerned. The Contractor is responsible for providing all required documentation to the Engineer to substantiate that the source meets all applicable contract requirements.

A. *Qualified Aggregate Material Suppliers List:* The Engineer, in concurrence with the District Materials Engineer, approves the use of sources included on the Qualified Aggregate Material Suppliers (QAMS) list for base, plant mix, or concrete aggregates for a specific project. Sources that are either State-owned or controlled are not on the QAMS list. The source approval letter prepared by the Engineer will include the following:

   1. A statement that approval is based on the current QAMS list for base, plant mix, or concrete aggregates.
   2. Pit number and location (e.g. "Ad-95c, Disraeli Construction, Boise").
   3. A list of the contract items which are approved to be obtained from the source.
   4. A statement that approval of the source shall result in no additional cost to the Department, and that acceptance of products is based on being in compliance with all specifications.
   5. A statement that the Contractor will be responsible and provide for site-specific hazard awareness testing.
   6. A statement that approval is contingent upon the Contractor signing and returning the letter indicating concurrence.
   7. Distribution, including District Materials.

See Figure 106.09.1 for an example.

B. *Sources Previously Used But Not On The Qualified Aggregate Material Suppliers List:* The District Engineer approves the use of previously used and newly submitted source documentation. Sources in this category may be Department-owned or controlled, Contractor-owned or controlled, or commercial. The Engineer reviews and forwards the Contractor's request to the District Materials Engineer. The District Materials Engineer verifies the documentation for contract requirements, and prepares the approval/disapproval letter for the District Engineer's signature. The letter will include item A.2 through A.6 above, plus the following :

   1. Reference to laboratory test numbers.
   2. Reference to reclamation plan.
   3. Reference to source plat and legal description.
   4. Reference to cultural resource clearance.
   5. Reference to conditional or special use permit.
   6. Reference to any additional clearances or permits required for wetlands or threatened or endangered species.
   7. If applicable, requirements for Material Source Release.

8. Special conditions or stipulations upon which the approval is contingent. For example, for State-owned or controlled sources, stipulations may include designation of area to be worked, source reclamation requirements specific to the project, operational restriction or specified stockpile sites.
9. Royalty rates, if applicable.
10. Distribution, including Resident Engineer and District Materials.

See Figure 106.09.2 for a Contractor source request example. See Figure 106.09.03 for a source approval example.

C. *Sources Not Previously Investigated:* The District Engineer approves the use of sources not previously investigated. Sources in this category may be either State-owned or controlled, Contractor-owned or controlled, or commercial. The Contractor shall meet contract requirements for a new source. Refer to the Department's Materials Manual - Section 270.13 for complete source approval requirements. The Engineer will forward the Contractor's request with associated documentation to the District Materials Engineer for analysis. A qualified independent laboratory is required by the contract to send all test reports directly to the Department. The test results are forwarded to the District Materials Engineer as well. The District Materials Engineer prepares the approval/disapproval letter for the District Engineer's signature. This letter will include items A.2 through A.6, and B.1 through B.10.

See Figure 106.09.2 for a Contractor source request example. See Figure 106.09.3 for a source approval example.

Royalty Payments. Royalty payments are referred to as a source cost recovery fee in the Department's Materials Manual Section 270.02.05, and are to be deducted from progress estimates to the Contractor when the source is either Department-owned or controlled. Royalty payments are required for Department-controlled sources. To prevent royalty payments to the source owner from being overlooked, the Engineer, at the time of preparing the Contractor's voucher, should prepare a second voucher to the source owner for payment of the royalty. In place of the claimant's signature on the second voucher, write: "per agreement with (property owner's name)."

Blend Sand. Blend sand, if approved for use in accordance with SSHC 703, must also come from an approved source. Naturally occurring blend sand is normally not approved when the specifications require rejecting natural fines.

In addition, for Plant Mix, blend sand approval is contingent on meeting the mix design requirements at no additional cost.

Release of Department Controlled Sources. A Materials Source Release (ITD-1121) or letter of release is required on Department-controlled sources other than those owned by the Department.

No release will be required on Bureau of Land Management sources secured by withdrawal. A release is not usually required for a Contractor-furnished source, unless it is Department-controlled. The requirement for a source release will be stated as a stipulation in the source approval letter.

It is the Contractor's responsibility to obtain source releases. A final estimate will not be processed until the source release is signed by the owner and submitted to the Engineer. It is good practice for the District Materials Engineer, Resident Engineer, and Contractor to inspect the source for compliance before issuing the final estimate.

[Current Date]

Mr. or Ms. ________________

RE: [Project Number]; [Key Number]

[Project Name]; Request for Approval to Use Contractor Furnished Source

Dear Mr. or Ms. _____________:

In reference to your request letter dated, _____________ to secure material from Source _ ______, owned by_________________ , located in the _____________, you are hereby authorized to use this source for the following contract item(s):

Item Number	Item	Quantity
_______________	___________________________________	_____________
_______________	___________________________________	_____________

The approval to use this source is based on: Source ___________is on the District ______ Qualified Aggregate Materials Supplier List. It is understood that this source approval is granted upon the condition that the material used is within specifications requirements of this contract.

The Contractor will assume full responsibility for any and all claims, liabilities, and/or damages by reason of the removal of material from Source ____________. The Contractor shall be responsible for and provide site-specific hazard awareness training.

Any claim for additional payment will not be allowed, and it is further understood should material from Source __________ prove inadequate in quantity or unsuitable in quality, all expenses incurred to produce materials contracted for shall be borne by the Contractor. Any claim for additional payment for such expenses will not be allowed.

If _______________ is in agreement with the above conditions, please sign below, and return the original to the Engineer. A copy is included for your records. Material from Source ___________ is not approved for use on the project until the Engineer receives this signed agreement.

Sincerely, Concurrence:

Engineer Contractor Date

Distribution: District Materials and Construction/Materials Section.

Figure 106.09.1: QAMS Source Approval Letter

[Current Date]

Mr. or Ms. ________________

Resident Engineer

P.O. Box 837

Lewiston, ID 83501

RE: [Project Number]; [Key Number]

[Project Name]; Request for Approval to Use Contractor Provided Source

Dear Mr. or Ms.______________:

In accordance to Subsection 106.09, I am requesting to utilize Source ____ on the above referenced project. Below is the required Source information:

ITD Source Number:	____________________	
Source Location	____________________	
Source Owner	____________________	
Approved Reclamation Plan (§107.17) Number:	____________________	
Cultural Resource (§107.18) Clearance Date:	____________________	
Environmental Impact or Permit Approval Date:	____________________	***If Applicable***
Source Plat Number and Date:	____________________	
Laboratory Test Number(s):	____________________	

I am requesting this source be approved for the production of the following items on this project:

Item Number	Item	Quantity
______________	________________________________	____________

A copy of the test report(s) documenting that this source will produce material that meet the quality and design standards specified in this contract will be forwarded to you by an independent laboratory.

Sincerely,

CONTRACTOR

Figure 106.09.2: Non-QAMS Source Approval Letter

[Current Date]

Mr. or Ms. ________________

RE: [Project Number]; [Key Number]

[Project Name]; Request for Approval to Use Contractor Provided Source

Dear Mr.or Ms. _____________:

In reference to your request letter dated, _______ to secure material from Source _______, owned by____ _____________ , located in the _____________, as a contractor provided source, has been approved for the following contract item(s):

Item Number	Item	Quantity
_______________	___________________________________	_____________
_______________	___________________________________	_____________

The approval to use this source is based on:

1. Laboratory test results ______________ indicating material meets quality specifications.
2. Reclamation plan number ___________ approval date _____________.
3. Attached source plat dated ___________.
4. Cultural resource clearance approval dated ___________.
5. Conditional or special use permit dated _______ ***(if applicable)***
6. The Contractor shall monitor all activities so there is no impact to wetlands or threatened or endangered species in accordance with permits___________. ***(if applicable)***
7. A Materials Source Release (ITD-1121) is required for the use of this source. ***(if applicable)***
8. The Contractor will assume full responsibility for any and all claims, liabilities, and/or damages by reason of the removal of material from _____. The Contractor shall be responsible for and provide site-specific hazard awareness training.
9. There will be no additional cost to the State beyond that otherwise allowed in the contract and acceptance of products is based on being in compliance with all specifications.
10. Material is available to the Contractor at a cost of $____ per cubic yard or $____________per ton, payable to the Idaho Transportation Department. All material removed from __________ shall be weighed in compliance with Section 109.01 of the ITD Standard Specifications. Concrete aggregate

weights will be averaged for each cubic yard after production begins and royalties will be paid accordingly. ***(if applicable)***

11. The attached source plat contains information regarding location, reclamation plan, clearances, and items 1-10 "OPERATION OF SOURCE" shall apply. A final inspection by District __ Materials of source _____ is required. The Contractor, at no cost to the Department, shall complete reclamation work for areas disturbed and depleted on this project. ***(Other stipulations and conditions if applicable)***

If _______________ is in agreement with the above conditions, please sign below and return the original to the Engineer. A copy is included for your records. Material from Source AD-111s is not approved for use on the project until the Engineer receives this signed agreement.

Sincerely, Concurrence:

District Engineer Contractor Date

Distribution: Resident Engineer; District Materials and Construction/Materials Section

Figure 106.09.3: New Source Approval Letter

SECTION 107 – LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

107.01 Laws to be Observed. The Contractor must observe and comply with all applicable laws, ordinances, regulations, orders, and decrees.

Construction Site Bulletin boards. Post information regarding Federal and State posters, emergency phone numbers, Davis Bacon Wages, Clean Water Act compliance, and Civil Rights/EEO laws and regulations required by the contract at the project site. The postings must be in a conspicuous place and be viewable even during non-working hours. Posters should be placed in a weatherproof case. Replace missing, vandalized, or damaged posters immediately.

A list of bulletin board requirements, including links where current required posters can be viewed and downloaded, can also be obtained on the ITD external website under Business->Click for More Topics->Construction Resources" OR "Inside ITD->Click for More Topics->Construction/Materials.") http://apps.itd.idaho.gov/apps/manuals/ca/Project_Poster_Checklist_Links.pdf

Construction Safety. Occupational Safety and Health Act (OSHA) and Mine Safety and Health Act (MSHA) are federal laws regulating safety practices in most industries and work activities throughout the United States. Because OSHA and MSHA are federal laws, they are made part of ITD Standard Specifications for Highway Construction (SSHC) 107.01.

Contractors must comply with OSHA/MSHA regulations applicable to their contracts and advise subcontractors of all necessary safety requirements. Each residency should have copies of the informational guides on OSHA and MSHA for ready reference.

After contract award and before the preconstruction conference, the Engineer and project inspectors are encouraged to study the plans, specifications, and other contract documents to identify specific safety aspects that should be discussed at the preconstruction conference.

Safety posters that should be placed on the bulletin board at the project site are:

- Job Safety and Health Protection (see the Department's website).
- Emergency Phone Numbers (see the Department's website).

Any questions project personnel have concerning OSHA/MSHA compliance should first be directed to the District EEO/Safety/Training Coordinator, whose duty it is to assist project personnel in this area and provide on-the-job training.

Additional assistance may be requested from the Department.

Preconstruction Conference and Preoperational Meetings. Before starting work at the project site, encourage the Contractor to confer with district traffic and maintenance to handle safety issues. The safety aspect can be a part of the general preconstruction conference. However, plan sufficient time to cover specific aspects of safety integration, including proposals for handling specific hazards.

A preoperational meeting may allow a more thorough discussion of safety, since this meeting can focus more on the "nuts and bolts" aspects of a particular operation. The suggested topics in the Safety Requirements Checklist are common safety concerns that should be discussed during preconstruction and preoperational meetings. These topics are intended only as reminders, with reference to important safety regulations, but are by no means complete. For more detail, please refer to the appropriate Federal Register references provided in the Safety Requirements Checklist

SAFETY REQUIREMENTS CHECKLIST

Safety Requirements – EARTHWORK AND GRADING OPERATIONS	**Code of Federal Regulations**
SAFETY PLAN – OSHA Posters, Emergency Numbers	29 CFR 1926.20-24
PERSONAL PROTECTION - Hard Hats, Hearing, Eyes and Face	29 CFR 1926.100-.107
FUEL STORAGE TANKS - Diked, Placarded, Fire Extinguishers, No Smoking Signs	29 CFR 1926.150-.155
TRAFFIC CONTROL PLAN – Certified Flagpersons and All Traffic Control Devices per MUTCD and NCHRP-350	29 CFR 1926.200-.203
HOUSEKEEPING – Storage and Disposal of Scrap and Debris	29 CFR 1926.25
OXYGEN AND ACETYLENE TANKS - Upright and Properly Secured and Stored	29 CFR 1926.350
CRANE – Inspection Records, Proximity to Power Lines, Capacity Chart, Boom Angle	29 CFR 1926.550
EQUIPMENT UNATTENDED - Parked Overnight Away From Travelway, Attached Equipment Lowered	29 CFR 1926.600
EQUIPMENT SAFETY DEVICES – Seat belts, Rollover Protection, Back-Up Alarms, Bed Stops on All Dump Trucks	29 CFR 1926.601-.602
EXCAVATION – Repose Angle, Shoring Banks Over 5' High	29 CFR 1926.650-.653
TRUCKS- Haul Legal Weight and Avoid Spillage	Idaho Code 49-1001 and-49-613, respectively
Safety Requirements – CRUSHER AND AGGREGATE TREATMENT PLANTS	**Code of Federal Regulations**
SAFETY PLAN – OSHA Posters, Emergency Numbers, MSHA Placards	29 CFR 1926.20-24
PERSONAL PROTECTION - Hard Hats, Hearing, Eyes and Face	29 CFR 1926.100-.107
FUEL STORAGE TANKS - Diked, Placarded, Fire Extinguishers, No Smoking Signs	29 CFR 1926.150-.155
TRAFFIC CONTROL PLAN – Certified Flaggers and All Traffic Control Devices per MUTCD and NCHRP-350	29 CFR 1926.200-.203
PLANT – Start-Up Alarm Signal	29 CFR 1926.555
HOUSEKEEPING – Storage and Disposal of Scrap and Debris	29 CFR 1926.25

OXYGEN AND ACETYLENE TANKS - Upright and Properly Secured and Stored	29 CFR 1926.350
LADDERS - Adequate and Properly Secured	29 CFR 1926.450-.452
CONVEYORS - Belt and Drive Guards in Place	29 CFR 1926.555
EXCAVATION – Safe Repose Angle in Pit	29 CFR 1926.651
TRUCKS- Haul Legal Weight and Avoid Spillage	Idaho Code
ELECTRICAL SERVICE - Ground Fault Circuit Interrupter (GFCI)	29 CFR 1926.404
POWER CORDS AND CONNECTIONS - Proper and Well Located	29 CFR 1926.400-.432
TRUCKS AND LOADERS – Back-Up Alarms, Bed Stops and Other Equipment Safety Devices	29 CFR 1926.600-.606
Review Drilling and Blasting Safety if Quarry Operations are Involved	
Safety Requirements – DRILLING AND BLASTING	**Code of Federal Regulations**
SAFETY PLAN – OSHA Posters, Emergency Numbers, MSHA Placards	29 CFR 1926.20-24
PERSONAL PROTECTION - Hard Hats, Hearing, Eyes and Face	29 CFR 1926.100-.107
FUEL STORAGE TANKS - Diked, Placarded, Fire Extinguishers, No Smoking Signs	29 CFR 1926.150-.155
AIR LINE CONNECTIONS - Securely Fastened and Equipped With Safety Chains	29 CFR 1926.302
WARNING SIGNS - Posted Properly Marking Work Area	29 CFR 1926.900
EXPLOSIVE STORAGE – Magazine Requirements	29 CFR 1926.904
CHARGE INITIATION – Safety Fuse, Detonating Cord, Misfires	29 CFR 1926.905-.911
BLASTING SIGNALS – Signal Sequence, Signs, Flaggers	29 CFR 1926.909
BLASTER QUALIFICATION – Training, Experience, Knowledge	29 CFR 1926.901
EXCAVATION - Angle of Repose	29 CFR 1926.651
TRANSPORTING EXPLOSIVES – Vehicle Placards	29 CFR 1926.902

SECURITY - Authorized Personnel, Inventories, Blast Mats, Warning Signals	29 CFR 1926.900
MSHA TRAINING - Quarry and Pit Operations—Requires Contractor to Conduct and Document Hazards Recognition Training	
Safety Requirements – CHIP SEAL COATING AND PAVING	**Code of Federal Regulations**
SAFETY PLAN – OSHA Posters, Emergency Numbers	29 CFR 1926.20-24
HOUSEKEEPING – Storage and Disposal of Scrap and Debris	29 CFR 1926.25
PERSONAL PROTECTION - Hard Hats, Hearing, Eyes, Face, Respirators	29 CFR 1926.100-.107
FUEL STORAGE TANKS - Fire Extinguishers, 20 ABC on Distributors, No Smoking Signs	29 CFR 1926.150-.155
TRAFFIC CONTROL PLAN – Certified Flagpersons and All Traffic Control Devices per MUTCD and NCHRP-350	29 CFR 1926.200-.203
TRUCKS AND LOADERS – Back-Up Alarms, Truck Bed Stops	29 CFR 1926.600-.601
Safety Requirements – STRUCTURES (BRIDGES, OVERPASSES, ETC.)	**Code of Federal Regulations**
SAFETY PLAN – OSHA Posters, Emergency Numbers	29 CFR 1926.20-24
HOUSEKEEPING – Storage and Disposal of Scrap and Debris	29 CFR 1926.25
PERSONAL PROTECTION - Hard Hats, Hearing, Eyes and Face Protection, Safety Nets, Lifelines	29 CFR 1926.100-.107
FUEL STORAGE TANKS – Diked, Placarded, Fire Extinguishers, No Smoking Signs	29 CFR 1926.150-.155
TRAFFIC CONTROL PLAN – Certified Flagpersons and All Traffic Control Devices per MUTCD and NCHRP-350	29 CFR 1926.200-.203
MATERIALS HANDLING AND STORAGE – Stable Platforms, Stacking Heights	29 CFR 1926.250
POWER TOOL CONDITION – Guards, Grounding	29 CFR 1926.300-.305
OXYGEN AND ACETYLENE TANKS – Upright, Properly Secured and Stored	29 CFR 1926.350
GFCI – On Electrical Service to Tools	20 CFR 1926.404
POWER CORDS AND CONNECTIONS – Proper and Well Located	29 CFR 1926.404

LADDERS AND SCAFFOLDS – Length, Side Rail Support, Toe Boards, Safe Access	29 CFR 1926.450-452
RAILING ON STAIRWAY OVER 4 RISERS – Smooth Top Rail, Toe Boards	29 CFR 1926.500
CRANE – Capacity Chart, Inspection Record Available, Proximity to Power Lines, Boom Angle Indicator	29 CFR 1926.550
EQUIPMENT – Unattended, Reverse Alarms, Parking Overnight	29 CFR 1926.600-606
EXCAVATION – Walkways Left Clear, Repose Angle, Shoring Requirements, Banks Over 5' (1.5 m) High	29 CFR 1926.650-653
FORMS, SHORING, SAFETY BELTS – Working Over Protruding Steel, Stripped Forms and Shoring Removed from Work Area	29 CFR 1926.700-703

Monitoring Construction Operations for Safety

Staffing and Preparation

The Engineer, with the aid of other project personnel, should continually monitor phases of work to note and take action on observed and reported safety provision violations. To the extent practicable, copies of current safety standards and regulations should be readily available at the project site.

On-Site Monitoring

The degree of hazard on a project site depends upon the nature of the work environment and the way in which the work is performed. To minimize the likelihood of accidents, practice constant vigilance. Project personnel, in connection with their everyday duties, must give constant attention to safety.

Safety Inspections. Contractor employee safety and project site safety are the direct responsibility of the Contractor and its subcontractors. Safety violations involving the Contractor's and subcontractor's workers, suppliers, and delivery personnel, when on Department projects or associated production facilities, must be handled in accordance with sections 107.01 and 107.16 of the ITD Standard Specifications and Form FHWA-1273, part VIII for federal-aid construction contracts.

FHWA or Department representatives may make safety inspections of the Contractor's operation from time to time. In addition, compliance officers of the federal and state safety enforcement agencies may make inspections. FHWA and Department personnel will cooperate fully with other agency officials in conducting construction project inspections.

General Safety and Health Provisions. The Contractor must initiate and maintain an accident prevention program. The program must provide for frequent and regular inspections of the project sites, materials, and equipment that are made by competent persons designated by the Contractor.

The use of any machinery, tools, materials, or equipment that cannot meet the safety standards applicable to these items is prohibited. Unsafe items must be identified as unsafe by tagging, locking the controls, or removing them from the place of operations.

Only those employees that are qualified, experienced, or trained under proper supervision are permitted to operate equipment and machinery.

Violations. Safety regulation violations may be minor or major in nature. Exercise judgment in interpreting the safety standards and determining the degree of hazard. Most deficiencies are minor and notifying the Contractor orally may be all that is necessary to remedy the violation. Oral or written notices to the Contractor should specify the safety regulation that is being violated. **Project personnel should not instruct a Contractor on how to correct a deficiency.**

Minor violations can be orally reported to the person in charge, the Engineer, the project inspector, or all three. Violations that are adequately and quickly resolved, and do not involve injuries or near misses, do not require written reports. Write a report for frequent violations or inadequate corrective action.

Report unsafe conditions or acts that jeopardize employee or public safety to the construction supervisor and/or project inspector on the ITD-2713 Safety Inspection Report. Give copies to the Contractor and distribute to others as appropriate. Photographs, including photos of the violation, should be taken whenever practical. A copy of any written notice of violation should be sent to the District EEO/Safety/Training Coordinator.

In the event that a condition of imminent danger exists, the Department representative will:

- Issue an immediate oral directive to cease work and correct the deficiency.
- If the deficiency is not fully and promptly corrected, the Engineer will issue a written order stopping all or part of the work as necessary until the hazard is eliminated (per SSHC 108.05). If all or part of the work is suspended, an ITD-2242 Status of Work form must be completed stating the reason for suspension in the appropriate space.

If the deficiency is not corrected immediately or repeated violations occur, take a photograph of the violation, provide written notice to the Contractor, and report the violation to your immediate supervisor, the District EEO/Safety/Training Coordinator, and the appropriate regulatory agency. The OSHA has purview over most industrial work and the MSHA has purview on mining (e.g., borrow source) operations.

Safety violations that require a written notice and involve construction contractor workers, suppliers, and delivery personnel when on Department projects or associated production facilities will be kept on file with other project records. The District EEO/Safety/Training Coordinator will also maintain a file of all safety violations and their corrective action(s), along with all associated documentation that can be inspected as part of any project or safety review.

The Engineer is responsible for ensuring that corrective action on reported violations occurs in a timely and appropriate manner.

Variations from Safety and Health Standards. In case of substantial engineering or other practical difficulties, the Contractor or subcontractor may request a variance from any of the published safety and health standards. Such requests must be fully justified in writing and submitted to the U.S. Department of Labor. The procedure for OSHA is set forth in Title 29, Code of Federal Regulations, Part 1926. The procedure for MSHA is set forth in Title 30, Code of Federal Regulations, Part 44. If the variance will provide safety measures that are as safe as those provided in the published standard, approval may be granted.

Accidents Involving Department Employees. Additional information on Department employee safety issues and accidents is contained in the Employee Safety/Risk Management Manual. Coordinate all accident reporting with the District EEO/Safety/Training Coordinator.

107.02 - Permits and Licenses.

Tax Assessments by Counties – Equipment. Although each Contractor who performs work for the State must pay taxes, license fees, and assessments promptly when due, questions often arise concerning assessments on equipment. Tax assessments are not the only tax responsibility, but one area of considerable interest to the Contractor. The following is for information only:

The Department and its personnel are not required to initiate any action on equipment assessments. The Contractor should be referred to each county assessor where work is being performed. Idaho Code, 63-1405 provides the basis for the county assessor's actions. The Contracting Services Section notifies the counties that a Contractor will be working in their jurisdiction at the time the contract is awarded.

The Contractor is obligated to pay taxes on the assessed evaluation of the equipment domiciled in each county of the State, whether it is working or not. The Contractor is required to contact the county assessor of each county where the equipment is domiciled and address the tax liability. The Department will verify tax notification by receipt of a completed WH-5 (Public Works Contract Report) at the preconstruction conference.

Each assessor uses forms that the Contractor is asked to complete. The forms call for a listing of the Contractor's equipment by serial number, its cost and age, and time in county or counties of Idaho. Standard tables are used by the county assessor to arrive at equitable assessment values and costs.

The Department's position is to advise the Contractor of the tax obligation and to indicate the liability for taxes, license fees, and assessments. The Department is obligated to withhold taxes due from Contractor's payment while working on projects.

Upon issuance of the District Engineer's acceptance letter, the District notifies county and state taxing units and advises the taxing unit that they have 15 days to inform Financial Services of any tax obligations that are due. Final payment cannot be made until authorized by the taxing units if there are any tax obligations. No further action is required by the District.

See examples in Figures 107.02.1 and 107.02.2. **Note that the County Assessor notification distribution (Figure 107.02.2) has changed per the most recent reorganization. Copies should no longer be distributed to the DMC Construction/Materials Section, and the copies sent to the Financial Services Section should be sent to: (1) FS/General Ledge and (2) FS/Projects Accounting.**

For The People of Idaho

STATE TAX COMMISSION

P. O. Box 36 • Boise, ID • 83722

REQUEST FOR TAX RELEASE

Date: December 22, 2015

Public Works Agency Requesting Release: Idaho Transportation Department
Address: P O Box 7129
Boise, ID 83707
Contact Name: Ms. Jennifer Miller, Financial Manager
Telephone Number: (208) 334-8047

Prime Contractor Name & Address:
Interstate Concrete & Asphalt Co
845 W. Kathleen
Coeur D'Alene, ID 83221

Contractor's Federal Employer Identification Number: 820326393

Project Name: 10th AVE JCT SH-54 TO VAN BUREN ST, SPIRIRT LAKE
Project Number: A011(225)
Project is Complete: 8 September 2014
Project is Substantially Complete: 4 September 2013
Project Start Date: 15 April 2013
Project Complete Date: 23 June 2015

Final Contract Amount (including change orders): $1,565,758.86

Did any public works or other government agency supply materials, which were installed by this contractor or his subs? Yes ________
No XXX

If yes, list these materials and their dollar values:
____
____

To request a Tax Release, the Public Works Agency or Contractor should send this form to:
Attn: Contract Desk; Sales Tax Audit;
Idaho State Tax Commission;
PO Box 36; Boise, ID 83722
FAX: 208-332-6619

Figure 107.02.1 Request For Tax Release

March 13, 2014

Idaho County Assessor
320 W Main
Grangeville, ID 83530

RE: Project Number: A008(810)
Name: SH-162, Four Corners to MP 13.1
Contract No.: 7613
Lead Key No.: 08810

This is to notify you that work on Contract No. 7613; Knife River, 5450 W. Gowen Road Boise, Idaho 83709 was accepted by this department on March 17, 2013.

Work commenced on this project on June 04, 2012 and was completed on November 9, 2012.

If there are any tax obligations due, State or County, please notify this department within fifteen (15) days from the date of this letter. All notifications should be addressed to:

Ms. Jennifer Miller
Financial Manager
Idaho Transportation Department
P.O. Box 7129
Boise, Idaho 83707

Sincerely,

ORIGINAL SIGNED BY:

DAVID B. KUISTI, P.E.
District Engineer

WF:cty/Z:\ADMIN\OM\WRDFILES\ADM\8810_107.02 Tax Letter.docx

bcc: State Tax Commission – contract desk w/enc.
FS/ Denae Walters w/enc.
FS/ Chelsea Avery w/enc.
DMC w/enc.
DRI2

Figure 107.02.2 Project Acceptance Notification

107.06 Traffic Control Devices. The Engineer, on projects where public traffic is involved, will designate one qualified individual, who will normally be on the project every day, as the Traffic Control Representative (TCR) to be responsible for traffic control and traffic control devices. The Contractor's certified project site traffic control supervisor is expected to work with the TCR to ensure traffic control devices are reviewed on a daily basis. This review will ensure that they meet the requirements of the Manual on Uniform Traffic Control Devices (MUTCD) as adopted by the State, and that changes in operations are reflected by appropriate changes in signing and other traffic control devices.

The TCR should be trained and have the adopted MUTCD available for reference.

107.09 Forest Protection. Department personnel must be aware of and meet commitments to the Forest Service on any projects that fall within National Forest boundaries.

The Chief Engineer of the Department signed a Memorandum of Understanding with the Forest Service in December of 1982 and amended it in May 1985. Part of this memorandum concerned construction activities within National Forest land as follows:

Construction. The State will:

- Invite the Forest Supervisor, or a representative, to attend the preconstruction conference with the successful bidder.
- Control construction under State contracts to assure work is in accordance with approved plans and agreements.
- Have the District Engineer contact the Forest Supervisor for agreement before starting any work under changed conditions that develop, before or during construction, which alter the land-use aspect of approved plans.
- Request the Forest Supervisor, or a representative, to participate in final project inspections.

The Forest Service will:

- Consult only with the District Engineer, or an on-the-job Department representative, on matters pertaining to project construction.
- Issue permits directly to the Contractor for burning, campsite locations, and water sources after agreement with the designated State representative. Copies of all permits issued will be furnished to the State.
- Participate in final project inspections and make recommendations to the State on matters related to Forest Service responsibilities for land and resource management.

107.10 Responsibility for Injury Damage

Public Liability and Property Damage

No work will proceed until the contract is signed, the required Public Liability and Property Damage insurance is in force, and the Department approves the certificate or other proof of insurance. (See Figure 107.10.1 for insurance procedures.)

Supplemental insurance (e.g., railroad insurance, XCU insurance) must be in force, with acceptable proof on file, before starting related work and remain in effect through the duration of the applicable portions of the project. The Engineer must verify that the Contractor has submitted a copy of the insurance certificate before allowing the project to start.

Thirty (30) days before policy expiration, the District should notify the Contractor to obtain an extension. If the Contractor does not submit an extension, the work must be suspended upon insurance expiration.

In the event a motorist or property owner claims damage alleged to be caused by the Contractor or the Contractor's action, Department personnel should, on request, advise the damaged party how to file a claim against the Contractor's insurance. The claimant should be given the name and address of the Contractor and the insurer. The claimant may also be advised that the alleged damage suffered should be fully described, as well as all pertinent facts known to the claimant that had a bearing on the damage (e.g., location, time, roadway conditions, equipment involved, personnel names, traffic control). Generally, the more complete the information provided by the claimant, the better chance the claimant has for recovery if the Contractor is, in fact, liable. (See Documenting Motor Vehicle Accident Information below for motor vehicle accidents. See SSHC 107.10 concerning claims against the State.)

Railroad Protective Liability Insurance. The Contractor is required to have a railroad protective liability policy when performing work on highway projects involving a railroad. Each railroad requirement is different and is spelled out in the contract special provisions. (See Figure 107.10.1)

The Contractor must furnish and keep current, for the duration of that project portion on or about railroad property, a railroad policy or policies that covers damages arising out of injury to or destruction of railroad property. The railroad company must approve these policies before the Contractor starts work on that project portion. Modifications may be made while the work is progressing.

A reliable insurer authorized to do business in the state of Idaho will issue each policy.

- Before work begins on or about railroad property, the Contractor will obtain and furnish an acceptable railroad protective liability policy to the Contracting Services (CS) Section. CS will forward the information to the railroad.
- CS will send three certified and railroad-approved copies to the District to be placed in the project file as part of the contract documents.
- A policy extension is handled the same as a new policy.

Handling Insurance Requirements on Projects. The following figure is intended to provide guidelines for processing and monitoring contract-required insurance policies.

Figure 107.10.1

Contracting Services (CS) reviews any Public Liability (PL) and Property Damage (PD) policies received before award, and verifies that the insurance has the required coverages and that the Department is named as a policy holder. Any PL and PD policies/certificates that are received after award will be reviewed and approved by the districts.

CS will receive and forward all Railroad (RR) policies (and all PL and PD policies) to the RR Company for approval. After receiving RR company approval, CS will then notify the districts and scan the RR insurance into Projectwise.

The districts are ultimately responsible to verify that all required insurance has been received by the Department before authorizing the work to begin.

R.R. Companies Involved

CS sends the original insurance policy/certificate of the Contractor's PL & PD and the original and required copies of the R.R.'s Protective Policy to the R.R. company. CS sends three (3) copies of the documents to the District.

R.R. Companies NOT Involved

CS sends the original approved insurance policy/certificate and two (2) copies to the District.

The Districts ensures that all policies are checked by CS and are in effect before allowing work to begin and that the insurance remains in effect during the life of the contract.

Upon receipt of approved copies of policies/certificates, the District monitors insurance coverage, obtains renewals, and distributes copies as needed. The Engineer, Resident Office Manager (ROM), and the District Records Inspector (DRI) each receive a copy.

It is recommended that each Residency maintain a suspense file on expiration dates to aid the Engineer in keeping policies/ certificates in effect.

The Engineer:

1. Ensures that the insurance is in effect before work.
2. Contacts Contractor of expiring policies/certificates for renewal.
3. Distributes copies of renewals to DOM and DRI.

DRI monitors District insurance procedures on a random sampling basis.

CS contacts the District whenever receiving renewals to ensure that the District has a copy.

Contracting Services - CS
Public Liability - PL
Property Damage - PD
District Office Manager - DOM
Railroad - R.R.
District Records Inspector - DRI

Obtaining Motor Vehicle Accident Information. Before beginning any work on a roadway project, the Engineer should write a letter to the Idaho State Police and local law enforcement agencies requesting timely information on any vehicular accidents that have occurred or may occur in the project area. This information is necessary for the following reasons:

1) Accident information may reveal a problem associated with safety of the roadway or current traffic control that would otherwise go undetected.

2) To assist the FHWA Idaho Division in complying with FHWA Order 5181.1 by providing immediate information on any vehicular accident on construction projects that result in incapacitating injuries or fatalities. The Engineer should provide this accident information to the FHWA as soon as possible following any accident that results in death or injuries severe enough that the victims need assistance to leave the accident scene (Class A injuries). The required accident information for the telephone contact are the number of deaths, number of injuries (Class A), number of vehicles involved, date, time of day, and location.

Police-investigated accidents and minor accidents that are not police investigated should be recorded whenever available as Motor Vehicle Accident Information.

Documenting Motor Vehicle Accident Information. Occasionally, state employees witness or come upon motor vehicle accidents that occur on the state highway system or vehicle accidents sometimes occur within construction or maintenance project limits involving persons other than employees of the state or its contracting agencies.

> Motor Vehicle Accident Documentation
>
> Whenever Department employees witness or come upon a motor vehicle accident, a record will be made in their diary of the date, time, highway route, and milepost. The weather condition, general condition of the travel way, and a short narrative description of how the accident happened should be included. Any assistance rendered by the employee to the accident victim (e.g., first aid, calling of police and/or ambulance) should be recorded. Brief sketches may be desirable to help explain the accident and can be made and attached to the diary entry page. A copy of the information will be sent to the District EEO/Safety/Training Coordinator.

Additionally,

- When an accident occurs within construction or maintenance project limits and property damage is minor with no injuries, the accident should be reported on an ITD-1746 Tort Claim Data Form.

- If the accident is of a **serious** nature (considerable property damage, injury, or fatality), then the report shall be made on an ITD-0645 Traffic Accident Field Report form. Sketches, diagrams, and photographs should show the general layout of the accident scene, location, distance of traffic control devices, and any other data relevant to the accident.

- Accidents that occur on a project, but are **not witnessed,** also require that known facts and data be recorded as a diary entry.

The supervisor in charge of the project or highway should review the reports to ensure that the accident is properly documented and made a permanent part of the project records or diary. The appropriate Contractor's personnel will be notified. When an accident occurs on a state-funded project, notify the District Engineer and District EEO/Safety/Training Coordinator.

The District EEO/Safety/Training Coordinator will send copies of the reports, photos, and diagrams of accidents to the Department's Employee Safety/Risk Manager for information and coordination with the appropriate headquarters section.

107.17 - Environmental and Cultural Resource Protection.

Air pollution control, stream and wetland protection, and stormwater runoff management must be performed in accordance with SSHC 107.17.

Guidance on SSHC 107.17 and 107.18 is located in the Environmental Section Stormwater website.

Project Files. The Engineer must maintain a project file labeled Environmental Monitoring. This file should include copies of the following:

- Approved Stormwater Pollution Prevention Plan (SWPPP) with amendments or Erosion and Sediment Control Plan (ESCP) with amendments, including operator and ground-disturbing subcontractor signatures
- ITD-2802 Environmental Monitoring Reports
- 3rd-Party Inspection Reports when applicable
- Correspondence with Resource Agencies on project issues
- Permit modifications
- Other relevant environmental information that is not already published in the contract provisions.

EPA Construction General Permit (CGP). Obtain a CGP for compliance with the federal Clean Water Act (CWA) on projects that meet the minimum National Pollutant Discharge Elimination System (NPDES) criteria. Since all projects are required to comply with the CWA, the Department also requires an Erosion and Sediment Control Plan (ESCP) on projects that are not covered under the NPDES. The NPDES general construction permit applies when a project meets the following two criteria:

- The area of ground disturbance exceeds one acre.
- There is a point discharge to waters of the United States.

A copy of the CGP may be downloaded from http://water.epa.gov/polwaste/npdes/stormwater/EPA-Construction-General-Permit.cfm. The State of Idaho's permit number is IDR100000. When working on Tribal lands in Idaho, the permit number is IDR100001. This permit describes provisions for complying with the NPDES stormwater regulations.

The NPDES requires preparation of a SWPPP. The Department initially develops a draft SWPPP during project development, which is included in the project proposal for bidding purposes. SWPPPs are site-specific plans showing such items as drainage patterns and areas, ground-disturbance areas, and erosion and sediment control measures. Once the contract is awarded, the SWPPP is finalized by the Contractor to reflect the Contractor's planned means, methods, operations, and schedule. **The Department, the Contractor, and all ground-disturbing subcontractors must agree to and sign the SWPPP. The Local Sponsor must also sign the SWPPP on local federal-aid projects.**

The SWPPP must cover all of the areas described in the CGP, including project-specific staging areas, haul roads, materials sources, waste sites, concrete batch plants, and asphalt hot plants. Only commercial sites, as defined by the CGP, are exempt from the project NPDES permit. Erosion and sediment control measures are required as needed on all areas covered under the CGP and SWPPP.

The Contractor and the Department (and any Local Sponsor involved) must complete and submit separate Notices of Intent (NOI) to the EPA to obtain coverage under the CGP. NOIs can only be submitted after the completed SWPPP is approved by the Department**. No ground-disturbing activities are allowed until the NOIs are posted on the EPA web site and 14 calendar days have elapsed after the latest posting.** The Department, the Contractor, and any Local Sponsor are considered co-operators under the CGP.

All erosion and sediment control measures and stabilization identified in the SWPPP must be installed and maintained in effective operating condition throughout the project duration in accordance with the Best Management Practices (BMP) Manual. Additional requirements for stormwater inspection are outlined below.

The Contractor is required to post a notice at a safe, publically accessible location visible from the public road that is nearest to the active part of the construction site. The notice must use a font that is large enough to be easily viewed from a public right-of-way. The notice must include the following information:

- NPDES Permit tracking number
- The location where the SWPPP can be viewed
- Name and telephone number of the Contractor's local contact person.
- If stormwater pollution is observed in the discharge from this site into any receiving waterbody, contact the EPA at: https:/www.epa.gov/enforcement/report-environmental-violations

A current copy of the SWPPP is required to be kept onsite, or at an easily accessible offsite location, so that it can be made available upon request by the EPA and other federal, state, local, or tribal officials, or the operator of a stormwater system receiving discharges from the project site.

Environmental Inspection Procedures. The following procedures are required on Department-administered projects with a NPDES Permit, 404 CWA Permit, 401 Certification, or IDWR Stream Alteration Permit and encouraged on all other projects:

1) A certified ITD environmental (Stormwater) inspector must inspect projects and document inspections on ITD-2802 Stormwater Compliance Inspection.

2) Projects with NPDES requirements must be inspected in accordance with the approved SWPPP.

    a) The environmental inspector must inspect stormwater pollution controls on the project site at least once every seven calendar days during the construction period, within 24 hours of the end of a storm event of 0.5 inches or greater, and at least once every 24 hours during an extended rain event.

    b) The entire project must be inspected, including all erosion and sediment control measures, not just those in the active construction area.

3) Within 24 hours of each stormwater inspection, inform the Contractor of any deficiencies found during the inspection.

4) The Contractor must sign the ITD-2802 acknowledging the alleged deficiencies. In the event the Contractor refuses to sign, the inspector will note that refusal on the form.

5) The Contractor must correct all deficiencies identified during stormwater inspections as soon as possible, and no later than five days after the inspection or before the next rain event, whichever is sooner.

6) Stormwater inspection reports must clearly indicate all areas of the project site that were inspected, using both descriptions and station numbers (e.g., "construction entrance at Station 0+00; potential discharge points at Stations, 1+09, and 2+10; ROW and BMPs from Station 0+00 to 3+20").

Stormwater inspection reports must clearly indicate the station number associated with each observation (e.g., “silt fences at Station 1+09 holding up well; Sediment pond at Station 1+57 needs to be cleaned out”).

CGP Closeout. After the Contractor has completed **all** ground-disturbing work, including installation of permanent erosion and sediment control measures (e.g., seeding, planting, rock armoring) and any punch list items, the Engineer will authorize the Contractor to submit a Notice of Termination (NOT) to the EPA. **The NOT concludes the Contractor’s permit obligations, therefore it must not be filed until all ground-disturbing work has been completed and accepted**. This is normally accomplished with Final Acceptance of the project.

In most cases, the Contractor’s NOT should indicate that another operator has assumed control of the project site and that final stabilization has not been achieved. **The Department (and Local Public Agency (LPA)s for locally sponsored projects) cannot file their NOT until the project meets the NPDES definition of final stabilization** (i.e., temporary measures are removed, permanent measures are in place, and any vegetated surfaces have achieved a density of at least 70% of native background vegetative cover).

107.22 Public Information Meetings. A number of Department projects, particularly those in urban areas, have a contractual requirement for the Contractor to arrange for periodic public information meetings. The public information meeting is held to keep those impacted by the project informed of upcoming activities that may affect their access and to receive input from the public that could lessen the effect of construction activities. The public information meetings are a form of partnering with the public and have been very effective.

The Public Involvement Coordinator (PIC) has been charged with coordination of all meetings with the public involving the Department. The PIC does not need to actually organize, conduct, or even participate in all meetings, but should be informed of the meetings and assist when requested. The PIC is knowledgeable in effective meeting methods, preparation of news releases,, and can address lead-time and other requirements that are necessary for conducting appropriate public meetings.

The Engineer should notify the PIC of any contracts where public information meetings are required. The PIC should be invited to preconstruction conferences to discuss and assist in planning the meetings or a separate meeting can be arranged involving the PIC, Engineer, and the Contractor. The PIC, Engineer, and Contractor should strive for a unified approach to properly respond to Department management or public inquiries concerning the meetings.

Additional guidelines and references for public hearings/meetings are outlined in Administrative Policies A-20-03, Public Hearings, and A-20-04 Public Hearing Officers. The Office of Communication has additional information about the conduct of public involvement initiatives.

107.23 Filing Tort Claims Against the State Of Idaho. Throughout the term of an active contract, the Contractor's public liability and property damage insurance will protect the State. However, situations may occur in connection with projects during work suspensions, following partial or final acceptance, or where no action or negligence on the part of the Contractor is involved, which may make the State liable for damage incurred by the public. For example, the State may be liable for a seal coat project following the Contractor's period of maintenance responsibility when a loose chip problem is improperly signed and results in broken windshields.

Any problem that may affect the public should be reported immediately to the District Engineer and the Employee Safety/Risk Management Section. Staff must be able to advise the public on filing of tort claims against the State.

The proper procedure for filing a tort claim against the State of Idaho is set forth by Idaho Code 6-905 of the Idaho Tort Claims Act and states that "All claims against the State … shall be presented to and filed with the Secretary of State within 180 days from the date the claim arose or reasonably should have been discovered…." Thus, under the Idaho Tort Claims Act, the only office eligible to receive a claim is the Office of the Secretary of State. However, a claimant does have several other options to make a claim against the State. The following are recommended approaches in handling three (3) of the more common situations:

- A citizen approaches an agency or employee of the State requesting information on filing a claim against the State of Idaho. The recommended procedure is to advise the claimant of the requirement to file a claim with the Secretary of State giving the details of the claim (as outlined in Idaho Code 6-907) and to submit the claim within the 180 days (as required by Idaho Code 6-905). The District EEO/Safety/Training Coordinators have a supply of the ITD-2326, Citizen's Claim Procedure form that can be given to the claimant.

- A claimant personally presents a written notice of claim to a Department employee. The written claim should be refused, and the claimant advised as to the proper procedures for making a claim against the State of Idaho as outlined above.

- A claim, or what could reasonably be interpreted as a claim, is received by mail. The recommended procedure is to immediately return the claim to the claimant along with a copy of the ITD-2326, Citizen's Claim Procedure form or a letter explaining the filing procedure.

> Any claim against the State that is received by the Department must be immediately returned. the Department cannot file the claim on behalf of the claimant.

When notified of an alleged incident, an investigation will be conducted and reported on the ITD-0090 Traffic Accident Field Report or the ITD-1746 Tort Claim Data for Risk Management form and sent to the District EEO/Safety/Training Coordinator. The District EEO/Safety/Training Coordinator will keep a copy and forward the original report to the Employee Safety/Risk Management Section.

> All incidents of possible tort claims must be reported at the time they occur or external insurance carriers could refuse responsibility for coverage.

Any questions concerning the filing of tort claims should be referred to the Employee Safety/Risk Management Section.

SECTION 108.00 – PROSECUTION, PROGRESS, AND TERMINATION

108.01 Subletting of Contract.

General. When a Contractor subcontracts a portion of a contract, the Contractor must submit an ITD-0315 Request to Subcontract to the Resident Engineer form. The Resident Engineer reviews and approves the request if the request is correct. The Contractor will be notified in writing by the District when approval is granted. One approved copy of the Request to Subcontract is returned to the Contractor and one is retained in the project files. Refer to Figure 108.01.1 for an example of the approval letter with the distribution. Number the ITD-0315 consecutively, beginning with number 1 for each subcontract. Refer to "Subletting of Work by Subcontractors" for the numbering of Requests to Sub-subcontract.

Change-ordered work, if subcontracted, requires approval through an ITD-0315. This work type is not considered in determining the percentage subcontracted. Handle subcontracted change-order work the same as sub-subcontracted or specialty items on the ITD-0315.

The Contractor must submit a copy of the completely negotiated subcontract agreement to the Engineer for approval. The Engineer should check for required physical inclusions stated in the contract to ensure that they are included in the subcontracted work as shown on the ITD-0315. Verify that the total dollar amount subcontracted equates to the "total dollar value of the subcontract or sub-subcontract" shown on the back of the ITD-0315, and that both parties have signed the subcontract. When the Resident Engineer approves the subcontract, the ITD-0315 is signed and dated, and a copy returned to the Contractor. The Engineer will also forward a copy of the signed and dated ITD-0315 to ITD's Office of Civil Rights at CivilRights@itd.idaho.gov.

The Resident Engineer files a copy of the transmittal letter to the Contractor, a copy of the ITD-0315, and a copy of the approved subcontract agreement. The required physical inclusions are:

- US Department of Labor (DOL) wage determination
- FHWA-1273 and addendum
- Civil Rights Special Provisions
- Training Special Provisions (if included in the contract)
- Special Provisions – State Aid (SP-SA) as applicable.

The ITD-0315 and the subcontract may be submitted together or separately, but **both must have the required written approvals before start of the work by the subcontractor.**

Figures 108.01.2 and 3.108.01.3a show the method of listing the required information on the ITD-0315. If more than one sheet is required, sheets may be stubbed and the items continued on succeeding sheets.

Firms operating plants (e.g., batch plants, crushing plants, central mixing plants) that set up primarily for the contract, must be considered as subcontractors and covered by a subcontract agreement. These firms cannot be considered as material suppliers unless the source has a history of similar product sales before advertisement. Firms providing support services (e.g., providing and cleaning portable toilets) do not require a subcontract unless they are directly working on a bid item. If questions arise, consult with the Construction/Materials Section.

Delivery vs. Application. Generally, a subcontract is not needed if the material is delivered or picked up. Examples of delivery are:

- Material delivered to the project site, but not applied.
- Material delivered to the project site and transferred to a holding tank (e.g., an oil truck delivers oil into a standing tank and then leaves the site).
- Material delivered to the project site and applied (e.g., concrete pump trucks) but the delivery employee(s) are on the project site less than 20% of the work week (Davis Bacon de minimis). See also CA Manual 112.03.

A subcontract is needed if material is applied onsite. Examples of application are:

- Delivery to the site and application of material (e.g., oil truck delivers tack oil and distributes oil on the pavement)
- Any work performed onsite (as defined in 29 CFR § 5.2(l)(1)).

Requests to subcontract plumbing, electrical, heating, and air conditioning work must be submitted even though the subcontractors are named in the proposal. Per Idaho Code 54-1902, all subcontractors and lower tier subcontractors are required to have public works licenses of the proper class. Additional guidance regarding public works licensing can be obtained from the Idaho Division of Building Safety. Subcontractors named in the proposal must be adequately licensed at the time of bid opening on state-funded projects. Federally-funded projects require licensure before award. The subcontractor named should be the one performing the plumbing, electrical, heating, and air conditioning work.

Idaho Code and Federal Regulations establish the minimum amounts of work that will be accomplished by the Contractor's own organization. These minimum amounts are measured by percentage of dollar amounts of the original contract cost. The original contract cost (or amount, shown on the ITD-0315) is the sum of the contract bid items plus the estimated costs of stipulated price items and invoice price items not on the bid schedule, minus any identified specialty items.

Typical stipulated price items include salvaged materials delivered to the state at a cost stipulated in the contract. Typical invoice items may be asphalt products. The estimated cost per unit from the detailed estimate may be used in computing the total contract cost if precise price quotes on invoice items are not known at the time subcontract approval is requested.

Determination of Value of Work to be Subcontracted. Contract bid prices (not subcontract unit prices) will always be listed in the column “Contract Unit Bid Price” to determine the value of work to be subcontracted. If the Contractor wishes to sublet an entire item, the contract bid price will be used to determine the value of the work, not the subcontractor's price, even though their price may be more or less than the contract bid price. If the Contractor proposes to sublet only a portion of an item (split an item), a value must be listed by the Contractor and approved by the Engineer as a "split item unit price" for that portion of the item to be subcontracted. When the entire item is to be subcontracted and the subcontractor's price is different than the contract bid price, the subcontractor's unit price will not be shown in the split item column.

The only time the split item column is used is when more than one contractor is performing work for one pay item. The contract unit bid price will be used as a basis for establishing a "split item unit price." Provide a brief description following the pay item indicating the nature of the work being performed as a split item. This is necessary before request approval can be made.

Submit a separate ITD-0315 for change-order work when a subcontractor, who is not pre-approved, performs the work.

Splitting of Items and Materials Costs. The materials cost for purchases by the Contractor from a supplier or commercial source may be deducted or split from any item to be subcontracted. However, when a firm both sells material to a Contractor and performs the work of incorporating the materials into the project, the material cost must be included in the subcontracted item value.

Splitting of an item is when the Contractor and/or subcontractor perform portions of the work required to complete the item. If another subcontractor completes the item, the subcontractor must be allocated the remainder of the unit bid price. One example of permissible splitting of items is the crushing, hauling, mixing, and placing of base and surfacing items. Any of these operations may be subcontracted as long as a percentage is assigned to that portion of the item to be subcontracted.

Item work units may also be split by using the contract bid price as the split item price. A case where this might be encountered would be a paving project that includes a chip seal coat. The prime may subcontract the chip seal coat, including the traffic control for the chip seal coat. The prime must show a reasonable number of hours at the contract bid price for the traffic control being performed by the subcontractor. The proper accounting method on the ITD-0315 for this situation is illustrated in Figure 108.01.2.

Subcontracting Specialty Items. When specialty items are subcontracted, submit an ITD-0315 form. However, the contract amount for these items is not charged to the amount subcontracted. Specialty items are designated in the contract bid schedule and are not to be confused with "SP" items.

Although the dollar amount of specialty items is not used to calculate percent subcontracted, the specialty items should be tracked. The way to handle specialty items is to show zero (0) dollars in the amount column and carry the specialty item amount on the "Sub-subcontract and/or Specialty Item Total $___________" line as illustrated in Figure 108.01.3.

Disadvantaged Business Enterprise (DBE) Subcontract Requirements. See CA Manual 110.04, Disadvantaged Business Enterprise (DBE).

DBE Regulations as stated in 49 CFR 26.11(c) requires the Department to create and maintain a comprehensive Bidders List, consisting of all firms bidding on prime contracts and quoting/bidding subcontracts.

During the ITD-0315 review process, check the Department's Bidders List to ensure that the subcontractor or sub-subcontractor is included. If the firm is not listed, they can be added to the Bidders List by following the bidders registration process on the Department's Bidders List website.

This requirement also applies to supply companies that provide materials that are permanently incorporated into Department (or LHTAC) projects.

The ITD-0315 form should not be approved until the firm is included on the Bidders List.

Subletting of Work by Subcontractors. The standard specifications permit subcontractors to sublet any of the work assigned to them under their subcontracts with the Contractor and upon approval by the Engineer.

If the subcontractor desires to sublet any of the work contracted, the Contractor must submit a request in the same manner as prescribed for requesting permission to subcontract a portion of its own work. The items, quantities, unit bid prices, and extended amounts must be shown, and the total value of the work shown to determine whether or not the sub-subcontractor holds the proper Contractor's license to perform that amount of work. However, the amount need not be carried below the sub-subcontract and/or specialty item Total $ ____ line, and the percentage need not be calculated as is done on a regular request to subcontract. The percentage has already been charged against the prime Contractor in the subcontract of the first subcontractor. Requests to sub-subcontract must have the same number as the subcontractor, with an alpha designator added, starting with the letter A (refer to Figure 108.01.3).

The Contractor must complete the back of ITD-0315. The Contractor and the subcontractor (not the sub-subcontractor) need to sign. However, the dollar value of the sub-subcontractor agreement must be placed in the area provided for the first subcontractor's agreement.

Enforcement of Specifications Governing Subcontracts. The Engineer is responsible for enforcing the requirements governing subcontracts and ensures work not being performed by the Contractor's forces is either covered by an approved subcontract or is being done by personnel added to the Contractor's payroll. See CA Manual 110.04 for special DBE requirements.

Requests to subcontract are generally submitted at the preconstruction conference. The Contractor must submit the request in sufficient time to obtain approval before starting subcontract work.

Use the ITD-0025, Construction Diary to document the day the subcontractor begins working on the project.

Occasionally, the Contractor decides to perform planned subcontract work with the Contractor's own workforces. Whenever this occurs, the subcontract records should be updated to reflect this change.

Checking the ITD-315, Request to Subcontract. The ITD-0315 form is used to determine the percentage of work being subcontracted. The dollar values of each item, as determined by the Contractor's bid, are used to perform the mathematical computations shown in Figures 108.01.2 and 108.01.3a.

If a Contractor unbalances the bid on an item, the split unit price must carry a similar imbalance to properly reflect the percent of the work being done by the subcontractor with respect to the total cost of the project. For example, if a Contractor bid $12.00 per ton on one project for plant mix pavement, $33.00 per ton on another project, and subcontracted the crushing of the aggregate on both projects, the split item unit price should be $4.00 on the first and $11.00 on the second (33% of the work in each case) even though the subcontracts themselves show the subcontractor is doing the crushing for both contracts for $4.00 per ton.

Check entries on the ITD-0315 form and mark with a "tick" mark if correct. If an entry is incorrect, it should be struck through with a single line, a corrected entry placed above or below, and initialed. The columns headed Item Number, Quantity, Item, and Unit Bid Price should read exactly as they read in the contract. Split quantities should then be shown in the Quantity column with an asterisk referring to a comment explaining the portion of the work to be performed by the subcontractor. Similarly, split item unit prices are to be marked and explained. Figures 108.01.2 and 108.01.3 illustrate these procedures.

A box at the bottom of the ITD 0315 form identifies the request approval by the Resident Engineer.

August 25, 1998

Idaho Construction Company, Inc.
3779 N. 3400 E.
Kimberly, ID 83341-9801

Project No.: DPC-BR-0031
Key No.: 5696
Location: Monte Vista Underpass, Pocatello
Contract No.: 5866

Your request to subcontract certain items of work on the captioned project has been submitted to this office for approval.

Our records indicate the following subcontractor(s) holds the proper Idaho Public Works Contractor's license and is / are approved to perform the work.

NAME OF SUBCONTRACTOR	REQUEST NO.	SUBCONTRACT AMOUNT
Pacific Ready-Mix, Inc.	#2	$103,498.45

This is 4.07 percent of the total contract amount requested to be subcontracted to date, less specialty items.

One complete copy of the subcontract agreement with the proper forms attached, as indicated on the ITD-315, must be submitted to the Resident Engineer and his approval obtained before any work by the named subcontractor can commence on the project.

Sincerely,

ED BALA, P.E.
District 5 Engineer

Bcc: State Tax Commission

CCO
Resident Engineer

Figure 108.01.1

ITD - 315 8-98

REQUEST TO [x] **SUBCONTRACT OR** [ ] **SUB-SUBCONTRACT**

Date: June 9, 1998 REQUEST NO.: 2

To: DISTRICT 5 ENGINEER
IDAHO TRANSPORTATION DEPARTMENT
P.O. BOX 4700
Pocatello ID 83205

PROJECT NO.: DPC-BR-0031(102)
KEY NO.: 5696
LOCATION: MONTE VISTA U'PASS, POCATELLO
CONTRACT NUMBER: 5866

From: (Name and Address)

PRIME CONTRACTOR Idaho Construction Company, Inc.
3779 N. 3400 E.
Kimberly, ID 83341-9801

SUBCONTRACTOR: [ ] DBE
Pacific Ready-Mix
4956 East "A" Street
Idaho Falls, ID 83405
License Number: 1234-AAA-4(4, 9, 10, 47)

SUB-SUBCONTRACTOR: [ ] DBE
License Number:

Contract Item	Contract	Contract Item	Contract Unit Bid	Split Item Unit	Amount
502-A-6	221 CY	Concrete Class 40-A	$184		$40,664.00
502-A-7	326 CY	Concrete Class 40-B	$184		$59,984.00
511-A	613 SY	Waterproof Membrane*	$8.50	* $ 4.65	* $ 2850.45
		* (Supply Only)			
Sub-Subcontract and/or Specialty Item (Do not include this amount in any total below) **TOTAL $**					

Total Amount of this Request $ 103,498.45
Total Contract Amount (Less Specialty Items) $ 8,769,345.28
Percent of Total Contract % 1.18

Amount of previously approved requests is $ 253,698.18 . This request will make the total amount subcontracted to date $ 357,196.63 , which is 4.07 percent of the total contract amount, less Specialty Items.

Checked by: ______________________
Resident Engineer

Signed: ______________________
(Contractor)

Approved: ______________________
District Engineer

Title: ______________________

Date: ______________________

Figure108.01.2a

ITD - 315 8-98
(Reverse Side)

Contractor's Statement and Acknowledgment

The prime contractor on the above contract, whose signature appears below, certifies that the following provisions of this contract will be physically incorporated into and made a part of the Subcontract Agreement and that the Agreement will be submitted

Check applicable contract provisions: (See requirements listed in contract.)

[x] U.S.DOT Form FHWA-1273	[x] SP-Training	[x] Civil Rights Special Provisions
[x] Department of Labor Wage Determination	[ ] State Aid Special Provisions (SP-SA)	[ ] Other ______________

The total dollar value of the Subcontract or Sub-Subcontract is $ ______________ 103,498.45

Signed: ______________________ , this __________ day of ______________ , 19 ____
Signature

______________________ ______________________________
Title (Name of Prime Contractor)

The subcontractor whose signature appears below also acknowledges his responsibility under the subcontract for including these clauses in any lower tier subcontract awarded by him (required only for Sub-Subcontracts).

Signed: ______________________ , this __________ day of ______________ , 19 ____
Signature

______________________ ______________________________
Title (Name of Subcontractor)

Instructions to Contractor

1. Address request to District Engineer having jurisdiction of project.
2. Subcontractor's or Sub-Subcontractor's name and address must be the same as shown on the State License.
3. Fill in all columns using Contract Item Numbers and Contract Items as shown in the Contract. Use column headed "Split Item Unit Price" only if splitting of items is allowed.
4. Contact Resident Engineer for information concerning permissible bid item splitting and determination of "Split Item Unit Price." When splitting an item, including a specialty item, a description of work being split out of the item must appear in the column headed "Contract Item."
5. When "Specialty Items" are listed, or when using form ITD-315 for a Sub-Subcontract, leave blank all total and percentage lines below **"Sub-Subcontract or Specialty Item Total"** line.
6. Carry percentages to two decimal places. Be sure your figures are accurate before submitting request.
7. If the Prime Contractor is requesting to subcontract, check the box next to "Subcontract." If the Subcontractor is requesting to Sub-Subcontract, check the box next to "Sub-Subcontract."
8. Check DBE box only if Subcontractor or Sub-Subcontractor is certified as a DBE with the Idaho Transportation Department. If DBE goals have not already been met, the good faith effort to obtain DBE participation must accompany this subcontract request.
9. Complete "Contractor's Statement and Acknowledgment" section.
10. All copies of all "Requests to Subcontract or Sub-Subcontract" must be signed and submitted by the Prime Contractor. Submit original and one copy through the Resident Engineer.

Figure 108.01.2b

SUBCONTRACTOR: [x] DBE	SUB-SUBCONTRACTOR: [x] DBE
A-1 Minority	Acme Inc.
Rt. 4, Box 173-A	5647 W. E Street
Blackfoot, ID 83221	Twin Falls, ID 83404
License Number: 6483-AA(1,2,3)	License Number: 1769-A-4(4, 14, 45, 47)

Contract	Contract	Contract Item	Contract Unit	Split Item Unit	Amount
656-A	1 LS	Traffic Signal Installation "SPECIALITY ITEM" *(Install Loop Detectors Only)	$58,000	* $12,000	
205-A	284,078 CY *1619 CY	Excavation *(Sub-Sub performing rock excavation near Sta. 705 only.)	$1.35	* $1.35	* $ 2185.65
Sub-Subcontract and/or Specialty Item (Do not include this amount in any total below) **TOTAL $**				$14,185.65	

Total Amount of this Request $ ______________
Total Contract Amount (Less Specialty Items) $ ______________
Percent of Total Contract % ______________

Amount of previously approved requests is $ ______________. This request will make the total amount subcontracted to date $ ______________, which is ______________ percent of the total contract amount, less Specialty Items.

Checked by: ______________ Resident Engineer   Signed: ______________ (Contractor)

Approved: ______________ District Engineer   Title: ______________

Date: ______________

Figure 108.01.3a

ITD - 315 8-98
(Reverse Side)

Contractor's Statement and Acknowledgment

The prime contractor on the above contract, whose signature appears below, certifies that the following provisions of this contract will be physically incorporated into and made a part of the Subcontract Agreement and that the Agreement will be submitted to the Resident Engineer for review and made available for compliance reviews by Idaho Transportation Department personnel.

Check applicable contract provisions: (See requirements listed in contract.)

[x] U.S.DOT Form FHWA-1273	[x] SP-Training	[x] Civil Rights Special Provisions
[x] Department of Labor Wage Determination	[ ] State Aid Special Provisions (SP-SA)	[ ] Other ____________

The total dollar value of the Subcontract or Sub-Subcontract is $ $14.185.65

Signed: ______________________ , this __________ day of ______________ , 19 ____
Signature

______________________ ______________________
Title (Name of Prime Contractor)

The subcontractor whose signature appears below also acknowledges his responsibility under the subcontract for including these clauses in any lower tier subcontract awarded by him (required only for Sub-Subcontracts).

Signed: ______________________ , this __________ day of ______________ , 19 ____
Signature

______________________ ______________________
Title (Name of Subcontractor)

Instructions to Contractor

1. Address request to District Engineer having jurisdiction of project.
2. Subcontractor's or Sub-Subcontractor's name and address must be the same as shown on the State License.
3. Fill in all columns using Contract Item Numbers and Contract Items as shown in the Contract. Use column headed "Split Item Unit Price" only if splitting of items is allowed.
4. Contact Resident Engineer for information concerning permissible bid item splitting and determination of "Split Item Unit Price." When splitting an item, including a specialty item, a description of work being split out of the item must appear in the column headed "Contract Item."
5. When "Specialty Items" are listed, or when using form ITD-315 for a Sub-Subcontract, leave blank all total and percentage lines below **"Sub-Subcontract or Specialty Item Total"** line.
6. Carry percentages to two decimal places. Be sure your figures are accurate before submitting request.
7. If the Prime Contractor is requesting to subcontract, check the box next to "Subcontract." If the Subcontractor is requesting to Sub-Subcontract, check the box next to "Sub-Subcontract."
8. Check DBE box only if Subcontractor or Sub-Subcontractor is certified as a DBE with the Idaho Transportation Department. If DBE goals have not already been met, the good faith effort to obtain DBE participation must accompany this subcontract request.
9. Complete "Contractor's Statement and Acknowledgment" section.
10. All copies of all "Requests to Subcontract or Sub-Subcontract" must be signed and submitted by the Prime Contractor. Submit original and one copy through the Resident Engineer.

Figure 108.01.3b

108.02 Contract Time. Contract time Starts 20 calendar days after contract award or as stated in the bid proposal. No work shall begin on the project until the contract has been fully executed.

WINCAPS Projects. The specifications for working day contracts require an accounting of elapsed contract time be provided to the Contractor monthly. Prepare the ITD-2242, Elapsed Time and Work Status Statement, for this purpose on all WINCAPS projects. This form should also be used for time accounting on a calendar day or fixed completion date project to account for work suspensions that may have occurred. The Contractor must sign the ITD-2242 and return it to the Engineer.

An ITD-2242 must be completed for every month of the project, beginning with the month containing the starting date as set in the Notice of Award or the month work is started, whichever represents the earliest date. When the entire project is suspended or being carried through a non-chargeable time period (e.g., winter months), the ITD-2242 does not need to be completed, but the reason for no work must be noted. Where days are not charged, explain clearly in the space provided. (See Figure 108.02.1)

During winter suspensions, supplement the ITD-2242 with a statement specifying what measures the Contractor should take to protect the work during the suspension period. (See ITD Standard Specifications For Highway Construction (SSHC) 107.11.)

If work is remaining by state forces and/or local public agency forces after contract completion of a project, the final contract ITD-2242 must include a note concerning the status or planned completion of the non-contract part of work remaining. When state or local forces accomplish the pending work, complete the ITD-1996, Final Inspection and Review of Final Estimate and Records form.

A copy of the ITD-2242 must be sent to FHWA on FHWA Projects of Interest.

WORKING DAY CONTRACT WITH LIQUIDATED DAMAGES

Elapsed Time and Work Status Statement ITD 2242 (Rev. 10-12)

Idaho Transportation Department

Date	Contractor	Report Number	
01/01/2014	Jones Construction	4	☒ Final

Key Number	Project Number	Work Authority	Location
111111	A111(111)	P123456	I-199 West of Boise

Type of Time ☒ Working Days ☐ Calendar Days ☐ Fixed Completion Date

Contract Award Date	Date Work Commenced on This Project	Period of Time Covered in This Statement
03/28/2011	07/06/2011	From 09/15/2011 To 10/17/2011

Contract Time Accounting

Days Allowed (Contract)	55
Day Adjustments (Change Order)	14
Total Days Allowed	69
Total Days Possible This Period	12
Total Days Not Charged This Period	3
Total Days Charged This Period	9
Days Previously Charged	61
Total Days Charged to Date	70
Total Days Remaining	-1

	Date		Date
☒ Work has been substantially completed	10/18/2011	☒ Work has been completed	10/18/2011

Percent of Work Complete 100 % | Percent of Time Elapsed 101.4 %

Remarks and Explanations of Days Not Charged (Give date, hours worked, information verifying reasons, etc.)

3 Days due to weather

You are Hereby Notified

☐ **To Suspend Construction Operations**

Effective Date of Suspension (Close of Work)

Reason for Suspension

Items of Work Suspended

☐ **To Resume Construction Operations Which Were Suspended**

Effective Date of Resumption

Items of Work Resumed

Resident Engineer's Signature

John Smith PE

Acknowledge Receipt – Return one signed copy to sender

Contractor Name	Date Received
Signature	Title
If Disagree, Specify Reason(s)	

Distribution: Public Affairs, District Engineer, Financial Services, Resident Engineer, FHWA (full oversight projects only), Dist Records Inspector, Contractor (2 copies)

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Figure 108.02.1

SiteManager Projects. Time accounting input is performed in the SiteManager project diaries by either the Project Coordinator or the RE. Time accounting output can be viewed in SiteManager under the project progress estimate located under Contract Payments, Reports, and Estimate Summary by Project. Separate ITD-2242s are not required for SiteManager projects.

108.03 Project Schedule.

General. Unless otherwise specified in the contract, the Contractor is required to provide the Engineer with a Critical Path Method (CPM) Schedule including a time-scaled logic diagram, predecessor and successor report, and bar chart printout at or before the preconstruction conference.

The Engineer will independently review the initial schedule and then meet with the Contractor for a joint review and make necessary corrections and adjustments. The specifications require this meeting take place within 10 calendar days of the initial schedule submission. After this meeting, but within 10 calendar days, the Contractor makes the necessary changes and then resubmits the schedule to the Engineer. Repeat this process, if necessary.

The schedule must show contract milestones, intermediate completion dates, substantial completion date, and the contract completion date.

Should the work progress be discontinued or changed for any reason, the contract specifications require the Contractor to notify the Engineer at least two days in advance of the change in schedule. Throughout the life of the project, the Engineer should verify that activities, durations, and start/finish dates shown on the schedule represent the actual work status.

The Engineer may request a written supplemental schedule if the actual work progress differs significantly from that represented on the schedule. The Contractor must provide the requested supplemental schedule within 7 calendar days and at no additional cost to the Department.

Hold project site progress meetings monthly or as specified to update the schedule. Review progress to verify actual start and finish dates of completed activities, remaining duration, and completion percentage of uncompleted activities, and discuss proposed schedule revisions. It is the Contractor's responsibility to provide the Engineer with activities status at the progress meetings and prepare schedule updates based on this information once it has been verified and agreed upon. Include a written narrative describing the schedule status, the critical path, schedule revisions, and how anticipated weather days have been incorporated with the updated schedule. The Contractor may be required to resubmit the updated schedule if it does not contain the agreed upon information.

The Engineer must have a schedule that accurately represents the progress of work and activities at all times. A current schedule is essential for evaluating contract time adjustment requests and determining how delays, extra work, interruptions, and suspensions, will impact the contract completion date or the Contractor’s scheduled completion date for incentive/disincentive contracts. The Engineer may withhold progress payments if the Contractor fails to provide the schedules and updates as provided in SSHC 109.05.

Bar Chart Printout. The Gantt (Bar) chart provides a graphical representation of the project plan that includes the activities that make up the project, estimated activity duration, and the planned activity performance sequence. Total float must be identified as developed from the CPM schedule.

Critical Path Method (CPM) Schedule. A CPM schedule is one that forecasts the amount of time required from project start to finish by arranging project activities in their logical sequence and calculating possible path lengths through the project. CPM schedules are used to ensure adequate project planning and provide a tool to quickly and accurately evaluate project changes. The CPM schedule may also be used to determine when and what activities need to be accelerated to meet contract milestones and completion dates.

The ITD Standard Specifications require the Contractor to submit one electronic copy and two printed copies of the Time-Scaled Logic Diagram, Predecessor and Successor Report, and a Gantt Chart Printout.

The Time-Scaled Logic Diagram requirements are specified in SSHC 108.03.

The Predecessor and Successor Report should completely define the schedule logic. It will clearly indicate all logical relationships and constraints. This can be complimented with a Program Evaluation and Review Technique (PERT) chart which may graphically show the activity sequence and dependency.

The Gantt Chart Printout must be sorted by activity number and must provide the following information for each activity: activity number, activity description, activity calendar, original duration, remaining duration, percent complete, early or actual start and finish dates, late start and finish dates, and total float.

Schedule Terminology. This section provides an overview of some of the terminology used in the scheduling specifications. It is not intended to provide a complete resource for project scheduling. Refer to CPM and other project scheduling textbooks or guidelines for additional assistance when reviewing and approving schedule submittals.

The schedule calendar defines how many days per week each activity will be performed. There are typically several calendars on each schedule.

A constraint is a restriction imposed on an activity start or finish date. Constraints are usually contractual or resource driven. For example, contract provisions limiting the Contractor's access to the river on a bridge project would be a contractual constraint. Start or finish dates for pile driving, based on crane availability, is an example of a resource constraint. The contract specifications require the Contractor to identify all constraints in the schedule. For CPM schedules, all constraints must be identified in the Predecessor and Successor Report.

On fixed completion date contracts, the contract completion date is specified in the contract. On calendar day contracts, the contract completion date is determined based on the date contract time accounting begins and the number of calendar days allowed for work completion specified in the contract. On working day contracts, the completion date is projected based on the date contract time accounting begins, the number of working days specified, and non-chargeable time (e.g., weekends, holidays, non-chargeable winter months). The projected completion date of a working day contract may change over the life of the project due to unexpected non-chargeable periods(e.g., bad weather).

A milestone is an event that has no schedule duration (e.g., an approval or an interim completion date). Milestones are often set as markers to represent certain progress stages. Contract milestones are targets established by the contract or requirements of the contract and are usually constrained to a specific date.

Total float is defined as the total number of days that a scheduled activity can be delayed without affecting an interim or contract completion date.

Free float is the number of days that an activity can be delayed without delaying the early start of a successor activity, (i.e., an activity that follows the activity in question).

As specified in the contract, float before substantial completion is not for the exclusive use or benefit of either the Contractor or the Department, but is available for use by either party as needed on a first-come, first-served basis. Float after substantial completion is owned by the Contractor and therefore is not available for free consumption by the Department when adjusting Contract Time for changes or excusable delays.

Contract time extensions will not be considered until the available float in the schedule is consumed (see SSHC 108.07). In other words, the Engineer may delay an activity without a contract time extension if the delay is no longer than the available float.

On contracts containing incentive/disincentive provisions, the Engineer may consume float without a contract time adjustment only to the extent that it does not impact the Contractor's scheduled completion date. Once a delay impacts the Contractor's scheduled completion date, a time adjustment must be considered (see SSHC 108.07).

The critical path, at any point in time, is the logical series of activities in a schedule that will take the longest total time to achieve substantial completion. Therefore, at any point in time, the critical path will typically be the path with the least float to substantial completion. The critical path can change as the project changes, and is only defined at a particular point in time. As the project progresses and the schedule updated with the actual activity durations and sequences, the critical path may change. The critical path does not have to have zero float. The critical path is typically located by finding the activity with the least float at each point in time.

For CPM schedules, the contract specifications require the Contractor to clearly identify all logical relationships in the Predecessor and Successor Report. Finish-to-start (FS), start-to-start (SS), and finish-to-finish (FF) are logical relationships between two activities. Any relationship involves two linked activities, a predecessor, and a successor. The start or finish of the predecessor activity controls the start or finish of the successor activity.

When the finish of the predecessor controls the start of the successor, the relationship is known as finish-to-start. An example of an FS relationship would be girder placement following abutment cure. The start of girder placement cannot begin until the finish of abutment cure. Finish-to-start is the most common activity relationship.

When the start of the predecessor controls the start the successor the, relationship is known as a start-to-start relationship. When the finish of the predecessor controls the finish of the successor, the relationship is known as a finish-to-finish relationship. An example of SS and FF relationships is excavation for pile driving (predecessor) and pile driving (successor). Excavation must start before pile driving can start (SS), and excavation must finish before pile driving can finish (FF). However, the activities can be going on at the same time.

Lag is defined as a delay or offset time in a relationship. For example, if three days of lag is specified for a finish-to-start relationship, the successor activity starts three days after the predecessor finishes. If three days of lag is specified for a start-to-start relationship, the successor starts three days after the predecessor starts. For CPM schedules, the contract specifications require the Contractor to clearly identify all lags in the Predecessor and Successor Report. Lags are not allowed without approval of the Engineer.

Early start is the earliest date an activity can be started after predecessors to the activity are completed. Early finish is the earliest possible date an activity can finish, or the early start date plus the activity duration.

Late start is the last day that an activity can start without delaying the project as a whole or without delaying an interim completion date. The late start date for an activity is the late finish date minus the activity duration.

108.04 Preconstruction and Preoperational Conferences. Soon after the Notice of Award is received in the District, the Engineer will write a letter to the Contractor setting up a preconstruction conference. List the suggested date, time, and place of the preconstruction conference and request date confirmation from the Contractor. The preconstruction conference will usually be held in the District office, but can be held in the Engineer's office or the Contractor's office if more convenient. Provide copies of the letter to the District Engineer, and in the case of FHWA Projects of Interest involvement, the FHWA. Provide copies of the letter to the local sponsor's representative along with copies of the plans and contract from the District Engineer for the sponsor's use and files.

Notify and invite the emergency response agencies (e.g., fire department, law enforcement, emergency medical services) that are responsible for service within project limits. Notify other interested parties (e.g., utility companies, irrigation districts, school districts, US Postal Service). A representative from the Office of Communication should be invited to facilitate preparation of news releases concerning the upcoming construction for those contracts not already involving the Public Involvement Coordinator. At the option of the district, additional specialists may attend (e.g., the District Traffic Engineer if a signalization contract). Also at the district's option, Digline may be invited to participate (1-800-342-1585).

Include in the letter instructions for the Contractor to submit subcontract requests, an initial progress schedule, a list of materials suppliers, and a preliminary WH-5 (Public Works Contract Report) form. The Contractor should provide a list of materials fabricated or manufactured off the project, including the item number and source. If the source is a supply house or distributor, then the origin must also be listed.

If it is known that the Contractor is contemplating a materials source change, the department Archaeologist should be invited.

The Contractor should be prepared to discuss, among other subjects, the progress schedule, the overall project operation plan, requests to subcontract, materials source(s), erosion and pollution control measures, traffic control plan, and safety program. The Engineer is strongly encouraged to hold the preconstruction meeting before any work begins on the project.

Conduct of Meeting. The District Engineer, Engineering Manager, or the Engineer should moderate the meeting. The Contractor should be represented by the owner or an officer of the firm, the superintendent who will be on the job, representatives of major subcontractors, and anyone else the Contractor wishes to invite.

As soon as possible after bids are opened and before the preconstruction conference, the Engineer should hold a staff meeting with all personnel who will be working on the project. These people should review the contract documents before the meeting and discuss those features that are unclear or confusing. The subjects for discussion are established by the Engineer. However, the Engineer should make it clear the degree of authority and responsibility each member of the staff is to have, who the supervisor of each person is, who may and how to suspend any portion of the work, and remind personnel to review the contract documents. An agenda of items to be discussed with the Contractor at the preconstruction conference should also be prepared and meeting minutes recorded.

Preconstruction Conference Outline. Use the following outline to prepare the agenda to ensure that all appropriate items are considered.

1) Conference participants' names, addresses, phone numbers, email addresses.
2) Notice of Award date (letter).
3) Date for contract time to begin (generally 20 days after the notice of award date).
4) CPM schedules.
5) Contractor's plan of operation.
6) Utilities, including railroads, and utility move status, including operation plan for utility moves and expected completion date. Any conflicts between the utility moves and Contractor's schedule should be identified. The Contractor should advise the Engineer of any problems as soon as apparent. Representatives of the utilities may be excused from the meeting at this point unless they desire to attend the full meeting.
7) Coordination between the Department, the Contractor, and the emergency response agencies should be made to best facilitate potential response to and/or through the project (e.g., location of access roads, emergency contact information, temporary accommodations for emergency traffic). Other participants who are not involved in the full meeting should also be heard from at this point to allow them to leave early if they choose to.
8) Establish time for notice (SSHC 104.03) to be given before work changes.
9) Correspondence to go to Engineer's office (give name and address).
10) Correspondence to Contractor (give name and address).

11) Subcontracts: Name subcontractor and items to be subcontracted. Submit request to subcontract if at all possible. Requests to subcontract must be approved by the District Engineer before the subcontractor begins work and the Engineer must have signed off on the subcontract itself.

12) Name and contact information of Contractor's superintendent.

13) Names of Department's project engineer/chief and project inspectors.

14) Names of Contractor's people authorized to sign pay estimates and change orders.

15) Cutoff date for progress estimate preparation. Determine if there will be one or two estimates per month. Consent of surety for 100% progress payments. Prompt payment to subcontractors including submission of certification of payment forms.

16) ITD-2242, Elapsed Time and Work Status Statement: starts, suspensions, and completions.

17) Claims: Early discussion of problems to avoid claims. Review claim procedures.

18) Materials supplier lists submitted to date. (Is materials supplier list in conformance with DBE plan?) A copy of the materials suppliers list must be sent to the HQ MC Section.

19) Discuss items requiring certification (e.g., steel, cement, bearing pads, guardrail).

20) Discuss items requiring shop drawings, including time required for Department reviews.

21) Discuss catalog data and manufacturer's details where required.

22) Partial or complete state-furnished lists given to the Contractor (e.g., pipe, guardrail, signposts, or other) with dates furnished.

23) Materials Sources specified:

    a) Special requirements such as haul roads, access, royalties, archaeological findings, and source reclamation.

    b) Change of Source: Time required and cost of testing. Archaeological clearance before disturbance.

    c) Source releases.

24) Construction surveying including any staking provided by the Engineer.

25) Traffic Control:

    a) Signing, detours, speed zones, road closures, delays, flagging, piloting, haul operations, bid item payment.

    b) Names and contact information of Contractor and Engineer's representatives who are responsible for checking traffic control daily, including those responsible for traffic control maintenance after work hours.

    c) Flagger and project site traffic control supervisor certification requirements.

26) Permits: e.g., NPDES, Army Corps of Engineers (404), DEQ, Stream Alteration. Areas of concern: Hot plants, crushers, materials sources, staging areas, waste sites, washing operations, haul routes, erosion control, work in or adjacent to water or wetlands, discovery of underground storage tanks.
    a) NPDES – Review SWPP Plan. If a permit is required, the Contractor, the local agency (if a local project), and the Department (or LHTAC) submit NOIs. No ground-disturbing activities are allowed until all NOIs are posted on the EPA website and the 14-day waiting period is over (refer to SSHC 107.17 and CA Manual 107.17 for details).
    b) Review all other permit requirements in the contract.
    c) Temporary and permanent erosion control work schedule submission.
    d) Limitation of disturbance of erodible material.
    e) Winter shut-down period if applicable.
27) Water and Air Pollution: Hot plants, crushers, washing operations, staging areas, waste sites, erosion control, work in or adjacent to water or wetlands, discovery of underground storage tanks.
    a) Temporary and permanent erosion control work schedule submission.
    b) Limitation of area of erodible material without approval.
28) Safety: Federal Safety & Health Regulations, first-aid training, emergency services, safety equipment, safety meetings, posting emergency phone numbers.
29) Labor Compliance:
    a) Who signs certified payroll?
    b) Payroll period.
    c) Employee classifications must be complete (not just group number) copy of code with first payroll.
    d) One copy of payroll to Engineer within seven days. If no work, WH-347 only.
30) Bulletin Board Requirements. A list of bulletin board requirements, including links where current required posters can be viewed and downloaded can also be obtained on the ITD external website under "Business-> Click for More Topics->Construction Resources" OR “Inside ITD-> Click for More Topics-> Construction/Materials.”
    http://apps.itd.idaho.gov/apps/manuals/ca/Project_Poster_Checklist_Links.pdf
    a) Required Federal and State posters
    b) Emergency phone numbers
    c) Contractor’s EEO policy statement and EEO officer for the project
    d) Davis-Bacon wage rates.

31) Provide copies of ITD-0086, Contractor EEO Compliance Report and FHWA 1391, Federal-Aid Highway Construction Contractors Annual EEO Report.

32) Civil Rights Provisions/EEO Obligations:

   a) No employment discrimination on the project.

   b) Policy statements and posters displayed appropriately.

   c) Obtain letter from Contractor identifying project EEO officer, by name. Place in project file.

   d) Obtain record of Contractor's meeting with employees (held before work commences) explaining EEO requirements. Place in project file.

   e) Employment goal for minorities ______, females _______. Contractor compliance is enforced by the U.S. Department of Labor.

   f) Contractor's employee records indicate race, sex, craft, work status (trainee, apprentice level, helper, or journeyman) and hours worked in each craft. Information should be available in summary form when requested by the Department.

   g) EEO employment provisions apply to all subcontracts over $10,000. Provisions must be included in **ALL** contracts.

   h) The Department may perform compliance review. The U.S. Department of Labor may also perform independent compliance reviews.

   i) Penalties for noncompliance include withheld payments, declaring the Contractor ineligible to bid for one year, suspending the contract until compliance is obtained, terminating the contract or assessment of administrative penalties in an amount equal to 10 percent of the contract or $7,700, whichever is less.

   j) Contractor submits FHWA 1391 in July.

33) Training Special Provisions:

   a) A primary purpose of the program is to train minorities and women in highway construction crafts in which they are underrepresented. The program also assists the Contractor in meeting EEO goals. The Contractor will be reimbursed $0.80 per hour of training under approved program.

   b) Contract requires _________slots; each slot = _____ hours, project specific as specified in the Training Special Provisions.

   c) Training program and trainees/apprentices have to be approved by the Engineer.

   d) The Contractor can request to use additional trainees with reimbursement, but must maintain the required ratio of journeymen to apprentices/trainees. The Contractor may also assign positions to subcontractor, if approved. (Number of positions specified in contract relates to contract, not the Contractor.)

   e) The Contractor provides trainee/apprentice certificate at training completion.

f) Trainees/apprentices must be identified on payrolls.

34) DBE Obligations

a) Contract requires __________% be subcontracted to DBE(s).

b) Contractor must use DBE(s) identified on the ITD-2396 form. If designated DBE(s) are unable or unwilling to perform, the Contractor will proactively reestablish DBE participation at a level to meet the original contract goal or demonstrate a good faith effort to do so.

c) Revised DBE participation plans must be accepted and approved by the Engineer and the EEO Contract Compliance Officer.

d) Sanctions for failure to meet goal(s) or perform good faith effort include withheld payments, suspension, termination of the contract, or assessment of administrative penalties per the ITD Disadvantaged Business Enterprise Plan, Section VII.D (http://apps.itd.idaho.gov/apps/ocr/civil/pdf/dbeplan.pdf).

e) DBE(s) must perform a commercially useful function (CUF). Failure of DBE(s) to perform a CUF will result in reduction of amount creditable toward prime Contractor's goal. An ITD-1701 form must be completed for projects whether or not they have a specified DBE goal.

35) Work acceptance, approval, and payment of.

36) Policy prohibiting gratuities.

37) Discuss any questions involving clarification of the plans, specifications, special provisions, or other project-related concerns.

38) Discuss qualification requirements for samplers/testers and laboratories, including field labs.

Preconstruction Conference Meeting Minutes. A qualified note keeper should be used at the meeting to record the discussion as verbatim as possible. After the notes are reviewed, prepare a report to itemize the major points of discussion. The conference moderator and Engineer will review the narrative report and finalize it in written form for the Engineer's signature. Send copies to the following:

- Contractor (2)
- District Engineer
- Engineer
- Local Sponsor, if applicable.

A cover letter to the Contractor should accompany the report and contain the following wording:

"Enclosed for your review is a copy of the minutes and attendance sheet from the Pre-construction conference. Please notify this office within 10 days if there are additions or corrections. If we do not hear from you, the attached minutes will become part of the project record."

Pre-Operational Meetings. Pre-operational meetings with the Contractor are sometimes a contract requirement. The Engineer should consider conducting pre-operational meetings, even when not a contract requirement, just before the start of major or complex construction operations on a project.

Hold the pre-operational conference onsite just before the Contractor begins work to discuss construction procedures, personnel, material, and equipment (including trucking) to be used and other pertinent elements (e.g., impacts to the traffic control plan). Those attending should include:

- Contractor representatives: the project manager, the superintendent, and other onsite supervisors and foremen in charge.
- Department District representatives: the Engineer, the project coordinator, the project inspector, and key inspection personnel. Attendance by the project designer(s), including consultants, should also be considered when warranted.
- Department Headquarters representatives: Bridge (whenever a structure is involved). Consider attendance by representatives of Construction/Materials, Environmental, and Design/Traffic when warranted.
- If the Contractor's key personnel changes or if the Contractor proposes a significant operations revision, an additional conference to discuss the changes should be held before further work is performed.

108.07 Extension of Contract Time

Substantially Complete. Whether the contract time is on a working day, calendar, or completion date basis, time will cease to be counted after the project is substantially complete. See SSHC 101.04 for the definition of substantially complete. The fact that the project is substantially complete must be evidenced in writing by the Engineer on the ITD-2242 Elapsed Time and Work Status Statement.

Restart time counting if the Contractor does not diligently continue to bring the project to completion. The Contractor should be advised by an ITD-2055, Avoid Verbal Order on the date time count will start.

When changes or extra work are to be performed after substantial completion, specify a method of time accounting to control the work duration in the change order. Time added after substantial completion is not subject to the time extension change order approval authority requirements in Table 104.02.1 in the 104 section of the CA Manual.

In similar manner, specify liquidated damages on the change order for work added after substantial completion. The liquidated damages associated with the change-order work may be less than the liquidated damages stated in the contract, depending on the value of the added work. Assess the liquidated damages amount for work added after substantial completion in accordance with 460.02 of the Roadway Design Manual.

Work Suspension and Resumption. The Engineer has the authority to suspend work for any condition or reason considered to be in the Department's interest as provided in SSHC 105.01.

Contract Time Extension. The contract specifies what the Contractor is to submit in its request for a time extension.

Time extension requests from the Contractor must be in writing and directed to the Engineer. Requests must meet the requirements of SSHC 108.07.A in order to be considered. Time extensions must be authorized by change order.

108.08 Failure to Complete on Time.

When a change order is initiated, contract time must be addressed through a schedule analysis. As events occur on a project that requires contract time to be adjusted, a review of the current project schedule is normally required.

When the Engineer does not adjust contract time, for contract changes or events which affect contract time, the Contractor must follow SSHC 108.07, Extension of Contract Time, to provide notice and submit a request and analysis for a contract time adjustment.

When the contract time expires, liquidated damages are to be charged on a working day basis for those days required to substantially complete the contract. The Engineer will retain the liquidated damages amount from subsequent progress payments.

For contracts that include an accelerated project completion clause (incentive/disincentive, or A + B), the Engineer will retain the disincentive amount from subsequent progress estimates.

For each of the issues described in this section, the Engineer should immediately notify the Contractor that any liquidated damages and/or disincentives incurred will be retained from future progress estimates.

Change orders initiated after the project is substantially complete should clearly identify that any additional days provided by the change order will apply only to the work identified in the change order.

108.09 Default and Termination of Contract.

Districts contemplating termination of construction contracts through default of the contract should contact and discuss with Legal before implementing the contract termination process.

108.10 Termination for Convenience of the Department.

Districts contemplating termination of construction contracts for the convenience of the Department should contact and discuss with Legal before implementing the contract termination process.

SECTION 109.00 - MEASUREMENT AND PAYMENT

109.01 Measurement of Quantities. Measure all work as required by the contract. Make measurements using instruments with the appropriate units. Perform measurement and computation calculations by recognized methods used in the highway construction industry. Discuss any unusual measurement or computation methods with the Contractor before performing the measurements, so there is an understanding on how the work will be measured for payment.

The specifications allow minor material quantities to be measured by either volume or by weight methods. Discuss and agree upon conversion factors with the Contractor before the work begins. Document the agreed conversion factor in writing via change order.

Check measurement and metering devices, such as water meters, to ensure their accuracy. If these metering devices are found to be inaccurate, the Contractor must recalibrate the device before proceeding with the work.

Weight Measurement.

Platform Scales. The Contractor is required to provide scales for weight measurements that are Engineer approved. See ITD Standard Specifications For Highway Construction (SSHC) 109.01.A.6.b for requirements. Do not approve scales that have not been certified by an independent scale company. Independent certified scale companies hired by the Contractor and approved before use shall check platform scales. Keep a scale check log at each scale location. The ITD-2216, Scale Approval Log Sheet, is provided for this purpose. Place the form in the project files after the operation is completed.

If any doubt exists as to the accuracy of any scale, the scale should be inspected and certified again by the Contractor. Weighing equipment shall be accurate to within one percent. The Engineer may require platform scales to be inspected and re-calibrated. Document inspections in the daily diary and enter on the scale log.

If the material delivery point is within the weigh person's sight, a checker is not needed provided the situation is documented.

Tickets. Determine and record the tare weight of each truck daily. Retain the tare tickets with the daily tickets or tally sheets. Do not issue tickets or accept loads that are over legal weight limits. **No exceptions are made for overweight loads.**

Account for every Contractor issued weigh ticket. Tickets are normally computer generated at the scale station and delivered to the job site with the driver. Ticket records are a part of the job records and are to be preserved with other project records. **Do not accept hand written tickets.**

When weighing material, the scale controller shall print on the tickets the current date, current time, project name, project number, contract pay item number, load number, truck number, load gross weight, load tare weight and net weight. Document the moisture percentage when it exceeds the specified limit. The Engineer may elect to list time on the ticket for control of certain operations. If the scale is equipped with a tare beam, only the net load need be recorded.

The checker receiving the load shall retain the original ticket as a check, with the log retained by the scale controller.

The checker should note the material placement location on enough tickets to permit subsequent location of the material. Turn the tickets in to the Engineer's office for checking at the end of each day. Maintain a running total to facilitate checking.

Quantity Tally Sheet. The Engineer may direct the following procedure for documenting material loads received with the ITD-2010, Quantity Tally Sheet - Weight Measurement:

- The scale controller will fill out the quantity tally sheet in duplicate, recording the time, truck number, and net weight.
- The checker will also make out a quantity tally sheet, recording the time, truck number, and the station placed on a sufficient number of loads to identify the load locations. The truck driver may be required to initial the tally sheet for each load.
- At the end of the day, a comparison will be made of the checker's tally sheet and the scale controller's tally sheet to verify what truckloads reached the project. Only include loads received by the checker in the total entered in the ledger. Provide an explanation for loads weighed but not received on the project.
- Give a copy of the scale controller's and the checker's quantity tally sheets to the Contractor.
- Make moisture corrections for each load as needed, and show adjustments on the scale controller's quantity tally sheet.

Conveyer Scales. The Department only accepts the use of conveyor scales that meet Idaho Department of Agriculture, Division of Agricultural Markets, Bureau of Weights and Measures requirements. The Contractor must provide a certificate of conformance number that is verified with the Idaho Bureau of Weights and Measures.

The conveyor is to be installed and operated in accordance with the manufacturer's recommendation. Slippage of material along the belt should not occur.

Perform a **Zero-Load Test** each day. If a belt-conveyer scale system has been idle for a period of two or more hours, run the system at least 30 minutes when the temperature is above 41ºF. Additional warm-up time for colder conditions or other variances is required before beginning the zero-load test. The variation between the beginning and ending indication of the master weight totalizer shall be less than one scale division when the instrument is operated at no load for a period equivalent to that required to deliver the minimum totalized load of 1000 scale divisions. Conduct the zero-load test over a whole number of belt revolutions, but at least three revolutions or 10 minutes of operation, whichever is greater. During any portion of the zero-load test, ensure the totalizer change is three scale divisions or less from its initial indication.

Perform a **Material Test** each week of operation in accordance with the conveyor scale manufacturer's recommendations. Use bulk material, preferably the material that the device normally weighs. Convey a pre-weighed material quantity over the conveyor scale similar to actual loading conditions. The material test load weighing method will depend on the conveyor scale capacity and the availability of a suitable scale for the test material. Where practical, use the substitution weighing method. Observe the following precautions to assure that the test load is accurately weighed:

- Ensure containers (railroad cars, trucks, or boxes) do not leak or loose material due to overloading.
- Determine the actual empty container tare weight at the test load time. Do not use stenciled tare weight on railway cars or trucks. Determine gross and tare weights on the same scale.
- When a pre-weighed test load passes over the scale, examine the belt-loading hopper before and after the test to assure that the hopper is empty and that only the test load material has passed over the scale.
- When using a railway track scale to weigh the test load, 48 hours or less should elapse between the conveyor scale test and the test load weight determination. When other scales are used, determine test load weight within 8 hours.
- Do not conduct the test if the test load weight has been affected by environmental conditions.
- On initial verification, conduct at least three individual tests. On subsequent verifications, conduct at least two individual tests. Do not determine the equipment performance by averaging the individual tests results. Ensure each test result is within the tolerance limits.

The above test procedures are from the National Institute of Standards and Technology, Handbook 44.

Checkers on conveyor scale weighing operations should compare the load size with the quantity on the printed weight ticket for reasonableness. If it is apparent that the conveyor scale is in error, the checker should not accept material until the error is corrected.

A Department inspector should observe the daily zero-load test and the material test. Also, make conveyor scale spot checks each day to observe the ticket printer operation and whether material is sticking to the belt.

The inspector will record the totalizer reading each shift, and reconcile differences between the totalizer reading and the total accepted by the checker as soon as possible (preferably no later than the next day).

Automatic Weighing Equipment. Automatic weighing equipment (hopper load cells, electronic platform scales, etc.) may be used with written Engineer approval. The Contractor shall furnish documentation assuring that an independent certified scale company has certified the automatic weighing equipment. Frequent random checks may be required.

The Contractor shall provide printed tickets to the Engineer. Obtain the Contractor's entire hauling fleet tare weight no less than once per day. Check automatic weighing equipment daily and document checks in the daily construction diary.

Volume Truck Measure. The checker at the point of delivery will record the volume delivered on the blank marked "Net Weight". Once each shift, or at such other interval determined necessary, a load shall be struck level to check on the volume contained in the load. The ITD-2010, Quantity Tally Sheet – Weight Measurement, may be used in lieu of tickets.

Moisture Correction. The Department will not pay for Granular borrow or aggregate with a moisture content greater than four percent of the dry weight unless otherwise specified. Correct the material weight for moisture above four percent.

This moisture correction means that moisture present at the weighing time up to the specified percentage, will be included in the aggregate quantity for payment. Payment for this moisture will be included regardless of its origin or method of addition, and includes moisture from a natural pit, aggregate washing, or water added at the crusher. The quantity of material produced must be reconciled with plan quantities by including the water (moisture) weight.

At the end of each shift, the moisture tests that exceed the specified limit will be averaged. Apply this average percentage to the material quantity that is wetter than the specified moisture content. Prepare one deduction ticket for each shift and attach it to the checker's quantity tally sheet. An acceptable alternate method is to deduct moisture on each ticket.

When aggregate from a stockpile is for a "load, haul, and place" item, the Department will not pay for any moisture added in excess of existing stockpile moisture, except as required under SSHC 403.07. The Department will not pay for moisture in excess of that allowed in the Specifications.

109.02 Scope of Payment.

Price Adjustment. As a means of allocating risk between the Department and the Contractor, the Department will allow price adjustments to applicable contract items as a payment to the Contractor or a credit to the Department when fuel and asphalt prices rise and fall, respectively, as defined in SSHC 109.02. Fuel and asphalt price adjustments should be computed using the ITD-2624 and ITD-2625 forms. Instructions for filling out these forms are included with the forms.

Fuel price adjustments were never intended to be applied to every contract bid item. Only those items that tend to use large amounts of fuel which are listed in ITD-2624 are covered. Fuel adjustments should not be applied to other contract items.

Work performed at no expense to the Department is not eligible for adjustments.

Guidance for administering fuel and asphalt price adjustments, including the published monthly fuel (BFI & CFI) and asphalt (BAI & CAI) indexes, can found on the ITD website under DOING BUSINESS WITH ITD.

109.03 Payment for Quantity Variations, Contract Revisions, and Delays.

General. The specifications allow work to be accomplished on a force account basis when specified or necessary. In order to avoid misunderstandings and possible disputes, a meeting between the Contractor and the Engineer should be held for the following purposes before force account work begins:

- Discuss the scope and nature of the work to be performed and establish a plan of operation.
- Determine the labor, equipment, and material required to perform the work and the availability of each.
- Discuss time keeping methods for labor and equipment, materials cost accounting, and documentation required to support Contractor payments.
- Discuss subcontracted, sub-subcontracted, owner-operator and professional service work; discuss and identify who will be the General Superintendent (not paid on force account) and who the Foreman in charge (paid on force account) will be.
- Agree on wage rates, material specifications and prices, and any travel/subsistence rates before the work begins, using the appropriate pricing methods and the Specifications.
- Agree on equipment rental rates, before the work begins, using the Blue Book and Specifications. The Engineer may disallow the use of equipment which is not in good working condition or that cannot be operated in a safe manner. The Engineer may also disallow equipment that is cost prohibitive. An example would be disapproving the use of a D-9 dozer when a D-6 dozer is all that is required. However, each situation must be reviewed on its own merits. For example, a D-9 dozer may be onsite and a D-6 may not; therefore, upon review, the D-9 may be cheaper when the D-6 transportation costs are taken into account. In lieu of disapproval, the Engineer may seek a negotiated agreement with the Contractor for use of the equipment at a reduced rate from that shown in the Blue Book. Agree on the negotiated rates in writing before the work begins. Rental rates higher than shown in the Blue Book may be approved for conditions that would subject equipment to greater than normal wear and tear.

Executing Force Account Work. If a Foreman is supervising some non-force account work, his or her time spent on Force Account work must be prorated between the different work activities.

Reimburse the Contractor for payroll burdens and fringe benefits for labor incurred on force account work. Provide acceptable documentation (e.g., ITD-0370, Labor Weekly Force Account).

The Contractor directs the work unless a change order is executed that gives this responsibility to the Engineer. The Engineer is responsible to ensure that force account work is performed in the most cost-effective manner possible.

The Engineer may require the use of any available equipment best suited for the work, recognizing the fact that such use on force account work should not cause cessation of work which normally could proceed otherwise, unless it is in the best interest of the Department.

Rental equipment available from sources other than the Contractor and more economical to the Department, considering the type of work, duration of the work, etc., should be brought to the Contractor's attention with a request that such equipment be made available.

For rental rates not in the Equipment Rental Blue Book, estimate the rate by extrapolating similar equipment or by checking the rates charged by local rental companies. If necessary contact the Construction/Materials (CM) Section for guidance. Attach a copy of the Blue Book rental rate or other documentation to the ITD-0371, Equipment Weekly Force Account.

When standby time is to be ordered by the Engineer, there must be a meeting with the Contractor to discuss the situation. Standby rate on equipment will be as specified in SSHC 109.03.C.5.f. Standby rate should not be utilized for extended periods of time when it would be more economical to release a particular piece of equipment from force account and recall its use later when it is again required. Also, standby rate should not be paid when a piece of equipment is down for repairs.

On equipment that must be assembled (such as crane booms, crawler tractor dozer attachments, and concrete deck machines), pay for the assembly work unless other arrangements are made. On equipment such as cranes, it may be necessary to start paying the agreed hourly rate when the crane leaves the owner's yard and continue until the work is finished. Agree upon payment of assembly and disassembly work before the work begins.

When equipment is not operating or handled to provide normal output or production, negotiate a reduced rate. This also applies when equipment is driven to the project under its own power (see SSHC 109.03.C.5.f.6).

Pay equipment transportation costs to and from a project for force account work. Examples include: haul truck, trailer, driver, and special permit fees.

Small shop tools having a listed rental rate of less than $10.00/day will be considered incidental, and will not be paid for separately.

If it is necessary for the Contractor to rent equipment from a rental agency, the Engineer is to verify the rate is competitive.

Materials acquired for force account work must meet the same acceptance criteria as other contract materials, unless otherwise approved by change order. Sales tax included on materials invoices is considered part of the actual materials cost. Materials quantities should be tracked using the ITD-0372 (Materials Weekly Force Account).

Payment for overhead and profit is included in the force account mark-ups.

Force account expenditures should be summarized using the ITD-0373 (Force Account Summary).

Payment of Administrative Expenses. Pay an administrative expense for coordinating work with an approved first or lower tier subcontractor, including professional service contractors, as stated in

SSHC 109.03.C.5.i. If the force account work by a subcontractor is performed along with regular contract work, reimbursement for administrative expenses will be prorated on the force account work total amount for Labor, Equipment and Materials supplied by the subcontractor or a lower tier subcontractor. Administrative expenses are only paid once per force account occurrence and are never paid for each tier of subcontracting.

Reports. Use forms ITD-0370, Labor Weekly Force Account; ITD-0371, Equipment Weekly Force Account; ITD-0372, Materials Weekly Force Account; and the ITD-0373, Force Account Summary Sheet to tracking force account work.

109.05 Partial Payments. Make partial payments to the Contractor at least once each month or bimonthly at the Contractor's request. Make these progress payments only for accepted work. When the Engineer's orders have not been fulfilled, payment may also be withheld. Generally, this withholding of payment is only for the specific work in question.

Timely submission of progress estimates is an important part of good contract administration. Both final and progress estimates, must be submitted as soon as possible. Construction work shall be accurately accounted for and paid without overpayment.

Progress estimates should be sent to the Contractor for signature within three days following the agreed cutoff dates. Because the Contractor's signature is optional on intermediate progress pay estimates, an estimate copy may be sent to the Contractor and used internally for processing. Only the final estimate requires the Contractor's signature. Attach an explanation letter for any item(s) not paid for, any deductions, adjustments, or issues that need clarification or that may be controversial, so the Contractor clearly knows what is being done.

Include payment for acceptable work, including extra work ordered, on the progress estimate for the period that the work was accomplished. If a change order has not been completely processed, work can still be paid on an estimate if the authorizing authority has approved the work and pricing, and the completed work is acceptable.

Consider withholding of all or part of the payment estimates when the Contractor is out of compliance with any of the following:

- Failure to correct deficient work or complete incomplete work
- Failure to maintain completed work or correct deficiencies resulting from the Contractor's failure to provide proper maintenance
- Failure to submit timely CPM schedules per 108.03
- Failure to provide material certifications
- Failure to provide certified payrolls
- Failure to provide adequate storm water management practices
- Failure to provide prompt payment to subcontractors or suppliers.

Ensure that the work being paid for is acceptable, and meets the plans and specifications requirements. It may become difficult, from the Department's standpoint, to request rework that has already been paid for. The Engineer should not wait until the project is substantially complete to prepare a punch list for corrective action. This list should be ongoing and progress payments made or adjusted accordingly.

Retainment. To comply with 49CFR requirements, the Department may not withhold retainage on progress estimates.

If there is a question of work integrity or of overpayment, the Engineer may deduct from the next partial payment once defective work or overpayment is discovered.

Even though the Department is no longer withholding retainage, a consent of surety letter is still required from the performance bond surety to cover the following two situations:

1. The Department overpays the Contractor.
2. The Contractor fails to pay all taxes owed.

A consent of surety letter example is presented below:

Willis

Telephone: 763-302-7100
Fax: 763-302-7200
Website: www.willis.com

Direct Line: 763-302-7214
E-mail: Nicole.Langer@willis.com

November 2, 2015

Idaho Transportation Department
PO Box 837
Lewiston, ID 83501

Re: Project: Broadway Bridge, Boise
Federal Aid Project Nos. A011(588)
Contract No. 8036 Key No. 11588
County: Ada Location: Idaho

As surety for the above referenced project, we consent to the release of contract retainage (and/or 100% progress payments). In accordance with subsections 107.02 and 109.05 of the Standard Specifications for Highway Construction, surety hereby guarantees, under it's performance bond, to promptly repay the Idaho Transportation Department for any overpayments, and further agrees to promptly pay any tax claims made pursuant to Title 63, Chapter 15, Idaho Code.

Liberty Mutual Insurance Company
Travelers Casualty and Surety Company of America

By: ______________________
Nicole Langer, Attorney-in-Fact

Willis of Minnesota, Inc.
1600 Utica Avenue, Suite 600
Minneapolis, MN 55416

Prompt Payment to Subcontractors. The Disadvantaged Business Enterprise (DBE) program requires that subcontractors be promptly paid by prime contractors for work items as they are performed and accepted by the Engineer. The following specification changes were made to SSHC 109.05 to ensure prompt payment is made:

Pay each subcontractor or supplier by the 20th calendar day after receiving payment from the Department, provided work performed by the subcontractor or supplier complies with contract requirements. Return retainage to each subcontractor or supplier by the 20th calendar day after the subcontractor or supplier completes work satisfactorily.

Certify to the Engineer that the Contractor provided payments to subcontractors or suppliers within the time specified in this section for each partial payment.

ITD's Diversity Management Tracking System will send an automated notice to Contractors that receive an estimate payment to log in and report payments made to subcontractors and suppliers during that time period. The payment information will be verified by the subcontractors and suppliers.

Ensure that first or lower tier subcontractors or suppliers meet these requirements.

At the pre-construction conference, instruct the Contractor on how to access the Diversity Management Tracking System for Contractor self-reporting. If the Contractor fails to self-report, the Engineer will be notified so that appropriate actions, including pay estimate withholding as described above, can be taken to bring the Contractor back into compliance.

Full Contract Obligation. Each District Engineer should insure that sufficient funds are obligated at all times to cover all current estimated costs (including incentives and contingencies) on each project under contract in their respective District.

The Engineer should estimate the final construction costs when construction expenditures reach 85 percent for any project within the contract. However, estimates should be performed earlier when warranted (e.g. when large cost change orders or quantity overruns occur).

Cost impacts for bid item quantity over and under runs should be assessed as well as costs associated with change order work to mitigate the potential for obligating funds less than, or in excess of, what is actually needed.

Change orders should not be approved unless sufficient funds are obligated to the project to cover these cost increases.

Assignment of Proceeds. Section 67-1022, Idaho Code, gives the authority to recognize assignments of obligations owing by the State to the State Controller, who is the only State official authorized to accept an assignment. District personnel, when contacted by Contractors or others concerning assignments, shall obtain the name, address, and phone number of the person who contacted them, and notify ITD's Legal Section.

Legal will contact the party in question and provide them with the necessary information and/or forms (Figure 109.05-1a-d) for pursuing the assignment. This form can be downloaded from the internet at the following address: http://www.sco.idaho.gov. Following approval of the assignment by the State

Board of Examiners, the State Controller will send copies to the Assignee, the Assignor, and the Department's Controller. The Controller will arrange for preparation of the expenditure voucher, in accordance with the assignment.

STATE BOARD OF EXAMINERS
Request for Recognition of Assignment

"Assignor" as used herein is ______________________________
Address ______________________________
____

"Assignee" as used herein is ______________________________
Address ______________________________
____

"Board" as used herein is the St[...] ...ners, State of Idaho.

"Controller" as used h[...] State Controller and Secretary to the Boar[...]

WHEREAS, t[...] ...s or may be obligated to make payments to [...] to its contractual or other obligatio[...] ...y described as follows:

...act No. ________, PROJECT NO.: ______________________
...ion: ______________________________
____
____
____

WHEREAS, Assignor has agreed with Assignee to assign all rights of payment for the above obligations to Assignee as reflected by the attached Agreement; and

NOW THEREFORE, pursuant to I.C. Sec. 67-1022, Assignee requests the Board to specially approve assignment of the above obligations on the conditions listed below:

REQUEST FOR RECOGNITION OF ASSIGNMENT - Page 1

Figure 109.05-1a

(1) Assignee agreed that its rights shall be subor te to any claims the State of Idaho or any of its or instrumentalities have or may have against Assign the future. These claims include, but are not lim tracts, tort claims, taxes, fines or penalties of a

(2) If the state receives more laim against the amounts owed to Assignor, Assignee the state the total cost of evaluating such claims. nclude, but are not limited to reasonable attor valuation of the conflicting claims and any or such evaluation, including but not limit transcript costs or any travel costs as nece d that the State of Idaho be made whole in is any dispute over the sums involved.

(3) made by the state to Assignee on the above ns, Assignee agrees to defend, indemnify an m. State of Idaho for any claims made against result from such payments to Assignee. It is intended the State of Idaho be made whole in any dispute involving yments made to Assignee.

The undersigned certifies that he/she is duly authorized by Assignee to execute this Agreement.

DATED this _____ day of ______________________, 19___.

ASSIGNEE	ASSIGNOR
Signature: ______________________	Signature: ______________________
Name: ______________________	Name: ______________________
Title: ______________________	Title: ______________________

REQUEST FOR RECOGNITION OF ASSIGNMENT - Page 2

Figure 109.05-1b

State of ________________)
: ss.
County of ________________)

On this ______ day of __________________, 19___, b... ..., the undersigned, a Notary Public in and for said stat... ...ally appeared _______________________________ known ... be the ASSIGNEE whose name is subscribed to the w... ... foregoing instrument, and acknowledged to me that h... the same.

IN WITNESS WHEREOF, I have her... affixed my official seal the day and yea... ...e first above written.

(SEAL)

____
...ry Public for ______________
...siding at ___________________
My commission expires ___________

... of ________________)
: ss.
...ounty of ________________)

On this _____ day of ________________, 19___, before me, the undersigned, a Notary Public in and for said state, personally appeared _________________________, known to me to be the ASSIGNOR whose name is subscribed to the within and foregoing instrument, and acknowledged to me that he executed the same.

REQUEST FOR RECOGNITION OF ASSIGNMENT - Page 3

Figure 109.05-1c

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

____
Notary Public for ___ ___
Residing at ______ ____
My commission exp ______

(SEAL)

The Board, having duly consid ... .est pursuant to I.C. Sec. 67-1022, speciall ... request on ___ ________________________ ... ssignment shall be effective seven (7) days ... y the State Board of Examiners.

____
J.D. WILLIAMS, Secretary
State Board of Examiners and
State Controller

..e: After the Assignee and Assignor have completed this form it should be mailed to:

State Controller
Attn: Phyllis Richards
P.O. Box 83720
700 West State Street
Boise, Idaho 83720-0011

After the State Board of Examiners approves the Assignment, each of you will receive an executed copy.

REQUEST FOR RECOGNITION OF ASSIGNMENT - Page 4

Form approved by Board of Examiners 12-12-88—amended 2-14-86

Figure 109.05-1d

109.06 Payment for Material on Hand. Pay for materials on hand when delivered to the project or stored in an acceptable storage place as described in SSHC 109.06. An "acceptable storage place" is considered as one that is under the control of the Contractor, and generally located on or adjacent to the project site.

An exception to this interpretation may be made in the case of precast or pre-stressed concrete beams, steel bridge girders, handrail, or signs. Depending on the individual circumstances, accept storage in the supplier or fabricator's yard, or other facilities away from the project. When storage is away from the project and materials verification is made by other than project personnel, the inspecting party shall provide documentation in a letter to the Engineer.

The amount paid for materials on hand should represent the fair value of the materials, including freight and sales tax, as evidenced by invoices, production costs estimates, or bid prices less the remaining work cost to incorporate the material into the project. The Contractor must request such payments in writing.

Lump sum items include materials, labor, equipment, and profit. Materials on hand will be paid as a percentage of the lump sum item. As an example of a project using WINCAPS, if a lump sum item is $100,000 and an invoice is received from the Contractor for $25,000 for materials, 0.25 will be posted as the quantity to the WINCAPS ledger sheet for payment for this material. If an additional invoice is received from the Contractor for $15,000 then an entry of 0.15 will be added to the WINCAPS ledger sheet to cover this material payment. This material percentage is calculated from the whole lump sum amount, not the remaining lump sum balance. The total of materials, labor, equipment, and profit should not exceed the quantity of one. The materials percent should not exceed 75% of the whole.

Material on Hand (MOH) stockpile quantities and prices are administered within SiteManager by going to Contract Administration, then to Contract Records, and finally to Stockpiled Materials. MOH accounts are drawn down as those materials are installed and paid for in the Inspectors' Daily Work Report pay items.

Invoice quantities cannot exceed the authorized contract item quantity. When multiple invoices are received, the material on hand unit price shall be adjusted to reflect the new amount needed to balance.

On multi-project contracts, the material on hand will be posted on projects based on the split in the detailed estimate, unless the material being paid for is to be used on only one project.

To correct a payment made for material on hand in excess of the contract amount based on plan quantity, a corrective entry will be made to the material on the hand WINCAPS ledger to deduct the overpayment for material on hand.

109.07 Allowance for Materials Left on Hand. Pay for materials left on hand when delivered to designated storage locations. The Resident Engineer shall verify material quantities, and coordinate the materials inventory and transfer to District Supply.

Project personnel should verify plan quantities and be continually alert for conditions that will change the required project quantities to avoid having large material quantities remaining on hand at the job completion.

When aggregates are crushed and stockpiled before use, the Contractor must be responsible for determining the stockpile quantity. Contractors should be discouraged from producing excess material in anticipation of selling the excess to the Department. The specifications clearly state that the option to purchase excess aggregates stockpiled at an approved location lies with the Department, not the Contractor. Normally, stockpiled material left on hand will be measured by the average end area method.

Refer to Administrative Policy 5539, Construction Materials Remaining on Hand, and SSHC 104.02 and 108.09 of this manual for further information about handling materials left on hand.

109.08 Acceptance and Final Payment. By the time the project is completed, inspection personnel should have reviewed and checked most of the quantities. Complete the remaining quantity checks immediately, with the records inspection completed by the District Records Inspector in a timely manner. Submit the final estimate to the Contractor by certified letter, which requires a return receipt.

Inform the Contractor of the necessary forms that are required to accompany the final estimate before payment can be made. The letter should discuss any penalties that will be assessed due to pending laboratory results that may impose an amount to be withheld.

The Engineer may also deduct pending asphalt failures and note in the letter, if applicable. The Contractor must be directed to submit a check to the Department covering the asphalt penalty amount.

Submit the final inspection and final estimate and records review, ITD-1996, and other required forms with the final estimate. This report should reflect the total project cost as listed on the final estimate. Disregard pending asphalt price adjustments costs or pending claims. If there are pending claims, the Contractor should be informed in the transmittal letter that the claims are being analyzed, and that final estimate acceptance will not jeopardize settlement of claims filed before the final estimate.

SECTION 110.00 – CIVIL RIGHTS

110.01 General. Receipt of federal-aid (FA) funds is contingent on implementing and compliance monitoring several Civil Rights (CR) programs by the Department. Three of the five CR programs: the Civil Rights Compliance Program, the Training Special Provisions (TSP) Program, and the Disadvantaged Business Enterprise (DBE) Program require that FA construction contracts contain special provisions stipulating that Contractors provide equal employment opportunity (EEO). Included in this is:

- Providing equal opportunity for the employment of minorities and women in the crafts utilized on the project (Civil Rights Compliance Program).
- Providing equal opportunity and taking affirmative action steps in the employment of minority and women trainees in the crafts utilized on the project (TSP Program).
- Providing Good Faith Efforts in subcontracting a portion of the work to certified Disadvantaged Business Enterprises (DBE) Race Conscious Program.
- Providing employment rights for Native Americans, including the Tribal Employment Rights Ordinances, if applicable (TERO program).

Use the following information as a supplement and guide for construction personnel who are administering federal aid contract "EEO Special Provisions", "Training Special Provisions", and "Tribal Special Provisions". These programs are further explained in the Civil Rights Compliance Program and the Disadvantaged Business Enterprise Program found on the Office of Civil Rights home page, along with program authority listings and other Department personnel responsibilities. Refer to the Civil Rights Compliance Program and the DBE Program for detail of actions to be taken when not specifically outlined within this section.

110.02 Preconstruction Conference. At the preconstruction conference, the Resident Engineer (RE) or the district Safety & Compliance Officer (SCO) should provide the Contractor the following:

- Bulletin Board Requirements. A list of bulletin board requirements, including links where current required posters can be viewed and downloaded can also be obtained on the ITD external website under "Business-> Click for More Topics->Construction Resources" OR "Inside ITD-> Click for More Topics-> Construction/Materials." http://apps.itd.idaho.gov/apps/manuals/ca/Project_Poster_Checklist_Links.pdf
- Office of Civil Rights Federal Aid Highway Construction Contractors Annual EEO Report online submission tool available at http://apps.itd.idaho.gov/apps/eeo1391form. (Contractors need to report on the last full pay-period in the month of July. Typically, this means the last week of July. However, if the Contractor did not work that week, then they would report any work

performed during the month of July. If no work was performed in July, then the Contractor will only submit basic project information, and select "no work performed.")

Review and emphasize the basic elements of the EEO Special Provisions at the preconstruction conference and place the following information in the Preconstruction Conference Outline, an example of which is located in CA Section 108.04. The RE or the district SCO is responsible for ensuring that the Contractor understands the commitments made when the contract was executed, and the consequences for failing to carry out those commitments. In order to have a more detailed understanding of the EEO Special Provisions, the RE and the district SCO should reference the Civil Rights Compliance Program and the DBE Program found on the Office of Civil Rights home page.

110.03 EEO Special Provisions.

General. Part I and II of the EEO Special Provisions contain the Contractor requirements to provide equal employment opportunity, and practice affirmative action in hiring, training, and promoting women and minorities in the crafts and in their subcontracting opportunities. As with any other provision in the contract, the RE is responsible for monitoring, administering, and ensuring compliance with the "EEO Special Provisions".

Resident Engineer's On-Site Inspection form ITD 2674. After each project is under way and the Contractor has employed at least two-thirds of the anticipated work force, the RE will conduct a minimum of three on-site inspections per contractor, per job (preferably at the beginning, middle and end of the project), and will record the findings of each inspection on an ITD-2674. Short-term projects of less than 50 working days duration require only one on-site inspection per contractor. Request that the Contractor take immediate corrective action if minor items (e.g. EEO policy not posted) are out of compliance. If the Contractor refuses or neglects to take the requested corrective action, the RE should initiate a Compliance Review (ITD-0086) by the headquarters Contract Compliance Officer (CCO). Forward electronic copies of all on-site inspections (ITD 0086) to the CCO.

- RE on-site EEO inspections will be conducted on:
    - All Prime Contractors
    - All Subcontractors with subcontracts of $10, 000 or more.
- The RE will complete the ITD-2674 and distribute as indicated on the form. EEO on-site inspections determine whether the Contractor is meeting the basic intent of the contract EEO Special Provisions. The inspections can serve as a reminder to contractors (who usually focus on completing the project) that ITD is also concerned about who is working on the project, and the environment in which they work.

In addition to routine contract monitoring by the RE, the district Safety & Compliance Officer (SCO) should randomly select current projects to determine:

- Whether the project file contains an ITD-2674 for the Prime and each covered subcontractor.
- Whether the information provided on the ITD-2674 completed by the RE (or the RE's designee) correlates with the SCO's independently conducted inspections.

The SCO should report their findings to the District Engineer (DE). Forward all random on-site inspection findings to the headquarters Contract Compliance Officer (CCO).

The RE and the SCO should refer to the Civil Rights Compliance Program in order to have a more detailed understanding of what to monitor while conducting the on-site inspections.

The CCO will also conduct annual reviews of selected contractors, which will be documented on an ITD-0086.

For procedures related to Contract Compliance Reviews, refer to ITD's Civil Rights Compliance Program found on the Office of Civil Rights home page.

Complaints. The Idaho Transportation Department is committed to thoroughly and promptly investigating each complaint in a confidential manner, and employing a process that treats all involved parties with respect. Refer to the Office of Civil Rights home page or a copy of these procedures, as detailed in the ITD Civil Rights Compliance Program, which will be provided upon request.

110.04 Disadvantaged Business Enterprise (DBE).

General. The DBE Special Provisions contain the Contractor requirement to ensure that Disadvantaged Business Enterprises (minority-, woman-, or otherwise disadvantaged-owned firms) have equal opportunity to participate in performance of the contract. If a DBE goal is included in the contract, the Contractor is required to make a good faith effort to seek out and consider DBE firms for work on the project. The Contractor's good faith effort is required to be documented on an ITD-2396 (DBE Commitments), which must be submitted at bid opening.

For procedures related to the topics below, refer to ITD's DBE Program Plan located on the Office of Civil Rights home page:

- Establishing Contract Goals
- Award of Contract
- Good Faith Efforts when Replacing DBE's
- Counting DBE Participation toward contract Goals
- Commercially Useful Function (Disadvantaged Business Enterprise (DBE) Job-Site Review Commercially Useful Function (CUF) Determination ITD-1701)

  - Form ITD 1701 must be completed for all DBE firms working on all Federal-aid projects regardless of whether or not there are specified DBE project goals

- Monitoring Compliance
- Record Keeping
- Sanctions
- Payments to DBE Subcontractors

110.05 Training Special Provisions (TSP).

General. The primary purpose of the Training Special Provisions Program is to train and upgrade minorities and women toward journey-level status in crafts where they are underrepresented. The contract will specify the number of training hours to be filled. The Contractor should assign training hours to crafts where minorities or women are underutilized. Minorities and women in training positions can be counted toward the EEO goals. RE's should encourage Contractors to bring trainees into the work force early in the contract to provide adequate opportunity for trainees and apprentices to complete their programs, and to reduce the risk of being found in non-compliance with the Training Special Provisions. The Contractor shall submit to the RE a plan showing how the Contractor will meet the TSP requirements before construction begins. This plan will include the number of trainees to be trained, the crafts that the training will cover and the approved training programs to be used. **All training programs must be approved before commencing work.** This plan must also show the starting time for the training in each craft, and the minimum length and training type for each classification.

Use the following ITD forms to document Training Special Provisions compliance: Training Action Request (ITD-2775), Trainee Monthly Progress Record (ITD-2776), and On the Job Training Agreement (ITD-2777).

110.06 Tribal Employment Rights Ordinances (TERO).

General. All Federal-aid projects located, in whole or in part, on Indian lands (meaning that construction limits are physically within reservation boundaries) are subject to Tribal Employment Rights Ordinances (TERO) governing employment practices and taxes. TERO requirements are identified in the contract proposal under the heading "Tribal Special Provisions".

Before the Contractor can begin work on a project covered by TERO, the RE must receive a copy of the executed TERO agreement between the Contractor and the Tribal Representative establishing preferential employment rights for Native Americans and the TERO tax amount, if applicable. The District Engineer, or designated representative must periodically (at least monthly) contact the appropriate TERO Representative to assure that the agreement is being honored. A memo documenting the contact must be transmitted to the ITD headquarters Contract Compliance Officer (CCO).

TERO taxes must match the same rate applied to all other contracts on the reservation. Differential or special treatment of Federal-aid highway construction contracts will make the TERO tax ineligible for Federal-aid reimbursement.

A reasonable Indian employment preference goal should factor in the Contractor's employment requirements other than core crewmembers as follows:

- A contractor's core crew is composed of full time employed individuals necessary to satisfy his/her reasonable needs for supervisory or specialty experienced personnel to assure an efficient execution of the contract work.
- The availability of skilled and unskilled Indian workers.
- The type of work to be performed.
- The employment goals for minorities and women established for the area by the U.S. Department of Labor's Office of Federal Contract Compliance Programs.

For state funded projects that are on reservations, the Department is not involved in the review or approval of any agreements between the tribe and the Contractor, and is not involved in TERO compliance.

110.07 Forms. All ITD forms identified within this section can also be found on Online Manuals or the ITD Form Finder system. For a more detailed explanation of the use of the identified forms, refer to the approved Civil Rights Compliance Program and/or the approved DBE Program found on the Office of Civil Rights home page.

110.08 Warranty Chipseal EEO Oversight. The following is the Contractor EEO self-evaluation process using the online submission tools located on the Office of Civil Rights home page. The overall approach is below:

- Office of Civil Rights (OCR) will identify warranty projects for the year
- OCR will contact the district Safety Compliance Officers (SCO's) to provide information and guidance on the process of self-evaluation with the due date for compliance.
- Contractors and their employees submit self-assessment form
- OCR forwards email submission to district SCO's for processing
  - If contractor is non-responsive, SCO will follow-up to ensure submission is received
- SCO's review and validate that the employee list(s) is a representative sample of the workforce
- OCR reviews the data and chooses 1/3 of the contractors for in-depth audit

- OCR conducts in-depth audits/reviews on the contractor

Forms can be obtained by using the links below:

Contractor On-Site Self-Inspection: http://apps.itd.idaho.gov/apps/ocr/selfinspect.aspx

Employee Questionnaire State-aid: http://apps.itd.idaho.gov/apps/ocr/empqueststate.aspx

Employee Questionnaire Federal-aid: http://apps.itd.idaho.gov/apps/ocr/empquestfed.aspx

SECTION 111 – FINAL REPORTS

This section describes the final documents necessary for project closeout.

111.01 As Constructed Plans. Provide as-constructed plans at project construction completion for all projects except stockpile projects. The district should retain all as-constructed plans, with a copy of major structure plans forwarded to the ITD Bridge Section and a copy of all building plans forwarded to the Facilities Manager of the HQ Mobility Services Section.

As-constructed plans should meet all current ITD CAD Standards and should be updated as information becomes available during the construction phase. This will avoid a potentially long delay in getting as-constructed plans finalized at project close-out. Show construction completion month and year on each plan sheet. Obtain current ITD CADD standards from the Division of Engineering Services (DES) Transportation Systems Section.

As-constructed plans should also show all utility and right-of-way plan changes.

111.03 Shop Drawings. Refer to both the ITD Standard Specifications for Highway Construction (ITD SSHC) Subsection 105.02 and the CA Manual Subsection 105.02 for requirements.

111.04 Final Estimate Voucher (ITD-1009). Refer to the Financial Services Manual for final estimate voucher preparation, coding, and submittal guidelines.

111.05 Project Quality Evaluation. Upon completion of a consultant-designed project or portion thereof (e.g., bridge design), the Resident Engineer must complete the ITD-0767 Project Quality Evaluation form. Before completing the ITD-0767, the Resident Engineer may wish to review the evaluation made by previous agreement administrators from the Professional Agreement Invoice and Progress Report (ITD-771) which includes a description of the consultant's performance every time the consultant requested a payment during the design phase. Forward the completed ITD-0767 to the Contracting Services Engineer.

111.06 Final Documents. The following documents are required:

- ITD-2242 Elapsed Time and Work Status Statement showing date project was completed in its entirety, including work by state or local forces completed by the Residency.
- District Engineer's final inspection letter and project acceptance letter prepared by the DRI.
- ITD-1996 Final Inspection and Review of Final Estimate and Records (including ITD-1845 and ITD-1970, as applicable), for both Federal and State-funded projects, prepared by the DRI. The ITD-1996 applies to contracts and work by local agency forces.
- ITD-1865 for work completed by railroad and utility companies.
- Material Summary Report (ITD-0858) prepared by the Residency and associated documents
  - Materials Certification Checklist (ITD-0852)
  - Materials Inspection Summary (ITD-0853)
  - Resident Engineer's Letter of Inspection of Contract Items (ITD-0854)
  - Independent Assurance Test Log (ITD-0860).

- Final materials certification letter (ITD-0500) prepared by District Materials Engineer and signed by the District Engineer.
- Surety Letter guarantying payment for over payments and tax claims.
- Local agency letter of acceptance, if applicable.
- Final approved CPM.
- Tax release letter prepared by the DRI and sent to the ID Tax Commission.
- Utility relocation records and utility permits issued by the Resident Engineer.
- Street, right-of-way monument, and public land corner certifications per Idaho Code 55-16.
- Pertinent project documents provided to the District Operations Engineer.

SECTION 112.00 – LABOR COMPLIANCE

112.00 General. The Idaho Transportation Department, as a contracting agency, is responsible to assure labor compliance by contractors, following federal-aid guidance and regulations, including Equal Opportunity (EO) requirements.

Any contracts, financed in whole or in part by federal-aid funds, must include the Required Contract Provisions (FHWA-1273) bound in the signed contract documents. These special provisions also require that all laborers and mechanics employed at the project site that perform contract work (including those performing remedial work under contract warranty clauses) be paid the prevailing (Davis-Bacon) wage and fringe benefit rates as established by the U.S. Department of Labor (USDOL). The USDOL defines laborers and mechanics in 29 CFR 5.2 (m) as those whose duties are manual or physical in nature (e.g., workers who use tools or who are performing the work of a trade), as distinguished apart from that of mental or managerial duties.

The contract provisions are based on:

- Davis-Bacon Act – Requiring payment of prevailing wage and fringe benefit rates as determined by the USDOL to all laborers and mechanics on federal government contracts.
- Copeland Act – Making it a Federal crime for anyone to require a laborer or mechanic to kickback their wages, and requiring contractors to provide weekly-certified payroll report submittals.
- Contract Work Hours and Safety Standards Act – Requiring time and one-half pay for overtime hours (i.e., over 40 hours in any workweek).
- 23 CFR Part 230 , Subpart D
- 23 CFR Part 633, Subpart A
- 23 CFR Part, 635.309
- 29 CFR Parts 1, 3, 5

Truck Drivers. Truck drivers are to be paid prevailing wage and fringe benefit rates when:

- Contractor or subcontractor drivers working **on the project site** (as defined below in Subsection 112.03).
- When loading and/or unloading materials or supplies on the project site for **more than 20%** ("de Minimis" time) of the delivery driver's workweek. Time accounting for de Minimis is the Contractor's responsibility, begins when the truck enters the project limits, and continues until the truck is outside of the project limits.
- Transporting materials or supplies **between** a facility that is part of the project site and the actual construction site.
- A driver transporting a portion(s) of the building material or when he/she works **between** a project site established specifically for the performance of the contract, or project, and where significant portions of the building or construction work takes place.

Leased Employees. The prime contractor must consider leased employees as part of its own organization and must pay the prevailing wage and fringe benefit rates, payroll submissions, compliance statements, and all other applicable federal requirements provided:

- The prime contractor maintains supervisory control over leased employee day-to-day activities.
- The prime contractor remains responsible for leased employee work quality.
- The prime contractor retains all authority to accept or exclude individual employees from work on the project.

112.01 Project Posters. A list of bulletin board requirements, including links where current required posters can be viewed and downloaded can also be obtained on the ITD external website under "Business->, Click for More Topics-> Construction Resources" OR "Inside ITD-> Click for More Topics-> Construction/Materials."
http://apps.itd.idaho.gov/apps/manuals/ca/Project_Poster_Checklist_Links.pdf

Residency staff must verify that the Contractor is displaying the required posters on the project site bulletin board.

112.02 Wage Decision Classifications. Each contract will contain the DOL published wage decision (WD) applicable to the project. The WD is the wage and fringe benefit rate listing for each laborer and mechanic classification, which the Department of Labor Wage and Hour Division Administrator predetermined to be the prevailing wage within a given area for a particular construction type.

The WD included in the contract may not always include all classifications needed for the required work on a project. In these cases, it is the Contractor's responsibility to identify all unlisted classification(s), including the applicable prevailing wage and fringe benefit rates for that work. These additional classifications may be added after award only as provided in 29 CFR 5.5(a)(1)(ii). Use the following link for guidance on the Davis-Bacon Additional Classifications Process.

Bidding Phase. In response to contractor inquiries regarding the WD in the contract:

- Refer contractors to the WD clause: "*Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses* (29 CFR 5.5(a)(1)(ii))".
- Refer contractors to the DOL website which includes the Prevailing Wage Resource Book. The Prevailing Wage Resource Book provides instructions regarding what information the DOL needs and how they will evaluate additional classification and wage rate requests.
- Refer contractors to the DOL Wage and Hour Division (http://www.dol.gov/whd/) if they desire further clarification regarding proper WD applications for specific upcoming projects.

- Inform contractors that all Request for Authorization of Additional Classification and Rate must be submitted on the DOL SF-1444 form, including all necessary supporting documentation. SF 1444 forms should be submitted to the DOL at the following email address: WHD-CBACONFORMANCE_INCOMING@dol.gov.

Emphasize:

- It is the contractor's responsibility to determine the correct prevailing wage to use when preparing bids.
- The DOL has final approval authority for additional classifications.

After Award. Discuss the wage decision (WD) and conformance criteria (i.e. Are additional classifications needed on this project?) during the pre-construction conference. Provide the SF-1444 form to the Contractor if needed.

The contractor request for additional classes and rates must be in accordance with the WD in the Prevailing Wage Resource Book. Specifically, the request must address the following:

- Work to be performed is not performed by a classification already listed on the applicable WD.
- Requested rate bears a reasonable relationship to other rates in the WD.
- Request complies with the guidance provided in the Prevailing Wage Resource Book.
- Submit the request to DOL for review and ruling (email the SF-1444 and a copy of the contract WD to the DOL at the following email address:
  WHD-CBACONFORMANCE_INCOMING@dol.gov).
- The regulations allow the DOL 30 days to respond with a ruling; however, if DOL does not response within 30 days that does not indicate tacit approval.
- Communicate the DOL determination to the Contractor and other interested parties immediately upon notification.
- Communicate the DOL determination to the Contractor and other interested parties. Advise the Contractor and other interested parties of the reconsideration and appeal process available under the regulations (29 CFR 5.5(a)(9) and 29 CFR Part 7.

During the Project. All Contractor and subcontractor (including lower tiered subcontractor) employees that meet the definition of a mechanic or laborer, as defined in the Code of Federal Regulations, must have a valid classification. Residency staff must also:

- Review certified payrolls. Look for classifications not listed in the WD or approved in advance or shortly thereafter the commencement of the project by the DOL as an additional classification request.
- Conduct onsite inspections, perform employee interviews, review certified payrolls, and identify additional classes if applicable.
- Address all non-compliance, complaints, and issues.
- Upon becoming aware, immediately address non-compliance with Davis Bacon, Equal Employment Opportunity, and/or complaints of discrimination.

- Document for the Project File ll discussion and all actions taken
- Consult with the DOL Wage and Hour Division
- Contact the Construction/Materials Section for additional assistance

Zone Differentials. The wage decision may indicate different work classification rates depending on established zones. 112.03 below defines zone determination as the physical place of the site of work. If the physical place of the project is located in two zones, the lower zone rate applies. Refer any questions concerning zone-differential pay rates to the Construction/Materials Section.

112.03 Site of Work.

Contractors of all tiers must pay laborers and mechanics the prevailing wage and fringe benefit rates for the work performed at the site of work.

Title 29 CFR 5.2 (l)(1) states "*The site of the work is the physical place or places where the building or work called for in the contract will remain; and any other site where a significant portion of the building or work is constructed, provided that such site is established specifically for the performance of the contract or project*".

In addition, Title 29 CFR 5.2 (l)(2) further clarifies that other work sites not located on the site of permanent construction, such as "*job headquarters, tool yards, batch plants, borrow pits, etc., are part of the site of the work, provided they are dedicated exclusively, or nearly so, to performance of the contract or project, and provided they are adjacent or virtually adjacent to the site of the work".*

The federal regulations do not define what is considered virtually adjacent. However, the Department has determined that all work areas located within a 1-mile distance of the project limits will be considered virtually adjacent, unless it can be shown otherwise by the Contractor.

Per 29 CFR 5.2 (l)(3), work sites "*Not included in the site of the work are permanent home offices, branch plant establishments, fabrication plants, tool yards, etc., of a contractor or subcontractor whose location and continuance in operation are determined wholly without regard to a particular Federal or federally assisted contract or project. In addition, fabrication plants, batch plants, borrow pits, job headquarters, tool yards, etc., of a commercial or material supplier, which are established by a supplier of materials for the project before opening of bids and not on the site of the work as stated in paragraph (l)(1) of this section, are not included in the site of the work. Such permanent, previously established facilities are not part of the site of the work, even where the operations for a period of time may be dedicated exclusively, or nearly so, to the performance of a contract."*

112.04 Warranty Work. Labor compliance as described throughout this section applies to all warranty or repair work. Therefore, a Contractor and/or subcontractor must also comply with these requirements, regardless of whether the work is five, ten, or more years after the original contract execution, if the Department uses federal-aid to fund any portion of the contract.

112.05 Exemptions. The DOL does not consider personnel who spend a major portion of their time on administrative, executive, or clerical duties as covered under these requirements. **However, a working foreman that devotes more than 20 percent of his/her time during a workweek on mechanic or laborer duties will be classified as a laborer or mechanic for the time spent performing those duties.**

Other exemptions are:

- *Apprentices and Trainees*. The only laborers and mechanics that may be paid below wage decision rates for a work classification, provided the apprentice or trainee is registered in an approved training program. Apprentices and trainees should be paid at the rates in the applicable approved training program.
- *Survey Personnel*. Contractors and/or consultant firms must consider survey crew members as subject to these provisions. Generally speaking, instrument operators, party chiefs, and rod persons are not covered, as they are not considered laborers and/or mechanics. However, crew members that perform manual work (e.g., clearing brush) fall within these provisions.
- *Owner-Operator*. This applies only to truck owner-operators. The owner-operator concept does not encompass other equipment (e.g., bulldozers, scrapers, backhoes, cranes, drilling rigs). To be considered an owner-operator, the owner must be driving the truck. Such owner-operators must be identified on payrolls with the notation "owner-operator" after each person’s name. However, it is not necessary to enter the number of hours worked, the wages paid, or the fringe benefits earned. If an owner-operator has more than one truck employed on a contract, the owner-operator must be a subcontractor. In addition, do not classify the other truck drivers (employed by the owner-operator) as owner-operators.

  Department staff/CE&I consultants will complete owner-operator interviews. Ask the driver to see their driver’s license, vehicle registration, insurance document, and fuel permit. All of these documents must show the same owner-operator name. The owner-operator is also responsible for major and minor vehicle repairs/maintenance and for fuel/oil payments as documented by maintenance logs and receipts.

  If an individual (not a corporation or LLC) provides evidence that he/she leased a truck, then that individual may be considered an owner-operator. The evidence provided for review must be compelling and satisfactory to the Resident Engineer. The evidence must include a bona fide lease agreement. Additionally, an owner-operator must:

    - Be independently established in his/her own trucking business
    - Bear ultimate responsibility for operation of the unit

- Be wholly responsible for cost items.

Compelling evidence includes:

- Maintenance logs and receipts
- Full Coverage Vehicle Insurance (Comprehensive, collision, liability, etc.)
- Permits, base plates, licenses, and taxes
- Fuel receipts
- Oil Change receipts
- Major and minor repair records
- Ferry charges and tolls paid
- Driver's remuneration (e.g., salaries, earnings, wages).

The evidence must also demonstrate that there is no close or continued supervision of the truck operation by the company leasing the truck (lessor). This means that the owner-operator may not work on a project upon which the lessor is a prime or subcontractor.

- ***Guards and Watchmen.*** Employees serving only as a guard or watchman are exempt. However, the wage rate paid must be at least equal to the current minimum rate under the Fair Labor Standards Act.
- *Suppliers.* The manufacturing offsite and the delivery of supplies to the project site, (e.g., sand, gravel, ready-mixed concrete) when performed by companies serving the general public, are typically exempt. The manufacturer and/or supplier must be able to demonstrate a history of sales prior to project bid advertisement.
- *Truck Drivers.* Davis-Bacon wage rates are not applicable for truck drivers under the following types of situations:
  - Material delivery truck drivers while off the project site.
  - Contractor or subcontractor drivers traveling between a Davis-Bacon job and a commercial supply facility while they are off the project site.
  - Truck drivers spending only a few minutes (i.e. less than de Minimis) at the worksite waiting to pick up or drop off materials or supplies are exempt.

  Contact the Construction/Materials Section if you have any questions regarding a specific truck driver’s exemption status.
- ***Railroad and Utility Adjustments.*** The contract provisions are not applicable to: 1) relocation work done by a public utility or railroad with their own forces, or 2) relocation done by a contractor engaged directly by the utility or railroad. It is important to note that if ITD engages the utility to move ITD’s utilities, as part of the utility adjustment, then there must be a separate accounting of labor, equipment, and materials.
- ***Quality Control/Quality Assurance.*** Personnel whose duties are material sampling and testing, and/or include quality and contract compliance inspections are exempt.
- *Traffic Control.* Personnel who provide traffic control for equipment drop-off and pick-up are typically exempt.

- Purchase orders, rental agreements, and other agreements for supplies or services.
- State or local agency force account labor.
- Contracts for debris removal following a natural disaster per USDOL.
- Separate projects on a local road or rural minor connector, not physically connected at either end to a Federal-Aid highway right-of-way.

112.06 Certified Payroll Reporting and Contractor Records Retention. Regulations require contractors to submit certified payrolls.

Contractors and subcontractors must submit weekly certified payrolls to the Resident Engineer (RE). In turn, the RE and his/her staff will check certified payrolls and retain them as part of the project file. Detailed checking of all certified payrolls is not necessary. Provide a detailed check of the first submitted payroll, any payroll with employee spot check interviews, and payrolls with new employees. Subsequent spot checks fulfill the checking requirements, except on certain projects where experience with an individual contractor indicates that a thorough review of each certified payroll is necessary. Subsection 112.12 herein contains a certified payroll review checklist.

Number certified payrolls consecutively. Consecutive numbering should be maintained for the prime contractor and for each subcontractor (or sub-subcontractor) working on a project. Submit numbered certified payrolls for time periods not worked but indicate "No Work was performed" across the form. When certified payrolls are not submitted during work suspension periods (e.g., winter), the Contractor (or subcontractor) should make a statement on the last certified payroll that no work will be accomplished until further notice. However, the project files should have adequate documentation to substantiate the fact that the Contractor (or subcontractor) was not performing work during periods when the contractor was not submitting certified payrolls. After suspension, when work resumes, the next consecutive number should be assigned.

Certified payroll copies must be completely legible. Do not accept faded or blurred copies. Upon discovering an error, do not return the payroll for correction. Instead, request a supplemental or corrected certified payroll.

There is no mandatory format for a Contractor or subcontractor certified payroll; however, all certified payrolls must contain the following information:

- The project number.
- The employer's full name.
- The employee's:
  - Classification in accordance with the contract wage-decision determination and/or any USDOL-approved additional classification(s).
  - Hourly wage and fringe benefit rate(s).
  - The number of hours the employee worked each day with overtime shown separately.
  - The gross amount earned.

- The itemized deductions made. Authorized deductions include those allowed or ordered by law (such as taxes and liens) and those requested by the employee. Verify all questionable deductions on the payroll and only allow correctly authorized deductions.
- The net amount paid.

Contractor certified payrolls are public records and are subject to disclosure, by statute, upon request. When receiving such a request, refer the requestor to the party who originated the document. If the requestor cannot obtain the information directly from the Contractor, they should state this in a letter to the District Engineer.

Upon receipt of this letter, the district will mail a copy of the requested information to the requestor with employee addresses and social security numbers redacted (blocked out completely). The cost for providing this service will be in accordance with the Department's Financial Services Section guidelines.

The Contractor must retain all payroll records for a minimum of three years after Department final acceptance of the project or final payment receipt for the contract work, whichever is longer. The contract work is not complete until the warranty period ends.

Statement of Compliance (WH-347). A statement of compliance must accompany each certified payroll and an authorized agent of the contractor must certify in writing that the facts are true. The statement indicates that the payrolls are accurate and complete, the wage rates contained therein are not less than those required by the contract wage decision, and the classifications set forth for each laborer or mechanic conform with the work performed. Use one of the following for the Statement of Compliance:

- WH-347 form, the optional Payroll and Statement of Compliance form that incorporates the statement of compliance on the reverse side.
- The contractor may prepare and submit another form, which must be attached to the payroll or noted thereon, as long as the contractor uses identical wording as contained on the WH-347 form.

112.07 Payroll Appointment Affidavit. If a contractor or subcontractor appoints a person other than a corporate officer, partner, or the sole proprietor to execute the weekly certified payroll statement and the WH-347 is not being used for certified payrolls, it must be indicated on a Payroll Appointment Affidavit (ITD-1800). The ITD-1800 is not required when the WH-347 is used for certified payrolls and the certification on page 2 of the WH-347 is completely filled out and signed.

The District staff should supply the Contractor with a blank ITD-1800 with the notice of intent to award. The completed payroll appointment affidavit should accompany the first payroll from the Contractor or subcontractor (including lower tier subcontractors), if applicable. In the event a contractor changes the authorized certifying individual, then the contractor must submit a new payroll appointment affidavit immediately.

If the Contractor or subcontractor is a corporation, then the President or Vice President must execute the payroll appointment affidavit.

When the Contractor or subcontractor is a partnership, then a member of the firm must execute the payroll appointment affidavit.

112.08 Fringe Benefit Payments. Typically, the wage decisions contain the fringe benefit rates or the additional classification process establishes the rate. Employers must make payment for the required benefits in the following manner:

- To an established approved program authorized by the USDOL: Generally, an employee accepts this method of fringe benefits payment as a condition of employment.
- To a predetermined program(s) (e.g, health insurance, life insurance, retirement accounts, savings accounts) where the employee agrees, enrolls, and voluntarily signs on to the program: The employee must designate his/her beneficiary(ies). In addition, the employee must willingly accept and allow the contractor to enroll the employee in the program(s).
- A direct payment of cash to the employee.
- Any combination of the above choices.

The contractor must state the fringe benefit compensation method clearly on the statement of compliance. If payment is by cash, it must be readily determined from the certified payroll.

112.09 Overtime. For federal-aid projects, all hours worked in excess of 40 hours per week must be paid at one-and-a-half times the basic wage rate. The term "basic wage rate" means the straight time hourly rate <u>actually being paid or the contract wage decision minimum rate, whichever is greater</u>. The contractor is to apply fringe benefits to overtime hours at a straight time rate. For overtime purposes, contractors may pay state holiday at a normal workday rate.

For non-Federal-Aid Projects, all hours worked in excess of 40 hours per workweek must be paid at one-and-a-half times the basic wage rate (use "basic wage rate" described above).

112.10 Employee Interviews. The Resident Engineer or his/her staff must conduct contractor employee interviews to verify compliance with federal and state statute. District staff must record all employee interviews on the ITD Labor Compliance Employee Interview form (ITD-2014). Staff must conduct interviews throughout a project's lifecycle to ensure a sufficient representative sample for all employed worker classes and ethnicities on the contract. To be considered sufficient, interviews need to include both a representative sample of the Contractor and subcontractor(s) (including lower tier subcontractor) employees.

112.11 Non-Compliance. If there are questions of non-compliance, follow these required steps. Non-compliance may be uncovered by: 1) certified payroll reviews; 2) employee interviews; and/or 3) receipt of a complaint by project personnel, labor unions, the Department of Labor (US or Idaho), or other outside individuals or organizations. Treat all complaints as confidential and investigate as follows:

- When applicable, send a letter to the affected employee(s) by certified mail requesting information (Figure 112.11.01 below).
- Notify the Contractor of possible non-compliance by letter. In this letter, request the Contractor's help and seek an explanation and/or correction about the matter in question. If it is found that the reporting (or certified payroll) was made in error, ask for an amendment or a corrected report (or certified payroll). **DO NOT** return the original report (or certified payroll).
- If non-compliance is still in question, or if the affected contractor denies it, then residency staff must perform a more comprehensive investigation. This includes performing additional interviews with the person or persons involved in the alleged non-compliance. The investigation should include everyone involved, along with the contractor's representative. This may also include an audit of the affected contractor's records.
- If the investigator finds a contractor in non-compliance with the contract requirements, inform the Contractor in writing, and request appropriate corrective actions be taken. If there is an underpayment of wages, the contractor must furnish a supplemental certified payroll indicating that the contractor made restitution. It may be necessary, in certain instances, for the contractor to furnish additional proof of payment in the form of photo copy of both sides of the adjustment check or signed acknowledgement from the employee that the contractor made the employee whole.
- Upon finding non-compliance, keep an adequate chronological record until its final disposition. Keep the contractor apprised about all actions that progress during the investigation (preferably in writing). Seek assistance from the Construction/Materials Section, the Department EEO Manager, and/or the Legal Section as necessary or applicable.

The most frequent occurrences of non-compliance result from the following two situations:

1) *Subcontractor Violations.* The prime contractor at times fails to realize that he/she is responsible for the subcontractor's (and lower tier subcontractor's) labor compliance, and that

the contracting agency has no direct contract with the subcontractors (and lower tier subcontractors) and must deal with the prime in these matters. These labor compliance violation types often require the prime contractor to pay restitution for wages due by the subcontractor (and lower tier subcontractor).

2) *Employees Working in More Than One Classification.* A contractor may fail to record on the payroll in cases where an employee works in more than one classification for any meaningful period of time (1/2-hour increments or more) with varying wage and fringe benefit scales.

112.12 Semiannual Labor Compliance Enforcement Report. FHWA requires the Department to file a labor compliance activities summary report using the FHWA-1494 form two times annually for the periods of 10/1 to 3/31 and 4/1 to 9/30.

Each residency will compile information for federal-aid projects under its jurisdiction for the reporting periods and must submit the report(s) to the Construction/Materials Section. Completely fill out all lines in the report.

The Construction/Materials Section must receive the residency report(s) by no later than the end of the first full week following the end of the reporting period.

The Construction/Materials Section will compile the supplied information and submit a statewide report to USDOL with a copy provided to the FHWA Idaho Division.

Certified Payroll Review Checklist. The following is a checklist to use when checking a contractor's payroll:

1) Is the project number on the payroll?
2) Does the payroll show the payroll period covered?
3) Is the employee's full name shown?
4) Are classifications complete and in accordance with the contract wage decision?
5) From your knowledge, are workers properly classified for work performed?
6) If codes are used for classifications, has a copy of the codes been submitted?
7) From your knowledge, are all hours worked each day shown on the payroll?
8) Has the Work Hours Standard Act been complied with, as to payment of wages for work, in excess of 40 hours a week?
9) Are wage rates at least equal to those in the contract wage decision?
10) Are fringe benefits paid as required by the contract wage decision?
11) Dose the payroll show net wages paid?
12) Are all deductions allowable or authorized?
13) Are all apprentices and trainees in an approved program, and is their status shown?
14) Is the payroll mathematically correct?
15) Does the payroll include the required statement of compliance?
16) Has the certified payroll been submitted within one week following the end of the work covered by the payroll?

17) The employees address is **not** to be shown on the payroll.
18) The Social Security Number is **not** to be shown on the payroll.

Example Employee Letter

[Current Date]

Mr. or Ms. ________________

RE: [Project Number]; [Key Number]
[Project Name]; Request for Labor Compliance Information

Dear Mr. or Ms. _____________:

This office is responsible for assuring that employees of contractors engaged in highway construction are paid in accordance with the contract for all hours worked. The purpose of this letter is to ascertain whether you are receiving the proper pay for your work classification and for all hours worked.

This inquiry is being sent to you, rather than conducted on the project site, to ensure your anonymity. Information received regarding this matter is considered confidential and your identity will not be disclosed to the employer without your written consent.

We would appreciate you answering to the best of your knowledge the attached questions and return your answers to us. Please use additional sheets if necessary and reference your responses to the numbers on the attachment.

If we do not receive a reply from you within 30 days from the date of this letter, we will consider that you are satisfied that the payments made to you are correct.

Sincerely,

Resident Engineer

Attachment:

Figure 112.11.01

[Project Number]; [Key Number] [Project Name]
Request for Labor Compliance Information Attachment

The payroll records indicate you were employed by (name and address of company) on the above referenced project from (date) through (date). The records indicate you were employed as a (work classification). The contract wages and fringe benefits for this work classification are (wage and fringe benefit rates)

1) Please indicate your work duties and tools used: ____
____
____

2) Were you being paid the contract wage and fringe benefit rates? ___ If no, what were the rates?____
____
____

3) Were you paid at the rate of time and one-half, for all hours worked in excess of 40 hours per week?___

4) If no, how many hours were you underpaid and on what dates? _________________________________
____
____

5) Did the contractor require you to return payments (i.e., kickbacks)? __ If yes, how much and on what dates? ____
____
____

6) What evidence do you have to substantiate underpayments or kickbacks (e.g., time cards, check stubs, diaries, cancelled checks)?____
____
____

7) What was the normal starting time for each day?_________________

8) How much time were you allowed for lunch?____________________

9) Did you ever complain about underpayments or kickbacks? ___ If yes, to whom and what action was taken?____
____
____

10) Do you have anything further to add? ____
____
____

Name:____________________________
Address:__________________________
____
Phone:___________________________

Signature: ________________________
Date:_____________________________

Figure 112.11.01

SECTION 113 – RECORDS

This section describes records necessary to administer an ITD construction contract by District staff consisting of Resident Engineers (RE), project coordinators (PC), inspectors, materials testing staff, office staff, and District Records Inspector (DRI).

113.01 Contract Item Work Report. Contract Item Work Report (CIWR). Prepare a Contract Item Work Report (formerly a ledger sheet) for each pay item in the contract. Also, any additional payment items (or reductions) listed on the progress and final estimate must be supported by a CIWR**.**

Include units as completed, and reference a source document for each pay item entry. The source document will usually be an inspector's Daily Work Report (DWR) (formerly an ITD Standard Construction Diary ITD-0025), a pay item sheet or load tickets. In some cases, cross sections, the mass diagram, computer runs or other materials may be the source document. Reference the source document in the CIWR.

Make entries each day work is performed and pay units are completed. Examples of items in this category are aggregate base, asphalt applied, plant mix, concrete. Post other items periodically (usually weekly or as established by the Resident Engineer) if the work covers several steps requiring considerable time before acceptance can be made. Examples of such items in this category are fence, guardrail, and clearing & grubbing.

The top portion of the CIWR provides a record of the bid and authorized quantity and any changes thereof. Compare the authorized and actual quantities periodically, to timely detect significant overruns or under-runs, which should be addressed via change order per Subsection 104.02 of the Standard Specifications.

Perform cost accounting procedures as follows on single or multiple projects let under one contract:

- Prepare a CIWR sheet for each contract item listed in that contract.
- Progressively post all quantities.
- Enter all change orders.
- Cross-reference CIWRs and prepare estimate vouchers at least monthly. (See Subsection 109.05, Partial Payments, in the Standard Specifications for details.)
- The project and contract number will represent all the projects in the contract. CIWR entry categories should include the actual project number.

When project CIWRs must be corrected due to errors, delete the incorrect entry and “repost” the correct entry to avoid any confusion resulting from the new entry.

113.02 Materials Inspection Summary and Certification.

See the Department's QA Manual for material inspection summary and certification requirements.

113.03 Daily Work Report (Standard Construction Diary).

General. The Daily Work Report (DWR) in SiteManager or Standard Construction Diary (ITD-0025) provides the Department with a complete and accurate record of the contractor's operation(s), and to support the fact that the project was constructed in conformance with the contract plans, specifications, and special provisions. The DWR(or ITD-0025) provides facts and figures to justify pay quantities, and information to support or deny a contractor's claim for extra work, delays, or suspended or eliminated work, or changed conditions. *Maintain force account records whenever there is a possibility of a contractor's claim (*See Subsection 109.03 of the Standard Specifications*).*

Preparing and Submitting Daily Work Report. Instructions for preparing the ITD-0025 Standard Construction Diary are included with the ITD-0025 in Form Finder. Instructions for preparing SiteManager Daily Work Reports are included in the SiteManager User Guide (SMUG). Complete the DWR throughout the day as the work happens. Do not take notes and then write the official DWR (diary) at a later time. Electronic DWR's (diaries) are acceptable if they are being completed throughout the day (e.g. on a laptop computer in the field).

Measure, and then document quantities in the ITD-0025 or DWR and supporting source documents, on a daily basis.

When multiple projects are awarded under one contract, quantities should be reported under the appropriate project funding code (work authority) according to actual placement on the project. Both stations and funding codes should be reported with pay quantities to assist office personnel and the District Records Inspector in cross checking reported quantities. Bid items shown in summaries, proposals, and estimates are to be used only as a guide in identifying locations and estimated item quantities. Proration is permissible for items such as mobilization, lump sum items, trainees, and traffic control, based on detailed estimates. Questions regarding charges to projects should be directed to the Project Accounting Unit of the Financial Services Section.

The Resident Engineer or designee should review and initial all project DWRs. The DWR approval process is as shown in the SMUG. It is the Engineer's option to file project diaries by date, operation, or the reporting individual. Prepare diaries in ink or electronically. Avoid the use of light blue colors, as these may not reproduce. **Print legibly. Do not use longhand**. Diaries or DWR's become a source document when used to report quantities, and are critical in defending the Department against claims.

113.04 Pay Document Inspection Program.

General. Verify all quantities by a checking process directed by the Resident Engineer. To the extent possible, computing and checking should progress concurrently with the project. Both the computer and the checker should initial checked project records, along with the date(s) when the check was completed. Print the name and sign above, when signatures are required.

Routine records checking will provide early errors and omissions detection, keep the checking current, and expedite final payment (and project closeout) as each phase or item is completed. Checks must assure that the items are correct from source document to final estimate. Checks should verify computations (including mathematical accuracy), activity documentation, and specification, policy and procedures compliance.

The Resident Engineer should also verify final quantity estimate accuracy through a system of concurrent independent project records checking. The District Records Inspector (DRI) will be assigned this responsibility. More details covering the records inspection review program may be found in the DRI Inspection Guide Lines.

Independent Inspection. The independent records inspection includes the following:

- Routinely check the project records as the work progresses.
- Provide a complete check from source document to final estimate for all items.
- Provide a written report of findings after each inspection.
- At the District's option, the DRI can submit a monthly status report to the District Engineer documenting ongoing DRI reviews.
- The DRI will reconcile the final estimate with the CIWR before submittal to the Contractor.
- The Final Inspection And Review Of Final Estimate And Records (ITD-1996) must be submitted with the final estimate to the Financial Services Section.

The DRI should make arrangements with the Resident Engineer to independently audit records as items are completed. Project personnel must compute and check quantities for each item before this audit should be performed. The DRI should indicate that source documents, CIWR, records and computations, and/or audit work papers have been verified for accuracy and compliance by audit symbols and/or initials and dates.

Any additional help required to keep the records inspection current should be provided from qualified personnel that are not assigned to the Resident Engineer in charge of the project.

Written reports will keep the district informed of the status of records, payments, checking, and provide a record for the project files. The report should document any discrepancies and corrective action(s) taken. The DRI should not make changes to project records. Any discrepancies should be rechecked by project personnel who originated the entry. If necessary, make corrections and document the actions taken. The District Engineer, in writing, can waive the necessity of rechecking if the item dollar value is deemed insignificant.

Disposition of Adverse Findings. The DRI will report procedural deviations (not minor mathematical errors) to the District Engineer as soon as they are discovered. The District Engineer will resolve in writing all differences shown on the ITD-1996, which have not been resolved by the time the final estimate is prepared.

If the adverse disposition letter is prepared by the Resident Engineer, it should either be signed by the District Engineer or be accompanied by a letter indicating District Engineer concurrence.

The adverse disposition letter should contain at least the following information:

- Brief History.
- Justification for accepting the exception.

- Assurance that material was received.
- Corrective action(s) taken. (i.e. Action plan to prevent deviations from happening on current and future projects.)

On Federal-aid projects, federal participation or non-participation recommendation(s) must be included in the adverse disposition letter. On State projects, acceptance for final payment should be recommended.

113.05 Recordkeeping on Special Projects.

General. These procedures are to be followed on projects completed by local forces under actual cost agreements, safety program projects, and projects completed by state forces involving federal funds. These procedures are not to be used when the project involves only utility or railroad work, such as railroad grade crossing projects, when the work is accomplished by the Utility or Railroad Company. (See CA Manual 105.07.)

Project Administration. The District Engineer will assign an engineer (Project Coordinator) to each project. This assignment should be given to an individual whose construction knowledge is commensurate with project type and complexity. This may be a Resident Engineer, Traffic Engineer, or Maintenance Engineer depending on the project type.

Hold a preconstruction meeting between the engineer and the local agency before beginning work to clarify local agency roles and requirements. Point out that the work performed and documents supporting this work must be in accordance with 2 CFR 200 Super Circular. (See the District Records Inspection Guide Lines for these documents.) Place Preconstruction meeting minutes in the project files, and submit a copy to the District Materials Engineer.

Inspection. The inspection required on these projects will depend on the complexity and nature of the work, and will be at the discretion of the assigned engineer. A final acceptance letter from the District Engineer will be required on all projects with charges to CN, UT, SF or ER to verify completion and compliance with plans and specifications.

Materials Inspection and Acceptance. Accept small quantities of miscellaneous materials by visual inspection and documenting on Form ITD-0854 (Resident Engineer's Letter of Inspection of Contract Items) submitted with Form ITD-0852 (Materials Certification Checklist). Submit Form ITD 0853 (Materials Inspection Summary) as needed.

Accept small material quantities taken from local government agency stock, by a certification provided by a responsible representative of the local government agency. For larger material quantities (or material supplied by the State), the local governmental agency (or state) should obtain a certification from the supplier. This will then be submitted with the ITD-0854.

Form ITD-0852 must accompany Form ITD-0854, and be submitted to the District Materials Engineer for approval.

Changes. Any plan, specification or agreement changes should be accomplished via change order per Subsection 104.02 of the Standard Specifications. Show the local agency as the Contractor.

Forms and Reports. The following forms and reports are also required on all special projects:

- Form ITD-2242 required on all projects.
- Materials certification on all projects (Forms ITD-0852 and ITD-0854).
- A final acceptance letter from the District Engineer is required on all projects, except those constructed by state forces.
- A Final Inspection And Review Of Final Estimate And Records (ITD-1996) will be required on all projects. The audit conducted by the District Record Inspector shall be in accordance with requirements outlined in 2 CFR 200 Super Circular.
- The Invoice Entry and Tracking Form should be prepared when required. The form should be signed by a responsible representative of the local jurisdiction performing the work.

113.06 Construction Photographs.

A good set of photographs is an invaluable supplement to project records. The following are suggestions and tips:

- Take pictures of situations which are difficult to adequately describe.
- Take pictures of any situation that you suspect might develop into a dispute or claim.
- Fill up the viewing screen with the object you are trying to show.
- To be admissible as court evidence, photographs must be documented properly, including a time and/or date stamp or electronic stamp.
- If possible, take pictures of the project site before construction begins.
- When accidents occur on the project, get pictures of the traffic control devices which existed at the time of the accident.

113.07 Records Retention.

All project records should be scanned and uploaded to ProjectWise. All records must be retained for a minimum of three years from the date of the final voucher. See 49 CFR 18.42 for details.

SECTION 114 – SAMPLER/TESTER AND INSPECTOR QUALIFICATION

114.00 General. The Division of Highways Inspector Qualification Program (IQP) meets the Idaho Transportation Department (ITD or Department) mission and the Code of Federal Regulations. The IQP consists of two parts: (1) sampler/tester qualification, and (2) inspector qualification. The overall objective is to provide qualified personnel to perform sampling, testing, and inspection on all Department construction projects.

114.01 Sampler/Tester Qualification Criteria. Sampler/Tester personnel must be qualified in accordance with ITD's Sampler Tester Qualification Program (STQP) and the Western Alliance for Quality Transportation Construction (WAQTC) guidelines before performing any sampling and testing on Department construction projects. The STQP/WAQTC guidelines are located in the STQP/WAQTC Registration, Policies, and Information Handbook (RP&IH), Idaho version. A copy of the RP&IH can be obtained from the Training & Development Section, one of the district trainers, or it may be downloaded from the Department's Inspector and Technician Qualification Information and Registry website.

The Inspector and Technician Qualification Information and Registry website also has Sampler/Tester qualification definitions, and individual personnel qualification registry and expiration dates.

114.02 Inspector Qualification Criteria. Department construction project inspectors are classified as **Professional or Technical**.

- **Professional Inspectors** have a bachelor's degree or above in Civil Engineering and/or an engineering license, or a bachelor's degree or above in Construction Management. They are exempt from the Sampler/Tester (WAQTC) prerequisites under the inspector qualification criteria.
- **Technical Inspectors** are all other individuals who do not qualify for the Professional Inspector category. **Technical Inspectors are required to have held the prerequisite Sampler/Tester certification in the corresponding area(s).**

Further breakdown by Department employee job classification is as follows:

- Manager 1/Technical Engineer 2 and above: Exempt from this process.
- Technical Engineer 1 and Transportation Staff Engineer (TSE): Exempt from Sampler/Tester (WAQTC) requirements per the Professional Inspector definition above.
- Transportation Staff Engineer Assistant (TSEA) **with** a Construction Management degree: Exempt from Sampler/Tester (WAQTC) requirements per Professional Inspector definition above.

- Transportation Staff Engineer Assistant (TSEA) **without** a Construction Management degree, Transportation Technician Principal (TTP), Transportation Technician Senior (TTS), Transportation Technician (TT), and Transportation Technician Apprentice (TTA): See Technical Inspector definition above. These classifications must, at some point, have been Sampler/Tester (WAQTC) qualified in the corresponding Qualification Areas. However, the employee's Sampler/Tester Qualifications do not have to be current to perform inspections.

To become a qualified Inspector in the Contract Administration, Earthwork and Base, Surface Treatment and Plant Mix Pavement, Concrete and Structures, and Traffic Construction Inspection Qualification Areas, the applicant may choose to complete the qualification process by the Course and Exam Method or Exam Only Method described below.

Managers (at their discretion) may require any and all employees to complete the qualification process by the Course and Exam Method only.

The use of electronic devices (including smart phones) will not be allowed during qualification exams, except that basic hand-held calculators may be used as needed.

To become a qualified Inspector in the Environmental NPDES/Storm Water Qualification Area, the applicant must complete the qualification process through the Course and Exam Method **only**.

Course and Exam Method. The applicant must:

- Have held the Sampler/Tester (WAQTC) qualification for the corresponding Inspector Qualification Area, unless exempt.
- Attend the entire Qualification Area course.
- Pass the written examination (80% minimum score). Failure to pass the Qualification Area written exam will require the applicant to retake the entire qualification course.

Exam Only Method. The applicant must:

- Have held the Sampler/Tester (WAQTC) qualification for the corresponding Inspector Qualification Area, unless exempt.
- Pass the written examination (80% minimum score). Failure to pass the written exam will require the applicant to take the entire qualification course or wait 30 calendar days to retake the exam.

Qualification Criteria Flow Chart.

SAMPLER/TESTER QUALIFICATION

All individuals that sample or test must be qualified.

INSPECTOR QUALIFICATION

Individuals that perform Inspections on Department construction projects:

Department Employees:

- TSE, TSEA, TE1 With degree in Engineering or CM
  - Pass Inspector Qualification Exams
  - No Sampler/Tester (WAQTC) Qualification Needed
- TSEA, TTP, TTS, TT, TTA
  - Pass Inspector Qualification Exams
  - Must have been qualified once in the appropriate Sampler/Tester (WAQTC) Qualification Area.

Local Agency/Consultant Personnel:

- Project Manager With degree in Engineering or CM
  - Pass Inspector Qualification Exams
  - No Sampler/Tester) (WAQCT) Qualification Needed
- Technician
  - Pass Inspector Qualification Exams
  - Must have been qualified once in the appropriate Sampler/Tester (WAQTC) Qualification Area.

114.03 Inspector Qualification Areas. A minimum competency level in the following Qualification Areas is required before performing inspections in that area.

As noted below, each Qualification Area references material from the ITD Standard Specifications for Highway Construction (SSHC), the corresponding WAQTC qualification areas, the Contract Administration (CA) Manual, and the Quality Assurance (QA) Manual.

Qualification Area	Standard Specifications for Highway Construction	Other Information
Contract Administration	Section 100	CA Manual Section 104 through 115
Earthwork and Base	Sections 200, 300, and applicable parts of 600	Corresponding CA and QA Manual sections. Prerequisite Certification: Sampler Tester AgTT & EbTT
Surface Treatment and Plant Mix Pavement	Section 400	Corresponding CA and QA Manual sections. Prerequisite Certification: Sampler Tester AgTT & AsTT or AsTT2
Concrete and Structures	Sections 400, 500, and applicable parts of 600	Corresponding CA and QA Manual sections. Prerequisite Certification: Sampler Tester AgTT & CTT or ACI-CFT
Traffic Construction Inspection	Applicable parts of Section 600	Corresponding QA Manual sections. CA Manual Section 616 through 619 and 656
Environmental NPDES/Storm Water[1]	Applicable parts of Section 100 and 200.	ITD Stormwater Website

NOTE: [1] Initial course length is 24 hours; requalification course length is 8 hours.

114.04 Examination Process. To qualify, applicants are required to pass a written examination for the corresponding Qualification Area to demonstrate both a knowledge and understanding of the inspection policies and procedures.

Applicants must pass the written examination by scoring a minimum of 80% on the entire written exam for each Qualification Area.

Individuals who fail the examination will be required to wait 30 calendar days before retesting, or they can attend the training course and re-take the Qualification Area examination without waiting 30 calendar days. It is strongly recommended that hands-on training and practice be done during the 30-

day waiting period. The full fee will be charged each time a Qualification Area course and/or written examination is taken.

Written Examination. The Exam Administrator should thoroughly explain to the participants what the exam(s) will entail (including the examination rules) before the exam(s) begins.

The examination is open book and timed, with multiple choice questions (some require calculations) or true/false questions. All exams require detailed knowledge of ITD's SSHC, the CA Manual, and the QA Manual. The Environmental NPDES/Stormwater qualification exam will also be based on other source materials.

The applicant is required to bring the resource materials needed to complete the examination (e.g., No. 2 pencils, erasers, and clean scratch paper.). Some questions require calculations, so a basic hand-held calculator will be allowed. However, calculators may not be shared and the use of smart phones will not be allowed.

The Exam Administrator will collect all exams and used scratch paper at the end of the exam. The Exam Administrator will destroy the scratch paper.

The written exam material will not be discussed with, or provided to, any unauthorized individual.

Exam scores will remain confidential.

Participant Notification. Applicants will be notified of exam outcome(s) within ten (10) work days of the examination completion date. If applicable, the re-examination procedure will also be explained to unsuccessful applicants. (Also see Subsection 114.06, Qualified Inspector Registry.)

114.05 Qualification Area Course Registration.

Each applicant must submit the following at least two (2) weeks before starting the Qualification Area course and/or exam process:

- A completed ITD-2905 Inspector Qualification Registration form.
- A completed, signed, and dated Right and Responsibilities Agreement (ITD-2905). The agreement informs the applicant of their rights and responsibilities, along with the consequences if the responsibilities are violated.
- A check to cover any applicable fee. The fee schedule is on the Inspector Qualification Registration form.
- Any other required documentation.

Cancellation Policy. The qualification venue will set the minimum class size for each course or examination. If the minimum size is not reached, the course or examination may be canceled. Courses or examinations may also be canceled for other reasons that have not been specifically stated. Every effort will be made to notify the applicants well in advance if a cancellation is necessary. If a course or examination is canceled, the applicant may request a refund of the pre-paid fee or ask to be enrolled in the next available course or examination.

Refund Policy. Cancellation by the candidate within seven (7) work days of the qualification course date (without their class slot being filled) will result in 50% of the fee being refunded. If their class slot can be filled, 85% of the fee will be refunded (15% will be retained to cover administrative costs).

An unforeseen emergency during the qualification course or exam will result in no refund of fees, but the candidate can retake the course or examination, whichever is applicable, at a later date by paying only the fee of 15% of the course and/or exam fee to cover administration costs.

No fee refund will be made for failure to pass the examination portion of the qualification process.

114.06 Qualified Inspector Registry.

The ITD Training & Development unit will log the successful applicants on the Inspector and Technician Qualification Information and Registry located on the ITD website within ten (10) work days after qualification exam completion.

The logged information will include:

- A unique qualification number
- The successful applicant's full name
- The Qualification Area as designated by:
  - Contract Administration (C.A.)
  - Earthwork & Base E.& B.
  - Surface Treatment & Plant Mix Pavement S.T. & P.P.
  - Concrete & Structures C. & S.
  - Traffic Construction Inspection T. C.
  - Environmental NPDES/Stormwater E. NPDES

114.07 Qualification Renewal Policy.

Interim or qualification refresher courses may be offered, but the inspector is ultimately responsible for staying abreast of source document, policy, and procedural changes.

Inspector qualification renewal is required after five (5) years by the last day of the month when the qualification was completed, for all courses with the exception of the NPDES/Stormwater course, which will require a refresher with frequency to be determined by the ITD Environmental Services Manager. The qualification renewal procedures are the same as for the initial qualification. The inspector is responsible for arranging to obtain his/her applicable qualification renewal, and must do so before the qualification expiration date.

An inspector that fails to successfully complete a qualification renewal in a specific Qualification Area will be considered disqualified in that area only, until the qualification renewal requirements have been successfully met, subject to the limitations set forth in this document.

The renewal process (including the 30-day waiting period or taking the corresponding qualification course) will be the same as for the initial qualification process, for those failing to pass a written exam on the first attempt.

114.08 Inspector Qualification Program Management. The Inspector Qualification Program (IQP) is administered by the ITD Construction/Materials Section. The Inspector Qualification Program Committee (IQPC), under the guidance of the ITD Construction/Materials Engineer, oversees the IQP.

IQP Website. The IQP website is intended to provide useful information to other agencies and the public about the IQP. The ITD Construction/Materials Section and/or the Training & Development Section will attempt to keep all information up to date in accordance with the guidelines set forth in this document. An IQP website link is also provided on the ITD website.

Program Revisions/Updates. Revisions and updates to the IQP will be recommended to the ITD Construction/Materials Section based upon participant comments, and changes to the source documents and/or ITD policies and procedures. The IQPC will meet when required to consider proposed revisions/updates. Suggestions and comments, in addition to those received from course evaluation forms, must be provided in writing to the committee for consideration. The revisions or updates that are adopted by the committee will then be incorporated into the master copy of the appropriate course material, or other documents, by October 15 of the year in which the revision/change has been adopted.

Program Review. The IQPC and/or the ITD Construction/Materials Section will conduct reviews as necessary to maintain program consistency.

114.09 Inspector Qualification Revocation. Inspector qualifications may be revoked at any time by the Inspector Qualification Program Committee (IQPC) for just cause reasons such as **negligence** or **abuse** of the inspector's responsibilities, or the Department may also disqualify inspectors for other reasons that may or may not be specifically defined herein following the due process procedures.

Negligence is defined as unintentional deviations from approved procedures that may or may not cause erroneous results/documentation. The IQPC may deviate from the following penalty guidelines for findings of negligence, if warranted.

Findings of negligence may result in a letter of reprimand being sent to both the employee and the employer.

Further findings of negligence may be considered as abuse.

Abuse is defined as intentional deviations from approved procedures. The IQPC may deviate from the following penalty guidelines for findings of abuse, if warranted.

The first finding of abuse may result in up to a one hundred eighty (180) day suspension of all qualifications.

The second finding of abuse may result in a minimum one (1) year suspension of all qualifications.

Any subsequent finding of abuse may result in permanent revocation of all qualifications.

Allegations of negligence or abuse must be made to the IQPC in writing. The allegations must contain the name, address, and signature of the individual(s) making the allegation. The allegations will be investigated by the IQPC. The accused and the individual(s) making the allegation will be given the opportunity to appear before the IQPC.

All involved parties will be notified in writing of the IQPC findings. Any warranted penalties will be imposed in accordance with guidance contained herein.

Decisions regarding allegations of negligence or abuse will be sent to the individual in writing by registered letter along with the individual's right to appeal the revocation. The individual may submit an appeal in writing to the IQPC Chair, who independently considers such written appeals. The IQPC Chair may also rely on the advice and counsel of the IQPC, and take such action as he/she considers appropriate.

A revocation is effective upon receipt by the inspector and will be affirmed, modified, or vacated following any appeal. Revocations or suspensions for negligence or abuse in one Qualification Area will be considered revocations or suspensions of all Qualification Areas held by the inspector.

Findings of **negligence** or **abuse** by Department employees will result in progressive disciplinary action up to and including termination, as outlined in the ITD Employee Policy & Procedure Handbook.

114.10 Examination Materials Security. This policy applies to all written examination materials, including blank exams, completed exams, and answer keys.

The examination materials must be kept secure and confidential at all times.

The examination materials must be kept under lock and key, except when utilized in an official manner and only by those having authority. Personnel involved with qualification examinations should attend an IQP orientation session conducted by the ITD Construction/Materials Section or a designee. Examination security violations can compromise the exam and destroy the exam's integrity and validity as a qualification instrument.

Exam security must be maintained during:

- New exam or question development and validation
- Exam materials reproduction

- Blank exam materials and answer key storage
- Administering and scoring exams
- Completed exam storage
- Old exam materials destruction

When the documents are removed from a locked location, the documents must remain in the authorized person's immediate possession and view, and not be available for possession or viewing by others.

Access to exam materials and answer keys is limited to the following personnel when and as needed in carrying out their responsibilities within the qualification process:

- Program administrative personnel performing exam materials inventory, storage, and reproduction.
- Exam administration and scoring by exam administrators and scorers.
- Recording exam results, storing completed exams, and destroying old exams by program administrative personnel.
- Reviewing, assessing, updating, revising, and validating exam materials by selected individuals or subject-matter experts who have been assigned and authorized by the IQPC.

The consequences for those individuals found violating qualification examination material security may be:

- Written reprimand if the violation is by negligence (as defined above) and a mandatory requirement to attend an IQP orientation
- Banning from any future IQP association, if the violation is willful or intentional.

Written Examination Retention. All registration forms, Rights and Responsibilities Agreements, exams, and course evaluation forms will be sent in a confidential envelope to the ITD Construction/Materials Section no later the two (2) work days after qualification exam completion.

All used exam materials, both passing and failing, will be kept secure and confidential by the Department, as described above for a period of one (1) year, and then will be destroyed by shredding or other effective method.

114.11 Instructor Qualifications.

All instructors are required to be qualified in the Qualification Area in which they will be instructing. Instructor training will also cover the CA Manual, Section 114 and all qualification process materials.

IQP instructors should meet the following guidelines:

- Extensive inspection experience in the corresponding Qualification Area.
- Experience and demonstrated ability in applicant training and communication.
- Positive attitude exhibited while interacting with others.

- A willingness to uphold the high standards set by the IQPC and to follow the policy guidelines.

114.12 Course or Exam Administrator and Scorer Qualifications. Only individuals who are approved by the IQPC should administer or score written exams.

The same party that administers the written exam is not required to also score the exam. Furthermore, exam administrators should not be in the chain of command of those being qualified, nor should they be related. All exam administrators are required to be qualified in the Qualification Area for the exam they are administering.

SECTION 115.00 – FHWA OVERSIGHT

115.01 General. This section provides information on:

- The Stewardship and Oversight Agreement between the Department and FHWA for Federal-aid projects that are not designated as FHWA Projects of Interest.
- Federal-aid projects that are designated as FHWA Projects of Interest.
- Federal-aid ineligible cost identification (i.e. FHWA non-participation).

115.02 Stewardship and Oversight Agreement. Per the Stewardship and Oversight Agreement, the Department has full responsibility to design and construct applicable Federal-aid projects in conformance with federal rules and regulations. The only required routine FHWA involvement is shown in the Stewardship and Oversight Agreement Section V. Delegated Responsibilities.

Any questions regarding the Stewardship and Oversight Agreement process should be addressed to the Construction/Materials Section.

115.03 FHWA Projects of Interest. Each year, the Department and FHWA will review the scheduled projects program to determine which projects will be administered as FHWA Projects of Interest. With projects of interest, the FHWA will participate in selected design and construction activities for review and approval. These selective reviews will be in accordance with the annual update of the stewardship and oversight plan for FHWA Projects of Interest Matrix.

115.04 Federal-aid Ineligible Cost Identification. Not all project costs are eligible for Federal-Aid participation. The list below identifies types of costs that may be ineligible for Federal-Aid participation. When costs are determined to be ineligible, the costs will be identified as non-participating and documented in the project records. Ineligible costs should be identified throughout the project. Any questions regarding ineligibility should be referred to the Construction/Materials Section.

- Costs incurred before FHWA change order prior approval (FHWA Projects of Interest only in accordance with Subsection 104.02 of the Standard Specifications).
- Costs not adequately documented (e.g. agreed prices or a lump sum change order was executed without obtaining a detailed price proposal from the Contractor and documentation is in the file that costs were verified as reasonable and justifiable).
- Costs for material that does not meet plan and specification requirements, or the Department's Quality Assurance Manual or 23 CFR 637 requirements. These costs may be identified during the construction phase or material summary report reviews, and upon project final acceptance.
- Costs for materials left on hand.
- Costs for work that does not conform to 23 CFR 635 Subpart D. Subpart D prescribes the requirements and procedures relating to product and material selection, and use on Federal-Aid highway projects including:

- Use of materials made available by a public agency
- Restrictions upon materials
- Buy America requirements
- Material or product selection
- Guaranty and warranty clauses
- Convict produced materials.

- Costs for work that is outside the approved project scope, including outside the approved project limits (a revised ITD-2101 must be prepared, approved and signed by the FHWA before beginning work).
- Costs related to contract claims that are not justifiable.
- Costs related to maintenance (both during and after the project is completed).
- Donations (land, services, materials) that are not identified on applicable State/Local agreements and/or ITD 2101 forms.
- Federal-aid local project obligation limits.

These guidelines should be used to determine if a cost is ineligible. Usually the district makes the initial determination in consultation with the Construction/Materials Section as appropriate.

Other ineligible federal-aid costs are identified on the project ITD-2101 and in the State/Local agreement, if applicable. All project personnel should be familiar with the State/Local agreement provisions and the most current ITD-2101 to assure that non-participating costs are properly documented. If local agencies are involved, they should be informed of any Federal-Aid ineligible costs as soon as they are identified.

SECTION 200 - EARTHWORK

200.00 Earthwork. Earthwork includes:

- Section 201 Clearing and Grubbing
- Section 202 Selective Removal of Trees or Stumps
- Section 203 Removal of Obstructions
- Section 204 Obliteration of Old Road
- Section 205 Excavation and Embankment (including borrow materials and blasting)
- Section 207 Stripping Designated Source Material Deposits
- Section 208 Interceptor Ditches
- Section 209 Small Ditches
- Section 210 Structure Excavation and Compacting Backfill
- Section 211 Source Reclamation
- Section 212 Erosion and Sediment Control
- Section 213 Topsoil
- Section 214 Roadside Cleanup.

Many potential earthwork problems can be discovered ahead of time during construction survey staking for earthwork. The Department very rarely performs construction survey staking.

Staking is done either by the Contractor or a consultant working directly for the Department. The survey work includes staking and quantity computations for pay items requiring volume measurements such as earthwork.

The Engineer is required to coordinate with the Contractor prior to work beginning regarding construction survey requirements. The Engineer should review all stake-marking procedures with the Contractor so that misinterpretation of survey stakes can be avoided.

The Contractor is required to compare staked cut and fill depths with the contract plans and report to the Engineer differences found. Verify with the Contractor throughout the work that this comparison is being performed.

Other survey requirements include:

1) Providing to the Engineer weekly all copies of all diaries, books and notes.
2) Submittal of all measurements and calculations for quantity computations including a copy of all grade calculations, cross section plots, and computer printouts. Format is to be approved by the Engineer.

The initial project staking should be completed prior to the start of earthmoving operations. The initial staking should include staking centerline, reference points, benchmarks, clearing and grubbing, right of way, and slopes. Good survey ties and references are essential. If the initial staking can be accomplished early, most errors and problems can be eliminated. Verify throughout the project that the required information is shown on the stakes.

Since field notes are the basic source document upon which pay quantities are based for volume measurements, require that care be taken so that the field notes are complete, legible, and orderly. Cross-section notes for computer use should be checked in the field for accuracy. All field books should be plainly labeled and numbered and an index of field book numbers kept.

The goal is that any person not familiar with the project can locate essential data easily. Periodic checks should be made to see that field notes are being properly kept.

When utility facilities interfere with or delay the Contractor's operations, the inspector should immediately notify the Engineer. The Engineer should meet with the utility company and the Contractor to resolve the problems and prepare a written report. The inspector should keep any additional records as may be required to substantiate or refute claims for delay.

201.00 Clearing and Grubbing. Clearing and grubbing may be measured by the acre or on a lump sum basis, depending on the contract. Generally, staking of areas to be cleared and grubbed is necessary only when measurement is specified by the acre. Areas clear of vegetation or of negligible or sparse vegetation should be excluded from measurement. All trees, shrubs and vegetation that is not to be removed must be clearly marked as required by the specifications.

Staking. Be familiar with all the staking and surveys within the areas involving clearing and grubbing to protect survey control points and control reference points, benchmarks, slope stakes, etc. Stakes should be set at the clearing and grubbing line with the specified color of flagging attached for easy identification.

The centerline reference points should be located outside the limits of clearing and grubbing, if practical. Centerline control points are less likely to be destroyed by clearing equipment if set with firmly driven iron pins and if they are well marked.

If conditions permit, clearing and grubbing limits may be set at the time of slope staking. Clearing and grubbing areas need not be re-measured provided that they are cleared as staked and so noted in the diary. Whichever method is used, sufficient survey notes and details must be provided to accurately determine pay quantities.

Additional staking for right of way lines is required and may be needed at the same time clearing and grubbing is staked to prevent encroachment on private property.

Disposal of Debris. Refer to Section 201 Clearing and Grubbing of the Standard Specifications for disposal area requirements.

Inspection Documentation. Adequate inspection of the clearing and grubbing work is essential. The inspector's records are normally used to verify the activity and document estimated quantities for the purpose of progress payments. Inspection records may also provide source data for additional areas of clearing and grubbing due to a slope revision or for other reasons not foreseen when the original staking was accomplished. Documenting in the diary that clearing and grubbing conforms to stakes eliminates the need for re-measure and is good practice.

Any damage to, or encroachment on, private property by the Contractor or any undue damage to vegetation outside the staked clearing and grubbing limits should be brought to the Contractor's attention immediately and recorded by the inspector.

Do not expect the Contractor to clear and grub or otherwise provide special treatment to vegetation in areas not included in the measurement. Where there is the possibility of a dispute, take photographs and review the areas of clearing and grubbing with the Contractor's representative to avoid any misunderstanding as to the areas and limits.

Documentation for Pay Quantity. Diary notations shall be used to verify the activity, date, and location of the work. Quantities are to be computed to the nearest 0.01 acre and rounded off to the nearest 0.1 acre on the final estimate.

The survey staking field notes are the source documents to be used for computing quantities. The method used is a function of the method of staking and field not format.

202.00 Selective Removal of Trees or Stumps. Count all of the trees and stumps prior to removal. Many times projects that have been several years in design will have an overrun due to subsequent growth. Each tree or stump that is to be removed should be plainly marked with flagging, paint, etc. The location of each tree and stump that is to be removed should be determined with reference to the roadway centerline and recorded in advance of the actual work. The notes should include a description of the item, whether it is a tree or a stump, and its diameter and placed in summary form as part of the permanent project records. When it can be readily determined that more than one tree is growing from a single stump, only one tree will be paid for.

Document completion of the removal work as it is accomplished. Normally, there is less chance of error or duplication in reporting if only one inspector is responsible for this documentation. The inspector's records should indicate completion of subsidiary work, such as backfilling of stump holes and removal of trees and stumps of less than six inches in diameter. The method of disposal should also be noted.

Documentation for Pay Quantity. The diary record shall be used to verify the activity, date, and location of the work. Quantities shall be computed and reported to the nearest whole unit.

Watch for duplicate reporting. Periodic checks should be made between field and office personnel to eliminate duplications. If a summary is prepared as described above, it is also considered a source document.

203.00 Miscellaneous Removals. Measurements should be taken and recorded in a notebook or summary sheet. Sketches may be needed to show dimensions. All notes should refer items to centerline, how far left or right, the project number, date, and who measured the item. Stakes or marks may be required to define areas of removal and where vertical sawing will be necessary.

Ensure that the measurements are taken prior to the time the items are to be removed. If trouble is anticipated on any item, photographs may be taken to supplement field measurements. These photographs should have information written on the back (or captioned) answering the questions, "What, Where, When, and Why".

Documentation for Pay Quantity. The diary shall be used to verify the activity, date, and location of the work. When used, summary sheets are considered source documents. Pay quantities shall be computed and reported to the nearest whole unit.

Watch for duplicate reporting. Field and office personnel should coordinate to eliminate duplications.

204.00 Obliteration of Old Road. Quantities and locations of an obliterated road are normally noted on the plans. Measure and enter the actual quantity and location of the work in the construction diary and note whether or not the obliteration is in accordance with staked quantities. Any deviation from original stakes should be accounted for on a summary sheet. Verify whether removal of old pavement falls under Section 203 Standard Specification requirements. Also verify whether any of the work is incidental to other pay items of the contract (e.g. in covered under a special provision or a bid item was not included).

Documentation for Pay Quantity. The diary shall be used to record the activity, date, and location of the work. When used, summary sheets shall be considered source documents. Quantities shall be computed to the nearest 0.01 station and rounded off to the nearest 0.1 station on the estimates.

205.00 Excavation and Embankment. One of the basic responsibilities for excavation and embankment is to ensure that a suitable foundation is constructed in conformance with established lines, grades, and cross-sections upon which the roadway base and surface courses and structures can be constructed. All inspection personnel must be qualified as described in CA Section 114.

As soon as construction slope stakes are installed, the earthwork quantities should be calculated to verify design quantities. Slope stake notes should be checked for possible staking errors. This check should be completed before the Contractor starts work, if at all possible. If quantities vary a significant amount, the Contractor should be notified of the quantity change by letter.

On projects involving borrow, granular borrow, or different schedules of excavation and embankment, the inspector should identify and locate the various quantities of each item placed. Diaries, notebooks, and sketches can be utilized to document this information. If profiles or cross-sections are required, measurements must be made prior to changes in material placement.

Excavation Below Subgrade. Soft spots in the subgrade which have a combination of soil type and moisture that can't be compacted to the required density must be excavated and backfilled with approved material in layers to meet compaction requirements, and to prevent trapping water under the roadway or structures. Use of nonwoven subgrade separation geotextiles and/or biaxial geogrids should be considered to reduce the depth of sub-excavation, as well as to provide stability to the subgrade.

Grade points (i.e. the junction point of sizeable excavation and embankments areas) require the same treatment as soft areas whether they show signs of failure or not. The amount to be excavated is confined between the shoulder slopes and as shown on the plans or as far in to the cut as necessary to obtain sufficient compaction in the subgrade.

All excavation below subgrade is referenced to the finished grade. For example, the plans will denote grade pointing by a note, such as "Grade Point 3.0 ft." to indicate that the depth of grade pointing will be 3.0 feet below finished grade. Measurement for excavation below subgrade should be made by the cubic yard in the original position. For small areas, the inspector should measure and record this information in the diary along with a sketch of the area. Large areas that are difficult to measure because of size or uneven floor should be cross-sectioned and computed by the Average-End-Area Method.

Removed material that is organic may be stockpiled with other topsoil if approved by the Engineer.

Wasting of Excavated Material. It is the responsibility of the Contractor, at no additional cost, to secure a suitable disposal area for all excess or unsuitable materials.

Foundation Areas Requiring Special Treatment. Situations may arise in areas that call for construction across swampy ground. The Standard Specifications permit end-dumping of granular material in swampy areas to provide a stable surface. This lift should be limited to a depth not greater than necessary to support hauling equipment. After which, the material shall be placed in layers and compacted as required by the specifications.

When end-dumping material across a swampy area, the loose lift thickness should support the hauling equipment without movement. If movement in the fill is detected after the layer is started, the operation should be backed up and material placed to a greater layer depth. It is sometimes necessary to carry the first layer at subgrade elevation. A nonwoven geotextile or/and biaxial geogrid should be considered in bridging swampy areas, and they will provide stability and keep the underlying materials from mixing with the embankment material. When both geotextile and geogrid are used for stabilizing the foundation, the geogrid should be placed on top of the geotextile. **Woven geotextiles should not be used because they have low permeability and may create a pumping problem.**

Embankment Construction. *Layering* – The specifications limit the loose layer depth for various types of materials before compaction. Layers should be placed in a uniform manner with special emphasis on the outer edges of the fill, especially regarding density and slope. A contractor may complain about not having sufficient bearing to support the equipment near the shoulders. However, this is no problem when compaction is carried out to the full shoulder width with each layer.

When shot rock is being used for embankment layer depths over eight inches, the layers should be regulated by the maximum size material, and in no case exceed three feet unless approved by the Engineer. Rock should not be end-dumped over the embankment, but dumped short of the edge and pushed with a dozer in order to fill the larger voids with smaller material.

A balance between material hauling and compacting should be maintained to keep the work progressing satisfactorily. When a density test fails, the Contractor should be immediately notified so that corrective measures may be taken. Areas that have had failing tests require check tests which show acceptable densities or, in cases of replacement with granular material, what disposition was made in the area. The Contractor should be encouraged to follow a systematic routing for compaction that will produce an acceptable and uniform result.

If, during the course of embankment construction, material is encountered which contains objectionable organic matter (such as logs, stumps, etc.), special care should be taken to see that such refuse is removed from each layer before compacting. The incorporation of frozen material in an embankment shall not be allowed unless approved by the Engineer.

If soft areas result because of poor material or excessive moisture, corrective measures (i.e. soft spot repair) should be taken before allowing additional material to be placed over the area. Where undesirable material is concentrated, it will normally cause trouble, especially when trying to get 100% density in the top foot of the embankment.

Special care must be taken when embankments are placed on existing slopes. Slopes steeper than 3H:1V must be benched to avoid creating a slipping plane in the new embankment. Benches may vary in depth of cut from layer thickness to that necessary to provide equipment working room.

Slopes - Cut and fill slopes must be constructed to the tolerances specified in the contract. Periodic visual checks should be made by looking at the slopes in profile as they are being constructed. Any obvious "bellies" or undercuts should be corrected immediately to avoid serious shortages or surpluses of materials. Diary notations should be made for slope areas that conform to the stakes or where they do not.

Slope rounding of higher cuts should be performed during pioneering, otherwise equipment will be unable to return to the top of the cut to remove the rounding material. All cuts, except solid rock, should be rounded to the extent necessary to prevent a ragged appearance upon completion, and to comply with the plans.

Rock Work - Cuts in rock are often designed with nearly vertical slopes. Ripping or blasting is usually necessary in order to reduce the material to a usable size. When jointing and bedding planes are not strong enough to withstand the forces applied during removal of the material, over-break or shattering of material outside the neat lines of the slopes results. This loosened and shattered material must be removed to prevent its sliding into the roadway at some future date.

The Contractor should be encouraged to hold over-break to a minimum. **Over-break will not be paid for.** Over-break is defined as that portion of the material that is excavated, displaced or loosened outside of and beyond the required slopes or grades. Over-break can occur because of natural cleavage or faults in rock formations, or because planned slopes result in an unsafe or unstable condition. Over-break can also occur because of improper blasting operations.

Verify and note the Contractor's drill hole spacing, hole depths, powder usage adjacent to slopes, blasting pattern, and any other information for compliance with the contract. After completion of the work, it is sometimes difficult to reach an agreement with the Contractor on whether the excess material removed is to be classified as over-break or slide (the specifications allow for payment of slide material). Good notes will help to alleviate any disputes.

Loose rock must be removed from the steeper slopes. The operation can be accomplished by hand or machine finishing methods. The Contractor should be advised of the necessity for finishing or "scaling" during the early phase of the project. Results are usually more satisfactory if slopes are scaled (from the top down) as each lift of the cut is removed. However, the timing of the work is the Contractor's choice. On flatter slopes, loose rock which appears to be stable, need not be removed except as necessary to present a finished appearance.

Every effort must be made to scale and clean rock back slopes of as much loose material as possible. If a poor job is done on scaling, the remainder of the work will fall to Department maintenance forces.

The specifications state, "No measurement will be made for rock excavation made below the roadbed unless such excavation is required or directed by the Engineer. No measurement will be made for borrow replaced by unauthorized rock or soil excavation below roadbed." Most Contractors will drill about 2 feet below to facilitate removal. The "shot rock" should be excavated as close as practical to subgrade elevation, allowing shot rock and spalls to fill any overshot areas. Occasional rock points extending above subgrade are permissible, but these should not exceed one-half the depth of the untreated base material. Requiring the removal of overshot material to remove objectionable material does not constitute authorization for payment for excavation below subgrade. However, if the objectionable material is encountered at this elevation, excavation should be authorized. Material used to backfill over-excavated cuts can either be granular borrow, excavation, or crushed gravel. Backfill will be paid for at the contract price for the material used.

Slides – Removal of slides is paid for at unit prices for excavation or as extra work in accordance with Standard Specifications Subsection 104.02. If during the progress of the work, a slide is encountered or suspected, the District Geologist or District Materials Engineer should be consulted for proper corrective action.

Finishing Subgrade. Extreme care should be taken, especially during finishing operations, regarding ditch grades and natural drainage outside the embankments. Water pockets along the finished roadway are unsightly and induce percolation under the roadway. Shaping ditches to drain after the grade is finished introduces the problem of either disposing of excess material or placing material in small quantities that requires special treatment in grading and compaction.

Occasionally contractors have requested that the subgrade surface be finished with a fine grade material to permit easier blading to a tight, smooth surface. Such requests should be carefully considered and the District Materials Engineer consulted. In no case should a good granular or rocky subgrade be contaminated by addition of a weak or plastic (e.g. silt or clay) soil on the top merely to expedite finishing.

Areas that have been disturbed or roughened by equipment outside the roadway proper shall be reconditioned and left in an acceptable condition.

Compaction Control. The term "compaction", as applied to highway construction, may be defined as "a measure of embankment and subgrade density". The attention the inspector gives to the actual placement of embankment and subgrade materials is extremely important. The duties of the inspector regarding compaction may be summed up in two primary objectives:

- To see that specification requirements for compaction are met and maintained.
- To obtain a uniformly compacted subgrade. The subgrade or top foot of cut and embankment carries the greater share of the ballast and traffic load. Non-uniform or insufficient compaction results in differential settlement and subsequent deterioration of the roadway.

The moisture-density relationship tests specified in the Standard Specifications are the criteria used to govern compaction control. As many tests as possible should be made but, in no case, should fewer tests be performed than the minimum required in the Quality Assurance Manual. Continuous observance of actual grading operations is very useful. To facilitate testing and checking, testing and inspection personnel should move with the grading operations.

A field laboratory should be located on the project and equipped with sufficient test apparatus and report forms to meet the pace of the operation. Orderly files should be kept in the field and include all laboratory reports, moisture-density curves, work papers, list of identification numbers, etc. It is the inspector's responsibility to see that sufficient tests and notes are taken to document compliance with compaction and other specifications.

Compaction is usually expressed as a percent of the laboratory-determined, maximum dry density for a given soil or mixture of soils. The inspector must first of all become familiar with the embankment materials which will be encountered on the job. Laboratory curves are usually developed during project development and may be used as the initial starting point. It is very important to verify these curves correspond with actual field conditions. This may be accomplished by studying all available laboratory curves, the soil profiles and boring logs developed during design, and (if necessary) by conducting further field investigations. When no laboratory curve is found which will fit all existing available data, a new curve must be generated in accordance with the applicable test method.

The thickness of the lifts being placed must be closely observed. In many cases, it may not be practical to compact the maximum allowable loose thickness. Some soils do not mix readily with water, so it may be necessary to spread them into thinner lifts, wetting each, and then compacting. More uniform moisture distribution may also be obtained by pre-wetting borrow pits and cut sections. Compaction may be aided and rolling time reduced by the proper routing of earth-moving and transportation equipment over the embankment. Discuss with the Contractor, but do not direct, the requirements needed to obtain the specified compaction.

Compaction tests shall be performed and reported in accordance with the Quality Assurance Manual. Most deficiencies in compaction stem from a lack of water or a lack of rolling, or both, and may be easily remedied. If a series of tests show a lack of proper compaction, the inspector should seek out the reason for the failure and then discuss with the Contractor what corrective actions will be taken. **Under no circumstances should the inspector direct the Contractor’s operations by assuming the duties of the foreman.** If the deficiency is serious or if a minor deficiency is not corrected within a reasonable length of time, work should be suspended and the inspector should notify the Engineer immediately.

Class “C” Compaction and Process Old Road. Embankment foundations within 8 inches of finish grade are usually designated as areas to receive Class “C” compaction and are shown on the plans. If the area is rock or poor material is being bridged, Class “C” compaction may not be required. Judgment should be used to determine the locations that require Class “C” compaction.

Diaries or field notes should record measurements and stations of areas receiving Class “C” compaction. The quantity of Class “C” compaction and “process old road” shall be computed to the nearest 0.01 of a unit and rounded off to the nearest 0.1 of a unit on the final estimate. The calculation sheets are source documents.

Dust Abatement Water. The Engineer, or representative, shall order the Contractor to place water for the purpose of controlling dust for safety and comfort of the traveling public, for the health and comfort of people residing near the project, and to protect crops which might be damaged from dust. The Contractor can be instructed to automatically place water under certain conditions as they arise, but the Contractor must notify the Engineer when such water will be applied so that necessary documentation of quantities can be made.

Where a haul road is used exclusively by the Contractor's equipment, the Contractor will be required to abate dust at no additional cost, unless other considerations as indicated above are required.

The quantity of "water for dust abatement" shall be computed to the nearest MG and rounded off to the nearest whole unit on the final estimate. Tickets (ITD-0072) should be issued for all water intended for payment. Diaries should record placement, tank measurements, inspection to verify quantities, etc. If dust abatement water is being wasted, appropriate quantities of water should be deducted after advising the Contractor that such action will be taken.

Excavation, Channel Excavation, Borrow, and Granular Borrow. Final pay quantities for excavation, channel excavation, borrow, and granular borrow will be based on office computations and/or computer data. The quantity of all excavation, borrow, and granular borrow shall be computed and reported to the nearest whole unit.

If the computer run is used as the source document, the computer run should be spot-checked for accuracy. Several cross-sections such as elevation and distances that are outside normal limits should be selected and the elevations of both the cross-sections and the computer listings should be reconciled. The plan quantity should also be compared with the computer quantity. Changes and corrections should be listed and checked on the computer run. The final quantity should be summarized, checked, and listed on the last page.

Quantities for progress payments may be determined by using the Contractor's daily load count. When possible, load count quantities should be verified by checking the quantities in an isolated cut. Estimated quantities should be frequently compared with plan quantities and any major discrepancies checked. The method used for obtaining quantities for progress estimates should be noted in the diary.

207.00 Stripping Designated Source Material Deposits.

Section 207 normally applies to designated sources only.

The source approval may stipulate that a certain area of the source is to be used or a certain area is restricted, or possibly that the stripping shall begin at a certain point and not exceed a specified slope. In these cases, the area involved may need to be staked.

Staking consists of designating baselines, benches, source boundaries, and area boundaries. Measurement is by the average end area method when the contract specifies stripping materials deposits by the cubic yard. Cross-sections should be established and recorded before and after stripping from a baseline that is referenced for horizontal and vertical reestablishment. Diaries should document completion and acceptance of this work. All material not acceptable for incorporation into the finished product must be stripped regardless of whether payment is by the cubic yard or as an incidental cost.

The standard specifications allow for measurement of stripping in its original position or in approved stockpiles. Since stripping may later be used for borrow or top soil, the stockpiles should not contain excessive vegetation or other foreign matter. However, this work is not considered as clearing and grubbing, which is not paid for on sources. Good construction practice would require that an attempt be made to consolidate the stockpile to a density matching the original in-place density. An understanding must be reached with the Contractor as to what constitutes an approved stockpile prior to using this method.

The contract special provisions or source approval may specify a certain area of the source is to be used or that a certain area is restricted, or possibly that the stripping shall begin at a certain point and not exceed a specified slope. In these cases, the area involved may need to be staked.

When alternate deposits are requested by the Contractor and approved, it will be at no additional cost to the Department.

Care should be taken to insure the source is not worked beyond the area to be worked as identified in the source approval. In the event additional material needs to be obtained, a revision of the area to be worked should be approved by the Engineer. The Engineer's approval should be supported by prior or additional materials investigation.

Documentation for Pay Quantity. The diary shall be used to verify the activity, date, and location of the work, and should show estimated quantities. The original and final cross-section notes and computer printouts shall be considered source documents, and used to compute quantities. Quantities shall be computed and reported to the nearest whole unit.

208.00 Interceptor Ditches. Interceptor ditches must be carefully located to serve their intended purpose of controlling drainage. The ditches should be staked after the slopes limits are established. Low spots or pockets in the flow line should be avoided or drained when possible. Special treatment, such as contour or riprap on excessive grades, may be necessary to prevent excessive erosion in some soils

Since most ditches are constructed off or near the edge of the right-of-way, the Contractor should be informed of the construction limits and Contractor responsibility for damage or trespass.

The inspector should prevent unnecessary damage to roadside vegetation. The inspector must check for conformity with stakes and plans and for workability of the design as grading progresses. Any necessary changes should be called to the Engineer's attention immediately. Delay may make any changes very difficult and expensive.

Documentation for Pay Quantity. The diary shall be used to verify the activity, date, and location of the work and any changes. If quantities are surveyed, the survey may serve as a source document. Staking notes and summary sheets, when used, may be source documents. A summary sheet is very helpful in determining compliance with plans, omissions, or additions in staking, and construction and duplication of quantities. Interceptor ditches shall be measured to the nearest foot and reported to the nearest 0.1 station on the final estimate.

209.00 Small Ditches. Small ditches, by definition, are ditches having volume that is on an average of less than 0.2 CY per linear foot. This volume limits the size of the ditch to an average end area of 5.5 square feet. Any excavation, borrow, or haul required to provide cuts or fills to carry small ditches will be paid for under Section 205. Ditch which is not considered as small ditch will not be paid for separately, but as the items required such as excavation, borrow, haul, etc.

Staking must be done carefully to ensure a satisfactory installation. The intended usage and required volumes must be considered and provided for. Stakes should be set for flow line, slopes on fills and cuts, and easement lines (if required). The layout should be reviewed in the field to be sure that the ditch will be satisfactory and that sufficient construction room is available without unnecessary waste of land. Staking should be done, or at least considered, early in the project and thoroughly discussed with the Contractor because of the effect the construction may have on irrigation and other items, such as minor structures, pipes, fencing, etc.

The inspector should be completely familiar with the required installation and its layout to insure satisfactory results. Material for fill ditches must be carefully selected to provide an impervious ditch and prevent erosion. Foundations should be carefully prepared and embankment properly compacted to prevent future settlement and washouts. The slopes of fills and cuts are usually limited by right-of-way and/or construction easements, and the Contractor must be advised of these limits. Trespassing without the owner's permission shall not be allowed.

Soaking the ditch prior to full use will generally help prevent erosion. In some soils, it may be necessary to line the ditch with coarse gravel or other material to prevent washing. The inspector should recognize these situations and notify the Engineer.

Documentation for Pay Quantity. The diary shall be used to verify the activity, date, and location of the work. The diary must contain enough information to assure proper payment for selective placement of material when required. Field books and summary sheets, when used, shall be considered source documents. Small ditches will be measured and reported to the nearest foot.

210.00 Structure Excavation and Compacting Backfill. The Contractor, (or consultant surveyors if applicable) are responsible for staking, recording grades and ground elevations, setting references, computing grades, and computing quantities. The crew must cooperate with the inspector and Contractor in scheduling their work. The Department verifies conformity with plans, note any problems or revisions, and approve the foundation. Pipe or structure locations must not be revised without the concurrence of the Engineer.

Specific densities are required in compacting backfill and foundation soils. Compaction tests shall be performed and reported in accordance with the Quality Assurance Manual minimum testing requirements.

The specifications require a waiting period and minimum strength of concrete before backfilling against newly constructed concrete structures. These requirements are listed in Table 502.03-5 “Form And Falsework Removal And Loading Of Concrete", in Subsection 502.03, Part E, Falsework and Forms. If a compelling reason exists to waive these requirements, a change order will be required. Minor structures, as defined in Section 609, may be excluded from such a waiting period or minimum strength requirement.

The material to be placed behind abutments, retaining walls, and wing walls shall be granular and allow thorough and effective drainage behind these structures. (Refer to standard drawings).

When designating additional excavation below staked grade, the inspector should carefully record reasons, depth, etc. If the Contractor does not agree with payment at contract prices for any additional depth, the Engineer should be notified immediately and force account records must be kept for work on the additional excavation.

The Contractor may use regular roadway equipment for compacting around structures. This requires extra care but can produce satisfactory results when properly controlled. The limiting planes used in calculating quantities will be the same regardless of the type of equipment used.

Documentation for Pay Quantity. The inspector should verify original and final measurements on structure excavation prior to and during the work to ensure that proper notes are available for quantity computation. The inspector shall report quantities of structural excavation, backfill, compacting backfill, concrete, etc., and should compute the quantities. A calculation book should be set up in advance of construction. Dimensions may be recorded in the diary during construction then transferred to the calculation book and all computations made on an ITD-0404 Standard Computation Sheet. A sketch should be drawn for each individual portion of a major structure showing dimensions and elevations both before and after excavation.

The diary shall be used to verify the activity, date, location of the work, and any measurements. The calculation sheet shall be the source document for pay quantity. Quantities shall be computed to 0.1 of a cubic yard and rounded off to the nearest whole cubic yard on each structure.

211.00 Source Reclamation.

Section 211 normally applies to designated sources only.

Source reclamation consists of grading and contouring material sources used for borrow, or the production of aggregates, to a pleasing, natural appearing conformation, placing topsoil over the slopes and floor, and seeding in accordance with the applicable subsections of Section 621 – Seeding in the Standard Specifications.

The inspector should make a careful review of the plans, special provisions and source plat before any work begins. Any proposed changes to the reclamation plan should be approved by the State Land Board through the ITD headquarters Construction/Materials section.

Slopes steeper than that specified on the plans may present serious erosion and safety problems. Slopes must be constructed as shown on the plans, to allow vegetation to be re-established.

Stockpiles of aggregates or overburden should not be allowed unless specifically shown on the plans.

Burying of trash in a materials source should not be allowed

Documentation for Pay Quantity. The diary shall be used to verify the work completed, the date, and the source number.

212.00 Erosion and Sediment Control.

At the preconstruction conference, or prior to commencement of the applicable contract work, the Contractor shall submit a plan of preventive measures for approval in accordance with Section 212 of the Standard Specifications, and special provisions, the plans, applicable permits and the Department's Best Management Practices (BMP) Manual.

Project personnel should be aware of potential soil erosion areas during the construction of the project and take steps to reduce or eliminate or erosion or sediment. The condition of the project prior to winter shutdown can be the most important factor in reducing unnecessary erosion the following spring.

Trouble Areas and Possible Corrections. The following list describes some potential trouble areas that need protection from erosion and sediment:

- Fill slopes left unprotected until curbs and embankment protectors are installed can, in some cases, be protected by a shoulder berm or combination ditch and berm. Water should be channeled to an area where less damage can occur.
- Interceptor ditches should be placed above cut slopes in problem areas as soon as practical.
- Steep haul roads can be cross-ditched at intervals when not in use.
- Projects that extend past one season may require partial seeding.
- Transitions from cut to fill may require treatments such as placing of granular material, or other methods, to avoid erosion as water leaves the cut and follows a natural course along the toe of the fill.
- Temporary stream crossings should be constructed with granular material or be protected from erosion by riprap. Pipes through the crossing should be large enough to handle high water levels.
- Fine sand or silt on slopes subject to wind erosion should be covered with granular material or soil that is less susceptible to movement by wind.
- Stripping of more area than is necessary for removal of material from sources must be avoided.
- All cross drains that can be placed should be complete prior to winter shutdown if possible. Headwalls or aprons should be in place, if required, or acceptable channeling and diversion of water into the pipe should be accomplished. Drainage channels into and away from pipes and structures should be clear of debris.
- Additional information on erosion and pollution controls can be obtained from the District Environmental Planner or the Department's Best Management Practices (BMP) Manual.

Documentation for Pay Quantity. When items of work performed are covered under other sections, they shall be measured and documented as outlined in the appropriate section.

Work not covered by other sections is either already incidental to the contract or will need a change order prepared in accordance with Subsection 104.02 of the Standard Specifications.

213.00 Topsoil. Topsoil consists of surface soil that is suitable germination of seeds and supportive of vegetative growth. Topsoil should be reasonably free of weeds and debris. The quality of topsoil varies depending on its source. Only very high quality topsoil should be utilized for irrigated planting beds and lawn construction. A lesser quality may be appropriate for rural highway slope seedbed construction. Any questions regarding suitability of topsoil for an intended use should be conferred with the Roadside Vegetation Coordinator.

Topsoil placement on slopes requires special treatment to avoid creep and erosion of the soil from the underlying base soil. The topsoil shall be keyed to the slope (if feasible) by harrowing, disking, or rolling. An ideal method, especially on steeper slopes, is to utilize the cleats of a crawler tractor that is driven or winched up and down the slope.

Documentation for Pay Quantity. Topsoil may be measured by the cubic yard in its original position or in temporary stockpiles. Topsoil measured by the square yard will be measured complete in place. When topsoil is excavated from the roadway prism, it will be paid for as excavation in addition to payment as topsoil.

Final pay quantities are based on office computations and/or computer data from surveys. Quantity of topsoil should be computed and reported to the nearest whole unit.

214.00 Roadside Cleanup. Roadside cleanup is intended to provide a means by which payment can be made to clean up debris from outside the clearing limits and the right-of-way line. Roadside cleanup should not be construed to include debris cleanup covered by other items, such as 201 - Clearing and Grubbing; 202 – Selective Removal of Trees or Stumps; 203 - Removal of Obstructions; or 205 – Excavation and Embankment.

The removal of unsightly or hazardous items not covered by the above-mentioned items should be disposed of under the Roadside Cleanup item.

Documentation for Pay Quantity. The diary should be used to verify the activity, date, and location of the work. The ITD-0370, ITD-0371, ITD-0372, and ITD-0373, Weekly Force Account sheets, should be used to document labor, equipment, and any materials needed.

SECTION 300 – BASES

300.00 Bases.

General. Before allowing any work within a materials source, the Project Inspector shall review the Special Provisions and source data shown on the source plat and confer with the district Source Manager to become acquainted with the requirements and stipulations relating to the operation and reclamation of the particular source. All provisions requiring special attention shall be brought to the attention of the Contractor. The source plat should be carefully studied to determine the area to be worked, location of aggregate and stripping stockpiles, location of haul roads and fences which must be relocated or maintained, etc. When changes are necessary, the District Materials Engineer should be advised. The source must be worked in a conservative manner and left with a neat appearance and in accordance with the reclamation plan.

Aggregate Production and Materials Source Operations. Prior to producing crushed aggregate, the materials source shall be stripped in accordance with CA Section 207, Stripping Designated Source Material Deposits.

The materials source may be worked in several different ways. Trenching is used when the Materials Source is in layers and allows the Contractor to mix the material and push larger loads into the trap. If the pit is wet, it may be desirable to work the entire surface to allow the material to dry out. The Project Inspector should visually observe the materials source at least weekly to check for changes in appearance and gradation of the material, layers of clay or foreign material, excess moisture, and any other changes that might affect the quality of the crushed aggregate. In addition, the Inspector should verify that the Contractor has not moved to any unapproved areas of the materials source. The Inspector should also be alert for archaeological and paleontological evidence and report all findings to the Resident Engineer. The Contractor should move to a different part of the approved materials source until this evidence has been evaluated and clearance is given to work the area in question.

The actual setup and operation of the crusher is the Contractor's responsibility. The Project Inspector should never tell the Contractor how to set up or operate the equipment. He should, however, become familiar with the overall operation of the crusher plant so that a neat and accurate crusher layout sketch can be produced for the project records.

The Contractor is permitted to use surplus secondary screenings produced from the manufacture of one product in the manufacture of any other product provided the blended combination meets specifications. Surplus screenings remaining will then become the property of the State, if the source is State-owned. Surplus screenings previously stockpiled under other contracts are not to be used under the above provision without written approval from the Engineer.

When beneficial and approved by the Engineer, sand or granular material may be added to the crushed product. The sand or granular material shall be blended uniformly into the base aggregate at the plant when the aggregate is produced. Spreading sand and granular material over the top of the aggregate source will not be permitted.

The Project Inspector shall conduct, at a minimum, the number and type of tests required in the ITD Quality Assurance Manual, Minimum Testing Requirements (MTR's), or the number and type of tests required if the project is a Quality Control/Quality Assurance type, or as directed in any fully executed related change order. Any time the tests indicate "borderline" material, the crusher foreman will be notified immediately. In the event the material fails to meet specifications, the Contractor shall be notified of such in writing and no more material shall be accepted until it again meets specifications. Test results will be checked daily with the crusher foreman. The crusher foreman will be provided with a copy of these results upon request.

As soon as a reasonably uniform material is being produced, the Inspector should test the unit weight of the material produced, and verify that it matches the unit weight used for the estimating basis on the plans. Refer to the ITD Quality Assurance Manual for methods to determine the unit weight. The Project Inspector shall report any differences between tested and estimated unit weights to the Engineer immediately.

The responsibility for the production of quality aggregates rests with the Contractor. The Project Inspectors must assure that all specification provisions are met.

After each day's crushing and hauling operation, the material weigh books must be totaled and checked. Normally, if the weigh person keeps an accurate running total on each book, the office person only needs to verify this total. The weigh person and office person will initial the books with their totals. These totals will constitute the independent check, providing they agree. The Project Inspector shall meet with the office person and weigh person to determine the reason for any discrepancies between the totals. All discrepancies shall be resolved within 24 hours. Each shift's weighing will be recorded in the ledger.

Documentation for Pay Quantity. Weigh tickets shall be written in accordance with CA Subsection 109.01.

Material purchased on a weight basis will be weighed to the nearest 100 lbs. when the scale reads in pounds. If it reads in tons, the weight will be to the nearest 0.1 ton. The volume of trucks will be measured to the nearest 0.1 cubic yard. Quantities will be rounded to the nearest ton or cubic yard on the estimate.

Reports. During the crushing operation, the Project Inspector should review the acceptance testing computations on Form ITD-0901, Daily Aggregate Data Sheet. Any shutdowns, delays, plant adjustments, conversations, or instructions given to the Contractor will be recorded in the diary. Any unusual conditions which develop in the materials source will also need to be noted in the diary. The weekly materials source observations will also be noted in the diary. When the project contains the Quality Assurance Special Provision see CA Subsection 106.03 for instructions.

301.00 Granular Subbase.

General. The material for granular subbase must meet the applicable requirements of Section 703 of the Standard Specifications. Pre-stockpiled material must be well-located and properly stockpiled to guard against segregation and contamination.

Unless otherwise specified, the requirements for mixing, shaping, and compacting granular subbase are the same as for aggregate base. See CA Subsection 303.00 below for details.

Compaction needs to follow closely behind the placing operation. There are basically two factors which influence the compaction: (1) moisture content of the material and (2) the compactive effort.

The moisture content at which compaction can be most easily obtained with the least compactive effort is the optimum moisture content. This generally ranges from about 5% to 7% for most granular subbases in Idaho except those containing volcanic type aggregates, which require more water.

Specifications provide for payment of moisture present at the time of weigh-in up to 7% in Granular Subbase material. Moisture in excess of 7% will be deducted from the pay quantity. Water added after weighing is not paid for. Regardless of the mixing method used, thorough and uniform distribution of the water must be obtained throughout the material. Moisture added to the surface only moistens the material near the surface. The material at the bottom of the layer does not receive the needed moisture; and, therefore, ultimate compaction will be less at that level. Water must be added to the surface to replace that lost by evaporation during processing.

The Contractor is free to choose the type of compaction equipment most adaptable to the material and work. Compaction shall continue until not less than 95% of the maximum density determined by Idaho T-74 is obtained.

Documentation for Pay Quantity. Documentation of pay quantities shall be by weigh tickets. See CA Subsection 300.00 above.

Reports. The required reports and corresponding form numbers are listed in the ITD Quality Assurance Manual, Minimum Testing Requirements (MTR's). Test numbers shall run consecutively for compaction tests, starting with test number one. Test numbers shall not be repeated. Should it be necessary to retest an area with failing compaction tests, the retest shall be numbered with the same number as the failing test, followed by an alpha character to indicate a retest. When the project contains the Quality Assurance Special Provision see CA Section 106.03 for instructions.

302.00 Emulsion Treated Base.

General. A conventional plant setup consists of a mixer, emulsified asphalt storage tank, metering pump and piping, equipment for feeding water and additives, controls for adjusting and monitoring the various components, a conveyer for feeding aggregate, and a spray bar for pre-wetting the aggregate. All aggregates used shall conform to Section 703 of the Standard Specifications. The asphalt should be of the type and grade called for in the contract, and should meet the requirements of Section 702 of the Standard Specifications.

Mixing. A high quality product requires a well-controlled plant. The operation should be carefully monitored at the aggregate feed, pre-wetting spray bar, and emulsified asphalt introduction locations. The mixing plant should permit variation in mixing times from 5-30 seconds.

Aggregates that are dry mixed with emulsified asphalt tend to be lifeless and difficult to handle. Aggregates with too much water become very fluid, making for difficulty in laying and compaction.

When adding water to the aggregate, the water and aggregate should be mixed prior to entering the mixer where the asphalt is added.

Lay Down. The emulsified asphalt base must be placed by an approved aggregate spreader. Paving machines can work. However, this type of mix is not as workable as plant mix.

Should the mix be difficult to lay, an adjustment of either the emulsion, water ratio, or the mixing time may make it more workable.

Emulsified asphalt bases may be laid in lifts up to 0.5 feet thick. However, compaction and curing proceed much quicker with course thickness of 2 to 3 inches. The emulsion should break after the mix has been laid. Because of this and the high moisture content, it may be necessary to wait for some of the moisture to evaporate, allowing the mixture to develop sufficient stability to support rollers.

Documentation for Pay Quantity. Emulsion Treated Base: by Weigh Tickets: see CA Subsection 300.00 above. Emulsified Asphalt for Emulsion Treated Base: see CA Subsection 400.00 of this manual.

Whenever material is wasted or it becomes necessary to make deductions from pay quantities, documentation should be prepared on the day the deduction occurs and be clearly identified as a deduction.

The asphalt content of wasted or unacceptable loads of emulsion treated base is computed from the asphalt content of the mix. Show computations on the weigh ticket or diary. Asphalt deduction tickets shall cover variations in delivery loading certificate weights. Separate weigh tickets must be used for emulsion treated base and asphalt if each is a separate pay item.

Deductions will be entered in the ledger with proper reference to tickets. Diaries should record:

- Instructions to the Contractor
- Asphalt deliveries and corrections to invoices, if any
- Mix or emulsified asphalt wasted or rejected and reasons (with reference to deduction tickets.)
- Daily emulsified asphalt tank measurements and computations of actual oil content

- Depth checks and calculations of spread rates
- Calibrations and equipment inspections
- Scale checks
- Weight of rollers
- All information pertinent to the operation.

Final quantities shall be to the nearest Ton for emulsion treated base course.

Reports. The required reports and corresponding form numbers are listed in the ITD Quality Assurance Manual, Minimum Testing Requirements (MTR's). Test numbers shall run consecutively for compaction tests, starting with test number one. Test numbers shall not be repeated. Should it be necessary to retest an area with failing compaction tests, the retest shall be numbered with the same number as the failing test, followed with an alpha character to indicate a retest. When the project contains the Quality Assurance Special Provision see CA Section 106.03 for instructions.

303.00 Aggregate Base.

General. All material must be produced within the specification limits to ensure a uniform product on the roadway. Pre-stockpiled material must be well-located and properly stockpiled to guard against segregation and contamination.

The specifications outline the four acceptable methods used for mixing and placing aggregate base.

Uniform mixing of aggregate and water is vital to a well-constructed base. Moist and dry areas will cause a variation in the compacted depth. This can result in a varying compacted density and an uneven surface.

Compaction needs to follow closely behind the placing operation. There are basically two factors which influence the compaction: (1) moisture content of the material and (2) the compactive effort.

The moisture content at which compaction can be most easily obtained with the least compactive effort is the optimum moisture content. This generally ranges from about 5% to 7% for most aggregate bases in Idaho except bases containing volcanic type aggregates, which require more water.

Specifications provide for payment of moisture present at the time of weigh-in up to 7% in aggregate base course material. Moisture in excess of 7% will be deducted from the pay quantity. Water added after weighing is not paid for. Regardless of the mixing method used, thorough and uniform distribution of the water must be obtained throughout the material.

Moisture added to the surface only moistens the material near the surface. The material at the bottom of the layer does not receive the needed moisture; and, therefore, ultimate compaction will be less at that level. Water must be added to the surface to replace that lost by evaporation during processing.

The Contractor is free to choose the type of compaction equipment most adaptable to the material and work. Compaction shall continue until not less than 95% of the maximum density determined by either Idaho T-74 or AASHTO T-180, Method D, is approved.

Documentation for Pay Quantity. Documentation of pay quantities shall be by weigh tickets. See CA Subsection 300.00 above.

Reports. The required reports and corresponding form numbers are listed in the ITD Quality Assurance Manual, Minimum Testing Requirements (MTR's). Test numbers shall run consecutively for compaction tests, starting with test number one. Test numbers shall not be repeated. Should it be necessary to retest an area with failing compaction tests, the retest shall be numbered with the same number as the failing test, followed by an alpha character to indicate a retest. When the project contains the Quality Assurance Special Provision see CA Section 106.03 for instructions.

304.00 Reconditioning.

General. It will usually be necessary to blade the shoulder slopes to remove weeds, sod, roots, and other objectionable material prior to scarifying and pulverizing the existing base and surfacing. If additional base material is required, it shall be thoroughly mixed with existing materials and spread to form a uniform base. Blading and watering should continue during the rolling operation to assure both a smooth surface and uniform moisture content throughout the mixture.

Although the plans do not generally contain a profile for a reconditioned section, it may be necessary to establish grades in curb and gutter sections, at railroad crossings and at bridge approaches.

Documentation for Pay Quantity. The diary shall be used to verify the activity, date, and location of the work. Transit or final re-measure notes will be required to verify the length of the reconditioned section. Tickets (ITD-0072) will be issued for all water intended for payment. Diaries should record placement, tank measurements, inspection to verify quantities, etc. Cross-section notes or three-dimensional measurements will be required to verify the quantity of excavation of soft spots.

Reconditioning will be measured to the nearest linear foot and reported to the nearest 0.01 station or mile on the final estimate. The reconditioning water quantity shall be computed to the nearest 0.1 MG, and rounded off to the nearest whole unit on the final estimate. The soft spot excavation quantities, as well as soft spot repair, shall be computed and reported to the nearest whole unit.

Reports. The required reports and corresponding form numbers are listed in the ITD Quality Assurance Manual, Minimum Testing Requirements (MTR's). Test numbers shall run consecutively for compaction tests, starting with number one. Test numbers shall not be repeated. If it is necessary to retest an area which fails compaction, the retest shall have the same number as the failing test, followed with an alpha character to indicate a retest. When the project contains the Quality Assurance Special Provision see CA Section 106.03 for instructions.

306.00 Rolling.

General. The specifications list three types of rollers in detail: Steel, Pneumatic-Tire, and Vibratory. If end results are specified, the Contractor may use any roller type to accomplish compaction. If end results are not specified, the Contractor's rolling equipment must meet the specifications for each roller type. The specifications also allow the use of miscellaneous rollers which must be approved by the Engineer.

When end results are not specified, such as plant mix compaction, the rollers must be inspected prior to use to determine compliance with specifications. This inspection should be recorded in the diary. Items such as roller weight, tire pressures, drum or tire width, dynamic forces, vibrations per minute, tire size, etc. must all be checked for compliance.

Adequate rollers must be available to handle the work being performed by the Contractor. Roller speed must be controlled. Rollers should operate at speeds of from 3 to 5 mph unless otherwise specified or directed. Certain items of work require specific rollers, such as plant mix leveling courses require a pneumatic type roller. The Inspector should check that rollers are of the proper type, in satisfactory condition, and meet the minimum roller requirements before work commences. The Contractor should furnish manufacturer's specifications and ratings to determine the capability of a roller.

Ample material has been provided to the districts on vibratory rollers. All Inspectors involved with vibratory rollers should be familiar with current literature on vibratory rolling. Vibratory rollers have many capabilities. Improper use of vibratory rollers, however, can do more harm than good. Project personnel should check to assure that vibratory rollers are being operated properly.

The specifications include phrases that incorporate wording about rollers such as "passes" and "coverages" which are defined below.

A. Roller Pass: A roller pass is the passing of the roller unit over an area (roller width) in one direction one time.

B. Roller Coverage: A roller coverage is the rolling of the entire width of pavement (roadway) one time including roller overlap.

Generally, rolling is not paid for separately, but as incidental to other bid items.

307.00 Open-Graded base. See Standard Specifications Section 307 for requirements.

SECTION 400 – SURFACE COURSES AND PAVEMENT

400.00 Surface Courses and Pavement. The traveling public judges an overall project by the smoothness and appearance of surface courses and pavements. The quality of the construction will determine the serviceability, durability, strength, and riding quality of the project.

The table in the specification shows the application temperatures for the various grades and types of asphalt. The following also must be considered regarding asphalt:

- Loading certificates should be checked carefully to assure that the asphalt is of the grade and type specified. When anti-stripping additive is required, the percentage and type of additive must also be shown on the loading certificate.
- Changes in asphalt grade should be carefully reviewed before being made. A change in specification change order is always required to change the grade for plant mix asphalt. The Engineer may change the asphalt grade one-step without a change order for other applications.
- The Department's Quality Assurance Program requirements.

Construction diary entries should include the following information unless recorded or filed elsewhere:

- Loading certificate number.
- Sample numbers.
- Air and application temperatures.
- Placement.
- Comparison of quantities used and planned quantities.
- A record of occasional tanker weights to verify certified weights. This may be achieved by weighing loaded and unloaded tanker on approved scales.
- Explanation of any material deductions.
- Discussions with the Contractor prior to and during production.
- Calculations for quantities both weight and volume.
- Yield calculations, depth checks, and smoothness tests.
- Scale checks and equipment inspections.
- Application rates of asphalt, CCM, rolling, maintenance, brooming, etc.
- Results of field tests.
- Any other information pertaining to construction (e.g., application rate of curing compound, the installation of load transfer devices and dowel bars, joint sawing and sealing operations) and reasons for material deductions (with reference to deduction tickets).

Whenever material is wasted or it becomes necessary to make deductions from pay quantities, documentation should be prepared on the day the deduction occurs and be clearly identified as a deduction.

The asphalt content of wasted or unacceptable loads of plant mix is computed from the asphalt content of the mix. Show computations on the ticket or diary. Asphalt deduction tickets must cover variations in delivery loading certificate weights. Separate tickets must be used for plant mix and asphalt if each is a separate pay item.

Compute quantities and report to the nearest whole unit.

401.00 Tack Coat. The tack coat is an application of emulsified asphalt on an existing pavement, , and is used as an aid in bonding a new pavement surface to the existing pavement surface. Any pavement surface exposed to the elements or traffic even for short periods will develop a film that cannot be removed by ordinary cleaning methods and may prevent or reduce bonding. The tack coat is only intended to provide a “tacky” surface between the surfaces. An excess of asphalt may act as a lubricant and create a slippage plane between the surfaces, or it may be absorbed and cause the new pavement surface to “flush.”

The three essential requirements of a tack coat are:

- It must use the correct application rate.
- It must uniformly cover the entire surface of the area to be paved.
- It must wet the old surface so the new surface will adhere.

The type and grade of asphalt is specified in the contract. Diluted emulsified tack coat requires equal volumes of water and emulsified asphalt to be mixed together by the supplier prior to application.

Tack must be placed on a clean surface. Material accumulations on the existing surface may interfere with the adhesion of the tack. Accumulated materials include dust, loose aggregate, soil, leaves and pieces or lumps of other foreign materials deposited on the surface. Ensure that cleaning includes the edges of any existing pavement adjacent to new pavement.

Application should be limited to the area that can be covered before traffic or dust nullifies the effect. Any areas of tack coat that are thus affected should be re-tacked. Reapplication of tack must be carefully controlled to avoid an excess of asphalt. Keep all traffic not essential to the work off the tack coat.

Tack coat should be sprayed uniformly on the surface at the specified application rate. If streaking is occurring, the Contractor should be required to adjust the distributor. Streaking is caused by faulty distributor adjustment or operation, resulting in the material being placed in ridges. These ridges will not flow together and will result in insufficient material available for bonding between these ridges.

In places where the distributor spray bars cannot reach, it is necessary to apply the tack coat with a hand spray attachment or by hand. It is very important that vertical edges of longitudinal and transverse joints be adequately coated to aid in bonding.

The tack coat must “break over” (i.e., the water must have all evaporated into the atmosphere) before pavement is placed or water will be trapped and create a slip plane.

402.00 Prime Coat. The purpose of the prime coat is to protect and stabilize the CRABS or base material and provide a uniform, firm working floor for the next course. The surface to be primed must conform to the typical section and have reasonably uniform compaction. The surface should be tight and in a surface dry condition. Excess float rock should be bladed off or rolled in prior to priming. Excess or insufficient moisture both tend to prevent penetration of the asphalt. A dusty, dry surface may require a light application of water to bring it to the desired moisture condition. Water should be applied only with a spray bar to obtain uniformity and prevent wet spots. The type and grade of asphalt is specified in the contract.

After the emulsified asphalt has been applied, allow time for it to penetrate prior to blotting. The ideal situation is to apply no blotter at all. The second choice would be to have time necessary for maximum penetration. However, traffic conditions and several other factors usually influence the amount of time available. The bulk of the penetration will occur quite rapidly within the first 30 to 60 minutes. If it rains, apply blotter material and prohibit traffic if at all possible. If not possible, a cleaning system for vehicles may need to be established.

Blotter material should be applied sparingly in those areas where necessary to prevent picking up the prime. Excess blotter material creates a hazard for traffic. Excess blotter must be removed prior to the next phase of construction.

403.00 Chip Seal Coat Warranty. A chip seal coat consists of an application of liquid asphalt immediately covered with an application of aggregate (cover coat). Generally, chip seal coats are applied to an existing asphalt surface to:

- Seal out moisture and air
- Rejuvenate a dry or weathered surface
- Improve skid resistance
- Improve visibility of delineation
- Improve riding quality.

Chip seal coat construction is a fast-moving operation and requires correct timing of the sequence of steps:

- Surface preparation
- Asphalt application
- Aggregate application
- Traffic control.

All needed equipment must be onsite and in good working order before the work starts. Equipment used in chip seal coating includes power broom, asphalt distributor, self-propelled aggregate spreader, dump trucks, and self-propelled pneumatic tired rollers. Dust control and blotter application equipment may also be needed.

Surface preparation is extremely important to any chip seal coat. The surface must be clean, dust free, and dry to obtain proper adhesion of the chip seal coat. All defective areas and broken edges should be repaired. The old surface should be brought to a reasonable degree of uniformity by correcting flushed or dry areas. Scrub coats, leveling courses, or patching material containing cutback emulsified asphalt should cure at least 10 days before sealing. It is important that vegetation overhanging the roadway be moved prior to chip seal coating.

The asphalt distributor is the most important piece of equipment on a chip seal coat project. Its purpose is to uniformly apply asphalt to a surface at a specified and maintained application rate. Verify that the distributors have been prequalified by the Contractor. Asphalt should be applied as outlined in the ITD Standard Specifications for Highway Construction (SSHC) 400, with special attention given to uniformity of spread and temperature of the asphalt and pavement.

Immediately prior to starting an application of asphalt, require the Contractor to test the spray bar and nozzles to verify that the asphalt will be sprayed properly. The distributor should be placed with the spray bar over the building paper and the nozzles opened so that the spray may be checked visually for non-uniformity.

After initial approval, maintain a close inspection to assure continuing equipment compliance and proper operation. Practically all problems involving distributor application of asphalt are the result of an uneven application of asphalt. If any streaked areas develop, the Contractor must stop and adjust the distributor. The development of ridges is usually the result of low asphalt temperature, improper pump pressure, uneven bar pressure, spray bar at improper height, interference between spray nozzles, improper nozzle sizes, or a combination of these.

- Rough or bleeding transverse joints are the direct result of poor joint construction, either improper papering, a bad start with the distributor, or poor cutoff at the end of a shot.
- Poor longitudinal joints are the result of an improper lap.
- Transverse corrugations are the result of pressure fluctuations or uneven travel speeds.

A distributor operation must be balanced. Changes in any factor affect all other factors and must be compensated for (e.g., changes in asphalt type or spread ratio may require a change in pressure, nozzle size or angle, bar heights, travel speed). Some distributors must be chained or blocked to prevent excessive change in bar height during unloading, thus affecting the spray lap. Observe the end of each distributor shot to verify the proper rate of asphalt is being applied. If the distributor shoots until it is fully off-loaded, the last of the application may be light or non-uniform. New pavements may require a slight increase in asphalt application rates.

The time lapse between the distribution of asphalt and the application of cover coat material is critical. The application of chip seal coat asphalt must not be started until there are sufficient trucks loaded with cover coat material at the project site ready for immediate use. If the cover coat is dusty, the material should be moistened at least 24 hours prior to intended use.

Asphalt must not be applied to more roadways than can be covered with aggregate within two to three minutes. The Asphalt Institute recommends two minutes, but sometimes three or more minutes may be successful. If an emulsion is used, it must be covered before it starts to break.

Each asphalt shot must be started on building paper at least 3 feet wide and longer than the spread width. This is to prevent buildup at the joint, assure a matching joint, and allow the distributor to be traveling at the proper speed. Paper may be required at the end of the shot as well if the shut-off is not positive. Verify that bridge joints are papered or covered with duct tape prior to applying asphalt.

The aggregate spreader should be checked carefully for compliance with specifications. The spreader must be capable of providing a uniform spread at the desired rate without segregation. Proper control of the spread rate is essential. Since aggregate cannot stick more than one particle thick, any excess will be wasted. Excess material will also have a tendency to displace and loosen material embedded in the asphalt. Immediately after material placement, verify that any areas with a deficiency or surplus of material are corrected.

Verify that the cover coat is applied so that the tires of the spreader or trucks coming to the spreader never contact the uncovered asphalt. Empty trucks may cross the uncovered longitudinal joint leaving the spreader, but this should not be allowed if any of the asphalt will be tracked onto a fresh chip seal coat. In this case, the joint should be covered with aggregate where the truck is crossing and then the material swept off the roadway.

The “meet line,” or longitudinal joint, is very critical. The lap must be correct to provide the required asphalt. Cover coat must not be applied to the joint until the abutting spread is made. If the joint is covered on the first spread, not enough asphalt is present to hold the chip. If the second spread of asphalt and aggregate laps the joint too far, a ridge will occur and usually the joint will bleed and cause tracking.

Only pneumatic tire rollers are allowed for chip seal coats. Rolling should start immediately behind the spreader and not be allowed to lag behind the spreading operation. Verify that the rollers are operating at a speed slow enough to prevent the tires from displacing or picking up the aggregate. The purpose of rolling is to seat the aggregate in the asphalt and promote the bond. The speed of the aggregate spreading operation should be geared to the speed of the rolling.

Embedment of the cover coat must be watched carefully. The largest stones should be embedded approximately 40 percent. Care must be exercised at all times to prevent scuffing or pickup of the new chip seal coat. Any damage should be repaired immediately. Bleeding areas should be blotted immediately.

Any loose aggregate particles are swept up using a power broom the morning following the previous day's application unless the Contractor is otherwise directed. Brooming reduces the danger of flying rock and prevents the loose material from prying the embedded chips loose. A light application of water may be needed to reduce dust during the brooming operation.

403.01 Traffic Control. Traffic control through the chip seal coat is extremely important to both the success of the project and public relations. The chip seal coat must be protected from the traffic until the material is firmly embedded and the chip seal coat has cured sufficiently to prevent pick up or displacement until the chips are firmly embedded.

Traffic control is usually accomplished during the initial curing with flaggers and pilot cars; later it may be handled by signing. Traffic should be piloted through the work at speeds low enough to prevent damage to the surface and to vehicles from loose chips. Normally, this speed will be less than 35 mph. Following an unexpected rainstorm, traffic should, if possible, be kept off of the roadway until cover coat aggregate has become dry. If this is not possible, extremely slow convoying of the traffic will be necessary and rolling continued until danger of dislodging aggregate has passed.

Pilot car traffic control should be maintained during that portion of the day when damage could occur to traffic due to flying rocks or to the chip seal coat because of weather conditions. It may even be necessary to pilot during the second day. The pilot car should vary travel paths to help seat the aggregate.

The length of time that traffic should be controlled over the project depends in part on the weather and the type of asphalt applied. During cool, damp, cloudy, or humid weather, it may be necessary to pilot longer than during a time when the weather is warm, dry, and sunny. This is because the cool, damp weather delays the evaporation of the moisture contained in the aggregate and the setting rates of the asphalt cutback or emulsion. During very hot weather, traffic should be controlled longer than normal if there is a possibility of chips rolling and picking up.

Care must be exercised to prevent sudden starts or stops of the traffic. When stopping traffic on a new chip seal coat, it may be necessary to provide additional cover coat or other material to blanket the area where the traffic will park. This will prevent pick up and tracking.

Sufficient pilot cars should be provided and the work should be arranged to handle the traffic with a minimum delay. Most extended delays (e.g., exposure of the traffic to unnecessary hazard, inconvenience to traffic, damage to the chip seal coat) are a direct result of poor planning for traffic control. Never pilot traffic by a distributor in the process of applying asphalt if there is a possibility of asphalt getting on vehicles.

Special traffic control considerations are required for four-lane interstate and other multi-lane highways. Stopping of traffic on these highways should be avoided if feasible, unless approved by the Engineer. Recirculating pace cars are normally used to control speed during the critical cure periods and during placement operations.

403.02 Weather Limitations for Seal Coats.

- Chip seal coats should be undertaken only when pavement temperature is above specified minimum. Chip seal coating should not be attempted during damp weather or when the weather appears threatening. In general, high pavement temperatures between 120 °F and 140 °F will be considered cause for tracking and bleeding and reason for ceasing the operation should they become evident.
- Air temperature should be between 80 °F and 95 °F. Chip seal coat operations should be avoided at air temperatures over 100 °F, especially if high ADTs and grades are present. Be sure and check temperatures in shady areas to verify that specifications are being met.
- Satisfactory bond is dependent upon good wetting action by the asphalt and involves the viscosity of the asphalt and evaporation rate of the diluents. Generally, RC asphalts are more suitable for use when the pavement temperature is above 90 °F and MC asphalts are recommended when the pavement temperature is below 80 °F. The asphalts are about equal when the pavement temperatures are between 80 °F and 90 °F.
- If feasible, stop asphalt application at the edge of shaded areas until the aggregate spreader catches up and can follow immediately behind the distributor through the shaded areas.
- Raise the asphalt temperature to its upper limits for colder pavement, weather conditions, and shady areas. Then cover with chips immediately.
- When windy, take special care to protect the traveling public. Do not seal in strong winds. Direct crosswinds are most critical for disturbing the flow of the fan edges. Specifications do not allow sealing if wind velocity exceeds 15 mph unless approved by the Engineer.

403.03 Precipitation Patterns as an Aid in Chip Seal Coating. The following figures contain a state map divided into climatic zones and graphs of average temperature and percent probability of dry weather expected during the chip seal coating season for these zones.

Information was gathered from the U.S. Department of Agriculture, U.S. Department of Commerce, and the University of Nevada Agricultural Experiment Station publications. A 30-year study base, 1931 to 1960, was used to predict the precipitation patterns. The average temperatures come from the annual summary of climate data published by the U.S. Department of Commerce.

The curves should be used as a guide to determine the best time to perform chip seal coating in a particular area. Better chip seal coats should result by avoiding the marginal sealing weather periods.

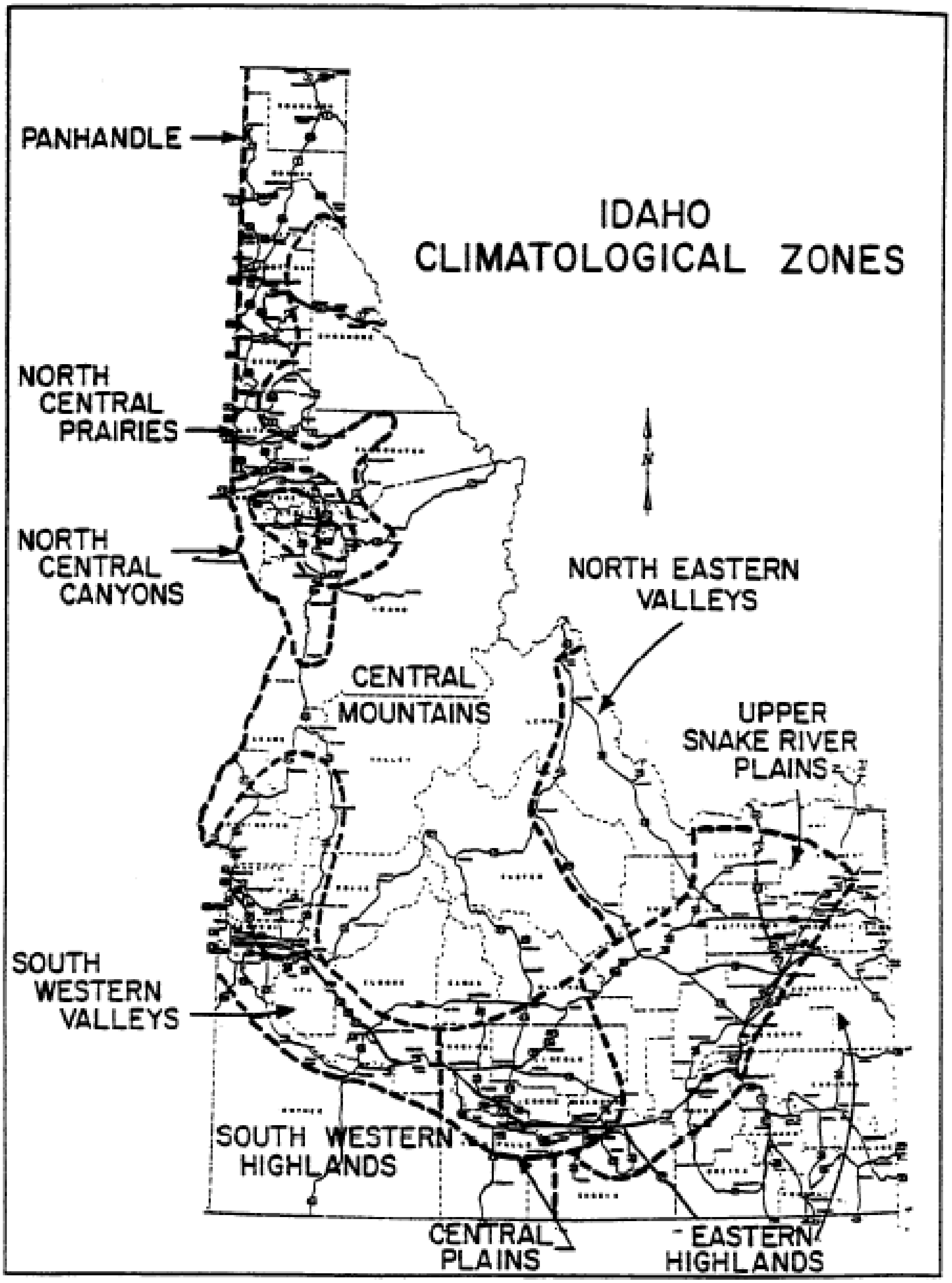


Figure 403.03.1: Seal Coat Exhibit 1

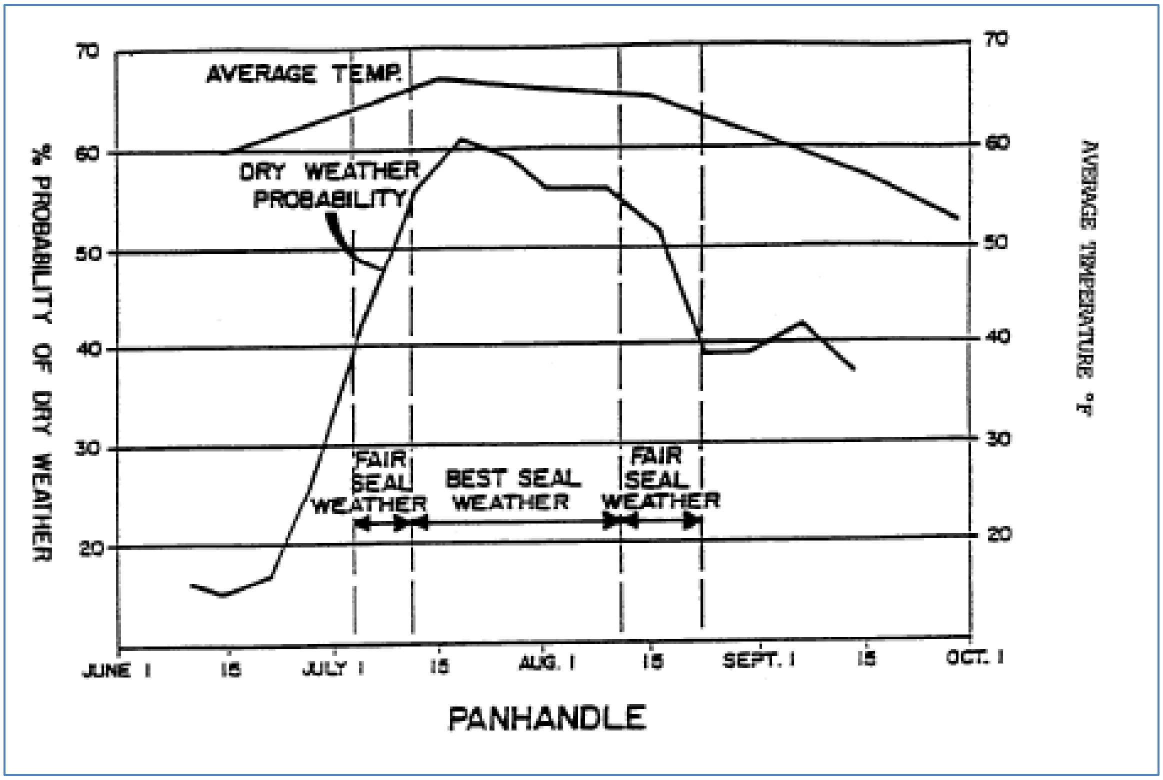


Figure 1

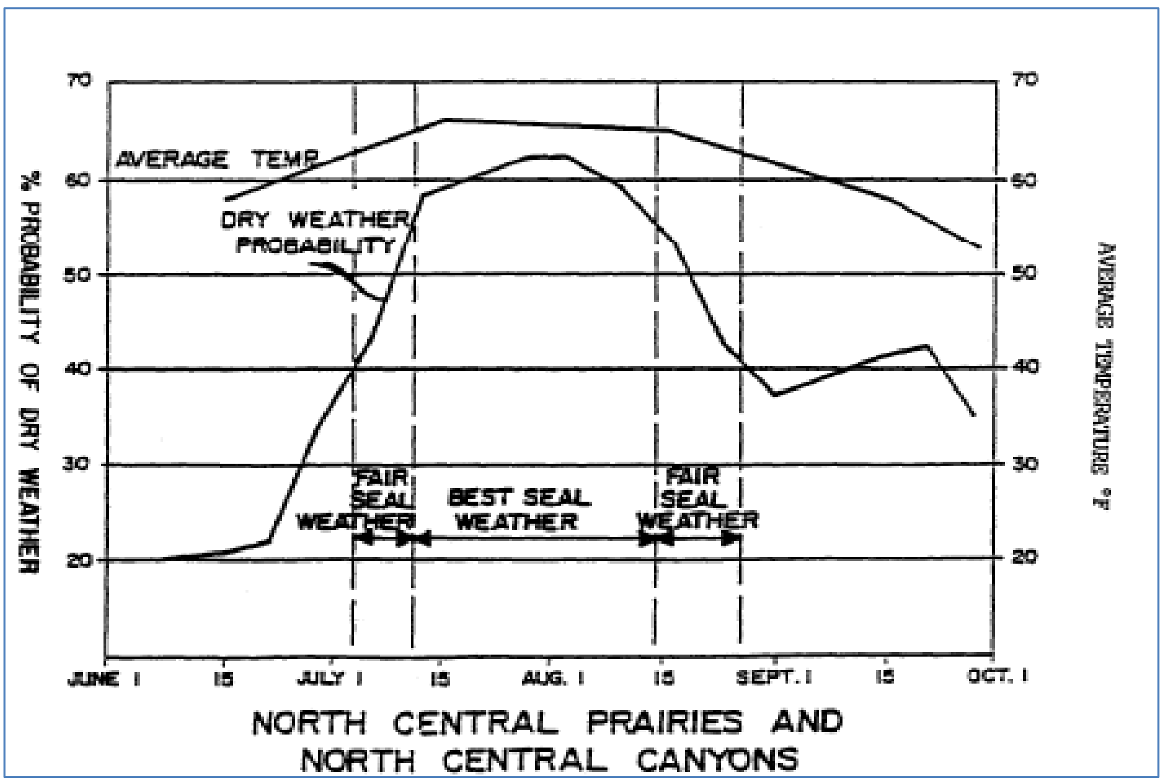


Figure 2

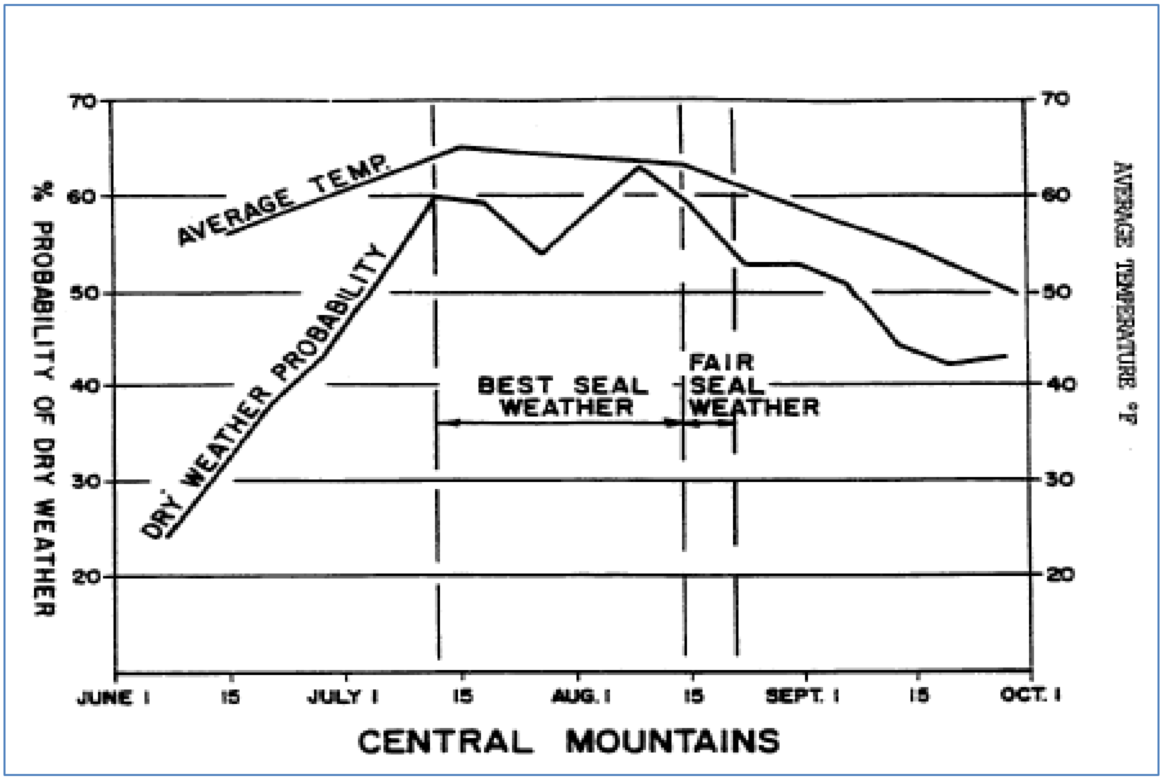


Figure 3

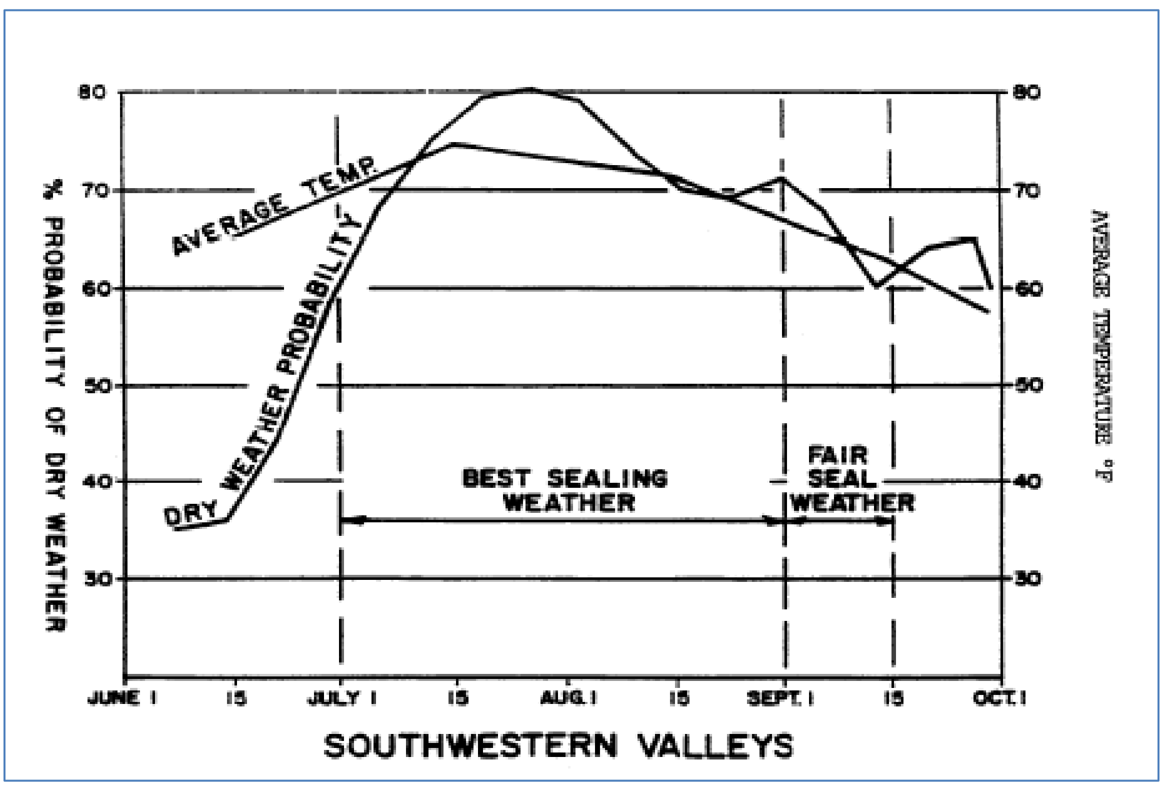


Figure 4

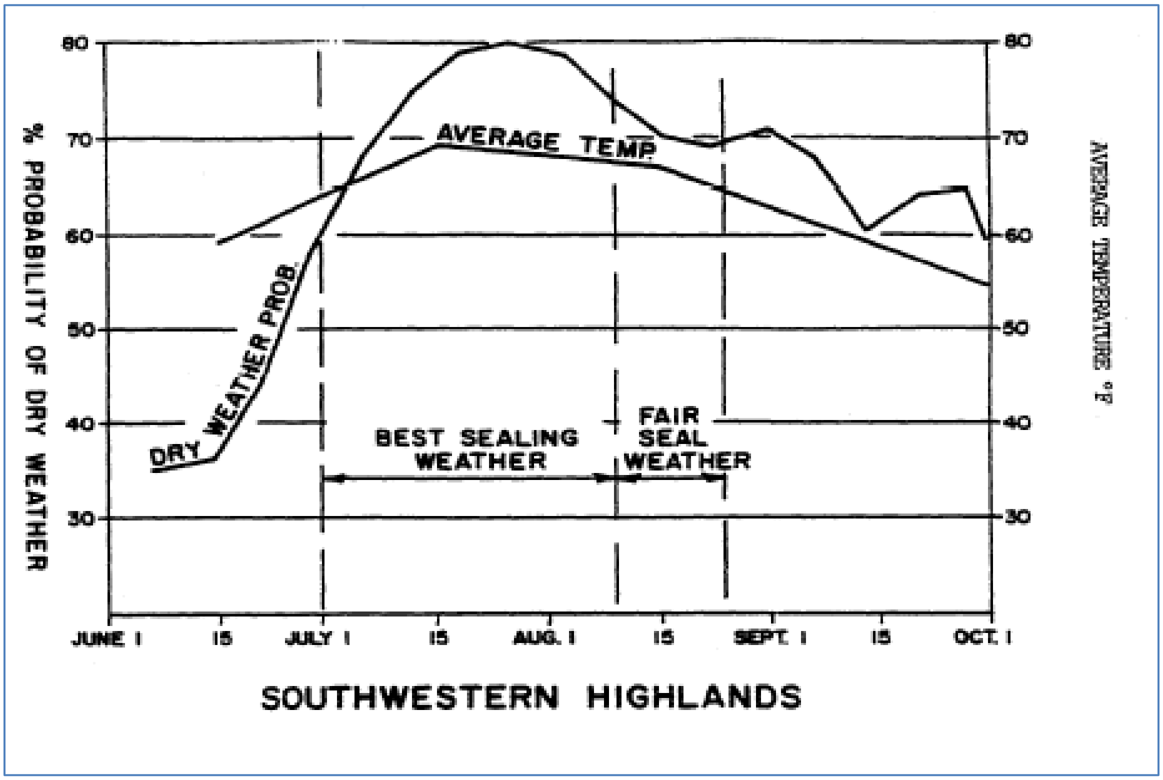


Figure 5

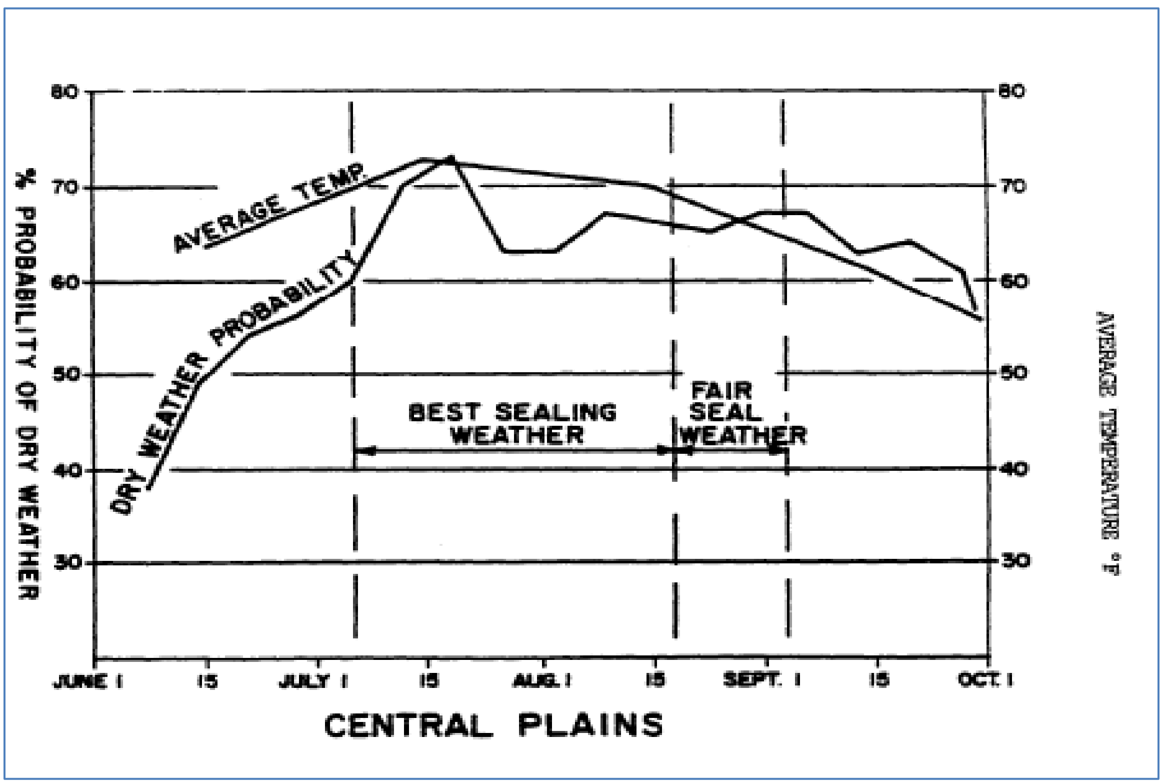


Figure 6

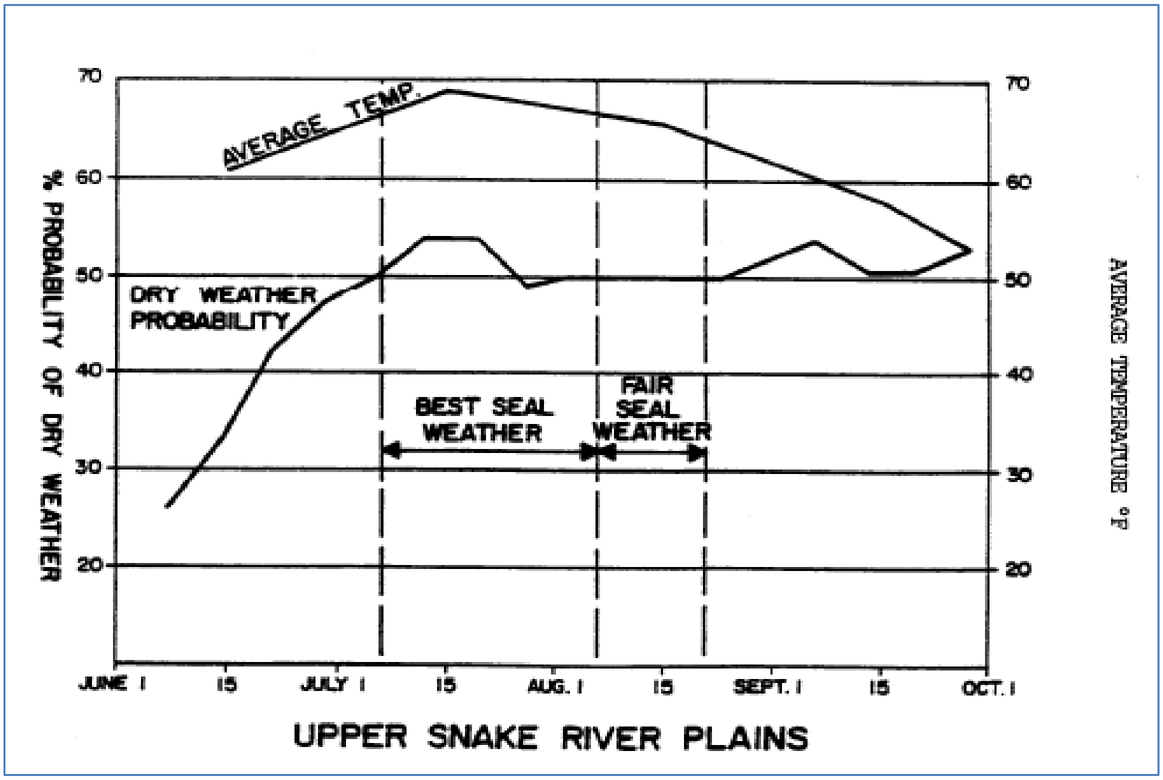


Figure 7

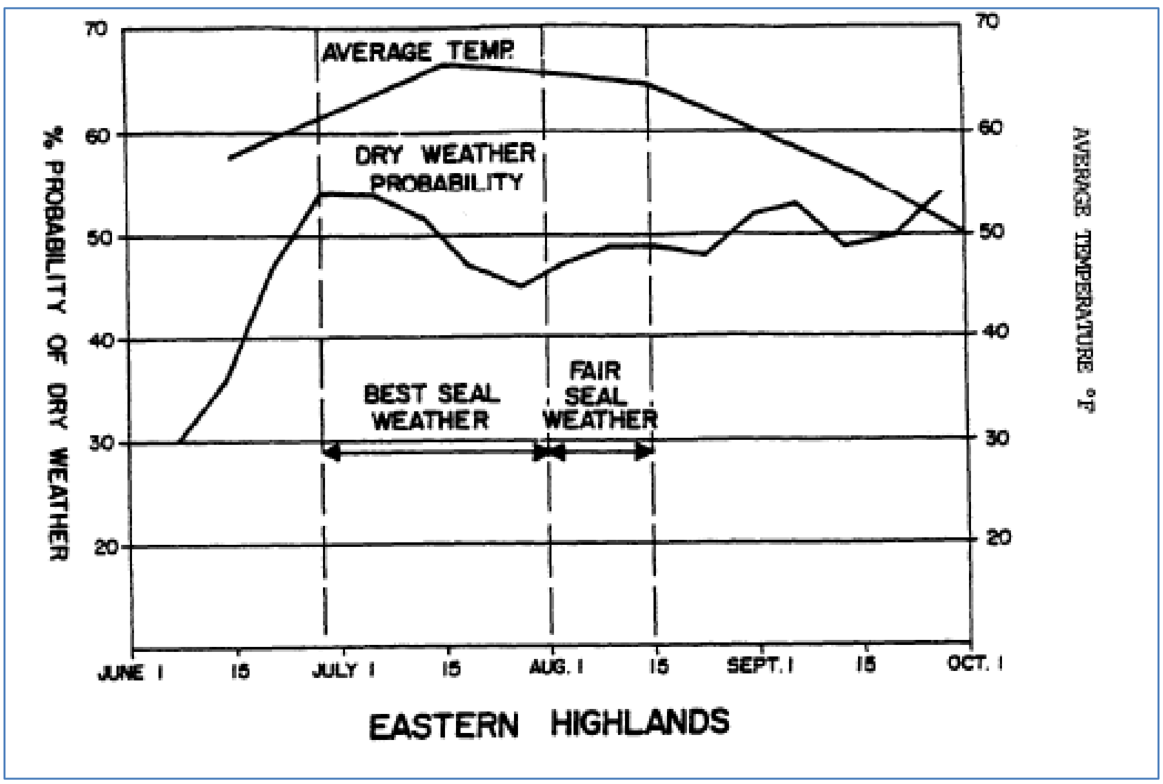
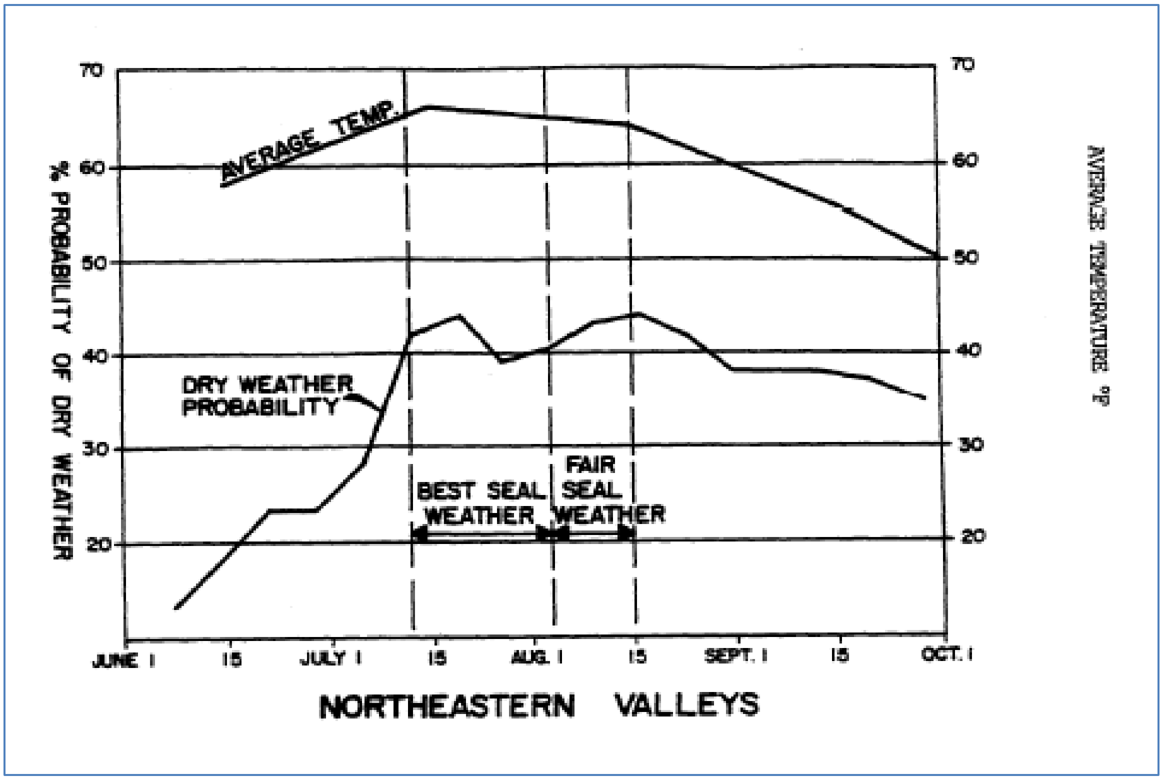


Figure 8



70
60
50
40
30
20
70
60
50
40
30
20
% PROBABILITY OF DRY WEATHER
AVERAGE TEMPERATURE °F
AVERAGE TEMP.
DRY WEATHER PROBABILITY
BEST SEAL WEATHER
FAIR SEAL WEATHER
JUNE 1
15
JULY 1
15
AUG. 1
15
SEPT. 1
15
OCT. 1
NORTHEASTERN VALLEYS

Figure 9

404.00 Surface Treatment. Surface treatment construction is a combination of prime and/or chip seal coats as specified, and the applicable sections apply to each operation.

405.00 Superpave Hot Mix Asphalt.

405.01 Description. Plant mix production and pavement construction requires extremely careful inspection. Pavement that does not meet all specifications will not perform satisfactorily and will result in high maintenance costs. An oversight or omission may result in an inadequate pavement that is not only unsightly and rough, but may materially affect the useful life of the project.

Plant mix is a mixture of aggregate and asphalt binder. Because of the high viscosity of asphalt binders at normal temperature, it is necessary to heat the aggregate and asphalt binder to permit mixing, placing, and compacting. Plant mix is produced in a central proportioning and mixing plant (hot plant). At the hot plant, the aggregate is dried and heated to the mixing temperature and then mixed with the specified asphalt binder. On completion of mixing, the mixture is discharged into trucks and conveyed to the roadway. The plant mix is then placed by mechanical spreaders (paving machines or blade laid) and compacted using compaction equipment before it cools and becomes unworkable.

405.02 Materials. See the specifications for materials and the test methods to be used.

405.03 Construction Requirements.

A. Mix Design. Plant mix is specified in the plans by a specific class (Class SP-2, SP-3, and SP-5) and nominal maximum aggregate size 1 ½, 1, ¾, ½, 3/8 inch, and #4. SSHC 405.02 provides the material specification parameters for the various mix classes and the tests used in determining specification conformance. These are the parameters that the Contractor's mix design must meet to produce the job mix formula (JMF) that will be used for the project. The Contractor must submit the proposed JMF including copies of all test reports, data, and worksheets at least 5 calendar days before the start of paving.

Materials must also meet the applicable requirements of SSHC 700 for asphalt binder, anti-stripping additives, and aggregates. SSHC 703.05 specifically addresses requirements for stockpiles; fine and coarse aggregates; aggregate fracturing, flat and elongated specifications.

B. Weather Limitations. SSHC 405.03 B specifies the weather conditions that plant mix may not be placed. Be aware that thin mats, low ambient temperatures, wind, low base temperatures, moisture, and cloudy days all have a significant effect on decreasing the temperature of the mix. There must be sufficient time from placement of the plant mix until the mix reaches the temperature parameters supplied by the asphalt manufacturer for the rollers to adequately compact the mix to obtain the required density. Discuss with the Contractor how the above factors will be taken into consideration when applicable to ensure that compaction requirements will be met. Document the details of this discussion.

Surface temperature measurements are taken using the following procedures:

- When taking a reading in the sun, place the thermometer on the pavement and then shade it for three minutes before reading. The intent is to prevent a false reading due to the sun's direct exposure.
- Take the surface temperature in an area representative of conditions for the project.

- Take a new temperature when conditions change for any reason.

Mix must not be placed on a wet or frozen surface. Mix that is placed on a wet or frozen surface will cool very quickly because of rapid heat transfer from the mix to the underlying surface. The required density will be difficult to achieve because of the low mix temperature. As a result of the lack of compaction and corresponding high air void content, the pavement will perform poorly. Sometimes the pavement "sweats" as a result of the dew point exceeding the pavement temperature. This generally occurs on a warm day immediately following a cold day.

It is the Contractor's responsibility to start and stop the mixing plant. However, production should stop when rain starts. Production should not start if the surface is frozen. Previously loaded trucks may be placed if standing water is not visible on the existing surface. Tickets issued for loads that were not placed are void and an appropriate notation should be made on the ticket.

Placement of mix under these conditions does not relieve the Contractor of the responsibility for all mix to be in satisfactory condition. If the Contractor insists on laying mix contrary to the above requirements, issue an Avoid Verbal Order (AVO) immediately to inform the Contractor that the mix is rejected.

C. Mixing Plant.

C-1. Mixing Plant Types. Most portable mixing plants are now dryer-drum mixers. The increase in use of dryer-drum mixers for the production of asphalt concrete is primarily because of the method's simplicity and economy.

The fundamental components of the dryer-drum plant are:

- Aggregate cold-feed bins
- Aggregate conveyor
- Asphalt storage tanks
- Dryer-drum mixer
- Hot mix conveyor
- Hot mix storage silo.

There are no screens, hot aggregate bins, or pug mill mixers as there are for batch mixing plants. Aggregate gradation control is achieved in the crushing and stockpiling operations. Accurately controlled feeders proportion the aggregate as it leaves the cold bins. Since mix gradation and uniformity are almost entirely dependent on the cold feed system, proper care must be exercised in the production and stockpiling of aggregates. Multiple aggregate stockpiles must not be mixed or contaminated prior to entry in the cold feed bins.

If reclaimed asphalt pavement is used, a reject screen must be installed as required in the specifications.

Positive separation of cold feed bins (e.g., dividers between bins) must be attained to prevent spillover. Cold aggregate bins should be equipped with feed units having interlocking controls to maintain a constant ratio between the relative quantities of each size of aggregate at varying plant production rates. The conveyor that delivers the combined aggregates to the drum should be fitted with a mechanical or electronic belt weighing device, linked directly to the asphalt metering pump with the appropriate time delay to ensure that the desired asphalt content is maintained at varying production rates.

Belt scales that continuously weigh and monitor the combined aggregates are interlocked with a metering asphalt pump to maintain a constant aggregate-to-asphalt ratio. Asphalt is added at various locations generally midway in the drum. The burner is located at the aggregate-entry end of the drum. This means that there is a parallel flow of burner gasses and asphalt-aggregate mixture toward the discharge end of the drum. An indicator for checking the quantity or rate of flow of the asphalt to the mixer should be provided.

When proportioning the asphalt at the plant, the moisture in the aggregate must be considered. The Contractor should correct the wet aggregate weight back to dry weight. The intended asphalt content is based on the dry weight. The Contractor should also monitor moisture content during production since changes in stockpile moisture may affect not only asphalt content, but variables such as compaction and mix temperature.

Controls and monitoring devices for feeders, aggregate conveyors, weight belts, asphalt pump, burner, mix temperature, and conveyors are usually housed in a control van with good visibility of the entire operation.

Although the combustion rate of the burner fuel is independently controlled, there should be a provision for automatic shutdown of the burner if there is an interruption in the flow of any of the mix components.

Diesel, natural gas, or propane fuels are commonly used in the burner. Be aware that contamination of the mix with unburned fuel may result if plant or burner output is pushed beyond recommended capacity when using diesel or heavier burner oils.

The benefits of hot-mix surge silos for both plant and paving operations are well known. The dryer-drum mixing plant is designed for nearly continuous operation, but the flow of haul trucks may be intermittent. The surge bin is the important link between a steady flow of asphalt mixture and the sometimes sporadic movements of haul trucks. Specifications require that the material in the silo not drop below the top level of the cone except at the end of the day's production.

Dryer-drum mixed asphalt concrete can be produced over a wide range of temperatures. Conditions such as stockpile moisture, aggregate characteristics, asphalt viscosity, weather, use of reclaimed pavement, and rate of production all have an effect on the mixing temperature. A thermometric instrument should be installed in the discharge chute of the drum to provide the plant operator with an easily visible indication of the mix temperature.

C-2. Mixing Plant Inspection and Calibration. The Contractor is responsible for calibrating the mixing plant and checking for accuracy. Observe the calibration whenever possible and always obtain a copy of all calibration data to verify that adequate information is available for making adjustment when indicated for project files. Document any deficiencies and corrective actions taken.

Calibration must be completed prior to production of plant mix to ensure that the asphalt pump, weigh belt, and cold bin feeders are operating properly. The cold feed aggregate bins are equipped with variable speed belt feeders and gates. Calibration charts are completed for each bin using the various aggregates to be included in the mix. These charts are used to adjust the mixing plant controls so that the proper mixture of aggregates is incorporated into the mix.

Prior to paving, verify that the mixing plant meets SSHC 405.03.C requirements. Report any deficiencies to the Contractor immediately and then document them and the corrective actions taken. At a minimum, verify the following:

- Hot plant equipment foundations are stable.
- Sampling locations are safe and convenient.
- Positively controlled gates on the cold feed(s).
- Aggregate sampler installed and working properly (See Subsection 106.11).
- Dust collection system in proper working order.
- Thermometers installed properly at the proper locations and calibrated.
- Scales in proper working order and accuracy within specified limits.
- Discharge gates open and close fully and quickly.
- For batch plants, pug mill paddles and liner in good condition with no excessive clearance (see manufacturer's recommendation).
- Asphalt storage adequate; tanks clean and equipped with a recirculating and heating system to provide constant temperature.
- Method of measuring asphalt in tanks is adequate and properly calibrated.
- Plant has been calibrated by the Contractor.

D. Hauling Equipment. Verify that the paving Contractor is using trucks and release agents that meet SSHC 405.03.D. Diesel fuel or other petroleum products are not to be used as a release agent. The release agent may be used to lightly coat the inside of each truck bed. Prior to production, assure that each truck is identified by a unique number. The paving Contractor may cover the truck beds during hauling to maintain mix temperatures.

During production, hauling equipment should be inspected to assure they are clean and that excess release agent is discharged before loading plant mix.

E. Paver. Paving machines may be mounted on track or rubber tires with tamping, vibrating, or oscillating-vibrating screeds. Before allowing the use of any machine, verify that:

- Screed and compacting mechanisms are in adjustment and fully operable.
- Drive mechanisms are properly adjusted, as loose racks or drive chains or improper or uneven tire pressures may result in a poor paving job.
- Automatic screed controls are in good working order.

After operations are started, the paving Contractor may need to adjust the feed from the hopper to provide as near as possible continuous operation of the augers. This will provide a constant depth of material in front of the screed. Fluctuation of this depth of material will change the pressure on the screed causing it to raise or lower, resulting in thickness variations and a poor ride.

The forward speed of the paver should be regulated to provide a balanced operation with the hot plant, trucks, and rollers. Pavers should be operated at as slow a pace as possible. Watch for excessive paver speed.

F. Mixing. The Contractor is responsible for providing a mixture that meets the specification tolerances and the control point minimum and maximum ranges specified in SSHC 703.05. These tolerances and the control point ranges are used to establish the upper and lower specification limits used in the QC/QA Special Provisions Quality Analysis.

The plant mix aggregate specification in SSHC 703.05 requires that aggregate being crushed for plant mix be screened so that not more than 10% of the naturally occurring minus ½" material remains in the material used to produce the coarse and fine aggregate stockpiles.

The purpose of this specification is to produce fractured coarse material as well as crushed fine material. Wasting of material finer than the ½" screen is an important part of the plant mix pavement production sequence. It must be accomplished because it affects the stability and compaction of plant mix pavements.

The Contractor must set the crushing plant up to comply with this specification be documented in the crushing reports.

Inspectors should inspect the amount of natural minus ½" material in the source (or being fed into the crusher) and the waste pile to document waste production versus crushed production quantities.

G. Superpave HMA Paving Plan. SSHC 405 requires a pre-operational paving meeting be conducted prior to paving. The intent of the pre-operational paving meeting is to discuss:

- The mix design to be used and the asphalt content starting point.
- The procedures to follow if the mix design is modified.
- Acceptance test strip construction procedures including testing and notification procedures.
- Nuclear density gauge calibration for correlation factors.
- Communication procedures to be used for weather shut downs and other potential construction issues.
- Procedures to follow if equipment breakdowns occur.
- What will be done regarding material segregation.
- Use of tack-application rates, pickup problems, and problems with rain.
- Testing: who, what, where, when and how; re-testing criteria; random sampling procedures; test result turn-around time; dispute resolution.
- QC/QA 0.75 and 0.85 pay factor decision criteria. Below 0.85 production must stop and adjustments made. Below 0.75, material is subject to rejection.
- Traffic control procedures and lines of communication.
- Other factors specific to the contract.

H. Acceptance Test Strip. An acceptance test strip is constructed by the Contractor using the JMF prior to the start of production paving to establish that the mix design parameters specified in SSHC 405.02 are met and that density may be achieved by the equipment, and construction methods used. Multiple test sections must be constructed if more than one target asphalt content is proposed. However, the Contractor must select only one JMF to be used on the project. Test methods to be used are as specified in SSHC 405.02 and 405.03.

The Contractor may also be allowed to perform offsite JMF verification and density gauge correlation sections in accordance with IT-125.

Acceptance of the test strip is based on the results of sampling and testing for mix design parameters, aggregate gradation, and density. Sample locations, sample numbers, and test methods are as specified. Responsibility for sampling and testing is as specified in the contract.

All samples obtained by the Contractor to be tested by the Department (or owner's representative) must immediately be turned over to the Department (or owner's representative). The Department (or owner's representative) has a specified time frame to complete testing based on the number of test sections. See specification for requirements. Acceptance criteria are as specified. Based on the acceptance criteria, the acceptance test strip is either accepted, rejected and removed, or rejected and allowed to remain in place with a 50 percent unit price reduction. A change order may be required if the test strip is allowed to remain in place.

Density correction factors for equipment correlations are also determined during acceptance test strip construction.

I. Tack. See SSHC 401.00 for requirements.

J. Production Paving. See SSHC 405.03.J for Contractor documentation and submittal requirements.

K. Spreading and Finishing. Spreading and finishing requires observation and inspection of the methods and practices employed by the paving Contractor to:

- Assure that these methods are producing the intended result
- To require corrective measures when unsatisfactory results are obtained.

The intended result is a pavement that is constructed to the correct depth and cross-section with a surface texture density and riding surface as specified.

The following conditions must be watched closely and documented in the construction diary including corrective actions taken, if necessary:

- Uniformity of the mixture and any evidence of segregation. Look for the accumulation of coarse aggregate in “pockets.”
- Surface texture of the mixture. Look for streaks of differing texture and pulling or tearing of the mixture.
- Temperature of the mixture. Take frequent measurements at both the plant and the roadway to verify specification requirements are being met.
- Yield, cross-slope, and smoothness of the pavement. Verify contract requirements are met by:

  - Calculating yield once per day based on the actual tonnage placed and the actual area (length and widths) paved.
  - Verifying paver is adjusted correctly and checking the cross-slope frequently with a straight-edge.
  - Reviewing the smoothness profilograph each day.
- Paver speed – Ensuring every effort is being made to keep the paver moving continuously and at an appropriate speed (e.g., Contractor is matching delivery of material to paver speed, enough haul trucks are being used to continuously supply the paver).
- Rolling operation – verifying the rolling pattern established during the acceptance test strip is being followed.

Check for difficulties when trucks are being used to load material into the paver hopper. Trucks must not be allowed to back into the spreader so that they bump it or bear against the machine.

By observing the surface texture and depth behind the machine and checking the surface with a straightedge, a malfunction in the paver or non-uniformity of mixture may be detected. Some of the most common difficulties encountered together with possible causes include (see table on next page):

FAULT	CAUSE
Dragging (Displacement of plant mix in a longitudinal direction)	• Cold mix • Improper gradation • Aggregate too large for depth of lay (lift thickness should be 2 ½ to 3 times the maximum aggregate size)
Tearing (Pulling of plant mix under the paver)	• Build-up on screed, • Worn screed • Worn tampers • Improper tamper adjustment • Improper amount of material in augers (usually too high) • Improper “lead crown” in screed • Tearing in center, add lead crown • Tearing on edge, take out lead crown [ordinarily the leading edge of the screed will have 1/8-3/16 in more crown than the back] • Insufficient asphalt
Segregation (Separation of the coarse aggregate from the rest of the plant mix)	• Segregated in trucks (improper handling, insufficient mixing) • Segregation in hopper • Feed from hopper too low worn augers
Wavy Surface (short choppy waves)	• The amount of material on auger is causing compaction under auger (auger shadow) • Worn tampers, worn augers • Truck driver setting brakes too tightly. • Pickup machine set too close to ground. • Uneven buildup or wear on truck. • Automatic controls hunting. • Running screed too empty with oscillating-vibrating screeds. • Excessive paver speed.
Wavy surface (long waves)	• Too much variation in amount of material in front of screed. • Over controlling screed. • Worn auger

Wavy surface (long waves cont.)	• Variation in machine travel speed • Improper mounting of windrow pickup device. Sudden stops and starts of machine. • Sag in erected stringline for automatic control • Ski or beam brackets binding on automatic controls. Variation in material temperature. • Variation in material moisture content. Variation in asphalt content. • Variation in gradation. • Variation in uncompacted material thickness • On pneumatic machines, the weight of the material on the conveyors from hopper to screed is carried by the pneumatic tires. Running this conveyor empty will cause the machine to rise. • Roller operating too fast
Irregular rough spots on pavement	• Roller standing on fresh surface. Abrupt reversing of roller. Trucks backing into paver. • Poor workmanship at transverse joints
Miscellaneous Bumps	• Pivot points on screed binding • Screed adjustment screw loose or binding • Paver setting too long on mat, allowing screed to settle. Bumping or uneven push on trucks. • Flat spots on rollers • Wear in kingpin or axle bearing or rollers. Running over spilled material. • Parking or turning rollers
SURFACE TEXTURE	
Excessively open	• Improper adjustment of strike-off. • Screed plat rough or galled. • Excessive paving machine speed. • Cyclic open texture is primarily caused by the machine operator allowing the head of material to fall below the top of the augers, or by dumping the wings of the paver when the hopper is low on material.
Varying	• Insufficient mixing • Trucks being loaded improperly at the plant. Segregation of mix at the plant. • Poor gradation control at the mixer • Screed not uniform across paving machine

Streaked	• Insufficient mixing. • Segregation of mix in trucks. • Worn or damaged screed plate.
Bleeding patches	• Asphalt not uniformly mixed. • Excessive moisture in mix.
Crooked or irregular longitudinal joint lines	• Careless machine operation

L. Compaction. The primary purpose of all rolling is to obtain compaction while also providing a satisfactory surface. Compaction rolling begins while the mix is still at the highest temperature that will allow rolling without damage to the surface or affecting smoothness. All compaction rolling must be completed prior to the cooling below the temperature parameters supplied by the asphalt manufacturer. Verify throughout that SSHCSection 306 and 405.03.L requirements are being followed.

Verify that the rolling equipment is the same type and weight as was used on the acceptance test strip. During production, verify the rolling equipment is following the pattern established during construction of the acceptance test strip. If the paving Contractor is experiencing difficulty in obtaining compaction, monitor and documents the efforts the Contractor is making to obtain the specified compaction. The rolling should be done in compliance with the temperature parameters supplied by the asphalt manufacturer. Poor mix compaction may occur because of the following:

- Improper rolling operation
- Reversing or turning too fast of rollers
- Parking roller on hot mat
- Improper mix design
- Moisture in mix
- Variation in mix temperatures
- Cold mix temperature.

If pick-up of material is occurring on the roller wheels, check that they are being properly moistened.

Traffic should not be allowed upon the new pavement until it cools to the temperature recommended by the asphalt manufacturer.

M. Joints. Joints, both longitudinal and transverse, have a great effect on the riding quality. On transverse joints, the previously laid material must be cut back to expose the full depth of the new lift thickness. Use of a straightedge is very important to determine the distance to cut the existing material back.

Ensure the paving Contractor is immediately testing the joint for smoothness and correcting defects before the material temperature drops below the minimum rolling temperature.

N. Miscellaneous Pavement. See SSHC 405.03.N for requirements.

O. Leveling Course. Plant mix leveling course may be either machine or blade laid. See the specifications for requirements.

P. Surface Smoothness. Surface smoothness testing is to be done by the Contractor using both a 10-foot straightedge and a profiler.

See SSHC 405.03.P for requirements.

The intent is to check the pavement for surface smoothness as soon as possible after final rolling. The profiler must be run no later than the next working day following placement. The graph chart produced by the profiler is to be evaluated by the Contractor in accordance with AASHTO R 57 and then given to the Department (or owner's representative) for review and retention. Pavement surfaces not meeting the required smoothness specification will have to be ground to specification values. If pavement smoothness is outside specification limits, it is imperative that the Contractor determine the cause and correct it to ensure a smooth pavement meeting specifications. Require the Contractor to follow specifications to analyze and submit by the next calendar day.

If grinding is necessary, observe roadway temperatures do not become excessive. If temperatures become too hot, the equipment may pull aggregates right out of the pavement. Stop operations until the pavement has sufficiently cooled down.

406.00 Road Mix Pavement. Three methods are generally used to produce road mix pavement:

- Travel plant mixing
- Stationary plant mixing
- Road grader mixing.

The specifications will allow the use, under certain conditions, of any of the above or may specify the method to be used. Regardless of the mixing method used, one of the major problems is the inherent lack of control of asphalt content. Variation in windrow or aggregate feed, minor segregation of material, and distributor operation can and do create fat or lean spots with the resultant flushing, pushing, and raveling problems. These variations are not always apparent by visual inspection. Therefore, every effort should be made to control, as closely as possible, the factors that may affect asphalt content.

Aggregate windrows must be of uniform size throughout the section to be mixed and the quantity of material must be known to calculate asphalt required. When placing material through a windrow-sizer, the load on the sizing gates should be constant, as this will affect the density of the material and thus affect the asphalt content.

When mixing in a stationary plant, the materials must be fed in such a manner to assure proper proportions. The material must be dry and any areas showing segregation must be corrected prior to mixing.

When mixing with road graders, the asphalt must be added in several shots as specified. This not only assures more uniform application, but will also facilitate mixing. Too much asphalt per shot will form balls of free asphalt and fines that are very difficult to break down.

Mixing must be continued until all particles are coated and no free asphalt remains. Since road mix pavements are ordinarily made with cutback asphalts, continued manipulation of the mix will allow the volatiles to evaporate and produce a dry material that is very difficult to place and compact. When the mix is to be left for any length of time, it should be placed in a tight windrow to cut down volatile loss.

A tack coat is not ordinarily necessary with road mix pavements when any mixing is done on the road.

Blade laying the material requires good operators and equipment. Patrols and rollers should be inspected carefully, and worn or defective equipment replaced. Patrols used for laying should be equipped with smooth or well-worn tires to facilitate the removal of tire marks from the surface. Care must be exercised during the laying and rolling to ensure sufficient and uniform compaction of the mat. The laying pattern of the patrol naturally provides additional compaction in some areas. If the compaction of the adjacent pavement is not sufficient, ruts and wheel path depressions may develop under traffic.

Any unsatisfactory areas of pavement must be repaired before the asphalt is cured. This may require picking up the processed material, remixing, and relaying it. Overlaying rough spots or depressions with thin patches will not ordinarily provide a satisfactory repair.

Chip seal coats should not be applied to a road mix pavement until it is thoroughly cured. A minimum cure time of 10 days is required after placement.

406.01 Emulsified Asphalt Road Mixes. Emulsified asphalt is an emulsion of asphalt cement and water that contains a small amount of emulsifying agent. It is a heterogeneous system containing two normally immiscible phases (asphalt and water) in which the water generally forms the continuous phase and the minute globules of asphalt the discontinuous phase.

Both medium setting (MS) and slow setting (SS) emulsified asphalts are used in emulsified asphalt base mixes. They may be either of two types: Cationic (AASHTO M 208) or anionic (AASHTO M 140).

406.02 Storage and Transfer of Emulsified Asphalts. The storage and transfer of emulsified asphalts requires close adherence to the following guidelines:

- Anionic and cationic asphalts should never be mixed. Storage tanks should be emptied and flushed with water before switching from cationic, and vice versa.
- Emulsified asphalts should not be stored at temperatures below 50 °F.
- Should it be necessary to heat emulsified asphalts, the heat should be applied very slowly while the emulsion is gently circulated. The temperature of the material should never exceed 160 °F.
- When emulsified asphalts are stored for any length of time, they should be gently circulated once or twice a week to prevent settlement.
- During the transfer of emulsified asphalts, foaming (caused by air entrapment) should be avoided. To this end, storage tank inlet pipes should be positioned within a few inches of the tank bottom. This provides for non-turbulent entry of the emulsion into the receiving tank beneath the free liquid surface.

406.03 Mixing. There are two basic methods of mixing:

- Central plant
- Mixed-in-place.

The choice of method depends on such factors as anticipated traffic loadings, aggregate source, project size, and available equipment. Regardless of the mixing method, 100 percent coating of the coarse aggregate particles is not always achieved and neither is it necessary. Mixing procedures should aim at achieving a uniform dispersion of the emulsified asphalt with a complete coating of the finer aggregate fractions. Toward achieving uniform dispersion of the emulsified asphalt, it is generally necessary to moisten the aggregate before application of the emulsion. The minimum amount of water needed for this purpose is that sufficient to merely darken the aggregate. However, the appropriate volume of water should be determined by means of the mix design.

Central Plant Mixing. Central plant mixing is generally accomplished away from the road site, frequently at the aggregate source. Conventional pug mill and dryer-drum hotmix plants may be used to produce emulsified mix. However, more frequently for these mixes, the central plant consists only of a mixer and certain auxiliary equipment for feeding the asphalt, water, aggregate, and additives (if needed) to the mixer. The emulsified mix plant generally has no dryer or screens other than a scalping screen to remove oversize aggregate. It is, therefore, readily transported and easily erected.

Any type of plant that can produce an asphalt mixture conforming to the specifications may be used. But, as a minimum, it should be equipped with meters to accurately control the emulsified asphalt and the water being applied, and controlled feeders for the accurate proportioning of aggregates and additives. The asphalt and the water pumps should be interlocked with the aggregate flow in order to produce a mixture with consistent predetermined percentages.

Although not always a plant component, a surge hopper at the discharge end of the plant allows a more continuous mixing operation and results in better mix uniformity.

Emulsion mixes require a shorter mixing time than asphalt concrete mixes. The tendency is to over mix emulsified asphalt mixes. Over mixing has the effect of scrubbing the emulsified asphalt from the coarse aggregate particles. It also may result in the premature breaking* of the emulsified asphalt, causing overly stiff mixtures. (*An emulsified asphalt is said to break when the asphalt and water phases separate. This is indicated by a marked color change from brown to black). A less common problem is under mixing, which results in insufficient aggregate coating.

Mixing times can be varied in a continuous pug mill plant by changing the arrangement of the paddles, by varying the height of the end gate, or by changing the location of the asphalt spray bar. With a dryer-drum plant, mixing time is controlled by varying the slope of the drum, rotation speed, or by changing the location of the asphalt inlet pipe within the drum.

In-Place Mixing. Three types of in-place mixing are commonly used: travel plant, rotary cross-shaft, and blade mixing.

Travel Plant: The pick-up type of plant moves through a prepared aggregate windrow on the roadbed, adding and mixing the emulsified asphalt supplied from a transport truck and discharging to the rear a mixed windrow ready for aeration and spreading.

The hopper type of travel plant combines aggregate that has been deposited in its hopper, with asphalt from a self-contained tank, and spreads the mix to the rear in one pass.

Rotary Cross-Shaft: Rotary cross-shaft mixing employs a mobile mixing chamber which, depending on the model, is either self-propelled or towed by a tractor.

The mixing chamber, usually a full lane wide, 2 to 3 feet high, and open at the bottom, contains one or more shafts, transverse to the roadbed, upon which mixing blades or tines are mounted. As the shafts rotate rapidly, the mixing tines thoroughly agitate the material in the roadbed. The machine, moving forward, strikes off a uniform course of asphalt-aggregate mixture.

Some rotary mixers are equipped with a system that adds water and asphalt by means of spray bars in the mixing chamber. Other machines, however, must be used in conjunction with a water truck and an asphalt distributor that sprays water and emulsified asphalt onto aggregate immediately ahead of the mobile mixer. The depth of treatment can be varied and is controlled by the height of the mixing shaft within the chamber.

Prior to mixing, in-place aggregate should be scarified to the full depth of the proposed treatment to loosen the material and remove any localized hard spots. After scarification, the surface should be shaped to the desired cross-section in preparation for the mixing pass.

One pass of the rotary cross-shaft mixer may prove sufficient to achieve uniform asphalt dispersion. However, should additional passes be necessary, it must be verified that the mixing tines are reaching the previous depth of treatment, since there may be a tendency to "ride up" on the partially stabilized aggregate.

Blade Mixing: The third (and least precise) method of in-place mixing is with a blade grader. The first step in the operation is to shape the aggregate into a uniform flattened windrow of a known volume by means of a spreader box, windrow spreader, or grader. This allows for the most accurate application of mix water and emulsified asphalt. After windrowing, fillers or additives, if specified, should be applied. Mix water is then added at a predetermined rate by means of a distributor truck straddling the flattened windrow. The water is then blended with the aggregate by blading the windrow to achieve a rolling action off of the moldboard.

After the mix water is thoroughly blended with the aggregate, and the flattened windrow reshaped with the grader, the emulsified asphalt is applied; usually in two or three passes. After each pass, the emulsified asphalt and aggregate are mixed by the same technique used to blend the mix water with the aggregate. The grader should fold the aggregate around the applied asphalt, working the mixture back and forth across the entire roadway surface. This mixing is continued until the asphalt is uniformly distributed throughout the aggregate.

After each asphalt application and its subsequent mixing, the mixture is reshaped into a windrow for the next application. During mixing, extra material must not be taken from the mixing table and incorporated into the windrow. None of the windrow should be lost over the edge of the mixing table or left on the mixing table without being processed.

In most cases, the mixture will be suitable for lay-down and compaction immediately after blade mixing. However, additional aeration may be required. In this event, the motor grader should continue to blade the mixture until the additional dehydration has occurred.

406.04 Maintenance of Uniform Asphalt Content. In order to maintain uniform asphalt content when using any one of the three mixed-in-place methods, three essential variables must be kept in equilibrium. They are:

- The travel speed of the equipment applying the asphalt
- The volume of aggregate being treated
- The flow rate (volume per unit time) of emulsified asphalt being applied.

The three variables must interact so that if one changes, the others are adjusted to maintain the predetermined asphalt content. However, when an asphalt distributor is used to apply asphalt to a windrow, or when mobile mixers or travel plants without synchronization are used, the operator must constantly monitor and adjust to changes in these three important variables.

406.05 Spreading the Mix. Emulsified asphalt mixes gain stability as the fluids (mainly water) that have made the mix workable, evaporate. It is important not to hinder this process. Therefore, lift thickness may be limited by the rate at which the mixture loses its fluids. The most important factors affecting this dehydration or curing are the type of emulsified asphalt, the mix water content, the gradation and temperature of the aggregate, wind velocity, ambient temperature, and humidity.

Although each job has its own particular combination of these factors, experience has shown that under the best conditions, dense-graded mixes should be placed in compacted thickness up to 3 inches.

Open-graded mixes, since they allow quicker evaporation, have higher early stability under traffic and may be placed in thicknesses of up to 5 inches under good curing conditions.

When multiple lifts are required, some curing time must be allowed between successive lifts. The length of this curing time is a function of the rate of evaporation, and thus varies.

However, an existing lift may normally be overlaid 2 to 5 days later under good curing conditions.

406.06 Compaction. Unlike asphalt concrete, which requires immediate breakdown rolling, a delay in initial rolling is often necessary with emulsified asphalt mixes, especially dense-graded mixes. Rolling seals the pavement as it reduces the voids in the mix. If done prematurely, it retards dehydration of the excess water required to facilitate mixing and greatly extends the time required for the mix to reach design strength. It also is necessary that the mix be allowed to develop strength sufficient to support the rollers. Nonetheless, if it is too long delayed, compaction is rendered difficult and, in some cases, the developing asphalt-aggregate bond will be irreversibly broken.

Proper timing is of utmost importance. Experience has shown that breakdown rolling should begin immediately before or at the same time as the mixture starts to break. About this time, the moisture content of the mixture is sufficient to act as a lubricant between the aggregate particles, but is reduced to the point where it does not fill the void spaces and prevent their reduction under the compaction force. Also, by this time, the mixture should be able to support the roller without undue displacement.

TYPES OF ROLLERS FOR COMPACTION OF EMULSFIED ASPHALT MIXES			
Type of Emulsified Asphalt Mixes	Stage of Compaction		
	Breakdown Rolling	Intermediate Rolling	Finish Rolling
	Steel-wheeled Pneumatic-Tired Vibratory	Steel-wheeled Pneumatic-Tired Vibratory	Steel-wheeled
Open-Graded	Steel-wheeled*	Steel Wheeled Vibratory Pneumatic-Tired**	Steel-wheeled
*Breakdown rolling of open-graded emulsified asphalt mixes is often facilitated by adding a small amount of detergent to the sprinkler system water to prevent pickup. **If intermediate rolling of an open-graded emulsified asphalt mix is to be with a pneumatic-tired roller, or if traffic must use a recently placed mix, a choker stone application from 4-6 lb/y^2 of suitable aggregate should be applied. Stone screenings from a crushing operation or concrete sand are among those suitable.			

406.07 Traffic Control. If possible, traffic should not be allowed on the mix until the mix will support vehicles without undue displacement. Under favorable conditions, thin lifts with low moisture content may handle traffic within 3 hours after rolling. However, it is often not possible to close a road completely. In this event, traffic control requiring reduced vehicle speeds is necessary. In most cases, a motor grader may be used to reshape any surface irregularities caused by early traffic. If there is a problem with asphalt pickup, a light sand cover will generally eliminate the problem.

406.08 Weather. The preceding paragraphs have discussed the relationship between dehydration and the strength gain of the emulsified asphalt mix. The key to this dehydration process is suitable weather conditions during construction and throughout the curing period.

Construction should not continue during rainfall and should not begin when rain is expected. Also, the emulsified asphalt mix should not be placed if the ambient temperature is below 50 °F.

407.00 Scrub Coat. A scrub coat is a preparation course for existing roadway surfaces that accomplishes crack filling and minor leveling of surface irregularities prior to the placement of subsequent courses or chip seal coats. It may be mixed on the roadway in a traveling plant or stationary plant depending on specification requirements. Plant mixing is the superior method, provided that sufficient aeration of the material is accomplished during the placement or scrubbing operation.

Scrub coats must not be used for the purpose of major leveling. In general, the maximum depth of scrub coats should not exceed 1 inch. Roadways requiring courses of greater depth for purposes such as filling deep ruts and depressions and building up of super elevations should be corrected using plant mix leveling courses.

Excessively deep scrub coat courses tend to entrap the low volatility diluents in the liquid asphalt aggregate mixture and create an unstable layer of material. The material is sized and windrowed on the roadway and spread with patrols. The patrols perform a tight blade on the material by scrubbing the fines into the cracks. The patrols should apply enough pressure so that some aggregate is broken in the application process. Pneumatic rolling is accomplished during the tight blading operation to compact the material in the cracks. The crack filling is best accomplished by blading the material from one shoulder to the other and then back to the original shoulder. The remaining material is then spread and compacted for leveling purposes. Excess course material may have to be wasted.

A standard tack is generally applied to the existing mat in amounts applicable to the surface condition. However, when road mixing is specified, the same liquid asphalt as the scrub coat is used. This sticks dry fines in the initial blade mixing and provides sufficient asphalt for tight blading into the cracks.

When applying a chip seal coat, the asphalt application rate is generally less than normal to account for chip penetration into the soft scrub coat. A minimum of 10 days is needed for the scrub coat to cure prior to placing a subsequent surface treatment.

408.00 Fog Coat. A fog coat or fog seal is a single shot of asphalt material in a very light application, generally 0.10 gal/yd^2 or less without a sand cover. This seal is used in the preparation for heavier applications of asphalt and cover material where the pavement surface has deteriorated to the extent that too much asphalt would be absorbed by the dry pavement and cause failure of the final chip seal coat. It is also used to provide a seal on a permeable pavement where a regular chip seal coat is not always desirable. It has been used to seal the surface of plant mix pavements constructed late in the fall where inadequate compaction is sometimes responsible for a slight raveling during the following winter.

Fog seals must be used with discretion and caution. They are used only to correct defects in existing pavements. Application of fog seals consists mainly of careful control of the distributor (SSHC 408). Verify that the distributor does not exceed 25 mph. Application rate should be based on the amount of asphalt that will readily penetrate the mat without leaving an excess on the surface. Surface voids should be sealed but not filled, since this would cause slick or fat spots. Generally, the surface texture of the mat should show little change after application. The initial visual effect should be that of a light paint job.

The rate of application should be determined by short test sections. Normally, it will be from 0.05 to 0.10 gal/yd^2 for dilute SS-1. More asphalt may be required for open textured or dry old pavements. Diluted emulsion resin runs about 0.10 to 0.12 gal/yd^2.

409.00 Portland Cement Concrete Pavement. The construction of high quality concrete pavement is a function of the Contractor's workmanship. The Department's (or owner representative's) role is to ensure and enforce that the Contractor is following all contract requirements. All sampling, testing, and reporting must be in accordance with procedures and frequencies outlined in the Department's QA Manual.

Convene a pre-paving operational meeting prior to paving to discuss materials handling, plant site, equipment, method of operation, and contract requirements.

409.01 Description.

A. Mix Design. The Contractor is responsible for the mix design. The Department (or owner's representative) reviews and confirms the mix design for compliance with the specified basic mix design parameters and proportioning. SSHC 409.03.A specifies the information and materials that the Contractor must submit as well as additional mix design criteria. Do not allow production to start until the Central Materials Laboratory has confirmed the mix design. The Materials Manual contains the procedures used by the Central Materials Laboratory to confirm the mix design.

B. Acceptance. Concrete acceptance during production is based on the basic mix design parameters and strength as required by the specifications. Concrete that does not meet the basic mix design parameters as determined by field testing is subject to rejection. The ITD Standard Specifications provide the criteria to be followed if minimum 28-day compressive strength tests are not attained. The minimum testing requirements, including testing frequencies and independent assurance (that the Department or owner's representative must perform) are contained in the Department's QA Manual.

409.02 Materials. See the specifications for materials and the test methods to be used.

409.03 Construction Requirements.

A. Proportioning. See mix design discussion in CA 409.01 above.

B. Equipment. Verify that all equipment is in compliance with the specifications before work begins.

B-1. Mixers and Hauling Equipment. Mixing blades should not be worn excessively. A worn blade will show more wear at the center with relatively little at the ends. The amount of wear may be measured using a stringline or straightedge. Blades with more than 1 inch of wear should be replaced.

The size of batch, speed of rotation, and mixing cycle must comply with the specifications. The batch counter or timer must be checked prior to discharge to assure that the material has received the full specified mixing.

The mixer must have the manufacturer's nameplate attached setting forth recommendations for its use. No equipment should be operated in excess of the manufacturer's recommendation.

Verify the water meter calibration to ensure that the correct water quantity is being attained. Verify that no water lines or valves are leaking.

All hard concrete or other foreign material must be removed from mixers and truck beds.

B-2. Paving Equipment. The slipform paving equipment must be self-propelled and capable of placing, spreading, consolidating, screeding, and finishing the freshly placed concrete to the proper pavement elevation and cross-section within the specified tolerances, using stringlines established by the Contractor. The concrete is vibrated with internal vibrators. See the specification for rates and measuring device requirements.

Critical features to verify are in good operating condition include checking all screeds with a stringline to ensure a true plane or crown, checking the height of the finished pavement elevation, checking vibrating frequency of the vibrators and screeds, checking the feelers or sensors for sensitivity and the related stringline for tightness to ensure adequate control. Finally, verify that the paver may accomplish the desired crown break section and any transition adjustments.

Slipform paving machines are equipped to receive concrete either in a receiving hopper or on the subgrade within an extension of the attached side forms. The concrete should not be dropped more than 5 feet. A greater freefall will induce segregation of the mix and a surge of concrete under the screed.

When provided, the hopper serves the purpose of providing for lateral distribution of the concrete to the main screed. Operation of the receiving hopper should be controlled to provide a uniform amount of concrete at the main screed. When concrete is placed on the subgrade in advance of the paver, the pattern of distribution of the batches becomes very important. Alternating wet and dry batches produces irregularities in the finished surface. The wet batches slump excessively at the edges and dry batches result in high spots and cause difficulties in operating the machine. The paver should be equipped with an initial strike-off blade that distributes the concrete for the full paving width in front of the main screed.

B-3 Concrete Sawing Equipment. Sawing equipment is generally equipped with guide, blade guards, water cooling systems, and cut depth controls. Adequate and extra equipment and parts as specified must be on the project site prior to placing concrete and during sawing operations. Verify that the gang saws are in alignment. Sufficient lighting must be provided so that sawing may be performed at night when necessary.

C. Handling, Measuring and Batching Materials. It is important that the aggregate be well graded and remain so throughout the job.

Segregation and contamination are two of the main problems associated with the stockpiling and handling of aggregates. Specifications regarding stockpile construction are outlined in SSHC 106.11 of the Standard Specifications. Under no circumstances should equipment being used to construct stockpiles be allowed to track mud into the stockpile site. Stockpiles of concrete aggregate must be physically separated by distance or by a bulkhead to prevent contamination.

The ideal moisture content for both the coarse and fine aggregate is that of a saturated surface dry condition. Aggregates that have been washed or taken from a wet source should not be used until the free water has drained off. Uniformity of moisture is probably the most important factor in achieving a consistent slump. Aggregates that have been washed must be drained at least 12 hours prior to use.

Particular attention should be given to the storage and handling of cement. The cement must be protected from the elements until it is incorporated in the mix. A considerable loss of cement may occur when it is exposed to the wind.

Concrete additives (e.g., air entraining admixtures, set retarding admixtures, water reducing admixtures) may be used if approved by the engineer. Verify that only approved admixtures are being used and are dispensed accurately and appropriately into the batch. The dispenser should be checked daily to see that it is functioning properly and accurately.

Any source of water approved for potable use may be used for concrete. Non-potable water must be approved before use. Water should be cool, particularly in hot weather, so that the temperature of the mix does not exceed 80 °F. In cold weather, it may be necessary to heat the water or aggregate or both. However, the 80 °F maximum temperature for the mix at the time of placing must not be exceeded.

The water meter should be checked at the start of each job and occasionally during the progress of the job by diverting water into a drum and weighing for various settings of the gauge. Leaky lines or valves are not permitted.

Materials must be accurately weighed into batches. Before starting the job and at frequent intervals thereafter, the batching equipment should be carefully inspected and checked. All batch-weighing equipment should be supported on stable footings and checked for accuracy before work begins. The scales should be checked throughout their working range. All calibration readings should be made a part of the project records.

During the progress of the work, the scales should be checked for zero balance daily and recalibrated when necessary.

If beam scales are used, the set screws holding the counterweights on the beam arm must be firmly tightened. Vibration tends to move these weights and cause incorrect batch weights. Scales must be kept level at all times. Fulcrums, clevises, knife edges, and other working parts must be kept clean and free from accumulations of dirt and cement dust.

D. Mixing and Delivering. Concrete may be delivered and mixed a variety of ways. See the specifications for requirements of the various methods including mixing and delivery time constraints.

E. Conditioning of Subgrade or Base Course. The subgrade must be shaped and thoroughly compacted prior to concrete placement and kept in this condition. Verify that the subgrade surface is firm and unyielding. Require that soft spots be removed and backfilled with suitable material.

Verify that the subgrade is at the correct elevation including the crown and any super transitions.

F. Temperature Limitations. See the specifications for when concrete may be placed and concrete temperature and evaporation constraints.

G. Hand Placing Concrete. Hand placing is permitted under very limited circumstances. See the specifications for when hand placing is allowed and requirements.

H. Joints.

H-1. Tie Bars and Load Transfer Devices. Tie bars are deformed steel bars used at the longitudinal joint to help hold the longitudinal lanes of concrete together. Tie bars are placed to the depth and spacing shown on the plans.

Load transfer devices are smooth steel bars used at the transverse joint locations to transfer load from one slab to the next under traffic loading. It is imperative that the dowel bars be installed parallel to centerline of the concrete roadway and parallel to the surface of the roadway. The locations of the dowel bars must be positively marked so that the transverse saw cut will follow the center of the dowel bar installation across the roadway. The dowel bars should be properly lubricated before installation.

H-2. Transverse and Longitudinal Joints. The purpose of joints is to control the location of cracks in the pavement. Joint spacing, skew, depth, and width of the joint to be sawed are shown on the plans. Stress relief saw cuts must be made as soon as the concrete has hardened sufficiently to allow sawing. It is necessary to make this relief cut to the depth indicated on the plans or random cracks may develop outside the planned longitudinal and transverse joint system.

Joints should be sawed as soon as the concrete has hardened sufficiently to permit sawing without damaging the pavement surface or concrete adjacent to the joint. All joints must be sawed before uncontrolled shrinkage cracking takes place. If necessary, the sawing operations will be carried on during the day and night regardless of weather conditions. The sawing of any joint will be omitted if a crack occurs at or near the joint location prior to the time of sawing. Sawing will be discontinued when a crack develops ahead of the saw. If dowel bars are being used for load transfer, refer to the specifications for corrective action to take should a pavement crack occur at any location other than the load transfer device.

H-3. Construction Joints. Whenever paving operations are discontinued at the end of the day, or at any time for more than thirty minutes, a construction joint will be constructed at right angles to the center line of the pavement. A header board should be cut to the slab section and firmly staked so that the board conforms to the proper elevation and section. The board should be a minimum of 1 $^{5}/_{8}$ in thick, and have a metal strip or board strip fastened to it of the size and shape specified to form a key-way in the end of the slab. Load transfer devices will be constructed as shown on the plans.

H-4. Construction Sealant Reservoir. After 72 hours, the joints will be sawed to the width and depth shown on the plans for placement of sealant. Verify that the reservoir is cleaned and prepared according to the specifications before any sealant is placed. Joint preparation and sealant placement are very critical operations and if the specifications and good workmanship are not followed, the sealant will more than likely experience premature failure. The serviceability and life of the concrete pavement depends heavily on the sealant keeping the water out of the pavement system. Ensure the Contractor is protecting the joints prior to sealing.

When a concrete pavement slab is placed next to an adjacent slab, require the Contractor to make every effort to line up the transverse joints.

I. Tolerance in Pavement Thickness. This subsection outlines the requirements for thickness determinations and provides price adjustment criteria when prescribed tolerances are not met. Ensure that thickness tests are obtained at the prescribed frequencies and results recorded in the construction diary.

J. Final Finish. The surface of the pavement must be finished as required by the specification. Timing is critical. The texturing must be done while the concrete is wet enough to allow proper texturing but not so dry as to cause tearing of the surface. Verify that depth tolerances are being followed in accordance with the specifications, ensure corrective actions are made immediately when necessary and record results on the proper form.

K. Surface Test. The specifications require that the pavement surface be tested with a 10-foot straightedge and a profilograph. Deviations in the form of high spots may only be corrected by grinding after the concrete has hardened. It is recommended that after the floating has been completed and any excess water and mortar removed, but while the concrete is still plastic, that the surface be tested for trueness. High spots may be cut down and refinished. Any depressions found should be immediately filled with fresh concrete, struck off, consolidated, and refinished. Special attention must be given to assure that the surface across joints meets the requirements for smoothness. Straightedge testing and surface corrections will continue until the entire surface is found to be free from observable departures from the straightedge and the slab conforms to the required grade and cross-section.

The profilograph is run after the concrete has hardened sufficiently to allow its use. Pavement outside specification limits will be corrected accordingly. See SSHC 405.03.P for profilograph verification procedures.

L. Curing. Curing compound is intended to protect the concrete against drying too rapidly and to prevent heat buildup from radiant solar heating. Effective curing assists the chemical action between the cement and the water and protects the concrete against shrinkage until such time as it gains sufficient strength to resist the imposed tensile stresses.

In order to be effective, the curing must be prompt and must be complete in its coverage.

Damaging loss of water occurs in concrete immediately after it starts to set if no protection is afforded to prevent evaporation from the surface. A delayed cure may also result in hair checking and random cracking. The sides of the slab must be covered with the curing compound as well as the surface.

Verify that the compound has been sampled, tested, and approved in accordance with the specifications prior to use.

Ensure that the use of any evaporation retardants is only in accordance with manufacturer's written recommendations.

M. Cold Weather Concreting. The Contractor is responsible for protecting the concrete during cold weather (see the SSHC 409.03.F for requirements). Verify that the recording thermometers are operating correctly.

N. Sealing Joints. Do not allow the Contractor to seal joints below the specified minimum temperatures. See the specifications for requirements.

O. Multiple Lane Construction. See the specifications for requirements.

P. Protection of Pavement. Verify that the Contractor has adequate materials for protection on hand.

Q. Opening to Traffic. When the pavement has developed a compressive strength as specified, the roadway may be opened to traffic if approved by the Engineer and after the pavement has been cleaned.

411.00 Urban Concrete Pavement.

411.01 Description. The requirements of SSHC 409 apply with exceptions as specified in SSHC 411.

411.02 Materials. See SSHC 409.02 for material requirements.

411.03 Construction Requirements. The requirements of SSHC 409.03 apply for:

- Mixers and Hauling Equipment
- Mixing and Delivering
- Slipform Paving
- Weather and Temperature Limitations
- Sawed Joints
- Curing.

The requirements of SSHC 409.03 apply.

See SSHC 411 for requirements applicable to the following:

- Strike-Off, Consolidation, and Finishing.
- Forms.
- Edging – Verify that the Contractor is doing the edging at the proper time.
- Final Surface Finish – Verify that depth tolerances are being followed in accordance with the specifications and record results in the construction diary.
- Surface Test – Use of a profiler is not required.
- Multiple Lane Construction.
- Protection of Pavement – Verify Contractor has enough protective materials on hand and are put to use when rain appears imminent.
- Opening Pavement to Traffic.

SECTION 500 – STRUCTURES

501.00 Structures.

General. The term “structure” is a general term used to refer to a variety of features commonly found on ITD construction projects. Typical structures include such features as bridges, retaining walls, dams/impoundments, buildings etc. Generally structures are major features that have been carefully designed to carry forces or loads in an economical and efficient manner. They are usually constructed of a combination of materials including: concrete, steel, wood, composites and other materials both natural and man-made.

Each structure is generally unique with its’ own special design, materials and construction requirements. Buildings are usually designed by consultants and have their special provisions included in the contract documents. Retaining walls, dams or impoundments may have been designed as part of the contract plans or these tasks may be contractually assigned to the contractor to perform. In addition, the contractors may design temporary dams or impoundments as part of their selected method of operation.

Projects that involve the construction of bridges may differ significantly depending on the type of bridge being built. Bridges are generally designated as to type by the nature/material of the principal, horizontal, load carrying members (stringers/girders) comprising the superstructure. Hence, a bridge with steel stringers/girders is designated as a structural steel bridge (CA Section 504). Whereas a bridge with pre-stressed concrete stringers/girders is designated as a pre- stressed concrete bridge (CA Section 506). Most bridges on the State Highway System will be composed in part of structural concrete (CA Section 502) with metal reinforcement (CA Section 503). Many types of bridges can involve bearing pads (CA Section 507) under the stringers/girders where they rest on the abutments/ pier caps, but these are more common on steel bridges.

The Engineer and the Inspectors should become familiar with the bridge type being built, as well as the nomenclature and basic function of each of the bridges principal components. In addition, the Engineer should use great care in making any field adjustments or changes on structures without the proper consultation.

Inspection. Inspection of the construction of structures is highly technical and demands that the inspector be completely informed on all phases of the operation. The inspector should be thoroughly familiar with the plans, specifications, and special provisions pertaining to a particular phase of construction before construction operations begin. The inspector should be aware of the reasons behind each of the provisions listed in the specifications that have been developed through years of experience and research designed to obtain a quality product. A review and discussion of the specification and the appropriate sections of this manual with the contractor, subcontractor, and/or supplier will eliminate many misunderstandings.

The first step in inspection is careful checking of the plans for errors. This should begin as soon as plans are available. Sub-dimensions must be compared to overall dimensions and clearances and tolerances checked. Bearing elevations and anchor bolt locations must be carefully verified. A check should be made from a distance to see that the item is in the correct place and proper position:

- Does the footing cover the piling?
- Does the skew angle fit conditions?
- Is there room for the other portions of the structure?
- Does the structure span the waterway or feature as intended?

When questions, unusual conditions or problems are encountered, the Engineer should document the situation and seek guidance from the consultant designer (if applicable) or the ITD Bridge Section, or both.

Staking. The responsibility for setting construction control stakes is outlined in the specifications. A question usually arises regarding the amount of staking that should be performed for the contractor on structures. Grades and lines that have been set by the contractor must be checked. The Engineer may elect to set all of the necessary structure grades for the contractor, but this practice should be avoided for two reasons:

- First, the Engineer has created a definite area of responsibility for errors, which may result on the structure.
- Second, while performing this work the Engineer obligates personnel to duties, which should be performed by the contractor.

Adequate control staking for the structure will greatly assist the contractor and provide a means of rapid checking by the Engineer's personnel. Control stakes should be located out of the area of operation of both the structure and roadway contractors as much as possible. The Contractor's personnel should be shown the location of these stakes and their purpose explained. Incomplete or vague marking may cause unnecessary delays or expensive corrections.

When setting grades, complete the circuit to a second bench mark thereby checking the elevation. A disturbed bench may not be discovered unless the grade is checked on a second bench.

Foundations. The design of a structure assumes an unyielding foundation. Any settlement will affect the grade line and riding surface. Minor settlement can cause overstress of material, serious cracking and failure. The structure foundation must be inspected to ensure adequate bearing capacity (i.e., bearing values and foundation data shown on the plans should be compared to field conditions). Loose, disturbed material must be removed from the excavation and replaced with backfill in accordance with the specifications. When excavation extends through stratified soils containing unsatisfactory materials, special probing or test holes may be required to check the material below the bottom of footing. This is especially true if layers above the bottom of footing do not conform to the test boring data. **Always compare the actual material that is found against the boring information.** Resolve any differences with the Engineer and HQ's Materials geotechnical specialists, and keep the HQ's Construction/Materials Section advised.

Special care should be exercised in the placement of fills beneath structures. The use of granular fills material and the special control of compaction or compaction procedures may be required by the plans to attain the required density.

The material to be used behind abutments, retaining walls, etc., must be free draining granular material. Refer to plans or special provisions for placement of this material and possible special drain requirements.

Any required shoring and cribbing should be designed to allow sufficient space for placement of forms. Water must be channeled outside the forms for pumping. Underwater foundations requiring cofferdams should also provide adequate space for placing of forms and for handling water outside the footing. They should provide for a possible lowering of the footing elevation and be high enough to prevent overflowing of the cofferdam during high water. The Contractor should be reminded that any restriction in the channel due to forming may result in raising the water elevation, making it necessary to deepen or re-channel the flow to avoid flooding. **Do not allow stream channels to be altered without first consulting with the District Environmental Planner.**

A material log should be included in the daily diary, together with work accomplished and unusual occurrences or materials encountered. Photographs of conditions and the operations, identified as to time and location, are valuable additions to the record.

When foundations are at a considerable depth below water, it may be necessary to provide a seal of concrete before attempting to de-water the cofferdam. This is done after the piling has been driven and/or the excavations to the final footing elevation have been completed. The purpose of the seal is to act as a counterbalance to the pressure created by the head of water on the outside of the cofferdam.

Documentation for Structures. Diaries are intended to provide a record of unusual or controversial happenings and to provide a detailed record of each phase of construction. The diary may be used in planning and organizing the work and for computation of quantities and may prove to be valuable references in connection with the performance or failure of some phase of work or may be used as evidence in court action to settle disputes between the Department and the Contractor. The inspector's diary should include a record of all tests, measurements made and samples taken during the shift, as well as the weather conditions. Any communications with contractor personnel should be noted in detail, and the notes should reflect compliance with the specifications. General observations should be made concerning weather conditions, water elevations, materials sources, and related information. Any incident affecting the progress of the work should be recorded (including cause, time, place, duration, number of men, and equipment made idle). It should keep in mind that there is always the possibility that a claim might arise. The diary should be written completely before the end of each shift and nothing concerning the job should be considered too unimportant. Field notes should not be copied but should be kept exactly as they are originally recorded.

502.00 Concrete.

General. Unlike other materials used in highway construction, concrete is seldom removed and replaced. Therefore, it is essential that every precaution be exercised to insure that the initial placement is correct. To ensure a quality product, the inspector must be thoroughly familiar with placing concrete and should have completed the appropriate inspector training and be current in the appropriate sampling and testing (WAQTC) requirements.

The district materials sections should have a list of approved aggregate sources (QAMS) for concrete rock. Before new sources of aggregate can be used, the source must first be tested and approved. High classes of concrete (Greater than class 45) may not be obtainable from all "approved" aggregate sources.

Concrete itself is a composite material. The fine and coarse aggregates act as the reinforcement while the cement, water, and admixtures act as the matrix. Concrete behaves best when the matrix and reinforcement are in continuous contact with each other and are mixed in the right proportions.

Steel reinforcement can interrupt this continuity when the bars are placed too close together. If there is not sufficient room for the coarse aggregate to help fill the space between the bars, there is no longer reinforced concrete, but reinforced mortar. Mortar is more prone to shrinkage and cracking than concrete.

To avoid this situation the maximum size aggregate in the concrete should be limited to the least of the following:

- 2/3 of the clear spacing between reinforcing steel bars or bar bundles
- 1/5 of the narrowest form dimension
- 1/3 the depth of the slab.

For example: if 5/8 inch coarse aggregate is used:

- The minimum clear spacing between bars would be 5/8 ÷ 2/3 = 15/16 ˜= 1 inch
- The narrowest form dimension would be 5/8 ÷ 1/5 = 25/8 = 3 1/8 inches
- The minimum slab depth would be 5/8 ÷ 1/3 = 15/8 ˜ = 2 inches.

Inspectors need to know the size of the coarse aggregate used so they can check for adequate rebar spacing and form size. It is not uncommon in areas where bars are lap spliced to find a spacing problem. Pier caps often have rebar spacing problems especially where the vertical pier steel penetrates into the cap beam.

Rebar spacing and cover problems should be brought to the attention of the Contractor and Designer. Both have the responsibility to ensure that the Standard Specifications are followed.

The quality of the project work should always come first in the Inspector's mind. Quality is the main reason why Inspectors are assigned to a project. Inspectors must not worry about the schedule when it comes to compromising the requirements of the contract plans and specifications. Stay focused on the contract plans and specifications, and help the Contractor to achieve 100 percent compliance. Inspectors need adequate time to inspect structural concrete forms, falsework, and steel reinforcement prior to concrete placement. This amount of time will vary from just a few minutes for a concrete catch basin to a few hours for a large bridge deck.

Contractors on the other hand want to place concrete the moment the forms are up and the last piece of reinforcing bar is tied in place.

The Inspectors and the Contractor's foreperson shall meet prior to the activity to discuss concrete placement schedules, steel placement activities, steel and formwork inspection requirements, and traffic and safety issues. The Contractor's foreperson is often under enormous pressure to meet deadlines and stay on schedule. When there is finite amount of time to place forms and steel the foreperson may try to make up for any delays by trying to shorten the inspection time. Inspectors then feel rushed and pressured to accept sub-standard work in an effort to help out their "partner." Partnering was never meant to allow relaxation of the contract specifications.

Here are some "DO's" and "DO NOTs" to help the Inspector and the Contractor get through these tough situations:

DOs:

- Perform frequent inspections as forms are going up and steel is placed to catch errors early on.
- Meet with Contractor's foreperson daily to discuss quality issues and progress.
- Point out recurring non-compliance issues to the Contractor no matter how unpleasant it becomes.
- Keep the Contractor informed of your inspection time requirements.
- Adjust your inspection schedule if the Contractor experiences delays (be flexible).
- Build a relationship based on cooperation and professional courtesy.
- Escalate chronic, un-resolvable, noncompliance issues no matter how small they are.
- Develop a feel for how the foreperson plans and executes the work, and adjust your daily work hours accordingly.
- Go through the contract plans with the various trade forepersons to verify they haven't missed some important details you may have noticed.
- Keep ahead of the Contractor by looking through the contract plans and specifications to see what could get the Contractor into trouble later on.
- Always be willing to help the Contractor clarify and interpret the contract plans and specifications.

DO NOTs:

- Allow the Contractor to rush you by cutting short your inspection time.

- Close the lines of communications between you and the Contractor no matter how tough things become.
- Take the Contractor's lack of attention to the contract specification requirements personally.
- Delay inspections to the very last minute.
- Keep to yourself defects you see in the Contractor's work.
- Compromise yourself or the specifications just to meet a schedule (escalate instead).
- Get into a power struggle with the Contractor over pour scheduling versus inspection time.
- Become reactionary if the Contractor ignores you or does not take you seriously.
- Direct the Contractor how to perform the work.

Weather and Temperature Limits. The Resident Engineer may suspend a pour due to weather limitations. Like other types of concrete, structural concrete has both temperature restrictions and precipitation limitations. Subsection 105.01 of the ITD Standard Specifications can be used by the Resident Engineer to suspend work if it is in the best interest of the Department. Keep in mind that only the threat of precipitation is needed to justify suspending the work. You don't have to wait until it is actually raining or snowing. The temperature restrictions for cast-in-place concrete are clearly stated in the Standard Specifications.

The standard specifications also require an accurate thermometer for measuring. The temperature measuring device shall be capable of measuring the temperature of freshly mixed concrete to ±1°F (±1°C) with a range of 0°F to 212°F (-18°C to 100°C). When heating water and aggregates, the approximate resulting temperature for a batch of concrete can be estimated from the following formula:

$$X = {(Wt + 0.22MT)}\Big/{(Wt + 0.22M)}$$

Where:
X = temperature of the batch in degrees F
W = weight (mass) of the water
M= weight (mass) of the aggregates and cement
t = temperature of the water in degrees F
T = temperature of the aggregates and cement in degrees F

Sampling and Testing. The ends of concrete cylinders must be smooth. Tests have proven that rough irregular cylinder ends cause a reduction of up to ten percent (10%) compressive strength. The reductions appear to become greater as the compressive strength increases. There is no substitute for careful workmanship in preparing concrete cylinders. The inspector is cautioned against poor practices resulting in irregular ends. Two of the most common are as follows:

- Denting the bottom of the mold with a tamping rod. Placing the mold on a firm foundation can prevent this.

- Improper finishing of top. Either too much or too little concrete results in an unsatisfactory surface. Too little concrete is difficult to trowel finish properly. Too much material, if allowed to come in contact with the mold lid, can result in an irregular or convex surface depending on the lid or a nonparallel surface if the lid is placed improperly.

With the mold on a level surface, trowel finish the cylinder flush with the top of the mold. Lightly place the mold lid on the mold (overnight), if possible, until the concrete is partially set. Then place the lid on firmly. Sealing of the lid too soon results in the concrete sticking to one side of the lid but not the other giving a nonparallel surface.

Concrete Acceptance. Subsection 502.03 of the Standard Specifications require the Contractor to submit all proposed concrete mix designs along with appropriate samples of all ingredients for the Engineer to review and confirm. The Engineer will submit the proposed mix design and all ingredients to the District Materials Engineer to confirm in accordance with the directions outlined in Section 260 of the Quality Assurance Manual.

The Engineer will promptly notify the Contractor of the acceptance or rejection of the proposed mix design. If the mix design is accepted the letter should remind the Contractor that final acceptance of the concrete is based on field compliance of all contract specifications requirements. If rejected, the Engineer will explain why and direct the Contractor to correct the deficiency(s) and re-submit.

Concrete acceptance is based on supplied concrete meeting the minimum requirements specified in Subsection 502.01 of the Standard Specifications and the results of the 28-day compressive strength tests. Concrete failing to meet the intended strength but meeting the allowable strength will be subject to a penalty per Subsection 502.01 B. Concrete not meeting the allowable strength will be removed at no expense to the Department. Plastic concrete not meeting the requirements of Subsection 502.01 of the Standard Specifications will be rejected prior to placement.

Concrete that has subsequently been damaged through neglect by the Contractor by not following specifications will be removed and replaced at no expense to the Department. If the damage is tolerable, the concrete may be left in place with an appropriate penalty (Subsections 105.03 and 502.01 B of the Standard Specifications).

A. Proportioning. The Contractor must submit a concrete mix design for all concrete classes. Each mix design, except Classes 15 and 22, must be supported by test results indicating the design, under production conditions, will consistently provide average compressive strengths equal to or exceeding the minimum specified strength (concrete class times 100) multiplied by the appropriate Strength Factor(s) or Strength Value. These factors and values shall be determined as described in Subsection 502.03.A of the Standard Specifications. Recent state project concrete compressive strength test reports may be used to support mix designs in lieu of furnishing special samples and lab test reports. If the mix design is acceptable and the laboratory results indicate the mix will consistently meet the intended strengths, the Engineer should write the Contractor authorizing the use said mix design. This approval is only for the mix design that the supportive data demonstrates. Acceptance of the concrete is still based on the 28-day concrete cylinder breaks.

Samples of cement, water, additives, sand, and coarse aggregate must be submitted at the start of the job, and as required by the minimum test schedule.

Slump and air tests must be run on the first concrete delivered to verify that specifications are being met. A yield test must also be run on this concrete to determine primarily if the batched concrete contains specified minimum cement per cubic yard. Concrete which over- or under-yields indicates that either the mix design is not being followed or adjustment in the design is necessary. Under yielding usually results in higher strengths and over-yielding in lower strengths. The ideal condition is when the yield is 100 percent.

Once a mix design has proven satisfactory, inconsistencies between loads can usually be traced to one of the following causes:

- Failure to make the proper moisture content correction for the aggregate at the mixing plant. Changes in the stockpile moisture results in changes in the mix. Specifications require aggregates to be stockpiled or binned for drainage at least 12 hours before being batched.
- Indiscriminately adding water to the mixture. The Contractor may make minor adjustments to the mix proportions to improve workability as long as all basic concrete specifications are maintained. The minor adjustments should be approved by the Engineer prior to implementation. If the Contractor wants to add water on site, a batch ticket will be required to show how much water will be added to reach the maximum allowable water/cement ratio. Extremely hot weather and extended mixing time may stiffen the concrete mix. When necessary, the cement may have to be added at the job site to help concreting operations.
- Failure of the mixing or measuring equipment or the improper operation of this equipment. The specifications clearly outline the requirements that equipment must meet. The inspector watch for any shortcomings in the equipment and that the contractor takes corrective action before batching.

B. Equipment. Each batch plant which furnishes concrete to the project must be inspected for full compliance with the specifications. Document the inspection on the ITD-0893 form. At least one plant inspection report must be in the project files before work is performed. Inspection reports are interchangeable between projects but must be done yearly.

C. Handling, Measuring and Batching. Check the procedure for batching, charging mixers, mixing, delivery and discharge to insure that properly batched and mixed concrete is placed. Also check that the scales have current certifications and the accuracy of the water metering devices. This checking should be done at the beginning of the job and as often thereafter as conditions warrant. Document the checking by a diary covering the day or days on which it was done.

D. Mixing and Delivery. Whenever ready mix concrete is used on the project, the Inspector shall be alert to the condition of the trucks being used for delivery. All trucks shall have operational counters and a device to measure the amount of water added at the site. All trucks are required to be operated within the rated capacity stated on the manufacturer’s data plate. When necessary, the Inspector will inspect the drums of the delivery trucks for the condition of the fins and buildup of hardened concrete.

E. Falsework and Forms. In essence, the field engineer's rule for falsework inspection is to ensure that the falsework, as it is constructed, complies with the following requirements:

Falsework must be designed and stamped by an engineer licensed in the State of Idaho. The drawings and computations must include design loadings and type of materials to be used. Falsework drawings and computations must be submitted to the Engineer for review.

The falsework is constructed to substantially conform to the falsework drawings.

The materials used in the falsework construction are of a quality necessary to sustain the stresses required by the falsework design.

The workmanship used in falsework construction is of such quality that the falsework will support the loads imposed on it without excessive settlement or take-up beyond that shown on the falsework drawings.

Experience shows that details give the most trouble. Falsework failures are seldom, if ever, a result of faulty design; rather, failures usually can be traced to the oversight of some minor detail. Construction details should be given special consideration, with particular attention to connections and details that contribute to the stability of the falsework system.

Falsework specifications require that construction of falsework may not begin until the Engineer has reviewed and approved the falsework drawings.

This requirement shall be enforced on all projects, without exception.

The leveling of ground is not interpreted as "falsework construction" for this specification; but the placing of timber pads or the driving of falsework piles is "falsework construction" and will not be permitted in the absence of checked falsework drawings.

Falsework is usually erected on timber pads or sills set on the surface of the existing ground. Occasionally, soil conditions are such as to require construction of concrete footings or driving of piles to ensure an adequate foundation for the falsework. In most cases, falsework is composed of either steel or timber members, or a combination of these two materials. Frequently encountered combinations of falsework materials are:

- Timber posts and caps with timber or steel stringers and timber joists. This type of construction is often referred to as "conventional" falsework.
- Tubular steel pipe-frame components assembled together to form towers. This system utilizes steel or timber stringers between towers with timber joists between the stringers.
- Structural steel bents constructed from I or WF rolled shapes or from welded tube sections, supporting steel or timber stingers with timber joists. Steel bents are usually supported by and securely fastened to concrete footings or steel sills anchored to the pavement.

Timely inspection as falsework construction progresses is essential, and the Contractor should be informed immediately when deficiencies are discovered.

Prior to the start of construction of any falsework over or adjacent to the traveled way, the Contractor must consider the safety of the public. The Engineer has the responsibility and the authority to demand that all aspects of falsework construction, including workmanship and erection procedures, conform to the best engineering practice in any situation where public safety is involved. The Engineer should not hesitate to require additional work or to direct or stop any construction procedures if such action is warranted to ensure public safety.

Conversations with the Contractor concerning falsework construction should be recorded in the daily diary. If there are conditions that are critical and the Contractor does not take corrective action, a written order should be given. The letter should state specifically what conditions need correcting, but should not dictate how the correction is to be done. No predictions should be made. The falsework cannot be loaded before satisfactory repair has been made. In addition to routine falsework photographs, close-up photos of details should be taken in all cases where the falsework has required extensive repair or upgrading in order to meet contract requirements.

The inspector should become familiar with the foundation phase of falsework inspection. Regardless of how well constructed the falsework may be, its ability to carry the imposed loads is no better than the foundation upon which it rests. Typically, falsework may be supported on soil, which may consist of native or imported material, or on rock, pavement, or driven piles. Foundation problems most often occur when falsework is supported on soil. However, it should not be assumed that because falsework is supported on rock or piles, no inspection of the foundation is necessary.

Falsework footings are to be designed to carry the loads imposed upon them without exceeding the assumed soil bearing values or anticipated settlements. The soil bearing value assumed in the falsework design for both wet and dry conditions must be shown on the Contractor's falsework plan. Actual values and soil condition must agree with the assumptions.

An inspection of the foundation materials should be made before the pads are set in place. The supporting capacity of the soil may be roughly estimated by probing with a piece of reinforcing bar. The bar may penetrate 1 ft. or more in loose material, but will penetrate only 1-2 in. in compact material. The weight of an average-sized man concentrated on the heel of one shoe exerts a force of approximately 21 lbs./in^2 or 1.5 tons/ft^2. Consequently, if the material is firm to walk on without indentation, it should be capable of supporting a falsework loading of this magnitude. These simple field tests are only indicators and should be used with judgment. The true bearing capacity of a given soil is not easy to determine. The Engineer should not hesitate to require a soil bearing test if there is doubts as to the ability of the foundation material to support the falsework load without settlement.

Falsework pads are often set on abutment fills, or on top of backfilled material around piers and columns. Additional care is particularly important in the case of backfill around piers or columns in stream channels or where traffic will be some distance away. Many falsework failures are actually attributed to excessive settlement of pads placed on improperly prepared soil. Falsework pads should not be placed on the sloping surface of a cut or fill slope where the pads may be undermined or subjected to sliding downhill. Pads should be set on horizontal benches cut into firm material, with the pad set well back from the edge of the bench. Many soils lose their supporting capacity when they become saturated. Adequate falsework construction provides for drainage to protect pads from being undermined or ponded in water.

The Construction/Materials Section is available for consultation and advice as to the suitability of load tests in a given field situation, as well as interpretation of test results.

Falsework and Form Materials.

Timber. -- The inspector’s primary responsibility is to prevent the use of materials which obviously do not meet the falsework design criteria, not become a lumber grader. The Contractor is not permitted to splice or block posts in bents adjacent to railroads or roadways; because the falsework must be stable at all times, including times when no appreciable dead load is acting. No bracing of any type should be fastened to the temporary rail that protects the falsework adjacent to traffic.

Timber posts should be wedged at either the top or bottom for grade adjustment, but not at both locations. Large posts may require two sets of wedges to reduce compression stress perpendicular to the grain. Blocking and wedging should be kept to a minimum. Extending a short post by piling up blocks and wedges is a very poor practice. Wedges should be placed with a surfaced side next to a rough-cut side rather than two surfaced sides together. Full bearing should be obtained between all members in contact. Deficiencies in this respect may be improved by feather wedging with a single shingle. Joints requiring more than a single shingle should be recut. When wood shores are butt spliced, the splice shall be made with square joints adequately secured on all four sides with not less than 2-by _ materials or 5/8 inch plywood of the same width as the post. The scab must extend 2 ft. beyond the joint. Good practice limits splices to one per post.

Structural Steel. -- Steel beams and, particularly, salvaged members should be examined carefully for loss or change of section due to welding, rivet holes, or web openings. If the exact size or section of a used beam is not readily apparent, section properties usually can be determined with sufficient accuracy for verification of beam strength by field measurements. Beams composed of short members which have been welded together to form a longer length should not be used for falsework at any critical location.

Manufactured Products. -- Manufactured products such as tubular steel shoring and overhang brackets are particularly vulnerable to damage by continual reuse. Fabricated units where individual members are bent, twisted, or broken will show a substantial reduction in load- carrying capacity. Steel shoring materials should be examined carefully prior to use. Shoring components should not be used if they are heavily rusted, bent, dented, re-welded, or have broken weldments or other defects. Connections, in particular, should be examined for evidence of cracked or broken welds. Miscellaneous components such as screw jack extensions, clamps, and adjusting pins should be inspected as well. Manufacturer's ratings are based on the use of new material or used material in reasonably good condition. The determination as to whether a manufactured product is in "reasonably good condition" is highly subjective and requires experience and judgment. Following is information on the more commonly used manufactured falsework products:

Standard Pipe-Frame Shoring. -- Falsework shoring composed of tubular steel members has gained wide acceptance during the past decade. Two types of frames are in general use: The ladder type frame that has horizontal struts between the vertical legs, and the cross- frame type that provide lateral stability by cross bracing between the legs. This shoring system consists of end frames of various types that are erected in pairs and held rigidly together with pin-connected diagonal cross-braces. The pairs of frames may be stacked one above another to form towers, each tower being 4 ft. wide (which is the frame width) and 8 or 10 ft. long. Frames are also available in 2 ft. widths for special uses. The base frames are 6 ft. in height. Extension frames may be set at various positions to extend the base frame from 1 to 5 ft. Minor vertical adjustments are made with screw jacks located at the top and bottom of the tower.

Deck Overhang Brackets. -- Several types of steel jacks or brackets especially designed to support cantilevered deck overhangs are available commercially. The manufacturer's recommended safe working loads should be followed. If a particular jack or bracket cannot be identified, a test load should be required. Special provisions may require falsework and forms to be so constructed that loads will be applied to the web of steel girders within 6 inches of a flange or stiffener. The loads must be distributed so as to prevent local distortion of the web. In addition, temporary struts and ties must be provided as necessary to resist lateral loads applied to girder flanges and to prevent appreciable relative vertical movement between the edge of deck form and the adjacent steel girder. Lateral loads applied to girder flanges will produce an overturning moment in the girder. To prevent possible overstressing of the permanent end and intermediate diaphragm connections, the temporary struts and ties required by the specifications must be designed to resist the full overturning moment.

Beam Hangers. – Basic hangars are hardware items that are placed transversely across the top flange of a beam or girder. Steel rods or bolts, which are inserted into threaded wire loops at the hanger ends, hang vertically and support the deck slab falsework. Manufacturer's catalog data should be consulted to determine the safe working loads. Note that some manufacturers list total hanger capacity whereas others list values for one bolt or rod. Unbalanced loading (i.e., loading only one side of the hanger) will materially reduce the load-carrying capacity of the hanger, unless it is designed to be loaded on one side at a time or unless special measures are taken to hold the hanger in place. Beam hangers must not be welded to the top flange of a steel girder or to pre-stressed girder stirrups. Welding to shear connectors or studs is permissible, however, if approved by the Engineer.

Steel Joist Assemblies. -- Joist assemblies, a common building construction, are being used more and more frequently in bridge falsework. Joist assemblies are essentially steel beams that can be adjusted to provide a wide range of span lengths. Manufacturer's catalog data should be consulted to determine the safe load-carrying capacity. Joist assemblies that are used to support deck slabs between girders are limited to a design load of the maximum deflection recommended by the manufacturer, which may exceed 1/270 of the span.

Falsework Workmanship Checklists. Workmanship should be of such quality that the falsework will support the loads imposed without excessive settlement or take-up beyond that shown on the falsework drawings. Poor workmanship, particularly in such details as wedges, fasteners, bracing, jack extensions and the like, has been responsible for more falsework failures than inadequate design or overstressed materials. Accordingly, construction details should receive the Engineer's closest attention. The following workmanship checklist is included as a guide to points that may require special consideration:

- The size and spacing of falsework members must agree with details shown on the falsework drawings.
- Falsework pads must be uniformly supported by the foundation material.
- Diagonal bracing, including connections, must agree with details shown on the falsework drawings.
- Diagonal bracing should be inspected after the falsework has been adjusted to grade. Connections must be securely fastened (retighten if necessary to ensure their effectiveness in resisting horizontal forces).
- Posts should be centered over the falsework pad or sill to ensure uniform soil load distribution.
- Posts must be plumb and erected from level and even surfaces.
- The ends of spliced posts must be cut square, and scabs nailed securely on all four sides.
- Blocking and wedging should be kept to a minimum. Too much blocking or too many wedges leads to instability.

- Full bearing should be provided at all contact surfaces.
- Permanently deflected stringers should be placed with the crown turned upward.
- The method of adjustment should be such that the falsework may be readily adjusted to grade.
- Jacks used for adjustment should be plumb and not overextended.
- Abutting edges of soffit plywood should be set parallel to the joists, and continuously supported on a common joist.
- A sufficient number of telltales should be installed to accurately determine the amount of joint take-up and settlement. Telltales should be attached to the joists and as near as possible to the supporting post or bent.

The following inspection checklist is based on information in the "Recommended Standard Safety Code for Vertical Shoring" issued by the National Scaffolding and Shoring Institute. Engineers may use this checklist as a guide when inspecting falsework constructed of welded tubular steel shoring:

- Shoring components should be inspected prior to erection. Shoring, including accessories, which is heavily rusted, bent, dented, or re-welded or which, if otherwise defective, shall not be used.
- A base plate, shore head, extension device or adjustment screw shall be used at the top and bottom of each leg of every tower.
- All base plates, shore heads, extension devices, and adjustment screws shall be in firm contact with the footing at the bottom and the cap or stringer at the top and shall be snug against the legs of the tower.
- Shoring components should fit together evenly without any gap between the lower end of one unit and the upper end of the other unit. Any component which cannot be brought into proper contact with the component into or onto which it is intended to fit shall be removed and replaced.
- Eccentric loads on shore heads and similar members shall be avoided.
- All locking devices on frames and braces shall be in good working order, coupling pins shall align the frame or panel legs, pivoted cross-braces shall have the center pivot in place, and all bracing components shall be in a condition similar to that of original manufacture.
- Shoring shall be plumb in both directions. The maximum deviation from true vertical shall not exceed 1/8 inch in 3 ft. If this deviation is exceeded, the shoring shall not be loaded until it is readjusted within this limit.

As concrete is being placed, the falsework should be inspected at frequent intervals for evidence of overstressing. In particular, look for the following indications of incipient failure:

- Excessive compression at the tops and bottoms of posts and under the ends of stringers.

- Excessive bending of stringers or shores.
- Tilting of joists or stringers.
- Pulling of nails in lateral bracing and movement or deflection of braces.
- Excessive settlement of telltales.
- Rotation of any member because of eccentric or cantilever loading conditions.

If, during the concrete placement, any member deflects unduly or shows evidence of distress, such as splintering on the bottom of stringers, crushing of joints or wedges, etc., concrete placement should be stopped and the affected area strengthened by the addition or replacement of falsework members. One important and often overlooked point is the effect of curing water on falsework foundations. Some means must be provided to prevent curing water from reaching and soaking the foundation material beneath the falsework bearing pads.

Falsework Field Changes. Some judgment will be required to determine whether the falsework construction "substantially" conforms to the drawings. The following changes will be considered substantial, and must be shown on revised falsework drawings regardless of other considerations:

- A change in the size or spacing of any main load-carrying member.
- A change in the method of providing lateral or longitudinal stability.
- Any change, however minor, which affects the falsework to be constructed over or adjacent to a traffic opening.

Forms. The Standard Specifications require all forms to be designed and to have the seal and signature of an engineer licensed in the State of Idaho, unless otherwise approved by the Engineer.

Extreme pressures are applied to forms by the concrete and during vibration; the concrete becomes fluid that increases the pressures even more. Every forming system must be adequately engineered to prevent failures during concrete placement. Many forms are commercially manufactured. The Engineer should determine the forming system's structural adequacy. Upon request, most manufacturers will supply all design and allowable loading data for their systems. If the forms are a contractor-built system, the Engineer should determine that the system is capable of performing as intended. If there is any question, do not hesitate to enforce the requirement that the forming system be designed and approved by a licensed engineer.

Deck Forms -- Deck forms should be inspected and approved as above. The most critical point for deck forms is the spacing of span girders, hangers, and overhang braces. Check to assure that proposed loads do not exceed the maximum design load of these components. The forms must not exceed the maximum allowable deflection.

When the forms are approved, the Contractor may proceed with forming of the deck. Care should be taken to insure tight fitting forms. Mortar running through holes in the forms can cause visual damage and in some cases structural damage to the concrete. The form design engineer should calculate all deck grades especially for bridges on curves or variations in width with assistance from the Bridge Design Section. Be sure to adjust all forms to grade before the steel placement begins then check the grade after the steel has been placed.

Before the concrete placement, inspect the forms both from the top and from the underside to insure that all the elements of the system have been properly placed and that no deficiencies exist. Final grade checks should be made on a "dry run" measuring down from the screed of the finishing machine to the mats of the reinforcing steel and to the deck forms.

Permanent Metal Concrete Forms -- The Standard Specifications describe the attachment of permanent metal concrete form supports to the flanges of stringers and girders by permissible welds, bolts, clips, or other approved means. The description goes on to say, "However, welding of form supports to flanges of steel not considered weldable and to those portions of a flange subject to tensile stresses (areas where intermediate stiffeners are welded to bottom flange and are gapped at top flange) shall not be permitted". Welding should be avoided in the tension areas, since arc strikes (which cause gouging) and weld metal deposits (which cause an abrupt change in cross-section) both result in areas of stress concentration. These stress concentrations are considered extremely detrimental to the fatigue strength of the girder or stringer as it flexes through many cycles of loading. The stress concentrations are the first places to develop fatigue cracks. An increase in section due to a weld can therefore have a similar effect to a decrease in section, such as a piece of steel which has been cut or notched will break at that weakened location after a number of repetitious bends. Any welding which has been found in tensile stress areas of girder or stinger flanges must be removed by grinding the weld flush with the original flange surface. Any reduction of the flange cross section due to cutting or gouging must be avoided during this corrective work.

The reference to intermediate stiffeners has caused some confusion that resulted in stringers without intermediate stiffeners receiving welds on the top flange in tensile areas. The intent of this specification is that no welding is permitted for girder or stringer flanges subject to tensile stress, and would also apply to deck overhang supports that have been welded to the girder flange.

Intermittent fillet welds are permissible to attach the form support angle to the girder or stringer flange in compression areas. The Contractor will probably continue to weld directly to the flange in the compression areas and use straps, clips, or some other methods in the tension areas. The approved shop drawings should show the tension areas over supports where welding will not be used. If the shop drawings do not show this, request the information from the consulting design engineer if applicable or the Bridge Engineer for all girders and stringers that are subject to tension before the Contractor begins attaching the forms.

F. Concrete Placement. Prior to each large deck placement, a meeting with the Contractor's supervisor should be held to go over all aspects of the placement. The total number of men available and in particular the finishers and finishing equipment should be adequate for the size of placement.

Placement crews must work over the deck area during the placement operation. The inspector must be particularly watchful to see that reinforcing steel and forms remain in their intended location. The deck finishing machine must be operated over the full length of the deck segment before concrete placement begins in order to check cover on reinforcement and any possible screed rail deflection. All necessary corrections shall be made before the placement is started.

Equipment breakdowns and power failures sometimes occur during concrete placement. Therefore, the inspector should be satisfied that an alternate placement procedure can be implemented and that certain items of standby equipment are available. An extra vibrator can be very valuable when the need arises.

During the placement of concrete, check for any movement or deformation of forms that may exceed the specified tolerance. If the movement or deformation exceeds the specified tolerances, take appropriate action. This action may include halting concrete placement to install additional bracing or changing the rate or sequence of concrete placement to achieve the required lines and grade.

Ensure the Contractor follows the specified order of placing. Also, ensure that concrete for horizontal members or sections is not placed until the concrete in the supporting vertical members or sections has been consolidated and subsidence has occurred. Determining when subsidence has occurred will require judgment based on your experience with various concrete mixes. In general, subsidence has occurred when bleed water at the surface has disappeared.

Through observation, ensure that concrete is placed without causing segregation. Concrete is placed in continuous horizontal layers. Segregation of concrete in the forms may be caused by building up too thick a layer of newly placed concrete and then allowing it to flow or slide down the slope at the end of the layer. Concrete is to be deposited into the forms as close as possible to its final position, without allowing it to flow laterally in the form any considerable distance.

The Specifications provide that concrete not have a free fall of more than 5 feet. The use of an open chute, enclosed chute or tremie will be used otherwise. These handle concrete without appreciable segregation and perform the very important function of keeping the reinforcing steel and forms from being splattered with concrete.

Ensure reinforcing bars are clean when they are embedded in concrete. If they become splattered with mortar from previous placements and it has dried, they need to be cleaned. If the Contractor exercises care and uses the proper methods, there is very little trouble from this source. It is important that the forms be clean and free from dry mortar, otherwise a rough surface will result.

Rate of Placement and Cold Joints. The pour rates should be such to keep cold joints from forming in a structure. A cold joint is formed when fresh concrete is poured against partially set or hardened concrete. Cold joints can form when there is a long interruption during a concrete pour or when the pour rate is too slow to keep each layer of fresh concrete in contact with a previous layer of concrete that is still fresh. Loads and stresses in the structures can cause the concrete to crack or pull apart at the cold joint. Cold joints are dependent on the concrete’s set time that is affected by temperature, admixtures, and the type of cement and secondary cementitious materials used. There is no rule of thumb that says when a cold joint will occur. The Inspector and Resident Engineer must carefully examine the concrete after the forms are removed for any visible layering or discoloring. If you suspect a cold joint does exist say so and reject the pour. The Contractor is then obligated to submit a repair proposal.

At this point the Contractor has several options:

- Core the structure at the cold joint and strength test the cores to see if they will fail at the cold joint.
- Submit an engineering analysis proving the cold joint is not detrimental to the structure.
- Repair the cold joint.
- Remove concrete beyond the cold joint to a place in the structure where a construction joint would be acceptable.

All of these alternatives can be time consuming and costly. Thus it is very important to work with the Contractor to minimize the risks of forming cold joints. It is advisable for the Inspector not to stop a concrete pour when you suspect a cold joint may be forming. Let the Contractor and the Resident Engineer make this call. Usually the burden is placed entirely on the Contractor, and the Resident Engineer will only intervene when the cold joint and its detriment to the structure are obvious.

Bridge Deck Placement. The Resident Engineer must hold a pre-pour meeting with the Contractor before the initial deck pours. The intent is to have the Contractor's concrete foreperson describe how the deck concrete will be placed, consolidated, finished, textured, and cured.

As a minimum, the following discussion should be covered:

- The Contractor's pour sequence plan which shall include the location of all construction joints by span and station, the width and quantity of concrete to be placed, the scheduled time for each placement, the direction of placement and orientation of the screed, the proposed screed, and the means of setting and controlling screed grades.
- The equipment to be used for vibrating, finishing, floating, tining, misting, and curing.
- Type of materials used for curing.
- Crew experience and assignments.
- Inspection staffing, procedures and timing.
- Rebar placement and scheduling.
- Material sampling, testing, and certification (concrete, rebar, curing compound etc.).
- Plant operations, inspections and concrete deliveries.
- On-site and off-site traffic control (traffic under the deck pour should be avoided).
- Safety hazards and protective equipment.
- Ladders and walkways for personnel access.
- Illumination requirements, if pour is at night.
- Contingencies for plant failures, pump breakdown, screed stoppages, and inclement weather (rain, snow, dry winds, falling temperatures).

The above points should be used as a basis for developing an agenda for the pre-pour meeting. Bridge deck pours are difficult and expensive to stop once they get started. The idea behind the pre-pour meeting is to ensure both the Contractor's and the Department's field personnel have a clear understanding of how the deck will be poured, and what inspection procedures will be followed. The time to have discussions about good construction practices and specification enforcement is in a meeting room, not on top of the bridge. Thus it is important for the Contractor and ITD to clearly understand all the details of the pour. The project supervisors and inspectors should be free to ask questions so they can fully understand the Contractor's methods. The Resident Engineer should ferret out any hidden agendas on both sides, ask the tough questions nobody wants to ask, and get a commitment from the Contractors staff to do quality work.

Placement Sequence. Bridge superstructures, particularly bridge decks, follow a placement sequence where some portions of the deck or superstructure are placed before others. The placement sequence can be found in the Bridge Plans. The Project Inspector must ensure the Contractor strictly follows the placement sequence.

The placement sequence is intended to place much of the concrete for the superstructure in the mid-span areas before placing concrete over the piers. The placement sequence allows the reinforcing steel over the piers to move as the bridge deflects from the weight of the concrete. If the concrete over the piers were placed first, the rebar would be locked into place as soon as the concrete hardens. Then when the mid-span areas are poured, the concrete over the piers could crack as the concrete tries to restrain the rebar from moving.

Skewed Bridges. All bridges that are built on a skew have special requirements that are sometimes overlooked by contractors and inspectors. Typically the abutments are not perpendicular to the centerline of the roadway. They are set at some angle other than 90 degrees, and can be as low as 45 degrees. However, the girders run parallel to the roadway centerline. As a result, the angle between the abutment and the girders is not 90 degrees.

The concern here deals with the placement and finishing of bridge decks. The bridge deck must be placed and finished in the direction of the skew angle and not perpendicular to roadway centerline.

Pumping Concrete. When concrete is pumped, the Contractor should be advised to have a standby pump in case the primary pump fails. It is not necessary for the standby pump to be at the job site as long as it can be mobilized and placed in operation within 30 minutes of a pump failure.

It is considered good practice on monolithic pours to allow a waiting period from two hours (minimum) to four hours (maximum) following concrete placement in walls, columns, or piers before permitting fresh concrete to be placed on top of these members. This delay can be modified where wall height is 6 feet or less. The delay is necessary to allow most of the settlement and shrinkage in the earlier placements to occur; thus, decreasing the probability of cracking at the junction of the two placements.

In some cases, the Project Plans will indicate the sequence of placing concrete in a structure. When not shown on the contract plans, the Resident Engineer should require the concrete to be placed continuously throughout each section of the structure or between indicated joints. The concrete placement rate should be such that no cold joints are formed within monolithic sections.

Vibrating Concrete. Subsection 502.03.F.2 of the Standard Specifications allows the Contractor to use vibrators for consolidating structural concrete. It is up to the Project Inspector to approve or disapprove vibrators. Inspection of vibrators and other placing and finishing equipment should be done at least one day before the pour, so the Contractor can replace any substandard equipment.

The purpose of vibration is to cause the concrete mix to envelop and bond to the reinforcement, fill voids, and make the structure more waterproof and durable. The concrete vibrator, when properly used, is a good tool for working the concrete under and around closely spaced reinforcement.

Operation of the vibrator requires some skill and considerable physical effort. Workers who are charged with this responsibility should have some experience and instruction in proper methods of vibrating. The vibrator should not be left in any one area of concrete longer than a few seconds.

As soon as the surface of the concrete surrounding the vibrator ceases to settle, it should be pulled out slowly and inserted slowly into a new area. Excessive vibration should be avoided as it tends to cause segregation and increases the lateral pressure on the forms.

If the Inspector suspects the vibrator is not operating at or above the minimum frequency, measure the vibrator's frequency with a portable tachometer or a vibrating reed called a Vibra-Tak. ITD district materials labs or the central lab should have these instruments. The frequency should be measured with the vibrator operating in and out of the concrete. A significant difference between the vibrator's measured frequencies in and out of concrete may indicate that the vibrator is in need of repair or there is an inadequate power or air supply.

Contractors should operate vibrators in accordance with the manufacturer's recommendations. If the Inspector suspects that the Contractor is not using a vibrator properly, the vibrator can be rejected for not being suitable to the Contractors placement methods. Consult the manufacturer's recommendations to make this determination. The depositing of concrete at one point and moving it with the vibrator is not permitted.

Concrete should be placed in approximately horizontal layers not more than 24 inches deep. If concrete movement is necessary it should be done with shovels rather than vibration. Moving concrete horizontally causes the grout to flow while the rocks settle.

Also, ensure that high frequency internal vibrators consolidate the concrete when specified. The method used to vibrate concrete directly affects the structure's strength. Ensure minimum contact between the vibrator and reinforcing steel. Concrete must be vibrated to the point where mortar and water flush to the surface; vibration beyond this point is not necessary or desirable. Insufficient vibration, on the other hand, will leave rock pockets (voids).

Bridge screeds should be equipped with vibrators and often have a tachometer as well. Bidwells and other commercially available screeds can be equipped with external vibrators mounted in front of the rollers. These vibrators must clear the top mat of reinforcing steel and are used to ensure that the riding surface of the deck is properly consolidated for long-term wear.

Joints in Major Structures. There are basically only two types of joints in any reinforced concrete structure: the construction joint and the expansion joint. The contract plans will show all joint locations.

The weakened plane joint (where the concrete is partially sawn to control cracking) is rarely used in reinforced concrete structures. Reinforcement steel acts like a crack stopper so there is no guarantee that the concrete will crack at the weakened plane joint.

Construction Joints. Construction joints are usually oriented and located in areas where load transfer is uniform or at a minimum. With the Designer's approval, the Contractor may add, alter, or relocate construction joints.

The construction joint is a provisional joint used primarily to terminate a concrete placement at a predetermined location. Some structures are so large that it is not possible or desirable to place them all at once. The construction joint is intended to provide a temporary means of ending a concrete placement while still providing structural continuity (that is adequate load transfer across the joint). The installation of construction joints is generally straightforward. A form serves as a bulkhead where the placement is terminated. Usually rebar will protrude through the form and a key is usually formed on the joint face (see Project Plans). The form is stripped the next day except when a stay-in-place form is used. The joint is then cleaned with either sand or water blasting (if more than eight hours old) and the next placement is continued.

Inspectors need to carefully examine construction joints in structures for:

- The correct location and orientation.
- Correct concrete placement procedures (ensure only acceptable concrete is used and that it is properly placed and consolidated—don't use the first concrete out of the chute or pump line).
- Proper cleaning and blasting (don't over blast the joint since this will only loosen the coarse aggregate).
- Smoothness across the joint when placed in a bridge deck or other riding surface (this may require extra straight edging and careful screeding or re-screeding by the Contractor).

Expansion Joints. The expansion joint is intended to allow movement between adjacent structures or between different members within a structure. This movement prevents stress build-up due to creep, shrinkage, or temperature changes that would seriously crack the structure.

Expansion joints create a small gap between two structures or structural members (abutment vs. girders) that allow for movement.

There are three important things that the Inspector must keep in mind about expansion joints:

- The joint is in the correct location and runs the full depth and length required by the contract plans (the joint must completely separate the two structures or structural elements).
- The gap is set at the correct width.
- There are no obstructions or connections between the two structures (rebar, conduit, utility lines or loose concrete) that would interfere with the opening and closing of the joint.

Only approved fillers and sealant materials should be used. Expansion joints are shown on the contract plans. Expansion joints can be found between abutments and bridge superstructures; between two sections of a long bridge superstructure; between anchor and approach slabs; and between approach slabs and abutments. Near the surface of an expansion joint, a compressible material (such as a bituminous or cellular plastic filler) is placed to prevent rocks, nails, and other incompressible material from entering the joint that would prevent movement. On top of the filler, a joint sealant is placed to prevent water from entering the joint. For expansion joints adjacent to bridge decks, a deck joint assembly is installed and serves as the joint filler and sealant.

Deck Joint Assemblies. ITD most often uses two types of deck joint assemblies. The compression seal joint and the strip seal joint. Both are designed to keep out water and prevent debris from falling into the joint.

The Contractor must submit shop drawings for all deck joint assemblies in accordance with Subsection 105.02 of the Standard Specifications. The bridge designer will review and approve the shop drawings. The inspector must have these shop drawings on hand when the Contractor installs the deck joint assemblies. The shop drawings will describe the installation method. The Inspector should ensure this method is followed. In addition, a temperature correction chart should be included with the drawings. It is very important for the inspector to ensure that the correct gap width for the joint is set prior to pouring the joint. The width is based on the structure temperature (not air temperature) at the time of the pour, which can be read from the chart. Setting the joint at the incorrect gap can create long-term maintenance problems for the Department. A gap that is set too wide can cause the joint material to tear or fall out as the joint expands. A gap that is set too narrow can cause the joint to close, which can severely crack the bridge deck, girders, and diaphragms.

Here are some other inspection checks the Inspector can do to ensure the Department gets long lasting, worry-free deck joints:

- A long-lasting joint is a smooth joint—ensure the steel guard angles on each side of the joint are correctly recessed so that no bump or dip will occur as vehicles pass over the joint (concrete grinding should be done to improve the smoothness).
- Ensure the existing concrete adjacent to the joint is coated only with an approved adhesive.
- Ensure good consolidation of the concrete under the guard angles.
- Ensure bolts in the erection angle are loosened after the concrete has set to allow movement.
- Enforce all the provisions of the contract. They were written to provide the Department with durable, high quality deck joints.

Seal Concrete. Seal concrete calls for extra cement to make up for losses during underwater placement. Special care must be exercised in the placement of concrete below the water surface to keep agitation to a minimum. Bottom dump buckets may be permitted in shallow water. When placing seal concrete with a bucket, it must meet the same general conditions as outlined for a tremie (must be watertight, the outlet buried in the concrete, and no washing of the concrete shall occur). Seal concrete is placed with a higher slump so it will flow out of the tremie or bucket and into final position with little working. The higher slump also aids in preventing foreign water from entering the concrete.

Care should be exercised to assure that the required depth of seal is obtained over the entire area. The excavation should be checked for high areas before the seal is placed and the surface of the placed seal should be checked for irregularities.

After the seal has obtained the required strength to withstand the hydrostatic pressure, the cofferdam may be dewatered. During this operation, the flow of water through the joints in the sheeting tends to seal with solids moving with the in-flow. Slow pumping provides more time for this sealing to take place. When the cofferdam is dewatered, the surface of the seal should be trenched to a sump area for pumping, piling cut to the required elevation and spacing checked. The footing is then formed and construction proceeds in a normal manner.

G. Cold Weather Concreting. Several precautions must be taken when placing concrete in cold weather. If temperatures below 40 F are anticipated within seven days following placing the concrete, the Contractor will normally be required to enclose the structure, and provide heat and moisture so the concrete will obtain its initial strength without freezing. The addition of moisture should be discontinued 24 hours before discontinuing the heat so there will not be an excess of moisture on the surface of the concrete to form ice in case of cold weather following the seven-day protection. If the temperature is below 40F when placing the concrete, the concrete must be heated to at least 50 F by heating the aggregate and/or water in accordance with the Standard Specifications. The temperature of the concrete, as well as the slump, must be consistent from batch to batch. Corners and edges require special attention to prevent freezing such as applying extra insulation.

In summary, the difficulties arising from cold weather concreting may usually be minimized by:

- Not placing concrete against any frozen or ice-coated foundation, forms, or reinforcement.
- Having a pre-approved plan for cold weather placement and curing.
- Heating aggregate and/or water to maintain mix temperatures above 50 F.
- Controlling temperature and humidity after placement by enclosing concrete and/or heating to a 50 F to 80 F for seven days.
- Adding moisture for six days and discontinue 24 hours before heat is stopped.

H. Hot Weather Concreting. When the concrete is being placed in the bridge deck during hot weather, additional precautions must be taken in order to prevent rapid surface evaporation. The Inspector should acquire a current evaporation rate chart which allows one to estimate the rate of evaporation based upon the air temperature, relative humidity, concrete temperature and the velocity of the wind. These charts are generally found in such manuals as the Portland Concrete Associations Design and Control of Concrete Mixtures manual. The district materials sections should have these readily available. Generally tolerable evaporation rates are considered under 0.2 lb./sf/hr.

Water reducing retarder admixture should be used in the concrete so the water-cement ratio and slump of the concrete can be maintained within the specification limits. The mixing time of the concrete should be held to the minimum. Shaved ice may be needed as part of the mixing water to keep the mix temperatures low enough.

The temperature of the concrete at the time it is placed in the forms must be kept under 85 F. Concrete with high temperature loses slump rapidly, and is difficult to place and finish. This temperature can be controlled by shading the concrete trucks while loading and unloading and shading the conveyors or pump lines used in placing the concrete. The forms and reinforcing steel should be cooled prior to placing the concrete. This can be done by covering them with damp burlap and then spraying them with cool water immediately prior to placing the concrete. Care must be taken to see there is no standing water in the forms when the concrete is placed.

The concrete must be placed and finished as soon as possible. If there is a delay in applying the curing compound after the concrete has been finished, a fog spray should be applied to reduce the moisture loss due to evaporation. If plastic cracks form and the concrete is still in a plastic state, they can be eliminated by re-vibrating the concrete and refinishing. Care must be taken to not re-vibrate the concrete after initial set has been obtained. The requirements for curing the concrete shall be enforced.

As soon as the visible bleed water has evaporated from the finished deck, the curing compound should be applied. The curing compound should be applied in two applications to ensure full coverage of the concrete. The second coat should be applied in a direction perpendicular to that of the first application. The amount of curing compound applied in the two applications should meet the minimum amount specified. Immediately after application of the curing compound and initial set, the concrete deck should be covered in accordance with Subsection 502.03.J of the Standard Specifications.

In summary, the difficulties arising from hot weather concreting may usually be minimized by:

- Using cool mixing water.
- Keeping the aggregate temperature as low as is economically feasible.
- Reducing the length of mixing time.
- Placing the concrete as soon as possible after mixing and with a minimum of handling.
- Keeping the surfaces shaded or cool during placing.
- Placing curing compound as soon as possible.

I. Finishing Concrete. All formed surfaces require an Ordinary Surface Finish per Subsection 502.03.I, as a minimum. The intent is to provide a concrete surface that is hard, sound, and reasonably impenetrable to moisture. No steel is allowed within 1 inch of the surface. This is to prevent the establishment of a rust channel that could corrode the reinforcement. A surface finish is just as important below ground as it is above. In fact, the potential for rebar corrosion is much higher underground. When formed surfaces will remain in view of the traveling public, the Contractor must use forms that will provide a pleasing appearance of uniform color and texture.

A Rubbed Surface finish is required when the Contractor's forming system does not produce a surface that is reasonably smooth and uniform in texture and color as required by the Standard Specifications.

The intent of Subsection 502.03.I is for the Contractor to produce the proper finish without having to resort to performing a Rubbed Surface finish. In other words, the Contractor cannot use damaged forms or substandard forms and compensate later by performing a surface finish after stripping. The surface finish procedure is merely in the Standard Specifications as a contingency for the unexpected occasion where the formed finish is not pleasing in appearance. It is not a replacement for good concrete forming practices.

If a formed surface does require finishing, Subsection 502.03.I specifies the finishing to begin Immediately upon removal of the forms. Immediately does not mean tomorrow or next week.

Contractors are often anxious to get their forms down as quickly as possible, but may not want to provide the labor necessary to finish and cure the exposed surfaces immediately after removal. Resident Engineers may require the Contractor to leave forms in place until a satisfactory crew could be assembled to finish and cure the exposed concrete. Mortar adheres to young concrete much better than to older concrete and it is easier to obtain a more uniform color and texture. In the long term, the surface will be more durable and uniform in color and texture if the concrete is finished when it is still relatively young.

Finishing Bridge Decks. One area of bridge deck finishing that inspectors and contractors should always pay close attention to is the deck smoothness at the joints. On precast girder bridges, this is especially important since many construction joints are needed to comply with the required pour sequence.

Any irregularities disclosed by the straight edging should be corrected immediately. Attention should be given to finishing the gutter lines on bridges particularly on nearly flat grades in order to preserve good longitudinal drainage.

The Inspector should allow the Contractor to make minor adjustments to the screed grades to obtain the smoothest joint possible while maintaining a deck thickness within allowable tolerances. In some cases, the Contractor may need to back up the screed and re-screed the surface to get the required smoothness. A small uniform roll of concrete should be maintained ahead of the screed. This requires constant attention when the screed is in operation. The smoothness of the deck will be governed to a great extent on how smoothly the screed operates.

Experience is important in the evaluation of straightedge data. Occasionally high spots are really on grade, but the low areas make the high spots look high. When this condition exists, cutting the area to meet tolerances over the low spots may result in removing too much of the surface and reducing the reinforcing clearance.

As one last reminder, Inspectors should spot check the deck thickness behind the screed. Inserting a piece of thick steel wire or rebar into the fresh concrete can do this. The measurement will ensure that the Department is obtaining the correct deck thickness and can alert everyone to potential problems that can be corrected while the concrete is still being placed.

Skewed Bridges. All bridges that are built on a skew have special requirements for finishing the bridge decks. The bridge deck must be finished in the direction of the skew angle and not perpendicular to roadway centerline.

Typically bridge decks have camber built into them to offset the long-term effects of creep. Creep affects the girders under the deck and causes the girders to sag with time. To ensure this sag does not show up in the deck, the Bridge Designer will set the deck elevations higher at the midpoint of the girders than at the ends where the girders come in contact with a pier or abutment. In order to build this camber into the bridge deck, the finishing machine must come in contact with the same point of each girder at the same time. The girders must be loaded uniformly so they all deflect evenly.

The best way to achieve the proper deck camber is to set the finishing machine at the same skew angle as the piers and abutments, not perpendicular to the roadway centerline. On bridges with a slight skew (less than 20 degrees), the Designer may allow the finishing machine to be set perpendicular to centerline. However, the Resident Engineer should obtain the bridge designer's approval before allowing the Contractor to finish in this direction.

Setting the finishing machine to finish along the skew angle requires a longer machine and some rail adjustments on the Contractor's part. Finishing along the skew is usually something most concrete forepersons do not anticipate. Notify the Contractor about this requirement at the pre-operational meeting.

Tining on a Skew. The tining of the bridge deck becomes a problem when the deck is poured on the skew angle. Tining the deck transversely to the roadway centerline can lead to uneven tining on skewed bridges. The tining rake crosses each girder at a different point along its span. The rake may start near the low point of an exterior girder (at a pier for instance) and cross the midpoint of one of the interior girders. This causes uneven contact pressure since the deck is higher at the girder midpoints due to camber.

The solution is to texture the deck at the same skew angle that it was finished. The intent is to get some type of texturing into the deck. The angle of the texture is not as important as its presence.

J. Curing. Proper curing is of major importance. The specifications require that all concrete surfaces are kept completely and continuously moist until a curing method, depending on the type of placement is applied. High temperatures, low humidity, and windy conditions have an adverse effect on curing of concrete surfaces. Each of these conditions, or a combination, will cause shrinkage cracks in the surface of the concrete unless preventative measures are taken. Idaho Test IT-133-07 in Section 530 of the QA Manual shows how to arrive at an evaporation rate. An evaporation rate greater than 0.2 lb./ft^2/hr. will indicate potential problems, and some type of corrective procedures should be considered to change the placement operation. Placement may be required at night or early morning hours when the temperatures are lower and perhaps less windy conditions.

Prior to deck placements a hygrometer and a wind meter should be obtained from the District Materials Section so that the rate of evaporation can be determined during placement. District Materials also has literature available for the prevention of plastic cracking in concrete.

Curing should not be delayed more than one hour after surface texturing or form removal. Any remedial finishing operation should be finished as soon as possible and should not interrupt curing for more than one hour. The bottom line is: Contractors need to have sufficient labor available to begin finishing, and apply curing as soon as the forms are removed—not three hours or three days later.

There are four methods that are acceptable to the Department:

1. The water curing method
2. The membrane formed curing compound method
3. The forms-in-place method
4. The steam cure method.

The curing method type that is used depends on the concrete surface type:

- For formed surfaces, the Contractor has the option of using water curing, curing compound, leaving the forms in place or steam cure.
- For unformed surfaces (such as top of walls, concrete pavements, etc.), the Contractor has the option of using either water curing or curing compound.
- For bridge decks, the Contractor must use water curing with a curing compound.

Curing Bridge Decks. Curing bridge decks requires a combination of wet curing and the application of curing compound. This curing process is more intricate than curing other concrete members.

The generally accepted procedure is to:

1. Finish and texture the bridge deck
2. Immediately spray with curing compound
3. Continuously apply atomized water until curing medium is applied
4. Apply the curing medium within four hours of the finishing operation—usually wet burlap or Burlene, and
5. Continuing wet curing for ten days.

Documentation for Pay Quantities. The concrete inspector shall calculate the concrete quantities before construction begins. The concrete calculations should show the quantity to be paid for in each portion of the structure. Payment is based on plan dimensions except where a change in the plan dimensions was required in the field. If the total concrete quantity for each major structure is within one percent (1%) of the plan quantity, no additional checking is necessary. If the difference is over one percent, the calculations should be rechecked in the residency.

If there is a great difference, the figures may be submitted to the consulting design engineer or the Bridge Section for checking. These computations and checks should be included as part of the project records, and generally will be the source document for final pay quantity of these items. Minor structures should check within one half of a percent (0.5%) of the plan quantity.

If the calculated pay quantities vary considerably from the amount of concrete ordered or batched, the inspector should determine the reason for the variation. Large area placements such as decks will readily consume additional concrete with no visible indication. Any wasted concrete should be so noted and the quantity estimated. By keeping track of the variations throughout the job, the inspector may easily account for the contractor's purchased amount as opposed to the amount paid for. On large projects, the waste can be considerable.

The Resident Office Manager enters the quantity of each item as reported from the field in the field ledger. The office manager may be required to compute or check the quantities.

The inspector may inform the Contractor of the concrete quantities that will receive payment; but, under no circumstances, should the inspector inform the Contractor of the amount of concrete to be ordered. This responsibility must remain with the Contractor.

The diary shall be used to verify the activity, date, and location of the work and measurements. Quantities for concrete shall be computed and reported to the nearest one-hundredth (.01) of a cubic yard. Round off to the nearest 0.1 cubic yard on the estimates is permitted. Stringers shall be reported and paid to plan dimensions. Estimates should be rounded to the nearest LF.

Reports. Concrete Batch Ticket, ITD-0070, is to be completed for each truckload of concrete.

SECTION 500 – STRUCTURES

503.00 Metal Reinforcement.

General. Reinforced concrete is a mixture of concrete and steel reinforcement. Concrete is weak in tension and cracks easily when it shrinks or creeps under sustained loading. It is a brittle material. When concrete fails, it breaks suddenly without warning. Steel, on the other hand, is 100 times stronger in tension than concrete; is 6 times stiffer; and will stretch 17 times more than concrete before failing. Steel reinforcement provides reinforced concrete the tensile strength, stiffness, and ductility needed to make it an efficient, durable, versatile, and safe building material.

For reinforced concrete to work as the designer of record intended, the inspector and Resident Engineer must ensure that reinforcing steel placed in a structure is:

- The correct grade and steel type
- The correct size, shape and length
- Placed in its specified location and spaced properly
- Tied and spliced together properly
- Clean and will get an adequate cover of concrete in all directions, and
- Placed in the correct quantities.

The Inspector should check the steel closely upon arrival. Any discrepancies in grade, type, size, shape or lengths should be reported immediately to the Contractor, the Bridge Section and /or the Consultant Designer.

The Resident Engineer should ensure that all the Inspectors are trained and prepared to inspect, sample and document all phases on the rebar placement. Appropriate reference and training materials should be readily available to Inspectors.

Information on identifying markings and placing rebar, splices, bar supports, and wire mesh can be found in the Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice (a copy is available at the ITD Bridge Section and hopefully in each District). Inspectors that inspect reinforcing on ITD projects should have access to the latest copy of *Placing Reinforcing Bars* published by the CRSI as well. Additional information on these manuals, questions, and video training supplements can be initiated by referencing the CRSI web site at http://www.crsi.org/ .

Primary and Secondary Reinforcement. In any reinforced concrete structure, the reinforcing steel can be divided into two categories. Primary reinforcement is the steel in the concrete that helps carry the loads placed on a structure. Without this steel, the structure would certainly collapse. Sometimes primary reinforcement is referred to as structural steel. The steel placed in a structure that enhances the durability and holds the structure together is known as secondary reinforcement. It provides the resistance to cracking, shrinkage, temperature changes, and impacts necessary for a long service life of the structure. Sometimes secondary reinforcement is referred to as temperature steel.

For example, the steel on the backfill face of a cantilever retaining wall that retains soil and resists the loads induced by the soil is primary or structural in nature. Whereas the steel in the front face of a wall functions more for crack and shrinkage control. Its main job is to hold the concrete together.

It's important for the Resident Engineer and inspector to become familiar with the primary and secondary steel reinforcement in the structure. Not only does this help the inspector visualize how the steel should look, but it helps in getting compliance from the Contractor by being able to discuss the reasons for good placement procedures and how each bar in the structure is intended to function. The designer of record can help identify which steel is primary and which is secondary reinforcement. This knowledge is also important in determining what course of action to take if defective or failing material is found for rebar already placed and covered with concrete. Generally non specification rebar should be rejected but it may be accepted with a price adjustment in some cases as discussed later.

Reinforcing Steel Changes in the Field. Contractors may request changes in how reinforcing steel is specified and designed to facilitate construction. These changes can include:

- Moving bars
- Bending bar
- Substituting bars for different sizes, grades or types
- Cutting or torching bars
- Welding bars, and
- Using different splice details or splice locations.

Any requests that would change the location, size, shape, type, grade, length, splice location or that would change the design of the steel reinforcement in a structure <u>**must have the approval of the designer of record.**</u>

Most reinforcing steel for ITD structures is specified as Type A615M (billet steel), Grade 60 (420). Occasionally, the Contractor may want to substitute A706 steel for the A615 type. This kind of substitution is generally acceptable as long as the steel grade stays the same, and there are no changes in bar sizes or lengths. However, some reinforcing steel types such as ASTM A616 (rail steel) and A617 (axle steel) are not acceptable substitutes.

Occasionally, contractors may desire to furnish higher grade steel than what is specified. While this may sound innocent enough there may be an issue. For example, if the Contractor proposes to use Grade 75 (520) steel for Grade 60 (420) a problem may exist. Grade 75 (520) steel has a much higher yield strength than Grade (60) 420 and could adversely affect how a structure behaves during a failure. Likewise, when the Contractor wants to substitute larger bar sizes over what is specified, problems can be created. Larger bars can cause clearance problems, and in some cases may lead to over-reinforcement of a concrete section (a violation of AASHTO bridge specifications).

As mentioned earlier, steel reinforcement can be divided into primary and secondary reinforcement. Even minor changes in either category can have a profound impact on the behavior and longevity of the structure. This is why it is important to contact the designer of record on rebar changes, so the impacts can be accurately assessed and accounted for in the design. Furthermore, a change order must be executed showing the concurrence of the structural designer of record and the Headquarters Construction/Materials Section for any change in the rebar material specification.

The Resident Engineer can deal with changes in how steel is tied, cleaned, supported, stored, and handled with input from the Bridge Section or Consultant Designer as needed.

Welded Wire Fabric (Wire Mesh). Wire mesh is sometimes specified by a designer of record to control shrinkage and cracking in a concrete slab or wall.

Construction Requirements.

Bending Schedules and Bar Lists. Bar bending diagrams and bar lists are shown in the contract plans. The Contractor needs to verify the bar lists within the structure drawings before ordering or fabricating the reinforcing steel. The intent is to get the Contractor to review these lists before the steel is made and shipped to the project. Any major discrepancies should be brought to the attention of the Resident Engineer and the designer of record. This proactive approach will help prevent any delays to the project due to bars that have been cut the wrong length, bent the wrong way, or specified as the wrong size. Waiting until the steel arrives on the job to begin checking bar dimensions is a practice that the Department would like to avoid.

On every set of bridge plans there is a diagram with notations describing the requirement for rod hooks and bends. A "hook" refers to the 90E, 135E or 180E bending of a reinforcing bar. A "bend" refers to any other degree of bend. Reference should be made to this diagram when inspecting metal reinforcement.

Following is a list of the types and purposes for which metal reinforcement is used:

- Longitudinal Bars - Reinforcing steel bars which run length-wise of a member.
- Transverse Bars - Reinforcing steel bars that run across the width of a member.
- Stirrups - "U" or "W" shaped bars placed in a vertical plane used to resist shear in structural members.
- Tie Bars - Act to resist stress and hold other stress bars and structural members in position.
- Dowels - Short bars extending from one member into another to transfer stresses from one member into another.
- Spiral Reinforcement - Spiraled hoops of reinforcing steel used on certain types of columns.
- Temperature and Shrinkage Steel - Usually #4 bars at 18-inch spacing, placed in lieu of stress bars to resist tension cracking due to curing and temperature shrinkage.

When bars arrive on the job, they are normally bundled and tagged. Each bundle will include all bars of a particular bend or schedule occurring in a certain portion of the structure. Each bar or bundle will bear a tag indicating the "mark" of the bar or bars. Some bars, all of a certain "mark," will be coded by a dab of paint on the end. This is to facilitate placement and identification.

Bending, Heating, and Cutting Bars. The inspector should check the rebar upon arrival at the job site to see that the bending has been done in such a degree of accuracy that placement could be made within the required tolerances. Items involving several bends such as stirrups are difficult to bend at the plant and these dimensions must be exact if the rest of the placement is to be correct. Rejecting reinforcement due to improper bending should be done prior to placement.

Contractors may want to field bend bars to simplify reinforcing steel installation or to improve access around a structure. Grade 40 bars smaller than # 8 can be bent out of the way and then re-bent to their final shape when done so per the standard specifications.

If the bars have already been bent once in the shop, only one bend is allowed in the field. Repeated bending of bars weakens the steel at the bends due to metal fatigue. (This is similar to what happens every time you bend a coat hanger or a paper clip back and forth—the repeated bending action weakens the steel until it breaks.)

Heating the steel to bend it is only acceptable when done so per the Standard Specifications. The heat, if not strictly controlled and closely monitored, produces a metallurgical change of the steel. Quenching or rapid cooling of bars heated cherry red produces hardening and brittleness in the steel and must not be permitted. This change results in a notching effect because too much heat will cause a permanent and local weakening of the steel’s crystalline structure just like an actual notch in the steel. Normal, still-air cooling is recommended when bars are heated for bending.

Cutting or torching bars because they are a hindrance to steel installation or concrete placement must not be allowed without the approval of both the structure designer of record and the Resident Engineer.

Cutting the bars and then splicing them after they are out of the way is not allowed. The problem with cutting the bars and then splicing them has to do more with the splicing than the cutting of the bar. If the bar has to be spliced, the type of splice and the location of the splice should be discussed with and approved by the designer of record before the bar is cut. Many times, Contractors want to cut rebar at locations where stresses in the steel are too high or insufficient bar length is available after the cut to fully develop the splice. These are the reasons why the designer of record must be involved in any bar cutting decisions.

Rebar Cover and Clearance. Reinforcing steel must have adequate concrete cover near any exposed surface. This cover is needed to prevent corrosion of the reinforcing steel due to moisture, atmospheric conditions (like high humidity), and reactive soils. The Project Plans should clearly indicate the amount of cover required for reinforcing steel. If the Plans do not, the designer of record should be contacted. AASHTO and ACI have minimum cover requirements on all reinforcing steel.

Adequate clearance is needed between reinforcing bars so all of the concrete mix can completely surround the bar. When bars are spaced to close together, two things can happen:

1. An air void can develop between the bars because there is not enough room for the concrete to flow between the bars. This void severely weakens reinforced concrete locally because there is

no concrete bonded to the steel. The void also causes stress concentrations in the surrounding concrete because the concrete must transfer additional stresses that the void cannot.

2. The area between the bars is filled only with mortar, and is void of coarse aggregate.

The problems with only having mortar between the bars include:

- A reduced shearing strength in the mortar due to the absence of coarse aggregate
- Increased stresses in the steel as the mortar tries to shrink around the bars in the absence of course aggregate, and
- Surrounding areas of weakened concrete that have too much coarse aggregate and not enough mortar.

ITD's Standard Specifications do not specifically limit the clearance between individual bars. Instead they limits the maximum size of coarse aggregate in the concrete mix based on the minimum rebar clearance. In other words, the Contractor must adjust the concrete mix design to fit the minimum rebar clearances in the structure. The Inspector's responsibility is to check areas of minimum rebar clearance and verify that the Contractor's concrete mix will meet specifications. If the mix does not, either the Contractor submits a new mix design or the designer of record is contacted about moving bars so the Contractor's mix can adequately coat the bars.

Common locations where rebar congestion is a problem are:

- Lap splices of longitudinal bars
- Column and cap beam connections where the cap beam reinforcing steel crosses the column steel protruding into the cap.

Sometimes cover problems with reinforcing steel are the results of errors in the formwork rather than errors in steel placement. If a cover problem does not seem to be the result of improper rebar installation, then check the dimensions of the forms for the correct forming tolerances.

Sampling, Acceptance and Price Adjustments. As soon as reinforcing steel is delivered to the project the inspector should determine if the bars are of the proper size and length, and if the bends and bend dimensions are in accordance with the contract plans and the tolerances shown therein.

Steel bars, steel wire, welded wire fabric, and other structural steel shapes used as reinforcement must be certified as conforming to the specifications and verified by testing **before** being covered with the concrete. Random samples for testing must be taken by the inspector in accordance with the contract specifications and Quality Assurance Manual. Encourage the Contractor to wait for the results before installing. Should the Contractor elect to install before the results of the verification testing are known, ensure he understands that he installs at his own risk per Subsection 106.03 of the Standard Specifications.

One important point about rebar sampling that should be stressed: precut bars furnished by the supplier as "sample bars" are not acceptable. Sample bars for verification testing must be removed from a steel shipment at random when delivered to the project site. These samples should be shipped promptly to the Central Materials Lab for testing maintaining a positive chain of custody by ITD staff or an independent carrier. Do not allow the Contractor to take possession of and/or transport the samples.

Occasionally rebar is placed and covered before the results of the verification testing are known. In these cases the judgment as to rejecting the work entirely or accepting with a major price adjustment must be well thought out as it could have major ramifications as to the serviceability of the bridge, federal participation and claims. In order for this judgment to be made the following information must be sent to the Headquarters Construction/Materials and Bridge Sections for review:

1. The project name and lead key.
2. The structure/bridge or place where the failing bar is located (e.g. US-95 MP 12.1).
3. Where the failing rebar is at in the structure (e.g. deck, pier etc.).
4. What the grade and the bar size was (e.g. grade 60, size 4).
5. How the rebar failed (yield point, tensile strength, cold bending).
6. What the magnitude of the failure was (e.g. acceptable tensile strength for grade 60 is 90,000 psi, bar failed at 89,000 psi).
7. What the purpose of the rebar was (Primary {structural} or Secondary {temperature} or both).
8. Was it epoxy coated?
9. When was it delivered?
10. When were the samples sent for testing?
11. When were the test results given to the Contractor?
12. When (date range) did the Contractor install the failing rebar?
13. How much did the failing rebar weigh?
14. What was the contract cost of each item where the rebar was installed?

After placement of the steel in the structure, a complete final inspection must be made and documented.

Bar Supports. Adequate support for reinforcing steel must take into account not only the weight of the steel, but the stresses and strains encountered while placing the concrete as well. The Concrete Reinforcing Steel Institute publication, *Placing Reinforcing Bars*, contains recommended spacing for metal chair supports. Regardless of the recommendations, there must be enough supports to keep the reinforcing steel within the placement tolerances and to keep it from deflecting under construction loading (concrete pours and foot traffic usually) until it is covered with concrete.

Chairs should be observed to detect whether they are bending or are indenting the form material. It may be necessary to use more chairs or chairs with broader feet to carry the load exerted by the reinforcing steel and the ironworkers. Heavy rebar cages containing large bar sizes are candidates for bar support inspection by the Inspector. Wall and column reinforcement should be checked for adequate lateral support to prevent the reinforcement from being pushed against the forms during concrete placement.

The Resident Engineer and inspector should pre-approve all bar supports and bar support methods in advance of any steel placement (preferably when the bar bending diagrams are approved).

If precast mortar blocks are used as bar supports, the blocks must have a compressive strength that meets or exceeds the strength of the concrete poured around them. The inspector must take one sample of precast mortar blocks for every 50 placed, and send them to the Central Materials Lab for strength testing.

Splicing and Lapping. Reinforcing steel is often specified in lengths that are too long for the steel to be delivered and placed as a single piece. As a result, two or more pieces are often spliced together at the site to form one long single bar. The following are three methods that ITD allows to splice rebar.

Lap Splices. Lap splices are formed when two bars are overlapped for a certain length and tied together. The length of the overlap is called the lap length and is specified in the contract plans. A sufficient lap length is needed to adequately transfer loads between the bars. Lap lengths can be longer than specified, but never shorter. Inadequate lap length can cause severe cracking in the concrete around the lap.

Reinforced concrete is typically its weakest around the lap splices in the primary reinforcement bars. For this reason, lap splices are placed in areas where the stresses in a reinforced concrete section are the lowest. The inspector must ensure that the Contractor laps reinforcing steel only in the places specified in the contract plans and with sufficient lap length. If the Contractor wishes to move a lap splice, the designer of record must approve the location change. In areas of high bending and tensile stresses, the Department should insist on using continuous bars or either mechanical or welded splices.

Lap splices can present problems with concrete cover and clearance between bars. Lap splices must have adequate concrete cover for corrosion protection just like continuous bars. It is important to ensure that the spacing between the lap splices allows for the adequate flow of concrete around the splice. Sometimes the lap splices in a group of bars are staggered to reduce congestion at the splice location.

Designers and Contractors have joint responsibility to ensure that lap splices are workable in terms of spacing and adequate cover. The designers need to ensure that lap splices will fit within the dimensions of a concrete member. Concrete cover must be adequate and rebar clearance must take into account a reasonable coarse aggregate size. If lap splices do not work, alternatives such as resizing the member, stagger splices, or a different splice detail should be specified. Contractors, on the other hand, have a responsibility to identify congested rebar sections on the contract plans and adjust their concrete mix design accordingly. They also have a responsibility to place lapped bars well within the allowable placement tolerances when congestion at a lap splice is a problem.

Non-Contact Lap Splices. When a precast member is structurally connected to a cast-in-place concrete member or another precast member, the rebar from both members is lap spliced together to ensure adequate stress transfer across the two members. Sometimes due to the positioning of the precast member or because of placement tolerances in the reinforcing steel, the lapped bars do not end up touching each other at the splice. In other words, there is a gap between the two bars at the lap splice. The designer of record must approve any non-contact laps that are not shown on the contract plans.

When non-contact laps are permitted, the bars must not be spaced too far apart or a zigzag crack in the concrete may develop between the bars. Usually the gap is limited to the lesser of 1/5 the lap length or 6 inches. Non-contact laps are generally permitted in secondary reinforcement and in some minor structures. However, they should not be allowed as an alternative to chronically poor workmanship.

Mechanical Couplers. When mechanical couplers are used to splice rebar, the couplers must be submitted to the Department ahead of time for approval.

For each type of mechanical coupler used, the Inspector should have the manufacturer's recommendations on how to make field splices. It is part of the inspector's job to verify that the Contractor is following the manufacturer's recommendation for making mechanical splices.

It is also the inspectors responsibility to sample mechanical couplers in accordance with the Standard Specifications, Quality Assurance Manual and any special provisions. The samples must be taken at random and after the splices have been made. The Contractor is entitled to no additional costs for providing samples of mechanical splices used for testing, or for the cost of repairing the rebar where the samples have been taken.

Welded Splices. Butt-welded splices are the only acceptable welded splices.

Changing the Type of Rebar Splice. For placement reasons, safety reasons, or for other constructability reasons, contractors may want to use mechanical couplers or welded splices in place of lap splices. Again, the Department and designer of record must approve the splice changes.

Just because lap splices are shown, doesn't mean the Contractor is limited to this type of splice. The Contractor must choose the appropriate splice type based on how he or she intends to construct the work. Changing lap splices to mechanical couplers or welded splices should be at no cost to the Department, since the Standard Specifications clearly allow the Contractor other splicing options. The Contractor's selection of a different splicing option is not a changed condition unless the contract plans or special provisions specifically preclude other splicing options.

Welding Rebar. Most rebar is specified as ASTM A615 steel. There are no strict controls on the chemical composition of the steel as long as the desired mechanical properties are met. Because there are no strict chemical controls, heating this type of steel for welding or cutting purposes can adversely alter the chemical composition of the steel. The steel can become permanently weakened and brittle due to the applied heat and the subsequent method of cooling.

When welding is permitted, ASTM A706 steel must be used and the welding must be performed by an American Welding Society (AWS) certified welder.

The welder should have the correct mill test report (chemical analysis) from the heat in which steel was made. Welding procedures do change to reflect the actual chemical composition of the steel. This test report should be included in the Certificate of Analysis.

The welding of stressed reinforcing steel may be permitted if such welding conforms to AWS D1.4/D1.4M:2011, *"Structural Welding Code- Reinforcing Steel, Including Metal Inserts and Connections in Reinforced Concrete Construction."*

Tack welding of non-stressed reinforcing steel is permitted when approved by the Resident Engineer. Tack welding of stressed reinforcing steel is **NOT** permitted. In ordinary slab-and- girder construction, only the top longitudinal slab steel is non-stressed. In column construction, all longitudinal steel is stressed; ties are non-stressed. In ordinary reinforced concrete beams, girders, and pier and bent caps, all top and bottom longitudinal steel is stressed; stirrups are generally stressed; small longitudinal bars which are not a part of top or bottom reinforcement groups are generally non-stressed. In pre-cast, pre-stressed concrete girders, stirrups are generally stressed; longitudinal non-pre-stressed steel is generally non-stressed although there are exceptions. Steel in footings is generally stressed. Steel in the outer faces of retaining walls, wing walls, and parapets is generally non-stressed. Vertical steel at the inner faces of parapets and the earth faces of retaining walls and wing walls is generally stressed. Exceptions are always possible. When a stressed reinforcing bar terminates with a hook, the extreme end of the bar at the hooked end may be considered non-stressed.

No welding should be performed near pre-stressing strands without protecting the cable from welding splatter. Even the slightest nick or burn mark in the strands is enough to cause failure during tensioning.

Epoxy-Coated Reinforcement. When epoxy-coated steel reinforcement is specified, inspectors need to be watchful in how the Contractor handles the bars. Scratches, nicks, and other damage must be repaired. Don’t allow the Contractor to mishandle the rebar with the intent of fixing any damage to epoxy coating later. Repair procedures should only be allowed for the occasional accident.

For epoxy coated rebar, the entire bar supports (i.e. chairs, tie wires, and mechanical couplers) must be corrosion proof. It makes no sense to support an epoxy- coated bar on a bare-metal chair. The Resident Engineer and Construction/Materials Section must pre- approve all bar supports, couplers, and tie wires for epoxy-coated rebar. The Contractor should submit samples and product literature well in advance of any placement work.

It is the Department’s policy not to allow any metal bar supports or metal tire wire (coated or uncoated) for epoxy coated rebar in concrete barrier wall. Non-metallic supports and tie wire must be used, since the steel in a barrier wall is highly susceptible to corrosion.

Protection of Material. Steel which is to be stored at the job site for an extended period should be protected from the weather to prevent excessive rusting. If covers are used to protect the steel, be sure to provide ventilation to prevent trapping of moisture in the enclosure.

A slight rust coating on the bars has little effect on the strength or on the bond to the concrete. Heavy rust pitting could materially reduce the cross-sectional area of the bar and should be cause for rejection.

Oil and grease, including form oil, act as bond breakers. When this gets on the bars, the Inspector has no choice but to insist upon its removal. Removal may be done with petroleum- based solvent such as naphtha, gasoline, or diesel fuel. A hand-held torch can be used to lightly heat up the bar and burn off oil, grease or paint.

Loose mortar, curing compound, dirt, and mud can weaken the bond between the steel and concrete. The steel should be wiped or washed clean of these contaminants. In severe cases, wire brushing may be needed especially on any primary reinforcement. Mill scale can be removed by sand blasting or in limited amounts by wire brushing.

Tolerances for Cutting, Bending and Placing. In the cutting, bending, and placing of reinforcing steel, it is recognized that it is not reasonable to require all bars to be cut, bent, and placed precisely as shown on the contract plans. On the other hand, the strength of each member of a structure is dependent upon the cutting, bending, and placing being within reasonable tolerances. Because of these facts, the Department has adopted allowable tolerances that are considered reasonable and practical to meet, yet will not significantly reduce the strength of the structural member below the theoretical design strength.

Cutting and Bending Tolerances. The following tolerances are based on industry standards established by the Concrete Reinforcing Steel Institute (refer to Chapter 6 of *Placing Reinforcing Bars*):

- Cutting to length on straight bars: ± 1 inch.
- Hooked bars, out-to-out: ± 1 inch.
- Truss bars, out-to-out: ± 1 inch. The height (H) or drop (rise): ± 1/2 inch.
- Bend down points and bend up points shall be within 2 inches of position indicated on the contract plans.
- Spirals or circles ties, out-to-out dimension: ± 1/2 inch.
- Column ties or stirrups, out-to-out dimension: ± 1/2 inch.

Bars that are consistently too short or consistently bent to the wrong dimensions are cause for rejection. Improper cutting and bending can also result in failure to meet placement tolerances in the forms.

Placing Tolerances. The effectiveness of the reinforcement and the strength of the structure are dependent upon the reinforcing bars being placed in the concrete in nearly the exact position shown on the contract plans. If they are not placed as shown, the structure will likely not have the strength that the designer of record anticipated. For example; when the depth of all truss bars in a structural concrete member is 1/2 inch less than shown on the contract plans, the strength of that member is reduced from 15 to 25 percent.

The correct position of the steel, in relation to the tension face of the concrete, is of great importance. If it is too far away from the face, the strength of the member will be adversely affected. If the position is too close, particularly in bridge decks, water and de-icing chemicals penetrate to the steel and cause it to rust. The rusting process causes an expansion in the volume occupied by the steel that will cause spalling of the concrete.

The following table of permissible variations from plan location or spacing shall be used as a guide in determining good construction practice for placement of reinforcing steel. Substantial conformance to these values is required.

	Beams	Slabs	Walls	Piers & Columns
Clearance from forms**	1/4 inch	1/4 inch	1/4 inch	1/4 inch
Spacing between top & bottom bars	------	1/4 inch	------	------
Spacing between parallel bars*	1/4 inch	1 inch	1 inch	1 inch
Placement of bars length-wise & location of bend points***	1 inch	2 inch	------	------
Stirrup projection above top of beams	2 inch	------	------	------
Stirrup and hoop spacing	1 inch	------	------	1 inch

* The number of bars in any 4 ft. of distance shall equal the number called for on the plans.

** End cover shall not be less than 1 inch.

*** 1/2 inch for walls more than 8 inches thick.

A final check must be made just prior to concrete placement to insure that the rebar is properly positioned and is held securely in place. Specifications require that the deck-finishing machine be operated over the full length of the bridge deck prior to concrete placement. This is the time to check the top steel for proper cover. The force exerted by concrete as it moves into final position can move individual bars, mats, or cages out of position very easily. Top layers of rebar in bridge decks must be tied down per each 16 ft^2 of deck area. Cages in walls must be securely attached to the forms, not freestanding or spaced with temporary blocks. Metal chairs bend quite easily when stepped on. They require constant checking during the placement. Ensure that no steel is displaced by runways, accidents, dumping concrete, etc. Due to the low slump deck concrete, it is conceivable that the reinforcement could be displaced upward during the necessary vibrating operation. Constant attention is required to detect and correct any displacement of reinforcement. Also check on other items such as anchor bolts, inserts, pipe sleeves, conduits, etc.

Documentation for Pay Quantities. Most reinforcing steel is paid for on a weight basis or is included in the cost of another contract item. Rarely is a contract setup to pay reinforcing steel on a lump sum basis. However, when there is a quantity dispute or additional work under a lump sum payment provision, the weight basis should be used to measure reinforcing steel to equitably adjust the contract amount.

The Inspector should collect the cut sheets that accompany each steel shipment and note any quantities used for placements, aids, or left out of the structure. The date and time the steel was placed in the structure should be noted. This process should not be much different than collecting concrete tickets, where the inspector tracks the concrete quantities, placement location, and waste.

Tracking steel quantities as steel is placed is important for heading off quantity disputes. Often these disputes arise because the quantity shipped to the project is different than the quantity shown in the bidding schedule or contract plans. However Inspectors need to keep in mind that there is a yield factor that applies to rebar similar to the yield factor that applies to ready mixed concrete. With rebar, there are end pieces that are not used, bars that are used as placement aids, and waste from rebar cutting. Sometimes even extra bars are sent at the Contractor's request to replace damaged bars previously shipped.

Inspectors don't need to document every single bar placed in a structure, but they do need to scrutinize cut sheets and other shipping documents and note any quantity discrepancies as steel is placed.

The inspector should calculate the quantities of metal reinforcement before construction begins. If the total quantity for each item is within one percent (1%) of the plan quantity, no additional checking is necessary. If the difference is greater, the calculations should be checked further in the residency. The Contractor and supplier should be informed immediately of any errors discovered during this checking. These computations and checks should be included as part of the project records, and will be the source document for the final pay quantity of these items. The above-mentioned calculations should show the quantity to be paid for each portion of the structure. Quantities for payment of metal reinforcement shall be computed to the nearest pound.

The diary shall be used to verify the activity, date, and location of work. Photographs of the steel placement should be taken for further documentation and project information.

SECTION 500 - STRUCTURES

504.00 Structural Metals.

General. The term structural metals generally applies to steel used for steel bridges. However, the provisions of this subsection could apply to other structural steel application such as those used in sign structures, piling or other features. Therefore, the following guidance could be applicable for them as well. The inspector on the project should become familiar with the outside appearance of acceptable fabrication, even though shop inspection is made by a qualified testing laboratory. The size and tolerances of rolled shapes should be spot checked against the American Institute for Steel Construction (AISC) *Manual for Steel Construction* to assure that a lighter weight shape of the same series has not inadvertently been delivered. Each District should have a copy of the latest edition of this manual. A copy of this manual is usually available in the Central Materials Lab and the Bridge Section libraries.

Fabricated shapes must be inspected for cracked welds, bent stiffeners and clip angles, bent flanges, torn or buckled plates, and other damage which might occur in shipping. A list of defects, which may be cause for rejection, should be furnished by the consultant shop fabrication inspector. These items should be documented in writing along with the corrective action taken.

Ensure the steel is unloaded in a manner that will not damage the members. Proper equipment and manpower should be checked before unloading begins.

Beams and girders should be kept in an upright position and set on wooden blocks that keep them off the ground. Long member should have adequate support to protect against damage from deflection. Bracing may be needed to prevent overturning.

Material stored on the project should be protected from damage. Steel should be stored in a well-drained area.

Assembly and Erection. Before erection, each member should be identified for proper location in the structure. Members are seldom interchangeable, because of location of bolt holes, special bevels, cuts or hangers. A plan must be developed for proper erection sequence, including details of field connections which are usually omitted from the contract plans. Sufficient equipment with adequate capacity and reach is needed to erect the steel without accident to men or material. Long girders may require more attention than weight alone would indicate because of lack of stiffness. Severe damage and over stressing may result from careless handling and erection.

Bearing surfaces of the structural members and of the substructure must be inspected for cleanness and freedom from defect. Contact of bearing surfaces, alignment, clearances, and in place camber, are items that require checking as erection proceeds and field connections are made. Before the erection of the structural steel the centerline of bearings must be laid out on all substructure units by precise methods and clearly marked on the concrete. Bearing areas need to be checked to ensure a flat surface is provided at the correct elevation. Any modifications required to make this happen (grinding, shims etc.) needs to be approved.

Generally, anchor bolts are used to tie the substructure to the superstructure. Anchor bolts are usually plain round bolts with the head and washer plate on the lower end and the thread and nut at the top end. These bolts are set in pipe sleeves to allow room for adjustment of the span. The location of the anchor bolt sleeve is very critical and must be verified by the Inspector. Also, the exposed length of anchor bolts should be checked to ensure enough thread is exposed out of the pier cap to tie down the lower bearing assembly. Anchor bolt holes and the void underneath masonry plates shall be grouted after all the structural steel is erected and adjusted for length and camber and at least seven days before the deck concrete is placed.

Field connections are normally restricted to bolts because of the difficulty and expense of properly inspecting welds in the field. Where field welded connections are permitted or specified, it may generally be said that a weld with a uniform appearance after slag has been removed is a satisfactory weld. Rough or slipshod appearance and defective welds often go together.

If there are suspected or apparent deficiencies such as laminations or inclusions in a weld and a check is desired the Inspector should notify the Resident Engineer and he should contact the Central Materials Lab for a listing of qualified consultant who are trained specialists in the operation of ultrasonic flaw detectors.

Steel members should fit together with very little strain or distortion. Bolt holes that are slightly out of alignment are generally brought into alignment with the use of drift pins. Excessive use of force that distort or enlarge the hole or making cuts or adjustments with a welding torch are not allowed. Excessive force can introduce stresses into the component for which it was not designed. When this is not feasible to adjust the holes alignment with the application of a modest amount of force the Resident Engineer and designer should be consulted. The material may be rejected or the Contractor directed to submit a plan for correction that must be approved. Straightening a member should always be done only after approval by the Engineer. It is desirable that an entire unit or continuous span of the structure be temporarily fitted, assembled, connected, adjusted and checked before the permanent connections are made.

Field connections are often permanently bolted. Bolted joints gain much of their strength from friction between the surfaces held together. Friction rather than shear or bearing allows the stresses to be transferred. This friction depends on bolt tension, which is a primary importance.

Special high strength bolts are used so that proper tension may be applied without stretching or breaking the bolt. A copy of Section 2.10.20 of *the Standard Specifications for Highway Bridges* adopted by AASHTO covering connections using high strength bolts should be obtained and enforced. Bolts should be checked carefully for compliance with material specifications.

High tensile strength bolts vary only slightly in shape, dimension and appearance form ordinary machine bolts. Both have hexagonal heads and nuts that differ only in that the heads and nuts are finished more accurately on the high strength bolts (to allow for more uniform bearing) and in the markings. Inspectors should be careful to ensure they are not interchanged. High strength bolts are designated Type 1, 2, and 3 and will be marked A325M or M164M along with a symbol identifying the manufacturer. AASHTO M-164 requires that Type 1 bolts be marked with an 8S, Type 2 bolts with and 8S underlined and Type 3 bolts shall be marked 8S3. Marks may be raised or recessed but must be located on the top of the bolt head.

The dimensions and specifications of bolts and washers should be spot checked to ensure they are in conformance with the contract requirements. The Resident and his staff are referred to current publications that provide this information including the AISC *Manual for Steel Construction.* The following ASTM standard specifications are also useful references:

- ASTM A 325 High Strength Bolts for Structural Steel
- ASTM F 436 Hardened Steel Washers
- ASTM A 490 Heat Treated Steel Structural Bolts
- ASTM A 563 Carbon and Alloy Steel Nuts

Proper bolt tension may be obtained with the use of Direct Tension Indicators (DTI) or by the "turn-of-the-nut method" described in Subsection 504.03.L of the Standard Specifications.

A DTI is a hardened round, steel shaped device similar to a washer with protrusions or bumps on one side or face. When the bumps are placed against the underside of a bolt head or against a hardened flat washer there is a noticeable gap. As the bolt and nut are tightened the clamping force flattens the bumps and reduces the gap. The more you tighten the more the bumps are flattened. When the gap is reduced to the required dimension you know the bolt has been properly tensioned. If used correctly, they will give satisfactory results. The Engineer must check the specifications to be sure this type of device is approved for the project, and install them in accordance with the manufacturer's recommendations. ASTM F 959 gives additional details on DTIs and their installation.

The field procedure for installing high tensile bolts is as follows:

- Flair-up holes with enough pins to maintain dimensions and plumbness of the structure. Pins are not to be removed until bolts in all other holes have been tightened.
- Install bolts in remaining holes.
- Tighten a pattern of bolts from the center of the pattern working outward, being sure that the connected parts are properly fitted.
- Using a spud wrench, tighten the nut of each bolt not used for fit up to a snug position, then continue to tighten it by turn-of-nut as specified, depending on grip length. Snug is defined as the tightness that exists when all plies are in firm contact. This may be obtained by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench.
- Replace pins with bolts and tighten as above.
- Back off the nut on each fit-up bolt (these bolts have previously been marked) then tension as per AASHTO turn-of-nut method.
- The bolt up crew should mark completed work with an identifying symbol.

Safety and safe practices are of paramount importance in all phases of structural steel work. The inspector should become familiar with the OSHA steel erection safety requirements, and be constantly alert to hazards.

Torque wrench and calibrated impact wrench methods shall not be used for tightening of bolted connections.

Documentation for Pay Quantities. See Subsection 504.04 and 504.05 of the Standard Specifications.

Reports. None.

SECTION 500 – STRUCTURES

505.00 Piling.

Pile Types.

A. Pile types can be separated into three categories based on the way they develop capacity:

- End-Bearing Piles are supported primarily by end bearing on rock or very dense soil layers (e.g., H piles).
- Friction Piles are supported primarily by skin friction between the pile shaft and the surrounding soils (e.g., pipe piles, or cast in place when filled with concrete).
- Combination Piles are supported by a combination of both end bearing and skin friction (e.g., closed-end pipe piles).

Friction piles can also be defined as low displacement or high displacement. Low displacement piles (e.g., H piles) are typically used in dense soils where driving high displacement piles to the required highest tip elevation would be difficult. High displacement piles such as pipe piles are typically used in soft/loose soils where the displaced soil becomes denser during pile driving, thus increasing the skin friction.

B. Pile types can also be separated into different categories based on the pile material:

- Steel Piles: E.g., H piles or shell/pipe piles. These pile types are most often used on Department projects.
- Concrete Piles: Concrete piles have never been used on Department projects. They are heavy, require careful handling, and are difficult to splice.
- Timber Piles: Timber piles were used on Department projects in the past, but they have not been used in the last 3 decades or so.

H pile size and weight per foot are designated by “HP” followed by two numbers separated by an x. For example, an HP 14x117 pile has a pile section that is nominally 14 inches wide and weighs 117 pounds per foot.

Shell or pipe piles are normally designated by their outside diameter. For example, a 16-inch shell pile has an outside diameter of 16 inches. Shell piles typically have a wall thickness from 0.25 to 0.75 inches.

When using abbreviations in diaries or forms, make sure they are standard abbreviations or that they can be readily interpreted. If there is any doubt that the meaning could be misinterpreted, make a notation on the pile driving forms (or in the diary) to clearly define the abbreviation. This will assist anyone who may be reviewing the forms at a later time, or relying on the information they present years after the work is completed.

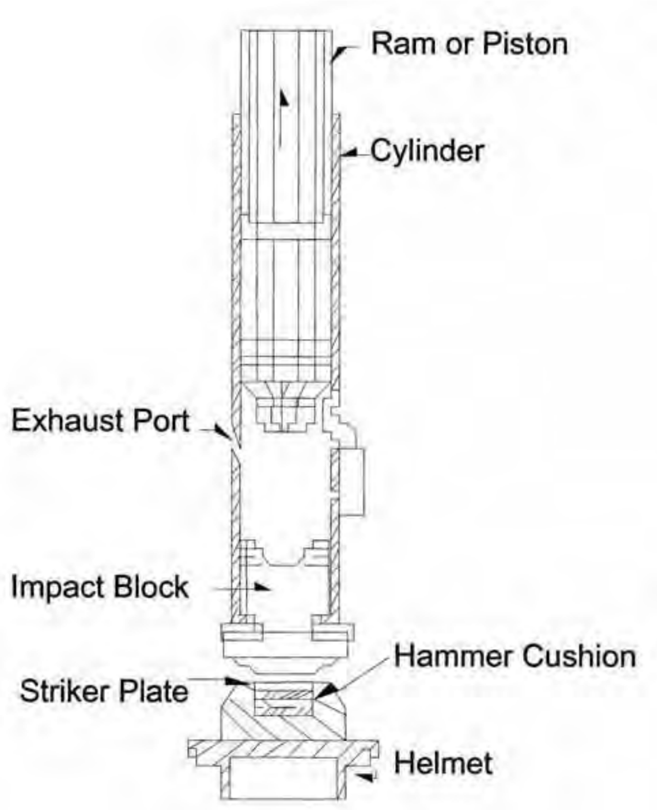
Pile Accessories. Pre-approved pile accessories for steel piles can be found on the Department’s Qualified Products List (QPL) website.

Pile Tip Protectors. Pile tip protectors (also called pile points or pile shoes) are used to help piles penetrate hard, dense soils, and to protect piles from damage during driving. Closed-end shell piles normally have a 1-inch-thick steel plate at the bottom. Thicker steel plates may be needed for larger shell piles. Conical (60 °) points are sometimes used to help shell piles penetrate hard or dense soils.

Pile Splicers. Steel piles are normally spliced by using backup plates (shell piles) or splice plates (H piles) as shown on the project plans. Pre-fabricated splicers can also be used to splice piles, and they can be found on the Department's Qualified Product List (QPL) website.

Pile Hammers. There are several different pile hammer types. The most common impact hammer types are diesel, air, steam, and hydraulic hammers. Vibratory hammers are sometimes used to extract piles out of the ground or to partially drive piles when noise caused by pile driving is a concern. For Department projects, even if a vibratory hammer is used to initially drive piles, the driving must be finished with an impact hammer so that the pile capacity can be determined at the end of driving.

There are two diesel hammer types, open-end (single-acting) or closed-end (double-acting). The most common pile hammer type used on Department projects is the open-end diesel hammer (see diagram and web links below) and it consists of a cylinder containing a ram and an anvil (or impact block). The ram is initially raised by an outside power source and dropped as a drop hammer. As the ram drops, it actuates a fuel pump which injects fuel into the cylinder. The falling ram compresses the air/fuel mixture which ignites, and the expanding gases drive the ram upward after the ram strikes the anvil.



The following link provides a video that shows how diesel hammers work:
http://www.youtube.com/watch?v=zK5jwpUAXnE

The diesel hammer energy output is dependent on a number of factors such as fuel quality, fuel setting, and soil resistance to pile driving. Generally, the greater the soil resistance, the higher the stroke (i.e. higher energy output) will be.

Attached to the hammer base is the pile helmet, which contains the strike plate and hammer cushion. The strike plate ensures uniform compression of the hammer cushion. The pile helmet fits over the pile top and uniformly distributes the impacts, thus protecting the pile from being damaged by eccentric blows.

Another pile hammer type that is occasionally used on Department projects is the hydraulic hammer. Hydraulic hammers lift the ram by hydraulic fluid pressure to a predetermined height and then release the ram. Pile driving energy is produced by the falling ram.

There are two hydraulic hammer types: single and double-acting. The single-acting hydraulic hammer works very similar to the open-end diesel hammer. The double-acting hydraulic hammer is closed at the top and utilizes a bounce chamber to provide added force in addition to gravity to drive the ram back down.

The energy output measuring method for each hydraulic hammer type is different. The single-acting hydraulic hammer energy output is measured similar to that of an open-end diesel hammer. However, the double-acting hydraulic hammer energy output is measured via a pressure gauge that measures the bounce chamber pressure when the hammer is operating.

If another hammer type is proposed to be used by the Contractor, the inspector should contact the Resident Engineer for further instructions.

Plan, Specifications and Pile Driving Criteria Review. Before starting work, review the contract special provisions and plans to become familiar with specific project requirements and to see if any changes have been made to the Standard or supplemental specifications.

Make a careful study of the foundation investigation plat and the project plans as these may indicate elevations at which:

- The bottom of the pile cap, the estimated pile tip, and the required highest pile tip are located
- Hard driving will likely be encountered
- Cobbles, boulders, or other obstructions may cause problems
- The bearing stratum is located, which is anticipated to be of adequate thickness to support pile loads.

Pile Driving Equipment Inspection (ITD-0969). A check of the Contractor's pile driving equipment and accessories must be done before any piling is driven.

Before pile driving begins, the hammer brand name and model number should also be identified. The data on ram weight, maximum fall or stroke length, or bounce chamber pressure for double-acting (i.e. closed-end) diesel or hydraulic hammers, and hammer cushion material must be reported on the ITD-0969 form (see Figure 1) submitted by the Contractor.

The hammer cushion condition, dimensions, and material type must be checked before pile driving begins to verify consistency with cushion data shown in the ITD-0969. A compressed (<75 percent of original thickness), worn or damaged hammer cushion, or hammer cushion material that is different than as submitted by the Contractor must be replaced per Subsection 505.03.C of the Standard Specifications.

See Photo 1 below for an example of a worn out hammer cushion that needs to be replaced.

Photo 1. Worn out hammer cushion.

Any change in the hammer system may require a new wave equation analysis to be run. Notify the Engineer immediately if the pile hammer system delivered to the site deviates in any way from what was submitted for the wave equation analysis.

Safe pile driving operations require that equipment be in good condition and that workers are safety-conscious. Cables, connections, and safe handling of the piling and the pile driving system should be observed. The inspector must be especially careful when making measurements in the area around pile driving operations. The operator and workers should be made aware of the inspector's presence at all times.

Pile Splice Inspection. Refer to the plans and specifications to determine splice requirements.

Piling lengths exceeding 60 feet will likely require a splice. For piles that have not yet been driven, no more than two (2) splices will be allowed, and the minimum allowable pile splice section length will be 10 feet.

Pile splice welding must be done by welders certified as specified in the bridge plans. The project inspector should verify welder certification for the type of welding process and welding position proposed to be used **before** field welding begins.

Predrilling. Minimum pile penetration is often needed to help piles develop adequate lateral load resistance or to place the pile tip into a desired soil layer. It may be difficult to obtain this penetration when driving piles through rock fills, very dense sand and gravel formations, boulders, or certain silts. If refusal occurs before minimum penetration is obtained, the Contractor may be required to try a larger hammer size or pre-drill the hole, depending on the contract requirements.

When pre-drilling is employed, the borehole diameter and depth should be as shown in the project special provisions. The borehole diameter is often slightly larger than the pile diameter (or diagonal dimension for H piles). The borehole is often drilled to the highest pile tip elevation to ensure that the pile will have the required minimum penetration.

The piling must be impact driven to its final position and pile design capacity or refusal. Piles can be driven in empty or pre-filled holes per the project plans or special provisions. The borehole annulus is often filled with pea gravel, sand and gravel or other approved materials. The borehole annulus extending into rock is sometimes grouted to the top of rock surface.

The pre-drilling depth and diameter should be documented on the Test Pile Record (ITD-0970) (see Figure 2) and Individual Pile Driving Record (ITD-0971) (see Figure 3).

Pile Driving Inspection.

Material Inspection (including lifting holes). Do not allow the Contractor to drive piling until the materials acceptance requirements per the Quality Assurance Manual, Item 505 (Section 230), are accomplished for each piling type to be used.

Steel Pipe Piling: Check for wall thickness and outside and inside diameter. Check end closure diameters and thicknesses.

H-Piling: Verify that the Contractor is handling the H piles in a manner that prevents bending of the flanges and that the piling is supported when stacked for storage to prevent damage. Check H piles for correct sectional dimensions, square ends, straightness, and constant width between flanges throughout the pile length.

Pile points or shoes may be needed to help piles penetrate hard soils or key into bedrock. Current Department-approved products should be listed in the bridge plans or lists may be obtained from the State Geotechnical Engineer or the Department’s QPL website.

Conical points may also be specified for pipe piles that must be driven through dense or hard soils. If conical points are not specified (typically in soft or loose soils), steel pipe piles will often have a 1-inch-thick steel plate welded to close off the tip. The steel plate’s purpose is to keep soil and water out because the pile will be filled with concrete. Occasionally, pipe piles will be driven open ended as in the case where a layer of dense soil may prevent closed-end piles to reach the required minimum penetration. Carefully review the contract plans and specifications for special instructions and details pertaining to this situation **before** pile driving operations begin.

An ITD-0914, Steel Certification form should be obtained from the Contractor for all pile and accessory shipments, including certified mill test reports for all heat numbers per the QA Manual Subsection 230.03. The ITD-0914s and required attachments should be placed into the project files. Pile and accessory shipments not accompanied by the required certifications are subject to rejection.

Site Preparation Inspection. Do not allow the Contractor to drive any piling until the foundation excavation (or embankment construction) is complete to bottom of pile cap elevation. When embankment settlement is expected where piles will be driven, pile driving should not start until at least 90 percent of the settlement, as determined by the Engineer, has been completed to avoid pile down-drag loads caused by embankment settlement.

Saximeter Operation, ITD 0970 (Test Pile Record) and ITD-0971 (Individual Pile Driving Record). The Saximeter (see Photo 2 below) is a hand-held device that uses sound recognition to automatically detect hammer blows when the pile is struck. Background noise is managed through manual adjustment of the sound sensitivity level at which a blow is detected. During pile driving, when the pile has penetrated each depth increment (e.g. 1 foot or 1 inch) the inspector presses the "AVG" button. The Saximeter then displays the number of blows detected (e.g. blows per foot or inch) and the average hammer stroke during the preceding depth increment. This information is then transferred to the Test Pile Record (ITD-0970) or the Individual Pile Driving Record (ITD-0971). The information on hammer stroke and number of blows per pile penetration increment is used to determine the pile-bearing capacity. Contact the District Materials Engineer if you need a Saximeter.

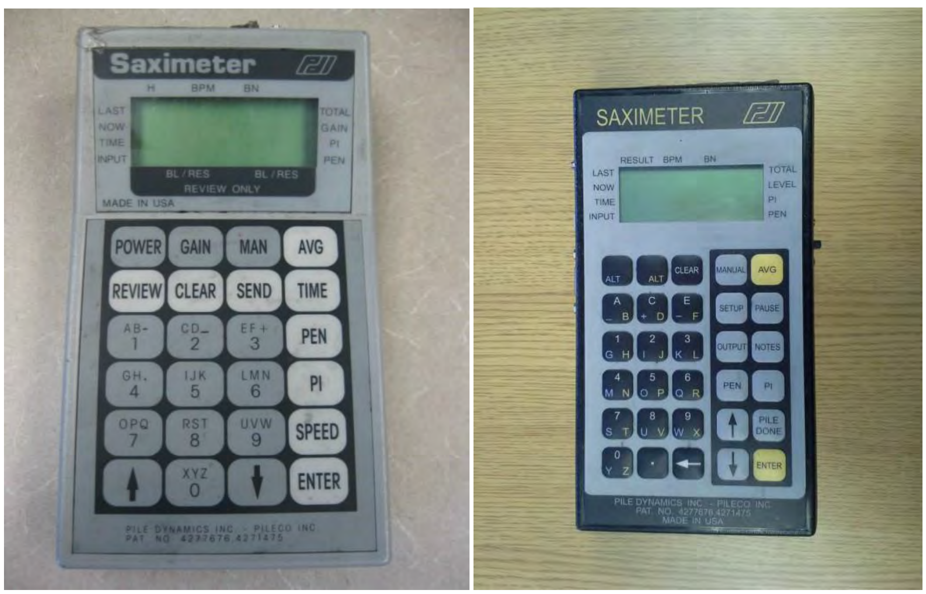
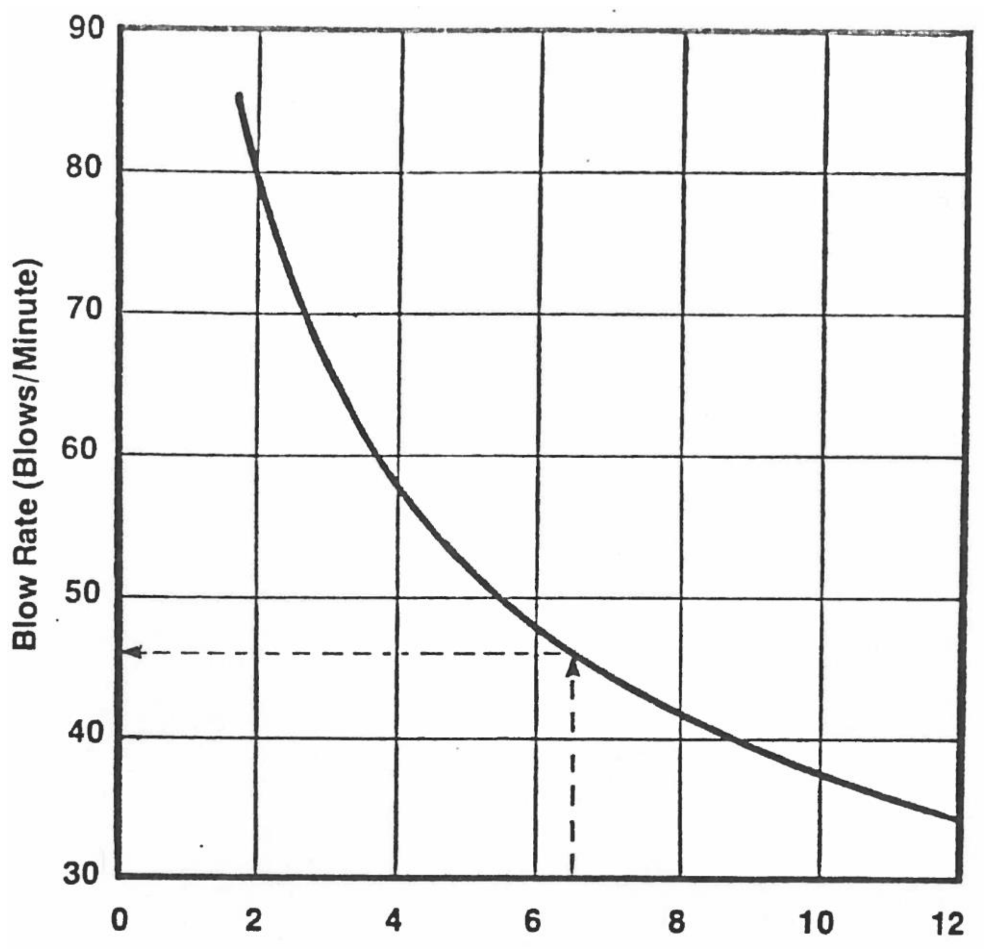


Photo 2. Typical Saximeter models used on ITD projects.

In the event that the Saximeter gives an average stroke and blow count reading that is erratic or does not appear to match up with how the pile driving hammer is operating, the problem is most likely being caused by the Saximeter recording background noise as additional blow counts. This will usually manifest itself by an average stroke reading that is significantly less (and a blow count that is significantly higher) than how the pile driving hammer is actually operating. The remedy for this problem is to raise the Saximeter sensitivity threshold (i.e. reduce the sensitivity) so the saximeter does not pick up background noise such as from heavy trucks, construction equipment or trains, and only records the pile hammer blows.

In the event the Saximeter is not working, the following graph can be used to estimate the hammer stroke from blows per minute.



Test Piles. Notify the Engineer of the date test piles are planned to be driven as early as possible, as well as any test pile schedule changes, so the Engineer who provided the pile driving criteria can receive the earliest possible notice to be available to analyze the test pile data and provide final pile lengths and revised pile driving criteria if required. Since the specifications allow only two business days to analyze the test pile data, the State Geotechnical Engineer (or the engineer who prepared the pile driving criteria with the wave equation analysis) needs to know the test pile driving date as early as possible, so that he/she can arrange his/her schedule and perform the test pile analysis within two business days after test pile driving is completed.

The ITD-0970, Test Pile Record form, is used for test piles.

Test pile data should be recorded from the beginning of test pile driving. If for any reason this is not possible, start recording data as early as possible. Sufficient readings should be taken to permit plotting a graph of bearing versus penetration from the beginning to the end of test pile driving. A separate record is required for each test pile. Handwritten records, neatly prepared, are acceptable and recopying is discouraged. The ground elevation at the test pile location must be recorded.

Test piles should be driven as continuously as possible, so the potential for soil set-up (or freezing), which could result in premature pile driving refusal or a false indication of pile-bearing capacity, will be reduced.

Other pile inspection procedures, as described below, for production piles should be followed for test piles.

Test pile data on the ITD-0970 form should be sent to the State Geotechnical Engineer (or the engineer who prepared the pile driving criteria with the wave equation analysis) as soon as it is available. The State Geotechnical Engineer (or the engineer who prepared the pile driving criteria) will analyze the test pile results to verify the pile driving criteria and to determine the pile length needed for the footing where the test pile was driven. The State Geotechnical Engineer (or the engineer who prepared the pile driving criteria) will then advise the Resident Engineer on the pile length the Department should authorize.

If test piles are not required, the Resident Engineer will base the authorized piling length on the estimated pile lengths shown in the plans.

Pile Markings. All piles should be marked in increments (e.g. 1 foot or 1 inch) sufficient to determine bearing capacity and penetration at all elevations. It is also recommended that each 5-foot increment from the pile tip be labeled for ease of recording pile penetration depths. Usually, a white or yellow keel or paint stick is satisfactory for marking the piling. On greasy, treated timber piling, spray paint generally gives the best results.

To observe pile penetration from one increment to the next, select a reference point so that it will be fixed, easy to see, and will not move during pile driving.

Determining Pile Bearing Capacity. A wave equation analysis is typically used for developing pile driving criteria that are needed for determining pile-bearing capacity. Necessary data on pile driving equipment (ITD-0969) must be submitted to the Resident Engineer and State Geotechnical Engineer (or the consultant engineer who will perform the wave equation analysis) at least 15 days in advance of pile driving so that the wave equation analysis can be performed. The wave equation analysis is used to determine the adequacy of the hammer system, prepare the pile driving criteria, and evaluate stroke, penetration resistance, bounce pressure, and driving stresses. If the proposed hammer is judged to be not adequate for the job, the Resident Engineer will require the Contractor to use a different hammer. The Contractor should be requested to provide the completed ITD-0969 form at the preconstruction conference.

If pile driving criteria developed by wave equation analysis is not available, then the Engineer should use the dynamic formula in the Standard Specifications, Subsection 505.03.G, to determine pile-bearing capacity during driving. However, in this case the Engineer who designed the structure must be informed as soon as possible of the use of the dynamic formula so that he/she can adjust the minimum bearing capacity that piles will have to be driven to.

Usually the State Geotechnical Engineer prepares and forwards the pile driving criteria developed by wave equation analysis to the Resident Engineer. However, the pile driving criteria is sometimes prepared by consultants. The pile driving criteria typically includes the required minimum blow counts for given stroke heights to achieve the design pile-bearing capacities. It also includes a graph showing pile capacity versus blow count per last 1 foot and/or 1 inch of driving (see example pile driving criteria and graph presented in Figure 6 below). This graph will generally show curves for different hammer stroke heights. Graphs may be prepared for various pile lengths, since the Wave Equation is based on definite pile lengths for bearing computations. Use the graph that corresponds to the actual piling length being driven if there are different graphs for different pile lengths.

A graph may also be provided showing stresses induced in the piles during driving versus stroke or blow counts. This graph can be used to determine the maximum stroke or blow count that should not be exceeded to prevent pile damage. This information is typically included with the recommended pile driving criteria presented in the below described cover letter.

The required penetration resistance, defined by blow counts for refusal or for the required pile capacity, will be shown in the cover letter, (see the example presented in Figure 6 at the end of this section). The pile refusal criteria are established to minimize potential for pile damage, particularly where piles are driven into rock. The inspector must compare the number of blows during the last 1 foot or 1 inch of driving with the required blow counts to determine if the required pile-bearing capacity or refusal has been achieved.

The required pile capacity should be achieved in at least two consecutive 1-foot or 1-inch penetration intervals before driving can be stopped. When piles are driven to refusal or in very hard or dense materials, the blow counts could be very high, and in these cases blow counts per 1-inch intervals instead of per 1-foot intervals can be used to determine pile bearing. If the wave equation analysis indicates that a pile might be overstressed and damaged at a certain blow count and/or stroke, this level of driving resistance will be indicated in the cover letter, and must **never** be exceeded.

The stroke height must be adjusted to compensate for the increased ram friction and inclination for battered piles. A stroke height adjustment graph is generally found in the Saximeter operating manual. Additionally, the pile driving criteria will be adjusted for pile batter, and the adjustment noted in the cover letter.

Notify the Resident Engineer as soon as possible when any driven pile does not achieve the required minimum penetration (or highest tip elevation), or does not achieve the required pile bearing at a penetration of less than 150 percent of the estimated pile length shown in the plans. Adjustments may be needed in the pile driving criteria.

Pile Stresses. Any driven pile must remain structurally intact and not be stressed to its structural limits during both its service life (static capacity) and during driving (dynamic capacity). In most cases, the highest stress levels will occur during driving. Therefore, pile damage often occurs because of excessive stress levels generated in the pile during driving. Two methods available for determining driving stresses are (1) a wave equation analysis, and (2) use of a dynamic Pile Driving Analyzer (PDA) during pile driving.

In easy driving situations (low resistance to pile driving), high tensile stresses are generated. Make sure that the tensile driving stress limitation is not exceeded. Typical easy driving situations are (1) at the beginning of driving, and (2) when the pile penetrates into soft or loose soil layers which offer little resistance to the pile tip.

In hard driving situations (high resistance to pile driving), high compressive stresses will be generated. Make sure that the compressive driving stress limitation is not exceeded. Typical hard driving situations are (1) at the end of driving for end-bearing piles, and (2) when the pile penetrates into very dense soil or rock layers. If pile driving becomes difficult and refusal is met before the required highest tip elevation is obtained, pile driving should be stopped and the Resident Engineer should be consulted. Otherwise, piling may be damaged.

The pile driving criteria developed using the wave equation analysis method, as described above under Determining Pile-Bearing Capacity, are designed to minimize the potential for pile damage due to overstressing the pile during pile driving. **Therefore, the maximum pile hammer stroke presented with the pile driving criteria should never be exceeded.**

The dynamic pile test, using a Pile Driving Analyzer (PDA) (see discussion below), is typically used for monitoring the test pile driving (and occasionally used for monitoring production pile driving). The dynamic pile test can measure the actual driving stresses for each hammer blow and the static pile capacity during driving. The dynamic pile test can detect potential pile damage during driving.

Production Pile Driving. Vibratory hammers can be used, if approved by the Engineer, to drive piles but must be stopped at least 10 feet above the estimated pile tip elevation as shown on the plans, or as directed. An impact hammer must then be used to drive piles to the required tip elevation or to the required pile bearing.

Verify the Contractor is driving the piles at the locations as shown in the plans and at the correct pile spacing. Check the vertical alignment (plumb or batter) and the location of each pile during installation. During construction, the Contractor must drive piles with a variation in alignment of not more than 0.25 in/ft from the vertical (or from the batter shown in the plans). The pile top plan location, at cutoff elevation, cannot deviate by more than 6 inches (2 inches for trestle bents) in any direction from the location shown in the plans. For steel H piles, pile orientation is important because the lateral resistance to pile bending depends on the web direction. Check the H pile orientation to ensure that rotational deviation is not more than 15 degrees from that shown in the plans. Notify the Resident Engineer if any driven pile becomes damaged or does not meet the above criteria, so that a determination can be made for any necessary corrective actions.

During driving, the average stroke height and number of blows per foot or inch for open-ended diesel or single-acting hydraulic hammers is determined using a Saximeter that records the hammer blows acoustically as described above under Saximeter Operation. The average stroke height and number of blows per foot or inch (for the last foot or inch of driving) are then compared with the pile driving criteria to determine if the pile has been driven to the required minimum bearing capacity as described under Determining Pile-Bearing Capacity above. If the number of blows per foot or inch meets or exceeds the minimum required for the measured average stroke height, the pile has been driven to the required minimum capacity. It may be possible, but highly unlikely, that a contractor may want to use a closed-end, diesel, or hydraulic hammer. In this case, contact the State Geotechnical Engineer for test and production pile driving guidance.

The Contractor is required to drive piles to the required minimum bearing capacity or refusal, as described in Pile Driving Criteria **and** highest tip elevation or minimum penetration, as specified in the bridge plans and Standard Specifications Subsection 505.03.A, respectively. However, care is needed to prevent piles driven to end bearing on rock or piles that encounter boulders from being damaged by overdriving as shown in Photo 3 below.

Photo 3. Damaged H pile due to overdriving.

Occasionally, when piles are driven to refusal on a sloping rock surface, or when a large obstruction, such as boulder, is encountered, the pile may refuse momentarily (or driving resistance may momentarily spike) then bend and take off down the slope (see Photo 4 below). An alert inspector who has studied the Foundation Investigation Plat sheet, and has familiarized themself with the anticipated subsurface conditions will often be able to detect this and stop the pile driving operation the moment this occurs.

Photo 4. Pipe pile damaged on sloping rock surface, in the process of being extracted.

Pile damage can be detected during driving when monitored by dynamic pile testing. After driving, steel pipe piles should be checked for damage that may have occurred during driving. This can be done by either lowering a light to the bottom of the pipe or using a mirror to reflect sunlight into the pile interior. Pipe piles should be covered after driving as a safety measure and to keep out water and debris. Piles that contain water must either be pumped or bailed out just prior to placing concrete, or the concrete must be placed under the water by an approved (e.g., tremie) method.

Make sure all piles in a given substructure have been satisfactorily driven or re-driven if heaving (pile being pushed up due to the driving of adjacent piles) has occurred before the piles are accepted for that substructure. Do not delay the Contractor unnecessarily, but inspectors should not let the Contractor pressure them into making a premature determination.

Use the ITD-0971, Individual Pile Driving Record form to record data for each production pile driven.

Documenting actual pile driving time in the pile driving records (or the inspector's diary) may discourage contractors from claiming the inspector is requiring overdriving. The Contractor is less likely to use this as an excuse for a slow operation if the records will show otherwise. Also, pile driving time records could be very helpful in determining unit price adjustments in the event differing site conditions are encountered (or claimed).

Piles should be cut off perpendicular to the pile axis after driving has been completed and the piles are accepted. Rejected H piles should be removed or cut off 2 feet below bottom of footing.

Rejected pipe piles should be cut off 2 feet below bottom of footing, left in place and filled with pea gravel.

Pile Restrike. Some soil types such as silts and clays will readjust after pile driving has stopped. This will often result in an increased pile-bearing capacity referred to as soil set-up (or freezing). This pile-bearing capacity increase can be as much as 50 percent or more in as little as 24 hours. Some soils, such as very dense, saturated sand, may relax after pile driving is finished and cause the pile to lose capacity over time. However, this condition, called soil relaxation, seldom happens.

Occasionally, piles may need to be re-driven a short distance after a waiting period specified in the contract or as directed by the Resident Engineer to determine whether pile-bearing capacity has increased due to soil set-up or decreased due to soil relaxation.

Pile re-strikes should only be done with a pile hammer that has been warmed up to normal operating temperature. Hammer warm-up can be accomplished by striking about 20 blows or more on another pile located as far away from where the re-strike will be performed as practical.

After the hammer is warmed up, the hammer is placed on the pile to be re-struck and the pile driven for at least four inches. The inspector logs the number of blows per inch and stroke for **each** of the four-inch increments driven. This data is then reported to the Engineer for evaluation to estimate what, if any, soil set-up or relaxation has occurred. If the pile dynamic test is performed for a test pile during initial driving, it is very likely that a pile dynamic test will also be required on the same pile during re-striking.

The re-strike test results may be used by the Engineer to develop revised pile driving criteria that will account for anticipated soil set-up or relaxation.

Pile Heaving. In loose silt and soft clay, pile heaving may occur when adjacent piles are driven. For this reason, the inspector should check elevations on pile groups after they are driven. Any piles that have heaved more than ¼ inch must be re-driven to the required pile capacity before the piling group is accepted.

Documentation. Use the ITD-0025 Construction Diary form to document the activity, date, and location of the work.

Measure and report piling quantities to the nearest 1 foot.

- Pay Quantities (ITD-0972) (see Figure 4)

  The ITD-0972, Summary Report of Pile Driving form, shall be the source document for pay quantities.

- Pile Layout (ITD-0973) (see Figure 5)

  The ITD-0973, Pile Driving Summary Report (Pile Layout) form, shows the driven pile locations relative to the pile cap (footing) or hammer head centerline.

Examples of these forms are presented below.

Pile Hammer Performance Issues. If the pile hammer is not operating properly, the pile-bearing capacity cannot be accurately determined. Some common pile hammer performance issues are described below.

A common diesel hammer performance problem is called pre-ignition. Pre-ignition occurs when fuel ignites before the ram strikes the anvil (or impact block). Pre-ignition reduces ram impact velocity and cushions the impact. Pre-ignition also causes the stroke and blow count to appear to be high, and thus gives a false indication of the true pile-bearing capacity. Pile hammer overheating is one reason for pre-ignition.

The following are signs of pre-ignition during hard driving:

- Black smoke combined with high strokes.
- Flames in exhaust ports.
- Blistering paint on pile hammer due to excessive heat.
- No obvious metal-to-metal impact (clang) sound.

  If pre-ignition is suspected, the hammer should be stopped and allowed to cool down. If stroke and blow counts are significantly lower after cool down, pre-ignition was most likely occurring.

Other pile hammer operating issues and associated symptoms are:

- **Water in the fuel**. Causes white exhaust smoke and a hollow sound on impact.
- **Clogged fuel lines**. Indicated by little or no exhaust smoke.
- **Malfunctioning fuel pump**. Indicated by inconsistent ram strokes and gray or black exhaust smoke.
- **Malfunctioning fuel injectors**. Indicated by inconsistent ram strokes and gray or black exhaust smoke.
- **Low lubricating oil**. Indicated by shorter than normal stroke.
- **Malfunctioning oil pump**. Indicated by shorter than normal stroke.
- **Water in the combustion chamber**. Causes white exhaust smoke and a hollow sound on impact.
- **Worn piston rings**. Indicated by shorter than normal stroke.
- **Broken tripping device**. Pawl or pin used to lift ram does not engage ram. Pawl engages but does not lift ram.
- **Overheating**. See discussion above on pre-ignition.

  Many diesel hammers have multiple fuel settings that can be used to adjust the fuel amount going into the combustion chamber and thus reduce or increase the delivered hammer energy.

Dynamic Pile Testing. Dynamic pile testing is performed using a Pile Driving Analyzer (PDA), which is a device used to measure and analyze the hammer's effect on the pile and calculate bearing capacity. Specifically, the PDA can provide output that shows unit skin friction per foot of pile length, bearing capacity at the pile tip, maximum compressive and tensile stress per foot increment of pile, and indicate the depth(s) along the pile length where damage may have occurred during pile driving. The PDA output can also be used to fine-tune the wave equation analysis to optimize/confirm pile driving criteria.

To perform the test, two transducers are bolted to an exposed portion of the pile (see Photo 5 of transducers below) that measure strain and acceleration during pile driving. With the newer PDAs, the strain and acceleration data is wirelessly transmitted to the PDA for analysis. This data can even now be sent directly to the Engineer for analysis at a remote office in real time via cell phone and the internet.

Photo 5. PDA transducers attached to pile.

Pile Inspector's Checklist.

1. Before starting work, review the contract special provisions and plans to see if any changes have been made to the Standard or supplemental specifications. Make sure the Saximeter is working properly and that all inspectors are familiar with its operation. Have all the necessary forms available for recording pile driving data.
2. Perform pile and pile accessory (e.g., pile points or shoes) material inspection, including obtaining materials certifications (ITD-0914), verifying domestic production, and matching heat numbers with markings on the piling. All sectional dimensions should be checked, including wall thickness for pipe piles to verify the required sizes have been delivered to the site. Weld

quality should also be inspected. Pile accessories should only be approved products as presented in the bridge plans or on the QPL website.

3. Verify that the pile hammer delivered to the site is the same make and model as was proposed in the ITD-0969 form.
4. Verify the pile hammer cushion is the same material type and dimensions as was submitted by the Contractor on the ITD-0969. The hammer cushion should be periodically inspected and replaced as required in Subsection 505.03.C of the Standard Specifications.
5. Become familiar with pressure gauge operation and readings, and how to properly interpret the pile driving criteria for double-acting or hydraulic hammers.
6. Check pile storage to verify piles are properly supported off the ground and separated by wooden blocking to prevent damage and to prevent contact with dirt, water, and other foreign material.
7. Verify welders performing onsite welding are certified for the welding applications/positions they are performing.
8. Make sure footing excavations (or embankment construction) have been completed to bottom of footing elevation and predrilling, if required, has been performed to the required depth before pile driving begins.
9. Make sure test piles are located as depicted in the plans. The test pile location can be changed if approved by the Engineer.
10. Verify the helmet is properly positioned over the pile head, the pile is properly positioned, including orientation and verticality (or batter) before (test or production) pile driving begins. A pile can be easily damaged when not properly aligned with the hammer.
11. Observe the pile and its verticality (batter) as driving begins. Insist on immediate correction if orientation is wrong or if the pile moves out of position.
12. Verify piles are driven to the highest tip elevation or minimum penetration and required minimum bearing capacity (or refusal), as described in the bridge plans and pile driving criteria. Piles must be driven to the highest tip elevation even if they achieve the minimum capacity before pile tips reach that elevation. Once below this highest tip elevation, the driving can be stopped if the pile has also reached the minimum bearing capacity. However, if pile driving refusal is encountered before the pile tip reaches the required highest tip elevation, the pile driving must be stopped. Notify the Engineer of this situation as soon as possible.
13. Signal the pile driving foreman when the pile has reached the required bearing capacity or refusal.
14. Verify that heaved piles are re-driven before allowing the Contractor to cut off piles.
15. Verify pile verticality (or batter), H pile orientation, and pile head location are within required tolerances per Standard Specifications Subsection 505.03.N. Document final pile layout on the ITD-0973 form for each substructure.
16. Verify pipe piles are undamaged and water or debris (e.g., soil) has been removed before allowing concreting to begin.

17. Measure pile penetration from the bottom of footing (or seal concrete) elevation for pile caps or bottom of river or lake bed elevation for trestle bents.

18. Completely and legibly fill out the Test Pile Record (ITD-0970), Individual Pile Driving Record (ITD-0971), and Pile Driving Summary Report (ITD-0972), so pay quantities can be accurately documented. Note that the pile tip protector is not included in pile length to be paid.

19. Verify soil that may have swelled above the bottom of pile cap elevation has been removed before reinforcing bar placement begins.

20. Contact the Engineer immediately if obstructions are encountered that cannot be penetrated (or removed if close to the ground surface).

Pile Driving Hammer Data
For Wave Equation Analysis

ITD 0969 (Rev. 11-17)
itd.idaho.gov

Note: All fields marked with * must be completed. This data is essential to the analysis.

Key Number*	Project Number*	Project Name*
12345	A012(345)	US-40, Big River BR

Project Location*
US-40, MP 100, Blaine County

Hammer

Manufacturer*	Model*	Lead Width* – in
APE	D30-32	26

Type*	Rated Energy* – ft-lb
Open End Diesel (Single Acting)	74,419
Ram Weight – kip	**Maximum Stroke – ft**
6.615	11.25

Strike Plate

Weight* – kip	Thickness – in
0.675	6.0
Diameter or Dimensions – in*	
22.5	

Example:

Material 1
Material 2
Material 1
Material 2
Material 1

Hammer Cushion

Material Type 1*	Combined Thickness of Material Type 1 – in*
Nylon	4.0
Material Type 2*	**Combined Thickness of Material Type 2 – in***
Aluminum	1.5
Diameter or Dimensions – in*	
22.5	

Helmet – Including Adaptor

Weight – kip*
1.166

Pile Cushion (For Concrete Piles Only)

Material Type 1*	Total Material Type 1 Thickness – in*
N/A	
Material Type 2*	**Total Material Type 2 Thickness – in***
N/A	
Diameter or Dimensions – in*	

Data Submitted By	Company
Tom Dowd	Disraeli Construction, Inc.
Phone Number	**Date**
208-334-8436	11/29/17

Distribution: ■ Resident Engineer (Original) ■ Geotechnical Engineer

Figure 1

Test Pile Record

ITD 0970 (Rev. 12-16)
itd.idaho.gov

Key Number	Project Number	Project Location
12345	A012(345)	US-40, Big River BR

Hammer Make and Model	Rated Energy – ft-lb
APE D30-32	74,419

Pile Type	Pile Size	Pile Length – ft
H-pile	14x117	45

Tip Protector	Pile Number	Abutment/Pier Number
APF-77600.B	1	Abutment 1

Ground Line Elevation – ft	Required Pile Capacity – kip
4839.0	375

Pile Penetration Below Ground Surface ft	Vertical Hammer Stroke ft	Blow Per ft	Blow Per in	Pile Capacity kip
1	N/A	N/A		
2	N/A	N/A		
3	N/A	N/A		
4	4.2	4		
5	4.5	3		
6	4.4	2		
7	5.1	4		
8	5.0	4		
9	5.3	7		
10	5.2	6		
11	5.1	5		
12	5.2	5		
13	5.7	9		
14	5.9	10		
15	6.0	11		
16	5.6	15		
17	5.6	15		

Pile Penetration – ft

Pile Capacity – kip

Remarks
Page 1 of 2. Pile #1 of Stage 1 as shown in the plans. Started at 12:30 and finished at 1:20.
Pile sank from weight of pile hammer and leads for first three feet of penetration.

Date	Inspector
12-05-2016	J. Ingram

Distribution: ☐ Resident Engineer (Original) ☐ Geotechnical Engineer

Figure 2

Individual Pile Driving Record

ITD 0971 (Rev. 12-16)
itd.idaho.gov

Key Number	Project Number	Project Location	
12345	A012(345)	US-40, BIG RIVER BR	

Abutment/Pier Number	Pile Number	Tip Protector	
Abutment 1	2	APF-77600.B	

Pile Type	Pile Size	Pile Length – ft	Cut Off – ft
H-pile	14x117	30	2.5

Pile Cut Off Elevation – ft	Ground Surface Elevation – ft	Pile Tip Elevation – ft	Design Load – kip
4841.0	4839.0	4813.5	375

Hammer Type	Manufacturer	Model	Rated Energy – ft-lb
Open End Diesel	APE	D30-32	74,419

Pile Penetration Below Ground Surface (ft)	Hammer Stroke (ft)	Blows Per ■ ft or ☐ in	Actual Pile Capacity (kip)*	Pile Penetration Below Ground Surface (ft)	Hammer Stroke (ft)	Blows Per ☐ ft or ☐ in	Actual Pile Capacity (kip)*
1	N/A	N/A	N/A	15	5.5	16	190
2	N/A	N/A	N/A	16	5.8	16	210
3	N/A	N/A	N/A	17	5.9	17	200
4	N/A	N/A	N/A	18	5.8	15	205
5	4.5	4	N/A	19	5.6	11	160
6	4.3	5	N/A	20	5.9	14	190
7	4.8	2	N/A	21	5.5	11	150
8	4.9	6	N/A	22	5.8	14	200
9	5.0	3	N/A	23	5.6	13	170
10	4.8	5	N/A	24	6.2	16	200
11	5.0	4	N/A	25	6.4	16	230
12	5.1	6	N/A	25' 6"	8.6	17/inch	830
13	5.2	11	150				
14	5.2	14	160				

*Determined from pile driving criteria during driving.

Remarks

Weather: 22 degrees F, light snow showers.

Pile sank from weight of pile hammer and leads for first four feet of penetration.

Started driving at 10:00 AM. Finished driving at 10:10 AM.

Date	Inspector
12/07/2016	J. Ingram

Distribution: ☐ Resident Engineer (Original) ☐ Geotechnical Engineer ☐ Bridge

Figure 3

Pile Driving Summary Report
Pile Length And Capacity

ITD 0972 (Rev. 12-16)
itd.idaho.gov

Key Number	Project Number	Project Location
12345	A012(345)	US-40, Big River Bridge

Pile Type	Pile Size	Tip Protector
H-pile	14x117	APF-77600.B

Hammer Type	Manufacturer	Model	Rated Energy – ft-lb
Open End Diesel	APE	D30-32	74,419

■ Abutment or ☐ Pier No.	Pile Number	Date Driven	Pile Length Driven ft	Cut Off Length ft	Net Pay Length ft	Vertical Hammer Stroke ft	Blow Per ☐ ft or ■ inch	Actual Pile Capacity kip	Pile Design Load kip
1	1	12/07/16	30	3.0	27.0	8.6	8	670	375
1	2	12/07/16	30	2.5	27.5	8.2	19	800	375
1	3	12/07/16	30	1.5	28.5	8.4	20	850	375
1	4	12/07/16	30	1	29.0	8.0	22	830	375
1	5	12/07/16	30	1	29.0	8.1	19	810	375
1	6	12/07/16	30	1	29.0	7.8	19	780	375
1	7	12/07/16	30	1	29.0	10.5	38/ft	550	375
1	8	12/07/16	30	1	29.0	9.3	39/ft	500	375
1	9 (T)	12/05/16	45	16	29.0	8.7	54/ft	530	375

Remarks
Pile No. 9 is the test pile.
Abutment 1 is the south abutment.

Date	Inspector
12/07/2016	J. Ingram

Distribution: ☐ Resident Engineer (Original) ☐ Geotechnical Engineer ☐ Bridge

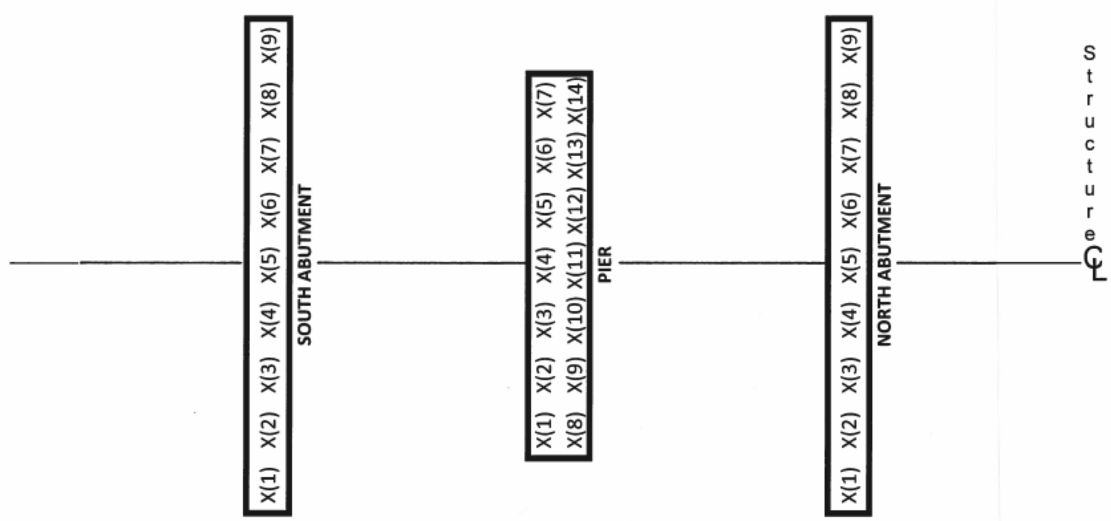
Figure 4

Pile Driving Summary Report
Pile Layout

ITD 0973 (Rev. 12-16)
itd.idaho.gov

Key Number	Project Number	
12345	A012(345)	
Project Location		
US-40, Big River Bridge		
Pile Type	Pile Size	Tip Protector
H-pile	14x117	APF-77600.B
Hammer Type	Manufacturer	Model
Open End Diesel	APE	D30-32
Ram Weight – kip	Maximum Stroke – ft.	Rated Energy – ft·lb
6.615	11.25	74,419

Pile Layout



Remarks
X: Pile Location
(1): Pile Number

Date	Inspector
12/07/2016	J. Ingram

Distribution: ☐ Resident Engineer (Original) ☐ Geotechnical Engineer ☐ Bridge

Figure 5

ITD 0500 (Rev.10-07)

Department Memorandum

Idaho Transportation Department

DATE: DECEMBER 6, 2016 **Program Number(s)** A012(345)

TO: GEOFF EMERICK, P.E.
RESIDENT ENGR.
Key Number(s) 12345

FROM: JOHN INGRAM, P.E.,
CONSTRUCTION/MATERIALS
Program ID, County, Etc. US-40, BIG RIVER BR, BLAINE CO

RE: ABUTMENT PRODUCTION PILE DRIVING CRITERIA

Following are abutment production pile driving criteria for the US-40 Concrete Girder Bridge over the Big River per your request.

The criteria were developed using the Wave Equation analysis method as confirmed by a CAPWAP analysis, and assuming that an APE D30-32 open end, diesel hammer will be used to drive steel HP 14x117 Piles through medium dense to dense, gravel with cobbles into low strength, sedimentary rock. All piles are designed for a minimum bearing capacity of 375 kips.

The following blow count criteria are for a minimum bearing capacity of 375 kips per pile.

HAMMER STROKE, (FT)	BLOW/FOOT
6.6-7.0	28
7.1-7.5	23
7.6-8.0	20
8.1-8.5	18
8.6-9.0	16
9.1-9.5	15

Attached is the graph showing the Abutment production pile Wave Equation analysis results.

The Abutment 1 test pile achieved the minimum bearing capacity at an actual penetration of about 26 feet. Therefore, abutment production piles are estimated to have a pile length of 30 feet.

Please call me at 334-8436 (or Tri at 334-8448 or 297-8379) if you have any questions.

cc: Bridge Design-George Martin
Dist. 4 Matls.
Geotech Engr.

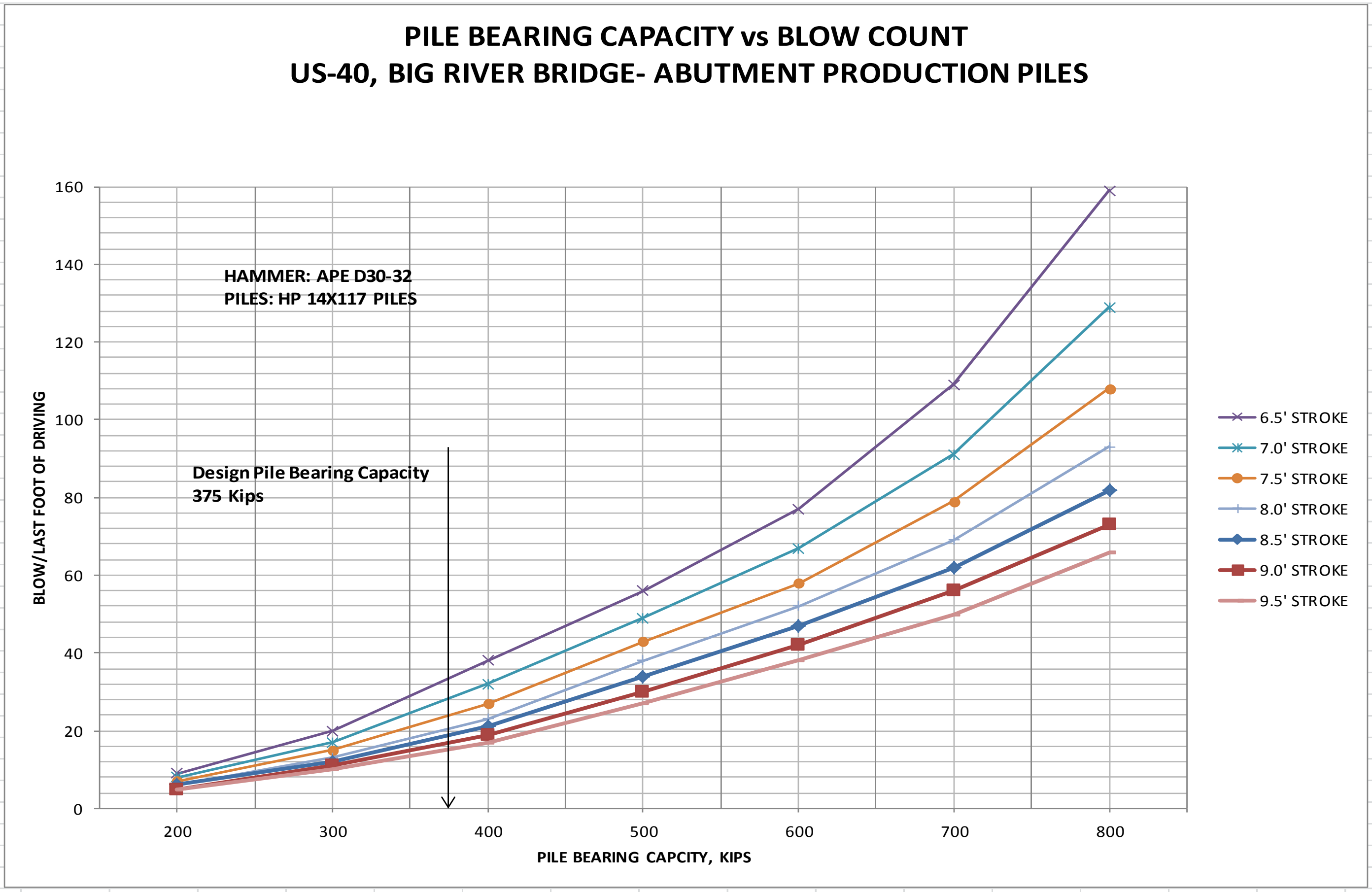

PILE BEARING CAPACITY vs BLOW COUNT
US-40, BIG RIVER BRIDGE- ABUTMENT PRODUCTION PILES
HAMMER: APE D30-32
PILES: HP 14X117 PILES
Design Pile Bearing Capacity
375 Kips
BLOW/LAST FOOT OF DRIVING
PILE BEARING CAPCITY, KIPS
0
20
40
60
80
100
120
140
160
200
300
400
500
600
700
800
6.5' STROKE
7.0' STROKE
7.5' STROKE
8.0' STROKE
8.5' STROKE
9.0' STROKE
9.5' STROKE

Figure 6

SECTION 500 – STRUCTURES

506.00 Pre-stressing Concrete.

General. Pre-stressing is specialized work that is done by crews trained and experience in this operation. The responsibility for pre-stressing lies with the Contractor, however the Engineer and the inspector should be familiar with the operation. Normally an experienced representative of the Central Materials Lab or an approved consultant will perform the actual pre-stressing inspection. It is important that these individuals are given ample notice so that arrangements can be made for the inspection.

The Contractor will submit and the Bridge Section will approve any subcontractors involved and the working plans which will show the type of pre-stressing, the bed layouts, calculations for elongation, friction losses, sequences for stressing and de-tensioning, etc. The most current version of the *Pre-cast/Prestressed Concrete Institute's Manual for Quality Control for Plants and Production of Structural Pre-cast Concrete Products* is incorporated into the ITD Standard Specifications, and will be adhered to on tolerances for the fabrication of pre-cast and pre-stressed concrete items. Each district must have a minimum of one copy of this publication on hand.

Pre-stressing Methods. Pre-stressing may be accomplished by pre-tensioning, post-tensioning, or a combination of both methods.

A. Pre-tensioning: The stressing tendons are tensioned before the concrete is placed. After the concrete has developed a specified strength, the anchorages for the tendons are released and the forces in the tendons are transferred to the concrete.
B. There are two systems of pre-tensioning the tendons. One system is the tensioning of each strand individually. This is referred to as single strand tensioning. The other system consists of pulling two or more strands simultaneously. This is referred to as multiple strand tensioning.
C. Post-Tensioning: The stressing tendons are installed in voids or ducts within the concrete, and are stressed and anchored after the concrete has developed a specified strength. As a final operation, the voids or ducts are pressure grouted. This method requires more attention to the details of the construction from the Engineer and his or her inspectors.
D. Combination Method: Some of the stressing tendons are pre-tensioned and some are post-tensioned. In this method, requirements for pre-tensioning and post-tensioning apply to the respective stressing elements used.

See CA Sections 502 and 503 for inspection of the concrete and metal reinforcement respectively.

Special attention should be given the location of the reinforcing bars extending out of pre-cast members. Bars which are to be used as connecting bars between pre-cast and poured-in-place construction should be extended from the pre-cast member the distance and at the exact location shown on the plans. Mortar coatings adhering to bars protruding beyond the surface of pre-cast members must be removed. Bending of these bars to facilitate moving or handling must be kept to an absolute minimum.

In the event that stressing is not done in a continuous operation, members should not be handled before they are sufficiently stressed to sustain all forces and bending moments due to handling.

When handling beams, it is imperative that they be maintained in a plumb, upright position at all times, setting on blocks and picked up and supported only near the ends using the devices installed for this purpose. Disregard of handling requirements may induce stresses that lead to damage or collapse of the member. Carefully document all improper handling, storage or potential damage with photos or video.

It can be difficult to establish fixed criteria regarding the acceptability of pre-stressed concrete members with respect to appearance. However, to ensure a reasonable appearance only clean, steel forms in good condition should be used. Pre-stressing steel is susceptible to corrosion and needs to be stored and protected from the weather and any corrosive agents. Likewise it must be free of silt, clay, grease, paint or any other deleterious material. All members should be fabricated in a workmanlike manner without cracks or other defects and true to the dimensions shown on the plans. However, it is recognized that certain cracks and surface defects may not be detrimental from the standpoint of structural integrity and may be harmless if remedied by the proper repairs. Small voids or honeycombs on the sides of beams can be repaired with grout having the same proportion of sand and cement as the concrete. These repairs must be made and cured prior to releasing the stress. The same is true for voids and honeycomb on the bottom of the beams except when these are located at or near the bearings. Voids here are grounds for rejection. The Bridge Section must be consulted when cracks or other defects are found, both as to the method of repairing the defect and the final acceptability of the member. The Construction/Materials Section should be advised of all problems and developments as well. All repair procedures must be approved by the Bridge Section before and after implementation.

If the concrete has been steam cured, it will be whiter in appearance than concrete made with the same materials which is not steam cured. Substitution of from one-third to one-half of the cement with white Portland cement in mixes made for patching and hand rubbing is common practice.

Each member should be marked in accordance with the erection drawing for identification.

Pre-cast, pre-stressed beams start creeping up immediately after pre-stressing strands are released. This creates the "upward bow" or camber in the member. The design camber at mid span should be checked against the actual camber measured in the field after beam erection to note if it is within specification tolerances.

Beams or girders shall not be placed on the finished piers or abutments until the concrete in these members reaches the time and strength requirements as indicated in Table 502.03-5 in Subsection 502.03.E of the ITD Standard Specifications. If grout pads are required they shall be constructed and cured as required by the plans and specifications before loading. If elastomeric bearing pads are used, the lower contact surface of the pads must be bonded to the structure with approved rubber cement to hold them in the position shown in the plans.

Each District should consult the Bridge Section for the most current guidance and literature on pre-stressing and key personnel should review it prior to stressing operations. Perhaps "just-in-time training" can be arranged as well. It should be noted that some of this information may be just guidance and not specification requirements.

Pre-stressing Guidelines. It is recommended that the following procedures be used before and during all pre-stressing operations:

A. No tendons should be stressed until elongation calculations have been adjusted for the materials being used.
B. In order to accomplish this, the correct value of the modulus of elasticity must be obtained for the strands being used.
C. On any pre-stress operation, an electrohydraulic type load cell and qualified operator should be on the job to monitor enough tendons to assure the provided calibration curve is not in error.
D. All jacks used for pre-stressing purposes shall be calibrated within 6 months of their use.
E. All equipment necessary to check the minimum efflux time of the grout should be on the job site in advance of the post-tensioning operation.

Safety. Pre-stressing operations can be dangerous and a safety meeting is advised prior to beginning these activities. Special safety precautions are required when working around pre-stressed stringers because of their size and the stress contained in them and the auxiliary equipment. Some of these are:

- No person should be directly behind either end of a tendon when stress is being applied.
- Do not stand, reach or walk under stringers which are being supported by a crane.
- Stand clear when stringers are being raised, as they may swing when coming off the ground.

Documentation for Pay Quantity. See CA Section 502.

Reports. See CA Section 502.

SECTION 500 – STRUCTURES

507.00 Bearing Pads and Plates.

General. Bearing units transfer the loads uniformly from the superstructure to the substructure, allow for movement of the superstructure due to thermal expansion or contraction, and allow for deflections due to live loads on the structure.

The bearing units are generally one of the following two types:

- TFE Bearings: A top plate made of steel with Teflon sliding on polished stainless steel. (An elastomeric pad is attached underneath the top plate.)
- Elastomeric Bearings: Solid or laminated neoprene pads.

The type of bearing specified for any individual structure depends upon the load and movement that is expected to occur. Elastomeric bearing pads are required to conform to Subsection 711.02 of the Standard Specifications, Teflon and the stainless steel mating surface shall conform to the latest AASHTO Specifications for Highway Bridges.

The importance of providing proper bearings cannot be overemphasized. Unless bearing surfaces are produced that will come in contact completely with the bearing supports, the structure may develop serious structural weaknesses. The centerline of the bearing must be laid out by precise methods and the elevation checked to ensure it is correct. Bearing surfaces are to be free of debris and organics.

The bearing area for a member bearing on elastomeric bearing pads must be finished to a true plane. This bearing area must be constructed so as to give uniform bearing on the entire area. These bearing areas must be formed with unyielding supports when the members are cast. Concrete beams that have voids or honeycomb on the bottom bearing areas need to be rejected.

A manufacturer's certificate is required and should be on file with the Department prior to installation. Ensure the certification is for the material received. A visual inspection of the pads should also be made by the Inspector prior to installation.

Steel plates must meet the requirements of CA Section 504 Structural Metals. The shop drawings will be approved by the Engineer prior to fabrication of the units.

Documentation for Pay Quantity. Use the diary to verify the activity, date, location of the work, and all dimensional checks. The cost is usually included in other pay items unless otherwise specified.

Reports. None.

SECTION 500 – STRUCTURES

508.00 Corrugated Plate Pipe.

General. Structural metal plate pipe includes steel and aluminum pipes and pipe arches that are assembled in the field. The plans and specifications designate the number and thickness of the plates in each installation.

Sufficiently in advance of the start of the Contractors' operation the Resident Engineer and inspectors should review the contract plans and each site to note any potential problems including drainage.

Typically the specifications do not require the Contractor to submit shop drawings for approval. If deemed necessary the requirement should be added to the specification prior to bid, otherwise a change order will have to be executed. If required, have the Contractor submit shop drawings and a detailed fabrication and erection plan for each pipe that shows the position of each plate and the order of assembly prior to fabrication of the structural steel plate sections. The Resident Engineer should review these and forward them to the designer for approval.

Upon delivery note the condition of the pipe plates. Require the repair of any minor damage to the galvanizing or bituminous coatings. Plates with serious damage such as having buckled, bent, cracked or torn areas should be rejected. Double check to ensure the proper type, size and strength of the plates are being used and that they match the certifications provided.

Before assembling the structural plates ensure you have received the manufacturer's assembly instruction and check these to ensure they conform to the plans and specifications. Resolve any differences before proceeding.

Construction Requirements. During the construction the following areas should receive special attention:

- Bedding and shaping of the foundation should conform to the requirements for conduits. A foundation with uniform bearing capacity is essential. Special bedding or backfilling materials or procedures will be outlined in the special provisions.
- Ensure the sequence of plate placing and the longitudinal and circumferential lapping of the joints are occurring per the manufacturer's written recommendations.
- Generally the structure should be assembled with as few bolts as possible until all the plates are in place. After several rings have been assembled the remaining bolts can be inserted, always working from the center of the seam to the corner of the plate. Corner bolts should be inserted after all other bolts are in place and tightened. Again follow the manufacturer's written recommendations.
- After all the plates have been assembled and bolted the nuts are to be tightened progressively and uniformity starting at one end of the structure and moving toward the other. Uniformity of tightening is important as is staying within the approved torque range. The minimum and maximum allowable torque depends upon the type of the structural plate.

- High strength steel bolts are required by the specifications to be used in assembling the plates. Bolt heads are marked with three radial lines 120 degrees apart. See CA Section 504 for additional information. Bolt/nut sizes, types, manner of placement, torques and the tightening sequence must be in accordance with the manufacturer's written recommendations.
- Damage to the galvanizing or coating can occur during erection especially around bolt holes. Damage should be repaired with an approved paint/material as soon as it occurs. Generally, two coats are advised.
- Verify that the type of end treatment is per specification.
- Ensure any strutting is done according to approved plans and procedures.
- Ensure equally placed layers of backfill on each side of the structure are occurring to prevent warping and movement.
- Verify backfill material compaction under the haunches meets specifications.
- Ensure that the minimum cover conditions as shown on the plans are met for the proper distribution of the construction loads on the culvert.
- Prohibit the use of any cementitious product being placed in contact with an aluminum component and ensure clean-up of the area after the work.
- As in all construction operations, ensure that adequate work platforms and safety devices are present to prevent accidents.

Documentation for Pay Quantities. Complete field notes will be required for the computation of structural excavation and compacting backfill. The length should be measured in the field and the pay quantity entered on diary or pipe sheet, if being used. The diary shall be used to verify the activity date and location of the work. Corrugated plate pipe will be measured and reported to the nearest 1.0 ft.

Reports. None.

SECTION 500 – STRUCTURES

512.00 Gabion Structure.

General. Gabion structures are woven or welded wire mesh baskets filled with rocks that are normally used to structurally retain earth similar to retaining walls or to assist in sediment and erosion control. Their use requires both sound engineering design and proper construction for the application to be successful. They have been used in various forms since the beginning of recorded history.

There are five major steps of work involved in gabion structure construction:

- The foundation preparation.
- The assembly, or set-up, of the gabions.
- Placement of the gabions into the proposed location.
- Placing the rock fill in the gabions
- Closing the gabions, backfilling, and finishing.

On any given project all four of these operations could be occurring simultaneously. It is the responsibility of the inspector to insure that each is being performed properly. To accomplish this task the inspector must have some background in the recommended methods of handling the gabion material during each of these phases.

Construction Requirements.

Preconstruction Phase. Upon being assigned to a given project the inspector should study the plans and specifications thoroughly. If any questions arise during this study the inspector should contact the Engineer and have them addressed.

The project specifications should require the gabion manufacturer to certify that their gabions meet the project requirements in all respects, or call attention to any deviations there from. The inspector should contact the State Geotechnical Engineer to verify that the technical information supplied by the Contractor satisfies the specifications. Refer to the QA Manual Section 270.00 for acceptance requirements. If discrepancies exist, the inspector must be satisfied they are acceptable to the designer and the Resident Engineer. This will save a great deal of time later in the execution of the project.

The inspector must obtain from the Contractor a copy of the gabion manufacturers' printed recommendations for installation of the units and be satisfied they are acceptable to the designer and Resident Engineer. Contractor designs can be constructed only after review and approval by the Resident Engineer after consultation with the appropriate HQ Construction/Materials personnel.

Gabion Assembly. The inspector should ensure the gabions delivered to the project have not been damaged during shipment. Check for damage caused by improper handling by forklifts and for excessive abrasion caused by tie-down chains. If any doubt exists as to the effects of any damage noted, the inspector should notify the Contractor to contact the gabion manufacturer for recommendations on repair or replacement.

A color stripe on the side of the folded gabion is normally used to identify the size.

The gabion fill rock, geotextile and/or granular filter media must have the appropriate inspection, testing and/or certification to be certain they satisfy the project specifications. Each of these items, and the backfill, is critical to the satisfactory performance of the gabion structure.

When the gabions are received they must be unfolded and assembled per the manufacturer's written recommendations and as approved by the Resident Engineer. Generally when first unfolded any units with a finished length over 6 feet will have an extra shipping fold. The crease caused by this fold must be removed or the unit will not be full length. One of the easiest, and most successful, methods of removing this crease is to back-stretch it over a 2x4 timber and walk along the sides.

The next operation is to connect the back and front panels of the gabion to the ends and diaphragms. The base wire fabric has heavier wires (2 gauges heavier) woven into it at the break lines forming the front, bottom, back and lid. The short extended length (about 4 inches long) of the top selvedge wire of the ends and diaphragms should pass under, and loop twice around the heavier wire between the lid and back panels. The extended wires of the end panels should be wrapped around and to the outside so as to lock the ends and prevent them from leaning into the unit. The bottom corners of the ends may have to be re-formed slightly to permit the top wire to pass under the heavier wire.

Using approximately 5 ft. lengths of the lacing wire, cut from the coils provided with the gabions, lace the front and back panels to the diaphragms and end panels. A lacing pattern of "single loop – double loop – single loop", with the loops being spaced approximately 4 to 5 inches apart, will develop the same strength as the body of the space gabion mesh. The ends of the lacing wire should be looped three times around the connected seam to prevent unraveling. (**Note: only wire supplied by the gabion manufacture is to be used in gabion construction. Gabion wire has a special coating which is not available in the local hardware store or supply houses**). Use 6 or 8 inch pliers for lacing.

Again, the connection of the gabions must be per the manufacturer's written recommendations, and as approved by the Engineer. Depending on the type of structure and the physical conditions of the project the assembled units can be formed into larger modules by attaching several units together. If this form of construction is employed the inspector must make sure the corners and top and bottom edges of the units are properly aligned and laced to each other.

Mechanically Applied Fasteners. Mechanically applied fasteners (rings or clips) can be used to connect panels, diaphragms or adjacent cells in lieu of lacing wire. Only Class 3 coated galvanized clips or rings should be used with galvanized gabions. Only stainless steel rings or clips should be used with PVC coated gabions. Hog rings must have a minimum overlap of 1inch when closed.

The Resident Engineer will have to decide, after studying all of the facts, whether or not to approve this method of assembly and/or construction.

Erection of the Gabion Structure. This section applies to 3 ft., 1.5 ft., and 1 ft. high gabions used in the construction of retaining walls, weir walls, stepped revetments, and flared transition zones between retaining walls and sloped revetments.

When gabion units, or modules, are placed into the structure the inspector must be concerned with the alignment, grade, stretching, and attachment of the individual units to each other. The alignment and grade are established by the field engineer or surveyor, but should be checked. The stretching and attachment of the gabions to each other are of primary interest to the inspector.

When several units, up to 100 ft., are in place and aligned, they should be stretched to tighten the wire fabric. This operation makes it much easier to control bulging during the filling operation. An anchor for the stretching operation can best be obtained by completely filling the end cell of the end unit. This may be accomplished either by machine or by hand filling. The inner tie wires (or stiffeners) shall be properly installed in both directions in this anchor cell (tie wires will be discussed later). The pulling force is then applied to the opposite end of the string. The attachment method for applying the pulling force should be such that the force is applied to at least 4 places on the heavy vertical selvedge wires forming the corners. The force should **NOT** be applied to the fabric of the end panel. While the stretching force is applied, the next to the last cell of the string is filled in the same manner as before. This will leave the last cell empty to provide for easier attachment of additional units. Subsequent gabions or gabion modules will be placed in the same manner with only the next to the last cell being filled during the stretching operation.

There will be times, depending upon the type of structure or the physical limitations of the project site, when it will be impossible to stretch the units. This will not affect the structural integrity of the structure. However, additional care will be needed during the filling operation to maintain alignment and prevent bulging.

Typical situations in which this can occur include:

- Counter fortes behind retaining walls
- The main wall of weirs or drop structures
- Curved or serpentine walls.

Gabion counter fortes and weir walls extend into narrow notches excavated into hill sides or stream banks which allow for very little working room. The shorter the radius of curvature of serpentine or curved walls, the more difficult it will be to apply a stretching force to a long string of gabions.

Seldom are the gabions stretched when used for thin splash/scour aprons or revetments. The desire in these structures is to have maximum flexibility to allow for structural adjustments which will compensate for scour and possible undercutting.

If gabions have to be placed on top of other gabions, they must be laced together on all perimeter edges. If the units are directly aligned on top of one another, this presents little problem since the workers can perform the work from the front and back of the structure. If, however, the top unit is off-set from the lower unit and extends out over the backfill, the worker will have to climb into the upper unit in order to lace the rear seam. This operation is most often overlooked by the labor crew, but it must be done.

The gabion units may be placed either as single units, modules of several units in a “string”, or as modules of several units arranged in a rectangular “block”. The method chosen by the Contractor will be a function of site conditions and the maximum reach of the type of equipment he plans to use to fill the units.

When the units are placed on top of a geotextile, care must be taken to insure the sharp edges of the bottoms of the diaphragms do not catch on the geotextile and pull it. This could open the overlap seam and expose the sub grade to the action of water. One method of preventing this from happening is to temporarily place thin plywood sheets on the geotextile and slide the gabion units into the correct position on the plywood. When the top edges of the units are properly aligned and “pig tailed” in position, the plywood is removed.

The geometric configuration of this type of structure may require some “cutting and fitting” to adjust for curvature of stream alignment, varying slope angles (and thus slope length) of stream banks, or angled wing walls of headwalls, etc. When a unit must be cut to fit an odd shape the cut must allow for a minimum 6 inches overlap to permit proper lacing. All cutting and fitting shall be by methods approved by the manufacturer and accounted for in the design.

Filling Gabions Cells. The rock used to fill gabions must be of sound rip-rap quality, preferably graded from 4 to 8 inches in size, and roughly cubical in shape. This will allow for the maximum amount of machine filling. There will be some minus 4-inch material present, due to breakage in transit, but this should be limited to a maximum of about 5%. No minus 4-inch material should be permitted on any exposed face of the structure since it can fall out, be washed out, or pulled out, thus creating a void in the structure. Soil (picked up from the bottom of the rock pile) shall not be permitted to remain in the structure as a seam or “block”. Some dirt or fine material is inevitable, but the amount must be minimal. Soil should be brushed or manipulated in a manner so as to provide for the required point to point contact of the large rock fill. Excessive amounts of sand/soil will wash out and create large voids in the gabion structure.

Rock should be placed in 1 ft. lifts in the gabion structure, moving from cell to adjacent cell. A row of 5 to 8-inch-size rock should be hand-placed against the exposed face(s) during the filling to present a pleasing appearance and minimize the size of exposed voids. The first fill layer is then leveled to permit the installation of the inner tie wires. When at all possible, the maximum difference of the rock level in adjacent cells should not exceed 1 ft. When 1.5-foot high gabions are used in a retaining wall or weir wall configuration they shall have the inner tie wires, placed only at mid-height. One foot high gabions, in the same situation, do not need the inner tie wires, but should be filled in half height lifts.

Inner tie wires or stiffeners are needed to help brace exposed, or temporarily unsupported, faces of the gabions. In a long retaining wall configuration they are placed transverse to the long axis of the wall. Only the end cells, or temporary end cells, will need inner tie wires in both directions. The inner cells of walls which have thick layers, say 9 or 12 inches (or more), do not need the inner tie wires if the adjacent cells are filled in 1 ft. lifts uniformly.

After the first 1 ft. lift of rock is laced and the inner tie wires installed, the second layer and inner ties and then the third layer are placed using the same sequence of operations. The last layer should be filled approximately 2 inches above the top of the gabion to allow for subsequent settling of the rock fill. The top should be roughly leveled (no large humps or voids), and the lid closed, and then attached to the tops of the cell diaphragms, ends, and fronts.

Backfilling behind the Gabion Structure. The inspector should be very familiar with the entire project specifications involving the type of backfill material and degree of compaction required.

Backfilling any gabion structure is performed in the same manner as in any other type of construction. Most care is needed to ensure the gabion mesh wires are not damaged or broken by contact with the compaction equipment.

Caution should be exercised when backfilling a single long “string” of gabions (as in a retaining wall). To achieve the normally specified degree of compaction, the compactive effort may be sufficient to push the gabions out of alignment. If the gabions are not embedded below grade, or laced to gabions which are embedded, alignment control may become a problem. One possible solution would be to place a temporary fill in front of the gabion string to help hold alignment. Sheets of plywood can be used to keep the temporary fill from infiltrating the voids of the front face of the gabions. When compaction is completed, the temporary fill may be removed. This method may cost a little in time and effort, but it is far cheaper, and much more satisfactory, then trying to push the filled gabion string back into alignment.

The degree of compaction of backfill around gabions placed in notches in stream banks (weirs), or around gabion counter fortes for retaining walls, is critical to satisfactory performance of the structure. If doubts arise the Resident Engineer and the design engineer should be contacted immediately.

Driving on Filled Gabions. There are times when the Contractor will request permission to drive equipment on top of gabions which have previously been filled. The answer to this question is not a simple “yes” or “no”. It depends on many factors, namely:

- Type of Structure
- Type of Equipment
- Type of Protection to be given the gabions
- Manufacturer’s Written Instructions
- Requirements and Specifications and the design engineer.

The last two factors above are the most important. The design engineer should be consulted before any answer is given. It is also wise to contact the gabion manufacturer for any recommendations as to the type of protection required.

Safety. During construction, and especially after completion, the entire structure must be inspected for protruding wire ends. All loose ends of the wire should, at all times, be turned back into the structure to prevent possible injury. This is especially important along the top edges of the units since workers are continually leaning over them thus exposing themselves to possible eye injury.

Documentation for Pay Quantities. The diary should be used to verify the activity date and acceptable completion of the work. Complete field notes will be required for the computation of structural excavation and compacting backfill. The dimensions of the gabions should be measured in the field and the pay item entered on the diary or the pay item report. Gabions will be measured and reported to the nearest 0.1 ft^3 of filled gabion complete in place.

Reports. Test reports as required per QA Manual, Section 270.

SECTION 600 – ANCILLARY CONSTRUCTION

Access Control Issues. During the course of a construction project, issues of access or access control may arise. Issues involving access control or encroachment on to the State Right-of-Way must be handled in accordance with Administrative Policy A-12-01, and the current version of the *Access Management: Standards and Procedures for Highway Right-of-Way Encroachments* manual maintained by the Department's Right-of-Way Section.

All changes to an approach or driveway with respect to width, location, or allowed use must be addressed on the ITD-0606 form prior to construction or documented during project closeout by having District Right-of-Way record the changes in the appropriate documents.

Questions should be directed to the District Traffic or Right-of-Way sections, or their headquarters counterparts. All changes that do not meet the requirements of *Administrative Policy A-12-01* must have the Chief Engineer’s approval. Additionally, FHWA must give approval for any changes involving the Interstate access. The Construction/Materials or Design/Traffic Sections can help facilitate this coordination.

All issues involving access control or encroachment on to a local right-of-way must be handled in accordance with the local entity’s (county, city or highway district) policy, and should be directed to the local entity for resolution.

If increases or decreases in costs are involved in the changes, a change order must be prepared. All changes must be noted on the "as constructed" plans and in the appropriate right-of-way documents.

Additions and Removals to Landowner Facilities. The addition or removal of pipes, fences, ditches, minor structures, or similar features shall be covered by a supplemental right-of-way agreement and, if necessary, a change order. If a fence, gate, or similar item is not installed, the material cannot be given to the landowner.

601.00 Conduits, General

Pipe Lists and Ordering. Since most contracts now involve contractor surveying, the Engineer should verify that the Contractor is preparing pipe lists in accordance with ITD Standard Specifications for Highway Construction (SSHC) Subsection 106.02. In the rare event that the surveying is performed by the Department (or Owner's representative), the Engineer should prepare and furnish to the Contractor the corrected list of pipe sizes and lengths at the earliest opportunity, thus avoiding a late delivery and delaying the progress of the work.

Ensure care is exercised in preparation of the pipe list. The list should be prepared from the field stake notes for installation and not from information taken from the plans, which are only an estimate. Installations, such as siphons, that require special fabrication at the plant for elbows and bends must have an accompanying line sketch showing the exact dimensions and angles needed. Copies of the pipe list should be retained by the Engineer.

The adjacent landowner should be contacted, if possible, to assure that the irrigation and drainage facilities planned will fit the landowner's operation after the construction of the project. The direction or method of irrigation may have changed since the design was completed. The right-of-way agreements must be checked to ensure that requirements coincide with the plans. Supplemental agreements may be necessary to effect changes that are advantageous to the owner and the Department.

Staking. At the time the pipe list is made up, pipes should be completely field staked. Staking may not always be done at this time; but if the Contractor's operations can accomplish the staking, it is advisable to do so. Many different methods are used to stake pipe. Generally, an offset line is used showing the alignment of the pipe and a grade reference from this line to the flow elevation of the pipe. Short pipe may only require end offset points for alignment with a grade reference.

Another method for staking pipe involves a set of field notes showing what was staked with space provided on the same notes for the installation inspector to record the re-measure dimensions for excavation and backfill. This consolidation of field data simplifies the computation of quantities for final payment. On projects where an exceptionally large amount of pipe is to be used, the Contractor or the Engineer may create a field form that would include all original field data and subsequent inspection data.

Inspection. Pipe should be inspected in the field, and rejection due to damage or manufacturer's defect is the responsibility of the field inspector. Remember that as pipe is delivered to the project, it will be handled many times and may become damaged. Thoroughly inspect each length of pipe, making sure that it is the type called for on the plans and that no defects exist. Special attention should be given to bituminous-coated pipe for uniformity in coating and scuffmarks. Concrete pipe should be checked for roundness and cracking from transit. Rubber gaskets used with concrete pipe must be examined to ensure that the gaskets are of the proper size and quality.

Pipe will be certified as outlined in the Quality Assurance Manual. Do not overlook the inspection of the gasket and gasket lubricant for conformance to specifications.

Check all pipeline installations for alignment and grade. Each joint shall be checked for proper fit, the presence of a gasket, proper alignment, and that it forms a good seal.

All trenches are susceptible to dangerous cave-ins. Be aware of Occupational Safety and Health Administration (OSHA) requirements and avoid unsafe practices. Various methods of shoring can be employed. On deep trenches, a movable metal box may be pulled along through the trench with the complete operation of placement being carried out (i.e. fine grading, pipe placement, backfilling, and tamping). If a deep trench has sheeting, the sheeting should be withdrawn gradually as the backfill is placed and contact with the trench walls is gradually established.

The Contractor is solely responsible for trench safety.

Backfill should be placed on both sides of the pipe in even lifts so as to avoid pushing the pipe out of alignment. Large size granular backfill should be placed so that the fill does not drop directly on the pipe and cause impact damage. Special protection should also be given to trenches in urban sections that are left open for any period of time. Proper signing, delineation, and barricades must be erected to make the public aware of the potential danger.

Every cable, pipe, tube, or any significant object that the trench intercepts shall be recorded with the following information: description (e.g., type/function, size,), stationing, depth (i.e., from a reference datum), and what the Contractor did to protect or support the object. If the service of a disturbed line is stopped due to trench excavation, the Contractor should immediately undertake the necessary action to restore service. Applicable information should be added to the as-constructed plans.

Some projects call for the same size of metal pipes at different locations with different thickness (gauges). Generally heavier thickness is because of higher fills, but the needs for a heavier thickness might also be due to soil pH or the pH of the water being transported. Be sure to get the right pipe in the right location, and check with the Resident Engineer before changing a pipe thickness.

Documentation for Pay Quantity. On projects containing a large number of conduits, the Department office staff should maintain a check sheet for all conduits on the project. The location and size can be entered with a subsequent entry showing the final quantities. The procedure simplifies the total inventory of conduit and will preclude any duplication of payment.

All conduit stake notes and computations should be kept in a logical sequence for ready reference and verification. A little time spent setting up good conduit records greatly contributes to the accuracy and ease of work later.

Complete field notes and survey records of the original ground and final re-measure are essential for computing the actual quantities of structure excavation and compacting backfill. Good coordination must exist between the survey crew and the installation inspector.

Estimated quantities may be used for backfill and excavation prior to the final measurement and computation for quantities. These entries, in both the diary and ledgers, should be shown as estimated quantities.

The diary will also be used to verify the activity, date, and work location.

Reports. Report compaction of backfill on the ITD-0850 form, Nuclear Density and Compaction Report for Soil and Aggregate.

602.00 Culverts.

General. The specifications for installation of pipe are intended to provide a lasting and well-designed conduit. The designer cannot foresee special problems that may result after a trench is excavated. Foundations should be carefully examined and unsuitable foundation material removed. Unsuitable materials include but are not limited to: construction debris, organics or other soft soils, oversized rocks, and frozen material. Removal is shown on the standard drawing.

During the backfilling operation, the inspector must verify the required density of the backfill by compaction tests as required by the minimum testing requirements. Tests may only be omitted when some other special means of compacting backfill is approved and used. Adequate hand tamping of the backfill material under the sides of the pipe is very important. Pipe may be damaged, after the project has been completed, by settlement of the backfill.

Uniformity of the bedding grade is usually checked with a reference string line pulled parallel to the bed prior to pipe placement. Careful inspection of the bed shall insure that no large rocks are embedded in the graded surface. Rocks just below or at the surface of the bed may act as point bearing and damage the pipe causing subsequent leaking or failure.

As soon as the inspector has approved the pipe bedding, the structure excavation and compacting backfill measurements should be taken. Re-measurement should be completed prior to placement of the foundation material.

The additional weight of hoisting equipment next to an open trench may create a safety hazard and shoring may be required. Whenever an unsafe condition is discovered, advise the Contractor and stop all applicable work until the situation is remedied. Sandy, supersaturated soils are particularly susceptible to sudden cave-ins.

Placing Corrugated Metal Pipe. The inspector shall make certain that the rivets or bolts on the joint band angle iron are not pulled through the band due to excessive tightening. Each band must be tight and the pipe ends butted together for a corrugated metal pipe to function properly. Be sure, in the case of metal culverts, that a pipe of the proper thickness (gauge) is being installed. A common practice is to install pipe prior to earthwork operations and then allow vehicles to travel over the pipe. A pipe placed in this manner is susceptible to crushing due to heavy loads. The inspector should check all pipes to ensure that they are in their original undamaged condition at the completion of earthwork operations.

Bituminous-coated corrugated metal pipe will often be scuffed during handling. After the coated pipe has been placed, the scuffed areas shall be coated with hot penetration grade asphalt. Additional applications may be necessary to achieve the required coating thickness. The bituminous coating on pipe bands must also be inspected to ensure full coverage.

Placing Concrete Pipe. After fine grading, the pip bed must have depressions dug out for the pipe bells. The pipe must lie on the bedding along its length with the exception of the depressions for the bells. The pipe must **not** be supported at the bell. The inspector must make sure that the bell is clear of the ground after the connection is made to the next length of pipe.

Reinforced concrete pipes of larger dimensions are stress-oriented using elliptical or double-line circumferential steel for reinforcement. According to the placement of this steel, the pipe is marked for the top and bottom alignment. These marks must lie in a vertical plane.

Occasionally, while placing reinforced concrete pipe of 24 inches diameter or less, a bell will be somewhat tight for the spigot. The Contractor, in forcing the joint together, may cause hairline cracks in the bell that are parallel to the length of the pipe. The Contractor should advise the materials supplier of the condition, and the pipe may be subject to rejection. This condition may be detrimental to pipes that are under pressure, such as siphons or irrigation lines.

Rubber gaskets require care in fitting. The gasket must be fitted properly in order to obtain tight joints. To ensure good fitting joints, keep gaskets and joints clean. A very small amount of soil will greatly inhibit proper installation. Lubricants (e.g., flax soap, bentonite, vegetable soaps) as recommended or supplied by the pipe manufacture, are used on the joints. Petroleum products are **not** permissible for joint lubricants.

Documentation for Pay Quantity. On projects containing a large number of pipes, the Engineer should maintain a check sheet for all pipes on the project. The location and size can be entered with a subsequent entry showing the final quantities. The procedure simplifies the total inventory of pipe and will preclude any duplication of payment.

All pipe stake notes and computations should be kept in a logical sequence for ready reference and verification. A little time spent setting up good pipe records greatly contributes to the accuracy and ease of work later.

The length of the culvert shall be confirmed by measurements and noted in the diary or pipe notes. Payment shall not be made for lengths greater than approved by the Engineer. Quantities must be measured and reported to the nearest foot. Compacting backfill and structure excavation is paid on the basis of quantities calculated from cross-sections and in accordance with CA Section 210.

When the culvert ends in a headwall or minor structure, the back of the headwall will be the outer limit for payment of structure excavation and compacting backfill. Excavation for pipe outside of the roadway prism will be paid for as structure excavation the same as within the roadway prism, unless otherwise specified.

Complete field notes and survey records of the original ground and final re-measure are essential for computing the actual quantities of structure excavation and compacting backfill. Good coordination must exist between the field survey crew and the installation inspector.

Estimated quantities may be used for backfill and excavation prior to the final measurement and computation for quantities. These entries, in both the diary and ledgers, should be shown as estimated quantities.

The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry.

Reports. Report compaction of backfill on the ITD-0850 form, Nuclear Density and Compaction Report for Soil and Aggregate.

603.00 Pipe Siphons.

Placing Pipe Siphons. The information in Section 602, Culverts, applies to siphons as well. Siphons are usually trenched into steep back slopes. After initial hand tamping along the pipe and bed contact zone, compacting backfill may be performed on horizontal lifts if the slope is too great for parallel-to-bed lifts.

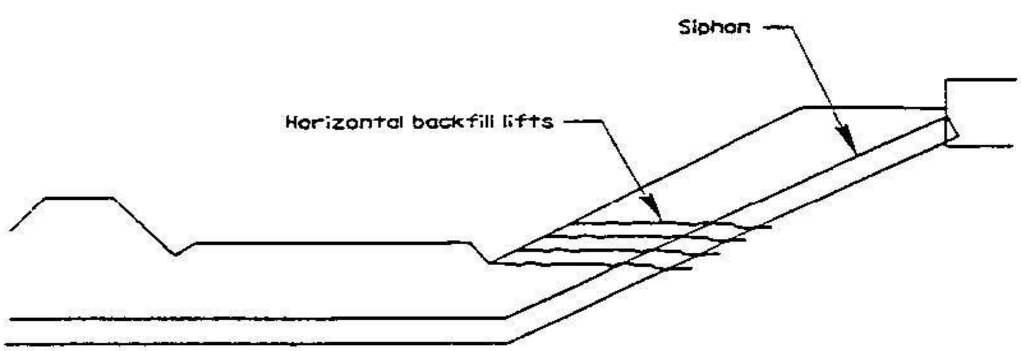
The importance of sealing the inlet and outlet cannot be overemphasized. Water escaping at these locations invariably follows the outside of the pipe down into the roadway. This condition not only causes washing around the pipe, but also may lead to excessive moisture in the roadbed at that location. The condition may compound itself by frost heaves or softening of the travel way and cause failure. Compaction at these locations is especially critical. The entire length of the siphon right and left of the roadway prism shall be backfilled with specified material. Siphon headwall wings and aprons require special care; the length of the wings and depth of the apron should be extended, if needed, to prevent washing out. Dense soil should be compacted around the headwall to provide additional sealing against water penetration.

Be sure, in the case of metal siphons, that the proper thickness (gauge) of pipe is installed.

Testing Siphons. The entire length of the siphon should be left exposed until the siphon has been tested. After filling the siphon with water, the inspector must examine the pipe for leaks. Some seepage through the pipe walls will occur on concrete pipe but will usually cease after soaking awhile. Pouring a reinforced concrete collar may repair joint leakage.

Documentation for Pay Quantity. Documentation for Siphons is similar to Culverts. See CA Section 602.

Reports. Report compaction of backfill on the ITD-0850 form, Nuclear Density and Compaction Report for Soil and Aggregate.



Backfill of Siphon Section in Back Slope

604.00 Irrigation Pipelines.

Placing Conditions. Placement of irrigation pipe must conform to the placement requirements for culverts per CA Section 602. Compaction of the backfill material placed within the roadway prism (i.e., between cut or fill catch points) shall be as specified for culverts. Backfill outside the roadway must be compacted by puddling, tamping, or rolling in a competent manner even though no percent of compaction is specified.

Puddling is the orienting of soil particles into a dense position by the use of water. Use of this method is particularly advantageous around minor structures since the puddling action will occur when the facility is placed in operation. Be sure, in the case of metal pipelines, that the proper thickness (gauge) is installed per CA Section 601.

Testing Line. Corrugated metal pipe irrigation lines generally have greater leakage than concrete pipelines, so before the pipeline is accepted, the pipe must be tested for leaks. Leaks must be located and repaired in a satisfactory manner before approval. The inspector must personally supervise the test and maintain a close check on the progress of the test.

Concrete pipe will absorb water and many small cracks will close up. Special care should be exercised in the protection and care of irrigation pipelines during construction. Concrete lines are especially susceptible to crushing or breakage due to the lack of metal reinforcement in them. The Contractor must be advised to keep heavy equipment away from irrigation pipelines after installation. Risers or outlets should be clearly marked to avoid damage.

Documentation for Pay Quantities. Documentation for irrigation pipe lines is similar to Culverts per CA Section 602.

Reports. Report compaction of backfill on the ITD-0850 form, Nuclear Density and Compaction Report for Soil and Aggregate.

605.00 Sewers, Manhole and Valve Covers.

General. Placement of sewer lines, manholes, catch basins, and inlets must conform to the placement of culverts and siphons. Excavation and backfill must be as discussed in CA Section 602, Culverts. During the placement of a sewer line, severe ground water conditions are often encountered. Many times, little or no space is available to perform dewatering operations. Whenever possible, the pipe should be installed when the ground water level is at its lowest elevation. Sewer line placement under adverse conditions requires extra care to ensure proper gasket installation.

Manhole connections may be made by laying the pipe continuously through the manhole location. The manhole base is then placed. After the base is cured, the pipe is broken out to provide access to the line. All broken masonry must be removed and irregular edges grouted. It is also permissible to form an invert in the manhole base rather than laying pipe through the manhole if desired.

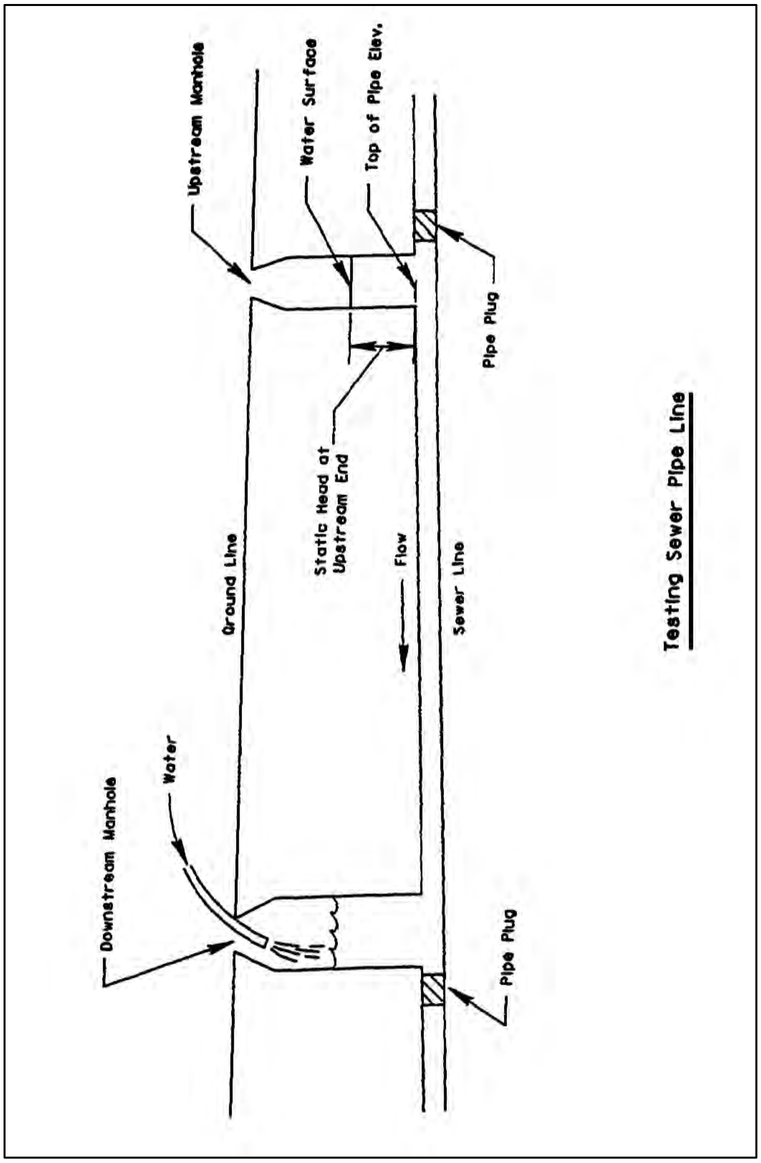
During placement operations, the inspector must spot-check the grade with a level. Good practice is to spot-check the grade points every 20-30 ft or once on pipes of 3-6 ft lengths. The inspector must check all of the grade stakes, verify the entire grade, and check the beginning and ending elevations at manholes, catch basins.

Placement of sewer lines in urban areas requires the utmost control for grade. Storm sewer lines are designed to take care of all surface drainage in the project. A change in grade on curb and gutter will almost invariably cause a similar change in grade on a catch basin or flow line of the sewer. The importance of completely checking all surface grades and line grades cannot be overemphasized.

When the project will not be completed in one season and the catch basins have been installed, but the pavement is not complete, provisions must be made for getting the drainage into the basins. Holes may be left in the wall at the necessary elevation. The holes should not be too low, as this will cause washing and plugging. The holes should be of 4-6 inches in size to avoid plugging.

Testing Sanitary Sewer Line. The sequence of operations in testing a sewer line (as presented in the following illustration) is as follows: using pipe plugs, a section between two manholes (including the manholes) is blocked off so that water may flow in the pipe between the two manholes but not enter the line before the first manhole or after the second manhole. The inspector must be present during filling of the test section to check that water can flow from one manhole to the next manhole. The head measurement is made in the upstream manhole. The measurements of the water depth in the manhole allow water volume loss to be determined from manhole dimensions. Both manholes' water levels will drop and the two volumes of water must be added together.

An alternate method for testing sanitary sewer lines has been added to the specification. This low-pressure air method must have special attention to assure that a good, firm plugging system is used. A 12-inch diameter plug will produce 450 pounds of force and increases by the square of the radius of pipe being used. Safety precautions must be taken due to the high safety risks that are involved with this method.



Documentation for Pay Quantities. Documentation for Sewer Lines is similar to Culverts per CA Section 602.

Manholes, catch basins, and inlets must be computed and reported to the nearest whole unit. Sewer pipe must be measured and reported to the nearest foot.

Reports. Report compaction of backfill on the ITD-0850 form, Nuclear Density and Compaction Report for Soil and Aggregate.

606.00 Pipe Underdrains and Urban and Rural Edge Drains.

General. General installation conditions are the same as for culverts. Perforated pipe is used for under drains and should be placed with the perforations down. The placement helps prevent infiltration of silt, gravel, or other solids that might clog the line and destroy the effectiveness of the system. Placing the perforations down also lowers the water table.

Special backfill should be used to provide a free draining material to carry the water from the aquifer to the pipe. Care must be taken to assure that this flow is not interrupted by the introduction of a stratum of impervious material, such as topsoil. Materials used for special backfill should be sound and not degrade under water conditions or compactive effort.

Backfill material should be graded to meet adjacent soil size and pipe perforations. Use of filter fabric is encouraged to prevent soil migration and pipe clogging. In the case of metal pipe, be sure the proper thickness (gauge) is installed.

Documentation for Pay Quantity. Documentation for Pipe Underdrains is similar to Culverts per CA Section 602.

Reports. Compaction of backfill and special backfill, when required, must be reported on ITD-0850 form, Nuclear Density and Compaction Report for Soil and Aggregate.

607.00 Embankment Protectors.

General. A problem is often encountered when compacting the material around spill pipes and embankment protectors. These installations are highly susceptible to washouts at the inlets. Pipe washouts are usually due to inadequate sealing around the inlet structures. A dense, fine material should be used for the bedding and backfill of the area around the inlet. The soil should be free of organic material and provide a seal against water penetration to reduce the possibility of a washout. The entire bedding and backfill material of a spill pipe or embankment protector should be a dense material whenever possible. A common error in constructing the area around the inlet is not providing adequate slope for the drainage to enter the pipe. In many cases, especially on relatively steep grades, the drainage runs past the inlet area. In the case of metal pipes, be sure the proper pipe thickness (gauge) is installed per CA Section 601.

Documentation for Pay Quantity. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry. If the project has a large number of these items, a summary sheet may be helpful. Embankment protectors must be computed and reported to the nearest whole unit. Discharge pipe shall be measured and reported to the nearest foot.

Reports. None.

608.00 Aprons for Pipe.

Inspection. Aprons should be inspected in the field and rejection due to damage or manufacturer's defect is the responsibility of the field inspector. The inspector must keep in mind that as material is delivered to the project, it will be handled many times and may become damaged. Thoroughly inspect each apron, making sure that it is the type called for on the plans and that no defects exist. Concrete aprons should be checked for roundness and cracking from transit. Rubber gaskets used with concrete must be examined to ensure that the gaskets are of the proper size and quality.

Do not overlook the inspection of the caulking, gasket, and gasket lubricant, if applicable, for conformance to specifications.

Care must be taken during installation that the placement of the apron lines up correctly with the direction of the flow to ensure that the flow will not bypass or undermine the apron. This is especially critical on skewed installations. Riprap should be applied if necessary to prevent erosion around and under the inlets/outlets.

It is also critical that the mounting base and backfill material be at the proper elevation and compacted properly.

Documentation for Pay Quantity. On projects containing a large number of aprons, the Engineer should maintain a check sheet for all aprons on the project. The location and size can be entered with a subsequent entry showing the final quantities. The procedure simplifies the total inventory of aprons and will preclude any duplication of payment.

When the culvert ends in an apron, headwall, or minor structure, the back of the headwall will be the outer limit for payment of structure excavation and compacting backfill on the culvert. Structure excavation and compacting backfill work related to the apron installation is considered incidental.

Aprons will be paid for by the each unless otherwise indicated.

The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry. Reports. None.

609.00 Minor Structures.

General. The same quality of workmanship is required for minor structures as any other structure. The cost of minor structures is extremely high as compared to other work on structures.

The adjacent landowner should be contacted, if possible, to assure that the planned minor structures will fit the need and operation of the landowner after the construction of the project. The direction or method of irrigation may change after the initial design.

Right-of-way agreements must be checked to assure their requirements coincide with the plans. Supplemental agreements may be necessary to effect changes that can be advantageous to the owner and the Department.

Staking. This work is usually performed by the contract surveyor. In the rare case that Department (or Owner's representative) personnel perform this work, use the following guidance. Minor structures will be constructed in conjunction with drainage facilities. Plans on minor structures should be checked for discrepancies. There are frequent omissions with respect to the number of ditches connecting a structure and errors in flow direction. The elevation of the flow line of the ditch with respect to the flow line of the pipe often varies from that presented in design. Elevations of the tops of minor structures require careful attention and may require a vertical extension of the structure walls. The top of an irrigation structure should be at least 4 inches higher than the ditch banks. Correct elevations are essential so that minor structures serve the intended purpose.

The surveyor should be familiar with the entire drainage system before the original staking of minor structures. A minor structure should not be staked as an isolated part of the system. Verify and match all elevations to obtain a continuous uniform flow from one right-of-way to another. Situations may change between the time the designer first conceived what should be constructed and the time of actual construction. The surveyor may be the only one able to discover needed changes.

Inspection. Follow concrete construction requirements for minor structures. The inspector should check all forms prior to placing concrete for correct dimensions and steel reinforcement. Check the location of keyways, bolts, and other special items that must be in place before pouring the structure. A check should be made from a distance to see that the portions of the structure are in the correct place and proper position. Do not assume that the survey crew has correctly interpreted the design. Ensure the wingwalls fit the ditches. Ensure the landowner can regulate the flow if more than one ditch begins at the structure. Consider the appearance of these minor structures from the roadway.

Documentation for Pay Quantity. The quantities representing the minor structure should be verified by quantity computations. If the original computation matches the plan quantity within 0.1 cubic yard for concrete and 5 pounds for metal reinforcement, no additional check is required. On projects where there are a large number of minor structures, a complete structure listing by location and station is advisable, as it may become difficult to determine which structures have been built and paid for. The list should be kept in conjunction with a pipe summary.

Verification of the quantities by computations is the only documentation necessary for ledger entries. Estimated quantities may be used prior to final computations. However, there should be few occasions when this is necessary. Concrete must be computed to the nearest 0.01 cubic yard and paid to the nearest 0.1 cubic yard. Metal reinforcement must be computed to the nearest pound and timber to the nearest 0.01 MFBM.

Reports. Report compaction of backfill on the ITD-0850 form, Nuclear Density and Compaction Report for Soil and Aggregate.

610.00 Fences.

General. Temporary fences may be required to restrict livestock or protect the work. All temporary fences are the responsibility of the Contractor unless otherwise called out in the contract. SSHC subsections 107.08, 107.11, and 107.19 should be cited for enforcement.

Any changes in the location or number of approaches, driveways, or gates must conform to the requirements of the access control established for the project and will require the Chief Engineer's approval if either the location, width, allowed use, or number of approaches or driveways does not meet with the requirements of Administrative Policy A-12-01.

The addition or deletion of pipe, fences, ditches, minor structures, or the like shall be covered by a supplemental right-of-way agreement. Approaches shall be constructed in accordance with the plans and the current version of *Access Management Standards and Procedures for Highway Right-of-Way Encroachments* maintained by the Department's Right-of-Way Section.

Staking. Particular attention should be given to the staking and establishment of the fence lines. An offset line within the right-of-way may be desirable. A good offset line, 5 to 10 feet from the right of way line, becomes an excellent reference for other features on the project. Extreme care must be exercised in staking fence around interchanges to ensure the right-of-way lines close accurately in these areas. Sometimes the fence stakes may need to be denoted with a color-coded lath to aid the Contractor in keeping other staked features on the project separate from the fence. Reference Administrative Policy A-05-19 for location of the fence with respect to the R/W line.

Inspection. The inspector should first determine that all materials on the project meet specifications. Fence is accepted on a pass/fail basis. Should the Contractor desire to install fencing material before test results are available for acceptance of the materials, the inspector should inform Contractor that replacement of unacceptable material will be the Contractor's responsibility. The inspector must be able to identify and locate all different lots of materials so any unacceptable materials can be removed.

Obstructions and vegetation must be cleared from the fence line prior to construction and in conformance to the specifications. The inspector must be satisfied that the fence is properly staked. The inspector must exercise judgment to determine the correct wire tension. Area climate and temperature at the time of installation will determine the amount of tension.

The inspector should also be aware of the location of utilities, headwalls, and pipe structures that may interfere with the proper alignment of the fence. An on-the-spot review prior to installation will avoid unnecessary conflicts.

The Contractor should be cautioned that equipment and work must be confined to within the right-of-way or construction easement. A fence Contractor that trespasses outside of the right-of-way or construction easement, without the property owner's consent, may strain public relations and could result in legal action.

Documentation for Pay Quantities. Enter final fence quantities in the ledger only after final measurement has been made. Daily estimates may be used for progress estimate payments. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry. A summary sheet may be used for the braces and gates. Braces and gates will be computed and reported by the unit. Fence shall be measured and reported to the nearest foot.

Reports. None.

611.00 Cattle Guards.

Inspection. Thoroughly inspect all materials to ensure they are the type called for on the plans and that no defects exist.

During installation, ensure that the placement of the guard matches the existing roadway slope or crown and that the appropriate pit slope exists for drainage.

It is also critical that the bearing pad materials be at the proper elevation and bonded properly or secured as specified.

All exposed metal surfaces must be painted as called for and all hardware fasteners must be galvanized.

Documentation for Pay Quantity. Structure excavation and compacting backfill work related to the cattle guard installation is considered incidental unless otherwise indicated.

Cattle guards will be paid for by the each unless otherwise indicated.

The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry. Reports. None.

612.00 Guardrail.

General. Since the designer does not have the opportunity to view the completed roadway for detailed guardrail design, the Engineer should inspect the roadway for guardrail requirements and revisions as soon as cut and fill sections are completed in the grading operation. In many sections, the rail may have to be extended to reduce a hazard. Immediately after this roadway inspection, the Engineer should develop a corrected guardrail order list so that the Contractor may obtain the correct number of posts and lengths of guardrail. At the preconstruction conference, the Contractor should be advised of the possibility of guardrail changes.

The appearance of guardrail is critical under the aspects of highway beautification. Elevation of the tops of posts shall be uniform, giving a smooth transition into curves and slopes. The posts must be well tamped to assure vertical alignment as well as safety. Do not violate design standards when changes are made in the field. Lengthening a run will usually not violate a standard. Shortening of a run of guardrail beyond that needed for embedment, interchanging of terminal types, modifying post lengths, or connections may violate a design standard and should be checked by the Resident Engineer before implementing. A design exception may be necessary.

Note during installation that end terminals (both interim and permanent) which are left exposed to traffic where the speed limit is higher than 35 MPH and that could spear, vault, or roll a vehicle are not in compliance with NCHRP-350 or the AASHTO Manual for Assessing Safety Hardware (MASH), and need to be protected or replaced as applicable.

Documentation for Pay Quantity. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry. Terminal sections shall be computed and reported to the nearest whole unit. Guardrail will be measured and reported to the nearest foot. The pay quantity for guardrail should conform to the ordered amounts and all ordered amounts must have proper certifications for the quantities involved.

Reports. None.

614.00 Sidewalks, Driveways, and Curb Ramps.

614.01 Sidewalks

General. Sidewalk appearance is important with respect to highway beautification. Uniform color and edge alignments are two important appearance factors. Long-term appearance depends upon prevention of cracks, surface spalling, and differential settlement.

Subgrade compaction must be carried out according to specifications. Occasionally water conditions or soft soil conditions may require a course of aggregate base to be placed under the sidewalk.

Sloping sidewalks may require a nonskid surface (e.g., transverse brooming) in order to reduce slipping hazards.

It is important to construct the Americans with Disabilities Act (ADA) compliant features properly. Project designers are required to provide a plan set that meets ADA requirements. However, it is not unexpected that conflicts may arise during construction. Resident Engineers and construction inspectors should be familiar with ADA requirements and the Standard Drawings that show properly designed features, and they should use extra caution to construct an ADA compliant and useable facility. They should field verify the design for ADA compliancy before construction begins.

Small adjustments of features may need to be made in the field to meet these requirements. The designer should be consulted whenever minor adjustments are made to the plans to ensure that additional problems are not created or the functionality of the design is not compromised. Whenever major conflicts are identified, the designer must be consulted to provide necessary redesign, and a change order issued.

Documentation for Pay Quantities. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry. Calculation sheets or field notes may also be used to report final quantities. Quantities will be calculated to the nearest 0.1 square yard and rounded to the nearest square yard on the estimates.

Reports. Report compaction tests on the ITD-0850 form, Nuclear Density and Compaction Report for Soil and Aggregate.

614.02 Driveways

General. Driveways and approaches are normally constructed to stop at the right of way line with the intent to provide serviceable access and protect the road edge. Radii and grade should be staked. Care should be taken so that the width and stationing is staked according to plan with a smooth elevation transition to the existing driveway or access road surface.

All changes to an approach or driveway either in width, location, or allowed use must be addressed on the ITD-0606 form prior to construction. Alternatively, changes may be documented during project closeout by having District Right-of-Way record the changes in the appropriate documents and be handled in accordance with Administrative Policy A-12-01 in the current version of the Access Management Standards and Procedures for Highway Right-of-Way Encroachments manual.

Questions should be directed to the District Traffic or Right-of-Way sections or their headquarters counterparts. All changes that do not meet the requirements of Administrative Policy A-12-01 must have the Chief Engineer's approval. Additionally, FHWA must give approval for any changes involving Interstate access. The Construction/Materials or Design/Traffic Sections can facilitate this coordination.

If an approach or driveway is moved and if costs change, a change order will be prepared. **All changes must be noted on the as constructed plans.**

Documentation for Pay Quantities. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry. See:

- Surface Courses & Pavement – CA Section 400
- Concrete – CA Section 502.

Urban approaches will be computed and reported to the nearest whole unit.

Reports. Report compaction tests on the ITD-0850 form, Nuclear Density and Compaction Report for Soil and Aggregate.

614.03 Curb and Gutter

General. Along with sidewalks, the curb and gutter comprise the finishing touches of a road or street. The alignments, finish, matching with old curb, and grade are important factors in the appearance of the final result.

Staking. The spacing of grade and alignment stakes will vary from 10 to 25 feet depending upon field and design conditions, such as vertical curves and radii. Since 10 foot-long form sections are often used, a staking interval of 10 feet is good practice. Grade stakes for the aggregate base course should not be placed so that the rolled plant mix is ever below the lip of the gutter. This will prevent the roller from overloading the lip of the gutter.

Inspection. Curb curing must be performed according to the specifications. If curing compound is used, it must be sprayed on immediately after the finishing is completed.

In construction of extruded curbs, there may be a tendency of the machine to climb when placing around a sharp radius and matching to an existing curb. The machine operator must adjust to this situation.

Documentation for Pay Quantities. Diary entries must be made for estimated and final quantities. If a pay item is an estimated amount, clearly mark this is as an estimated item. The diary will also be used to verify the activity, date, and work location. Curb and gutter will be measured and reported to the nearest foot.

Reports. None.616.00 Signs and Sign Supports.

General. As soon as grading operations permit accurate determination of sign placement and signpost lengths, a list of sign post lengths will be developed by the Contractor for approval by the Engineer in accordance with SSHC Subsection 106.02. The list must be developed at an early date, especially where steel signposts are involved, as fabrication may require a considerable amount of time. If the placement of a sign or signs at the location shown on the plans is impractical, the District Traffic Engineer should be contacted to determine a new location.

Foundations. Concrete sign foundations for breakaway steel posts must be set at proper elevations with respect to the finished ground line. A foundation that is located too high becomes a roadside hazard rather than an integral part of a safety feature. A foundation that is too low can also create a roadside obstacle due to impairment of the intended breakaway action by soil or aggregate in the breakaway plane.

Breakaway Post Fabrication and Erection. Inspection of breakaway H beam posts should verify that fuse plates have been installed after galvanizing. If the signposts are delivered preassembled, torque of the fuse plate bolts should be checked on sufficient posts to verify the proper fuse plate bolt tension.

For three and four bolt slip bases, proper breakaway of type A and B signposts is contingent on having the correct torque on the slip base bolts. Over tensioning of these bolts may reduce the effectiveness of the breakaway design and can even cause failure of the anchor bolts on vehicular impact. The slip base bolt torque must be carefully checked.

Break-Safe systems do not require a specific torque. Follow the manufacturer’s recommendations for the hinge plate (fuse plates) couplers and bolts for tightening requirements. Break-Safe slip bases are addressed in the Standard Drawings.

Anchor Bolt Repair. Units with three and four bolt slip bases must have their high-strength anchor bolts protected prior to erection of the signposts to avoid having them bent or broken by construction traffic. Repair of broken or bent anchor bolts is quite expensive and welding is not an acceptable method of repair. Broken or badly bent high-strength anchor bolts must be repaired by total foundation replacement or by using high-strength sleeve nuts.

This second method of repair requires that a portion of the foundation be removed to a point that will permit the installation of the sleeve nut to be entirely embedded in the replaced concrete. The sleeve nut and bolt extension must be adequate in size to develop the strength equivalent to the original design. The sleeve nut and bolt extension must be cadmium plated.

Straightening of badly bent high-strength anchor bolts should not be allowed, as these bolts are extremely brittle. Although they may appear okay after straightening, they are fractured and may later fail under very light loading conditions.

Working Drawings (Shop Drawings). Working drawings for sign structures and signal supports are to be submitted by the Contractor for approval as indicated in SSHC Subsection 105.02 and as modified by SSHC Subsection 616.03. Final shop drawing submittals for these structures must meet all Subsection 105.02 requirements and must be transmitted to the Traffic Engineer for storage.

The submittal shall also include CADD drawings in the acceptable format.

Documentation for Pay Quantity. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry.

Reports. None.

617.00 Delineator and Milepost Assemblies.

General. Delineators and mileposts must be installed at the stations and offsets indicated in the plans.

The Traffic Manual and Standard Drawings should be consulted to verify proper type, use and installation.

Documentation for Pay Quantity. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry.

Reports. None.

618.00 Marker Posts, Witness Posts, and Street Monuments.

General. The Traffic Manual and Standard Drawings cover the subject of marker posts, witness posts, and street monuments.

Marker posts, witness posts, and street monuments must be installed at the stations and offsets indicated in the plans.

Documentation for Pay Quantity. The diary will be used to verify the activity, date, and work location. Quantities will also be documented by diary entry.

Reports. None.

619.00 Illumination.

General. This work, as well as other electrical work and signalization, requires the services of a licensed electrical contractor. Few inspectors have had sufficient experience to thoroughly and adequately inspect this type of work. To overcome this problem, it is recommended that the District Signal Electrician work closely with project personnel to assure plan and specification compliance.

Experience has proven that many potential problems can be averted or minimized by a pre-operational meeting involving the electrical contractor or subcontractor, project personnel, and the Signal Shop Superintendent or District Signal Electrician. This special pre-operational meeting should be held immediately prior to starting the electrical work. It is especially important that the Contractor's job Superintendent or Foreman attend this meeting. The conduct of the meeting should be informal and cover the real critical problems that may be expected or that have occurred on previous projects.

Common Construction Errors. Over the years, a number of recurring construction errors have been discovered regarding electrical work either at final inspections or later when maintenance work was being performed. A list of these more common errors follows. This list is included as a reminder for inspection personnel and should not substitute for the above recommended pre-operational meeting where this list should be presented and discussed with the Contractor.

A. Conduit Installations

1. Use of plastic for elbows greater than 45 degrees instead of steel, as required, causing conduit to be cut when wire is pulled.
2. Steel elbows require bonding when used with Rigid Plastic Conduit.
3. Minor bends in conduit without proper use of bending tools causing partial collapse of conduits and resultant problems pulling wire through conduit.
4. Use of rocky material for conduit backfill instead of fine soil or sand which results in eventual collapse of conduits.
5. Failure to clean dirt and moisture from conduits prior to pulling wire.
6. Failure to cap stub ends and free ends of conduits resulting in intrusion of soil and moisture.
7. Conduit buried at less than required 24 inch depth causing future maintenance problems, such as inadvertent cutting or mashing of conduits.
8. Placement of conduits by other than a qualified, licensed, electrical Contractor. This can result in rejection by the State Electrical Board.
9. Placement of conduits at locations other than shown on the plans without proper indication on the as-constructed plans.

B. Foundations

1. Improper or wrong size anchor bolts installed or installed out of alignment for proper pole base plate fit.
2. Foundation not set at proper elevation. Too high or too low an elevation to permit proper action or exposure of the slip base or breakaway coupler.
3. Improper backfilling or lack of mechanical tamping around foundation may result in eventual tipping of the foundation and pole.
4. Failure to grout under the base of the pole on anchor base installations. **Note**: Breakaway steel neck couplers are **not** to be grouted.
5. Failure to ensure skirts are installed on breakaway coupler installations.
6. Improper placement of structural concrete per SSHC Subsection 502.03 (exceeding max 5-foot drop)

C. Pole Erection

1. Failure to accurately plumb poles after all hardware is in place.

D. Expansion Fittings

1. Failure to install a proper conduit expansion unit at structure expansion joints.
2. Failure to provide expansion couplings on long runs of plastic conduit may result in buckling of the conduit.

E. Wiring

1. Failure to use a wire lubricant prior to pulling through the conduit may damage the wire, its insulation, or the conduit.
2. Use of extreme force and speed to pull wire may damage the wire, its insulation, or the conduit.
3. Unauthorized splices in buried or concealed junction boxes that create future maintenance problems.
4. Failure to use insulated bushings at conduit entrances to metal junction boxes, and cabinets. will scuff insulation from the wire when it is pulled.
5. Use of wrong type or size of wire or wire with improper insulation.
6. Failure to use specified wire connectors or wiring methods, approved for the application per the NEC.

F. Grounding

1. Failure to connect poles, junction boxes, and other equipment to the service ground by an insulated AWG 8 soft-drawn stranded copper wire.

14-Day Field Test. It is the intent of this specification to provide two weeks of standard operation with photocell, manual, or other specified turn-on control. During this test, the Contractor will be responsible for all corrective work resulting from improper installation, workmanship, or materials. Following successful completion of the test, the Engineer should recommend partial acceptance covering illumination. The cost of power consumed during the test period should be borne by the agency or agencies assigned maintenance responsibility by the cooperative project agreement.

Documentation for Pay Quantities. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry.

Reports. None.

620.00 Planting.

General. Landscaping, wetland mitigation, and native and wildflower plantings are several areas where construction personnel may become involved with planting vegetation. With an increasing emphasis on the environment, including promoting and preserving biodiversity and enhancing natural beauty and aesthetics, the Department must take positive measures to preserve and restore natural landscapes that have been disturbed by development whenever possible and to achieve desirable results.

Landscaping and Wetlands. The Senior Environmental Planner in the District must have landscape and planting experience, be familiar with the recommended practices and procedures for planting trees and shrubs and provide guidance early in the project and at the time of planting. Projects with landscaping and/or wetland mitigation typically contain contract specifications with a minimum plant establishment period.

Trees and shrubs come in various forms (e.g., containerized, balled, bare root, and cuttings). The various types of plants require special attention in handling and planting. Plants shall be inspected prior to purchase to ensure plants are robust and in healthy condition before planting.

Prior to planting, a thorough examination should be performed by the Contractor on all plants to ensure they meet compliance and design specifications. The root system of bare-root plants shall be examined and any broken or damaged roots shall be cut off cleanly.

After the original planting, appropriate District personnel shall periodically inspect the condition of plants and planting areas to ensure successful planting and plant establishment. The Engineer will inspect the plants periodically and notify all responsible parties of apparent defects, faults, conditions, and dead plants discovered by the inspection. Correction of apparent defects, faults, conditions, and the removal and disposal of dead plants must be completed within 10 days after notification. Dead or damaged plants will be replaced at the earliest suitable time. Plant replacement will not be postponed until the end of the establishment period.

If immediate replacement of dead or rejected plants is impossible due to seasonal conditions or because specified plants are unavailable, a marker should be placed at the spot of replacement (if necessary) and replacement will be made during the next planting season.

Native Plants and Wild Flowers. A landscaping project involves any action taken as part of a highway construction project or as a separate action to enhance the aesthetics of a highway through placement of plant material consistent with a landscape design. States are encouraged to use native plants on highway projects as part of erosion control measures, wetland mitigation or restoration, and/or as a total vegetation management program. All work performed in association with landscaping will be included in the total landscaping expense. This applies to all projects with a landscape, seeding, and/or planting design plan.

Guidance information has been included in Appendix E.30.04 of the Roadway Design Manual and provisions for native plants or wildflowers shall be incorporated into each landscape project (including roadside seeding and plantings) unless a waiver has been signed.

Documentation for Pay Quantities. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry.

Reports. Construction Inspection Reports: ITD-1406 and ITD-2802 may be used as needed.

621.00 Seeding.

Seed Supply and Ordering. Seed supplied by the Department should be available at the Supply Services Warehouse. Order seed using an updated and unnumbered ITD-2379 form. The most recent version of the order form must be prepared and routed to the District Supply Operations Supervisor or appropriate source, prior to submitting the unnumbered form to the Roadside Program Manager for final entry and approval. The following is a set of guidelines to use when preparing an order.

- Use one ITD-2379 blank form for ordering seed. Do not include any other items except seed on this form. Use a separate ITD-2379 for each project.
- On the ITD-2379, fill in work authorization number (project code), function (or task) expenditure type, and organization code, description of seed species, unit of measure (in pounds), and quantity needed. These codes change periodically and should be filled in by the Roadside Program Manager). Use appropriate rule codes for all projects on State or local systems. Provide project name and number, including key number, and a short description or project location under the comments field.
- Calculate the pounds for each kind of seed species (e.g., grass, forbs, and shrubs) needed and add 10% to the amount. Round quantities for each grass seed species to multiples of 50 lb, legume seed species to multiples of 10 lb, and shrub or forb seed species to multiples of 5 lb. Record these quantities on the ITD-2379 form.
- If native seed is desired or specified, contact the Roadside Program Manager for assistance in species selection and quantities. Record pounds for each native seed species requested on the ITD-2379 form following the legume species list. Quantities of native seed species shall be calculated in multiples of 5 lb in most instances.
- Use correct name and identifier symbols or codes, as shown in the Idaho Roadside Revegetation Handbook in conjunction with the Roadway Design Manual and seed supply listing obtained from Supply Services Warehouse. **Do not insert ITD catalog numbers.**
- Give your best estimate as to what date need the seed delivered. Order seed a minimum of 30 days in advance of desired delivery date to ensure order is received in a timely manner. It is best to allow more time if possible, but do not order seed more than 3 months in advance.
- After completing the information on the unnumbered ITD-2379 form, except for Activity Code and Supply Catalog numbers, route the ITD-2379 to the District Supply Operations Supervisor. The District Supply Operations Supervisor will send the order to the Roadside Program Manager for approval and retain a copy for District Supply files. The Roadside Program Manager will assign a K document number on the ITD-2379 form and send it to Supply Services for data entry. The Roadside Program Manager will return copies of the ITD-2379 to the District Supply Operations Supervisor and Resident Engineer after approving the form.
- Return all unused seed appropriately labeled and in original unopened bags to District Supply. A credit will be made to the original purchase code charging the project and the District Supply General Inventory Account will be debited. Do not return any containers or bags of mixed seed or any open bags containing unmixed seed. All mixed seed left over or seed left in opened bags or containers will be transported to the District Maintenance Section and documented on an

ITD-0500, Inter-department Correspondence form. Document the quantities transferred to Maintenance on the ITD-0500.

Seedbed Preparation. Seedbed preparation includes weed control and soil conditioning, which are vital for successful seed sowing and long-term plant establishment. Areas to be seeded must be maintained reasonably free of weeds by mechanical means or application of appropriate chemicals until seeding time. All weeds must be kept from going to seed.

Slopes that are 2H:1V or steeper are best addressed by hydro-seeding or broadcast seeding. Areas to be broadcast seeded must be roughened and cultivated immediately prior to seeding at a minimum depth of 2 inches, and must be left in a rough condition similar to that obtained by walking a crawler tractor up and down the slopes in a perpendicular direction to slope contours. Where slopes are benched or serrated, no additional preparation will be required. Reference the ITD Best Management Practices Manual as needed.

Frequently, cut slopes are too hard and too smooth to obtain adequate seed coverage from the sloughing of the soil. Cut or excavated slopes steeper than 2H:1V may be constructed with stair-step or serrated conformation (e.g., terraces or benches) to encourage vegetative growth and establishment. The steps or serrations must have approximately 1-2 feet vertical dimension with horizontal dimensions to fit the slope. Steps or serrations must follow approximate contour lines and not be constructed on slopes containing soil types that are sandy, rocky, non-cohesive or highly erodible, or in soft rock laminations.

Slopes that are 3H:1V or flatter and areas without excessive rock, gravel, or hardpan soil are best addressed by drill seeding. Soil must be roughened using normal tilling methods and must be cultivated to a minimum depth of 3 inches. The soil must be worked to obtain a desirable surface that will permit proper operation of drill seeding equipment. When using ripper teeth or scarifiers, serration intervals must be set to 3 feet spacing width and 12 inches deep. Unless otherwise specified, seed, fertilizer, and mulch must be applied in separate operations, one following the other in this order, except fertilizer may be applied with a fertilizer attachment at time of seeding or with water when watering is specified. Tillage and drilling must be performed cross-slope (horizontal) and furrows shall remain open.

Constructed or excavated slopes 3H:1V or flatter that includes topsoil application must be roughened, serrated and/or cross-ripped horizontally to the slope, prior to placement of the topsoil. After topsoil has been spread, the surface must be prepared for seeding as specified above.

On areas subject to severe erosion, the extent of seedbed preparation must not exceed the area on which the entire seeding and mulching can be applied within a one-day operation. If conditions occur that prevent seeding in appropriate furrows (i.e. depth according to size and dimension of seeds), or if the roughened condition is destroyed, the Contractor must prepare the seedbed again.

Weed control is part of the seedbed preparation to keep weeds from going to seed and to reduce weed growth and spread from interfering with seeding operations. Weed control must commence after weed seeds have germinated and plant growth is noticeable. Immediate action must be taken on existing weeds to control and prevent additional weed seed production. Method of control, appropriate application, and timing are essential for best results. One treatment may be sufficient if these conditions are met. To determine the most appropriate or best method of control, mechanical or chemical application, contact the District Vegetation Foreman or the Roadside Program Manager for assistance.

Weed control is best achieved when applied after the last early season rain and before weeds reach blooming stage. This normally occurs between May and July depending on the region or area.

Weed control is the responsibility of the Contractor and is not considered an extra expense. The method of weed control will require prior approval from the Engineer. If additional weed control is necessary due to Contractor error and/or failure to appropriately seed the areas during the specified seeding season (as required in SSHC Section 621) the costs of additional weed control are the responsibility of the Contractor.

Broadcast Seeding. Areas to be seeded that are not practical for drill seeding methods may be broadcast using hydro-seeder or dry broadcasting equipment. It was found that some broadcast seeding methods that combined wood fiber, seed, and fertilizer into one broadcast operation resulted in higher failure rates. The fiber seems to attach tightly to the soil particles and provides a barrier to prevent temperature and moisture penetration. There is greater moisture lost under the fibers than in areas where the seedbed was properly prepared without mulch. In areas where wood fiber and seed were mixed together, most of the seed was found suspended in the fibers above the soil where germination is impossible without high moisture conditions. When fertilizer was included in the mix, a greater number of seeds were found burned in the mix. Therefore, seed, mulch, and/or fertilizer must be applied in separate applications. Seed must be applied to the seeded area first, followed by mulch and/or fertilizer applications second. Agitation of seed in hydro-seeder shall not exceed 30 minutes due to an increase in seed damaged by the hydro-seeder if seed is circulated over 30 minutes.

If certain conditions exist (e.g., soils that are too hard, loose, or smooth) that prevent adequate seed cover or moisture retention near the seed long enough for germination to take place) then alternative actions or methods should be considered and a change order initiated, if applicable.

Broadcast rate includes number of seeds distributed per square-foot of surface area. Generally, broadcast seeding requires more seed per acre than for drill seeding.

Poor sites such as south and west-facing slopes require more seed than favorable sites; and the upper portions of the slopes should receive more seed then the lower areas on the slope. The number of seed required depends on the type of seeding method used. The following is a list of seeding methods ranged in order of low quantity of seed required to high quantity of seed required: drilling, whirlwind broadcast, hydro-broadcast, and aerial broadcast.

Drill Seeding. Proper drill seeding techniques are important in obtaining successful seeding. Most drill seeding failures are results of improper seed placement in the soil (e.g., too deep, too shallow, or low moisture accumulation). Several factors affect seed establishment, including improper seedbed preparation, incorrect disc spring pressure, failure to use appropriate depth gauges, improper drill or drilling speed, or drilling when wind is too strong.

The seedbed must be prepared and soil loosened enough to allow the disc to penetrate the soil and still maintain appropriate depth control. Drill rate must be accurately calibrated for proper row spacing and number of seeds (quantity) distributed per foot of row length. Drill rows must be spaced no wider than 6-7 inches in order to avoid weed competition and stand establishment delays.

Disc spring pressure should maintain appropriate depth control. However, in some cases depth gauges may be necessary to compensate for limited spring adjustments. Fast drill speeds and/or high winds can contribute to seeding failures by leaving seed on the soil surface instead of burying the seed underneath the soil.

A double-disc drill with agitator is required when mulch is not included. The drill must be properly adjusted and operated so that the seed is placed at the bottom of small, cross-slope furrows approximately 2 inches deep, with minimal soil covering. Furrows should be set according to the size and dimension of the seed. Depth of soil covering the seed must not exceed ½ inch and furrows must be left open. Drag chains are not acceptable and must not be used. If the furrows are constructed properly and seed is accurately placed at the bottom of the furrows, the wind and water from the sloughing of the soil should adequately cover the seed.

If mulch is used, the type of mulch and method of application must be specified. Mulch must be an approved product and certified by an authorized agency as noxious weed free. Mulching must not be performed when wind interferes with mulch placement. Straw, grass hay, compost, wood fiber, soil amendments (or mulch mixture), or any combination of these materials must be applied uniformly and as directed. All material applied to the ground must allow for the absorption and percolation of moisture.

When mulch is used, cross-slope furrows should not be too deep and should be mechanically anchored into the soil. Where grain straw or grass hay is to be anchored by mechanical crimping, it must have approximately 50 percent of the stems exceeding 10 inches in length. Furrows must be deep enough to hold the seed in place, with maximum soil coverage of ½ inch, until mechanical anchoring is completed. This will provide additional seed cover. Mechanical mulch anchoring must be completed on slopes 3H:1V or flatter. Mulch must be anchored into the soil by use of a heavy disc with flat scalloped discs approximately ¼ inch thick, having dull edges and spaced no more than 9 inches apart.

Anchoring must be to a depth of at least 2 inches with no more than one pass of the equipment on the same surface. All mechanical anchoring must be done horizontal to the slope.

Seeding must not commence when wind interferes with seed placement as determined by the Engineer. Drill spacing must not exceed 9 inches. Legume seed must be seeded through a separate box from grass seed, with seed spouts out, or broadcast ahead of the drill. Native seeds in the mix must be broadcast immediately ahead of the drill. Seed must be thoroughly mixed before placing in the drill or seeder box.

The goal is to place the seed under enough soil with adequate provisions to hold moisture. Both the furrows and the mulch serve to accumulate moisture. Once the drill is adjusted, monitor the drill speed, wind conditions, and free-flowing spouts. If the drill is not equipped with an agitator and the seed bridges over, correction can be made by properly securing baling wire to the drill box and monitoring seed dispersal.

Areas to be seeded that contain intermittent rocky areas may be broadcast seeded by raising the drill while going over the rocks, allowing the seed to disperse out. When the drill discs are raised high enough to clear the rocks and the seed delivery system remains in gear the seed is able to disperse over the rocks. If this method doesn't work or the drill cannot be raised high enough to clear the rocks, then the seed should be broadcasted by hand or by some other broadcast method. Drilling in or around rocks should be avoided where equipment may be damaged. Do not drive equipment over the area after seed is in place.

Mulch Anchoring. For slopes 2H:1V or steeper, a mulch tackifier should be used to help anchor the mulch. Mulch anchoring (tackifiers) must be a material that bonds mulch together in such a manner that it will prohibit the mulch from washing or blowing away after application. When cured, the tackifier must not be re-emulsifiable. The tackifier must be soluble (mixable) in water and nontoxic to animals, soil microorganisms, aquatic and plant life, and not interfere with or impede seed germination or vegetative growth and establishment. The tackifier must be applied in accordance with the manufacturer's written instructions and applied at a rate that is acceptable to the mulch, soil type, condition and degree of slope.

Mulch plus tackifier must consist of premixed packaged wood fiber mulch with tackifier or wood fiber mulch plus tackifier added prior to application and be mixed in accordance with manufacturer's written instructions.

If applied separately, incorporate a method to differentiate between the tackifier and mulch material by color or tracer material. Do not tack when wind interferes with tackifier placement.

The general rule in achieving good seed germination and growth is to lightly cover seed with enough moist soil for a two-week period when soil temperature is above 50° F. Survival of the seeding, after the seed germinates, depends on selecting the appropriate season for seeding and the correct seed mix.

Soil Amendments. Soil amendments must consist of organic soil-applied compost or manufactured organic soil amendments. Compost must be a Class A compost that meets or exceeds US EPA 40 CFR #503 requirements, SSHC Section 711 for Classification Type I and pass a Solvita Maturity Test of 5 or greater.

Manufactured organic soil amendments and/or biological soil stimulants must consist of organic materials, nutrients, and minerals that show the propensity and performance to facilitate and sustain the germination and growth of vegetation.

Mulch Mixture. Mulch mixture must consist of mulch, soil amendments, biological soil stimulants, soil microorganism inoculants, bonding fibers, tackifiers, and/or other erosion control and plant nutrient ingredients as specified. Mulch mixture must be premixed using the specified products and rate, and shall be hydro applied in one operation.

Erosion Blanket. For slopes 2H:1V or steeper, an erosion blanket may be used to stabilize and protect the soil surface. Erosion blankets must be a material that protects disturbed soils from raindrop impact, surface run-off, and soil erosion. Erosion blankets may consist of either a pre-manufactured roll (e.g., biodegradable or synthetic), or a bonded fiber matrix or liquid mixture sprayed onto the soil surface. The type of blanket must be as specified or approved, and must be installed according to the manufacturer's recommendations or as directed.

The rolled erosion blanket must be placed with fibers in contact with the soil over the entire area covered. The blanket must not be stretched taut. The blanket must be anchored at joints, corners, and along the edges. Blankets on slopes must be installed vertically to the slope. The blanket edge along the top of the slope and the ends of adjoining blankets on the slope must be buried and anchored in an approved manner to prevent slipping or displacement of the blanket. Blankets used in ditches or channels must have a minimum width of 3 ft. Blankets must be anchored and overlapped in an approved manner so water will neither flow under nor displace the blanket. Adjoining blankets must be overlapped in the direction of water flow or as recommended by the manufacturer.

The liquid erosion blanket mixture must be soluble in water and nontoxic to animals, soil microorganisms, aquatic and plant life and not interfere with or impede seed germination or vegetative growth and establishment. The mixture, as well as mixing and applying the mixture, must be in accordance with the manufacturer's written instructions and applied at a rate for the soil type, roughness of surface, conditions and degree of slope.

Fertilizer. Fertilizer type and application must be as specified. Fertilizer may be either broadcast (wet or dry) or drilled. For drill seeding method, it is preferable to place fertilizer with the seed at time of drill seeding by use of a fertilizer attachment whenever physically possible. For broadcast seeding method, it is preferable to apply fertilizer as a separate application after seeding. Fertilizer may be applied as dry ingredients or thoroughly mixed in a liquid mixture. Fertilizer may be applied with irrigation water as directed. When fertilizing established stands, fertilizer must be applied when the average noontime temperatures are 60° F or lower. Fertilizer must be certified by an authorized or approved agency and declared or certified as noxious weed free prior to acceptance.

Watering. A temporary water delivery system must be installed by use of either sprinklers or trucks. Water must be applied by the acre unit at the times directed. A one acre unit constitutes application of 0.5 inch of water over a 1-acre area, which will saturate the soil to a depth of 4 inches under average conditions.

Pipe connections must be kept tight to avoid leakage and washing. Sprinklers must be maintained in proper working order. Should runoff begin, watering must be stopped and the balance applied after earlier water has penetrated the soil. The standard application rate is 16,000 gallons/acre and constitutes the amount of water which will saturate the soil to a depth of 4 inches under average conditions.

Inspection for 4 inch depth of saturation must be made by excavating to a depth of 4 inches and observing for wetness. It is intended that the wetness inspection locations will be reasonable and not be on slick spots or in unrepresentative areas.

Seeding Season. Selection of appropriate seeding season is essential when developing roadside seeding plans and insuring successful seeding on construction projects. Even though other specifications may be established correctly, if the timing of the seeding is incorrect, then the seedlings will most likely fail. There is constant pressure on ITD to expand the seeding time and seasons when this work can be accomplished but the most suitable time for sowing seeds is usually a three or four week window. This information is very useful and should be followed when planning roadside seeding. The contract special provisions contain required dates for seeding based on average climatic and other conditions for the project location. The specifications allow for some adjustment of these dates as directed. The purpose is to provide a specific time for seeding on a given project so that the season falls within a few days earlier or later of the specified time. Any deviation from the specified dates shall be approved by the Engineer.

Seed Mixtures. The specified seed mixture normally includes selected grasses, legumes, shrubs, and native forbs. Each species is selected because of its unique growth characteristics and/or special needs of the project. There are other definite reasons for using the specified mixtures (e.g., mature height, seedling vigor and longevity, bunch-type grass, size of seed, site suitability, and species ability to integrate or interact with other species during and after establishment). Any deviation from the specified mixes, except for minor substitutions when filling out a seed order from supply, must be approved by the Engineer.

Documentation for Pay Quantity. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry. Payment will be made per the specifications except for authorized additions or deletions, unless otherwise noted. When the unit of measurement is based on plan quantity, SSHC Subsection 109.01 should be reviewed. If the Resident Engineer believes the plans are in error, they should re-measure the area and adjust the pay quantity, if necessary. The Contractor may also request a re-measure; and if the quantities are in error, they should be readjusted.

Reports. None.

622.00 Precast Concrete Headgates.

General. Without high-quality backfilling, the headgate locations are usually the weakest part of the ditch. Care must be taken to provide solid bedding and proper backfill. Material meeting the contract material and compaction requirements and free of any organic matter, must be used for backfilling headgates.

Documentation for Pay Quantity. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry. Right-of-way agreements generally dictate the number and location.

Reports. None.

623.00 Concrete Slope Paving.

General. Concrete slope paving is subject to undermining and concentrated flows of run-off water along its edges, resulting in erosion. Care should be taken during construction to ensure all drainage and run off water is directed in a manner that will protect the slope paving.

Documentation for Pay Quantity. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry..

Reports. None.

624.00 Riprap.

General. Riprap must be placed to the dimensions shown on the plans and typical sections. Refer to the SSHC Section 624 if thickness is not shown on the plans. Slopes and toe trenches that will receive the riprap must be approved prior to placement of the stone. It may be necessary to cross-section or take three-dimensional measurement of the slopes and toe trench prior to placement of riprap to determine whether or not deficiencies exist in thickness or height. Riprap quantities must be computed from the staked dimensions.

Riprap-- Rock taken from the project excavation can be used if it meets specifications and is permitted by the Engineer. This material will be paid for as excavation and riprap. However, this material must be replaced by the Contractor at no expense to the Department or Local Public Agency (LPA) when the excavation is needed for project embankments or other similar requirements. Rock volume swell and borrow volume shrink must be taken into account when computing the replacement quantity.

Make sure that the riprap source is approved. Avoid haphazard dumping which may result in segregation. The finished riprap should be well keyed and present a regular surface having mass stability. Additional guidance may be obtained from the HQ Hydraulics Engineer (or hydraulics engineer of record) or HQ Geotechnical Engineer.

Documentation for Pay Quantities. Riprap and structure excavation must be calculated on a computation sheet or the diary. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry. Quantities shall be computed to 0.1 of a cubic yard, and be rounded off to the nearest cubic yard on the estimate.

Reports. The ITD-0025 Diary can be used to document other riprap quantities.

625.00 Joints.

General. Joints in structures or concrete pavements and the related fillers normally consist of one of the following types:

Construction joints. Construction joints are provided to enable the Contractor to perform the work in reasonably sized increments. When placed in a structure, metal reinforcement or dowel bars normally extend across the joint to tie the sections together. A vertically formed bulkhead must be used to hold the concrete to grade and provide resistance for consolidation. If a construction joint is not shown on the plans, then the Bridge Section (for structures) or the Construction/Materials Section (for pavements) should approve its location. Construction joints placed in concrete pavements may or may not require the placement of reinforcing steel or dowel bars depending on the design or location.

Contraction Joints. Contraction Joints allow for contraction or shrinkage of the concrete. When concrete sets, a small amount of shrinkage occurs and results in a tension stress that causes the concrete to crack. To achieve a more pleasing surface appearance in the finished concrete pavement, contraction joints are placed, tooled, or sawed at predetermined intervals. The theory is that the concrete will then crack in straight lines at the predetermined joints. To keep foreign matter from wedging into the preformed or sawed joints, they may be filled with a sealer or filler. Tooled joints, such as used in sidewalks, are not sealed; but the tooled joint must be of sufficient depth to control cracking. When the depth of a contraction joint is not specified, the general rule is that it should be at least one-third of the depth of the section of concrete.

Expansion Joints. Expansion Joints provide a clear space where the concrete can expand or contract without damaging or distorting adjacent material. Expansion joints allow for the expansion and other movement of bridge decks, curbs, and sidewalks. They are normally filled with a sealer, pre-formed expansion joint filler, or compression seal. The filler or seal must be firmly secured to the face of the joint or the action of the joint opening and closing will eventually work the material out of the joint. Expansion joints sometimes have dowels to tie the joined sections together. The portions of the dowels that are to allow movement must all be parallel and in the same plane. Improperly installed dowels will actually work as ties and prevent movement, rather than allow movement, and result in cracking of the connected sections. It is not important as to which end of a dowel is fastened and which end is free to move. It is good practice to have the fixed end of the dowel in whichever portion of the structure is poured first. This practice will allow minor alignment of the expansion end after the dowel is firmly held by the first pour and, thereby, insures proper positioning.

Expansion joints may also have waterstops installed to prevent water from flowing through the joint. The waterstop should be carefully installed and bonded into both panels being joined. It must be continuous for any particular joint to form a completely waterproof barrier.

Polymer Silicone or Similar Sealers. Polymer silicone or similar sealers rely on their bonding properties to maintain the position in the joint. The joint surface must be clean. Sandblasting is one of the best methods to ensure a clean surface.

Elastic joint fillers. Elastic joint fillers are cellular in cross-section and are of a rubber-like material. The elastic joint fillers normally come in coils or rolls and are inserted into the carefully prepared joint with the aid of a lubricant. Care must be exercised not to overstretch the filler. This joint material works best when kept in a state of compression and for this reason it is best inserted during colder temperatures when the joints tend to be more open.

Documentation for Pay Quantities. The inspector should keep proper records as to lot, joints sealed, surface conditions, and temperature. The cost for these items is included in the contract prices for structure or pavement items. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry.

Reports. None.

626.00 Temporary Traffic Control.

626.01 Devices

General. Use of construction traffic control devices must meet the requirements of the current Manual on Uniform Traffic Control Devices (MUTCD) as adopted by the State.

The Contractor must furnish all construction traffic control devices as shown on the plans, required by the Engineer, and as described in the MUTCD. In addition, all traffic control devices must meet the requirements of NHCRP 350 for crashworthiness so they are not a hazard to the traveling public.

The MUTCD for Streets and Highways, published by the Federal Highway as adopted by the State, establishes the design and application of traffic control devices on all public roads in Idaho. Included in the MUTCD are requirements for traffic control devices to control and guide traffic through or around road and street construction, maintenance operations, and utility work.

Normal design procedure is to establish pay items for certain types of traffic control devices on construction contracts. However, the provisions of the MUTCD and SSHC Section 626 apply to all construction, maintenance, and utility work regardless of the presence or absence of pay items established by the contract.

A contractor's or utility company's operations can change from day to day or even more frequently. Therefore, the Engineer on projects where traffic interference is involved must designate one person to work with the Contractor or utility company daily in coordinating and tailoring traffic control to fit the work in progress. This person should be a trained traffic control technician or supervisor andmust be familiar with all the construction traffic control requirements of the Traffic Manual, Standard Drawings, MUTCD and its supplements. The Contractor or utility company should also designate a Traffic Control Supervisor of comparable responsibility with whom the inspector can recommend, propose, and evaluate the solutions to traffic control problems. It is desirable to have the District Traffic Engineer review and approve long term traffic control schemes, detours, or especially critical traffic control problems.

The Construction Inspection Report ITD-1406 form must be used to document conformity of the traffic control provided on the project to the plans, Traffic Manual, Standard Drawings, MUTCD, and any approved modification of the Traffic Control Plan (TCP) at the initiation of the traffic control operation and when changes are implemented. A nighttime review should be included to verify the visibility and adequacy of traffic control devices under the condition of darkness. Subsequent day and night reviews should be made by the Engineer or other qualified staff members periodically and the results documented in the project files using the ITD-1406 form.

Application of Traffic Control. The part of the MUTCD covering traffic controls for construction and maintenance operations establishes basic principles and prescribes standards for design, application, installation, and maintenance of the various types of traffic control devices. The persons responsible for establishing TCPs must be capable of using good judgment in the selection of applicable devices and using them in accordance with the provisions set forth in the plans, by the MUTCD, or as directed by the Engineer.

A well-designed TCP must satisfy three requirements:

- Sufficient traffic control devices, provided in advance of the work area, to adequately warn motorists
- Adequate visibility and/or protection of the workers and work area.
- Motorists must be safely guided through or around the work area. Consistency in device selection will aid greatly in this effort.

SSHC Section 626 allows for payment for bid items if they are established for several types of traffic control devices (e.g., signs, barricades, drums, tubular markers, vertical panels, advance warning arrow panels, traffic control signal, hazard identification beacons, and pavement striping tape and flexible raised pavement markers). However, this specification does not limit the types of traffic control devices for use on projects to the above items.
Note: Weighted base devices (e.g., barricade warning lights, floodlights or other types of illumination, traffic cones, delineators, and orange flags to supplement important warning signs) must include all weights required to retain the device in its proper position and working order at no extra cost to the Department or Local Public Agency (LPA). Payment for these devices may be provided under Rent Incidental Traffic Control Item.

Although they are not traffic control devices, guardrails (e.g., W beam and concrete rails) have considerable value in some traffic control schemes to protect traffic and work areas.

Condition and Maintenance. Regardless of whether a traffic control device is covered by a pay item or its cost is incidental to other items, only those devices which are in good condition and meet the requirements of the MUTCD and specifications for color, size, design, intensity, and reflectivity will be used on a project. It is important that once installed on the project, the devices be kept clean, in a good state of repair, and properly located and supported. Properly installed and maintained devices command the respect of motorists and greatly enhance the desired effects. Conversely, improper devices and sloppy maintenance have the opposite influence on motorists. The project should be reviewed to determine if traffic control is to be monitored on a 24-hour basis. If so, it should be clearly specified.

Construction Signs.

Reflectivity. Sheeting on signs used for traffic control is specified to meet retroreflectivity requirements of either Class A or Class B. Class A is enclosed lens retroreflective sheeting and is normally called Engineering grade. Class B is referred to as high performance and is much more reflective than Class A. Class B sheeting can be identified by patterns within the sheeting. Class A sheeting is void of any such pattern. Generally, the sheeting for red and orange signs will be Class B, and the sheeting for white regulatory signs will be specified as Class A. All traffic control devices signs are required to have Class B, Type III, High-Intensity sheeting, and a minimum required retroreflective reading as stated in ASTM D4956. Regulatory Black/White signs are exempted from this requirement. Retroreflectivity readings may exceed minimum requirements, but at no time will they drop below 75percent of the initial reading for Type III, High-Intensity sheeting as stated in ASTM D4956. Questions regarding acceptability of retroreflective sheeting should be referred to the District Traffic Engineer.

Design. The Standard Highway Signs Manual and the MUTCD provide information on the design of the most commonly used construction/maintenance warning signs. Legends other than those shown in the MUTCD may be used provided that the signs are of the same shape and color as standard signs of the same functional types, and have been approved in the TCP. Symbols used on signs must be as provided for by the MUTCD.

All sign sizes, text, sign numbering and design must be as indicated in the ITD Sign chart unless approved by the Department before use. Sign sizes for standard signs are minimum allowable dimensions.

Position, Mounting Height, Location, and Spacing. These requirements are covered in the MUTCD and the Traffic Manual. Some clarification by the Engineer may be necessary regarding the requirements on mounting heights.

The MUTCD establishes basic mounting heights above road surface for primary signs at 5 feet for rural areas and a minimum of 7 feet for urban areas. These standards apply to all primary signs with the exception that temporary signs may be mounted on portable supports a minimum of 1 foot above the road surface unless otherwise shown in the plans or directed by the Engineer. Temporary must shall be considered as **only** those signs which are mounted on temporary supports and used in the workzone for a continuous period of less than three (3) days. Thus, if a sign is needed at a location for a continuous period of three (3) days or more, it must be mounted either 5 or 7 feet above roadway elevation in accordance with the MUTCD. The lower standard does not apply to Regulatory signs (e.g., speed limit, stop signs).

Signs that are left in place when they no longer apply are as much of a problem as not having a needed sign. They may, in fact, create more resentment by motorists than the latter condition. It is imperative that signs that no longer apply be removed; or if not in use for a period not to exceed two (2) hours, that they be covered or moved to a location at least 15 feet from the edge of the traveled way and laid flat to the ground when not required. The cover should be fabricated from material which is not a vapor barrier.

Covers such as plastic garbage bags can cause damage during warm weather to the plastic reflective sheeting mounted on the sign. Signs and sign supports that are not in use beyond the two (2) hour period must not be allowed to remain on the roadway shoulder.

A. Flagger Signs

It is important that the proper sequence of signs precede the flagger position. The placement of warning signs needs to take into account the length of traffic backup rather than the location of the front of the vehicle queue. Then when the flagger is not required, the signs must be turned, covered, or removed.

Construction Barricades and Drums.

Reflectivity. All barricades and drums must be orange and have white Class B retroreflective sheeting.

Night time inspections should be performed periodically to verify adequate reflectivity of all temporary traffic control devices.

Function, Design, Construction, and Application. These requirements are covered in some detail by the MUTCD. Some items, however, need to be emphasized:

- Diagonal stripes on barricades must slope downward in the direction traffic is intended to pass by the barricade, or in compliance with the MUTCD.
- Drums or barricades should never be placed in the roadway without advance warning signs. Under severe conditions (e.g., heavy traffic volumes, severe curvature) it may be advisable to use flashing beacons on single drums or barricades and steady burning lights on a series for night use. All signs and battery-operated flashing or steady burning lights shall **only** be used on devices that have been crash tested and approved for the same configuration and use.

Traffic Control Signal.

- Traffic control signals must meet all the requirements specified by the MUTCD.
- Requires interconnection or daily time based synchronization to operate properly.

Flashing Beacons. The MUTCD includes several specific requirements on size, mounting, visibility, flash rate, and lamp wattages under Section 4. Do not confuse a flashing beacon, which normally operates on 110 to 120 volts, 60 Hz. A.C., with a battery-powered barricade warning light.

Advance Warning Arrow Panels. The primary application of this device is to assist in the diversion of traffic (e.g., lane closures on multilane highways and total diversion to an interchange ramp).

The specifications require these devices to be capable of 50 percent dimming for night operation. This is necessary to reduce driver disability glare that would otherwise result from the 12 to 15 lamps operating at full lamp voltage during hours of darkness.

Project plans will require the use of advance warning arrow panels for lane closures and diversions on multilane highways where the designers anticipated the need for this device. However, if the job conditions or Contractor operations later dictate lane closures or diversions on rural multilane roadways, a change order should be negotiated to establish the use and agreed price of this device. Very short time diversions and lane closures may not justify the use of advance warning arrow panels.

Temporary Pavement Marking Tape. The ITD Standard Specifications adequately cover the materials requirements and application. The color of the pavement marking tape shall be in accordance with the color requirements for permanent pavement markings, summarized as follows:

- Yellow separates opposing traffic.
- White delineates the separation of traffic flows in the same direction.
- White is used for pavement marking legends and symbols.

The Resident should request the assistance of the District Traffic Engineer in laying out complex pavement marking schemes.

Temporary pavement markings that no longer apply must be removed immediately.

The specifications require marking of all new asphaltic surfaces (e.g., leveling courses, scrub coats, ATB's, and surfacing courses) on a daily basis. Unless otherwise provided, Department or Owner representative personnel will be responsible for temporary markings on new seal coats and surface treatments. The markings must be applied to seal coats and surface treatments immediately following brooming. Paint may be used in lieu of temporary pavement marking tape if the tape will not adhere to the surface.

No roadway will be opened to traffic until proper pavement markings are in place.

Traffic Control Maintenance. The item Traffic Control Maintenance is provided on projects with traffic control devices. This bid item complements other SSHC Section 626 items and is intended to pay for relocation and maintenance of devices not paid for or rented under other bid items, including incidental traffic control items and costs associated with providing monitoring and surveillance of traffic control devices.

The TCPs and/or special provisions will specify the type of special monitoring and surveillance required if extra attention to these matters is considered necessary due to high traffic volumes or higher speeds.

The Contractor should not be expected to furnish personnel for this activity on a full-time basis unless the plans and specifications explicitly include this requirement.

Regulatory Speed Control Zones. A reduced speed limit should be based on good judgment, experience, and evaluation of geometrics and should not be based merely on the idea that such action will somehow absolve the Department, LPA, or Contractor of any responsibility in case of accidents.

Prior to establishing reduced speed zones through construction projects, some important considerations should be evaluated:

- Is there another feasible and possibly better alternative than reducing the speed limit? Studies have indicated that generally fewer accidents are likely to occur if traffic can be safely accommodated at the prevailing speed limit.
- Based on previous experience, can a reduced speed limit be enforced by a reasonable or normal level of law enforcement?
- If roadway alignment is one of the factors involved in the need to reduce speed, has safe speed been determined by sight distance determinations and by ball bank indicator measurement on horizontal curves?
- Can the reduction in speed be held to a maximum of 10 mph less than the normal posted speed?

Reduced speed zones are often appropriate due to roadway or lane conditions (e.g., constrictions, temporary surfaces, alignment revisions, construction activity interference). Transportation Board Policy 4016 and Administrative Policy A-12-03 give the District Engineer the authority to establish special speed regulations through construction and maintenance zones on the state highway system. This is accomplished by letters signed by the District Engineer and directed to the District Lieutenant of the Idaho State Police and local law enforcement agencies stating the special construction zone speed limit, the location, the date it will become effective, and any special application (e.g., during working hours only). Copies of the letter must be furnished to the Resident Engineer, District Files, District Traffic Engineer, and the Contractor. Speed zone reductions must be removed as soon as they no longer apply.

When the construction speed zone is removed, a follow-up letter from the District Engineer must be sent to the law enforcement agencies informing them of the reversion to the normal speed limit.

Establishment of reduced construction speed zones on locally sponsored projects not on the state highway system requires approval of the appropriate governing body. These procedures must be followed on all projects requiring special speed zones regardless of the origin of the request or requirement. Projects including detailed TCPs that show reduced speed zones must be handled in the same manner as those projects on which speed zone requests originate on the job.

State-Furnished Signs. The specifications indicate that certain guide and regulatory signs will be furnished by the State. This is intended to apply to regulatory and guide signs which are presently installed within the project limits and the construction operations requiring relocation of these signs. However, because some guide signs are difficult to acquire on short notice, the State will also furnish temporary destination signs and route markers.

Traffic Control Plans. It is a Department policy that every highway construction project plan includes a construction TCP. The TCP will vary in complexity and impact on project costs depending on the type of construction and the speed and volume of traffic to be accommodated.

Department policies which mandate TCPs and key elements of those plans are as follows:

A. Administrative Policy A-12-04 Traffic Control during Construction, Maintenance, Utility or Private Development Operations:
   Key elements of this policy regarding construction projects are as follows:
   1. Public convenience must be considered on every project.
   2. The movement of Traffic must be inhibited as little as possible.
   3. Maximum delay to traffic should not exceed 10 minutes per stop nor 15 minutes total if more than one delay is necessary to move traffic completely through a project.
   4. The construction TCP will provide, if appropriate, limitation of Contractors' operations during periods of peak traffic volumes.
   5. Construction contracts must include a comprehensive construction TCP that addresses the safety and efficiency of traffic, pedestrian, and bicycle movement during construction.
   6. Any changes to the construction TCP require the approval of the Engineer or their designee before implementation.

B. Roadway Design Manual, Section 300 Preliminary Design, Subsection 355

These sections of the Roadway Design Manual set forth policy and procedures on TCPs. Among items covered and not discussed elsewhere in this manual are the following important points:

1. TCPs for interstate highway projects should provide for minimum interference with the free flow of traffic.
2. Stopping of interstate traffic must be avoided and only considered in an emergency.

The above described policies cannot be enforced with the Contractor unless they are appropriately adopted by the contract. However, if the designers have neglected including provisions as required by policy or if contract changes are made that may require employment of the described policies, a change order must be prepared to incorporate provision of the applicable policies.

TCP's may be revised at the request of the Department, or LPA, or the Contractor to provide for a better or more efficient plan or to accommodate revised work, or a Contractor proposal to pursue project construction in a manner different than anticipated by the designer. Major revisions in TCPs will be accomplished only after a contract change order allowing the revision is approved. Alternate TCPs will be evaluated for acceptance on the basis of equality of safety and traffic accommodation and cost as compared to the original TCP.

Documentation for Determining Pay Quantities. The diary will be used to verify the location and type of temporary construction traffic control devices placed on the roadway.

Construction operations are not to begin until traffic control devices are approved by the Engineer.

No payment will be made for devices that do not conform to the MUTCD. This includes, but is not limited to, installation height and spacing, reflectivity at night, and sign face condition.

For ease in calculating, it is suggested that the sign chart in the construction TCP list the square foot quantity of each sign. The ledger will summarize the total quantity of the item and reference the diary and charts as the source documents. Quantities must be computed to 0.01 ft^2, and rounded to the nearest 0.1 ft^2 on the estimate.

The inspector assigned to traffic control on the project should number and date each sign, barricade, or drum as it arrives on the project to aid in maintaining an inventory for payment.

As stated in the specifications, a traffic control device once paid for is available for use on the project(s) throughout the life of the contract, at no additional cost to the Department or LPA, including repairing or replacing it. The Traffic Control Maintenance item reimburses the Contractor for its use once the device has been employed.

If the Engineer approves removal of all construction traffic control devices from the project(s) and it later becomes necessary to reemploy some of the devices, the payment and inventory requirement become reinitiated. An example of this situation would be as follows:

> Paving of a project is completed and seal coating is to be done the following year. If the Engineer approves removal from the project(s) of all devices upon completion of paving, it will be necessary to pay the Contractor the following year to provide the required devices. Therefore, it behooves the Engineer to evaluate traffic control device requirements on subsequent phases of construction prior to authorizing their removal upon partial completion of the project.

Furnishing of traffic control devices by a subcontractor or by the Contractor has no bearing on how payment under this item is to be administered.

The diary will be used to verify traffic control maintenance, date, and explanation of work performed. Tickets or ITD-0370 or ITD-0371 Weekly Force Account sheets would be acceptable documents on a daily basis. Regardless of the means of documentation, concurrence on a daily basis of quantities must be verified by the Contractor representative's initials along with the Engineer representative's initials on the source document. According to the specifications, traffic control maintenance will be measured and paid for by the hours of authorized traffic control maintenance. Hours of traffic control maintenance will be reported to the nearest 0.5 hour. Any overtime for traffic control maintenance has no bearing when reporting hours worked for Contractor payment.

When a flag person sets up signs, that period of time will be paid as traffic control maintenance. There will be no payment for flagging during that same period of time.

Reports. None.

626.02 Flagging and Pilot Cars

General. Flag persons furnished by the Contractor to control traffic will be trained using a Department-approved course and have a valid flag person's card on their person. Idaho's cards are valid for three (3) years from the date of issue. The Department currently accepts all American Traffic Safety Services Association (ATSSA) and Evergreen Safety Council cards and cards issued in Washington, Oregon, Montana, and Utah (under a reciprocity agreement with these states), provided they have been issued within the last three years. The flag person's card must be verified and documented by diary entry, recording the card number, organization, and state that issued the card. It is strongly suggested that flag person's cards be scanned and electronic copies be placed in the project files.

Acceptable flagging equipment and attire, as described in the most current issue of the MUTCD as adopted by the State and the contract, must be used. **Flaggers are required to wear matching hats and vests at all times.** All equipment deemed to be inadequate should be rejected. A guide published by the ATSSA can be used to determine the serviceability of signs and some flagging equipment.

All pilot cars must be equipped with the proper signing and mounting, as designated in the current MUTCD as adopted by the State, and be properly mounted. The vehicles used for piloting must be in good running condition and be equipped with a roof-mounted, high- intensity rotating or strobe type amber flasher visible to both oncoming and following traffic.

Documentation for Determining Pay Quantities. The diary will be used to verify the activity, date, and work location. The ITD-0370 or ITD-0371, Weekly Force Account sheets, are acceptable documents for use on a daily basis. Other district-generated forms are also acceptable.

Regardless of the means of documentation, concurrence on a daily basis of quantities should be verified by the Contractor representative's initials along with the Engineer representative's initials on the source document.

According to the specifications, flagging will be measured and paid for by the hour of authorized flagging and pilot car by the hour of authorized operation. (e.g., if two pilot cars were authorized for six hours each, the pay quantity for that day would be 12 hours. Similarly, if two flaggers must flag traffic for an 8-hour period, payment is made for a total of 16 hours, even though a third flagger may have been employed for relief.)

Hours that are authorized for flagging and pilot car operation must not include show-up time or standby time. Hours of flagging and pilot car operation must be reported to the nearest 0.5 hour. Overtime for flaggers or pilot car operations have no bearing when reporting hours worked for Contractor payment unless they are being done separately under change order conditions. Flagging paddle and pilot car operating time are by pay units, not payroll hours.

Reports. None.

627.00 Painting.

General. Paint removal, disposal, and new painting specifications are changing because of environmental and personnel safety concerns. Field staff should thoroughly review each contract specification when involved in inspection of this type of work.

When the paint arrives at the job site, the inspector must check that the specified paint formula and system is being used.

Each District Materials Engineer has the "Pictorial Surface Preparation Standards for Painting Steel Surfaces," as well as the SSPC Painting Manual, Volume I, "Good Painting Practice," and Section 2, "Surface Preparation Specifications," from SSPC Painting Manual, Volume II. These three guides will be of great assistance in eliminating painting problems.

Painting must be performed under clean, dry conditions. Moisture on the surface will be trapped by the paint and prevent bonding. Moisture or dust in the air will cause a speckled or blotchy appearance. Cold weather also inhibits good bonding of the paint.

The new paint systems must be applied in accordance with the paint manufacturer's recommendations utilizing proper pressures, paint guns, and nozzles. Because of the quick-drying nature of some paints, the gun must be held close enough to the metal to get the paint to the metal in a moist condition and thereby ensure a sealing coat. Several conditions of improper application, thinning, extreme temperature can arise that will allow the paint to dry or be nearly dry upon contact with the metal. These undesirable conditions must be corrected immediately.

The painting must follow the sandblasting as quickly as possible. Generally, anything sandblasted one day should be painted with the prime coat the same day unless inside dry storage of the structural steel is utilized. If dew, rain, or other moist conditions dampen the near-white sandblasted steel surface, immediate rusting will occur, and the metal would require sandblasting again.

Inspection of steel that has been cleaned by sandblasting should verify that the surface meets the specified color or preparation. To ensure the proper thickness of paint on the steel surface, the dry film mil thickness must be checked by means of a gauge or meter. The inspector should document where the depth checks were made and choose checkpoints so as to check all types of surfaces.

Painting of the concrete will be required when noted in the special provisions, on the plans, or when initiated by change order. The concrete surface preparation must be an ordinary surface finish, as stated under SSHC Subsection 627.03.E. The concrete must be cured by one of the methods designated under SSHC Subsection 502.03.J. Painting will follow the manufactures recommendations for the best results.

Documentation for Pay Quantity. Painting will not be paid for separately unless otherwise provided. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry.

Reports. None.

628.00 Snow Poles.

General. Supplemental guidance to the Standard Drawing (628-1) for installing snow poles can be found in the Traffic Manual, Section 261.

Documentation for Pay Quantity. The diary will be used to verify the activity, date, and work location. Quantities will also be documented by diary entry.

Snow poles will be paid for by the each unless otherwise indicated with acceptance by the RE letter or as otherwise specified.

Reports. None.

629.00 Mobilization.

General. Mobilization is an item to reimburse the Contractor for monies spent to initiate the start of a project including: bonding, insurance, and initial material acquisition.

Documentation for Determining Pay Quantities. SSHC Subsection 629.05 is quite explicit on how the Contractor is to receive payment for the mobilization bid item. This specification does not allow payment for mobilization to exceed 10 percent of the total contract amount until completion of the project work.

Reports. None.

632.00 Removal of Bridge Deck Concrete.

General. Removal of bridge deck concrete can be complicated depending on project-specific situations. Consult with the Bridge Section if there are any major issues or questions regarding procedures to follow.

SSHC Subsection 632 specifies requirements for removing concrete in the upper portion of the deck (Class A) followed by the selective removal of any remaining defective or deteriorated concrete (Class B). All exposed reinforcing steel must be cleaned and debris and water removed.

Before the Contractor begins removal operations, verify the following:

- All bridge drains have been plugged.
- Expansion joints and barrier curbs are protected.
- Milling of the overlay, if any, has been satisfactorily completed and accepted.
- The line separating deck sections where removal is not required (see plan sheets) has been saw cut to a depth approximately 75 percent of the planned removal depth. **Note**: care should be taken to avoid cutting any rebar.
- The hydro-demolition equipment shielding (typically rubber mats), used to prevent flying debris, is in good condition.
- Adequate protection (e.g. plywood sheets) has been provided to protect the public from flying debris both on and under the work site. Even when the equipment shielding is in good condition, aggregate and other debris can shoot out and travel quite a long distance.
- Provision for water and residual debris containment are adequate and prohibited from flowing into the vehicular and pedestrian traffic areas and into nearby waterways, also including under the worksite. Verify that any temporary collection ponds are lined with an appropriate material.

Class A Removal. Class A removal consists of the removal of all concrete from the top surface of the deck over the area shown on the plans to the mean depth limits shown on the plans. Removal may be accomplished by either hydro-demolition or mechanical means.

Before beginning Class A removal, a pre-operational meeting should be held with the Contractor. Topics to discuss include:

1) Size and type of equipment to be used. Equipment should be able to make a series of equal passes to remove the requisite width and depth of concrete.
2) Containment of debris and water runoff.
3) Methods for disposal of removed material.
4) Manufacturer representation.
5) Methods to be used for measuring Class A and B removal quantities.
6) Contractor is responsible for depth of cut adjustments during Class A removal. Any work required because of over or under removal or deck blow-outs is at no additional cost to the Department or LPA.

Hydro-demolition. Hydro-demolition involves the pressurization of water and the controlled delivery of a water jet to demolish the cement matrix between the concrete aggregate. It can attain a high production rate while removing concrete to the desired depth. The equipment consists of both a power unit and a demolishing unit. The power unit is typically housed in a large metal container on a flatbed trailer tractor. The demolishing unit is typically a microprocessor-controlled wheeled vehicle equipped with a water delivery nozzle. High pressure water is delivered from the power units to the nozzle by flexible hosing. If a water source is not readily available, a water supply truck is also required.

Do not allow any work to begin if:

- A qualified full-time representative of the manufacturer of the hydro-demolition equipment is not present and available as required by the specification. The representative is required on site during trial area removal and until the work is progressing satisfactorily.
- Documentation that the equipment is operated by qualified personnel trained by the manufacturer has not been provided.
- The Contractor does not have sufficient spare parts and service to maintain to maintain the operation of the equipment.

The Contractor must satisfactorily demonstrate that the equipment, labor, and methods of operations can achieve the specified Class A removal depth. The Engineer designates the location of the trial area and the trial area is then demolished until satisfactory removal (i.e., specified mean depth and as determined by the Engineer) is achieved. Reject any equipment and personnel that do not produce satisfactory results.

Locate the trial area within a uniform section of the deck that appears in good shape (i.e. sounder concrete where deterioration or delamination is not present). Make sure the trial area is not located in an area where previous patching is present. Patching material usually has a significantly higher strength than the original concrete and could result in an over-removal of Class A material.

Removal of both above and below (e.g., when patches or delaminated concrete are encountered) the mean depth is expected for this type of work, is included in the contract unit price for Class A removal, and is addressed in the specification:

- If the hydro-demolition removal extends beyond the mean removal depth where unsound concrete is encountered, the Department will still consider the work Class A removal at no additional cost to the Department.
- Remove concrete not removed to specified limits during hydro-demolition by mechanical means. This would be at no additional cost to the Department or LPA.

These points should be emphasized to the Contractor during the pre-operational conference.

The system operating parameters for Class A removal are established based on satisfactory removal of the trial area and is critical for ensuring that the mean removal depth is attained during production. The depth of cut is adjustable in several ways and includes:

- The rate of travel forward by the mill
- The rate of traverse on the cutting arm

- The size of orifice in the water jets
- The angle of their attack.

The depth of removal is normally adjusted using only the rate of travel by the forward mill. Document the trial area work in the construction diary and obtain a copy of the established operating parameters for the project files.

Verify that the equipment has begun moving prior to the actual removal. Monitor and document removal depths and overlap of equipment passes throughout production. Watch for areas of deteriorated concrete or patching. Some contractors try to reduce Class A patching removal and Class B removal requirements by setting the operating parameters higher than what is needed for the specified removal depth. This can result in an increase in deck blowouts because of excessive water pressure and increase the volume of material needed for the deck overlay. Patches frequently require removal by mechanical means because of its high strength. Verify that the contractor is adjusting for depth of cut appropriately during production. If not, stop work and discuss.

Also verify that the actual depth of the reinforcing steel is not higher than what is shown in the plans. The design intent of Class A removal is to take off the concrete surface that is above the top mat of reinforcing steel (though again some exposure is expected). The mean removal depth may need adjustment if the reinforcing steel was higher than what was shown in the plans.

Finally, ensure that the contractor is adequately supporting any exposed unsupported reinforcing steel following Class A removal and that it is protected from construction operations. Do not allow any equipment on unsupported reinforcing steel. Require the Contractor to repair any damaged reinforcing steel. The approved repair method is at no expense to the Department (or LPA).

Mechanical Removal. Class A removal by mechanical means is either by power-operated diamond grinding machinery or jackhammers. Diamond grinding is used in lieu of hydro-demolition while jackhammers are normally employed for removal of patching material, other discrete areas that may be higher than the specified removal depth, and areas inaccessible to the hydro-demolition equipment.

If diamond grinding is to be employed, contact the equipment manufacturer to verify equipment operating requirements for the specific project in question. Document the results in the project file.

Verify that equipment maximum ratings are not exceeded. See the specification for specific removal requirements.

Communicate to the Contractor the specification requirement that: If reinforcing steel is exposed, immediately stop work and request instructions from the Engineer. The Engineer should then evaluate the best method(s) for protecting the reinforcing bar from being damaged or de-bonded from the concrete. This may require changing the type of jackhammer bit or raising the grinder teeth to avoid nicking the reinforcing bar.

Runoff and Cleaning. The demolished concrete and water combine into a mixture of rubble, slurry, and excess water that must be contained and removed. See SSHC Subsection 632.03 for containment and removal requirements. Do not allow brooming as an option for cleaning. Brooming does not effectively remove fine particles.

Ensure that the cleaning is timely (i.e. promptly follows removal), so that the material is not allowed to dry. If the material is allowed to dry, it will adhere to the deck and become extremely difficult to remove. Regardless, the deck must be completely cleaned of all debris and water to ensure that a clean, bondable surface remains.

Cleaning of Exposed Reinforcing Steel. Also included in Class A removal is cleaning any exposed reinforcing steel of rust, scale, and corrosion. This is necessary so that the new deck overlay material will bond with the steel. The hydro-demolition operation typically removes a majority of rust, scale, and corrosion but the Contractor may still have to employ additional methods such as sandblasting. Verify that the steel has been adequately cleaned.

Class B Removals. Class B removal is comprised of removing:

1) Localized areas of deteriorated concrete remaining after Class A removal
2) Concrete around de-bonded reinforcing steel.

Areas for removal are designated by the Engineer and should be clearly marked in the field. Verify that equipment maximum ratings are not exceeded. See the specification for specific removal requirements.

Remember, partially exposed reinforcing steel does not automatically mean it is de-bonded. Verify bonding conditions before requiring removal. Removal of concrete around bonded reinforcing steel tends to cause loosening ahead of the process and could result in excessive removal.

Documentation for Pay Quantities. Payment for both Class A and B removal is by area and require field measurements. Provide the Contractor with quantity computations regularly throughout the work. Quantities and computations can be reported via the construction diary, the pay item report, or the ITD-0404 form.

Reports. Document all discussions, work activities, including locations and depth of removal verifications, in the construction diary. Supplement with photographs and videos, especially if any issues or irregularities occur.

633.00 Construction Maintenance During Winter Suspension.

General. If winter maintenance is required for a construction project, a pre-suspension meeting must be held between the Engineer and the Contractor to determine the level of maintenance on the roadway during suspension. The equipment, work force, and materials necessary for the maintenance will be determined at this time. All equipment being used and paid for must be available at all times and materials necessary for repairs must be readily available.

All actual loaded labor costs to the Contractor for this work must be paid for, including travel time (actual costs).

Payment for any work accomplished by a piece of equipment during a one-month period will not amount to less than the equivalency of 100 percent of the owner's monthly equity rate.

Documentation for Pay Quantities. The diary will be used to verify the activity, date, and work location. Weekly force account sheets should be kept in duplicate and signed by both parties.

Reports. None.

634.00 Mailbox.

General. Mailboxes and their supports must meet the Departments' minimum standards for construction as shown in the ITD Standard Drawings. ITD Standard Drawings 634-1 and 634-2 reference mailbox details. Mailboxes and newspaper appurtenances can be a safety hazard depending on the cross-section dimensions of the highway, sight distance, the impact resistance of the support, traffic volume, and if vehicles must occupy a portion of the travel way when accessing the mailbox.

If possible, the mailbox and support should be erected with the following considerations in mind:

- Easy access in an area not exposed to traffic
- Good sight distance in advance of the mailbox
- Be of the nature and type that does not present a hazard if struck by a vehicle and contains supports that break away safely if struck.

Current postal regulations should be consulted for specific set-back requirements applicable to the area and roadway type involved. Additional guidance on mailbox installations can be found in the latest edition of AASHTO A Guide for Erecting Mailboxes on Highways.

Documentation for Pay Quantity. The diary will be used to verify the activity, date, and work location. Quantities and final measurements will also be documented by diary entry.

Excavation and compacting backfill work related to the mailbox installation is considered incidental unless otherwise specified.

Reports. None.

SECTION 600 – ANCILLARY CONSTRUCTION

640.00 Construction Geotextiles.

General. The term Construction Geotextiles as used here applies to the broad category of textile type materials manufactured with the purpose of being used with soils, rock, earth etc. as part of an engineered structure or system. They may be manufactured from a variety of raw materials including synthetic polymers, glass fibers or natural fibers such as cotton, jute and other plant based substances. Those made from synthetic polymers of polypropylene, polyester, polyethylene or polyamides (nylon) are known as geosynthetics. However, the term geosynthetics is commonly synonymous with the phrase construction geotextiles.

Construction geotextiles typically serve one of the following primary functions: filtration, drainage, separation, reinforcement, fluid barrier and protection. Some may serve more than one function. Their applications are usually defined by their primary function. They are identified by one or more of the following: their general class, the type of material from which they are made, their method of manufacturing and select physical properties.

The four major sub classes of construction geotextiles or geosynthetics are: geotextiles, geogrids, goemembranes and geocomposites. The vast majority of geotextiles are classified as either woven or non-woven. Woven are typically natural materials manufactured similar to other cloth making processes and are characterized by high tensile strengths, high modulus and low elongation. Non-woven geotextiles are typically synthetic polymer fibers or filaments continuously extruded then subject to being spun, blown, needle punched, heat bonded, or welded into a textile layer. They are characterized by high elongation and permeability.

Geotextiles are generally permeable materials manufactured from polymers, fibers or yarns and combined into planar, textile structures. Geotextiles are typically used in filtration, drainage and separation applications. A typical application would be to prevent soils from migrating into drainage aggregate or stop sub grade materials from penetrating into the road base. They usually allow water flow through the system.

Geogrids are permeable layers of synthetic materials used primarily for soil reinforcement. Geogrids are manufactured by a knitting or weaving process similar to the non-woven methods referenced above and then coated. They have larger apertures or openings which allow the fill material on either side to interact and interlock while allowing vertical drainage of free draining soils. Hence, they act primarily to add tensile strength to the soil matrix thereby providing a more competent structural material. They are common in the construction of retaining walls and in separation and stabilization application.

Geomembranes are commonly impermeable or low permeable materials used to act as fluid barriers and to affect a seal or separation of the adjacent layers. They are used in applications requiring containment, lining, capping and sealing.

Geocomposites consists of materials that can provide two or more of the above sub class functions. Geocomposites are often used as a substitute for conventional graded aggregate or perforated pipe subsurface drainage systems. Geocomposites such as geonets, sheet drains, pavement edge drains, and prefabricated vertical drains (PVD or wick drains) are used mainly for drainage. Geocomposites may be a single material or the same results can be accomplished using combinations of different materials together.

Construction Requirements. Field personnel must be properly trained to observe all phases of the construction.

Handling, storage and installation requirements must follow the contract provisions and the manufactures' written recommendations. Emphasis should be placed on ensuring material is not wrinkled or folded when laid out and the required overlaps are made. Geotextiles can be contaminated during placement so they will not drain, geogrids can experience broken grids which reduce strength and geomembranes can be punctured reducing their effectiveness as a water barrier. All seams, both factory and field, need to be checked for flaws. The inspector should note that care is taken to prevent void spaces behind or under the material and that good contact with the underlying layer is made. Also ensure that dumping damage does not occur during covering and construction equipment is not allowed to drive on the material until adequate cover has been placed over it.

For uniaxial geogrids check to ensure the strong direction, normally the roll direction, is placed in the direction as shown in the plans.

General questions should be directed to the material manufacturer or the Geotechnical Engineer in the Construction/Materials Section. However, material and construction details changes such as those around penetrations and adjacent structures are highly dependent upon the design and any variations in these should only be done with the approval of the designer and documented by the Engineer.

Documentation for Pay Quantities. The diary should be used to note the activity date and acceptable completion of the work. Material description and lot numbers need to be checked to verify they match the contract requirements and the certifications which should come with the shipment. The material should be measured in the field and the pay item entered on the diary or the pay item report. Construction Geotextiles will be measured and reported to the nearest 1.0 SY of material in place less overlaps. Do not pay for material until certification is received.

Reports. Test reports as required per QA Manual Section 270.

SECTION 600 – ANCILLARY CONSTRUCTION

656.00 Traffic Signal Installation.

General. This work is very specialized requiring the services of a licensed electrical contractor. Few inspectors have had sufficient experience to thoroughly and adequately inspect this type of work. To overcome this problem, it is recommended that the District Signal Electrician work closely with project personnel to assure plan and specification compliance.

Experience has proven that many potential problems can be averted or minimized by a special pre-operational meeting involving the electrical prime contractor or subcontractor, project personnel, and the Signal Shop Superintendent or District Signal Electrician. This special pre-operational meeting should be held immediately prior to starting the electrical work. It is especially important that the Contractor's job superintendent or foreman attend this meeting. The conduct of the meeting should be informal and cover the real "nuts and bolts" problems that may be expected or that have occurred on previous projects.

Common Construction Errors. Over the years, a number of recurring construction errors have been discovered regarding electrical work either at final inspections or later when maintenance work was being performed. A list of these more common errors follows. This list is included as a reminder for inspection personnel and should not be substituted for the pre-operational meeting where this list of errors should be presented and discussed with the Contractor.

A. Common Conduit Installations Problems
   1. Use of plastic conduit for elbows greater than 45^{o} instead of steel (as required) causing conduit to be cut when wire is pulled.
   2. Minor bends in conduit without proper use of bending tool causing partial collapse of conduit and resultant problems pulling wire through conduit.
   3. Use of rocky material for conduit backfill instead of fine soil/sand results in eventual collapse of conduit.
   4. Failure to clean dirt and moisture from conduit prior to pulling wire.
   5. Failure to cap stub/free ends of conduit resulting in intrusion of soil and moisture.
   6. Conduit buried at less than required 24 inch depth causing future maintenance problems, such as inadvertent cutting or mashing of conduit.
   7. Placement of conduit by other than a certified licensed electrical contractor. This can result in rejection by the State Electrical Board.
   8. Placement of conduit at locations other than shown on the plans without proper indication on the as-constructed plans.

B. Common Foundations Problems
   1. Improper or wrong size anchor bolts installed or installed out of alignment for proper pole base plate fit.
   2. Foundation not set at proper elevation.

3. Improper backfilling or lack of mechanical tamping around foundation may result in eventual tipping of the foundation and pole.
4. Failure to grout under the base of pole.
5. Improper placement of structural concrete per ITD Standard Specifications Subsection 502.03 (exceeds 5-foot max drop).
6. Improper size of signal cabinet foundation installed. This is a common problem with projects that have multiple signal installations and it is assumed that all cabinets take the same foundation.

C. Common Pole Erection Problems
1. Rotation of signal mast arm 180° from designed position resulting in a drooping instead of a raked appearance.
2. Failure to accurately plumb poles after all hardware is in place.
3. Failure to properly tighten fasteners.
4. Failure to clean or chase internal threads, prior to component attachment.

D. Common Expansion Fittings Problems
1. Failure to install a proper conduit expansion unit at structure expansion joints.
2. Failure to provide expansion couplings on long runs of plastic conduit may result in buckling of the conduit.

E. Common Wiring Problems
1. Failure to use a wire lubricant prior to pulling through conduit may damage the wire, its insulation, or the conduit.
2. Use of extreme force and speed to pull wire such as with a vehicle may damage wire, its insulation, or the conduit.
3. Failure to pull signal cable by hand may damage insulation due to the sharp bends normally required in signal installations.
4. Unauthorized splices in buried or concealed junction boxes that create future maintenance problems.
5. Failure to use insulated bushings at conduit entrances to metal junction boxes, cabinets, etc. will scuff insulation from the wire when it is pulled.
6. Unauthorized splices in signal cables (signal head wiring, video or loop detection). The specifications allow no splices, as splices are a common source of problems in signal installations. The cable must be continuous between terminal connections.
7. Use of wrong type or size of wire or wire with improper insulation.
8. Failure to use approved wire connectors and insulated splice kits.

F. Common Signal Loop Wiring Problems
1. Improper splicing of signal loop detector lead-in wire which may break down causing moisture to enter the splice and ground the loop making it inoperable.
2. Improper use of shielded conductors for loops.
3. Use of a loop lead-in wires other than the approved type.
4. Allowing the Contractor to use a sharp instrument, such as a screwdriver, to force loop wire into the sawed slot causing damage to the wire or insulation.
5. Use of a tar or asphalt sealer which are not approved for use on loops and splices.

6. Use of non-approved loop sealant.
7. Slots sawn for loop detectors, not wide enough for proper embedment in sealant.
8. Loop system testing not being recorded and certified on ITD-2698.

G. Common Video Detection Problems
   1. No site review by manufacturer's representative(s).
   2. Improper field of view set in camera.
   3. Improper detection zones in configurations. Must be per the detector loop spacing plan (Standard Drawing I-5).
   4. No consideration for seasonal low sun angles.
   5. No follow up to confirm operation during dusk to dawn operation.

H. Common Interconnection Problems
   1. Fiber optic interconnect system is not properly installed to control minimum bending requirements of fiber optic cable.
   2. A specified length of fiber optic cable is not installed in maintenance loops.

I. Common Grounding Problems
   1. Failure to connect poles, junction boxes and other equipment to the service ground by an insulated AWG 8 soft-drawn stranded copper wire.

14-Day Field Test. It is the intent of this specification to provide two weeks of standard operation with photocell, manual, or other specified turn-on control. During this test, the Contractor should be responsible for all corrective work resulting from improper installation, workmanship or materials. Following successful completion of the test, the Resident should recommend partial acceptance covering signalization. The cost of power consumed during the test period should be borne by the agency or agencies assigned maintenance responsibility by the cooperative project agreement.

Documentation for Pay Quantities. The diary shall be used to verify the activity, date, and work location.

Reports. None.