

OREGON DEPARTMENT OF TRANSPORTATION

**INSPECTOR'S
MANUAL**

2001

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Introduction

This 2001 edition of the ODOT Inspector's Manual replaces all previous or draft versions.

This Inspector's Manual provides guidelines to the Inspector for inspecting and documenting work on ODOT contracts.

This Inspector's Manual references the Oregon Standard Specifications (2001 or later version) and other publications.

Although this Manual provides guidelines for inspecting many work items on ODOT projects, it does not include discussion on some work items. For work items not covered in this Manual, the Inspector must work with the Project Manager and others as needed, to determine:

- Items or processes to be inspected,
- Inspection processes, including timing of the inspections and any needed inspection at a manufacturer facility,
- Quality documentation not specifically defined,
- Processes to measure or calculate quantities of work performed,
- Other information that must be recorded in the appropriate report or format.

Nothing in this Manual changes any provision, specification, or requirement in:

- The contract,
- Any other ODOT Manual, publication, directive, or policy,
- Any applicable law, ordinance, or regulation.

It is intended that this Manual will complement instructions and directions included in:

- The ODOT Construction Manual,
- The ODOT Manual of Field Test Procedures,
- The ODOT Non-Field Tested Materials Guide,
- Other ODOT Manuals relating to the ODOT Project Delivery program.

The Inspector acts under the authority and direction of the Project Manager for each project.

This Manual generally is written in the imperative mode. In sentences using the imperative mode, the subject, "the Inspector", is implied, as well as "shall" or similar words.

This Manual uses the pronoun "it", when referring to the Contractor, since the Contractor is an organization rather than a person.

This Manual uses the terms “Region” or “Area” to describe duties, actions, responsibilities, etc. that must be fulfilled by the Region Manager or Area Manager. Since the delegation of responsibilities varies by Region or Area, the Project Manager must work with the Area Manager to determine whether the Project Manager should contact the Region or Area in each instance.

The Project Manager and project staff must be familiar with all applicable requirements of the Oregon Standard Specifications, which this Manual references, and the contract for each of their projects. They must also be familiar with other Manuals, technical reference manuals, or instructions that apply to other portions of their work not covered in this Manual.

ODOT’s Construction Section, under the State Construction & Materials Engineer, published this Manual and welcomes any comments and suggestions for revisions, corrections, or additions.

Kenneth L. Stoneman,
State Construction & Materials Engineer

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Contract Administration Engineer

Part 00100 - General Requirements

This Inspector's Manual provides guidelines to the Inspector for inspecting work on ODOT construction contracts (projects).

Although this Manual provides guidelines for inspecting many work items on ODOT projects, it does not include discussion on some work items. For work items not covered in this Manual, the Inspector must work with the Project Manager and others as needed, to determine:

- Items to be inspected,
- Inspection processes,
- Quality documentation not specifically defined,
- Processes to measure or calculate quantities of work performed and prepare a Source Document,
- Other items that must be reviewed or information that must be recorded in the appropriate report or format.

The Inspector may be responsible to inspect construction work on several projects that could be progressing simultaneously. If the Project Manager is unable to assign other Inspectors to those projects and multiple priorities prevent the Inspector from being in more than one place at the same time, the Inspector, with input and guidance from the Project Manager, must implement a "just in time" inspection process. The Inspector may include the following, or other processes, in the "just in time" process:

- Verify the sequence and timing of each Contractor's work from the current project schedules and discussions with each Contractor,
- Identify the construction processes that are most critical for inspection, if inspection needs are concurrent,
- Discuss, with the Contractor(s), the planned methods and procedures for each planned activity to assure that the Contractor is aware of, and plans to utilize and assure, acceptable materials, methods, and workmanship,
- Use the Quality Assurance Program to help assure quality materials and workmanship. Also refer to the discussion on Quality of Materials and Work in this section of this Manual,
- Identify key points, in each of the simultaneous activities, at which the Inspector can review the work and fundamentally assure that the work is properly accomplished with acceptable quality,
- Identify and implement methods to gather and assure acceptable quantity information and documents, including Weigh Memo/Material Receipts and measurement of work performed.

Roles, Responsibilities, and Authority of Inspector

Section 00150.02 specifies the authority and duties of an Inspector. They are also discussed in the Responsibilities of Project Manager section (9) of the Construction Manual.

The Inspector is the ODOT representative of the Project Manager, who is normally on the project site. The Inspector may have a variety of duties, responsibilities, and authority, including:

- Those specified in 00150.02,
- Those discussed in the Construction Manual,
- Those discussed in this Inspector's Manual,
- Those specifically assigned by the Project Manager.

Generally, the duties and responsibilities of the Inspector include:

- Assuring that the Contractor has properly located, laid out, and marked the facility, structure, or operation to be constructed,
- Assuring that material(s) to be incorporated in the work meets contract requirements and the Contractor has properly performed all required testing. The Inspector may coordinate with the Quality Control Compliance Specialist (QCCS) on this. Additionally, assuring that ODOT has inspected material at manufacturer facilities and has performed verification testing as needed,
- Assuring that the Contractor performs its work as required by contract and the work is producing a product with the qualities required by contract,
- Assuring that the work or processes do not violate contract restrictions, including restrictions for protection of the environment and restrictions set by statutes, laws, or ordinances,
- Measuring the work, or assuring that measurements are taken and recorded, and preparing Source Documents, as work is performed, to justify payment. This includes assuring that the Contractor performs check weights, as required, when material is paid by mass,
- Acting as the representative of ODOT and the Project Manager on the project site, in communications with the Contractor, the public, or other interested parties. This involves responding to questions or concerns from the Contractor and others,
- Recording information about the project and its happenings in the Project Diary, Daily Progress Report, or other appropriate document.

The Inspector must utilize good communication skills in order to:

- Develop and maintain a good working relationship with the Contractor,
- Assure that the Contractor plans to, and actually utilizes and incorporates, acceptable quality of materials, processes, and workmanship in the project work,
- Convey project concerns to the Project Manager,
- Deal effectively with issues involving the public or other agencies,
- Resolve, or assist in resolving, project concerns, issues, or disagreements,

Also refer to the discussion on Communications below.

In relations with the Contractor, the Inspector must:

- Inspect work as needed and required by being aware of the project schedule, discussing the planned work with the Contractor, and openly communicating with the Contractor,
- Utilize good communication skills in order to develop and maintain a good working relationship,
- Discuss expectations and requirements, before a work process starts, to verify that the Contractor understands the contract requirements for the work process as well as other expectations, such as quality of the materials or work, traffic control, safety, etc.,
- Act in a courteous, but firm, manner,
- Not assume responsibility for the Contractor's operations, even though ODOT may be directing the work of the Contractor when it is performing force account work or some emergency work,
- Not operate or adjust the Contractor's equipment,
- Communicate only through the Contractor's appointed representative,
- Assure that all communications are productive and will result in timely responses and actions,
- Respond in a timely manner to all requests, commitments, and needs.

The Inspector must be able to read and understand contract documents, including plans and specifications. Request assistance from the Project Manager for any questions on contract documents or interpretations and on administration of the contract requirements.

The Inspector must properly record information in the daily reports or project diary for daily happenings, in Field Inspection Reports or other documents to document quality of work or materials, and in Source Documents for quantities of work performed. Strive to use proper grammar and correct spelling in all communications and writing.

If and when the Inspector has a question about contract documents or contract administration or about recording information, seek assistance from the Project Manager. If the Inspector feels that the working relationship on the project has deteriorated, involve the Project Manager to resolve or improve the situation.

Often, the public contacts the Inspector to express concern about project conditions. Refer to the discussion on Public Relations and Complaints later in this section of this Manual.

If, at any time during the project, the Contractor is not performing the work as required by contract, the Inspector must take the necessary action, including suspending the work, to have the Contractor correct its operation. The Inspector must involve the Project Manager when necessary.

Familiarity with Project and Contract Documents and Requirements

The Inspector must become familiar with all documents for the project and contract. Those include, but are not limited to:

- Project plans,
- Project special provisions and supplemental standard specifications,
- Standard specifications that relate to the project,
- Changes to the contract documents, including plans and specifications,
- Permits and permit requirements relating to the project, including environmental concerns and restrictions (discussed below),
- Right of Way obligations,
- Concerns raised during project development (discussed below).

The first four items comprise the “contract” for the project. This term is used throughout this Manual.

Become familiar with all contract requirements before any project work starts, preferably prior to the pre-construction conference. The contract requirements include restrictions needed to protect the environment, as well as restrictions specified by statute, law, or ordinance. If you have questions or need assistance, ask the Project Manager.

Before work on each pay item or contract operation starts, review the contract requirements for that work to assure that you do not overlook any element or requirement of the work.

It is also very helpful to discuss, with the Contractor’s supervisor, the work of each pay item or contract operation, just before work starts on that item or operation, to assure that the Contractor:

- Is familiar with the contract requirements for the item or operation,
- Has appropriate workers, equipment, and materials available for the work,
- Performs the necessary surveying timely,
- Performs the required testing and/or provides proper quality documents for materials,
- Establishes the needed traffic control measures,
- Properly weighs delivered materials, if needed,
- Does not expose workers or the public to hazardous conditions.

Also, the Inspector must be familiar with the contract requirements for measuring the quantities of pay item work performed and must assure that quantities are properly measured or calculated to justify proper payment for work performed.

Concerns Raised During the Project Development Process

During the project development process, the Project Team addresses concerns that are considered or included in the project design. Those concerns include those related to protection of the environment.

The Inspector must be aware of those concerns, whether or not they were included in the design, to:

- For those concerns included in the design, assure that the concern is properly handled in the construction process,
- For those concerns not included in the design, avoid changes that would inappropriately incorporate those concerns into the project,
- Properly address those concerns if the Project Manager orders any changes to the project.

As addressed in the Acceptance of Project section (36) of the Construction Manual, the Project Manager and Project Team need to assure that all concerns are adequately addressed in construction of the project.

Unbalanced Bid Items

Unbalanced bids are discussed in the Evaluation for Unbalanced Bids section (7) of the Construction Manual.

If your project includes items with unbalanced bids (either over or under-priced), follow the instructions in that section of the Construction Manual.

Project Authorization

The Project Authorization is discussed in the Project Authorization section (5) of the Construction Manual.

Since the Project Manager has no authority to spend more than the Project Authorization for the project, the Inspector must be aware of changes to the project work that may affect the Project Authorization. Those changes could involve:

- Work added to the project,
- Work deleted from the project,
- Significant deviations from or increases in bid quantities of work,
- Unplanned work by utilities or public forces, if the cost of that work will be borne by the project.

The Inspector must be aware of the estimated project costs as compared to the Project Authorization. When appropriate, the Inspector must remind the Project Manager of anticipated increases in the estimated project costs due to increases in quantities or other reasons.

Before Work Can Begin

Section 00180.40 and the Before On-Site Work Can Begin section (11) of the Construction Manual list and discuss several events that must occur before project work can begin. Those include:

- ODOT must have issued the Notice To Proceed for the project,
- The Contractor and Project Manager must meet for a pre-construction conference. The Inspector should participate in the pre-construction conference and should work with the Project Manager to help identify the need for, and help implement other meetings that will improve the effectiveness of the pre-construction conference and establish a good working relationship,
- The Contractor must submit an acceptable project schedule that meets the requirements for the project (further discussion below),
- The Contractor must submit a traffic control plan that is acceptable to the Project Manager (further discussion below),
- The Contractor must submit an erosion and sediment control plan that meets the requirements for the project and is acceptable to the Project Manager (further discussion below),
- The Contractor must submit a pollution control plan that is appropriate for processes to be used by the Contractor and is acceptable to the Project Manager.

Refer to the Construction Manual for further discussion.

Review and “Approval” of Contractor Submittals

The contract often requires the Contractor to submit its plans, working drawings, shop drawings, and other documents to the Project Manager for review and approval. The Project Manager may need to have the Engineer of record, for the project, also review and approve some documents. As needed, the Inspector must assist the Project Manager in reviewing documents.

“Approval” of these and other Contractor submittals by the Project Manager, Engineer of record, or other ODOT personnel, signifies that the submitted documents appear to fulfill all contract requirements. “Approval” by ODOT does not guarantee that the submitted documents, with their processes and devices, will work in all situations or will not require modification.

Communications With The Contractor

It is extremely important that ODOT and the Contractor develop and maintain a good working relationship on each project. A key element of a good working relationship is that the parties must maintain good, effective communication. This is discussed in the Responsibilities of Project Manager section (9) of the Construction Manual and is also addressed earlier in this section of this Manual.

The Inspector is a very key factor in maintaining good, effective communication and a good working relationship on the project, since the Inspector must communicate with the Contractor very frequently.

The Construction Manual lists critical project issues on which the communication, particularly written communication, must occur only between the Project Manager and the Contractor's Superintendent. The Inspector, however, may be involved in those communications and must be aware of all such communication.

The discussion on the pre-construction conference in the Before On-Site Work Can Begin section (11) of the Construction Manual recommends that the Project Manager and Contractor develop a communications chart for each project.

When communicating with the Contractor, assure that you are communicating with the proper person. Also, determine whether written communication is needed to document an issue or to assure that the other party has the same understanding. If undecided about whether an issue needs to be documented in writing, document it in writing with copies to appropriate persons.

Also, for verbal communications:

- If another person requests you to do something, verify that you understand what is requested, that you know the timeframe needed to respond, and that you respond in a timely manner,
- If you are requesting another person to do something, verify that the other person knows and understands what you expect them to do, including the timeframe for response,
- Ask questions, paraphrase responses, or use other processes to assure that both parties understand the communication, needs, and timeframes for response. It is often helpful to courteously remind the responsible party of an upcoming response timeline.

For written communications to the Contractor or others, assure that:

- If needed, the communication was discussed with persons of the proper authority before the communication was sent to the Contractor,
- The communication is timely,
- The communication is understandable, is easy to read, and uses correct spelling, grammar, and punctuation,
- Communication to the Contractor is addressed to the field office of the Contractor with a copy to its home office,
- Copies of the communication are sent to others, including other agencies or persons and others in ODOT, as appropriate,
- The ODOT person of proper authority has signed the document.

Respond in a timely manner to all requests, commitments, or needs. "Timely" is described as:

- The timeframe specified in the contract or statute,

- The timeframe agreed to by the parties making and receiving the request,
- If, by chance, no timeframe meets those circumstances, the timeframe needed for a response in order to allow affected work or processes to occur without delay.

If the Inspector feels that project communication or the working relationship is deteriorating and the Inspector cannot resurrect good, effective project communication, the Inspector must ask the Project Manager to assist or take actions necessary to restore good, effective communication and the relationship. That may involve discussions with the Contractor's Superintendent or its home office personnel and may involve the Area Manager or others.

Record key discussions in the project diary or daily report. Confirm agreements or verbal direction with a written memo when helpful or needed.

Seek the guidance and advice of the Project Manager on questions. Keep the Project Manager apprised of project progress and happenings.

Daily Reports

The Daily Reports/Diaries section (12-A) of the Construction Manual discusses daily reports.

The Inspector must:

- Complete reports daily as required,
- When appropriate, record information in the project diary,
- Assure that others are completing reports, as required,
- Strive to use proper grammar, spelling, and punctuation in those reports, as well as all other writings.

Erosion and Sediment Control

This is discussed in the Before On-Site Work Can Begin section (11) and the Daily Reports/Diaries section (12-A) of the Construction Manual. The Inspector must assure that the project is inspected and Erosion Control Monitoring, form 734-2361, sheets are completed as required.

For contract administration purposes, "erosion and sediment" also includes any other substance that may be harmful to people or any element of the environment, including those elements identified in the project's environmental documents or assessments.

If the Contractor is responsible for completing the form 734-2361, the Inspector must also periodically inspect the project site to assure that erosion and sediment are properly controlled and that the Contractor is recording all appropriate information on form 734-2361, as discussed in the Construction Manual.

If erosion and sediment are not being properly controlled, the Inspector, with assistance from the Project Manager, must take action to assure proper control.

Safety

This is discussed in the Safety section (17) of the Construction Manual.

Some work activities are particularly dangerous, because of the proximity to traffic or equipment movement, or work over water or above or below ground. Other sections of this Manual address safety issues specific to particular activities.

If the Project Manager required the Contractor to submit the ODOT Safety Questionnaire, the Inspector should review information on that form.

Refer to the Construction Manual for actions to assure that the project area is safe for workers, ODOT and other project employees, and the public.

The Inspector and others may be exposed to a degree of risk by being in close proximity to particular materials as they are delivered, used, constructed, removed, etc. Before becoming exposed to new or unfamiliar materials:

- Seek input from the Contractor,
- Review the Material Safety Data Sheet (MSDS) for the material, as appropriate,
- Request guidance and advice from the Project Manager,
- Seek other information to determine potential hazards and if protective clothing or devices are needed.

The Inspector must work with the Contractor to assure that:

- Planned work activities do not place workers or others at unneeded risk,
- All persons use protective clothing or devices, when needed,
- Adequate ventilation is maintained if work is performed in a confined space,
- Adequate traffic control is always implemented and maintained,
- The Contractor does not allow workers to take unneeded risks and does not place others at unneeded risk,
- Information on Material Safety Data Sheets (MSDS), as appropriate, is made available to persons who will be in close proximity to the subject materials.

Refer to the Daily Reports/Diaries section (12-A) section of the Construction Manual for discussion of actions of the Project Manager or Inspector if the public is involved in an accident within the limits of the project.

Project Schedule

As required by Section 00180.41 of the contract and as discussed in the Before On-Site Work Can Begin section (11) of the Construction Manual, the Contractor must submit a project schedule that meets the requirements of the contract and reflects

the Contractor's plans for the project work. The Project Manager may request the Inspector to assist in reviewing the Contractor's submitted schedule.

After review, the Project Manager should not "approve" the project schedule but, if the schedule appears to meet the contract requirements, the Project Manager should so notify the Contractor.

The Inspector must be knowledgeable about the project schedule so the Inspector may:

- Plan work needed by ODOT,
- Provide information, when requested, to others, including the media,
- Assure that the Contractor plans to complete the work within the required timeframe,
- Assure that the Contractor does not plan to perform work contrary to environmental or other contract restrictions,
- Help the Contractor to identify oversights or omissions in the schedule, potential problems areas, or conflicts in work activities,
- Be aware of delays to the project work no matter who is responsible for the delay,
- Help the Project Manager identify impacts to project activities and the project completion. This may involve recording affected resources that are impacted by a delay and may also involve helping to analyze the Contractor's Request for Adjustment of Contract Time or helping to analyze requests for damages due to unreasonable delay.

The Inspector must review all required schedule updates and must notify the Project Manager to require a schedule update if the current schedule no longer reflects the project work and specified timeframes. The Project Manager may need to withhold progress payments or to suspend work if the Contractor does not update its schedule as required.

The Inspector must appraise the Project Manager of any delays to the project and record necessary information that is needed to analyze those delays.

Temporary Protection & Direction of Traffic (TP&DT)

As discussed in the Before On-Site Work Can Begin section (11) of the Construction Manual, the Contractor must submit a Traffic Control Plan (TCP), that is acceptable to the Project Manager, if it plans to use a TCP different from any shown in the project plans.

The Inspector must be familiar with the TCP to assure that the TCP is implemented and is working properly. The Inspector must take necessary action to have the Contractor correct deficiencies to the TCP or to amend the TCP if it no longer represents the needs for the project work.

If the contract requires the Contractor to have a Traffic Control Supervisor, that person must also complete and submit a TP & DT Daily Report. The report can be on form 734-2474 or can be on a similar format, as long as all information is included.

As discussed in the later sections of this Manual, the Contractor must implement and maintain adequate traffic control to protect the work, the workers, and the public. As appropriate and before affected work activity start, the Inspector must discuss needed traffic control and the TCP with the Contractor to assure that the Contractor will implement and maintain proper and adequate traffic control.

If the Contractor does not implement and maintain proper and adequate traffic control, require the Contractor to correct the deficiencies. If necessary and with the concurrence of the Project Manager, suspend the Contractor's operations until the Contractor corrects the deficiencies.

Further discussion is included in Section 00225 of this Manual.

Pre-Work Conferences

The contract requires key personnel of the Project Manager and Contractor to meet prior to some specified operations, including production of aggregates, paving, or bridge deck placement. The Inspector should be involved in those conferences.

It may also be helpful to have similar conferences prior to other project activities. This will help the Inspector to assure that the Contractor:

- Is aware of contract requirements for the activity,
- Has proper and required materials for the work and will perform the required quality control,
- Will have adequate resources to accomplish the work,
- Understands the procedure needed to accomplish the desired work product and quality,
- Understands the finish, surface, or smoothness requirements and how to test them, if appropriate,
- Will have proper traffic control,
- Plans a safe work area and environment for the activity.

The Inspector may wish to have the Project Manager also participate in those pre-work conferences.

If, at any time during any work activity, the work is not being done as required by contract, the Inspector must take the necessary action, including suspending the work if necessary, to have the Contractor correct its operation. The Inspector must involve the Project Manager when necessary.

Utilities

On most projects, the Contractor must work adjacent to the facilities of utilities or public agencies, including those of ODOT. On some projects, it may adjust or construct new facilities as part of the project work. On many projects, the owners of those facilities must adjust or relocate their facilities to allow construction of ODOT's project.

Refer to the discussion in the Work Done by Utilities and Railroads section (24) of the Construction Manual.

Section 00150.50 discusses and specifies the responsibilities of persons to notify the Oregon Utility Notification Center before performing excavation work.

The Utility Location & Coordination Council has established the following Uniform Color Code for marking of buried facilities:

- RED:** Electric power lines, cables, or conduit and lighting cables
- YELLOW:** Gas, oil, steam, petroleum, or other hazardous liquid or gaseous materials
- ORANGE:** Communications, cable television, alarm, or signal lines, cables, or conduits
- BLUE:** Water, irrigation, or slurry lines
- GREEN:** Sewers, storm sewer facilities, or other drain lines
- WHITE:** Pre-marking of the outer limits of the proposed excavation or marking the centerline and width of proposed lineal installations of buried facilities
- PINK:** Temporary survey markings
- PURPLE:** Reclaimed water, irrigation, and slurry lines

The Inspector must:

- Work with the Project Manager to involve all affected parties in the pre-construction conference or similar discussions,
- Assure that owners of utility facilities are kept aware of the schedule of project work that will affect their facilities,
- Assure that affected facilities will be adjusted or relocated in a timely manner so that project work is not unreasonably delayed,
- When facilities must be adjusted or relocated, assure that the facilities are adjusted or relocated to positions that will not conflict with project work,

- Record adjustment and relocation activities in the daily report or diary. As appropriate, record information about location of facilities and assure that it is included on the As Constructed Plans,
- Verify that the Contractor has notified the Oregon Utility Notification Center as required to allow existing facilities to be located and marked. The common phrase is “Call Before You Dig”,
- Watch for other facilities that may not be known, but are discovered during the project work,
- If project work causes conflict with other facilities, work with the Project Manager, the facility owner, the Contractor, and the Engineer of record for the project to resolve the conflict. If the conflict may result in a delay claim or a claim for additional compensation, work with the Project Manager and Contractor to record necessary information and to help resolve the issue.

Affirmative Action Requirements - DBE, EEO, OJT, TERO

The Affirmative Action Program section (18) of the Construction Manual discusses these requirements.

The Inspector must perform the activities described in that section to assure that the Contractor fulfills its Affirmative Action obligations. Those activities include:

- Assisting in reviewing subcontracts before the Project Manager consents to the subcontract,
- Performing Commercially Useful Function reviews for Disadvantaged Business Enterprise (DBE) requirements,
- For Equal Employment Opportunity (EEO) requirements:
 - Assuring that the Contractor fulfills those requirements when it hires workers and that it also requires its subcontractors to do the same,
 - Assuring that the Contractor documents its EEO accomplishments and submits required EEO reports.
- For On The Job training (OJT) requirements:
 - Assuring that the Contractor submits OJT requests as required to allow timely review and response by ODOT,
 - Assuring that trainees are utilized for the most possible time for OJT positions. This may require the Project Manager to suspend work until the Contractor properly employs an OJT person,
 - Completing Source Documents to justify payment for OJT,
 - Assuring that each Apprentice or Trainee on the project completes and submits a Monthly Progress Record for all training time.
- For projects involving Tribal Employment Rights Organization (TERO) or other requirements, assuring that the Contractor fulfills all requirements,
- Assisting the Project Manager or the Office of Civil Rights in reviewing and/or resolving concerns.

Wages

Refer to the Labor Compliance section (19) of the Construction Manual.

The Inspector must:

- Assure that the Contractor has properly posted a copy of the established wage rates to be paid for project work, if required. Normally, the Contractor is not required to pay established wage rates when it is producing material that will not be utilized on the project,
- Assure that the Contractor is submitting payrolls for its employees and all subcontractors and providers of rented, operated equipment,
- For all projects that include Federal-Aid funding, conduct and record Wage Interviews with the Contractor and each subcontractor,
- If a worker complains that wages have not been paid properly, work with the Project Manager to resolve the complaint. Also, refer to related discussion in the Labor Compliance section (19) of the Construction Manual.

Surveying

Refer to the discussion of construction surveying in the Construction Surveying/Monumentation section (20) of the Construction Manual.

Section 00150.15 addresses this work if ODOT will perform the construction surveying and Section 00305 addresses it if the Contractor will perform that work.

Also refer to Section 00305 of this Manual if the Contractor will perform the construction surveying.

Permit Requirements

Refer to the Permits section (21) of the Construction Manual.

ODOT must acquire and furnish some permits, as listed in the contract. The Contractor must acquire all other permits. The term, “permits”, also includes all restrictions and regulations needed to minimize impacts to the environment.

The Inspector must:

- Be familiar with requirements of all permits furnished by ODOT and furnish copies, to the Contractor, of all permits that affect the Contractor’s operations,
- Be sure that the Contractor has acquired all other required permits. The Inspector may ask to see those permits or may request copies, if needed,
- If project work will restrict the height or width of the roadway or a lane, assure that the Motor Carrier Services Unit has timely notice of the restriction so that it can restrict the use by oversize vehicles,
- Where appropriate, establish a working relationship with the representative of the permitting or regulating agency. This is not needed in most cases, but can be helpful on projects with critical issues,
- Assure that the Contractor complies with permit requirements,

- Assure that all required monitoring or reporting is done,
- Work with the Project Manager and Contractor to resolve disagreements and to mitigate impacts from any violations. This may require the Project Manager to suspend work until the issue is resolved.

When the project work is performed within the requirements of all permitting and regulating agencies, ODOT and the Contractor:

- Can avoid paying fines,
- Can avoid having work suspended,
- Should have fewer problems acquiring permits for, or constructing, other projects,
- Will not have improperly impacted the environment or other concerns of the permitting or regulating agency.

Contract Time (including suspensions of work)

Contract time is discussed in the Contract Time section (13) of the Construction Manual.

The Inspector must:

- Be aware of the specified contract time for the project, normally a specified completion date or specified calendar days of contract time. Some projects will include more than one completion time,
- Work proactively with the Contractor to assure that contract work is completed timely,
- Be aware of any adjustments made, by ODOT, to the completion date or contract time,
- As previously discussed, assure that the project schedule accurately reflects the contract time for the work,
- Notify the Project Manager of delays to the project schedule,
- If the Contractor notifies ODOT of a delay, record information needed by the Project Manager to analyze the cause and impact of the delay,
- Work with the Project Manager to minimize impacts from delays,
- Assure that the Project Manager issues Weekly Statements of Contract Time Charges when needed and required and the Project Manager assesses liquidated damages when specified,
- Work with the Project Manager to order Suspension of or Resume Work,
- Assure that the Project Manager issues Second Notification timely.

As Constructed Plans and Project Manager's Narrative Report

Refer to the As Constructed Plans section (12-H) and the Project Manager's Narrative Report section (37) of the Construction Manual for discussion of these items.

Since the objective of these two items is to address issues or changes that happen on a project, the Inspector must:

- Record all information about all changes to the project plans and assure that those changes are accurately included in the As Constructed Plans that will be submitted at the end of the project. This may include information about final location of utility facilities,
- Work with the Project Manager to identify issues that need to be included in the Project Manager's Narrative Report and record information about each of those issues to be included in that report. Always include praise or commendation for project development done well, for project documents that were well prepared, and for processes, designs, or relationships that worked well,
- Work with the Project Manager to determine the need for, or to help facilitate, a post-project critique and assure that findings from that critique are shared with interested persons.

Quality of Materials and Work

Refer to the Quality section (12-B) of the Construction Manual, Section 00165 of the contract, and the Quality Assurance Program in the Manual of Field Test Procedures. Also refer to the requirements for materials and workmanship that are included in the specification for each work item.

All material and workmanship that the Contractor incorporates into the project must comply with applicable contract requirements, except as allowed under Section 00150.25.

The Contractor must perform testing and/or provide quality documentation as required. That information is specified in one or more of the following:

- The specification for the particular work item,
- The Manual of Field Test Procedures,
- The Non-Field Tested Materials Acceptance Guide.

The "Blue" and "Green" sheets for traffic signal, illumination, and other electrical work also help to identify the quality requirements for those items.

For field-tested materials, refer to the Quality Assurance Program included in the Manual of Field Test Procedures. Under the Quality Assurance Program:

- The Contractor:
 - Must utilize certified testing technicians to test materials and processes, and to perform other quality control processes, to assure that the materials, processes, and the resulting products comply with contract requirements,
 - Must perform, and is fully responsible for, all quality control needed to assure that its materials and processes will provide a final product that complies with contract requirements. To do this:
 - * The Contractor's supervisor, workers, and testing technician must develop a work process, including required and other needed quality

- control testing, that will produce the specified product. It may involve the Inspector or the QCCS in developing this process,
- * The Contractor's testing technician must perform testing, early in the process, to determine and assure that the process really does produce a product that meets contract requirements,
 - * If the product does not meet contract requirements, the supervisor, workers, and testing technician must modify the work process, do further quality control testing, and re-process the earlier work until the process results in an acceptable product. The Inspector, the QCCS, or a member of the Region Quality Assurance Team may be involved,
 - * As the work progresses, the supervisor, workers, and testing technician perform other visual observation or testing, in addition to the minimum required by contract, to assure that an acceptable product is being produced. If any party detects unacceptable process or results, the Contractor must modify and correct the process and product.
- ODOT (normally just the Inspector and QCCS, but may also involve the Project Manager and members of the Region Quality Assurance Team):
 - May be involved with the Contractor in defining its original work process and quality control measures,
 - Cursorily reviews (inspects) the work process and resulting product to verify that an acceptable product is being produced,
 - Cursorily reviews the quality control testing and the resulting test results and product to assure compliance with requirements. If any defects or errors are found, requires the Contractor to correct them and the affected product. Although the QCCS will normally actually perform this work, the Inspector must assure that it occurs,
 - Randomly tests the materials or products to verify that the Contractor's test results represent the material, process, or product and that the material and the resulting product comply with contract requirements. The Inspector should assure that the Region Quality Assurance team performs a verification test early in the work process to check the validity of the Contractor's testing and work.

If the Contractor has supplied or incorporated material that does not conform to contract requirements, but that ODOT has determined to be acceptable to remain in place, refer to the Quality Price Adjustments section (12-C) of the Construction Manual. Some items require ODOT to pay a bonus payment for material or work that consistently meets or exceeds contract requirements.

The requirements for quality of the work product (including workmanship) are specified in the specification for each work item. The Contractor may be responsible to do some testing or verification of the work quality. The Inspector must assure that the Contractor performs the testing or verification and that the work quality conforms to contract requirements.

The Inspector must:

- Assure that the Contractor knows the quality requirements for each work item or material and what testing it must do or what quality documentation that it must provide. Remind the Contractor before the work item starts or before the materials are delivered as necessary,
- Assure that the Contractor's testing processes and results are acceptable, even though this task is normally performed by the QCCS,
- Assure that ODOT performs verification testing as required, including a verification test early in the work process to help assure that the process is appropriate,
- Not allow material to be incorporated into the project until acceptable quality documentation is received, except as allowed in Section 00165.70(b),
- If unacceptable material is delivered to the project, notify the Contractor that it is unacceptable and mark it so it is not incorporated. Mark the unacceptable material in such a manner that the material is not damaged, the Contractor is still able to return the unacceptable material to the supplier, and it can still be used on another project where its quality is acceptable. In other words, do not use paint or similar material to mark material of unacceptable quality,
- Assure that the submitted quality documentation fulfills contract requirements,
- Inspect the material, either visually or by other appropriate methods, to detect damage or contamination and assure that the material is acceptable for use,
- Complete a Field Inspection Report or Sticker, as needed, to justify acceptance of material,
- Verify that the quality of the material and work product meets contract requirements. If the quality is not acceptable, require the Contractor to modify its processes such that the product meets contract requirements and require the Contractor to repair deficient work or remove and replace it. Involve the Project Manager,
- Identify areas of deficient work or material. Work with the Project Manager to determine whether the work or material must be removed and replaced or whether it may remain with an adjustment in price. Assist the Project Manager in calculating the adjustment in price,
- Identify work or material that is eligible for a bonus payment. Assist the Project Manager in calculating the bonus payment,
- Assist the Project Manager in reviewing and checking quality documentation.

Material Sources

Refer to the Sources of Materials section (22) of the Construction Manual.

The Inspector must:

- If the Contractor will use a prospective source, assure that the Project Manager notifies the Region Geologist of the planned use,
- Assure that compliance testing is current, or that the needed testing is performed, and that the test results indicate that the source is acceptable for use,

- For manufacture of steel or other fabricated material, assure that the material will be inspected at the fabrication site,
- If the Contractor or others must perform quality control testing as material is produced, coordinate with the QCCS to assure that the testing is being properly performed, that the test results are acceptable, and that verification testing will also be performed by ODOT,
- If there is any indication that material does not meet contract requirements, take necessary action to assure that corrective action occurs. Involve the Project Manager.

Quantities of Materials to Be Produced

Refer to the Quantities of Materials to Be Produced section (23) of the Construction Manual.

The Inspector must:

- Before production starts, calculate and check the quantities needed to perform the project work. The Contractor should also be checking quantities before it starts production and comparing its calculations with those of ODOT. Work with the Project Manager and Contractor to resolve any disagreements on the needed quantities,
- Assure that quality of the produced material is acceptable,
- If the Contractor requests payment for material on hand, assure that quantities are measured and calculated and paid on the Progress Estimate. The Inspector may also be involved in calculating the cost to be paid for the material. Also refer to the Materials Stored or On Hand section (12-F) of the Construction Manual,
- If material is left over after contract work is complete and the Contractor requests payment for it, refer to the Materials Left Over or Produced for a Third Party section (33) of the Construction Manual.

Quantities of Work Performed (includes both Progress Estimate and Final)

Refer to the Quantities section (12-D) of the Construction Manual.

The Inspector must:

- Assure that all required quality documentation is provided before material is incorporated into the project. Also refer to the discussion on Quality of Materials and Work above,
- As work is completed, prepare Source Documents to allow payment,
- For work that has been performed but that is not yet completed, on or before the end of each pay period, prepare Source Documents to justify payment on the Progress Estimate,
- Work with the Project Manager to involve others, as needed, to measure quantities of work,
- Check, or assist in checking, Source Documents that have been prepared by others.

Public Relations and Complaints

Refer to the Relations with Public or Other Agencies section (4) of the Construction Manual.

Since the Inspector is the representative of the Project Manager and ODOT for the project and is often at the project site, the public often contacts the Inspector about project conditions. Use good communication skills to work through those situations, including:

- Assure that the Project Manager has provided information to the media as needed, especially prior to events that will impact public traffic. Assist the Project Manager by providing or helping to prepare information to be provided to the media or others,
- Listen courteously to all concerns and complaints and remain courteous,
- Conduct yourself such that no undue criticism or discredit is reflected on yourself or ODOT,
- Take action, as appropriate, to respond to or to mitigate concerns or complaints,
- Involve the Project Manager as needed, especially if the needed actions are beyond the authority of the Inspector,
- Be professional in discussions with others about work, your job, or the project,
- Refer issues to the Project Manager if they involve other authority or may be controversial, such as:
 - Interviews by the news media,
 - Discussion of condemnation of property for public use,
 - Requests for opinions on controversial manners.

Record significant events, happenings, or communications in the daily report or project diary, including all changes made in response to a concern or complaint.

Complaints about Improper Payment from Subcontractor or Supplier

Refer to the Prompt Payment/Claims Against Contractor's Bond section (26) of the Construction Manual.

Regarding complaints that proper payment has not been made, the Inspector must:

- If the complaint involves improper quantities of work, review Source Documents and work performed to attempt to resolve the complaint. Involve the Project Manager if needed or unable to resolve it,
- If the complaint involves improper or untimely payment by the Contractor, ask the Project Manager to respond to the complaint,
- Not order the Contractor or anyone else to make payments that may not be proper.

For complaints alleging that improper wages have been paid, refer to earlier discussion on Wages in this Manual.

Changes to the Work

Refer to the Change Orders/Force Account/Work by Public Forces section (15) of the Construction Manual, as well as pertinent portions of Sections 00140 and 00195.

The Inspector must:

- Be familiar with the contract documents and all change orders that have been issued,
- Be observant to discover and be aware of errors or differences in pay item quantities that could result in disagreements,
- Look for oversights or omissions that may require changes to pay item work or additional or Extra work,
- Remember that, for some pay items such as Flagging, Pilot Car, Temporary Striping, Stripe Removal, or Watering (125%), the bid price is only applicable for the bid quantity. For all work performed in excess of the bid quantity, the Project Manager must take the action required by the contract, either to establish a unit price and allow payment or to order the work to be performed on a force account basis. Also refer to the specification for each item and the Quantities section (12-D) of the Construction Manual. Alert the Project Manager before the quantity of work accomplished reaches the bid quantity, assist the Project Manager as needed, assure that the Project Manager takes needed action before the quantity exceeds the bid quantity, and prepare Source Documents or Daily Force Account Records as appropriate,
- Keep the Project Manager apprised about all issues that could result in disagreements,
- Involve the Project Manager, as needed, in addressing and resolving all issues that the Contractor has raised,
- Assist the Project Manager in evaluating the cost of changes to the work,
- When a Contract Change Order is issued and the work is performed, prepare a Source Document to justify payment for the work,
- When an Order for Extra Work to be Performed on Force Account Basis is issued, record information as described below,
- When public forces perform work under an Order for Force Work that will be charged to the project, record information as needed to be able to review and justify payment for the work,
- If changed, Extra, or force order work must be started before the change order for the work is issued, work with the Project Manager to issue written instruction that specifically describes the work to be performed and the manner of payment. Do not allow the Contractor to start such work before the Project Manager has proper approval for the work and ODOT has issued the written instruction or the actual written order.

Force Account

Refer to the Extra Work Performed on Force Account Basis section (12-G) of the Construction Manual.

If the Project Manager orders the Contractor to perform Extra work on a force account basis, the Inspector must:

- Work with the Project Manager to issue an Order for Extra Work to be Performed on Force Account Basis, preferably before the Extra work is started,
- If the Extra work must start before the order can be issued, work with the Project Manager to obtain proper approval for the work and to issue a written order to the Contractor to perform the specifically described Extra work,
- With the Project Manager as needed, meet with the Contractor, before the Extra Work is started, to agree on or decide the best way to perform the Extra work. Remember that force account work is one of the few times that ODOT may direct the Contractor's operations. Direct the Contractor's operations only through the Contractor's designated supervisor,
- As the Extra work is performed, record the resources utilized and other information daily on a Daily Force Account Record, form 734-3428. Have the Contractor's representative sign to indicate agreement. If disagreements on the force account work cannot be resolved daily with the Contractor, involve the Project Manager to help resolve them,
- Involve the Project Manager, as needed, in answering questions or resolving disagreements about the Extra work,
- Assist the Project Manager in checking the Contractor's force account billings for the Extra work and in resolving any disagreements about the Extra work.

Disagreements

Refer to Section 00199 of the contract and the Disagreements, Disputes, and Claims section (27) of the Construction Manual.

The Inspector, as well as keeping the Project Manager informed, must:

- Be aware of issues or concerns that could result in disagreements,
- When the Contractor raises new issues or concerns, address the issues or concerns,
- Attempt to resolve the Contractor's issues or concerns, within the authority and capability of the Inspector,
- Seek advice and guidance from the Project Manager, as needed, to try to resolve the disagreement,
- If the disagreement is not resolved immediately between the Inspector and Contractor, work with the Project Manager to:
 - If work involving the disagreement is progressing, record resources and information about the work under disagreement, while the parties attempt to resolve the issue,
 - If needed, request further information from the Contractor to be better able to understand the disagreement,
 - Perform needed analysis of the disagreement,

- For changed work only, pay the Contractor, under a unilateral Contract Change Order, for the value of changed work that ODOT has justified even though the Contractor has not agreed to it,
- Resolve all issues as soon as possible.

Part 00200 - Mobilization and Traffic Control

Section 00210 - Mobilization

Mobilization consists of the operations and preparatory work that the Contractor must perform to become ready to perform the work or an item of work.

There are no quality requirements for this item. The Inspector, though, should record pertinent information in the daily report or project diary.

The Inspector does not have to prepare a Source Document for this item or to measure this item, because payment is based on the value of contract work completed. The Project Manager or project staff will use the Contract Payment System to calculate the value and prepare the Source Document for this item.

The Contract Payment System calculates the value of the Mobilization item as specified in Section 00210.90, which excludes the mobilization item value and payment for materials on hand. The Project Manager or project staff may ask the Inspector to review the calculation.

When calculating the value of work added or paid by Contract Change Order, the price to be paid for that work should not include any additional costs for mobilization unless the Contractor actually had to perform additional items of mobilization work as described in Section 00210.40.

Section 00220 - Accommodations for Public Traffic

The Contractor must perform its work and maintain facilities, involved in or affected by the project, to accommodate public traffic.

Refer to the requirements of Section 00220, particularly 00220.02.

The Inspector also must assure that the Contractor has:

- Provided adequate access to businesses, residences, intersections, and connections as specified by Section 00220.40(c),
- Adequately protected adjacent excavations as specified by Section 00220.40(d).

Generally, no quality documentation is required and no payment is made for work under this section unless specified by contract or provided under other sections. The Inspector, though, should record pertinent information about this work in the daily report or project diary.

If the contract specifies liquidated damages for excessive delays to public traffic, record the information, on a Source Document, that is needed to properly justify and assess liquidated damages.

Section 00225 - Work Zone Traffic Control

Work zone traffic control consists of providing temporary traffic control measures (TCM) and all work that must be done involving TCM and associated traffic control devices (TCD).

The Contractor is responsible for the safe handling of traffic. The Inspector should not issue instructions that would shift responsibility from the Contractor to ODOT.

Some projects require the Contractor to employ a Traffic Control Supervisor (TCS). If so, that person must perform the duties specified in the contract and must complete and submit a daily report. Also, the Inspector must complete and submit Source Documents, as required, to justify payment for the TCS as well as the pay items for traffic control. Refer to Section 00225.60 and the Daily Reports/Diaries section (12-A) of the Construction Manual.

With the Project Manager, review the Traffic Control Plan (TCP) submitted by the Contractor at about the time of the pre-construction conference. Traffic control, utilized during project work, should conform to the TCP.

The Contractor should observe traffic conditions during all project work. If traffic is not moving properly, the Contractor must modify the TCM, as necessary, to improve traffic movement and safety.

The Contractor must adequately and timely maintain all of the TCD, used in the TCM, without having to be told by the Project Manager or Inspector. If the contract requires the Contractor to employ a TCS, the TCS is responsible to monitor all traffic control and perform all needed duties.

The Inspector must also observe traffic conditions during all project work. If traffic is not moving adequately through the project or if the TCM or TCD are not being adequately implemented, placed, or maintained, require the Contractor to take corrective action.

If the TCP is not providing adequate traffic control and management, require the Contractor to revise its TCP.

Quality

Review all TCM, TCD, and other materials to assure compliance with contract requirements. Consult the Non-Field Tested Materials Guide for any quality

documentation that must be submitted. The Inspector seldom must submit quality documentation for temporary traffic control items.

Although the Inspector seldom needs to submit quality documentation for this work, the Inspector should review the temporary materials and should record information about their condition, etc. in the daily report or project diary.

Assure that the materials being used continue to meet contract requirements throughout the life of the project. Monitor the quality of TCD, according to Section 00225.60, using the "Quality Standards For Work Zone Traffic Control Devices" published by the American Traffic Safety Services Association. If the quality of any TCD or TCM falls below the requirements, assure that the Contractor replaces or upgrades the TCD or TCM to acceptable quality.

If the TCM or TCD does not achieve the intended objective and does not allow traffic to flow as freely as possible, work with the Contractor and Project Manager to improve the situation. This may also require that the Contractor modify the TCP.

Survey and Layout

Assure that:

- Survey markings will not confuse traffic,
- TCD, as laid out, appear to comply with and fulfill the TCP and contract requirements,
- Survey markings indicate when devices must be mounted on posts,
- Both the Contractor and Inspector understand the survey markings,
- For post-mounted devices, there are no apparent conflicts with buried or overhead facilities.

Construction

Review the TCM to assure that:

General

- The TCM and TCD conform to the TCP and do not confuse traffic,
- All TCD are in acceptable condition,
- All TCD are visible and readable during both day and night,
- 120 volt wiring to devices is constructed in a safe manner,
- When the condition of any TCD falls to "marginal" or "unacceptable", as specified in Section 00225.60, the Contractor adequately upgrades that TCD or replaces it with an acceptable TCD,
- The TCM are appropriate for construction operations, road conditions, and traffic flow,

- If the contract requires a TCS, the TCS is performing all required duties,
- The Contractor adequately maintains all TCM and TCD, including washing, repairing, and replacing TCD as needed, throughout the life of the project.

Temporary Signing

- The Contractor has contacted the Oregon Utility Notification Center to identify conflicts between post locations and utilities (Refer to 00150.50 and discussion in the General section (00100) of this Manual),
- All temporary signs are in new condition when first installed, unless allowed by the contract to be in like-new or other condition,
- All temporary signs are mounted on wood posts, unless allowed by Section 00225.41(c),
- Signs are secured such that they will not blow down and create a different traffic hazard,
- Signs are installed at the proper angle to the roadway to insure reflectivity,
- Signs have acceptable flashers, if required,
- The Contractor has covered or removed inappropriate signs.

Temporary Barricades, Guardrail, and Barrier

- Guardrail and barrier is properly aligned and constructed or installed and has proper end treatments,
- Sufficient barricades, of the proper type, are used and placement is proper,
- Placement of the devices allows sufficient room for traffic and traffic movements.

Temporary Traffic Delineation

- An adequate number of devices of the proper type are used,
- The spacing and taper lengths for tubular markers and barrels is proper for site conditions,
- Inappropriate striping is removed. Assure that the method of removal is allowed by contract and does not unacceptably damage or mark the pavement,
- Striping and pavement marking are proper for site conditions and do not confuse traffic,
- Temporary electrical signs, including changeable message signs and arrow boards, are properly placed and will be properly serviced to assure continuous function,
- Pavement markers are replaced as needed,
- If temporary striping or markings fade or are worn, the striping or markings are renewed or replaced as needed.

Flaggers/Pilot Cars

- Adequate and proper signing is placed and maintained,

- Flaggers and pilot car operators have completed an approved work zone traffic control course within the past 3 years,
- Flaggers and pilot cars have adequate radio communications,
- Pilot cars are properly equipped with sign and yellow overhead light,
- Flaggers have proper attire and safety equipment,
- Each Stop/Slow paddle is of the proper size, is in acceptable condition, and is reflectorized if needed,
- Flaggers are stationed away from vehicles, equipment, or areas of shade, so motorists can effectively see them,
- Flaggers use hand signals, when directing, stopping, or starting traffic flow, and make eye contact to assure that motorists understand the directions and to help assure the safety of the flagger and motorist,
- Flagger stations are adequately illuminated at night,
- If queues accumulate to the first sign of the flagger sign series, the Contractor properly moves the signs or adds an advance set of flagger signs, including an advance flagger if roadway conditions so dictate.

Lighting Conditions

- Work and equipment lighting does not blind or confuse traffic,
- The brightness of the changeable message sign, sequential arrow sign, or other lighted signs is appropriate for light conditions,
- The flagger can easily be seen at illuminated flagging stations,
- The devices are effectively placed to properly direct the traffic, rather than confusing motorists with a multitude of reflectorized devices,
- The Contractor properly services all lighting devices to assure continuous operation when needed.

Maintenance

- The Contractor properly maintains all TCM and TCD, including washing, servicing, or repair as needed,
- The Contractor replaces temporary signs and other TCD if their condition does not conform to contract requirements,
- The Contractor replaces faded flags or paddles,
- The Contractor replaces missing pavement markers or ineffective pavement markings,
- The Contractor replaces elements of electrical signs as needed and monitors brightness.

Measurement

Measure work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit Source Documents to justify payment.

If a TCD is damaged or destroyed by public traffic and ODOT orders it to be replaced for further use on the project, ODOT will pay for the replacement TCD, unless the Contractor's improper operations caused the damage and except for damaged sequential arrow signs and portable changeable message signs. Do not pay for TCD damaged or destroyed for other reasons.

For Temporary Striping, Stripe Removal, Flaggers, and Pilot Cars, the bid price is effective only for the bid quantity of that work. Before having or allowing the Contractor to perform any work beyond the bid quantity for those items, consult the contract for required actions and assure that they are performed. Also refer to the Quantities section (12-D) of the Construction Manual.

Section 00240 - Temporary Drainage Facilities

This work consists of constructing and removing temporary drainage facilities.

Quality

Generally, no quality documentation is required for this work. The Inspector, though, should record information about temporary facilities in the daily report or project diary.

Assure that the materials and methods comply with contract requirements.

Construction

The size of temporary drainage facilities shown on the plans is the minimum required. Work with the Project Manager to determine that the size, strength, and type of facility, proposed by the Contractor, will be acceptable.

Assure that the location for each temporary facility is properly located and marked and both the Contractor and Inspector understand the markings.

Assure that drainage will flow through the facilities, water does not flow around the installation, and construction is adequate to carry traffic and maintain a stable roadway, if needed.

When the devices are removed, assure that the Contractor properly removes them from the project and acceptably restores the affected area.

Measurement

Work with the Project Manager to assure that an acceptable breakdown of the lump sum payment is developed.

As the work is performed, prepare and submit a Source Document to justify payment.

Section 00280 - Erosion and Sediment Control

This section involves all work, devices, and measures required to control erosion and sediment on the project. For contract administration purposes, "erosion and sediment" also includes any other substance that may be harmful to people or any element of the environment, including those elements identified in the project's environmental documents or assessments.

ODOT may include an Erosion and Sediment Control Plan (ESCP) in the contract documents. The Contractor must revise the ESCP, or develop a new one, to represent the actual, anticipated project conditions and submit it to the Project Manager for approval.

As specified in the contract, the Contractor must submit both an ESCP and a Pollution Control Plan (PCP) near the time of the pre-construction conference. The Project Manager must review and approve those plans before allowing the Contractor to start any work on the project site.

"Approval" of these and other Contractor submittals by ODOT signifies that the submitted ESCP and PCP, or other submittals, appear to fulfill all contract requirements. "Approval" by ODOT does not guarantee that the submitted plans, with their processes and devices, will work or will not require modification.

If the ESCP, PCP, or other submittal does not provide the desired performance, the Contractor must modify the submittal, processes, and devices as needed to provide the desired performance.

Refer to the ODOT Hydraulics Manual-Volume 2 and the Field Manual for Erosion & Sediment Control for further guidance and advice.

Quality

Quality requirements are specified in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Complete and submit quality documentation as required. If the Inspector does not need to submit quality documentation on an item of work, record relevant information in the daily report or project diary.

Assure that the materials are not damaged and that installation is done according to contract requirements and manufacturer recommendations.

The Contractor must inspect the project and the erosion and sediment control devices frequently to assure that they are properly controlling erosion and sediment. The Contractor, with ODOT concurrence, must modify the ESCP and devices, including replacing devices or utilizing different devices or methods, as needed to assure proper control.

If the devices and measures are not achieving the desired results, work with the Project Manager and Contractor to improve the controls or develop other controls for use on the project.

Survey and Layout

Assure that:

- The devices and measures, as laid out, comply with contract requirements, the ESCP, and the PCP,
- The devices, measures, and layout are appropriate for local conditions,
- All areas needing erosion or sediment control have been addressed,
- The Contractor has not marked or installed unneeded devices or measures,
- Both the Contractor and Inspector understand the markings,
- If new kinds of or different devices are needed, they are identified or developed and utilized.

Construction

Refer to the ODOT Hydraulics Manual-Volume 2 (Erosion and Sediment Control Manual), particularly Chapter 6 and Appendix E, and the ODOT Field Manual-Erosion and Sediment Control, particularly Section 5.

Assure that the Contractor complies with contract requirements, including:

- The Contractor has designated a qualified Erosion and Pollution Control Manager (EPCM), who will be on the project site as needed,
- Copies of the approved ESCP and PCP are available at the project site,
- A contingency plan is developed for use in emergencies and the rainy season,

- Periodically, including prior to beginning of project work, review the ESCP, PCP, and the project with the EPCM to assure that effective and proper devices have been or will be implemented,
- The EPCM monitors rainfall, inspects the project and control devices as needed and specified to assure their effectiveness, and completes and submits an Erosion Control Monitoring, form 734-2361, as required,
- The EPCM maintains the control devices as needed,
- The EPCM installs additional or new devices, as approved by ODOT, as needed,
- The EPCM, in conjunction with ODOT, incorporates or develops new or different devices, to more effectively control erosion and sediment, and modifies the ESCP,
- Seeding or other permanent control is performed during the proper seasons or additional control is provided as necessary,
- The Inspector and Project Manager, with the EPCM as appropriate, periodically inspect the project site to determine that the control devices are properly functioning and controlling erosion and sediment,
- As devices are installed or removed, the EPCM records those dates on the ESCP or PCP,
- When project work is completed, the Contractor acceptably removes or obliterates the control devices as specified and acceptably smoothes or finishes the affected area.

Measurement

Refer to the contract for pay items and the method of measurement and payment for each.

For lump sum items, assure that an acceptable breakdown is developed for each lump sum item.

For unit items, measure the work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As the work is performed, prepare a Source Document to justify payment.

If a new device or process needs to be designed, developed, and incorporated, assist the Project Manager to:

- Design the device or process,
- Develop the value and negotiate the pay item value with the Contractor if possible,
- Assure that the proper change order is processed and administered.

Part 00300 - Roadwork

Section 00305 - Construction Survey Work

This work consists of the calculations and surveying involved in setting stakes and marks that the Contractor needs to locate and perform construction work on the project. It may also involve setting boundary or other survey markers and filing survey documents as required.

ODOT must furnish survey control points and other information needed for the Contractor to perform its calculations and perform the needed survey work. The Contractor must perform the work and provide the information specified by contract, or required by law if it must also file survey documents with the County Surveyor.

Also refer to the Construction Surveying/Monumentation section (20) of the Construction Manual.

If ODOT will be performing the construction survey work, refer to Section 00150.15 and the Construction Manual.

Quality

No quality documentation is needed for this item.

If the Contractor must perform the survey work, it must have a Land Surveyor (who is licensed in Oregon) or a Professional Engineer (who is licensed in Oregon) in responsible charge of the survey work. Only a licensed Land Surveyor, however, may be in responsible charge of boundary surveying or monumentation work.

Assure that the quality of both the survey work and the finished work product meet contract requirements. Although no quality documentation is required, the Inspector should record pertinent information in the daily report or project diary.

Construction

The Inspector must:

- Assure that:
 - ODOT has supplied the information needed by the Contractor to perform and fulfill its survey requirements,
 - The Contractor understands the information,

- Cursorily review the survey work to detect apparent errors in surveying or in interpreting the project plans, etc. and to detect conflicts in the plans or with planned work, traffic, utilities, etc.,
- If the Contractor is performing the survey work, assure that both the Contractor and Inspector understand the staking and marks left by the survey,
- If ODOT is performing the survey work, assure that the survey work is performed when needed and that both the Contractor and Inspector understand the staking and marks left by the survey,
- Assure that ODOT performs and records all measurements needed to record or calculate quantities of work performed. This includes assuring that ODOT has recorded valid information for the original digital terrain model, if the model will be used to calculate quantities,
- If the Inspector uses some of the Contractor's survey information to calculate quantities of work to be paid, perform some cursory validation of the survey information to assure reasonable accuracy. Also refer to the Quantities section (12-D) of the Construction Manual,
- If ODOT requires the Contractor to perform additional survey work, assure that a change order is issued, if needed, and record the information needed to justify payment for the additional work,
- Assure that the Contractor's surveyor provides required information to ODOT and files records of its surveys with the County Surveyor, if needed,
- When work is completed, assure that the survey stakes are acceptably removed and other markings do not damage aesthetics or property.

Measurement

Assure that an acceptable breakdown of the lump sum item is developed.

As work is performed, prepare and submit a Source Document, as required, to justify payment.

If additional survey work is ordered and performed, record information or prepare a Source Document as required to justify payment.

Section 00310 - Removal of Structures and Obstructions

Section 00320 - Clearing and Grubbing

Removal of Structures and Obstructions is the demolition and disposal of man made materials. Clearing and Grubbing is the removal and disposal of vegetation and similar buried matter.

Quality

Unless required differently in the contract, no quality documentation is required for this work. The Inspector, though, should record pertinent information in the daily report or project diary.

Assure that disposal operations do not violate permit requirements or local ordinances. If some of the material will be left on the project, assure that the material is properly broken down or processed and its placement does not jeopardize contract work or future work.

Surveying and Layout

Assure that:

- Clearing and removal limits have been properly located and do not include inappropriate areas,
- The Inspector reviews locations, where guardrail or barrier will be needed, to minimize the need for short runs of rail or barrier by flattening the slope if possible,
- If the contract requires specific areas to remain undisturbed, those areas are properly located and marked,
- Locations of Right of Way obligations have been located, marked, and protected or identified for needed work,
- Vegetation and trees to remain in place are marked,
- Marketable timber has been marked, when specified,
- Danger trees have been marked,
- Disposal areas have been approved and staked if needed,
- Survey markers have been located and protected,
- Underground utilities have been located and marked,
- If items are to be salvaged and left or transferred to others, they are clearly marked and procedures are in place for transferring possession,
- Both the Contractor and Inspector understand the survey markings.

Construction

Review the contract and project information to be aware of any restrictions on use or disposition of property involved in or to be salvaged from the work.

Observe the Contractor's operations to assure that the work is completed as specified. Assure that:

- The Contractor is aware of, and does not violate, environmental restrictions or the regulations of a regulatory agency,
- The Contractor is aware of and does not violate restrictions on use of property,

- The Contractor is aware of contract requirements for removing or leaving stumps or other vegetation outside of excavated areas,
- The Contractor is aware of areas where the contract does not allow any disturbance,
- If the Contractor will dispose of material on private property, it has an acceptable agreement with the property owner. If there is any question, request to see the agreement or obtain a copy of it,
- If a well must be abandoned, a licensed well driller performs the work and files the required report with the Department of Water Resources, with a copy to the Project Manager,
- Erosion and sediment control is in place or will be constructed and maintained according to the Erosion and Sediment Control Plan,
- Proper traffic control is provided and dust is controlled,
- The Contractor's operations do not involve obvious safety issues,
- The Contractor will use acceptable disposal methods, including:
 - If debris will be burned, the Contractor has a valid burning permit and the operation does not create a hazard (smoke, heat) to traffic or adjacent property,
 - If debris will be buried, it does not create an unsafe condition and will not impact construction or future use in that location,
 - If debris is to be chipped or ground and will remain on the project, acceptable areas and procedures have been identified or developed,
- The Contractor acceptably restores affected areas or leaves them in acceptable condition for the succeeding construction operation.

Measurement

Assure that an acceptable breakdown of each lump sum item is developed.

If work is to be paid on a unit basis, measure the work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00330 - Earthwork

Earthwork, or grading, is a general term relating to all earth-moving work required on the project.

Quality

Refer to the Manual of Field Test Procedures for testing and other documentation needed to assure quality of the materials and work.

Unless required differently in the contract, the Contractor is responsible for all quality control, including testing, and ODOT must perform verification testing. Refer to the discussion on Quality and the Quality Assurance Program in Section 00100 of this Manual.

Assure that the Contractor is aware of those requirements, performs required testing with certified technicians, and provides required quality documentation and test results. Also assure that the ODOT QAC is aware of scheduled work and performs required verification testing.

If there is any question about the quality of any material or work procedure, require the Contractor to demonstrate, or perform further testing to assure, that the material or procedure is acceptable or produces acceptable results.

Prepare and submit required quality documentation. Record other pertinent information in the daily report or project diary.

Surveying and Layout

Assure that surveying work has been properly performed, including:

- ODOT has gathered necessary information on the original ground to calculate quantities of work,
- The surveying does not indicate any work to be done outside of Right of Way, unless ODOT has secured the use of the property,
- The Inspector reviews locations, where guardrail or barrier will be needed, to minimize the need for short runs of rail or barrier by flattening the slope if possible,
- All surveying and layout properly allows for or includes required stage construction,
- Slope and grade staking do not have apparent mistakes,
- Both the Contractor and Inspector understand the survey markings,
- Pipes and other drainage structures, that need to be placed prior to or during earthwork operations, have been located,
- Earthwork, needed to fulfill Right of Way obligations, is properly located and marked,
- Survey markers are protected or referenced.

If any overexcavation or other additional pay item work is ordered to be performed, the Inspector must mark or identify the limits of that work and measure the work, or assure that the work is measured, so that quantities can be calculated for payment.

Construction

Before work begins, review the geology or geotechnical report for the project to learn of the concerns during design. Also, assure that:

- The Contractor is aware of its responsibilities regarding quality control, including quality control testing,
- The Contractor is aware of restrictions on use of property,
- Fences have been moved and temporary fences have been installed, where necessary,
- The Contractor maintains access for affected properties and businesses,
- Utilities have been located, marked, and protected,
- If the work will involve blasting, an acceptable blasting plan has been submitted and the Contractor has performed a pre-blast survey of adjacent buildings and wells. Also refer to discussion in Section 00335 of this Manual,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Erosion and sediment control is in place or will be constructed and maintained according to the Erosion and Sediment Control Plan,
- Clearing and grubbing have been acceptably completed,
- The ODOT QAC is aware of the schedule and planned production rates for earthwork so that verification testing can be planned.

Check the terrain on and adjacent to the project for possible problem areas such as:

- Springs,
- Slides,
- Unstable materials.

If such conditions exist, work with the Project Manager and Contractor to develop plans for handling them.

During earthwork operations, assure that:

- The Contractor is fulfilling its responsibilities under the Quality Assurance Program, including responsibility for assuring that only acceptable materials are incorporated and are properly placed, compacted, and tested as required. ODOT should only have to perform verification testing as required and cursorily review the earthwork process to assure that the work complies with contract requirements. Some items to periodically review are:
 - Do the Contractor's supervisor, workers, and tester seem to understand their roles and responsibilities in performing earthwork, particularly embankments? If not, it may be appropriate to involve the Project Manager and the Contractor's Superintendent.
 - Does the compaction equipment appear to be suitable to perform the required compaction and suitable for the type of material to be compacted? For instance, the contract requires specialized equipment for non-durable rock.

- Do the Contractor's workers have a "rule of thumb" process, based on experience and common sense, to be pretty sure that they are constructing an acceptable embankment, in addition to or between needed testing? If not, they should do frequent testing at the start of the embankment to be aware of and develop acceptable work patterns and recognize acceptable work quality.
- Before the embankment operation starts, is the underlying material or surface properly prepared and compacted?
- At the start of the embankment operation, is the Contractor performing additional testing to assure an acceptable operation? Is it properly testing the embankment density at no less frequent intervals and locations than required? Are all test results properly recorded? Are areas of failing compaction being recompacted and retested?
- Has a member of the ODOT Quality Assurance Team performed a verification test, early in the embankment process, to verify that the Contractor's testing is proper?
- Does the material vary widely in composition?
- Is nondurable rock present in the earthwork area?
- Is wet material being adequately dried or otherwise treated to remove excess moisture?
- If material is dry, is moisture added to ensure proper moisture content for acceptable compaction?
- Is the Contractor separating unsuitable (organic, peat, etc.) material so that it is not incorporated into the embankments?
- Is the material moving under the weight of hauling equipment?
- Is the material being placed in lifts of acceptable thickness and equipment routed over the entire width of the embankment to achieve uniform compaction?
- The Contractor's grade checker understands the survey markings for the work,
- If topsoil or other material is to be removed and stored for other use, that work is acceptably performed,
- If material will be hauled on public roadways, the Contractor restricts loads to legal limits and does not allow leaking loads,
- The foundation for each embankment has been prepared and compacted as specified,
- Original ground and the adjacent subgrade, at the intersection of an excavation area and an embankment area, are well compacted, or a subgrade drain is installed as specified in the contract, to prevent settlement or slippage or to intercept drainage,
- Existing surfacings are scarified or otherwise broken up,
- Soft areas are adequately stabilized,
- Abandoned drainage structures are plugged and abandoned as specified,
- Tops of cut slopes are rounded, if required, and excavation is to proper side slope,

- Slopes are properly constructed, compacted as required, finished, and roughened to allow vegetation to grow,
- Wet areas are properly drained and drainage systems are maintained,
- Foundation benching is performed as specified or required,
- If ODOT orders the Contractor to perform excavation below subgrade, the Inspector marks or identifies the limits, records measurements, and prepares a Source Document to justify payment. Additionally, the Inspector works with the Project Manager to identify the material for backfilling the overexcavation and establish methods for payment if needed,
- If blasting must be performed to loosen rock material, it is performed according to Section 00335. This work is incidental unless a pay item is established in the contract. If the results of blasting do not comply with the intent of the approved Blasting Plan, require the Contractor to modify the plan and operations as needed,
- Stumps, concrete, and oversize rock fragments are properly buried, processed, or disposed,
- Embankment material is placed in layers of no more than the thickness specified in the contract.
- For embankments at ends of bridges:
 - Embankments are constructed to the density specified for the location,
 - The Contractor does not use rock or boulders in the areas where piling will be driven,
- The Contractor properly disposes of unsuitable and excess materials,
- The Contractor is sorting earthwork materials to make their best use in the work or as required for specified pay items,
- Work areas are sloped to provide adequate drainage throughout the earthwork operation,
- Subgrade is properly compacted and constructed to the proper elevations,
- Dust is properly controlled by watering or other means,
- ODOT accomplishes its verification testing,
- The Contractor acceptably finishes and smoothes the final surfaces. Also refer to the discussion in Section 00370 of this Manual.

Measurement

Assure that measurements are taken to calculate quantities of work performed. If some items will be calculated using the digital terrain model method, assure that ODOT has obtained information on the original ground and has analyzed confidence points to verify the validity of the model. Work with the Project Manager, as needed, to calculate quantities from the digital terrain model.

If ODOT orders overexcavation, excavation below subgrade, or other work beyond the original typical section and that work is not addressed in Section 00331, identify or mark the limits and record measurements, or assure that measurements are

taken, so that pay quantities can be calculated. As needed, assist the Project Manager in developing a method of payment for the overexcavation or other work.

If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

Prepare a Source Document, as work that is not measured by the digital terrain model is performed, to justify payment. Include supporting calculations with the Source Document.

Section 00331 - Subgrade Stabilization

This work consists of excavating and disposing of unstable materials, in excavation areas only, and placing geotextiles and stone embankment or aggregate backfill as required.

Quality

Quality requirements are specified in the Nonfield-Tested Materials Acceptance Guide and the Manual of Field Test Procedures.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Also assure that the ODOT QAC is aware of the scheduled work so that verification testing is performed.

Prepare and submit required quality documentation.

Construction

Assure that:

- ODOT marks the limits of the material to be excavated and replaced and the Contractor understands the markings and depths required. If the limits for the work are specified in the plans, verify that the limits, as marked by the Contractor, are appropriate and both the Contractor and Inspector understand the markings,
- Excavation leaves smooth, firm surrounding soil,
- The Contractor properly disposes of the excavated material or removes it from the project,
- The excavated surfaces are properly prepared and replacement material is placed and constructed as specified,
- Placement of replacement material does not damage additional subgrade area or the excavated area,

- The replacement material is adequately compacted and finished to required finish and tolerances,
- Excess or unneeded materials are removed and affected areas are acceptably cleaned and restored or finished.

Measurement

Payment is generally on the area basis to the specified depth. As work is performed, measure the dimensions, or assure that measurements are taken, of the stabilization work. If deeper depths of stabilization are required, also record that information to calculate the areas as specified in the contract.

If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document, with calculations of pay quantities, to justify payment.

Section 00332 - Surfacing Stabilization

This work consists of excavating and disposing of unstable surfacing and subgrade materials and replacing with geosynthetics, subbase, base, and surfacing materials.

Quality

Quality requirements are specified in the Nonfield-Tested Materials Acceptance Guide and the Manual of Field Test Procedures.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Also assure that the ODOT QAC is aware of the scheduled work so that verification testing is performed.

Prepare and submit required quality documentation.

Construction

Assure that:

- ODOT marks the limits of the material to be excavated and replaced and that the Contractor understands the markings and depths required. If the limits for the work are specified in the plans, verify that the limits, as marked by the Contractor, are appropriate and both the Contractor and Inspector understand the markings,

- Surfacing at the edge of the marked excavation is sawed or otherwise cut to leave a smooth edge with no damage to the remaining surfacing,
- Excavation leaves smooth, firm surrounding surfaces,
- The Contractor properly disposes of the excavated material or removes it from the project,
- The excavated surfaces are properly prepared and replacement material is placed and constructed as specified,
- Placement of replacement material does not damage additional surfacing or the excavated area,
- The replacement material is adequately compacted and finished to required finish and tolerances,
- Excess or unneeded materials are removed and the affected areas are acceptably cleaned, smoothed, finished, and restored as needed.

Measurement

Payment is generally on the area basis to the specified depth. As work is performed, measure the dimensions, or assure that measurements are taken, of the stabilization work. If deeper depths of stabilization are required, also record that information to calculate the areas as specified in the contract.

If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document, with calculations of pay quantities, to justify payment.

Section 00335 - Blasting Methods and Protection of Excavation Backslopes

This work consists of controlled blasting to allow excavation of rock material and to achieve smooth, unfractured backslopes.

Some blasting may be required, under Section 00330, to loosen rock material for excavation. The Contractor must perform that work according to Section 00335, except that the work will be incidental unless a pay item is included in the contract.

Quality

The Contractor must develop an acceptable blasting plan, must perform the work according to the acceptable blasting plan, and must scale the excavated slope to remove loose rock.

No quality documentation is needed for this work. If the material is to be utilized in project work, assure that the size and gradation is acceptable. Record pertinent information in the daily report or project diary.

Surveying and Layout

Generally, surveying will be needed to establish the top of rock cut slopes after the Contractor has removed overburden.

Assure that:

- The surveyor has properly marked the slope, corresponding to the plan section, both the Contractor and Inspector understand the markings, and there are no apparent mistakes in locating the outside (top) of the slope
- If information from this layout will be used to calculate pay quantities, the information is recorded and accurately depicts the work.

Safety

Assure that the Contractor follows safe practices, including:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Work is accomplished according to the acceptable blasting plan,
- Explosives are stored and handled in a safe manner,
- Nearby structures, wells, etc. are inspected for existing damage before blasting starts and are adequately protected during blasting,
- Traffic, properties, and the public are adequately protected during blasting,
- Personnel are properly warned and are safely removed from the blast area,
- Unexploded blasting devices are safely secured and blast debris is cleared from roadways before allowing traffic to resume,
- Slopes are properly scaled to remove loose debris before allowing work to resume on the next blasting lift,
- The blasting plan is modified as needed to assure safe, effective loosening of the rock material.

Construction

Duties of the Inspector include:

- Work with the Project Manager to review the blasting plan for conformance to contract requirements and assure that needed changes are made to the plan. The Project Manager may also request assistance from the ODOT Geo-Hydro Unit,
- Assure that the blasting operation follows safe practices, including those described above,

- Review the test blast and assist the Project Manager in reviewing needed changes to the blasting plan,
- Require changes to the blasting plan if the plan does not produce acceptable results during production blasting,
- Assure that loose material is acceptably removed from the excavated slopes,
- If motorists or adjacent property owners complain about damage, assure that the Contractor takes appropriate action on the complaints and modifies practices, as needed, to minimize complaints and damage,
- If the Contractor delays traffic movement beyond the provisions of Section 00220, record appropriate information so that liquidated damages can be assessed, if specified in the contract. If the Contractor can modify operations to lessen the delays, require the Contractor to make those changes,
- Assure that excess material is acceptably removed and affected areas are acceptably treated, finished, or restored as needed.

Measurement

Assure that ODOT has recorded sufficient information, before work starts, if needed to calculate pay quantities.

As work progresses, take needed measurements, or assure that measurements are taken, to calculate pay quantities of work performed. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document, including calculation of quantities, to justify payment.

If the Contractor violates the requirements of Section 00220, record the appropriate information and prepare and submit a Source Document to justify assessment of liquidated damages.

Section 00340 - Watering

This work consists of furnishing and applying water, with additives if required, to adequately prepare and compact earthwork, bases, and surfacings and to control dust, within the project, when that control or dust is not the Contractor's responsibility.

Quality

Refer to the Nonfield-Tested Materials Acceptance Guide for any required quality documentation.

Prepare and submit required quality documentation. If none is required, record pertinent information in the daily report or project diary.

Construction

The Inspector must:

- Verify that the Contractor has a legal right to the source of water and that it has properly acquired the right to use the water from that source,
- Determine the volume of each haul vehicle, unless water will be measured by an approved meter,
- Order or direct the rate and manner of watering,
- Assure that the watering operations are performed such that water is:
 - Properly screened, etc. as it is obtained, if the source is a stream or other natural water source, to prevent damage to fish or vegetation in the body of water,
 - Not wasted,
 - Applied in a uniform manner,
 - Mixed with proper amount of additives if required,
 - Not applied in a manner that causes erosion, sedimentation, or other contamination of runoff or waterways,
 - Only included for payment if it is used as directed or specified by the contract,
- Assure that the Contractor is properly recording watering work on form 734-3427,
- Assure that the Contractor restores or repairs all damaged, affected areas.

Measurement

Determine the volume of each haul vehicle, unless measurement will be by an approved meter. Assure that volumes are entered on a Sprinkling Tally Sheet, form 734-3427, as watering is performed.

If the Contractor enters the volumes on the Sprinkling Tally Sheet, the Inspector must:

- Assure that payment is only made for watering done as directed or ordered and not for watering done for the Contractor's responsibility or for other pay items,
- Perform some cursory validation that the volumes on the Sprinkling Tally Sheet are appropriate.
- Submit the Sprinkling Tally Sheet, as a Source Document, for payment.

Section 00350 - Geosynthetic Installation

Geosynthetics are utilized for many applications, including drainage, erosion control, separation of materials, or as a reinforcing or retaining structure.

Quality

Quality requirements are specified in the contract and in the Non-Field Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, acceptably protects the materials, and provides acceptable quality documentation before the material is incorporated.

If the Contractor supplies material that does not conform to contract requirements, assist the Project Manager in consulting the ODOT Geo-Hydro Unit to determine if the material is suitable to use. If it is suitable for use but does not conform to contract requirements, refer to the Quality Price Adjustments section (12-C) of the Construction Manual. The Project Manager must initiate a Contract Change Order to allow use of different material than specified in the contract documents.

Prepare and submit required quality documentation.

Construction

Assure that:

- The limits of the application, as marked, comply with contract requirements or the limits ordered by the Project Manager or Inspector, and both the Contractor and Inspector understand the markings,
- The geosynthetic materials have been properly stored and protected from damage,
- Damage and/or defects are repaired, if the material is suitable to use,
- The surface, under or behind the geosynthetic, has been properly prepared,
- The geosynthetic is adequately protected, especially when material is placed on, or equipment operates on, the geosynthetic,
- The installation is performed as specified by both the contract and the manufacturer,
- The Contractor acceptably disposes of unwanted materials,
- Affected areas are suitably smoothed and finished.

Measurement

Measure the work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document, including calculation of quantities, to justify payment.

Section 00360 - Drainage Blankets

This work consists of furnishing and placing drainage blanket materials as required.

Quality

Quality requirements are specified in the contract, the Manual of Field Test Procedures, or the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs testing as required, and provides acceptable quality documentation before the material is incorporated. Assure that the ODOT QAC is aware of scheduled work so that required verification testing is performed.

Also assure that the material is not contaminated prior to installation.

Prepare and submit required quality documentation.

Construction

Assure that the limits for the work are properly located and marked and both the Contractor and Inspector understand the markings.

Assure that the material:

- Underlying the drainage blanket is properly prepared and compacted and is finished to the appropriate line and grade,
- Does not become segregated during hauling, placing, or compacting,
- Is not contaminated by underlying or other material,
- Is compacted as required,
- Is finished to proper line and grade.

Measurement

Take measurements, or assure that measurements are taken, to allow quantities to be calculated. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

Prepare and submit a Source Document, including calculation of quantities, to justify payment.

Section 00370 - Finishing Roadbeds

This work involves finishing the subgrade and other finished surfaces to the shape and condition specified, as well as blending obliterated elements into the adjacent terrain.

Quality

No quality documentation is needed for this item. The finished product, though, must comply with contract requirements.

Record pertinent information in the daily report or project diary.

Construction

Most of this work occurs at or near the end of the earthwork operations. Assure that:

- Subgrade is properly shaped and trimmed to proper grades. Perform or observe testing to assure that the subgrade is acceptably smooth. Since the Contractor normally performs the survey work for this operation, the Project Manager may wish to require surveying to verify that the subgrade has been constructed within acceptable tolerance of specified grades,
- The subgrade has been compacted as required, compaction testing has been performed, and acceptable test results provided,
- Slopes have been acceptably trimmed and shaped,
- Sewers, culverts, and drains have been cleaned,
- Ditches have been cleaned, trimmed, and shaped as required,
- Obliterated surfacings or other elements have been shaped to blend into the adjacent terrain,
- The Contractor acceptably disposes of unwanted materials.

Measurement

If payment is on a lump sum basis, assure that an acceptable breakdown of the lump sum is developed.

If payment is on a unit basis, measure the work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00390 - Riprap Protection

This work consists of placing an erosion resistant covering for protecting slopes, trenches, and basins.

Quality

Quality requirements are specified in the contract, the Manual of Field Test Procedures, and the Non-Field Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs testing as required, and provides acceptable quality documentation before the material is incorporated. Also assure that ODOT performs required qualification testing and verification testing.

Visually review the riprap material, as it is delivered, to assure that it meets contract requirements, is not contaminated, and does not contain unacceptable materials.

Prepare and submit required quality documentation.

Construction

Assure that:

- The location has been properly marked and both the Contractor and Inspector understand the markings,
- The layout of the installation complies with the plans and the installation will blend with surrounding topography,
- Vegetation has been removed as required and slopes have been excavated to required dimensions and properly finished,
- Underlying materials have been compacted as specified,
- The backing material has been properly supplied and installed,
- Riprap material has proper gradation and is not segregated,
- The riprap is placed to the full course thickness in one operation,
- The underlying material, filter blanket, or geotextile are not displaced,
- If required, the riprap is keyed and grouted as specified,
- The Contractor acceptably disposes of unwanted materials,
- Affected areas are acceptably smoothed and finished.

Measurement

Measure the work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document, including calculation of quantities, to justify payment.

Section 00396 - Shotcrete Slope Stabilization

Shotcrete slope stabilization is the process of pneumatically applying a concrete mortar over a prepared surface. Shotcrete can be applied in either dry-mix or wet-mix forms.

Quality

Quality requirements are specified in the Non-Field Tested Materials Acceptance Guide. Also, assure that the Contractor performs preproduction and daily production testing.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Also assure that material is not contaminated or damaged.

Prepare and submit required quality documentation.

Construction

Assure that:

- The limits of the application, as marked, comply with the contract documents or the limits ordered by the Project Manager, and both the Contractor and Inspector understand the markings,
- Labor and equipment meet contract requirements,
- The surface to be treated is properly prepared,
- The prepared surface is damp prior to application of shotcrete,
- Devices to control thickness of application have been installed,
- Anchors have been properly installed,
- Reinforcement is properly positioned,
- Piping for weep holes is in place,
- Weather conditions are acceptable for shotcrete application, including required curing,
- Shotcrete has been properly batched and mixed (including steel or other fibers when required),
- Shotcrete is applied in a manner that minimizes rebound,
- Rebound material not reused,
- The application is finished and cured as specified,
- The work is properly protected during the cure period,
- The Contractor acceptably disposes of unwanted material.

Measurement

Measure the work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document, including calculation of quantities, to justify payment.

Part 00400 - Drainage and Sewers

Drainage is one of the most essential elements of highway construction. Drainage structures and facilities must be properly chosen and constructed or installed to ensure that surface and subsurface water are efficiently and effectively moved or removed. If soils become wet due to deficient drainage, they can lose their load carrying capabilities and cause the roadway or adjacent slopes or structures to fail.

If sanitary, irrigation, and other pipes are not properly installed, they can also cause or contribute to failure of the roadway or adjacent slopes or structures.

Prior to the work, review the drainage shown on the plans and compare it to actual and future field conditions to assure that the drainage is adequate, can be realistically constructed, and will perform properly. Work with the Project Manager to address problems or deficiencies.

Assure that each pipe (or other drainage or sewer conduit) is furnished, installed and backfilled as specified by the contract and manufacturer's recommendations. Thoroughly inspect the installation before, during, and after installation as necessary to assure that the drainage will function as designed and as required.

Since improper drainage may result in claims or litigation by adjacent property owners, the Project Manager and Inspector should:

- Assure that drainage facilities are constructed to the lines and grades shown on the plans. Check with the designer or Engineer of record prior to changing pipe size or the elevation or location of the inlet or outlet of a pipe,
- Record information about where water flows onto or off of an adjacent owner's land, including existing inlet and outlet elevations, existing water level elevations, etc. Take photographs as appropriate, before and after construction,
- Record information, during any flood or other high water event, including photographs as appropriate.

Refer to the ODOT Hydraulics Manual for further information and guidance.

Section 00405 - Trench Excavation, Bedding and Backfill

This section discusses excavation and related work needed to construct or install drainage, pipes, and minor structures.

Quality

Quality requirements are specified in the contract, the Manual of Field Test Procedures, and the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs the required testing with certified technicians, and provides copies of the test results and other acceptable quality documentation before the material is incorporated. Assure that ODOT performs verification testing as required.

Prepare and submit required quality documentation.

Additionally, assure that:

- Backfill material is not contaminated,
- Bedding and backfill material is properly compacted and density testing is performed as required or needed.

Safety

Poor safety practices, during construction of underground facilities, cause a number of deaths each year. Most of those could be prevented with normal safety practices.

During underground construction:

- Assure that adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Verify that the Contractor has requested that existing underground utility and other facilities are located and marked and this is actually accomplished for known facilities,
- Park vehicles away from the work area,
- Stay clear of the swing radius of each hydraulic excavator and other such equipment,
- Do not walk directly behind any equipment,
- Be sure that the equipment operator is aware of you when you are in front of equipment,
- Stay out of the operating paths of equipment,
- If you hear a backup alarm or other signal, instantly assure that you and others are not in the equipment's intended path. It is very easy to become complacent about backup alarms!,
- Assure that excavated material, if it is placed near the excavation, does not create an unsafe condition,
- If work will be done in trenches, assure that the Contractor has a "competent" person, at the work site, who is qualified to assure the safety of work in the trench or similar excavation,
- Assure that the Contractor uses shoring, or other devices or practices such as sloping the sides of trenches, to prevent trenches from collapsing,
- Assure that workers do not enter unsafe trenches, even for very short times,
- Assure that placement of and compaction of materials in the trenches is properly performed and does not place the workers, the trench, or the facility being constructed at risk,

- If the Contractor appears to be working in an unsafe manner and the Inspector wants additional advice, the Inspector should consult with the Project Manager or the Region Safety Officer. They may request OR-OSHA to perform a consultation (courtesy) inspection to get additional advice or, if the Contractor is apparently working unsafely and not willing to correct the situation, may request OR-OSHA to perform an enforcement inspection. Also refer to the discussion in the Safety section (17) of the Construction Manual.

Construction

- Review the layout and marking of each installation to detect errors and assure that the installation will:
 - Include all required appurtenances,
 - Achieve the desired result,
 - Correctly tie to inlet and outlet structures and locations. Be sure that both the Contractor and Inspector understand the markings,
- Obtain a copy of the survey marking notes, as appropriate, and review the control stakes. The survey notes are especially helpful if the Inspector may use some of that information to justify pay quantities on the Source Document,
- Assure that the Contractor adequately controls line and grade of the construction from the survey markings. Methods of accomplishing this include using a stringline, laser beam, or other method,
- Notify the ODOT Quality Assurance Coordinator of the schedule for accomplishing work so that verification testing can be accomplished,
- Assure that:
 - Appropriate measures to control erosion and sediment are implemented and maintained, according to the ESCP,
 - Excavation is performed to the proper dimensions and slope specified in the plans and in the surveyor's markings,
 - The foundation under the pipe and/or bedding is firm and rock or other hardpan has been removed to allow acceptable material between that and the pipe,
 - Bedding materials are proper, placement and compaction is properly performed, and testing is performed as required,
 - All pipe materials comply with contract requirements,
 - Construction of pipes and other minor structures is properly completed, including randomly checking line and grade of the installation, before backfilling is performed,
 - For waterlines, thrustblocks have been constructed to the proper size and at the proper location. Also refer to discussion in Part 01100 of this Manual,
 - The backfill under, around, and over the pipe is properly placed and compacted so the pipe will support the load above it,
 - Suitable hand tampers or other tools are used to compact backfill under the haunches of the lower half of pipes and other, similar locations. Work in this area is difficult. Poor compaction in this area can cause lateral movement

and excessive stress on the lower part of the pipe and may allow water movement alongside, rather than through, the pipe,

- If equipment will be operating over a pipe, the backfill provides adequate cover to prevent damage, to the pipe installation, by the equipment,
- The backfill operation, or other following earthwork operation, has not shifted the line and grade of the pipe or caused other damage. After the embankment is complete, look into each pipe and inspect other minor structures to be sure it has not been damaged or knocked out of alignment,
- Waterlines are properly pressure tested and disinfected, including having owners of the facility observe those operations if specified or requested. Also refer to Part 01100,
- If required, the Contractor performs remote (television or video) inspection of underground facilities and corrects deficiencies,
- Surfacing, of the proper type, is replaced if required. Also refer to discussion in Section 00495 of this Manual,
- The Contractor acceptably disposes of unwanted material,
- The affected area is acceptably smoothed and finished.

Measurement

Refer to the contract for the method of measurement and payment of each pay item.

Measure the work, or assure that measurements are obtained, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document, with quantity calculations as appropriate, to justify payment.

Section 00406 - Tunneling, Boring and Jacking

This work consists of installing pipes, casings, or other conduits without excavating the overlying surface.

Quality

Quality documentation for this work is specified in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs testing when required, and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

With the Project Manager and others as appropriate, review the Contractor's working drawings. Assure that the Contractor has adequately addressed all concerns, and requests for additional information, before allowing the Contractor to start work.

Assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Utilities within the area of construction are adequately located and marked,
- The Contractor has railroad insurance, if work will be done within railroad property, and the policy is in effect,
- The Contractor is aware of all permit requirements involving the work,
- The installation is adequately located and marked and both the Contractor and Inspector understand the markings,
- Construction of boring, jacking, etc. pits is performed according to acceptable working drawings,
- Work and material conform to the requirements of the contract or acceptable working drawings,
- Appropriate measures to control erosion and sediment are implemented and maintained, according to the ESCP,
- Excavation or installation does not cause or result in voids in surrounding material and all resulting voids are properly repaired or grouted,
- Excavated material and/or water from the work area are acceptably disposed of, without impacting or damaging waterways or other environmentally sensitive areas,
- If required, cradles are properly installed to support the pipe in the casing,
- Where required, the space between the pipe and casing is properly filled with the specified material,
- The Contractor acceptably disposes of unwanted material,
- The affected area is acceptably restored, smoothed, and finished.

Measurement

Refer to the contract for the method of measurement and payment. If a lump sum is involved, assure that an acceptable breakdown of the lump sum is developed.

Measure the work, or assure that measurements are taken, to calculate quantities. If the Inspector is using information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00420 - Salvaging Pipe

This work consists of removing, cleaning, and either stockpiling or reinstalling pipe.

Quality

Assure that materials are properly cleaned and are not damaged or defective.

Prepare a Field Inspection Report, form 734-3469, to document that the materials have been properly cleaned and are not damaged.

If new materials must be used in reinstalling the pipe, require and submit quality documentation required under Section 00445.

Construction

Assure that:

- The locations have been marked to indicate salvage,
- If the pipes will be reinstalled, the new installation is properly marked,
- Both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Materials are:
 - Properly cleaned,
 - Not damaged or defective,
 - If reinstalled, properly installed according to appropriate requirements of Section 00445,
 - If stockpiled, placed as directed or specified in the contract, including protecting the pipe from damage during any part of the operation, including the stockpiling operation,
- The Contractor acceptably disposes of unwanted materials,
- The affected area is smoothed, restored, and finished.

Measurement

Measure work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document, with calculations of quantities as appropriate, to justify payment.

Section 00430 - Subsurface Drains

This work consists of constructing subsurface drains as specified.

Quality

Quality requirements are specified in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Additionally, assure that:

- The drainage material is not contaminated,
- The geosynthetic properly separates the drainage material from the surrounding soil material,
- No material is damaged or, if damaged, is replaced or acceptably repaired, if allowed.

Construction

Assure that:

- Installations have been properly located and marked, the layout complies with the contract documents, and both the Contractor and Inspector understand the markings,
- Needed installations, additional to the plan locations, have been identified and laid out,
- Utility facilities have been located and marked,
- No apparent conflicts with other contract work, utilities, or other installations exist,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The trench is excavated to the proper line, grade, and dimensions,
- Rock, hardpan, or other unyielding material is removed to at least 75 mm below the pipe and replaced with acceptable material,
- Pipe is installed to proper line and grade, with all appropriate connections,
- Filter material or geosynthetic and drain backfill material is installed as required, without contamination,
- Installation is properly backfilled and compacted to required elevation,

- Locations of outlet pipes, other than those connected to inlets or other structures, are properly marked so Maintenance forces can locate them,
- The Contractor acceptably disposes of unwanted material,
- The affected area is acceptably smoothed, restored, and finished.

Measurement

Measure work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document, with calculations of quantities as appropriate, to justify payment.

Section 00435 - Wick Drains

This work consists of installing wick drains.

Quality

Quality documentation is specified in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Additionally, assure that the wick materials are properly protected until they are installed.

Construction

The Inspector must:

- Assure that the wick drains have been properly located and numbered and both the Contractor and Inspector understand the markings,
- Review the Contractor's proposed installation process and observe the trial installation process to assure a satisfactory installation process. Involve the Project Manager as needed,
- Assure that monitoring equipment, if needed or required, is installed and protected,
- Assure that drains are installed in the proper locations,
- Assure that the drainage material is not contaminated,

- Work with the Contractor to determine and record the depth of the drains and the final length installed at each location,
- Assure that the drains are not damaged during their installation,
- If an obstruction is encountered:
 - If needed, order the Contractor to implement obstruction clearance procedures,
 - If the obstruction cannot be cleared, work with the Contractor to install the drain(s) at alternate locations. Involve the Project Manager as needed,
- Assure that the Contractor acceptably disposes of unwanted material,
- Assure that the drainage material is smoothed and finished to the required elevation and that any contaminated drainage material is removed and replaced with acceptable material.

Measurement

Record information needed to calculate the quantities of pay item work performed. Assure that payment is not made for inappropriate or unacceptable installations. Record information for each wick drain installed.

Submit that information as a Source Document to justify payment.

Section 00440 - Commercial Grade Concrete

This work consists of furnishing, placing, and finishing concrete to construct minor structures. This material may also be called minor structure concrete (MSC), but the acronym “CGC” will be used in this text. Allow this material to be used only as specified or allowed in the contract.

Quality

Quality requirements are specified in the contract and in the Manual of Field Test Procedures.

Assure that the Contractor is aware of those requirements, performs sampling and testing as required, and provides acceptable quality documentation before the material is incorporated. Assure that the ODOT QAC is aware of scheduled work to perform needed verification testing.

Do not allow the Contractor to place concrete that is of questionable quality, including concrete that has exceeded the allowed time from mixture until placement.

If the CGC fails to achieve its specified strength, work with the Project Manager to determine whether the CGC must be removed and replaced or may be left in place with a price adjustment. If appropriate, calculate a price adjustment according to the

methods specified in the Quality Price Adjustments section (12-C) of the Construction Manual.

Construction

Assure that:

- Each structure is accurately located and marked and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The forms, into which the CGC is to be placed, appear to be constructed according to best common practice and the forms will yield a structure of the specified shape, size, and orientation,
- Underlying and/or adjacent material is compacted, firm, or undisturbed, as specified,
- The CGC has been properly batched and mixed,
- Weather conditions are suitable for placing the CGC,
- The CGC is properly placed and consolidated,
- Surfaces are finished as specified, without addition of water,
- The CGC is properly cured and otherwise protected from unsuitable climatic conditions or damage from vandals, etc.,
- When forms are removed, surfaces are finished if specified.

Measurement

No measurement is required for this item, since payment will be made under the pay item in which the CGC is incorporated.

Section 00442 - Controlled Low-Strength Materials

This work consists of furnishing and placing controlled low-strength materials (CLSM).

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Material Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs testing as required, and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The limits of the CLSM placement are properly marked and both the Contractor and Inspector understand the markings,
- The materials are properly mixed and placed to properly fill the specified voids, spaces, volumes, or depths,
- CLSM material does not leak or flow into unwanted areas.

If placement of CLSM will take place over several weeks, review the strengths of the placed material to assure that the achieved strength is within the specified range. Involve the Project Manager, as needed, and require the Contractor to modify the CLSM mixture in order to achieve acceptable strengths.

Measurement

Refer to the contract for the method of measurement and payment.

As work is performed, measure the work, or assure that measurements are taken to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

Prepare and submit a Source Document, with quantity calculations, to justify payment.

Section 00445 - Sanitary, Storm, Culvert, Siphon and Irrigation Pipe

This work consists of constructing pipes of 1800 mm or less in diameter.

Quality

Quality documentation is specified in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Inspect pipe soon after it is unloaded. The Contractor should unload pipe at locations that will minimize handling and should block the pipe to prevent rolling.

Identify sections of pipe or other materials that are unacceptable for use on the project. Items to check include:

Concrete pipe

- Pipe is of the specified class with appropriate identifying markings. Gaskets and other materials conform to requirements.
- Reinforcement is not exposed and cracks and voids are not evident. Check soundness by tapping pipe lightly with a hammer. Sound pipe will “ring” when tapped. A section with damage or voids will have a dull sound,
- Ends are not damaged or, if repaired, repairs are tightly bonded.

Metal pipe

- Materials are of proper size and type, with appropriate identifying markings,
- Dents or bends are not evident and coatings are not damaged,
- Proper gaskets, if required, bands, and hardware are furnished.

Plastic or other pipe

- Materials are of proper size and type, with appropriate identifying markings,
- Material is not damaged,
- Proper connecting materials are furnished.

Have the Contractor separate unacceptable material so it is not used on the project and is not included for payment. Do not use paint or other such marking methods to identify unacceptable material, as the material belongs to the supplier and it may be able to use the material elsewhere, even though it is unacceptable on this project.

Include pipe and material identification marks on the Field Inspection Report or other quality documentation. If material is rejected, describe the reasons and disposition of rejected material.

For siphon and sanitary sewer installations, obtain a copy of the Contractor's records of the watertightness testing or record the results in the daily report.

Prepare and submit required quality documentation.

Construction

Assure that:

- Installations are properly located and marked and both the Contractor and Inspector understand the markings. Obtain copies of the survey marking notes, if needed,

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The Contractor adequately controls line and grade of the installation from the survey markings. Methods of accomplishing this include using a stringline, laser beam, or other method.
- For excavation, bedding, and backfill:
 - Work is accomplished as required and discussed in Section 00405.
- For laying pipe:
 - Pipe is of the proper size and type,
 - Pipe is handled carefully during installation to prevent damage, including to ends and coatings,
 - Laying is started at the downstream end unless conditions require otherwise,
 - For elliptical pipe, the major axis is placed as required,
 - For riveted pipe, outside laps are placed upstream and seams at sides,
 - Bell or grooved ends are placed upstream,
 - The paved invert is installed in the pipe's flowline,
 - Perforations in drain pipe are installed down unless otherwise specified.
- For joining pipe:
 - The specified type of joint is used, including proper gaskets or other materials,
 - Joints fit close and tight and, when required, are watertight,
 - Dirt and foreign material is cleaned from the pipe and joint areas,
 - Pipe and gaskets are lubricated according to manufacturer's recommendations,
 - Mortar joints for concrete pipe are constructed as required,
 - Bands are aligned and installed as specified, centered with half on each pipe section,
 - Bolts are tightened properly. For corrugated pipe, the Contractor may tap the band with a mallet, while the bolts are being tightened, to help jar the corrugations together and allow a tight fit,
- All damage to coatings is acceptably repaired or the element is replaced,
- The Contractor properly places and compacts backfill material, including testing for compaction as required or needed,
- The Contractor acceptably disposes of unwanted material,
- Affected areas are smoothed, restored, and finished.

Measurement

Measure the work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00450 - Structural Plate Pipe, Pipe Arch and Arch

This work involves the construction of various Structural Plate structures.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide. Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Inspect the delivered materials for damage, including damage to shape and coatings.

Prepare and submit required quality documentation.

Construction

Assure that adequate traffic control is implemented and maintained, according to the Traffic Control Plan.

Surveying and Layout

Assure that the structure, as located and marked, conforms to the plans and matches the adjacent terrain. Assure that both the Contractor and Inspector understand the markings.

Excavation, Bedding, and Backfill

Assure that this work is accomplished as required and discussed in Section 00405.

Erection

Assure that:

- Footings have been constructed to proper line and grade. Also refer to inspection guidelines in Sections 00440 and 00540 of this Manual,
- The Contractor understands the contract requirements and the manufacturer's assembly instructions and performs the work properly,
- Bolts are of proper lengths to have a full nut grip and include all required washers and other hardware,
- Bolts are installed and properly tightened in the proper sequence,
- Strutting is installed as required by the manufacturer's specifications and the contract,
- To monitor changes in shape and alignment, monitoring devices, such as tell-tales, are utilized,

- Damage to coatings is properly repaired,
- Headwalls, aprons, and other appurtenances are constructed to proper line and grade. Also refer to inspection guidelines in Sections 00440 and 00540 of this Manual.

Measurement

Measure the work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document, with calculation of quantities as appropriate, to justify payment.

Section 00460 - Paved Culvert End Slopes

This work consists of constructing end slopes (generally of portland cement concrete) on culverts and other pipes as specified.

Quality

Quality requirements are specified in the Nonfield-Tested Materials Acceptance Guide and in the Manual of Field Test Procedures. Refer to Section 00440 for discussion of Commercial Grade Concrete.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated.

Prepare and submit quality documentation as required.

Construction

Assure that:

- The dimensions and layout for each installation comply with contract documents,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The forms for the end slope appear to be constructed according to best common practice, the dimensions of the forms will yield a structure of the specified shape and size, and the finished product will acceptably match the end of the culvert or other pipe and the adjacent finished surface,
- Underlying material is compacted as specified,

- The welded wire fabric or other specified reinforcing is of proper spacing and dimensions and it is adequately supported and secured so it will be in the proper location in the completed structure,
- The concrete has been properly batched and mixed,
- Weather conditions are suitable for placing the concrete,
- The concrete is properly placed and consolidated,
- Surfaces are finished as specified and to acceptably match the end of the culvert or other pipe and the adjacent finished surface,
- Concrete is properly cured and otherwise protected from unsuitable climatic conditions or other damage,
- When forms are removed, surfaces are finished if specified,
- The Contractor acceptably disposes of unwanted material,
- Affected areas are acceptably smoothed and finished.

Measurement

As work is performed, prepare and submit a Source Document, recording the installation and the quantity of work as specified in the Standard Drawing or plan for the installation, to justify payment.

Section 00470 - Manholes, Catch Basins and Inlets

This work involves the construction of cast in place or precast manholes, inlets, and similar structures.

Quality

Quality requirements are specified in the contract and the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs the necessary testing, and provides acceptable quality documentation before the material is incorporated. Assure that ODOT performs verification testing as needed.

Inspect the delivered materials for damage.

Prepare and submit required quality documentation.

Surveying and Layout

This work is generally done in conjunction with Section 00405 and 00445 work. Assure that:

- If the Contractor plans to use precast elements, the Contractor has prepared acceptable working drawings that accurately show the location and elevation of all inlet and outlet pipes and other appurtenances,
- The installation, as marked, complies with the contract documents or modifications ordered by the Project Manager,
- There are no apparent conflicts with other facilities,
- There are no apparent errors in location or elevations.

Construction

Assure that:

- Installations have been properly located and marked and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Excavation, bedding, and backfill is performed as specified and discussed in Section 00405,
- Reinforcement is installed as specified and will have the specified coverage with concrete,
- For precast elements, the underlying material provides full and adequate support for the element and the element is installed to the proper elevation and orientation,
- Base or subgrade drain pipes are properly installed,
- Joint material is properly installed,
- Grates and covers are installed to the proper elevation and slope to match the adjacent finished surface. It is generally best for the Contractor to make the final adjustments after the adjacent finished surface is constructed,
- The Contractor acceptably disposes of unwanted materials,
- The affected area is acceptably smoothed, restored, and finished.

Measurement

Measure the work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00480 - Drainage Curbs

This work consists of constructing mechanically extruded curbs using either portland cement concrete or asphalt concrete.

Quality

Quality requirements and documentation are specified in the contract, Nonfield-Tested Materials Acceptance Guide, and the Manual of Field Test Procedures.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated.

Assure that materials are not contaminated and are of acceptable quality.

Prepare and submit quality documentation as required.

Surveying and Layout

Assure that:

- The installation, as laid out and marked, will comply with contract requirements and local conditions,
- Curb breaks for outlet drainage and other needs are properly located,
- Both the Contractor and Inspector understand the markings.

Construction

Assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The area, upon which the curb is to be placed, is clean and free of extraneous matter,
- A proper bonding agent has been placed under the curb location and is still in a condition to properly bond the curb to the underlying material when the curb material is placed,
- Curb material includes proper materials and has been properly mixed and handled,
- Placement and finishing results in a well-compacted mass and the surface is smooth and dense,
- Expansion joints are properly placed and contraction joints are properly constructed,
- Honeycombed or otherwise defective sections are removed and replaced,
- Line and grade of the finished product meet contract requirements,
- Portland cement concrete is cured as specified,
- Curb is protected as appropriate,
- The Contractor acceptably cleans up and disposes of unwanted material.

Measurement

Measure the completed work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00490 - Work on Existing Sewers and Structures

This section consists of joining new work to existing work, adjusting existing manholes, sumps, inlets, boxes, and similar items, and repairing or abandoning existing facilities.

Quality

Quality requirements are specified in the contract and the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Assure that ODOT performs verification testing as needed.

Inspect the delivered materials for damage.

Prepare and submit required quality documentation.

Assure that the materials of the existing installation are not damaged. If they are, work with the Project Manager to have damage repaired or new materials installed.

Construction

Assure that:

- Installations have been properly located and marked and both the Contractor and Inspector understand the markings,
- There are no apparent errors in final elevation or location of the facilities,
- The planned adjustment, connection, or removal procedure conforms to contract requirements and that flows are properly handled. Work with the Project Manager to review the Contractor's bypass pumping plan, if needed,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The Contractor does not allow material and debris to enter the facility,
- Proper materials are available and used,

- Joints and connections are properly constructed,
- Adjustments are properly performed to the required elevation and slope and match the adjacent finished surface,
- All facilities to be abandoned are properly drained, plugged, and filled if required,
- The Contractor acceptably disposes of unwanted materials,
- The affected area is properly smoothed, finished, and resurfaced as required.

Measurement

Measure the work, or assure that measurements are taken, to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00495 - Trench Resurfacing

This work consists of resurfacing pipe trenches and replacing other fixtures or materials damaged or removed during pipe trenching operations.

Quality

Quality requirements are specified in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The area to be restored is excavated to the proper depth, the underlying material is properly compacted, and the area to be restored is clean,
- Materials of the required quality and type are properly placed to the required depths,
- Replacement materials are properly smoothed, compacted, and finished and are properly cured and protected from damage,
- The Contractor adequately disposes of unwanted material,
- Affected areas are smoothed, restored, and finished.

Measurement

Measurement is generally on the area basis, except as specified differently by contract. Measure the dimensions of the restored areas, or assure that measurements are taken, to calculate the quantity. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document, with calculation of quantity, to justify payment.

Part 00500 - Bridges

Safety

Bridge construction poses many potential risks to workers, the Inspector, and motorists. The Inspector and Project Manager must assure that the Contractor utilizes safe methods, as well as assuring that ODOT and others use safe practices and that motorists are not placed in undue danger.

The risks in structure construction include:

- Equipment or personnel working overhead and swinging or moving materials through or over the work area,
- Forms, construction materials, and uneven surfaces are present in the work area,
- Work may be performed over water or in cofferdams,
- Work may be performed in excavations or locations where the surrounding soil is restrained by shoring or other devices,
- Work may be performed above the ground level and may require workers or the Inspector to be properly restrained,
- Access to some work areas may require climbing or descending slopes, ladders, or stairways,
- Some equipment and processes have a high noise level,
- Some work must be performed adjacent to traffic.

The Inspector and others:

- Should plan their work, activities, and movements to not place themselves or others in danger,
- Should wear a hard hat (must wear a hard hat if work, equipment, or materials are overhead or if the Contractor has a mandatory hard hat policy) and other safety apparel, including shoes or clothing,
- Must use hearing protection in areas of high noise level,
- Must wear a life vest when working over water,
- Must use acceptable restraining devices when required,
- Must assure proper ventilation, etc. when entering or working in confined spaces,
- Must use a proper respirator when around air-borne dust or other materials,
- Must abide by all other safety requirements of the Contractor or ODOT,
- Should be another set of eyes, ears, and knowledge to help the Contractor provide and maintain a safe work environment.

The Inspector should assure that:

- The Contractor provides working drawings, stamped by a properly licensed Engineer, for falsework, forms, and other supporting devices and for devices that restrain earth or water, such as shoring or cofferdams,
- The Contractor constructs falsework, forms, shoring, cofferdams, and other supporting or restraining devices in the manner that is approved by the Engineer of record for that work,
- Forms and temporary access methods are sufficiently constructed, supported, and maintained to handle the loads that will be placed on them,
- Adequate traffic control is implemented and maintained at all needed times, according to the Traffic Control Plan.

Section 00501 - Bridge Removal

This work consists of removing and disposing of existing bridges or portions thereof.

Quality

There generally are no quality requirements for this work, unless the contract specifies differently. The Inspector, though, should record pertinent information in the daily report or project diary.

Construction

Assure that:

- The Contractor is aware of, and does not knowingly violate, the requirements and restrictions of the contract or regulatory agencies. This includes work in water or other sensitive environments and treatment of hazardous materials.
- The Contractor's plan for this work seems viable and does not:
 - Violate contract requirements or those of regulatory agencies. The Project Manager may involve the Region Environmental Coordinator in reviewing the Contractor's plan for removal, etc.,
 - Create traffic control issues that are unacceptable,
 - Create unacceptable safety problems,
 - Create potential damage or danger to other parts of the work, including the remaining portions of a structure where only part is removed,
- If appropriate, the media and emergency services have been notified,
- If appropriate, regulatory agencies have been notified,
- If needed, an acceptable Traffic Control Plan is developed and adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Work is performed according to the Contractor's plan,
- If an unknown, potentially hazardous material(s) is discovered, work with the Project Manager, Contractor, and affected regulatory agencies to develop a method to handle it and initiate additional payment, if needed,

- If only part of a structure is to be removed, the removal line is adequately sawed or otherwise constructed to protect the remaining work,
- The Contractor properly handles and disposes of the removed material, including:
 - If material is to remain on the project, it is removed, obliterated, or broken as required by contract, including the provisions of Section 00310,
 - If material is removed from the project, the Contractor's operations do not create other problems and the disposal is done in an acceptable manner,
- The affected area is acceptably repaired, smoothed, and finished.

Measurement

Measurement is by lump sum. Assure that an acceptable breakdown of the lump sum is developed.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00510 - Structural Excavation and Backfill

This work consists of excavating, backfilling, and disposing of earth and other materials involved in construction of structures.

Quality

Quality requirements are specified in the contract and in the Manual of Field Test Procedures. Assure that:

- The Contractor is aware of those requirements,
- The Contractor utilizes properly certified personnel to sample and test materials for quality control,
- For backfilling, the Contractor has an acceptable method to assure that the material will be properly placed, compacted, and tested,
- ODOT performs verification testing as required,
- The Contractor provides quality documentation as required.

Prepare and submit required quality documentation.

Construction

Assure that:

- If the excavation will require a cofferdam, cribbing, shoring, or other bracing, the Contractor has provided an acceptable plan for that work and the plan and construction has been approved by a licensed Engineer as required,

- The Contractor's planned methods for disposing of excavated materials, water, and other materials do not violate contract requirements or other environmental restrictions,
- The location and limits for the work are properly identified and marked and both the Contractor and Inspector understand the markings,
- The Contractor has involved utilities and others in identifying and locating underground facilities,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- If shoring or other bracing will be needed, the Contractor has the proper materials, and other resources needed to construct it, available before the excavation work starts,
- Clearing, grubbing, and other removal work is performed as needed,
- All needed erosion and sediment control devices are in place and maintained as needed,
- Excavated materials are properly stored or removed to prevent dangerous conditions or damage to water or other environmental concerns,
- The Contractor acceptably removes water from the excavated area and properly disposes of it,
- If blasting is required, the Contractor utilizes controlled blasting techniques as described in Section 00335,
- If subsequent concrete is to be placed against undisturbed material, the excavation is made in close tolerance to the specified dimensions, with firm surfaces,
- The bottom of excavation is made to the correct depth, loose material is removed, and the surface is adequately compacted, as required in Section 00510.46,
- If specified material, such as rock, is not encountered at the specified depth, work with the Project Manager and the Engineer of record, if needed, to adjust the elevation of the subsequent construction, pursue any needed change in design, and address payment for the change in the work or any alleged differing site conditions, if appropriate,
- Do not allow equipment to operate in, or any material to be placed in, a stream, waterway, or other environmentally sensitive area unless allowed by the contract and regulatory agency,
- For cofferdams, shoring, cribs, etc.:
 - The cofferdam, shoring, crib, etc. is constructed according to the Contractor's acceptable plan,
 - Construction does not cause unacceptable impact to the stream, waterway, or other environmentally sensitive area,
 - Work is performed as specified in Sections 00510.44 and .45.
- For backfilling:
 - The concrete, against which the backfill is to be placed, has reached adequate strengths, as specified in Section 00510.48,

- All forms and other unacceptable material have been removed from the area to be backfilled,
- Concrete surfaces have been acceptably finished as required,
- As needed, structures are backfilled in a manner that prevents unbalanced loading,
- Backfill is placed in a manner that does not damage the structure or cause other unwanted stresses, as specified in Section 00510.48,
- Backfill is placed, compacted, and tested as required,
- Affected areas are acceptably smoothed, restored, and finished,
- The Contractor properly disposes of excess material.

Measurement

Refer to the contract for pay items. Items will be paid on either a lump sum or volume basis.

For lump sum items, assure that an acceptable breakdown of the lump sum is developed. Additionally, for Structure Excavation on a lump sum basis, assure that a basis for payment below the specified elevation is developed as appropriate.

For items paid on a volume basis, it may also be appropriate to develop a breakdown of the unit cost, since much time may elapse between the time of excavation and the time of backfilling. Measure the work, or assure that measurements are taken, according to the requirements of Section 00510.82, .84, .85, .86, and other requirements of the Special Provisions. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document, including calculation of quantity, to justify payment.

Section 00512 - Drilled Shaft Foundations

This work consists of constructing drilled, cast-in-place, reinforced concrete shafts.

Quality

Quality requirements are specified in the contract, in the Manual of Field Test Procedures for field-tested items, and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs required testing with certified technicians, and provides acceptable quality documentation

before the material is incorporated. Also assure that ODOT performs verification testing as required.

Prepare and submit required quality documentation.

Construction

During the bidding phase of the project, assure that a copy of all Soils and Geological Exploration Logs is available, in the Project Manager office, for review by bidders.

Prior to the pre-construction conference, assure that the Contractor provides the required information to verify the experience of the firm and the personnel that will construct the drilled shaft. Work with the Project Manager to review the information and consent to the firm and personnel.

Before allowing drilled shaft work to begin, assure that the Contractor has submitted the required installation plan specified in Section 00512.40. Work with the Project Manager to review the submittal and consent to the installation plan.

Also assure that:

- The Contractor develops an acceptable mix design for the concrete to be used in the drilled shafts, including acceptable production and testing of concrete aggregates,
- The Project Manager, Inspector, and Contractor have agreed on the required quality control for the work, as specified in Section 00512.19,
- The locations for the drilled shafts have been properly and accurately located and marked and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- If appropriate, measures are installed to control slurry, mud, and other materials that could damage the surroundings, drainage, or environmentally sensitive areas,
- Only acceptably qualified individuals are used to perform the specified elements of the work,
- Drilling and other excavation does not cause unacceptable damage to, or disturbance of, the surrounding soil,
- The Contractor acceptably disposes of excavated material,
- The Contractor properly assures the stability of the excavation, including use of slurry or casing, as required,
- The Contractor performs required and acceptable quality control,
- The shaft is excavated within allowable tolerance for vertical and horizontal alignment and location,
- If the Contractor encounters material that is different from that shown on the Soils and Geological Exploration Logs, or the Contractor alleges encountering a

differing site condition, immediately work with the Project Manager and Engineer of record, if needed, to analyze the situation, modify the design if needed, and resolve the differing site condition,

- The shaft excavation is performed to the proper elevation or dimension into specified soil material and the Project Manager approves the bottom elevation and material,
- The excavated shaft is acceptably cleaned of loose material prior to placement of reinforcement and concrete,
- The Inspector obtains needed measurements to determine the pay quantity for the shaft work,
- The reinforcement is properly placed to prevent settlement and assure adequate concrete cover and the crosshole sonic logging access tubes are properly installed if required,
- The Contractor either dewateres the excavation to allow concrete placement or implements proper procedures to allow concrete placement underwater,
- ODOT performs verification testing as needed,
- The concrete is properly placed to avoid segregation and contamination and assure a continuous, dense mass,
- The Contractor disposes of all displaced water, slurry, and contaminated concrete in an acceptable manner,
- All temporary casing is removed without causing unacceptable damage to the excavation, concrete, or other work,
- If unacceptable work is happening, the Contractor acceptably corrects the operation or stops the work as required,
- The top of the shaft concrete is placed to the specified elevation and is smoothed and finished as required,
- The Contractor properly cures the exposed concrete,
- If required by the Project Manager, the Contractor performs all needed testing and other work to detect and determine unacceptable construction and corrects all unacceptable work or constructs a new drilled shaft as required,
- The Contractor acceptably disposes of unwanted material,
- The affected area is acceptably smoothed, restored, and finished.

Measurement

Refer to the contract for pay items.

For each lump sum item, assure that an acceptable breakdown of the lump sum is developed as needed. For unit price items, take measurements, or assure that measurements are taken, to calculate the amount of work performed.

As work is performed, prepare and submit a Source Document, with quantity calculations, to justify payment.

Section 00520 - Driven Piles

This work consists of furnishing and driving piles.

Quality

Quality requirements are specified in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs sampling and testing as required, arranges for inspection to be done at supplier or manufacturer facilities as needed, and provides acceptable quality documentation before the material is incorporated.

Assure that ODOT performs all required inspection and verification testing.

Prepare and submit required quality documentation.

Safety

The pile driving operation involves lifting and swinging of heavy materials to significant heights, excessive noise, work in excavation, cofferdams, or around or over water, and removal of excess pile material above the cutoff elevation.

Assure that the Contractor:

- Has a safe plan to accomplish the work,
- Will not violate noise ordinances or unacceptably disturb surrounding residences or facilities and has obtained required variances to ordinances,
- If nearby buildings or other installations could be damaged by the pile driving operation, it has performed pre-work inspections as appropriate,
- Implements and maintains adequate traffic control, according to the Traffic Control Plan,
- Adequately secures piles and other materials during each operation,
- Provides safe access to allow its workers and the Inspector to perform their responsibilities,
- Provides or requires hearing protection and hard hats for its workers and the Inspector wears hearing protection and hard hat,
- If work is over water, provides life jackets to workers and the Inspector wears a life jacket,
- Safely handles the pile material during the cutoff and removal operation.

Construction

Assure that:

- The Contractor provides required information to allow evaluation of the pile driving equipment. Work with the Project Manager to review the information, before the pile driving work starts, and allow the equipment to be used. Also agree on the method to determine when a pile has been driven to the required elevation or bearing,
- If overhead utilities are present, the Contractor arranges to have them moved or implements other acceptable safety precautions to prevent damage to the facilities or equipment or injury to workers and others,
- The surface, into which the piles are to be driven, has been excavated or embanked to the specified elevation and the excavation is properly supported or restrained, as required, to prevent slope failure,
- The location for each pile is properly and accurately determined and marked, whether on the ground or with a template or other locating device, and both the Contractor and Inspector understand the markings,
- The pile driving equipment conforms to the approved submitted information, is acceptably assembled, the hammer has acceptable driving components, and swinging leads, if allowed by the Project Manager, will acceptably allow energy to be transferred to the pile by the hammer,
- The leads are acceptably stabilized,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- If required, the piles have acceptable pile tips,
- Piles are not damaged or improperly handled. If any pile is damaged or improperly handled, the Contractor acceptably repairs the damage or replaces the affected pile,
- The piles are driven in the specified or required sequence,
- If the pile hammer cannot effectively drive the piles, work with the Contractor and Project Manager to review and approve a different hammer or modify the process,
- The Contractor does not pre-bore the holes, or jet the piles, unless specified or specifically allowed by the Project Manager and Engineer of record,
- The Inspector marks and measures each pile, before it is used, to be able to calculate the pay quantity and tip elevation, as appropriate,
- As each pile is set into the leads, the pile is properly oriented and equipped with the required tip, if applicable, and the pile will be driven to the specified batter, if required,
- As it is driven, the pile does not deviate unacceptably from its specified vertical or battered orientation,
- Each pile is driven to the specified elevation or bearing and the Inspector agrees with that determination,
- The finished location of the cutoff elevation of each pile is within acceptable tolerance to plan location. If not, work with the Project Manager to determine whether a new pile needs to be driven or whether the Contractor must modify following work to accommodate the difference,
- If needed, splices are properly constructed,

- The person performing welding for pile splices is properly certified according to AWS D1.1,
- If the length of the driven piles is differing significantly from the plan lengths, work with the Project Manager and Contractor to record needed information and to determine if adjustments must be calculated for payment for driving piles or other pay items,
- If piles are not achieving the specified minimum tip elevation, consult the Project Manager and Engineer of record,
- The elevations of cutoff are properly and accurately located and marked,
- The operation to cut off the portion of the pile, above the cutoff elevation, is performed safely. If the cutoff material is acceptable for use as other piles, the Inspector marks the material to identify quality information for this or other projects,
- If soil has “heaved” during the driving process, the Contractor acceptably removes the excess material to the specified elevation,
- Pile heads are properly treated, as required,
- The Contractor acceptably disposes of excess material and smoothes and finishes affected areas.

Measurement

Refer to the contract for pay items.

Measure the work, or assure that measurements are taken, to calculate quantities for payment. The Inspector must record most of this information in a Pile Record Book, form 734-3485.

If the driven pile lengths differ significantly from plan lengths, work with the Project Manager and Contractor to determine needed adjustment to payments for driving piles or other pay items.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00530 - Steel Reinforcement for Concrete

This work consists of furnishing and placing reinforcement in concrete construction.

Quality

Quality requirements are specified in the contract and the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs sampling as required, and provides acceptable quality documentation before the material is incorporated.

Also assure that the Contractor provides order lists, bending diagrams, and working drawings as required, that ODOT performs timely review of those documents, and the Contractor corrects or modifies those documents as needed.

For manufactured items, assure that ODOT inspects the items at the manufacturer facility as needed.

Prepare and submit required quality documentation.

Construction

Assure that:

- ODOT performs needed sampling, testing, and inspection of the material at the manufacturer facility,
- As material is delivered, it is acceptably stored and protected,
- As required, adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The location or placement of reinforcement within the structure is within acceptable tolerance of plan locations, as defined in the “Manual of Standard Practice” published by the Concrete Reinforcing Steel Institute,
- Reinforcement is not exposed to any welding, unless allowed by contract,
- All debris and other unacceptable material, such as grease or oil, is cleaned from reinforcement and other material as appropriate, before placement,
- Reinforcement and other material is placed, supported, and secured in a proper manner to ensure proper final location and coverage with concrete,
- Only proper materials are used to secure and support reinforcement and other materials and no unacceptable material will be used on or near an exposed surface,
- All lap splices involve at least the specified length of material and are properly tied,
- Mechanical splices are constructed according to the contract or the recommendations of the manufacturer,
- All splices are acceptably staggered,
- If required, appurtenances for cathodic protection, including assuring continuity of reinforcing, are properly installed and tested,
- Reinforcement is tied at least at the specified locations,
- Coated reinforcement is tied only with nonmetallic coated ties,
- All damage to coated reinforcing is acceptably repaired,
- All required reinforcement and materials are properly in place, including excessive ends of tie materials, to assure adequate coverage with concrete,

- Concrete placement operations will not damage the reinforcement or its placement or support,
- Before starting concrete placement, the Contractor verifies that reinforcement and other materials are properly secured, will assure proper concrete cover, and have been cleaned of unacceptable material.

Measurement

Consult the contract to determine the method of measurement.

If measurement is on the mass basis, calculate the mass, as specified in the contract, of the reinforcement actually incorporated in the work.

If measurement is on a lump sum basis, assure that an acceptable breakdown of the lump sum is developed.

If the Project Manager has ordered changes to the work, work with the Project Manager to calculate adjustments to the lump sum payment.

As the work progresses, prepare and submit a Source Document, with calculations as required, to justify payment.

Section 00535 - Resin Bonded Anchor Systems

This work consists of constructing anchors in hardened concrete.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- Locations for the work are properly located and marked and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained as required,

- Weather conditions are appropriate to perform the work, especially construction of the epoxy resin,
- The Contractor does not allow material to enter drainage or otherwise sensitive areas,
- The Contractor uses the proper method of drilling and the proper size of drill, as required by contract or recommended by the manufacturer of the anchor,
- The holes are drilled to the proper depth,
- The holes are properly and adequately cleaned of dust, foreign matter, and excess water with a brush or compressed air,
- Epoxy resin is mixed and placed as recommended by the manufacturer,
- Placement of the epoxy resin and anchor device are coordinated to ensure that no air pockets remain in the installation,
- Installations are protected until the epoxy resin has adequately set,
- When epoxy resin has adequately set, twist or pull on some of the anchors to detect faulty installations. If required, the Contractor performs testing to ensure adequate installations,
- As required, the nuts on anchor bolts are tightened to $\frac{1}{4}$ turn beyond snug tight unless shown otherwise in the contract,
- The affected area is adequately cleaned and restored.

Measurement

Generally, no measurement is needed because payment is made under the item that the anchor system fastens.

Section 00540 - Concrete Bridges

This work consists of constructing bridges of portland cement concrete.

Common Bridge Terminology

The major elements of bridges and related terminology include:

- Foundation-That portion of the structure that transfers the weight and loads of the structure to the underlying soil materials, including:
 - Piles-Refer to Section 00520,
 - Drilled shafts-Refer to Section 00512,
 - Footings-That portion of the foundation that is constructed to transfer structure loads from the substructure to the piles, drilled shafts, or the underlying soil,
 - Spread footings-Foundations that are supported only by the underlying soil material,
 - Shoring or cofferdams-Structures or other restraining devices that are designed and constructed to temporarily restrain or withhold the adjacent soil

or water and allow the work to be constructed. These devices are normally removed after the structure is constructed.

- Substructure-That portion of the structure between the foundation and the superstructure, including:
 - Abutment-That portion of the structure that supports the end of a single span or the extreme end of a multi-span structure and, in general, also provides support for the approach embankment above that elevation. It generally includes the abutment cap and beam seat, backwall, and wingwalls or other restraining elements,
 - Pilecap-That element of the structure, generally cast above ground, that transfers the load of the superstructure to the pile or drilled shafts. It generally includes the cap and beam seat. Pilecaps can be constructed of reinforced concrete, steel, or wood,
 - Column or pier-That portion of the structure, other than pilecaps, that supports the superstructure at locations between abutments. It also includes the cross beam constructed at the top of the column or pier to support the superstructure elements,
 - The substructure can also include arches that are constructed entirely below the roadway elevation.
- Superstructure-That portion of the structure, supported by the substructure, that includes the roadway, including:
 - Girders-Longitudinal elements that are supported by the substructure elements and support the roadway and other elements. Girders can be constructed of reinforced concrete (including those that are cast in place, precast and prestressed, post tensioned, or a combination), structural steel, or wood (including glued laminated wood),
 - Trusses-A framework of members, either above or below the roadway, that supports the roadway and other elements and is supported by the substructure elements,
 - Deck-That portion of the superstructure that forms or supports the roadway and other elements,
 - Curb, bridge rail, etc.-Those portions of the superstructure, cast on the deck, constructed to channel, direct, or restrain traffic and pedestrians. These elements can be constructed of reinforced concrete, wood, steel, or a combination.
- Falsework-Temporary supporting devices and structures that are designed and constructed to support materials, work, or portions of the permanent structure until the permanent structure is self supporting. All of this temporary work is generally removed to the specified depth below ground line.

Quality

Quality requirements are specified in the contract, in the Manual of Field Test Procedures for concrete, and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs testing with certified technicians as required, and provides acceptable quality documentation before the material is incorporated. Assure that ODOT performs required verification testing.

Prepare and submit required quality documentation.

Construction

Assure that:

- ODOT has furnished the required, correct survey information and elevations of final surfacing to the Contractor,
- The Project Manager, Inspector, and others have reviewed the contract documents to determine apparent errors and have agreed on resolution of the errors,
- The Contractor is aware of all environmental and other restrictions specified in the contract or required by regulatory agencies and the Contractor does not plan work in violation of those restrictions,
- The Contractor's Traffic Control Plan will provide adequate traffic control and adequate traffic control is implemented and maintained as required,
- If the work will restrict travel lanes or vertical clearances, the Motor Carrier Services Section is notified timely to allow them to notify haulers of oversize loads,
- For those manufactured elements that require inspection at the manufacturer facility, the Project Manager has assured that the required inspection will be performed,
- The Contractor acceptably manufactures aggregates and other materials needed for the work, performs required quality control and testing, and develops needed mix designs. Also, ODOT performs required verification and other testing,
- As the Contractor performs surveying to locate and mark elevations for the work, both the Contractor and Inspector cursorily review that work to detect apparent errors in location, dimension, or elevation and understand the markings,
- Buried and overhead utilities and other facilities have been properly located and conflicts with the work have been resolved.

For work bridges, trestles, or other temporary structures needed to provide access to the work areas:

- The Contractor has obtained approval, including permits as required, for the temporary structure from the appropriate regulatory agencies,
- As appropriate, the Contractor has provided acceptable working drawings that have been stamped by a licensed Engineer, if required,

- The Contractor constructs the temporary structure according to the working drawings or as approved by the licensed Engineer,
- The temporary structure will be removed before it violates restrictions of the contract or regulatory agencies,
- The temporary structure is fully removed and the affected area is smoothed and restored as required.

For placement of concrete:

- The Contractor has an acceptable mix design for the specified concrete, has an adequate supply of acceptable aggregates and other materials, and will have a certified technician test the concrete as required,
- Forms have been acceptably constructed to the proper shape and depth and reinforcement and other appurtenances, including electrical conduit and anchor bolts, have been properly placed, secured, and supported,
- All form bolts and other metal, that will be within 25 mm of the concrete surface, can be easily removed to that depth and the location acceptably finished after concrete is placed or forms are removed,
- If needed, the Contractor has adequately marked the elevation to which the concrete is to be placed, to ensure the proper depth,
- The space, in which the concrete is to be placed, has been cleaned of unacceptable and unwanted material and the forms and reinforcement have been dampened prior to placement of the concrete,
- Weather and climatic conditions are acceptable,
- The ODOT QAC is aware of scheduled work to perform needed verification testing,
- The Contractor has adequate resources and equipment to properly place, consolidate, finish, and cure the concrete,
- The concrete has been properly batched and mixed and will be placed within the allowable time from mixing to placement. Review the information on the delivery ticket that must accompany each load,
- The Contractor performs required testing as the concrete is delivered, but before it is placed, and the test results are acceptable or the concrete is not placed,
- The concrete is properly placed in its final position by the delivery device and no segregation of the mix occurs,
- The concrete is adequately consolidated with a vibrator and the vibrator is not used to move the concrete,
- For placement of deep sections, such as columns or tall abutments, the rate of placement does not exceed the design rate of placement for the forms,
- Any excess depth concrete is moved or removed with a shovel to avoid segregation of the mix,
- The concrete is smoothed and finished as required, including the construction of required shear keys,
- The concrete is adequately protected and kept moist for the period specified in the contract, including contract requirements regarding strength and subsequent loading. Do not allow liquid curing compounds for Section 00540 concrete,

- If the air temperature is forecast to be below 4°C within 7 calendar days of concrete placement, the Contractor either uses approved insulated forms or encloses the concrete and heats the enclosed space,
- As allowed by the contract, the forms are removed and any damaged or deficient areas are acceptably repaired,
- The surfaces are finished as required by the contract, including removal of all metal to at least 25 mm below the surface.

For foundations:

- If needed, the Contractor has provided acceptable working drawings for cofferdams or required shoring or other restraining devices,
- ODOT records information on existing ground and the required excavation to calculate pay quantities,
- Embankment is constructed to the specified density and is smoothed and finished to the required elevations,
- The Contractor constructs cofferdams, shoring, and other restraining devices according to the approved drawings,
- Excavation is performed as specified and discussed in Section 00510 and provides a smooth, firm foundation, at the required elevations,
- If a cofferdam protects the foundation work:
 - The cofferdam is constructed according to the approved working drawings or as approved by the licensed Engineer,
 - Construction of the coffer dam and all subsequent work does not violate restrictions in the contract or required by regulatory agencies,
 - Excavation is performed to the required elevation, including any possible heaving caused by subsequent pile driving, and the Contractor properly disposes of or stores the excavated material without violating any restrictions,
 - The Contractor drives required piles. Refer to Section 00520,
 - If required, the Contractor properly places seal concrete to the proper elevation and allows the concrete to achieve the specified strength before de-watering the cofferdam,
 - The Contractor removes water within the cofferdam and disposes of it without violating any restrictions. If unacceptable amounts of water are seeping through the cofferdam, the Contractor acceptably seals the seepage and removes the water from the work area,
 - The Contractor cuts off the piles to the specified elevation, removes the cut off portions, and acceptably cleans the seal concrete to allow construction of the footing,
 - As appropriate, the Contractor places backfill and other material, as required, and removes the cofferdam without violating restrictions,
- If a spread footing will be constructed, the underlying soil material will provide the required bearing and is appropriately cleaned and finished. Unacceptable material is removed and replaced with concrete or other acceptable material, as agreed by the Project Manager,

- The Contractor drives pile, cuts them off to the specified elevation, and removes any excess material that heaved as a result of pile driving. Refer to Section 00520,
- The Contractor constructs adequate forms that will produce a concrete element of the proper dimensions and geometry. If concrete is to be placed against undisturbed material, the material is acceptably firm,
- Reinforcement of the proper size, number, and dimension is properly placed, secured, and supported to prevent movement during concrete placement or other work. Refer to Section 00530,
- Other appurtenances, such as electrical conduit or fasteners, are properly placed and secured,
- Concrete is properly placed. Also refer to the above discussion on this topic,
- Concrete is properly cured, forms are removed, defects and damage are repaired, and required finishing is performed,
- Backfill is properly placed as specified and required and affected areas are acceptably smoothed and finished.

For substructure elements:

- All needed prior work has been performed, including:
 - Concrete has been placed and cured and has achieved the required strength or waiting period,
 - Piles for pile caps and abutments have been properly driven, have been cut off to specified elevations, and have been capped or otherwise treated as required,
 - All underlying soil materials have been excavated or placed to the specified elevations, have been properly compacted, and are acceptably smooth,
 - All unwanted material, within the area of the substructure construction, has been removed and surfaces have been properly cleaned,
- All access to work sites, above or below ground, conforms to OR-OSHA requirements,
- All elements have been properly located and marked and both the Contractor and Inspector understand the markings,
- Falsework, if needed, is constructed according to the acceptable working drawings unless the drawings are amended by the licensed Engineer,
- All reinforcement is properly placed and secured, either before or after forms are placed,
- Adequate forms of the proper dimensions, geometry, and height are constructed and secured,
- Reinforcement is adequately blocked to assure proper coverage of concrete,
- All other required appurtenances, including bolts, drain pipe, fasteners, and electrical conduit, have been properly installed and secured in the correct location, orientation, and height,
- If elements of the substructure will be constructed in multiple lifts, devices are acceptably installed in the lower lifts to allow the upper lift of forms to be

attached and the concrete achieves the specified or required strength before forming for the next lift is started,

- All unwanted material is removed from the formed area prior to placing concrete,
- Placement of concrete for deep sections does not exceed the design rate of placement for the forms,
- Concrete is acceptably mixed, placed, finished, and cured. If curing of the concrete is not complete when the forms are removed, the concrete is adequately protected and kept moist for the complete cure period,
- When forms are removed, all damage and unacceptable material is acceptably repaired and the surface is finished as specified.

For superstructure elements:

- All required prior work has been completed and unwanted material has been removed from the superstructure area,
- All access to above ground work sites conforms to OR-OSHA requirements,
- Placement of all superstructure concrete conforms to the sequencing specified in the contract,
- The locations and elevations for all needed portions of the superstructure are correctly located and marked and both the Contractor and Inspector understand the markings.
- For cast-in-place girders (normally a box girder):
 - Falsework is properly constructed, including:
 - * It is constructed according to the acceptable working drawings unless the drawings are amended by the licensed Engineer,
 - * If piles are used for the falsework, they are driven to the bearing capacity specified in the acceptable working drawings,
 - * Until the licensed Engineer inspects and approves of the constructed falsework, do not allow any concrete or unacceptable point loads to be placed on the falsework,
 - * It is adjusted to provide the proper elevations, slope, and cross section for the following work, including allowance for “crush” between falsework elements,
 - * Tell-tales are installed at supports and other necessary locations and monitored to detect unexpected settlement during and after concrete placement in elements of the superstructure.
 - For the bottom slab:
 - * Locations for the stems and diaphragms and the outside of the slab are accurately determined and marked,
 - * Forms for the outside beam are adequately constructed to the proper line and slope and of adequate height, including placement of a chamfer strip if specified,
 - * Reinforcement and post-tensioning ducts, if needed, are properly placed, secured, and supported to assure proper location and required coverage of concrete. Also refer to Sections 00530 and 00555,
 - * Construction joints are properly formed at the allowed locations,

- * Required access holes, and drains at the low points of the box girder, are properly located and formed,
- * Other appurtenances, such as luminaire blockouts, electrical conduit, and bolts or connectors for utility lines, are properly installed and secured,
- * All unwanted material is removed prior to placement of concrete,
- * Elevations of the top of concrete placement are accurately marked to ensure proper thickness of concrete,
- * Concrete is placed and cured as required.
- For stems and diaphragms:
 - * All damaged or missing reinforcing, post-tensioning ducts and anchors, electrical conduit, utility blockouts, and other appurtenances are acceptably repaired or installed,
 - * Forms are acceptably constructed and reinforcement is acceptably blocked to assure required coverage of concrete,
 - * The elevations for the top of concrete are accurately marked to assure that concrete will not extend into the deck area or above the location of the specified joint at the top of the stem or diaphragm,
 - * Construction joints are properly constructed,
 - * All unwanted material is removed prior to placement of concrete,
 - * Concrete is placed and cured as required,
 - * All formwork and unwanted material is removed prior to constructing the deck.
- If precast concrete or structural steel girders are utilized, they are properly and accurately placed, assembled, and stabilized as needed.
- For deck construction:
 - Elevations for construction of the deck formwork are accurately marked on the girders, stems, etc. Assure that appropriate camber has been included in the grades,
 - If precast concrete or steel girders have excessive camber, work with the Project Manager, Engineer of record, and the Contractor to adjust the deck elevations to avoid constructing any section of the deck with insufficient thickness. Require additional reinforcement in the built up section as specified or required,
 - Forms for the deck are adequately constructed to assure that the deck is constructed to the proper thickness, dimensions, and cross section,
 - Outside forms for the deck are constructed at the proper location, vertical and to the specified height, are properly secured to accommodate all forces on them during construction, and will produce an acceptable line and grade on the outside of the deck, including placement of a chamfer strip if specified,
 - Reinforcement and other appurtenances are properly placed and secured and all damage to coatings is acceptably repaired,
 - If the Contractor must construct additional build-up over girders due to camber in the girders, it must place additional reinforcement in that build-up as specified,
 - The deck finishing machine support system is constructed as detailed in the approved working drawings,

- The Contractor properly surveys and sets the elevation of the support system rail to be a uniform distance above the specified deck elevations, including camber,
- The Contractor properly adjusts the deck finishing machine carriage rails to match the required cross section for the deck,
- The Contractor operates the finishing machine over the entire area of the deck and assures that:
 - * The rails have been properly set to provide the specified deck cross section and grade line,
 - * The finishing machine will produce a deck surface with the specified thickness of deck beneath. Remember that the concrete will cause the finishing machine drum to float up about 3 mm,
 - * All reinforcement and appurtenances will have the specified coverage of concrete,
 - * All bulkheads and construction joint forms have been set to the specified grade and cross section,
- A pre-placement conference occurs, between key ODOT and Contractor personnel, at which the parties discuss planned deck placement procedures and responsibilities. Topics to be discussed include:
 - * Contractor personnel and equipment that will be used,
 - * The approved mix design for the concrete,
 - * Number of and timing of concrete delivery trucks,
 - * Quality control testing to be performed by the Contractor,
 - * The need, and responsibility, for rejecting unsuitable concrete,
 - * The method of delivering concrete to the deck (pump, bucket, conveyor, buggies, etc.). Does the Contractor have a backup system available?,
 - * Acceptable weather conditions,
 - * Needed traffic control,
 - * Responsibilities of ODOT, including inspection and verification testing,
 - * Placement and consolidation of the concrete, including backup vibrators in case of breakdown,
 - * Finishing process,
 - * Checking smoothness during placement,
 - * Texturing,
 - * Curing, including availability and prior wetting of curing materials,
 - * A plan for constructing a construction joint or removing the green concrete if an incurable situation occurs,
 - * Checking smoothness of the cured deck surface and needed correction,
- The Contractor cleans the deck area of all unwanted material and checks all reinforcement and other appurtenances to assure that they are properly secured,
- Weather and climatic conditions, on the day of concrete placement and for the specified following period, comply with contract requirements,
- The Contractor properly mixes, delivers, tests, places, consolidates, finishes, and cures the deck concrete, including:

- * Form surfaces, reinforcement, and other appurtenances are dampened prior to placing concrete,
- * Concrete is delivered at an acceptable rate to allow timely placement,
- * The Contractor does not use the vibrator to move concrete,
- * If concrete must be moved, only shovels, or other devices that will not cause segregation, are used,
- * Concrete, in areas of subsequent construction such as rails or curbs, is properly roughened or has required shear keys constructed,
- * No water is added to the concrete from the time of its discharge from the delivery truck until finishing and texturing are complete,
- * The Contractor frequently tests and assures the proper deck thickness and smoothness, including assuring that the finished surface at the ends of the placement will match the gradeline of adjoining surfaces,
- * Texturing is performed at the proper time in the process to assure adequate texturing, but to avoid tearing of the surface,
- * Wet burlap, or other acceptable material, is placed over the textured surface as soon as it will not damage the surface finish and is maintained in a wet condition until the specified cure period is complete,
- * The concrete is adequately protected from other damage,
- If post-tensioning is required, deck and side forms for the superstructure are removed before tensioning is performed,
- All forms and falsework for the superstructure are removed or released before above deck construction, such as curbs, sidewalks, and rails, is performed,
- All damage is acceptably repaired and surfaces are finished as specified and required.
- For above deck construction:
 - Required post-tensioning has been done and supporting forms and falsework have been removed or released,
 - Reinforcement and other required appurtenances, such as electrical conduit and bolts, have been properly placed and secured, including allowance for all required expansion and contraction joints,
 - Acceptable forms have been constructed, or an acceptable slipform system is used, that will produce a structural element of the proper dimensions and height with acceptable line, elevation, and grade,
 - Concrete is properly placed and cured, forms are removed if used, damage is acceptably repaired, and the surfaces are finished as required,
 - Other elements, such as metal rail, sign mounts, and luminaires, are properly installed,
- The Contractor and Inspector test the smoothness of the roadway surface and, if needed, the Contractor acceptably grinds or repairs areas of unacceptable smoothness,
- Required utility fixtures and other appurtenances are properly attached to or installed in the structure,
- The Contractor removes and acceptably disposes of all unwanted materials,
- All approach work is completed,

- Roadway delineation is performed.

Measurement

Refer to the contract for the method of measurement and payment.

For lump sum items, assure that an acceptable breakdown of the lump sum is developed.

For unit price items, measure the work, determine measurements, or assure that measurements are taken to calculate quantities.

As work is performed, prepare and submit a Source Document, including required quantity calculations, to justify payment.

Section 00545 - Reinforced Concrete Bridge End Panels

This work consists of constructing reinforced portland cement concrete bridge end panels.

Quality

Quality requirements are specified in the contract, in the Manual of Field Test Procedures for field-tested materials, and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Also assure that ODOT performs verification testing as required.

Since the reinforced concrete bridge end panels are the transition from roadway to bridge deck, it is extremely important that the Contractor and Inspector exercise extra care to assure that the transition will be smooth. Among other things, that involves assuring that:

- The roadway and bridge deck are on the same grade line, cross section, and superelevation,
- The backfill and embankment in the area are properly placed and compacted to prevent settlement,
- Forms for the panels will produce a panel of the proper and smooth grade. For example, if the panel is in an area of significant vertical curvature, the Contractor may need to construct some curvature into the panel forms and the finished surface,
- The finished surface of the panel actually provides an acceptable grade and smoothness.

Prepare and submit required quality documentation.

Construction

Assure that:

- If needed, adequate traffic control is implemented and maintained,
- Elevations to be set for the panel indicate that the bridge deck and abutting roadway are on the same grade line, cross section, and superelevation. If they are not, work with the Project Manager to adjust roadway or deck finish grades to prevent the impact panel from creating an unneeded bump or dip,
- Elevations set for the panel will result in a panel of the proper depth, dimensions, geometry, line, and grade. Also review the comments above,
- The underlying material is properly and fully compacted and is properly smoothed and finished,
- Reinforcement of the required size and type is properly placed and supported to provide the required cover of concrete,
- Weather conditions are acceptable to perform quality work,
- The forms and underlying material are dampened prior to placing concrete,
- The concrete is properly mixed, furnished, and tested,
- The concrete is placed in its final position by the placing device (usually the chute from the truck), properly vibrated to consolidate the concrete, and screeded to the proper finished elevation. If necessary, the screeding should produce any needed vertical curvature,
- The Contractor does not add any water to the concrete or its surface during the placing or the finishing process,
- The Contractor performs other screeding, floating, and finishing to produce the correct finished elevation of, and to seal, the surface,
- The Contractor checks and assures the proper finished elevations and grades of the panel. It may use a straightedge, stringline, or other device(s),
- The surface is properly textured,
- The panel is properly cured by keeping it moist for the specified period, preferably with wet curing blankets,
- The Contractor removes forms and unwanted material, properly disposes of it, acceptably repairs any damage, and prepares the surfaces for remaining work,
- If the panel will be overlaid with an asphaltic concrete wearing surface, the Contractor constructs a saw cut in the wearing surface at the ends of the panel and fills it with poured joint filler.

Measurement

Measure the work, or assure that measurements are taken, to calculate quantities.

As work is performed, prepare and submit a Source Document, with calculation of quantity, to justify payment.

Section 00550 - Precast Prestressed Concrete Members

This work consists of manufacturing and installing precast, prestressed, concrete members.

Quality

Quality requirements are specified in the contract, in the Manual of Field Test Procedures for field-tested materials, and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs required testing, arranges for inspection during production, and provides acceptable quality documentation before the material is incorporated. Also assure that ODOT performs verification testing as required.

Prepare and submit required quality documentation.

Construction

In most cases, representatives of the ODOT Structural Services Engineer will inspect the production of precast, prestressed concrete members. If so, assure that the ODOT Structural Services Engineer is aware of such production. The Project Manager and Inspector are responsible for inspecting work as and after the members are delivered to the project, but may also need to inspect production of the members if representatives of the Structural Services Engineer do not perform that work.

If the Project Manager will inspect the production of those members, assure that:

- If the Contractor proposes an alternate design, the Project Manager and Engineer of record review and concur in the design and the Project Manager executes a Contract Change Order to incorporate the alternate design,
- The Contractor provides shop or working drawings as required and the Project Manager and Engineer of record review and concur in them,
- The Contractor supplies an acceptable mix design for the concrete to be used and ODOT reviews and agrees to the mix design,
- The Contractor performs required and acceptable quality control during production of concrete aggregates and ODOT performs required verification testing,
- The forms for the members are suitably constructed with the proper dimensions and shape, cleaned, and treated with a release agent,

- End forms are placed at the proper angle to the member, including bearing plates and other devices as required,
- Reinforcement of the specified sizes and other appurtenances are properly placed, secured, and supported to ensure adequate coverage of concrete,
- The proper number and size of prestressing strands have been properly located in the member and have been stressed to the proper force,
- Weather conditions are suitable for the work,
- Concrete is properly mixed, delivered, and tested and ODOT performs required verification testing,
- Concrete is properly placed and consolidated,
- The concrete surface is properly finished,
- Each member is properly cured until the concrete achieves the desired strength,
- After prestress is released and forms are removed, surfaces are properly repaired, cleaned, and finished,
- Each member is checked for unacceptable deformation or damage and the Contractor acceptably repairs damage or replaces unacceptable members,
- Members are acceptably stored to prevent deformation or damage.

As the members are delivered to and incorporated into the project, assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The surface, on which each member will be supported, is suitably cleaned and prepared as specified, including placement of bearing pads or other devices if required,
- Each precast member is properly located on the supporting member, with proper clearance from adjacent construction,
- Acceptable tie rods are installed and tensioned, as specified,
- If the members must be post-tensioned, the ductwork openings and joints between members will allow the post-tension material to be placed and tensioned,
- Keyways are cleaned and filled with joint material, as specified,
- Surfaces are protected and kept clean to allow following work.

Measurement

Measure the work as members are incorporated into the project, or assure that measurements are taken, to calculate quantities.

As members are incorporated, prepare and submit a Source Document to justify payment.

Section 00555 - Post-Tensioning

This work consists of post-tensioning cast-in-place and precast concrete.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

As the tensioning strand, bolts, or other tensioning material is delivered, assure that it is adequately protected from moisture or other damage until it is encapsulated in the work.

Also, obtain samples of the tensioning strand, bolts, or other material and submit to the ODOT Materials Laboratory for testing as required. Assure that test results are acceptable before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- The Contractor provides acceptable shop or working drawings and the Project Manager and Engineer of record review and concur in them.
- As the ducts are installed:
 - The specified number of ducts are located with the proper geometry and within acceptable tolerances of specified location,
 - Anchor devices are installed at the proper location and angle,
 - Ends of ducts are covered to prevent entry of moisture or debris,
 - All joints are made mortar-tight,
 - Vents are provided in each duct at each high and low point,
 - All ducts are properly secured to reinforcement or other materials to prevent displacement during the placement of concrete,
 - All damage to the ducts is acceptably repaired or the duct is replaced,
 - Before forms are installed, the Contractor demonstrates that all ducts are free of obstruction,
 - Forming and other work does not damage ducts or the damage is repaired.
- The placement of concrete does not damage or displace the ducts,
- After concrete is placed, the Contractor checks each duct for any obstruction that would impair the tensioning operation.
- For the tensioning operation:
 - The Inspector and Project Manager determine the required strand elongation resulting from the required tensioning,

- The Contractor provides acceptable, certified calibration information on each jack that will be used for the tensioning work,
- The Contractor and Inspector each calculate the required jack gauge pressure, from the calibration charts, and agree on the required pressure. Involve the Project Manager if unable to agree,
- All ducts are cleaned of water and unwanted debris when strand is placed in them,
- The concrete achieves the specified strength before tensioning is performed,
- All tendons are tensioned to the required tension according to the specified procedure and the Contractor and Inspector verify the proper tensioning by comparing the jacking force and the resulting elongation. Since this is a potentially dangerous operation, stay away from the tensioning direction of the jack during tensioning operations.
- For the bonding and grouting operation:
 - The ducts and tensioning tendons are properly bonded and grouted within 14 days after the strands are placed in the ducts,
 - Each duct is properly cleaned before grout is installed,
 - The Contractor develops an acceptable grout mixture that meets contract requirements,
 - Weather conditions are suitable for the work,
 - All grout is mixed to the proper proportions and is installed in the ducts within the allowable timeframe after mixing,
 - Vents are plugged only after acceptable grout has replaced all water, air, and other unacceptable materials,
 - All grouting and anchorage recesses are acceptably filled with concrete and finished.

Measurement

Measurement is by lump sum. Assure that an acceptable breakdown of the lump sum is developed.

If the Project Manager has ordered changes to the work, work with the Project Manager to determine payment for the changes.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00560 - Structural Steel Structures

This work consists of fabricating and erecting structural steel structures.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, arranges for inspection when needed, and provides acceptable quality documentation before the element is fabricated or the material is incorporated, as appropriate.

Prepare and submit required quality documentation.

Construction

Assure that:

- The Contractor provides acceptable shop or working drawings for all structural steel members and elements,
- The Project Manager, with assistance from the ODOT Structural Services Engineer as appropriate, identifies the Inspector of the structural steel fabrication process,
- The Project Manager, Contractor, Steel Fabricator, and Inspector of the structural steel fabrication meet for a prefabrication conference to discuss all phases of the steel fabrication and work. Also involve the ODOT Structural Services Engineer as appropriate,
- The Inspector of the steel fabrication process assures that:
 - The Contractor provides acceptable quality documentation and only utilizes material that meets contract requirements,
 - Discrepancies in the shop or working drawings are identified, as soon as possible, and corrected or resolved,
 - Elements are fabricated and joined according to contract requirements,
 - The Contractor performs some verification to assure that the elements can be assembled to create the desired structure. This may involve assembling the structure at the manufacturer facility and disassembling it for shipment to the project site,
 - All required testing is performed, including ultrasonic and magnetic particle inspection of welds as appropriate,
 - The Contractor removes and properly replaces elements that have been improperly fabricated or constructed,
 - All material is properly handled and stored,
 - Elements are properly prepared and coated and protected until they are shipped to the project site. Also refer to Section 00594,
 - All elements are properly marked or identified to assure proper sequence of shipping and erection.
- As materials and elements are delivered and erected:
 - Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
 - If work is over or near a waterway or other environmentally sensitive area, the Contractor complies with all requirements,

- All material is properly handled, stored, and supported to prevent damage,
- Elements are stored such that erection can be performed easily,
- If material has been unacceptably damaged, it is replaced with acceptable material,
- The Contractor will implement required safety devices and processes during and after the erection process, including scaffolds, access, netting, etc., and those devices and processes comply with OR-OSHA requirements,
- As required, locations of all installation and erection have been accurately located and marked and both the Contractor and Inspector understand the markings,
- All areas of erection have been suitably constructed, cleaned of unwanted materials, and have received the proper treatment before erection starts,
- Required falsework or temporary supports have been acceptably constructed in the proper locations and to the proper elevation and grade,
- Bearings and anchorages are properly installed,
- All elements are properly erected and assembled according to the requirements of Sections 00560.46 through .48, other applicable contract requirements, and common, appropriate industry practice,
- All damage is acceptably repaired and all structural steel is prepared and coated as specified. Also refer to Section 00594,
- The Contractor removes all falsework, temporary supports, and other unwanted materials, acceptably disposes of them, and smoothes and restores affected areas.

Measurement

Assure that an acceptable breakdown is developed for the lump sum items.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00570 - Timber Bridges

This work consists of constructing bridges of timber and glued laminated timber.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

In most cases, representatives of the ODOT Structural Services Engineer will inspect the manufacture of timber members. Assure that the ODOT Structural Services Engineer is aware of such work. The Project Manager and Inspector are responsible for inspecting work as and after the members are delivered to the project, but may also need to inspect the manufacturing process if representatives of the ODOT Structural Services Engineer do not perform that work.

If the Project Manager will inspect the manufacture of those members, assure that:

- If needed, the Contractor provides acceptable shop or working drawings and the Project Manager and Engineer of record review and concur in them,
- Each member is constructed of the proper material and dimensions,
- Beams or stringers are constructed such that all knots or other acceptable defects are in the top, or compressive, portion of the member,
- Members do not have unacceptable checking, cracking, warping, or other defects. If needed, consult with the ODOT Structure Services Engineer on questionable defects,
- As necessary, the Contractor verifies that the elements can be assembled into the desired structure. This may involve assembling the structure at the manufacturer facility and disassembling it for shipment to the project site,
- As needed, members are marked for easy identification for assembly,
- Material is suitably handled, stored, stacked, and protected,
- If wood material must be treated, the manufacturer performs tests to assure proper treatment.

As the materials are delivered to the project and incorporated, assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- If work is over or near a waterway or other environmentally sensitive area, the Contractor complies with all requirements,
- Treated timber is carefully handled to prevent damage to the treatment. Do not allow any devices that will penetrate or damage the surface of the wood,
- All members are installed in the proper location and to the proper dimension and spacing, as specified,
- Beams or stringers are installed such that all knots or other acceptable defects are in the top, or compressive, portion of the member,
- Members have not developed unacceptable checking, cracking, warping, or other defects. If needed, consult with the ODOT Structure Services Engineer on questionable defects,
- Treated timber is not cut or bored after treatment, unless allowed by the Project Manager,
- All cuts and abrasions in treated timber are adequately treated with a field preservative,

- All unacceptably damaged wood and other material is removed and replaced,
- All fasteners are properly installed and tightened, as required, and damage to treatment is repaired,
- All joints have even bearing,
- Trusses show no irregularity of line,
- Line and grade of wheel guards and railings is smooth and true,
- As required, elements are coated as specified,
- The Contractor cleans up all unneeded or unwanted material and properly disposes of it.

Measurement

Measure the work as specified in the contract, or assure that measurements are taken, to calculate pay quantities.

As work is performed, prepare and submit a Source Document, with supporting calculations, to justify payment.

Section 00581 - Bridge Drainage Systems

This work consists of constructing metal deck drains, drain pipe, and appurtenances for bridges.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Assure that manufactured materials are inspected at the manufacturer facility.

Prepare and submit required quality documentation.

Construction

Assure that:

- As required, the Contractor provides acceptable shop drawings and the Project Manager reviews and concurs in them, with assistance from the Engineer of record as needed,

- The Project Manager either assures that representatives of the ODOT Structural Services Engineer will inspect manufactured materials or assigns an Inspector to inspect the materials at the manufacturer facility,
- Locations for the deck drains are properly and accurately located and marked and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- If work is over or near a waterway or other environmentally sensitive area, the Contractor complies with all requirements,
- Deck drains are installed to the proper elevation and slope to meet the surrounding deck surface,
- Deck drains are installed, secured, and supported to prevent movement during concrete placement or other work,
- Drain pipes and appurtenances are installed to provide a water tight connection and are properly and adequately secured to the supporting surface,
- The Contractor tests the systems to assure that each system is water tight and free of obstructions,
- The Contractor cleans up unwanted material and properly disposes of it and acceptably repairs any damage.

Measurement

Refer to the contract for the method of measurement and payment.

Measure the work, or assure that measurements are taken, to calculate quantities.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00582 - Bridge Bearings

This work consists of constructing and installing bearings for structures.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Assure that manufactured materials are inspected at the manufacturer facility.

Prepare and submit required quality documentation.

Construction

Assure that:

- If needed, the Contractor takes field measurements of existing installations to insure correct dimensions of the manufactured elements,
- The Contractor provides acceptable shop drawings and the Project Manager and Engineer of record review and concur in them,
- The Project Manager assures that manufactured materials will be inspected at the manufacturer facility as needed, either by a representative of the ODOT Structure Services Engineer or by one of the Project Manager's inspectors,
- Bearings are constructed of the required and acceptable components,
- As required, all exposed steel surfaces are properly prepared and coated. Also refer to Section 00594,
- All materials have been acceptably protected, as recommended by the manufacturer, including protection from physical damage,
- As required, adequate traffic control is implemented and maintained, according to the Traffic Control Plan, as the bearings are installed,
- If work is over or near a waterway or other environmentally sensitive area, the Contractor complies with all requirements,
- Elastomeric bearings are properly placed over an acceptable concrete surface,
- Bearings are installed as recommended by the manufacturer,
- The final alignment of the bearings corresponds to the alignment of the girder or other supported element,
- The Contractor repairs all damage and removes and disposes of all unwanted material.

Measurement

Measure the work, or assure that measurements are taken, to calculate pay quantities.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00583 - Electrical Conduit in Structures

This work consists of installing electrical conduit in structures.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- All electrical installation is performed under the supervision of a licensed Electrician,
- The Contractor is aware of all required locations for electrical conduit and other devices in structures and assures their installation before concrete forming and concrete placement is done at each location,
- If required, adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Conduit is of the specified or required size and type,
- Where conduit is to be imbedded in concrete, the conduit is properly secured and supported to prevent displacement during placement of concrete and other work,
- Expansion joints are properly installed at all joints where movement may occur. Also, work with the Contractor to determine other locations where expansion joints may be needed, but are not shown in the plans. In those instances, seek input from the Project Manager and Engineer of record,
- Elbows, junction boxes, cabinets, and other appurtenances are also properly installed to allow the specified installation of wiring and future maintenance needs,
- All ends of conduits are covered to ensure that unwanted material does not enter the conduit,
- Any damage to other work is corrected.

Measurement

Measure the work, or assure that measurements are taken, to determine pay quantities.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00584 - Elastomeric Concrete Nosing

This work consists of constructing elastomeric concrete nosing to form a bulkhead at bridge ends or expansion joints.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- If an asphalt concrete overlay will be constructed on the structure before the elastomeric nosing is constructed, the Contractor places a bond breaker in the area where the elastomeric concrete nosing will be constructed,
- The Contractor will be providing and installing a product that complies with contract requirements,
- As material is delivered to and stored on the project, it is properly protected as recommended by the manufacturer,
- The Contractor has submitted acceptable working drawings for the installation, as specified in Section 00584.40(a),
- The manufacturer's representative has advised the Contractor and the Inspector about proper installation procedures,
- The Contractor has properly trained its installers and complies with and provides all health and safety requirements for the product(s) that will be used,
- Weather and climatic conditions are suitable for the work,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Abutting pavement is sawcut to provide a smooth, solid surface,
- The surface, for the application, has been properly cleaned and prepared, including the removal of the wearing surface material, bond breaker, unacceptable concrete, and other material,
- Primer is applied as specified by the manufacturer,
- Elastomeric concrete is properly mixed and placed, before the primer has set, and is properly compacted, smoothed, and finished to the required shape,
- Nosing is protected until properly cured,
- The Contractor properly cleans up and disposes of unwanted material.

Measurement

Measure the work, or assure that measurements are taken, to calculate pay quantities. If the elastomeric material must be installed to a depth greater than the

specified nominal depth, record measurements to calculate the volume of the additional depth.

As work is performed, prepare and submit a Source Document, with calculation of quantities, to justify payment.

Section 00585 - Expansion Joints

This work consists of constructing expansion joints in structures.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- The Contractor will be providing and installing a product that complies with contract requirements,
- As required, the Contractor provides acceptable shop or working drawings and the Project Manager and Engineer of record, as needed, review and concur in them,
- If needed, elements are inspected at the manufacturer facility,
- As material is delivered to, handled, and stored on the project, it is properly protected as recommended by the manufacturer,
- All manufactured materials comply with approved shop or working drawings and all specified coatings have been properly applied,
- The manufacturer's representative has advised the Contractor and the Inspector about proper installation procedures and is present during construction of joints, as required,
- The Contractor has properly trained its installers and complies with and provides all health and safety requirements for the product(s) that will be used,
- Weather and climatic conditions are suitable for the work,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Abutting existing concrete and pavement is sawcut to provide a smooth, solid surface,

- Existing concrete, that is unacceptable, has been removed and repaired as directed by the Project Manager,
- The surface, for the application, has been properly cleaned and prepared, including the removal of unacceptable concrete and other material.
- For filled expansion joints:
 - The Contractor properly and adequately supports the joint filler, to prevent deflection, if placing concrete against it,
 - If specified, traffic loop sealant or poured joint sealer is placed at the top.
- For closed expansion joints:
 - The Contractor has submitted acceptable working drawings for the installation,
 - The installation is constructed according to the working drawings,
 - The Contractor performs a leakage check and performs all needed repair.
- For armored corner joints:
 - The Project Manager and Contractor have arranged for inspection of the devices at the manufacturer facility,
 - The new devices are properly installed to required elevation, slope, and cross-section and are adequately secured and supported to prevent movement during subsequent work,
 - Concrete or elastomeric concrete is properly mixed, placed, compacted, smoothed, and finished,
 - The preformed strip seal is properly installed.
- For asphaltic plug joint seals:
 - Before the preceding deck wearing surface is placed, the Contractor places a bond breaker in the area of the joint seal,
 - Wearing surface material, bond breaker, and other unwanted material is acceptably removed to the proper dimensions,
 - The joint is constructed properly and the materials are properly mixed, placed, compacted, smoothed, and finished.
- For poured sealant joint seals:
 - The backer rod is properly and adequately placed and secured to prevent loss of the sealant,
 - Sealant is placed to the proper depth and finished as required.
- For preformed compression joint seals:
 - The Contractor provides the proper size of preformed seal to accommodate movement of the joint and anticipated compression set,
 - The seal is installed in one continuous strip across the full roadway width and into the curbs, with no splices,
 - The seal is installed at the proper location in the joint.
- For preformed strip seals:
 - Steel retainers are properly spliced, as needed, and placed, secured, and supported to prevent movement, provide the required joint opening, and provide the required elevation and slope,
 - Seals are installed in one continuous strip across the full roadway and into the curbs, without splices,

- The seal is installed at the proper location in the assembly.
- For modular expansion joint seals:
 - The Contractor has submitted acceptable shop or working drawings for the installation,
 - The Project Manager has assured inspection of the devices at the manufacturer facility,
 - Each device is installed according to the shop or working drawings and provides the required elevation, slope, and cross section to match the abutting deck,
- Each installation is protected from damage until all materials have properly set or achieved the required strength,
- The Contractor cleans up and disposes of all unwanted material.

Measurement

Refer to the contract for the method of measurement and payment. As needed, measure the work, or assure that measurements are taken, to calculate quantities.

As work is performed, prepare and submit a Source Document to justify payment. If asphaltic plug joints must be installed to greater than the nominal specified depth, take measurements and calculate an adjustment for the additional material.

Section 00587 - Bridge Rails

This work consists of constructing bridge rails.

Quality

Quality requirements are specified in the contract, in the Manual of Field Tested Procedures for concrete, and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before material is incorporated. Assure that ODOT performs verification testing as required and inspects manufactured materials at the manufacturer facility.

Prepare and submit required quality documentation.

Construction

Assure that:

- As needed, the Contractor takes field measurements of existing installations,

- The Contractor provides acceptable shop drawings and the Project Manager and Engineer of record review and concur in them,
- The Project Manager assures that manufactured materials will be inspected at the manufacturer facility as needed,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- As required, the Contractor properly and adequately removes existing rails and disposes of the unwanted material.
- For constructing concrete rails:
 - Proper reinforcement was placed in previous construction to allow placement of rail reinforcement or anchor devices are properly installed in existing construction,
 - Specified size, shape, and quantity of reinforcement is properly installed and secured to assure proper coverage by concrete,
 - Contraction and expansion joints areas are properly installed in the reinforcing,
 - If required, electrical conduit and other appurtenances are installed and properly secured,
 - Expansion joint materials, including those in electrical conduit or other appurtenances, are accurately placed and secured,
 - If used, fixed forms:
 - * Are of a composition and finish to provide an acceptably smooth concrete surface without excessive finishing,
 - * Are of the proper shape,
 - * Are properly and adequately secured to prevent movement during concrete placement,
 - * Have acceptable indentations or other devices to construct expansion and contraction joints and the location of those devices matches the locations in the reinforcement and conduit and as specified in the contract,
 - * Are of suitable height to allow the top of the rail to be cast at the specified height to a smooth line and grade,
 - * Are placed such that the proper width and other dimensions of the rail will result,
 - If the Contractor will use a slipform operation:
 - * The reinforcing is further braced to prevent longitudinal movement,
 - * The Contractor has cast an acceptable test section or otherwise provided acceptable evidence of acceptable slipform work,
 - * The mold is of the specified shape and size,
 - * The concrete and slipforming operation complies with the requirements of Section 00587.42(c),
 - Concrete is furnished, mixed, and placed according to Section 00540,
 - Contraction joints are acceptably constructed,
 - Surfaces are finished as required,
 - Concrete is cured, as specified, and protected from damage,

- All damage is acceptably repaired and surfaces are finished and coated as specified.
- For metal rails:
 - The Project Manager has assured that the rails are inspected at the manufacturer and coating facilities, as needed,
 - Bolts or other anchors are properly and accurately located and cast into prior concrete construction or bolts or anchors are properly installed in existing concrete,
 - Posts and rails are installed and adjusted to provide the required and smooth line and grade,
 - All connections are properly tightened,
 - As specified, grout pads are properly constructed under the posts,
 - All damage is acceptably repaired,
- The Contractor cleans up and properly disposes of unwanted materials.

Measurement

Refer to the contract documents to determine the limits for measuring the work. Measure the work, or assure that measurements are taken, to determine pay quantities.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00591 - Waterproofing Membrane

This work consists of constructing a membrane waterproofing system on bridge decks.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Determine the system that the Contractor will construct and become familiar with the manufacturer's recommendations and the contract requirements.

Also, assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Limits for the installation are properly identified and marked and both the Contractor and Inspector understand the markings. Be sure that the limits include the specified amount up the face of curbs or concrete railings,
- Conditions are acceptable for constructing the installation and that the specified time has elapsed before the system is placed on new concrete,
- The surface, on which the system is to be installed, is properly prepared and cleaned,
- If required, the Contractor applies a leveling course of asphalt pavement to specified thickness, grade, cross section, and smoothness,
- If required, the Contractor constructs a drainage barrier in the abutting pavement by sawing a vertical slot in the pavement, cleaning the slot, and filling it with a joint sealer as specified,
- The Contractor has adequate and proper personnel, equipment, and materials on hand before starting the membrane work,
- The Contractor performs the work according to the manufacturer's recommendations,
- The Contractor acceptably removes or releases bubbles beneath the membrane,
- The Contractor adequately protects the work from traffic or other damage until the subsequent layer of surfacing is in place and acceptably repairs any damage,
- The Contractor acceptably contains and disposes of waste or excess material.

Measurement

Measure the work, or assure that measurements are taken, to calculate the pay quantity.

Prepare and submit a Source Document, with calculation of quantity, to justify payment.

Section 00594 - Preparing and Coating Steel Structures

This work consists of preparing and coating steel structures in the shop and field.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, provides acceptable quality documentation before the material is incorporated, and provides access to allow inspection of the work as needed.

Prepare and submit required quality documentation. Also record other pertinent information in the daily report or project diary.

Construction

Assure that:

- Prior to the contract phase of the project:
 - To the extent possible, all elements of the existing coating systems and the need for special treatment of the coatings or removed material have been identified,
 - If a Pre-Bid Conference is required, the Project Manager and Inspector work with the ODOT Structural Coatings Coordinator to present needed information to bidders and demonstrate removal of existing coatings,
- The Inspector and Project Manager develop an inspection plan, detailing a chronological sequence of inspection activities. The Contractor's supervisor or employees should be performing similar inspections. Inspection activities include:
 - Be familiar with the project, contract documents, and other related information,
 - Have the following equipment to perform inspection:
 - * Thickness gages with calibration standards (to check thickness of dried coating),
 - * Wet mil gage (to check thickness of applied coating),
 - * Surface profile gage (measures profile of prepared surface),
 - * Psychrometer with charts (to measure and determine relative humidity),
 - * Thermometers, both air and surface (to verify application conditions and determine relative humidity),
 - * Flashlight and mirror (to inspect difficult locations, corners, bolts, etc.),
 - * Adhesion tester (checks adhesion of coating to substrate),
 - * Tooke gage (to verify number of coatings and thickness),
 - * Clean, white cloth (to check for oil or water in compressed air),
 - * Knife or sharp scraper (for quick adhesion test),
 - Become familiar with the equipment that the Contractor will use for the work, including its basic operation, function, and possible environmental problems that could arise,
 - Prior to work, assure that compressed air is checked for contaminants, air for breathing is properly filtered and monitored for carbon monoxide or other hazardous substances, the containment meets contract requirements, and the Traffic Control Plan will be implemented and maintained,
 - Frequently, assess the operation of the containment, including:

- * Verify containment is performing as required, providing acceptable environmental conditions, and that negative air conditions contain debris and dust,
- * Verify that workers receive proper ventilation,
- Prior to surface preparation work:
 - * Identify structural surfaces that are contaminated by oil, grease, bird droppings, and other material that must be removed prior to normal surface preparation,
 - * Assure that processes will adequately contain the removed materials,
- Following each area of surface preparation:
 - * Verify that the preparation achieves contract requirements and is performed properly,
 - * Assure that removed material has been acceptably contained and the Contractor will dispose of it properly, including treatment if necessary,
 - * Inspect areas that are difficult to clean, using mirrors, lights, etc.,
- Immediately prior to application of each coat:
 - * Verify that environmental conditions are appropriate for coating application,
 - * Assure that areas of unacceptable surface preparation have been suitably corrected,
 - * Inspect the prepared surface for flash rust prior to application of the prime coat,
 - * Verify that no contamination has occurred to the prepared surface prior to application of the prime coat, or to the previously coated surface prior to application of succeeding coating,
- Following each coat application:
 - * Measure the dry film thickness and verify that the thickness complies with contract requirements and the manufacturer's recommendations,
 - * Verify that coverage is complete and proper, especially in areas that are difficult to coat (use mirrors, lights, etc. in those areas as needed),
- Following the curing of each coat:
 - * Inspect for complete and proper cure,
 - * Look for coating failures, including delamination, blisters, pinholing, mudcracking, dryspray, embedded dirt or debris, or other detrimental problems.
- After coating is complete:
 - * Inspect the entire structure, or area being worked, to assure complete coverage and uniform appearance,
 - * Assure that the Contractor repairs all deficient, non-compliant, or damaged areas.
- The Contractor, Project Manager, and Inspector meet at the required Pre-Coating Conference to discuss all elements of the preparation and coating processes, including:
 - Needed traffic control, including a Traffic Control Plan,

- All hazardous or environmentally sensitive materials, resulting from or used in the preparation and coating processes, are identified and acceptable handling and disposal procedures are developed,
- Material Safety Data Sheets (MSDS) are provided and available on site for all applicable materials,
- Safety devices or procedures to be used by all persons,
- Containment of the preparation operation and removed material, including specified or needed treatment and disposal. Also, devices needed to measure or indicate conditions within the containment, protective gear or devices, and required protective procedures. If required, the Contractor provides acceptable shop or working drawings of the containment system or structure,
- Procedures identified by the Contractor to continually monitor the safety of the project and work, including situations where work must be stopped to correct safety deficiencies,
- The preparation process, including specified standard(s), assurance, inspection, and protection of the prepared surfaces,
- Type and source of the coating materials, including required inspection at the manufacturer facility and testing. Assure that MSDS are provided and available as discussed above,
- The coating process, including protection and cleaning of the prior coatings, repair of unacceptable coatings, and assurance and inspection of coating thickness,
- Required quality documentation,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The Contractor:
 - Adequately protects pedestrians, traffic, other structure surfaces, and elements of the environment and accepts responsibility for all damage to them,
 - Adequately constructs the containment system according to acceptable shop or working drawings and the requirements of the contract and regulatory agencies,
 - Regularly evaluates the required function, operation, and safety of the containment system,
- The Contractor's equipment is appropriate for the work, including:
 - Compressed air is checked for oil and water to avoid contaminating the steel surfaces,
 - Air for breathing is properly filtered and is monitored for presence of carbon monoxide and other hazardous substances,
- The environmental conditions are appropriate for the work,
- Oil, grease, bird droppings, and other similar material are adequately removed prior to required surface preparation,
- Surfaces are properly prepared to the required specification and are properly protected or restored until coating is applied,

- Removed material is properly collected, stored, and disposed. Also, no material is allowed to leak unacceptably from containers,
- The containment system does not allow any unacceptable leaking of material,
- All surfaces and elements, that are not to be prepared or coated, are adequately protected and any damage is acceptably repaired,
- Coatings are:
 - Mixed, thinned, and applied according to the manufacturer's recommendations,
 - Applied only when weather, climatic, and other environmental conditions are appropriate,
 - Applied to the thickness specified by contract, in the number of applications required by the manufacturer, product, or application conditions,
 - Properly allowed to cure between applications or coats,
 - Adequately protected until the next application, including exposure to the cleaning process,
 - Acceptably repaired, if damage or improper application occurs,
 - Properly tested for thickness and deficient or unacceptable areas are properly corrected,
- As required, the date of application and type of coating are stenciled on the structure's finish coat,
- If coating is performed in the shop and the structure elements will be further handled, all damage to coatings is acceptably repaired and restored,
- The Contractor acceptably cleans up and restores the site and removes and disposes of unwanted material.

Measurement

Generally, no measurement is required. Assure that an acceptable breakdown is developed for each lump sum.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00595 - Reinforced Concrete Box Culverts

This work consists of constructing cast-in-place or precast reinforced portland cement concrete box culverts.

Quality

Quality requirements are specified in the contract, in the Manual of Field Tested Procedures for concrete, and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Also, assure that ODOT performs verification testing as required.

Prepare and submit required quality documentation.

Construction

Assure that:

- The Contractor is aware of, and complies with, all environmental and work in water restrictions in the contract or required by regulatory agencies,
- The Contractor has an acceptable mix design for its source of concrete,
- If the Contractor will use precast elements, the Project Manager assures that production of the elements is inspected at the manufacturer facility,
- The location and limits for the structure have been properly and accurately located and marked and both the Contractor and Inspector understand the markings,
- The location and limits for the structure acceptably match the waterway or other feature that will go through the structure, the limits will accommodate other required contract work, and the structure will comply with or fulfill all permit requirements,
- Flowing water is acceptably re-routed or handled during construction,
- The surface underlying the structure is constructed or excavated to the required elevation and limits and is acceptably compacted or firm,
- If the work will tie into an existing structure, all required portions of the existing structure have been acceptably removed, abutting surfaces have been properly finished, and required anchors have been properly installed.
- For precast elements:
 - The underlying material will adequately and uniformly support the new elements to the specified line and grade,
 - Joints between elements are clean and sealed as required,
 - Surfaces and damage are appropriately repaired and finished,
- Reinforcement is properly placed, secured, and supported to assure proper placement in the structure with the specified coverage of concrete,
- Forming for all elements will ensure that proper thickness will be controlled and specified shapes and dimensions will result,
- Construction joints are acceptably placed at the proper orientation,
- The timing and sequence of concrete placement for walls and top slab comply with contract requirements,
- Concrete is properly mixed, delivered, tested, placed, and finished. Assure that ODOT performs verification testing as needed. Also refer to the discussion in Section 00540,
- Concrete receives proper cure after placement,
- Adequate time elapses between placement of adjoining concrete sections,

- Before forms or falsework are removed or subsequent loading is applied, the concrete has achieved acceptable strength or the specified time has elapsed since the concrete was placed,
- The concrete surfaces are properly finished, including removal of snap ties or other devices and proper application of specified patching compound,
- Backfilling is performed according to Section 00510 and affected areas are smoothed and finished.

Measurement

If payment is on a lump sum basis, assure that an acceptable breakdown is developed.

If work is paid on a unit basis, measure the work, determine measurements for payment, or assure that measurements are taken, to determine pay quantities.

If the Project Manager has ordered changes to the plan dimensions for the structure, work with the Project Manager to determine adjustments to the payment due to the changes.

As work is performed, prepare and submit a Source Document, with supporting quantity calculations as needed, to justify payment.

Section 00596 - Retaining Walls

This work consists of constructing retaining walls.

Quality

Quality requirements are specified in the contract, in the Manual of Field Test Procedures for field-tested items, and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- Early in the project, the Project Manager and others compare the specified finish grades of each retaining wall with the final elevations of the adjacent ground to determine if specified dimensions, elevations, or lengths, of the wall need to be revised. If so, the changes are incorporated into the contract,
- As required, the Contractor submits shop drawings, working drawings, or other required submittals for the wall that it intends to construct and for required support of excavated slopes during construction,
- For needed aggregates and other produced materials, the Contractor acceptably tests the material and ODOT performs required verification testing,
- The Contractor furnishes an acceptable mix design for any needed concrete,
- As needed, the Project Manager assures inspection of manufactured materials or components at the manufacturer facility,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The location for each wall is properly and accurately located and marked and both the Contractor and Inspector understand the markings,
- The Inspector again reviews, with the Project Manager as needed, the planned wall height, length, and configuration with the planned finish surfaces and adjacent facilities or work to determine if changes need to be made,
- The Contractor assures that all buried facilities will be located and marked. Work with the Project Manager and Contractor to identify and resolve conflicts with existing facilities or those to be constructed during the project,
- For excavation and backfill:
 - Excavation is performed to the required lines, grades, and slopes and slopes are adequately supported or restrained as required,
 - Unsuitable and unstable material in the bottom of the excavation is either stabilized or removed and replaced with suitable material. If needed, work with the Project Manager to develop methods of payment for the work,
 - The bottom of the excavation is to the specified elevation, is acceptably smooth, and is firm or compacted,
 - Backfill, of the required type, is placed as required in the specified lift thickness, compacted properly to the required density and stability, and tested as required and needed. Unacceptable density or compaction must be corrected or the affected material is removed and replaced,
- For proprietary systems, the manufacturer's representative participates in a pre-construction meeting with the Project Manager, Inspector, and supervisory personnel of the Contractor and involved subcontractor(s), and is present on the site as required,
- Drainage systems for the wall are installed or constructed as specified,
- Work is not performed, and existing work is protected as needed, during periods of unacceptable weather or climatic conditions,
- Forming for each element of cast-in-place concrete is properly done to ensure the specified size, shape, thickness, and specified surface treatment of the element,

- Reinforcement of the specified size and spacing and other appurtenances are properly placed, including needed expansion and contraction joints. Also refer to Section 00530.
- For cast-in-place concrete:
 - Concrete is properly mixed, delivered, tested, placed, consolidated, and finished to the specified elevations and ODOT performs verification testing as needed,
 - Concrete is properly cured and protected,
 - Before forms are removed, concrete has reached the required time or strength requirement ,
 - After forms are removed, concrete is finished as required,
 - After concrete has achieved the required strength, acceptable backfill material is properly placed, compacted, and tested. Unacceptable compaction is properly repaired or the material is removed and replaced.
- For walls and wall elements other than cast-in-place concrete:
 - Leveling pads or footings, if required, are properly constructed of acceptable materials,
 - Elements are placed in proper sequence, properly connected or attached, and properly backfilled with specified materials placed and compacted in specified lift thickness, with required testing,
 - The work is continually checked for unacceptable deviations in wall line, grade, etc. Unacceptable work is acceptably corrected or the unacceptable elements are removed and replaced,
- The Contractor cleans up and disposes of unwanted material and smoothes and finishes the affected area as needed.

Measurement

Refer to the contract for the method to determine the pay quantity. As appropriate, assure that an acceptable breakdown of the unit price is developed to allow progress payments for the work.

Measure the work, determine measurements for payment, or assure that measurements are taken to determine pay quantities.

As work is performed, prepare and submit a Source Document, with quantity calculations as needed, to justify payment.

Section 00597 - Sound Walls

This work consists of constructing sound walls.

Quality

Quality requirements are specified in the contract, in the Manual of Field Test Procedures for concrete, and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Assure that ODOT performs verification testing as required.

Prepare and submit required quality documentation.

Construction

Assure that:

- The Contractor provides acceptable shop or working drawings if needed,
- As needed, the Project Manager assures inspection of manufactured materials or components at the manufacturer facility,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The location of each sound wall is properly and accurately located and marked and both the Contractor and Inspector understand the markings,
- The Inspector reviews the wall markings to determine if any conflicts with property boundaries, existing facilities, or subsequent work exist. If so, work with the Project Manager to resolve those conflicts,
- The Contractor assures that buried utilities and other facilities are located and marked. If conflicts exist, work with the Project Manager and Contractor to resolve the conflicts,
- Work is not performed, and existing work is protected as needed, during periods of unacceptable weather or climatic conditions,
- Excavation is performed to the required limits, required shoring or other slope protection is constructed, unsuitable or unstable material is repaired or replaced as needed, and the excavated area is smoothed and compacted as needed,
- Wall components are installed in the specified manner and to produce the specified alignment, grade, and finish,
- All damage is acceptably repaired or the element is replaced,
- For concrete block walls:
 - The required reinforcement and grout is acceptably furnished and placed,
 - Specified surfaces are properly waterproofed or damp proofed,
- The Contractor cleans up and disposes of unwanted materials and smooths and finishes the affected area.

Measurement

Refer to the contract for the method to determine pay quantity. As appropriate, assure that a breakdown of the unit price is developed to justify progress payments for the work.

Measure the work, determine measurements for payment, or assure that measurements are taken, to determine pay quantities.

As work is performed, prepare and submit a Source Document, with quantity calculations as needed, to justify payment.

Section 00599 - Concrete Slope Paving

This work consists of constructing concrete slope paving on bridge end slopes.

Quality

Quality requirements are specified in the Manual of Field Tested Procedures for cast in place concrete and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Also, assure that ODOT performs verification testing as required.

Prepare and submit required quality documentation.

Construction

Assure that:

- The location and limits for the work have been properly located and marked and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The surfaces, on which the work will be performed, are adequately compacted and smooth and have been finished to proper line, slope, and grade,
- If required, acceptable bedding material has been placed to the proper thickness and compacted,
- Curbs are constructed to the proper elevation, grade, orientation, and geometry to ensure the proper exposure from the slope or berm paving and the surrounding surface,
- Joints of the blocks or panels form an acceptably smooth line in the proper orientation,
- Joints between precast blocks are acceptably assured by placement of spacers until the joint filler material is placed,

- Joints between the precast blocks are properly filled with specified material and excess joint material is removed from the surface,
- The Contractor acceptably disposes of excess materials,
- Affected areas are acceptably smoothed and finished.

Measurement

Measure the pay limits, or assure that measurements are taken, for each item of work to determine pay quantities.

As work is performed, prepare and submit a Source Document, with quantity calculations, to justify payment.

Part 00600 - Bases

Section 00620 - Cold Plane Pavement Removal

This work consists of removing pavement and surfacing to prepare a foundation for placing new surfacing.

Quality

Unless required differently in the contract, no quality documentation is required for this work. If no quality documentation is required, record pertinent information in the daily report or project diary.

If the removed materials will be incorporated into the project, assure that they are not contaminated or mishandled until their use in the final product.

Construction

Assure that:

- Locations for the work are properly and accurately identified and marked and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The Contractor does not use a heating device with the planing machine,
- Line, grade, and cross slope will be adequately and accurately controlled, including use of independent grade control if needed,
- Work is planned and scheduled so that the specified areas and widths will be planed or removed and replaced, as required, to allow timely re-opening to public traffic,
- On bridge decks, removal of the last 25 mm is done only with a diamond grinder or by micromilling or hydroblasting,
- The planing or grinding results in an acceptable surface for traffic use or for placement of replacement surfacing, as specified, and that the Contractor tests the surface as required,
- Planing or grinding does not leave a thin portion of a surfacing course that will delaminate or cause further problems. If so, work with the Project Manager to adjust the grade of the planing or grinding,
- The Contractor adequately disposes of the planed or ground material or properly places it for use in the project work,
- The planed or ground surface is adequately cleaned and loose material is removed,

- If traffic will be restored to the planed or ground surface, the Contractor places temporary pavement markings as required.

Measurement

Refer to the contract to determine the method of measurement. Measure the work, or assure that measurements are taken, to calculate quantities.

As work is performed, prepare and submit a Source Document, with quantity calculations, to justify payment.

Section 00640 - Aggregate Base and Shoulders

Section 00641 - Aggregate Subbase, Base and Shoulders

This work consists of furnishing and placing one or more layers of aggregates, on a prepared surface, to specified lines, grades, thicknesses, and cross sections. Section 00641 also requires the aggregates to be mixed with water before final placement.

Quality

Quality requirements for Section 00640 are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide. Quality requirements for Section 00641 are specified in the contract and in the Manual of Field Test Procedures.

Assure that the Contractor is aware of those requirements, performs testing as required, and provides required quality documentation before the material is incorporated.

For Section 00640, prepare and submit required quality documentation.

For Section 00641:

- Assure that the source of aggregates is properly qualified. If needed, work with the Project Manager to assure that qualifying sampling and testing is performed and the results are acceptable,
- Assure that required quality control testing is properly performed and the produced material is acceptable,
- Assure that aggregates are acceptably stockpiled and non-specification material is removed as required,
- Assure that the ODOT Quality Assurance Coordinator is aware of the aggregate production schedule and performs required verification testing,

- Prepare and submit required quality documentation. If required, work with the Project Manager to calculate a price adjustment for non-specification material that is allowed to remain in the project.

Construction

Assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan.
- For foundation preparation:
 - The work area is adequately and properly laid out and marked and both the Contractor and Inspector understand the markings,
 - The underlying surface (normally the subgrade) has been properly and adequately prepared, including:
 - * The surface has been trimmed and finished to the specified grades and cross section,
 - * The surface has been properly compacted and adequate and acceptable compaction testing has been done, including checking for deflection under movement of a loaded truck,
 - * All areas of inadequate compaction or instability have been repaired and retested,
 - * Loose material has been removed.
- For mixing, hauling, and placing:
 - If measurement is by mass, the Contractor furnishes and operates an acceptable, properly certified scale to determine the mass and the Inspector utilizes a process to properly accept the material as it is delivered and incorporated,
 - The Inspector records the location of placement for the material as it is delivered and placed, usually on either the Weigh Memo and Material Receipt or the record of material receipt. Refer to the Quantities section (12-D) section of the Construction Manual,
 - The Inspector, or a designee, requires and witnesses the required check weighing of selected haul vehicles and assures that the weighing process is properly and accurately performed. Refer to the Quantities section (12-D) of the Construction Manual,
 - Appropriate and adequate water is mixed with the aggregate as required,
 - If the material is mixed with water after it is delivered to the project, the water is adequately and uniformly mixed with the aggregate and the mixing process does not incorporate unacceptable materials into the mixture,
 - Material is placed and compacted without delay (this prevents excessive loss of moisture),
 - The Contractor maintains the correct moisture content for the material,
 - The material is placed, in uniform layers that do not exceed the allowable thickness, and is compacted to specified line and grade,

- Compaction is tested as required and areas of inadequate compaction are repaired, recompact, and retested,
- ODOT performs verification testing as required,
- The final surface of the material is constructed to the proper elevations, cross section, and smoothness. If requested by the Project Manager, assure that the Contractor performs a survey to validate that the final elevations conform reasonably to specified line, grade, and cross section,
- The Contractor maintains each layer as specified and repairs loose, soft, or rutted areas,
- The Contractor adequately smoothes and finishes the edge areas and slopes.

Measurement

If measurement is by mass, assure that the Contractor has an acceptable scale to measure the mass of each load. Assure that overweight loads are not allowed on the roadway. Refer to Section 00190.20 of the contract and the Weigh Memos and Scale Diary subsection of the Quantities section (12-D) of the Construction Manual for scale certification, scale diary, and check weights.

Establish a procedure to gather the Weigh Memo and Material Receipt, or similar format, for each load incorporated. Calculate the sum of all loads delivered each day and submit that calculation, with the Weigh Memo and Material Receipts, as a Source Document to justify payment.

If measurement is by area, verify that material has been placed to the required depth. As the work is performed, measure the area, or assure that measurements are taken, and prepare and submit a Source Document, including calculation of area, to justify payment.

If some material does not comply with contract requirements, work with the Project Manager to determine the disposition and calculate a price adjustment if the material is incorporated. Provide a copy of the price adjustment to the Contractor.

Section 00680 - Stockpiled Aggregates

This work consists of furnishing crushed rock or other aggregates in stockpiles at the locations and in the manner specified.

Quality

Quality requirements are specified in the contract and in the Manual of Field Test Procedures.

Assure that the Contractor is aware of those requirements, performs the required testing, and provides copies of the test results. Assure that ODOT performs verification testing as required.

Assure that the Contractor removes failing material, as specified, or does not place it in the stockpile.

Construction

Assure that:

- ODOT and the Contractor have acquired all needed permits before work starts. If needed, ODOT may request to see, or obtain copies of, permits that the Contractor has acquired,
- The Contractor has copies of, and knowledge of, permit requirements and complies with all permit requirements,
- Stockpile sites are properly marked and are prepared as specified or directed,
- If ODOT is recording information to calculate quantities in the stockpiles, it has accurately recorded information from the stockpile base,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Procedures to acceptably control erosion and sedimentation are implemented and maintained,
- Stockpiles are constructed in lifts, no thicker than specified, and in a manner that minimizes segregation and allows adequate access to remove materials later,
- Hauling vehicles, other equipment, or operations do not contaminate the stockpiled material with mud or other unwanted materials,
- Stockpiles are properly shaped and finished to allow easy measurement,
- The source site and stockpile areas are properly cleaned up and restored as required.

Measurement

Assure that stockpiles are measured to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

Prepare and submit a Source Document, with calculation of quantity of each stockpile, to justify payment.

Part 00700 - Wearing Surfaces

The public travels and drives on the wearing surface portion of the roadway surface. Because of that, the finished wearing surface must provide a smooth ride. If work on the wearing surface is not producing an acceptably smooth ride, require the Contractor to modify processes and procedures such that it produces an acceptably smooth riding surface, as well as other requirements.

Section 00705 - Asphalt Prime Coat and Emulsified Asphalt Fog Coat

This work consists of applying asphalt cement, with or without aggregate cover materials, to a prepared surface to coat and bind the material into a hard surface.

Quality

Quality requirements are specified in the contract and in the Manual of Field Test Procedures.

Assure that:

- The Contractor is aware of its responsibilities regarding material quality, has qualified technicians to perform sampling and testing as required, and provides copies of test results to the Inspector,
- An acceptable quality compliance certificate accompanies each shipment of asphalt cement, indicating acceptable material,
- The Contractor samples the liquid asphalt, as required, and submits the sample to ODOT, as specified,
- ODOT performs verification sampling and testing as needed.

Prepare and submit required quality documentation.

Safety

Refer to the discussion of safety in Sections 00744 and 00745 below.

Construction

Assure that:

- Cover aggregates, if required, are properly manufactured to comply with contract requirements,
- Traffic control is implemented and maintained, according to the Traffic Control Plan,

- Limits for the work are properly identified and marked and both the Contractor and Inspector understand the markings,
- The Contractor's equipment is capable of applying uniform, proper applications of the specified materials,
- The spreading equipment is properly calibrated to apply the specified quantity of material,
- The distributor's spray bar is set at the correct height to provide a triple lap coverage of liquid asphalt,
- Weather conditions are suitable to perform the work and to allow the asphalt to cure or set,
- The surfaces, upon which the application is to be made, are in proper condition for the treatment,
- Both the asphalt cement and the cover aggregate, if required, are applied uniformly at appropriate rates. The Contractor must correct plugged gates or nozzles and must correct defective work that has resulted,
- Cover aggregate, if required, is applied immediately after the asphalt cement is spread and before the asphalt cement starts to cure or set,
- The surface is swept, as required, to remove loose aggregate,
- If traffic or construction equipment is running on the treated surface, the Contractor repairs and maintains the treated surface as needed,
- The Contractor acceptably cleans up and disposes of unwanted material.

Measurement

Payment for the asphalt cement will be by mass. As work is performed, gather the Weigh Memo and Material Receipt, or similar document, from each delivery vehicle. If only a partial load is used, assure that the vehicle is weighed and the mass used is properly determined. Calculate the sum of all asphalt cement used daily and submit that calculation, with the Weigh Memo and Material Receipts or similar document, as a Source Document to justify payment.

The method of payment for the cover material, if required, will be specified by contract. With the Project Manager, establish a procedure to determine the pay quantity of cover material placed. Also refer to the Quantities section (12-D) of the Construction Manual. As work is performed, prepare and submit a Source Document to justify payment.

Section 00710 - Single Application Emulsified Asphalt Surface Treatment

Section 00715 - Multiple Application Emulsified Asphalt Surface Treatment

This work consists of applying emulsified asphalt and graded aggregates, either in a single application or multiple applications.

Quality

Quality requirements are specified in the contract and in the Manual of Field Test Procedures.

Assure that:

- The Contractor is aware of its responsibilities regarding material quality, has qualified technicians to perform sampling and testing as required, and provides copies of test results to the Inspector,
- An acceptable quality compliance certificate accompanies each shipment of asphalt cement, indicating acceptable material,
- The Contractor samples the liquid asphalt, as required, before additional water is added to it and submits the sample to ODOT, as specified,
- ODOT performs verification sampling and testing as needed.

Prepare and submit required quality documentation.

Safety

Refer to the discussion of safety in Sections 00744 and 00745 below.

Construction

Assure that:

- Aggregates are properly manufactured to comply with contract requirements and are acceptably stockpiled,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Limits for the work are properly identified and marked and both the Contractor and Inspector understand the markings,
- The Contractor's equipment is capable of applying uniform, proper applications of the specified materials and properly compacting them,
- The spreading equipment is properly calibrated to apply the specified quantity of material,
- The distributor's spray bar is set at the correct height to provide a triple lap coverage of liquid asphalt,
- If necessary, have the Contractor demonstrate that the distributor nozzles are uniformly applying the asphalt cement. Do not allow the operation to proceed if application is not uniform,
- Weather conditions are suitable to perform the work,

- The surfaces, upon which the application is to be made, are in proper condition for the treatment,
- The application process works toward the aggregate stockpile from the furthest section of the project, unless otherwise approved by the Project Manager,
- The Contractor places building paper over the treated surface, at the beginning of each spread of asphalt cement, to demonstrate that the distributor nozzles are operating properly, to construct a neat match line, and to avoid excessive buildup of treatment. Also, the Contractor places building paper at the location of each intermediate construction joint to assure a smooth, uniform joint,
- The Contractor schedules and performs its operations to assure that the required widths of travel lanes and roadway are completed daily,
- Longitudinal joints are not placed within the travel lane, unless approved by the Project Manager,
- Spread rates for the asphalt cement and aggregates are appropriate,
- As appropriate, the Inspector, or a designee, requires and witnesses the required check weighing of selected haul vehicles and assures that the weighing process is properly and accurately performed. Refer to the Quantities section (12-D) of the Construction Manual,
- The asphalt cement is applied to completely cover the intended surface, but not to overlap adjacent coverages. If overlaps occur, assure that excess asphalt is removed with a squeegee, etc. to prevent a bump or area with excess asphalt,
- The moisture content of the aggregate is maintained so that the aggregate is surface damp at the time of placement on the asphalt cement,
- Aggregate is spread on the asphalt cement immediately after its application and before the asphalt cement starts to set or cure (break),
- Excessive buildup of aggregate (piles) is immediately removed,
- Compaction is performed immediately behind the aggregate application,
- Speed of the compactors is less than 8 km/h and the compactors do not pick up aggregates from the surface,
- If aggregates start to pick up under the compaction operation or traffic, the Contractor applies and compacts additional aggregate in the affected areas,
- Traffic on the treated surface is controlled to minimize damage to the surface and from flying aggregate,
- The treated surface is adequately swept to remove loose aggregate,
- For multiple applications, at least the required time elapses between applications,
- For multiple applications, the Contractor measures the finished surface with a straightedge to assure proper smoothness and corrects all deficiencies in surface tolerance,
- Traffic is adequately controlled until the treatment is adequately cured and the loose aggregate is removed,
- Damage, including that resulting from traffic, is suitably repaired,
- The Contractor properly accepts responsibility for damage to private vehicles due to the work,

- Temporary pavement markers are properly placed and maintained until permanent marking is performed,
- The Contractor acceptably cleans up and disposes of unwanted material,
- Unless allowed by contract or the Project Manager, the work is completed daily such that no traffic lane is closed after dark.

Measurement

Payment for the asphalt cement will be by mass. As work is performed, gather the Weigh Memo and Material Receipt, or similar document, from each delivery vehicle. If only a partial load is used, assure that the vehicle is weighed and the mass used is properly determined. Calculate the sum of all asphalt cement used daily and submit that calculation, with the Weigh Memo and Material Receipts or similar document, as a Source Document to justify payment.

The method of payment for the aggregate is specified by contract. With the Project Manager, establish a procedure to determine the pay quantity of aggregate placed. As work is performed, prepare and submit a Source Document to justify payment.

Refer to Section 00190.20 of the contract and the Weigh Memos and Scale Diary subsection of the Quantities section (12-D) of the Construction Manual for scale certification, scale diary, and check weights.

Measure, or assure that measurements are taken, to be able to calculate the quantity of other pay items. As work is performed, prepare and submit a Source Document to justify payment.

Section 00730 - Asphalt Tack Coat

This work consists of furnishing and placing asphalt cement on a prepared surface to ensure bond between lifts of surfacing.

Quality

Quality requirements are specified in the contract and in the Manual of Field Test Procedures. Assure that:

- The Contractor is aware of its responsibilities regarding material quality and has qualified technicians to perform sampling as required,
- An acceptable quality compliance certificate accompanies each shipment of asphalt cement, indicating acceptable material,
- The Contractor performs sampling, as required, before additional water is added and submits the sample to ODOT, as specified,
- ODOT performs verification sampling as needed.

Assure that the asphalt cement is not contaminated and that the tacked surface is not unacceptably damaged before the surfacing material is placed.

Prepare and submit required quality documentation.

Safety

Refer to the discussion of safety in Sections 00744 and 00745 below.

Construction

Assure that:

- Asphalt cement is properly diluted as needed,
- Asphalt cement is not excessively pumped prior to application,
- The haul or spreading vehicle has been weighed so the quantity of tack can be calculated. As appropriate, the Inspector, or a designee, requires and witnesses the required check weighing of selected haul vehicles and assures that the weighing process is properly and accurately performed,
- The distributor will apply asphalt at the specified rate and required width and the distributor's spray bar is set at the correct height to provide a triple lap coverage of liquid asphalt,
- If necessary, have the Contractor demonstrate that the distributor is providing a uniform application. Do not allow the operation to proceed if application is not uniform,
- Temperature and climatic conditions are appropriate,
- Traffic control is appropriate and traffic, other than appropriate construction equipment, will not operate over the tacked surface,
- The surface, to receive the application, is properly cleaned and dry,
- Tack is applied uniformly to the entire surface, including the vertical surfaces, on or against which the surfacing will be placed,
- Asphalt in the material separates from the water (breaks), but the material has not lost its tackiness, before surfacing material is placed on it,
- The Contractor acceptably cleans up and disposes of unwanted material.

Measurement

Assure that masses of the haul vehicle or distributor are measured to determine the quantity of material used.

Refer to Section 00190.20 of the contract and the Weigh Memos and Scale Diary subsection of the Quantities section (12-D) of the Construction Manual for scale certification, scale diary, and check weights.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00735 - Emulsified Asphalt Concrete Pavement

This work consists of furnishing and placing material to construct an emulsified asphalt concrete (EAC) pavement.

Quality

Quality requirements are specified in the contract and in the Manual of Field Test Procedures.

Among other things, assure that:

- The Contractor is aware of its responsibilities regarding material quality, has certified technicians to perform sampling and testing as required, and provides copies of test results to the Inspector,
- Aggregates have been properly crushed and are of acceptable quality,
- The Contractor has developed and submitted an acceptable job mix formula,
- An acceptable quality compliance certificate accompanies each shipment of emulsified asphalt cement, indicating acceptable material,
- ODOT performs verification sampling and testing as needed,
- Materials are not contaminated at any time,
- The mixing and placement processes produce a product that meets contract requirements and will produce a smooth riding surface,
- The Contractor tests smoothness as required and that the resulting ride is acceptable,
- If failing materials are allowed to remain in the finished product, calculate a price adjustment, as required, and furnish the results to the Contractor.

Prepare and submit required quality documentation.

Safety

Refer to the discussion of safety in Sections 00744 and 00745 below.

Construction

A key element in constructing a quality pavement is assuring that the mixture is consistently and uniformly produced.

Among other things, assure that:

- For production of the aggregates:
 - The source for the aggregates is qualified and that needed testing has been performed,

- Prior to crushing of aggregates, appropriate Contractor and ODOT personnel meet for the required pre-crushing conference,
- With the Project Manager and Contractor, quantities of work to be performed are calculated and compared to help assure that materials are not over or under-produced,
- Substandard materials in the source are not utilized or included in the aggregate production,
- During aggregate production:
 - * Aggregates are properly crushed,
 - * Sampling devices obtain representative samples,
 - * Sampling and testing is done properly with copies of test results provided to the Inspector,
 - * Material is acceptably stockpiled,
 - * Failing or unacceptable material is separated and not incorporated, as required,
- The Contractor has developed an acceptable job mix formula (JMF) for review by ODOT.
- For production of the EAC mixture:
 - Prior to starting paving work, appropriate Contractor and ODOT personnel meet for the required pre-paving conference,
 - The Inspector is familiar with the features of the mixing plant,
 - The mixing plant is properly calibrated and equipped as specified and the mixing plant controls are properly interlocked,
 - Aggregates are loaded in the bins in a manner that prevents segregation or intermixing of sizes,
 - Sampling devices will obtain representative samples,
 - The Contractor performs required testing and takes appropriate corrective action if test results or other indicators show that the mixture is deviating from contract or JMF requirements,
 - All are alert for changes, that could be detrimental, in the appearance of the EAC mixture,
 - Moisture content and asphalt content are monitored and modified as needed,
 - If measurement is by mass, the Contractor furnishes and operates an acceptable scale to determine the mass and the Inspector utilizes a process to properly accept the material as it is delivered and incorporated. Also, the Inspector, or a designee, requires and witnesses the required check weighing of selected haul vehicles and assures that the weighing process is properly and accurately performed.
- For delivery of the mixture to the paving machine:
 - Mixture is delivered to the paving machine with no detrimental change in its characteristics,
 - Haul vehicle beds prevent leakage of hauled EAC or any liquids,
 - Haul vehicle beds are clean and treated with an approved release agent,
 - Mixture is loaded into the haul vehicles such that segregation is minimized,

- The number of haul vehicles is sufficient to allow EAC placement to be performed as continuously as possible. If the number of vehicles is not sufficient, suspend operations until sufficient vehicles are provided or sufficient mixture is supplied to resume normal operation,
- Mixture is unloaded without segregation or bumping or moving the paving machine,
- Adequate traffic control, according to the Traffic Control Plan, and routing of the haul vehicles allows the work to be accomplished with minimum impact to traffic,
- The pick-up machine, if used, picks up substantially all mixture from the roadway.
- For placement and compaction of the EAC mixture:
 - Paving limits are clearly and properly marked, including location and dimensions for approaches, road or driveway connections, guardrail flares, and mailbox turnouts, etc., and both the Contractor and Inspector understand the markings,
 - The Inspector records the location of placement of the EAC mixture as it is delivered and placed, usually on either the Weigh Memo and Material Receipt or the record of material receipt,
 - Longitudinal joints for successive lifts are offset as specified,
 - Longitudinal joints in the wearing course do not occur within the area or width of a travel lane, unless approved by the Project Manager,
 - The paving machine has an acceptable means to control grade and cross-slope,
 - Compactors are of adequate type, size, and number to ensure proper compaction of the EAC,
 - Weather and surface conditions are appropriate for construction of EAC pavement,
 - Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
 - The joint at the beginning of the day's work is prepared as specified,
 - The underlying surface is finished and has been cleaned and tack coat applied, as required,
 - If required, depressions, potholes, etc. have been prepared and filled,
 - Moisture content and asphalt content of EAC are appropriate, based on the JMF, and are modified as needed,
 - EAC is uniformly coated without excessive greybacks or draindown of asphalt, does not segregate or otherwise result in an improper finished product, and all defects are repaired. Involve the Project Manager, who may involve the Region QAC or the Pavement Quality Engineer, if unable to resolve this or other issues,
 - The Contractor assures that the beginning section of work, that abuts existing pavement, is properly placed, smoothed, and compacted, such that the joint has an acceptably smooth riding quality,

- Delivery of the EAC allows continuous operation of the paving machine, except as allowed,
- The mat has a uniform appearance and is free of longitudinal seams, tears, or other unacceptable blemishes or defects,
- When constructing a longitudinal joint, the EAC mixture is properly lapped and raked to construct a joint that is dense, tight, and flush with the adjoining surface,
- The Contractor and Inspector verify the mat thickness and yield to assure that the pavement is constructed to the specified thickness,
- The paving machine is operated as continuously as possible, with minimum stopping,
- Compaction is performed as specified, including:
 - * The Contractor develops and performs appropriate rolling patterns to assure uniform and adequate coverage,
 - * Rollers are operated at acceptable speeds,
 - * The drive wheel of each roller is nearest the paver,
 - * All roller marks are removed,
 - * Areas not accessible to rollers are adequately compacted,
- The Contractor acceptably removes or disposes of unacceptable material and replaces it with acceptable material as needed,
- Choke aggregate is applied as needed and specified and does not create unacceptable dust under traffic,
- The joint, at the end of the day's work, is properly constructed to allow construction of the joint to start the next day's work or to abut existing pavement with acceptable smoothness,
- Loose choke aggregate is removed as needed,
- Choke aggregate, or other acceptable material, is used to control excess asphalt on the pavement surface,
- The Contractor measures surface smoothness and corrects deficiencies and roughness as specified,
- Each lift of EAC cures for at least 72 hours before the next lift is placed.
- The Contractor acceptably cleans up and disposes of unwanted materials.

Measurement

Refer to the contract for the method of measurement.

If measurement is by mass, assure that the Contractor has an acceptable scale to measure the mass of each load. Assure that overweight loads are not allowed on the roadway. Refer to Section 00190.20 of the contract and the Weigh Memos and Scale Diary subsection of the Quantities section (12-D) of the Construction Manual for scale certification, scale diary, and check weights.

Establish a procedure to safely gather the Weigh Memo and Material Receipt, or similar format, for each load incorporated. When possible, use the procedure in the

Quantities section (12-D) of the Construction Manual to avoid having the material receiver in the work area. Calculate the sum of all loads delivered each day and submit that calculation, with the Weigh Memo and Material Receipts or similar format, as a Source Document to justify payment.

If measurement is by volume in the haul vehicle, measure each haul vehicle. Record those measurements and calculate the volume of each vehicle on a Source Document. As work is performed, record the placement of each load and prepare and submit a Source Document to justify payment.

If measurement is by area, verify that material has been placed to the required depth. As the work is performed, measure the area, or assure that measurements are taken, and prepare and submit a Source Document, with supporting calculation of quantities, to justify payment.

Section 00744 - Hot Mixed Asphalt (HMAC) Pavement

Section 00745 - Hot Mixed Asphalt Concrete (HMAC)

This work consists of furnishing and placing material to construct a hot-mixed asphalt concrete (HMAC) pavement.

Quality

Quality requirements are specified in the contract and in the Manual of Field Test Procedures.

Among other things, assure that:

- The Contractor is aware of its responsibilities regarding material quality, has certified technicians to perform sampling and testing as required, and provides copies of test results to the Inspector,
- Aggregates have been properly crushed, with acceptable quality,
- The Contractor has developed and submitted an acceptable job mix formula (JMF),
- An acceptable quality compliance certificate accompanies each shipment of asphalt cement, indicating acceptable material,
- ODOT performs verification sampling and testing as needed,
- Material is not contaminated,
- The mixing and placement processes produce a product that complies with contract requirements and provides a smooth riding surface,
- The Contractor tests smoothness, as required, and the resulting ride is acceptable,
- Test results are entered into STATSPEC, as required, and results are furnished to the Contractor,

- If STATSPEC is not used, price adjustments are calculated, as required, for failing material or compaction, that is allowed to remain, and the results are furnished to the Contractor,
- If the contract allows payment of a premium price adjustment (bonus), the adjustment is calculated and the results are furnished to the Contractor.

Prepare and submit required quality documentation.

Safety

This work is normally performed next to public traffic and involves many haul vehicles and several pieces of equipment. Be extremely conscious of and practice safety, including:

- Assure that traffic control adequately protects public traffic and, to the extent possible, provides an adequate, safe work area,
- All personnel wear safety clothing that is highly visible, including a hard hat if required by the Contractor,
- Face traffic or equipment whenever possible,
- Stay out of the areas of traffic or equipment movement whenever possible,
- Do not walk behind vehicles or equipment,
- Park vehicles out of areas of traffic or equipment movement,
- When possible, use the procedure, for collection of the Weigh Memo and Material Receipts or similar formats, in the Quantities section (12-D) of the Construction Manual to avoid having the material receiver in the work area,
- When working after darkness, take extra necessary precautions, including:
 - Assure that construction and equipment lighting does not blind or confuse drivers or traffic,
 - Traffic control provides adequate direction and delineation without confusing or misleading drivers or traffic.

Construction

A key element in constructing a quality pavement is assuring that the mixture is consistently and uniformly produced.

Additionally, assure that:

- For production of the aggregates:
 - The source is qualified and needed testing has been performed, with acceptable test results,
 - Prior to crushing of aggregates, appropriate Contractor and ODOT personnel meet for the required pre-crushing conference,
 - With the Project Manager and Contractor, quantities of work to be performed are calculated and compared to help assure that materials are not over or under-produced,

- During aggregate production:
 - * Aggregates are properly crushed,
 - * Sampling and testing is done properly with copies of test results provided to the Inspector,
 - * Material is properly stockpiled,
 - * Failing material is separated and not incorporated, as required,
- The Contractor has developed an acceptable JMF for review by ODOT.
- For production of the HMAC mixture:
 - Prior to starting paving work, appropriate Contractor and ODOT personnel meet for the required pre-paving conference,
 - The Contractor has obtained all required permits for plant operation, etc.,
 - The Inspector is familiar with features of the mixing plant,
 - The mixing plant is properly calibrated and equipped as specified and the mixing plant controls are properly interlocked,
 - Aggregates are loaded in the bins in a manner that prevents segregation or intermixing of sizes,
 - Sampling devices obtain representative samples,
 - The Contractor performs required testing and takes appropriate corrective action if test results or other indicators show that the mixture is deviating from contract or JMF requirements,
 - All are alert for changes in the color of exhaust from the plant and take appropriate action to evaluate and cure the cause as needed,
 - All are alert for changes in the appearance of the HMAC mixture,
 - If measurement is by mass, the Contractor furnishes and operates an acceptable scale to determine the mass and the Inspector utilizes a process to properly accept the material as it is delivered and incorporated. Also, the Inspector, or a designee, requires and witnesses the required check weighing of selected haul vehicles and assures that the weighing process is properly and accurately performed.
- For delivery of the mixture to the paving machine:
 - Mixture is delivered to the paving machine with no detrimental change in its characteristics,
 - Haul vehicle beds are clean and treated with an approved release agent,
 - Mixture is loaded into the haul vehicles such that segregation is minimized,
 - Loads are covered, as required, or otherwise protected to maintain acceptable temperature of the mixture,
 - Temperature of the delivered mixture is appropriate for proper placement,
 - Adequate traffic control, according to the Traffic Control Plan, and routing of the haul vehicles allows the work to be accomplished with minimum impact to traffic,
 - The number of haul vehicles is sufficient to allow mixture placement to be performed as continuously as possible. If the number of vehicles is not sufficient, suspend operations until sufficient vehicles are provided or sufficient mixture is supplied to resume normal operation,
 - Mixture is unloaded without segregation or bumping or moving the paving machine,

- The pick-up machine, if used, picks up substantially all mixture from roadway.
- For placement and compaction of the mixture:
 - Paving limits are clearly and properly marked, including location and dimensions for approaches, road or driveway connections, guardrail flares, and mailbox turnouts, etc., and both the Contractor and Inspector understand the markings,
 - The Inspector records the location of placement of the HMA mixture as it is delivered and placed, usually on either the Weigh Memo and Material Receipt or the record of material receipt,
 - Longitudinal joints for successive lifts are offset as specified,
- Longitudinal joints in the wearing course do not occur within the area or width of a travel lane, unless approved by the Project Manager,
 - The paving machine has an acceptable means to control grade and cross-slope,
 - Compactors are of proper type, size, and number to ensure proper compaction of HMA,
 - Weather and surface conditions are appropriate for construction of HMA pavement,
 - Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
 - The underlying surface is finished and has been cleaned and tack coat applied, as required,
 - If required, depressions, potholes, etc. have been prepared and filled,
 - The joint at the beginning of the day's work is prepared as specified,
 - When constructing a longitudinal joint, the HMA mixture is properly lapped and raked to construct a joint that is dense, tight, and flush with the adjoining surface,
 - HMA does not segregate or otherwise result in an improper finished product and all defects are repaired. Assure that the Contractor immediately addresses and resolves the cause of the segregation and other defects,
 - The mat has a uniform appearance and is free of longitudinal seams, tears, or other unacceptable blemishes or defects. Clumps, crusted mix, etc. are removed and replaced with acceptable mixture,
 - Delivery of HMA allows continuous operation of the paving machine, except as allowed,
- The Contractor assures that the beginning section of work is properly placed, smoothed, and compacted, such that the joint has an acceptably smooth riding quality,
 - The paving machine is operated as continuously as possible, with minimum stopping,
 - The Contractor and Inspector verify the mat thickness and yield to assure that the pavement is constructed to the specified thickness,
 - Locations, where a connection, flare, turnout, etc. must be constructed, are constructed in such a condition to allow a good joint and connection to the future work,

- Compaction is performed to achieve the required density, including:
- The Contractor, its workers, and its testing technicians are working together to achieve the required product quality and are resolving all problems,
- The required compaction is achieved while the mixture is still within the specified temperature range,
 - The Contractor develops and performs appropriate rolling patterns to assure uniform coverage and compaction, accelerating or delaying rolling patterns as necessary to resolve tenderness problems,
 - Rollers are operated at acceptable speeds,
 - The drive wheel of each roller is nearest the paver,
 - All roller marks are removed,
 - Areas not accessible to rollers are adequately compacted,
 - The Contractor performs all required compaction testing,
 - ODOT performs verification testing as needed, including a test early in the process to validate the Contractor's processes,
 - If the Contractor cannot achieve the required density and other requirements, it must modify its processes to achieve an acceptable product. Involve the Project Manager, who may involve the Region QAC or the Pavement Quality Engineer, if this or other problems cannot be resolved,
- The construction joint, at the end of the day's work, is properly constructed to allow construction of the joint to start the next day's work or to abut existing pavement with acceptable smoothness,
- The pavement is protected from damage and all damage is acceptably repaired.
- The Contractor acceptably cleans up and disposes of unwanted material.

Measurement

Refer to the contract for methods of measurement and payment, especially for measurement of the Asphalt in Mixture pay item.

If measurement for the mixture is by mass, assure that the Contractor has an acceptable scale to measure the mass of each load. Assure that overweight loads are not allowed on the roadway. Refer to Section 00190.20 of the contract and the Weigh Memos and Scale Diary subsection of the Quantities section (12-D) of the Construction Manual for scale certification, scale diary, and check weights.

Establish a procedure to gather the Weigh Memo and Material Receipt, or similar format, for each load incorporated. Calculate the sum of all loads delivered each day and submit that calculation, with the Weigh Memo and Material Receipts or similar format, as a Source Document to justify payment.

If measurement for the mixture is by area, verify that material has been placed to the required depth. As the work is performed, measure the area, or assure that measurements are taken, and prepare and submit a Source Document, with supporting calculation of quantities, to justify payment.

Record needed measurements, perform needed calculations, and prepare and submit a Source Document, with supporting calculations, to justify payment for other items.

Section 00746 - Crack Sealing Flexible Pavements

This work consists of repairing and sealing cracks in pavements.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Assure that the material is properly protected so that neither it nor vehicles driving over it are damaged. If surfacing will be placed over the material, assure that the sealing work will not affect the quality of the finished surfacing or smoothness of the ride.

Prepare and submit required quality documentation.

Construction

Assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Locations for the work are properly identified,
- Cracks to be sealed are properly cleaned and dried,
- Sealing material is appropriately heated and mixed (obtain copy of manufacturer's recommendations from the material package or have the Contractor furnish before work begins),
- Climatic conditions are appropriate for installing the sealing material,
- Cracks are completely filled and the surface is properly finished,
- When crack sealing is performed prior to a pavement overlay, the sealed cracks are completely covered with a clean sanding material,
- The work is adequately protected from traffic,
- The Contractor acceptably cleans up and disposes of unwanted material.

Measurement

Measure the sealed cracks, as the work is performed.

Prepare and submit a Source Document to justify payment.

Section 00749 – Miscellaneous Asphalt Concrete Structures

This work consists of constructing miscellaneous structures of asphalt concrete, including road approaches, street connections, driveways, guard rail flares, mailbox turnouts, sidewalks and footpaths, gutters and ditch linings, etc.

Quality

Quality requirements are specified in the contract and in the Manual of Field Test Procedures.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- The location for each miscellaneous asphalt concrete structure is properly located and marked and both the Contractor and Inspector understand the markings and requirements for the structure to be constructed,
- If earthwork will be performed, the earthwork limits include required widening for guard rail flares, mailbox turnouts, and similar construction that requires additional subgrade or roadway width,
- If specified, aggregate base is placed and compacted in the affected area,
- Aggregate or soil materials underlying the structure are acceptably compacted, smoothed, and shaped to allow the correct depth and dimension of structure to be constructed,
- If the underlying surface is concrete or bituminous material, it is dry and free of unsuitable material and a tack coat has been suitably applied to all surfaces that will be contacted by the asphalt concrete,
- Asphalt concrete mixture has been properly mixed and is in suitable condition to allow proper placement and compaction,
- Asphalt concrete mixture is placed, by mechanical devices or by hand methods, to specified thickness and dimensions,
- Asphalt concrete mixture is compacted to a firm, dense mass,

- The Contractor checks the smoothness of the structure and corrects all deficiencies,
- The Contractor acceptably cleans up and disposes of unwanted material,
- As required, the Contractor constructs adjacent slopes with acceptable material and smoothes, compacts, and finishes affected areas.

Measurement

Refer to the contract for the method of measurement and payment.

Measurement and payment will be by one of the following methods:

- “Mass and Extras” basis: This method will have the words “Extra for” in the title of the pay item. Assure that payment is made for both the asphalt concrete mixture item(s) (including the asphalt cement in the mixture item as appropriate) and the extra item for the miscellaneous structure.
- “Complete in Place” basis: Payment, under this pay item, includes the asphalt concrete mixture, the asphalt cement in the mixture, and all work involved in constructing the miscellaneous structure.

Measure the work, or assure that measurements are taken, to calculate pay quantities.

As work is performed, prepare and submit a Source Document, with supporting calculation of quantities, to justify payment.

Section 00755 - Continuously Reinforced Concrete Pavement

Section 00756 - Plain Concrete Pavement

This work consists of constructing portland cement concrete pavement.

Quality

Quality requirements are specified in the contract and in the Manual of Field Test Procedures.

Also, assure that:

- The Contractor is aware of its responsibilities regarding material quality, has certified technicians to perform sampling and testing as required, and provides copies of test reports to the Inspector
- Aggregates have been properly produced, with acceptable quality,
- The Contractor has developed and submitted an acceptable mix design that produces acceptable test results,

- Acceptable quality compliance documentation accompanies each shipment of cement, fly ash, chemical admixtures, curing materials, reinforcement, and other materials,
- ODOT performs verification sampling and testing as needed,
- Material is not contaminated at any time,
- The mixing and placement processes produce a product that meets contract requirements and will produce a smooth riding surface,
- If failing material is allowed to remain in the finished product, calculate a price adjustment, as required, and furnish the results to the Contractor,
- The Contractor tests smoothness and corrects deficiencies, as required. If smoothness is not acceptably corrected, calculate a price adjustment, as required, and furnish the results to the Contractor,
- If the contract specifies a premium price adjustment (bonus) for smoothness, calculate the adjustment and furnish the results to the Contractor.

Prepare and submit required quality documentation.

Construction

A key element in constructing a quality pavement is assuring that the mixture is consistently produced and that the placement is uniformly done such that little handwork is needed.

Additionally, assure that:

- For production of the aggregates:
 - The source is qualified and needed testing has been performed, with acceptable test results,
 - Prior to crushing of aggregates, appropriate Contractor and ODOT personnel meet for the required pre-crushing conference,
 - With the Project Manager and Contractor, quantities of work to be performed are calculated and compared to help assure that materials are not over or under-produced,
 - During production of aggregates:
 - * Aggregates are properly crushed if required,
 - * Sampling and testing is done properly and test results are provided to the Inspector,
 - * Material is properly stockpiled,
 - * Failing material is separated and not incorporated, as required,
 - The Contractor has developed an acceptable mix design, with acceptable test results, for review by ODOT.
- For production of the concrete mixture:
 - Prior to starting paving work, appropriate Contractor and ODOT personnel meet for the required pre-paving conference. Also:
 - * Required reinforcement, joint materials, traffic detector loops, etc. have been properly placed,

- * Needed grade controls have been properly set,
- * Grade controls indicate a smooth grade line for the finished pavement,
- The Inspector is familiar with the features of the mixing plant,
- The mixing plant is properly equipped and has been properly calibrated,
- Cement and other additives can be properly added to the mixture and controlled,
- Aggregates are loaded in the bins in a manner that prevents segregation and intermixing of sizes,
- Aggregates, particularly fine aggregates, are periodically tested for moisture content to facilitate production of a consistent mixture,
- The Contractor performs required testing, rejects or acceptably modifies all unacceptable material, and provides copies of test results to the Inspector,
- All are alert for changes in the appearance of the materials and/or the concrete mixture.
- For delivery of the concrete mixture to the placement machine:
 - Mixture is delivered to the placement machine with no unexpected change in its characteristics and within the timeframe after mixing as allowed by contract,
 - Haul vehicle beds are clean, free of build-up of any material, and, if needed, are moistened to prevent unexpected drying of the concrete mixture,
 - Concrete mixture is loaded into the haul vehicles such that the mixture does not segregate,
 - Loads are covered or protected if needed,
 - The number of haul vehicles is sufficient to allow placement to be performed as continuously as possible and mixture is placed within the allowed timeframe after mixing,
 - Condition of the delivered concrete mixture is appropriate for proper placement and finishing,
 - Mixture is unloaded and placed into final position without segregation or damage to or displacement of reinforcement, joints, and other appurtenances.
- For placement and finishing of the mixture:
 - Placement limits are clearly and properly marked and both the Contractor and Inspector understand the markings,
 - All reinforcing, joints, traffic signal detector loops, and other required appurtenances are properly placed, supported, and restrained to prevent movement during placement and finishing of the concrete,
 - The procedure, for assuring that manholes and other devices are set in the proper location to the proper elevation and slope, is acceptable,
 - Locations of all joints for jointed paving are clearly marked so that joints can be identified after concrete placement and are sawed in the proper location,
 - End forms and needed abutting work have been constructed to the proper grade and slope,
 - The placement and finishing machine(s) has an acceptable means to control grade and cross-slope,

- The Contractor has tested the vibrators to assure that they operate in the specified manner or as recommended by the manufacturer,
- The underlying surface is cleaned and prepared. It is appropriate to moisten the surface and reinforcing, during periods of warm weather, to avoid quick-setting of the concrete,
- Weather conditions are appropriate for construction of concrete pavement,
- If cold weather is expected during the curing period, the Contractor has an acceptable process and appropriate devices to protect the concrete,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Quality of the concrete mixture is not affected by the placement and finishing operations,
- Defective material is not placed or is removed,
- The Contractor assures that the beginning section of the pavement is constructed, including consolidation and finishing, to provide acceptable quality of the work and an acceptably smooth surface that matches adjoining pavement and provides an acceptable ride,
- Delivery of concrete mixture allows continuous operation of the placement and finishing machines, except as allowed,
- The finishing machine is operated as continuously as possible, with minimum stopping,
- The concrete is placed to the specified thickness,
- Hand work of the surfaces is minimized, including:
 - * The surface is checked for irregularities and no hand finishing is done unless the check shows that it is needed,
 - * No additional water is applied to the surface of the concrete mixture,
 - * Hand work is only performed to correct irregularities or to seal the surface or sides of the pavement structure,
 - * Do not allow unneeded hand work of the concrete mixture or surfaces,
- The surface is textured, as required, after the mixture is adequately set, but before the texturing damages the surface,
- The Contractor constructs the joint at the end of the day's work as specified by the contract, including appropriate consolidation, hand finishing, and assurance of smoothness and grade to produce acceptable quality of the work and to match the adjoining surface,
- The exposed surfaces of the concrete mixture are protected to prevent moisture loss either by:
 - * Adequate and proper application of an approved curing membrane-forming compound,
 - * Placement of other acceptable materials to prevent loss of moisture from the concrete mixture and to prevent damage to the concrete surfaces,
- Joints are sawed, or otherwise constructed, as soon as that work can be performed, but before shrinkage of the concrete starts. If required, joints are acceptably cleaned and filled with specified filler,

- The concrete surfaces are protected from moisture loss, vehicle or equipment use, and other damage or use as long as required by contract.
- The Contractor acceptably cleans up and disposes of unwanted material and acceptably repairs any damaged areas.

Smoothness Testing and Correction

- The Contractor must test the smoothness of the pavement surface as specified in the contract,
- Do not allow traffic on the concrete pavement until the Contractor corrects all required deficiencies,
- The Contractor must correct all deficiencies, that are greater than allowed, by grinding,
- For deficiencies that are not corrected by grinding, calculate a price adjustment as specified and furnish the results to the Contractor,
- If the contract allows payment of a bonus for smoothness, calculate the bonus and furnish the results to the Contractor.

Measurement

Measure the work, or assure that measurements are taken, to allow the quantity of work to be calculated.

As work is performed, prepare and submit a Source Document, including the supporting calculation of quantities, to justify payment.

Section 00759 - Miscellaneous Portland Cement Concrete Structures

This work consists of constructing miscellaneous portland cement concrete structures, including curbs, islands, sidewalks, and stairs.

Quality

Quality requirements are specified in the contract, the Manual of Field Test Procedures, and the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs required testing and provides copies of test results to the Inspector, and provides acceptable quality documentation before the material is incorporated. Also assure that ODOT performs required verification testing.

Inspect materials for damage. Do not allow concrete to be incorporated if it is improperly mixed or if too much time has elapsed since it was originally mixed.

Prepare and submit required quality documentation.

Construction

Assure that:

- Each structure location is accurately located and marked and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The underlying material is acceptably prepared, compacted, and cleaned,
- Forms will result in a finished structure of the proper dimensions,
- Reinforcement, dowels, joint materials, electrical conduit and devices, and other required appurtenances are properly placed and anchored to prevent movement during placement and finishing of the concrete,
- The finished product will allow adequate drainage of surface water,
- If extruding machines will be used to construct the structure:
 - The molds are of proper size,
 - Acceptable line and grade control has been established for the machine, including cross-slope if appropriate,
 - Vibrators operate properly and hydraulic or other leaks are repaired to prevent damage to the concrete or the environment,
- Concrete mixture is of acceptable quality and is properly placed and consolidated,
- Surfaces are dampened before concrete is placed,
- Joints are properly constructed at the proper locations,
- Finishing is properly performed in a timely manner,
- The surface is checked, using straightedge, stringline, or other acceptable method, and deficiencies are corrected,
- Concrete is cured and protected as required,
- If forms were used during construction, the resulting surface is finished as specified after their removal,
- The Contractor acceptably cleans up and disposes of unwanted material,
- Affected areas are acceptably smoothed, restored, and finished.

Measurement

Measure the work, or assure that measurements are taken, to calculate the quantity of work performed.

As work is performed, prepare and submit a Source Document for each pay item, including calculation of quantities, to justify payment.

Part 00800 - Permanent Traffic Control and Guidance Devices

Section 00810 - Metal Guardrail

This work consists of constructing metal guardrail and metal median barrier.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and furnishes acceptable quality documentation before the material is incorporated.

Inspect the delivered materials for damage or defects. Also assure that the finished installation exhibits acceptable line and grade and that the posts have firm foundations to prevent settlement and loss of structural capacity.

Prepare and submit required quality documentation.

Construction

Guardrail provides an important safety feature on roadways and must be properly constructed.

Assure that:

- As the locations for clearing and earthwork are being laid out, the Inspector reviews locations, where guardrail or barrier will be needed, to minimize the need for short runs of rail or barrier by flattening the slope if possible,
- During the earthwork phase of construction, the required additional width is constructed to accommodate guardrail flares and installation,
- Guardrail locations have been properly located and marked, according to the contract, and both the Contractor and Inspector understand the markings. Review the marked locations to assure that the guardrail installation will properly protect traffic and structures,
- The installation locations have been reviewed for conflicts with buried facilities and utilities have located buried facilities, as appropriate,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- When guardrail is installed after final surfacing, the edge of pavement extends to the specified location related to the guardrail and does not protrude beyond the

front face of posts. Prior planning will prevent the cutting or patching of surfacing,

- When surfacing is constructed after the guardrail is constructed, the surfacing is properly constructed to the limits shown in the contract documents,
- Wood posts do not have unacceptable seasoning checks. No individual check can exceed ½ the thickness, whether or not other seasoning checks are evident.
- Posts and anchors are properly installed and damaged material is repaired or replaced,
- The material around each post or anchor is compacted properly to assure proper performance of the guardrail installation,
- The height of the installation is acceptable,
- The specified end treatments and anchors are used,
- All damage to coatings has been properly repaired,
- Rail members are properly lapped so that exposed ends do not face approaching traffic, except as allowed by contract,
- All fasteners and elements are properly tightened,
- If required, delineators are properly installed,
- The Contractor acceptably cleans up and disposes of unwanted material,
- Affected areas are acceptably smoothed and finished.

Measurement

Measure the work or count the elements as allowed, or assure that measurements are taken, to calculate quantities of work performed. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As the work is performed, prepare and submit a Source Document to justify payment.

Section 00812 - Adjusting Guardrail

This work consists of adjusting existing guardrail by raising it to the proper height.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and furnishes acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- Locations of the adjustment work are properly located and marked and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- If the Contractor removes guardrail components to accomplish the adjustment, it reinstalls all components during the same day they are removed or uses concrete barrier as a temporary guardrail installation,
- If existing materials are not acceptable for reinstallation or adjustment, work with the Project Manager to establish requirements and payment for acceptable replacement materials,
- The Contractor uses an acceptable method to raise the elevation of the installation and provide an acceptable finished product,
- Material is properly placed and compacted under the bottom of the adjusted post to prevent settlement,
- Material is properly placed and compacted around the adjusted post to keep the installation vertical and provide needed lateral support,
- The height, line, and grade of the adjusted installation are acceptable,
- All fasteners and elements are properly tightened,
- If required, delineators are properly reinstalled on the guardrail installation,
- The Contractor acceptably cleans up and disposes of unwanted material,
- Affected areas are acceptably smoothed and finished.

Measurement

Measure the work or count the elements as allowed, or assure that measurements are taken, to calculate quantities of work performed. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As the work is performed, prepare and submit a Source Document to justify payment.

Section 00820 - Concrete Barrier

This work consists of constructing concrete barrier, either precast or cast in place.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that:

- The Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation and/or test results before the material is incorporated,
- ODOT inspects the casting work, as required,
- ODOT performs verification testing as required,
- Barriers are marked, as required, so that quality documentation can be matched and related to the applicable barriers,
- The barrier conforms to contract requirements, especially if it was salvaged,
- All damage is properly repaired,
- If concrete strength is less than specified and ODOT allows the barrier to remain in place, work with the Project Manager to calculate a price adjustment and furnish the results to the Contractor.

Prepare and submit required quality documentation.

Construction

Assure that:

- As the locations for clearing and earthwork are being laid out, the Inspector reviews locations, where guardrail or barrier will be needed, to minimize the need for short runs of rail or barrier by flattening the slope if possible,
- Barrier locations have been properly located and marked and both the Contractor and Inspector understand the markings. Review the locations to determine that the barrier installation will properly protect traffic and structures,
- Line and grade of the surfacing at the barrier locations will result in an acceptable installation. If they are not acceptable, require correction of the surfacing,
- For cast in place barrier:
 - The underlying surface is cleaned,
 - Acceptable line and grade is established,
 - Forms or equipment for construction will result in an acceptable product,
 - Reinforcement and other needed appurtenances are properly placed and secured,
 - The concrete is properly mixed, tested, placed, cured, finished, and protected,
- If the structural integrity of any barrier is reduced by damage, etc., the barrier is not incorporated into the work,
- The specified end treatments or sections are used or properly constructed,
- All damage is properly repaired,
- Reflector devices are installed when specified,
- The barriers are properly cleaned prior to being painted,

- The Contractor acceptably cleans up and disposes of unwanted materials.

Measurement

Measure the work or count the elements as allowed, or assure that measurements are taken, to calculate quantities of work performed. If fence is to be mounted on the barrier, assure that measurement and payment is made according to the contract. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As the work is performed, prepare and submit a Source Document to justify payment.

Section 00822 - Glare Shields

This work consists of installing glare shields on concrete median barrier.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and furnishes acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- The locations for the work are properly identified and marked and both the Contractor and Inspector understand the markings,
- The Contractor understands the manufacturer's instructions for installing the glare shields,
- The Contractor does not cause undue damage when drilling holes or installing anchor devices in the barrier,
- The glare shields are installed at the proper angle to traffic,
- The glare shields are installed vertical and in acceptable line,
- All elements in a continuous run are of the same manufacture and like appearance,
- The Contractor repairs all damage from the work,
- The Contractor acceptably cleans up and disposes of unwanted material.

Measurement

Measure the work, or assure that measurements are taken, to calculate the pay quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As the work is performed, prepare and submit a Source Document to justify payment.

Section 00830 - Impact Attenuators

This work consists of furnishing and installing impact attenuators.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, performs testing when required, and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- The installation has been properly located and marked and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan, to protect the construction and the installation,
- Concrete elements are of the proper dimensions and are properly constructed,
- The installation is constructed according to manufacturer directions and recommendations,
- The Contractor acceptably cleans up and disposes of unwanted materials,
- Affected areas are acceptably smoothed, restored, and repaired if needed.

Measurement

As the work is performed, prepare and submit a Source Document to justify payment.

Section 00840 - Delineators and Milepost Markers

This work consists of furnishing and installing delineators or milepost markers.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and submits acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- Locations of installations are accurately and properly marked, including the proper distance from the pavement and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The portion installed in the ground is driven or installed to the depth required by the contract or the manufacturer, whichever is greater,
- If the portion installed in the ground is installed in rock, the excavated hole is of adequate size and depth and the hole is properly filled with grout after the device is set,
- Split, cracked, or otherwise damaged devices are not left in the final installation,
- If devices will be attached to guardrail, they are properly attached,
- Target members are properly secured to the support,
- Mileposts are installed at the proper location and in the proper sequence,
- If galvanized parts are used, all damage is properly repaired,
- The Contractor acceptably cleans up and disposes of unwanted material,
- The affected area is acceptably cleaned and shaped.

Measurement

Count the number of installed devices to calculate pay quantities.

As work is performed, prepare and submit a Source Document, listing number of devices installed per reasonable section of roadway, etc., to justify payment.

Section 00850 - Pavement Markings for Legends

This work consists of furnishing and applying pavement markings to construct legends.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that:

- The Contractor is furnishing only a material that is allowed under the contract. Do not allow the Contractor to furnish or utilize other material without specific approval. If the Project Manager allows use of a different material, assure that a Contract Change Order, allowing the use of other material, has been approved,
- The Contractor is aware of the quality requirements and provides acceptable quality documentation before the material is incorporated,
- If needed, take a representative sample of the materials for testing.

Prepare and submit required quality documentation.

Construction

Assure that:

- Climatic and surface conditions are suitable for the work,
- Locations are adequately and properly marked, both the Contractor and Inspector understand the markings, and the installation will provide the proper legend and encourage smooth traffic flow,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- A manufacturer's representative is present during all placement of the legend materials, when required by the contract,
- Existing or conflicting markings are removed,
- The legend is properly laid out, including proper direction, orientation, and spelling,
- The area of placement is adequately and properly cleaned, according to the contract and the manufacturer's recommendations,
- Primer is applied as required and specified,
- Material is properly prepared and placed, as required by the contract and the manufacturer's recommendations, including that liquid materials are placed to the specified thickness,
- If installation is not properly done, or markings are not aesthetically acceptable, require the markings to be removed and replaced to result in acceptable markings,

- Markings are protected until properly hardened or cured,
- The Contractor acceptably cleans up and disposes of unwanted material,
- The Contractor provides the warranty specified by contract,
- If needed during the warranty period, the Inspector assists the Project Manager in inspecting needed repairs.

Measurement

Consult the contract for pay items. Measure the work, or assure that measurements are taken, to calculate pay quantities.

As the work is performed, prepare and submit a Source Document to justify payment.

Section 00851 - Permanent Pavement Striping Tape

This work consists of constructing permanent pavement striping with tape material.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- The locations for the pavement striping are properly and adequately marked, both the Contractor and Inspector understand the markings, and the installation will provide smooth, acceptable flow and direction of traffic. If needed, ask the Region Traffic representative to also review the layout,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- A manufacturer's representative is present during all placement of the striping materials, when required by the contract,
- Climatic and surface conditions are suitable for the work,
- The Contractor's equipment is capable of placing double lines of striping simultaneously, if appropriate,

- If the tape will be applied to a freshly paved asphalt surface, the tape is applied and rolled into the surface while the temperature of the asphalt surface is within the manufacturer's recommendations,
- If tape will be applied in a grooved installation, the groove is properly constructed and cleaned before the tape is applied,
- Striping is constructed within the tolerances specified in the contract,
- The Contractor tests the retro-reflectivity of the installed material, records the results, and provides them to the Project Manager or Inspector,
- The Contractor acceptably removes and replaces all striping that does not comply with contract requirements and tolerances,
- The Contractor acceptably cleans up and disposes of unwanted material,
- The Contractor provides a warranty as specified by contract,
- As needed during the warranty period, the Inspector assists the Project Manager in inspecting any needed repairs.

Measurement

Measure the work, or assure that measurements are taken, to calculate pay quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00860 - Pavement Markers

This work consists of furnishing and installing pavement markers.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that:

- The Contractor is furnishing only a material that is allowed under the contract. Do not allow the Contractor to furnish or utilize other material without specific approval. If the Project Manager allows use of a different material, assure that a Contract Change Order, allowing the use of other material, has been approved,
- The Contractor is aware of the quality requirements and provides acceptable quality documentation before the material is incorporated,
- If needed, take a representative sample of the materials for testing.

Prepare and submit required quality documentation.

Construction

Assure that:

- Locations are properly and accurately located, including alignment of installations as appropriate,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Existing or conflicting markers are removed as needed or specified,
- Climatic and surface conditions are suitable for the work,
- The location for each marker is properly and adequately prepared by the specified treatment, sandblasting, etc., including grooving of the pavement for recessed markers, and the installation area is cleaned and dry,
- The adhesive is properly prepared and placed, according to the contract and the manufacturer's recommendations,
- Markers are properly aligned on the adhesive and protected until the adhesive hardens,
- Excess adhesive is removed from the exposed surfaces of the markers,
- The Contractor acceptably cleans up and disposes of unwanted material.

Measurement

Consult the contract for pay items. Count the number of installations, or assure that work is measured or counted, to calculate pay quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As the work is performed, prepare and submit a Source Document, listing the number of devices installed per reasonable section of roadway, etc., to justify payment.

Section 00861 - Painted Permanent Pavement Striping

This work consists of applying paint and other materials to construct the permanent striping on the wearing course of pavement.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Assure that the Contractor is furnishing only a material that is allowed under the contract. Do not allow the Contractor to furnish or utilize other material without specific approval. If the Project Manager allows use of a different material, assure that a Contract Change Order, allowing the use of other material, has been approved.

Prepare and submit required quality documentation.

Construction

Assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The locations for the painted lines are properly and adequately marked, both the Contractor and Inspector understand the markings, and the installation will provide smooth, acceptable flow and direction of traffic. If needed, ask the Region Traffic representative to also review the layout,
- Areas where paint is to be applied are adequately cleaned,
- Climatic and surface conditions are suitable for the work,
- Paint and beads are applied at a minimum of the specified rate. Periodically, compare the amount of stripe placed to the quantities of product used to verify minimum coverage,
- Lines are constructed within acceptable tolerances. If not, require the Contractor to remove and replace the unacceptable segments,
- Over open-graded HMA, a second application is made as required,
- Unacceptable dribbling or tracking of paint is acceptably cleaned up and striping is retraced if needed,
- If temporary flexible pavement markers had been installed, the Contractor adequately removes and disposes of them,
- The Contractor acceptably cleans up and disposes of unwanted material.

Measurement

Refer to the contract for the method of measurement.

If measurement is on a lump sum basis, assure that an acceptable breakdown of the lump sum is developed.

If measurement is on a unit basis, measure the work or assure that measurements are taken. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As the work is performed, prepare and submit a Source Document to justify payment.

Section 00862 - Durable Permanent Pavement Striping

This work consists of applying durable marking materials to construct the permanent striping on the wearing course of pavement.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements and provides acceptable quality documentation before the material is incorporated.

Assure that the Contractor is furnishing only a material that is allowed under the contract. Do not allow the Contractor to furnish or utilize other material without specific approval. If the Project Manager allows use of a different material, assure that a Contract Change Order, allowing the use of other material, has been approved.

Prepare and submit required quality documentation.

Construction

Assure that:

- The Project Manager, Inspector, and Contractor meet for the specified pre-striping meeting to discuss the issues specified in the contract,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The locations of the permanent markings are properly and adequately marked, both the Contractor and Inspector understand the markings, and the installation will provide smooth, acceptable flow and direction of traffic. If needed, ask the Region Traffic representative to also review the layout,
- A representative of the manufacturer is on the project site during this work, if required by the contract, and, among other things, approves of the application equipment and process,
- Climatic and surface conditions are suitable for the work,
- The surface on which the material is to be applied is acceptably clean and dry and has been prepared as required by contract or the manufacturer,
- The Contractor performs a test stripe, if required,
- Application of the marking is done as required and results in the specified product. Periodically, compare the amount of line placed to the quantity of product used to verify minimum coverage,
- All applications are adequately protected and all damage is adequately repaired,

- The Contractor records specified measurements, including thickness of application,
- The markings are constructed to acceptable tolerances. If not, require the Contractor to remove and replace, or otherwise acceptably repair, the unacceptable portions,
- The retro-reflectivity is measured as required,
- If temporary flexible markers were used, the Contractor adequately removes and disposes of them,
- The Contractor acceptably cleans up and disposes of unwanted material,
- The Contractor provides the specified warranty,
- As needed during the warranty period, the Inspector assists the Project Manager in inspecting any needed repairs.

Measurement

Measure the work, or assure that measurements are taken, to calculate the quantity of work. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00863 - Pavement Marking Removal

This work consists of removing striping and other pavement markings from the pavement surface.

Quality

There are no quality requirements for this work. The Inspector, though, should record pertinent information in the daily report or project diary.

Construction

Assure that:

- Markings to be removed are acceptably and properly identified,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The removal equipment properly contains the removed material,
- Markings are acceptably removed without damage to the pavement,
- If new markings will be constructed, the new markings are placed on the same day as the existing markings are removed,
- The Contractor acceptably repairs any damage to the pavement surface,

- The Contractor acceptably cleans up and disposes of removed material or other unwanted material.

Measurement

Measure the work, or assure that measurements are taken, to calculate the quantities of work. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document to justify payment.

Part 00900 - Permanent Traffic Control and Illumination Systems

Section 00905 - Removal and Reinstallation of Existing Sign Installations

This work consists of removing existing signs, as required, and reinstalling them at new locations, when specified.

Quality

No quality documentation is generally required; however, assure that:

- The removed material, if reinstalled, will provide an acceptable installation at its new location. If not, work with the Project Manager to establish payment to have the Contractor furnish and install needed new materials,
- The reinstalled installation is properly constructed. If needed, the Contractor furnishes and uses appropriate new parts. If the new parts are not specified as incidental under the contract, work with the Project Manager to establish proper payment,
- Each reinstallation properly serves its intended purpose.

Although no quality documentation is required, record pertinent information in the daily report or project diary.

Construction

Assure that:

- The location of each removal and reinstallation is properly located and marked and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The removed item or material, if it will not be reinstalled, is properly disposed of on site or is removed from the project site,
- Items to be salvaged or reinstalled are properly handled, with appropriate temporary support, to prevent damage,
- Reinstallation is done immediately, unless allowed differently,
- If new or different materials are required to accomplish an acceptable reinstallation, the Contractor furnishes and uses the proper materials. If the new materials are not specified as incidental, the Inspector works with the Project Manager to identify the needed materials and establish payment as appropriate,
- The reinstallation, and the resulting installation, complies with contract requirements and standard practices and provides required and acceptable guidance to traffic,

- The Contractor acceptably smoothes and finishes affected areas.

Measurement

Payment is generally on a lump sum basis. If appropriate, assure that an acceptable breakdown of the lump sum is developed.

As work is performed, prepare and submit a Source Document to justify payment.

If specific business logos and tourist-oriented directional signs are out of service for more than 5 calendar days, prepare and submit a Source Document to justify assessing the liquidated damages specified in Section 00220.

If new materials are required for reinstallation work and those materials are not specified as incidental, work with the Project Manager to establish payment. As the materials are incorporated, prepare and submit a Source Document to justify payment.

Section 00910 - Wood Sign Posts

This work consists of furnishing and installing wood signposts.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that:

- The Contractor is aware of the quality requirements,
- The treated posts are inspected, generally by representatives of the ODOT Structure Services Engineer, at the treatment facility and required documentation is furnished,
- The Contractor provides acceptable documentation before the material is incorporated.

Review the delivered wood posts for checking and other damage and assure that unacceptable posts are not incorporated. Also refer to discussion in Section 00810.

Prepare and submit required quality documentation.

Construction

Assure that:

- Locations for wood sign posts are accurately located and marked and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Holes for the posts are excavated to the specified depth or deeper,
- Rock or other hard material is removed to allow the proper depth of installation,
- The post is of the specified dimension and is placed in the proper orientation,
- If cutting of posts is required, only the bottom is cut,
- If required, holes for breakaway are properly drilled (correct size hole, elevation, and orientation),
- The sign, or other device to be mounted on the post, will be at the proper elevation and orientation after installation,
- The hole is properly backfilled and compacted full depth and the post is vertical,
- The Contractor acceptably cleans up and disposes of unwanted material,
- The affected area is acceptably smoothed and finished.

Measurement

Measure each post as it is installed. Record the information, by installation location as the work is performed, in a Source Document, calculate the pay quantity, and submit to justify payment.

Section 00920 - Sign Support Footings

This work consists of constructing sign support footings.

Quality

Quality requirements are specified in the contract, in the Nonfield-Tested Materials Acceptance Guide, and in the Manual of Field Test Procedures.

Assure that:

- The Contractor is aware of quality requirements, arranges for needed inspection of manufactured material, performs required testing, and furnishes acceptable quality documentation before the material is incorporated,
- Manufactured materials are inspected, generally by representatives of the ODOT Structure Services Engineer, at the manufacturer facility and required documentation is furnished. Furnish acceptable, approved working drawings to that representative to allow proper inspection.

Prepare and submit required quality documentation.

Construction

Assure that:

- Installations are properly and accurately located and marked and both the Contractor and Inspector understand the markings,
- The installation, as located, will allow the sign(s) to be installed at the correct elevation and orientation,
- Utilities have located and marked their buried facilities. If conflicts exist with planned work, work with the Project Manager to resolve the conflicts,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Excavation is performed of adequate size to allow concrete to be placed against undisturbed material or to allow adequate compaction of backfill materials,
- Forming, if performed, will result in proper dimensions of the installation,
- Reinforcement, conduit, ground rod, anchor bolts, and other devices are properly placed and secured against movement during concrete placement,
- Damage to coatings is acceptably repaired,
- Concrete is properly furnished, tested if required, placed, finished, cured, and protected against damage,
- Forms are removed and the resulting surface is finished as specified,
- Backfill materials meet contract requirements, are properly compacted to full depth, and are tested for density as required,
- The Contractor acceptably cleans up and disposes of unwanted material,
- The affected area is properly smoothed, compacted if required, and finished.

Measurement

Payment generally is on a lump sum basis. Assure that an acceptable breakdown for the lump sum is developed.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00930 - Metal Sign Supports

This work consists of furnishing and installing metal sign supports.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that:

- The Contractor is aware of quality requirements, arranges for inspection of manufactured material, and furnishes acceptable quality documentation before the material is incorporated,
- Manufactured materials are inspected, generally by representatives of the ODOT Structure Services Engineer, at the manufacturer facility and required documentation is furnished. Furnish acceptable, approved working drawings to that representative to allow proper inspection.

Prepare and submit required quality documentation.

Construction

As needed, assist the Project Manager in reviewing working drawings for the sign supports. If the Contractor is performing the construction survey work for the project, the Contractor's surveyor or others must field verify the elevations needed to calculate dimensions of each sign support.

Also, assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- As needed, installations are properly and accurately located and marked,
- The sign support, with its support footing, will allow the sign(s) to be installed at the specified elevation and orientation. If the sign support is of the improper length or the footing is of improper elevation or orientation, work with the Project Manager and Contractor to resolve the problem,
- All required parts of the connection to the footing support, as well as other portions of the installation, are furnished and properly installed,
- All connectors, bolts, and other parts of the installation are of proper size and have the proper coating,
- Bolts have been properly tightened and tested as required,
- Any damage to coatings is acceptably repaired,
- As specified, the installation is painted or otherwise coated,
- The Contractor acceptably cleans up and disposes of unwanted material.

Measurement

Refer to the contract for units of payment. For lump sum items, assure that an acceptable breakdown of the lump sum is developed.

As work is performed, prepare and submit a Source Document, listing locations of work, to justify payment.

Section 00940 - Signs

This work consists of furnishing and installing traffic signs.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that:

- The Contractor is aware of quality documentation requirements, arranges for inspection at the manufacturer facility, and furnishes required quality documentation before the material is incorporated,
- Manufactured materials are inspected, generally by representatives of the ODOT Structure Services Engineer, at the manufacturer facility and required documentation is furnished. Furnish acceptable, approved working drawings to that representative to allow proper inspection,
- The signs, as delivered, have the proper construction, have proper, accurate legend, and are not damaged.

Prepare and submit required quality documentation.

Construction

Assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- As appropriate, the location for each sign is accurately marked,
- The Contractor will have all necessary signs installed before making any change in traffic control,
- Delivered signs are of proper construction and legend and are not damaged,
- Signs are installed, as specified, on the proper support or post, including the specified number and type of fasteners,
- If installed and not appropriate, signs will be covered until the sign is appropriate,
- Signs are installed at the proper elevation with the specified angle and orientation to the roadway,
- Damaged signs are replaced or the damage is acceptably repaired,
- Mounting devices, including all specified components, are properly furnished and installed or constructed,
- The Contractor acceptably cleans up and disposes of unwanted material.

Measurement

Measurement is on a unit basis.

As work is performed, prepare and submit a Source Document, listing for each installation by pay item, to justify payment:

- Location of installation,
- Type, legend, or other identification of sign, including pay item identification,
- Dimensions of sign,
- Calculated area of sign.

Section 00950 - Removal and Reinstallation of Highway Illumination and Traffic Signals

This work consists of removing, abandoning, salvaging, and reinstalling existing illumination and traffic signal material.

Quality

Quality requirements for new materials are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide. Assure that the Contractor is aware of these requirements and furnishes acceptable quality documentation before the material is incorporated.

For material that is shown or specified to be salvaged and reinstalled, assure that the salvaged material is properly cleaned and is acceptable for re-use. If the material is damaged or not acceptable for re-use, work with the Project Manager and Contractor to establish payment for replacement material.

Prepare and submit required quality documentation.

Construction

Assure that:

- Items or materials to be removed, and salvaged if appropriate, are specifically and properly identified and marked if needed,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Items to be salvaged are protected from damage until placed or installed in their final location,
- For items to be removed or abandoned below ground level:
 - The items are properly removed,
 - The ground, including any surfacing, is properly restored and finished,

- The Contractor records the location of all abandoned items and provides that information to the Inspector,
- The Contractor properly disposes of materials, that are not salvaged, or removes them from the project,
- If removed materials are specified to be stockpiled, they are acceptably delivered to and stored at the specified location. If needed, the Inspector should work with the Project Manager to make appropriate contacts to gain access to the stockpile location,
- If materials are to be reinstalled:
 - They are properly cleaned,
 - If new materials are needed to accomplish the reinstallation, the Contractor furnishes those materials with acceptable quality documentation. Work with the Project Manager to establish a method of payment, if needed,
 - If required, the Contractor properly paints or coats reinstalled material or repairs damage to coatings,
- The Contractor acceptably cleans up and disposes of unwanted material.

Measurement

Measurement is by lump sum. Assure that an acceptable breakdown of the lump sum is developed, if appropriate.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00960 - Common Provisions for Highway Illumination and Traffic Signals

This work consists of constructing or modifying highway illumination, sign illumination, or traffic signals.

Quality

Quality requirements for most of this work are specified in Sections 00970, 00980, and 00990 of the contract or the Nonfield-Tested Materials Acceptance Guide. Quality requirements for field-tested items are specified in the Manual of Field Test Procedures.

Assure that manufactured materials are inspected, generally by representatives of the ODOT Structure Services Engineer, at the manufacturer facility and required documentation is furnished. Furnish acceptable, approved working drawings to that representative to allow proper inspection.

Assure that the Contractor:

- Submits required shop drawings for review and verification of pole heights, etc. by ODOT,
- Submits information on standard manufactured components for review by ODOT,
- Is aware of all quality requirements,
- Schedules needed inspection of manufactured materials,
- Performs the required testing,
- Furnishes acceptable quality documentation before the material is incorporated.

Assure that all electrical work complies with applicable contract requirements and codes including the National Electrical Code.

The Traffic Management Section provides periodic training on construction and inspection of highway illumination, traffic signals, and variable message signs. Also, work with the Project Manager to consult with the Region electrical crew or Region Traffic representative for assistance or guidance regarding this work.

The Project Manager is still responsible for properly administering the contract and assuring that the Contractor fulfills its responsibilities.

Prepare and submit required quality documentation for each associated pay item.

Construction

As needed, assist the Project Manager in reviewing shop drawings for the luminaire or signal poles. If the Contractor is performing the construction survey work for the project, the Contractor's surveyor or others must field verify the elevations needed to calculate dimensions of each pole, when requested by the Project Manager.

Assure that:

- The Project Manager and Inspector have coordinated with the Region electrical crew or Region Traffic representative for appropriate guidance, advice, or assistance in inspection or testing of the installation,
- The Contractor has furnished, and ODOT has reviewed and agreed to, equipment lists, drawings, and other information needed to perform the required work,
- The Contractor properly and accurately marks the locations for elements of the work, as needed, and both the Contractor and Inspector understand the markings,
- Adequate traffic control is implemented and maintained, as specified in the Traffic Control Plan,
- Utilities have located their facilities in areas of underground work,
- As the Contractor performs the work, it must record, on the project plans or other document, all changes to the plans. When work is complete, it must submit 6

copies of those plans or documents, depicting the changes, to the Project Manager,

- The Contractor has provided a copy of the license or apprentice registration for each licensed electrician or registered apprentice to the Project Manager,
- The Contractor uses only properly licensed electricians or registered apprentices to perform electrical work,
- In constructing the foundations, the work is performed according to Section 00960.41 and .43, including:
 - Excavation is performed to at least the specified depth,
 - The finished elevation of the foundation must correspond to the final constructed elevation of the adjacent slope or surfacing,
 - Excavation is performed to the neat lines of the specified foundation. If material is excavated beyond the neat lines, the additional volume must be either replaced with concrete placed against undisturbed material or replaced with material that is well compacted, upon approval of the Project Manager,
 - Any underground pipes, that will be encased in the foundation, will be wrapped with heavy roofing paper or enclosed in a protective sleeve,
 - The required reinforcement, conduit, ground rod, anchor bolts, etc. are properly positioned and secured to prevent movement during placement of concrete,
 - The concrete is furnished, tested, placed, finished, cured, and protected as required,
 - The concrete has achieved the required strength before the poles or other structural elements are erected,
 - If part of the foundation must be constructed in forms, assure that, when the forms are removed, backfill material is placed and well compacted,
- When installing conduit, the work is performed as specified in Section 00960.41 and .42,
- Junction boxes are properly installed and marked as specified in Section 00960.44,
- When installing cable and wire, the materials are furnished as specified in the contract and installation is performed as specified in Section 00960.45, including specified extra conductors or pull wires,
- For metal poles, the materials and installation conform to Sections 00960.43(b) and 00960.46, including:
 - The Contractor has furnished acceptable shop drawings for the poles and verified the pole heights and ODOT has reviewed the drawings, noting any errors or discrepancies,
 - Before the poles are erected, the Inspector visually inspects the welds and reviews the poles for conformance to shop drawings and contract requirements, including specified or needed appurtenances,
 - Aluminum poles are properly protected from contact with steel or concrete,
 - The Contractor properly repairs any damage to coatings,
 - After all hardware is installed, the Contractor verifies that each pole is plumb and constructs the grout pad, with the required drain hole, as specified,

- For wood poles, materials and work conform to Section 00960.47, including:
 - Poles are of proper length to achieve required height and embedment,
 - Wood does not have unacceptable checking or other defects,
 - Poles are installed and properly backfilled to the proper depth,
- For coatings, proper coatings have been applied and any damage is acceptably repaired,
- Grounding and bonding is performed as specified in Section 00960.50 so that all parts of the installation are properly grounded,
- For electrical services:
 - The materials and installation conform to Section 00960.49,
 - The Contractor has properly notified the utility,
 - ODOT initiates the process to pay for electrical energy when it is responsible for the costs of electricity,
 - The Project Manager contacts the utility to arrange for the electrical hookup,
- The Contractor acceptably cleans up and disposes of unwanted material,
- The affected areas are acceptably smoothed, finished, and restored.

Measurement

No measurement is required for this section. Work is measured and paid under other pay items.

Section 00970 - Highway Illumination

This work, in conjunction with Section 00960, involves construction of highway illumination systems.

Quality

Refer to the discussion and requirements of Section 00960.

Also, assure that the Contractor furnishes the required information regarding the luminaire(s) that it intends to install.

Prepare and submit required quality documentation.

Construction

In addition to the requirements of Section 00960, assure that:

- Poles conform to approved shop drawings and contract requirements and welding is acceptable,

- Other components conform to the contract requirements and submittals approved by ODOT,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Cable and wire are of the proper types and are acceptably installed,
- The Contractor does not de-activate existing or temporary systems until the new system is operating, unless specifically allowed,
- Each luminaire is properly marked with the date of installation,
- The Contractor performs required testing, in the presence of the Project Manager or Inspector, prior to the field test of the illumination system,
- The Contractor successfully operates the system through the required field test and performs all required replacement, modification, and maintenance,
- The Contractor acceptably cleans up and restores the affected areas and disposes of unwanted material.

Measurement

Pay items for this work are generally lump sum. Assure that an acceptable breakdown of each lump sum is developed.

As work is performed, prepare and submit a Source Document to justify payment.

If the Project Manager orders changes to the work, work with the Project Manager to calculate changes to the pay item as specified in Sections 00190.10(e) and 00195.20.

The Contractor is responsible for the costs of all electrical energy until ODOT accepts the system after the field test. When appropriate, assure that ODOT assumes responsibility for the costs of the electrical energy.

Section 00980 - Sign Illumination

This work, in conjunction with Section 00960, involves construction of sign illumination.

Quality

Refer to the discussion and requirements of Section 00960.

Also, assure that the Contractor furnishes the required information regarding the lamp(s) or luminaire(s) that it intends to install.

Prepare and submit required quality documentation.

Construction

In addition to the requirements of Section 00960, assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan
- Components conform to the contract requirements and submittals approved by ODOT,
- Cable, wire, and conduit are of the proper type and are acceptably installed,
- The Contractor acceptably cleans up and restores the affected areas, including disposing of unwanted material.

Measurement

Payment for this work is generally on a lump sum basis. Assure that an acceptable breakdown of the lump sum is developed.

As work is performed, prepare and submit a Source Document to justify payment.

Section 00990 - Traffic Signals

This work, in conjunction with Section 00960, involves construction of traffic signals.

Quality

Refer to the discussion in Section 00960.

Prepare and submit required quality documentation.

Construction

In addition to the requirements of Section 00960, assure that:

- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- If ODOT will furnish some of the required materials, work with the Project Manager to assure that the materials are furnished or delivered in a timely manner,
- Other components conform to the contract requirements and submittals approved by ODOT,
- The Contractor delivers the control equipment to ODOT, as required, for testing,
- Poles are properly located so the signal heads are located over the traffic lane that they control,
- Anchor bolts and footings are properly oriented,

- All poles and arms conform to approved shop drawings and contract requirements and welding is acceptable,
- Cable and wire:
 - Are only spliced where allowed by contract and splicing is performed as specified,
 - Must be stranded copper unless specifically allowed differently by the contract,
 - Additional (spare) conductors are installed as specified,
 - Are distinctly marked or identified unless the colors or markings conform to the standard color code,
 - Are properly supported, bundled, and secured to messenger cable as appropriate,
- Signal heads and interior illuminated signs are installed at the specified height above the roadway, with the specified hardware and components,
- All signal heads are of the specified type, are properly installed, and are properly programmed, if needed,
- Each signal head is located over the traffic lane that it controls. If not, work with the Project Manager and Contractor to resolve the location,
- For span wire installations, the messenger cable and tether cable are properly attached and tensioned,
- All signal heads are covered until ready for continuous operation,
- The detection devices are of proper type and properly installed and constructed as specified in 00990.43 and the contract,
- The traffic control signs are of proper type and properly installed as specified in 00990.44 and the contract,
- The flasher mechanism, fire preemption, railroad interconnect, and other devices are properly installed as specified in Section 00990.45, 00990.46, and 00990.47 and other appropriate portions of the contract,
- The Contractor adjusts the vertical orientation of the poles after all hardware has been installed and constructs the grout pad with drain hole,
- The Contractor provides all manufacturer warranties or guaranties,
- The Project Manager or Inspector requests assistance and guidance from the Region electrical crew or Region Traffic representative, as needed,
- The Project Manager, after the Contractor has tested all aspects of the traffic signal to demonstrate and assure its proper operation, arranges for ODOT to test and turn on the traffic signal,
- The Contractor acceptably cleans up and restores the affected areas, including disposing of unwanted material.

Measurement

Although measurement is on a unit basis, it basically is a lump sum item. Assure that an acceptable breakdown is developed for each item.

As work is performed, prepare and submit a Source Document to justify payment.

Part 01000 - Right of Way Development and Control

Section 01030 - Seeding

This work consists of seeding and associated tasks to develop plant growth for erosion control, environmental mitigation, and roadside development.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, provides samples for testing when required, and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- The Contractor has planned and will implement seeding or other acceptable erosion control practices to avoid erosion and excessive exposure of disturbed soil surfaces,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Work areas are properly located and marked and both the Contractor and Inspector understand the markings,
- If required, the Contractor performs specified soil testing,
- Soil is properly prepared according to Section 01030.43,
- If required, irrigation is installed prior to seeding,
- Permanent seeding is performed during the specified calendar periods,
- If placement of topsoil is required, the materials and work comply with 01040.43,
- If soil amendments or bio-amendments are specified, the materials and work comply with contract requirements,
- Fertilizer is of the type specified by contract and is uniformly spread on the appropriate areas at the specified coverage. Do not allow different fertilizer to be used unless the Project Manager has processed a Contract Change Order and assessed a price adjustment as appropriate,
- The seed is of the proper quality and mixture,
- Seed, fertilizer, and mulch does not drift onto people or vehicles or onto areas not intended to be seeded,

- The work does not allow any material to fall, be displaced, or wash into waterways or drainage,
- For hydroseeding:
 - The specified amounts of seed, fertilizer, mulch, and tackifier are uniformly applied,
 - If all material is applied in one operation, the Contractor applies double the specified amount of seed in the application,
 - Amounts of mulch and tackifier are appropriate for the area to be seeded and are applied uniformly,
- For seeding, fertilizing, and dry mulching:
 - The specified amounts of seed and fertilizer are uniformly applied,
 - Dry mulch is spread, within 24 hours of the seeding and fertilizing operation, uniformly over the specified area to the specified depth,
 - Mulch is tacked or anchored as specified,
 - If mulch has blown away or otherwise exposed the seeded surface, the Contractor repairs the seeded surface as necessary, replaces the mulch, and properly tacks or anchors the mulch,
- For drill seeding:
 - Weather and ground conditions are suitable for the work,
 - The specified amounts of seed and fertilizer are uniformly applied and worked into the soil,
- For seeding over mulched areas:
 - The area is properly prepared,
 - The Project Manager has approved of this procedure,
 - Twice the specified amount of seed is used in the application,
- The Contractor acceptably repairs all damage to the work,
- The Contractor protects the seeded areas and performs required establishment work, including:
 - Watering, if needed, to maintain growth,
 - Controlling weeds,
 - Mowing lawn and water quality seeded areas,
 - Re-seeding of all areas with unacceptable establishment of the seeded plants,
- The Contractor acceptably removes and disposes of extraneous matter,
- Affected areas are acceptably smoothed and restored.

Measurement

Refer to the contract for the method of measurement for each pay item.

If payment is on a lump sum basis, assure that an acceptable breakdown of the lump sum is developed.

If payment is on a unit or area basis, measure the work, or assure that measurements are taken, to calculate the quantities of work. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As the work is performed, prepare and submit a Source Document, with calculation of quantities, to justify payment.

Section 01040 - Planting

This work consists of planting and associated work.

Quality

Quality requirements are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide.

Assure that the Contractor is aware of those requirements, provides samples for testing when required, and provides acceptable quality documentation before the material is incorporated. Also assure that ODOT performs testing, such as for topsoil, when required to allow timely performance of the affected work.

Prepare and submit required quality documentation.

Construction

Assure that:

- The Contractor submits the Planting Work Plan specified in 01040.04(a) and the Project Manager and Contractor meet to discuss the Planting Work Plan,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Measures to acceptably control erosion and sedimentation are implemented and maintained as necessary,
- Areas or locations to be planted are accurately and properly located and marked and both the Contractor and Inspector understand the markings. Also, plantings are not located in areas or locations that are not conducive to their growth, including areas that are wet, have insufficient soil, or where trees will be under overhead utility lines,
- If specified plant materials are not available, the Contractor requests substitution. Work with the Project Manager to secure approval of the plant substitutions and to determine a change in unit price if the substitute plant will result in a different unit cost,
- The Contractor has assured that all utilities in the affected area have been identified and located,

- Required irrigation facilities have been installed prior to planting,
- The Project Manager and Contractor review the planting areas to:
 - Assure that the planting areas and the specified plantings are compatible,
 - Identify potential problem areas, such as wet areas or areas that have standing water in winter, areas of insufficient topsoil, presence of wildlife that may destroy the plantings, overhead utility lines, etc.,
 - Make necessary adjustments to provide appropriate plantings and planting areas,
- The Contractor is aware of and properly protects vegetation that is to remain,
- ODOT and the Contractor have arranged for permanent sources of electricity and water and temporary use by the Contractor at its expense,
- If required by contract, the Contractor has soil testing performed,
- If the Contractor will furnish and place topsoil:
 - The Contractor identifies the source for the topsoil and furnishes a sample, if required,
 - ODOT tests the topsoil sample in a timely manner to allow topsoil placement,
 - The topsoil is free of unwanted plants and other detrimental matter,
 - Topsoil is properly placed, worked, and finished to the specified depths, grades, contours, and condition,
- If required, soil conditioners, soil amendments, and bio-amendments are uniformly incorporated at the specified rates,
- The Contractor uses a properly licensed applicator to apply chemical herbicides and pesticides,
- For planting:
 - Planting locations are properly located and marked,
 - Planting areas are free of weeds,
 - Planting areas are properly prepared, including removal of unacceptable materials and addition of topsoil as needed,
 - Climatic conditions are appropriate for planting,
 - Plants conform to contract requirements,
 - The proper type and amount of fertilizer is incorporated at each plant location. Do not allow a different type of fertilizer to be used unless the Project Manager has processed a Contract Change Order and assessed a price adjustment as appropriate,
 - The planting procedures comply with Sections 01040.49, .50, .51, and .52,
 - Mulch of the specified type is applied to the proper depths and specified areas,
 - The Contractor waters the plants as needed,
- Miscellaneous items are constructed or placed as specified,
- The affected areas are shaped, cleaned, repaired, and finished as needed and the Contractor properly disposes of unwanted material,
- During the establishment period:
 - The Contractor regularly performs the specified work, as needed and without request from ODOT, including removal of weeds and replacement of unacceptable plants,

- The Contractor and Project Manager jointly inspect the planted areas as specified.

Measurement

Refer to the contract for the method of measurement for each pay item.

If measurement is on a lump sum basis and no breakdown method is included in the contract, assure that an acceptable breakdown of the lump sum payment is developed.

If measurement is on a unit basis, measure the quantity, or assure that measurements are taken as specified in the contract. If payment for establishment work is included with the unit price for the plantings, assure that the cost for establishment work is properly identified and payment is made only as that work is accomplished.

As work is performed, prepare and submit a Source Document to justify payment.

If measurement is by volume on an in-place basis:

- Assure that material is placed to the specified depth throughout the specified area by performing spot checks for depth,
- Take measurements, or assure that measurements are taken, to calculate the area covered and the resulting volume. Do not include areas where material was placed contrary to the contract or direction of ODOT. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information,
- Prepare and submit a Source Document, with calculation of quantity, to justify payment.

If measurement is by volume in the haul vehicle:

- Measure each haul vehicle and prepare a Source Document to calculate the volume of each haul vehicle,
- Assure that the Contractor is not hauling loads that are over the legal load limit,
- Assure that each load, with no allowance for settlement of the material during transport, provides at least the “water level” capacity volume. If not, make deduction as necessary and as discussed in the Quantities section (12-D) of the Construction Manual. Make no allowance for over capacity loads,
- As material is delivered and incorporated, prepare a Weigh Memo and Material Receipt for each delivered load or utilize other acceptable methods to prepare and submit a Source Document to justify payment.

At the specified points during the establishment period, prepare and submit a Source Document to justify payment for the acceptably performed establishment

work. Assure that the Contractor regularly fulfills all establishment period responsibilities.

Section 01050 - Fences

This work consists of constructing fences, including gates and gateways.

Quality

Quality requirements are specified in the contract, in the Nonfield-Tested Materials Acceptance Guide, and in the Manual of Field Test Procedures.

Assure that the Contractor is aware of the required quality documentation, performs sampling and testing as required, and provides acceptable quality documentation before the material is incorporated.

Obtain samples of materials, as required, and submit to the ODOT Materials Laboratory for testing. If materials fail to meet contract requirements, work with the Project Manager to order the materials to be removed and replaced or to calculate a price adjustment and allow the material to remain in place.

Inspect all wood materials for unacceptable checking or other damage. Reject unacceptable material.

If unacceptable material is delivered to the project, mark it in such a manner that it is not damaged and the Contractor can return it to the supplier or use it on other projects where the quality is acceptable.

Prepare and submit required quality documentation.

Construction

Before layout of this work starts, review the plans and the Right of Way obligations to assure that construction will fulfill all obligations.

Also, assure that:

- The surveyor has properly located and marked the fence construction (normally 1 foot inside and parallel to Right of Way lines), including gates and gateways, and both the Contractor and Inspector understand the markings,
- The fence location varies, as required and directed, to preserve trees and geographic features,
- The location of fence posts, corner posts, and bracing do not conflict with or disturb required survey markers,

- The Contractor has identified buried facilities and has had utilities and others locate and mark their buried facilities, as appropriate,
- The adjacent property owners are aware of fencing activities,
- The Contractor has coordinated fencing activities to prevent livestock from leaving their enclosures,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- All ground disturbance, outside of ODOT Right of Way, is minimized and is acceptably repaired,
- All vegetation and other debris is removed from the fence line area,
- All required grading, to allow proper fence construction to required line and grade, is performed,
- Footings are excavated to proper dimensions and backfill or concrete is properly placed and constructed,
- Where rock is present, footings and post installations are constructed as specified,
- Posts are installed, as specified, to allow the fence to be placed on the specified side of each post,
- All damage to posts or other materials is repaired in an acceptable manner or the material is replaced,
- The fence fabric is installed and secured properly,
- Corners, connections of fence sections, and connections to structures or existing facilities do not have unacceptable gaps,
- The fence is electrically grounded as specified,
- Gates and gateways operate properly,
- The Contractor acceptably cleans up and disposes of unwanted material,
- The affected area is acceptably smoothed and shaped.

Measurement

Measure work, or assure that measurements are performed, to calculate quantities of work. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As the work is performed, prepare and submit a Source Document, including calculation of quantities, to justify payment.

Section 01070 - Mailbox Supports

This work consists of removing and maintaining mailboxes on temporary supports during construction, constructing new supports, and installing mailboxes and newspaper boxes on the new supports.

Quality

Quality requirements are specified in the contract, the Nonfield-Tested Materials Acceptance Guide, and the Manual of Field Test Procedures.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- Delivery personnel have acceptable access to the mailboxes and newspaper boxes at all times during the project,
- As needed, mailboxes and newspaper boxes are installed on acceptable temporary supports until placed on permanent supports,
- Locations of the permanent supports are properly marked and located and are acceptable to the U.S. Postal Service or other delivery persons and both the Contractor and Inspector understand all location markings,
- Supports are installed or constructed as specified in the plans or manufacturer's instructions,
- Mounting brackets are of the proper size and location to allow proper installation of each box,
- All damage is adequately repaired,
- The Contractor acceptably cleans up and disposes of unwanted material,
- The affected area is adequately smoothed and finished.

Measurement

Measurement is on a unit basis. Assure that the work is accurately measured to determine quantities.

As work is performed, prepare and submit a Source Document, listing locations of the installations and total quantity of each item, to justify payment.

Part 01100 - Water Supply Systems

Section 01120 - Irrigation Systems

This work consists of constructing irrigation systems.

Quality

Quality requirements for most materials are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide. Quality requirements for bedding material, concrete, and other field-tested materials are specified in the Manual of Field Test Procedures.

Assure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated.

Prepare and submit required quality documentation.

Construction

Assure that:

- ODOT and the Contractor have obtained the required permits and the Contractor is aware of all permit requirements,
- ODOT has arranged for water service, if needed, or that the Contractor pressure tests the existing supply to assure adequate water and pressure for the intended work,
- ODOT has arranged for electrical service and the Contractor has contacted the provider of electrical service before installing the meter base at the power source,
- The Contractor marks the layout of the irrigation system before starting construction, assuring that the finished system will provide adequate, complete coverage. If alterations or changes are needed, work with the Project Manager and the Contractor to identify and incorporate those modifications,
- The Contractor has identified buried facilities and utilities and others have located and marked their buried facilities,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- The Contractor records locations of all installations for inclusion on the As Constructed drawings,
- For excavation:

- Topsoil is kept separate from other excavation, for replacement as the top layer of backfill, or the Contractor must replace the layer of topsoil at its own expense,
- Trenching is done in a manner that adequately protects existing plants, including:
 - * The Contractor excavates by hand and tunnels under roots of 50 mm or greater diameter, unless the root is in the direct line of the pipe,
 - * The Contractor cleanly cuts all exposed roots of 10 mm or greater diameter and treats with an approved tree wound dressing ,
 - * If the trench is not backfilled within 24 hours, the Contractor protects the exposed roots with moist burlap or canvas,
- Trenching is performed to the proper depth and adequate width,
- The trench bottom is relatively smooth and free of rock or other unsuitable material. Rock or other unsuitable material must be excavated to an additional 150-mm depth and replaced with sand or other suitable material,
- Detectable marking tape is placed with the pipe in the trench as required,
- For piping:
 - Piping is constructed as required by the contract,
 - Drain valves are installed at all section low points,
 - Ends of all pipes are plugged or capped to prevent entry of unwanted material,
 - All joints are properly constructed,
 - Concrete thrust blocks are acceptably constructed as required,
- For electrical installation:
 - Wiring is of the required specification, size, and numbers,
 - Splicing is done only at acceptable, accessible locations,
 - Wires are properly bundled,
 - Wires are properly placed in the trench,
- All piping is properly flushed to remove foreign material, air is purged as required, and piping is properly and acceptably pressure tested,
- All sprinkler heads and other appurtenances are constructed as required by the contract or manufacturer specifications, at the required locations, and to the required elevations and are adequately protected during construction,
- For backfilling pipes:
 - Backfilling is not done until all piping has been inspected, tested, and approved,
 - If sufficient backfill material is not available, work with the Project Manager and Contractor to obtain suitable material and establish a method of payment, if needed,
 - Backfilling within 150mm of piping is free of rocks or unacceptable material. Allow use of Class C bedding, if acceptable to the Project Manager and Engineer of record,
 - Backfilling is properly compacted,
 - The top 150mm of material is topsoil or other suitable material,

- All sprinkler heads are tested and adjusted to provide uniform coverage, with no spray on pavement, walks, or structures,
- The Contractor marks facilities, as required, to allow later identification for maintenance or other needs,
- The Contractor operates the installation through all required phases and situations to assure correct and proper operation,
- The Contractor performs all needed maintenance, testing, and inspection until all contract work is complete,
- The Contractor submits all drawings, schematics, and layouts needed for ODOT to complete the As Constructed drawings,
- The Contractor acceptably cleans up and disposes of unwanted material,
- The affected areas are acceptably smoothed and restored,
- The Contractor provides all needed parts lists and service manuals and conducts a training session, arranged by the Project Manager, for personnel who will operate and maintain the system.

Measurement

Work with the Project Manager to assure that an acceptable breakdown of the lump sum payment is developed.

As work is performed, prepare and submit a Source Document to justify payment.

Assure that payment for water and electricity is implemented and made.

Section 01140 - Potable Water Pipe and Fittings

Section 01150 - Potable Water Valves

Section 01160 - Hydrants and Appurtenances

Section 01170 - Potable Water Service Connections, 50 mm and Smaller

This work consists of constructing pipe and fittings, appurtenances, and connections for use with potable water.

Quality

Quality requirements for most materials are specified in the contract and in the Nonfield-Tested Materials Acceptance Guide. Quality requirements for bedding material, concrete, and other field-tested materials are specified in the Manual of Field Test Procedures.

Assure that:

- The Contractor is aware of those requirements,
- The Contractor performs testing as required,
- The Contractor provides acceptable quality documentation before the material is incorporated,
- All materials are delivered, handled, and stored in a manner that prevents damage and entry of unwanted material,
- Damaged material is either replaced or acceptably repaired.

Prepare and submit required quality documentation.

Construction

Assure that:

- Locations of installations are properly and accurately located and marked and both the Contractor and Inspector understand the markings,
- The Contractor has arranged for all utilities and others to locate their facilities in the work area and those facilities have been located and marked,
- Adequate traffic control is implemented and maintained, according to the Traffic Control Plan,
- Where existing services are to be transferred from an old to the new facility, the work is coordinated with the owner of the facility and the owner concurs with the Contractor's planned procedures and schedule,
- The inspection issues in Section 00405 of this Manual are fulfilled for trench construction and backfill,
- Water in the trench area is kept removed until the ends of the pipes are sealed and the pipe is secured from floating,
- If conflicts with utilities or other contract work occur, work with the Project Manager and Contractor to resolve those conflicts and initiate changes in payment, as appropriate,
- Pipe is of the proper size, material, and construction for each installation,
- All foreign material is removed from the pipe before the pipe is placed in its final position,
- All cut ends of pipe are properly smoothed and reamed as required,
- Pipe is laid according to the requirements of the contract and recommendations of the manufacturer,
- Valves, hydrants, connections, and other appurtenances are constructed at the proper location, elevation, and orientation,
- Joints are properly cleaned, lubricated if required, and constructed as required by contract or recommended by the manufacturer,
- When required, the pipe is properly encased, with polyethylene or other specified material, as required by contract or recommendation of the manufacturer,

- Concrete for thrust blocks is properly mixed, tested as required, placed to the proper dimensions against undisturbed material, and allowed to develop the required strength before the pipe is pressurized,
- For all nonmetallic pipes, detectable marking tape or wire is properly installed above the pipe,
- Hydrants that are not in service are properly covered with a burlap or plastic bag,
- Valve boxes and similar appurtenances are properly marked as required,
- The Contractor:
 - Properly flushes, disinfects, and tests all pipes as required by contract,
 - Performs the testing in the presence of the Inspector or owner of the facility as required,
 - Acceptably repairs or replaces any defective material or workmanship,
 - Properly disposes of the flushed or treated water,
 - May observe as the Project Manager or owner of the facility collects samples and conducts bacteriological tests. The Contractor must take appropriate action if the test results are not acceptable,
 - If needed, repeats the original disinfection procedure,
- When connecting to existing water mains:
 - The Contractor submits a detailed sketch of the connection process for review and concurrence by the Project Manager or the owner of the water main,
 - If water service must be interrupted, the Contractor properly notifies affected parties,
 - The owner of the facility is present during the connection process, if desired,
 - The Contractor constructs the connection according to the approved process and restores interrupted service as rapidly as possible ,
- The inspection issues in Section 00495 of this Manual are fulfilled for restoring existing surfacings in the trench areas,
- The Contractor acceptably cleans up and disposes of unwanted material,
- All affected areas are acceptably smoothed, finished, and restored as required.

Measurement

Refer to the contract for pay items and their measurement.

Measure the work, or assure that measurements are taken, to calculate pay quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform some cursory validation of that information.

As work is performed, prepare and submit a Source Document, with supporting calculations as needed, to justify payment.

Formulas for Perimeter, Area, and Volume

Perimeter

Any multi-sided shape:	$P = \text{sum of length of individual sides}$
Circle:	$P = \pi d$, or $P = 2 \pi r$
Ellipse:	$P = \pi \frac{(D + d)}{2}$, where D and d are diameters

Area

Rectangle or square:	$A = l w$
Parallelogram:	$A = b h$, where h is perpendicular to b
Trapezoid:	$A = h \frac{(B + T)}{2}$, where B and T are lengths of bottom and top sides
Triangle:	$A = \frac{1}{2} b h$, where h is perpendicular to b
Circle:	$A = \pi r^2$
Cube:	$A = 6 e^2$, where e is the length of each side
Sphere:	$A = 4 \pi r^2$
Ellipse:	$A = \pi R r$, where R and r are radii of ellipse

Volume

Rectangular solid:	$V = l w h$
Cube:	$V = e^3$
Cylinder:	$V = B h$, or $V = \pi r^2 h$, where B is area of base
Pyramid:	$V = \frac{1}{3} B h$
Cone:	$V = \frac{1}{3} B h$, or $V = \frac{1}{3} \pi r^2 h$

Sphere:

$$V = \frac{4}{3} \pi r^3, \text{ or } V = \frac{\pi D^3}{6}$$

Prismoidal Formula:

$V = \frac{1}{6} h (B + 4 M + T)$, where B is the area of the base, T is the area of the top, and M is the area at the mid-section

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