

# ODOT Inspector's Manual

## FOREWORD

The 2014 *Inspector's Manual* is a revision of the 2001 manual. The 2014 version includes direction from the Specification Owners/Technical Experts on what they view as critical inspection areas for a given specification. The *Inspector's Manual* is a work in progress as we look to further enhance the materials with input from all users including inspectors.

Along with the manual text, additional resources are included:

- **General Guidance Section** provided as a tool for those new to ODOT construction inspection. The introduction sections we provide in the classroom training are condensed into this section. The information focuses on navigating the specifications, special provisions, plans and other resources in general. The *General Guidance* section while directed to new Inspectors is also a tool for experienced Inspectors as a review for the General Construction Inspector certification exam.
- **Inspector Manual Tables** organized by specification including guidelines for inspecting and documenting work provided in a tabular format.
- **Forms List** organized by Specification with a hot link to the on-line forms.
- **ODOT Checklists** for Sections 00200's through 01100's as available. Not every section has a checklist available but we have included what is available through ODOT.
- **Non-Field Tested Materials Guide Flowchart** as a basic reference to understanding how the Guide is used. An example is provided to demonstrate the process.
- **Documentation Information** with hot links to the *Construction Manual*. We guessed that not every Inspector has a *Construction Manual* on his/her desk so we provided links which include examples of properly completed forms. The key documentation sections include: Dailies, Quality and Quantity.
- **Reading Slope Stakes Reference** to understand the basics of what is written on a slope stake.

We foresee this document as a work in progress and welcome any suggestions to improve its usefulness. If you have ideas for improvement, please contact us at:

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**INSERT TAB**

**General Guidance**



# General Construction Inspector General Guidance

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## General Guidance

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### Role of Construction Inspector

The construction inspector has the toughest job in construction. The Inspector has the responsibility and authority to point out deviations from specifications, but has no corresponding authority to approve changes, even though they might be minor. The Inspector's function begins and ends with seeing that construction operations produce the results called for in the plans and specifications. If an Inspector has the quality of firmness coupled with patience, and judgment inherent with a desire to be correct but practical, then they will fulfill their intended function on the construction team.

Inspectors must work constantly to achieve a high standard of excellence in the administration and quality control of construction projects. Each Inspector has the responsibility to perform in such a manner that their personal goals and the owner/designer goals are in harmony. Since an Inspector is isolated from immediate supervisory resources and guidance much of the time, they must be able and comfortable in making many individual judgments throughout the workday affecting the quality of construction. The Inspector represents the owner at the site of work and is empowered to enforce the provision of the Contract. The Inspector is authorized to reject materials and workmanship not in conformance with contract requirements.

***SS 00150.01 Inspector's Authority and Duties include the responsibility to orally reject defective materials...***

The Inspector must be mature, confident, patient, meticulous in duties, and be a person of integrity who also possesses good judgment. There are innumerable attributes that make up a good Inspector. An unknown author once described an Inspector best by defining what they are not:

- An Inspector is NOT a designer, although they must be able to read plans and speak with designers.
- An Inspector is NOT a surveyor, although they must understand surveying principles.
- An Inspector is NOT a superintendent, although they must know construction and good planning.
- An Inspector is NOT a policeman, although they must secure compliance with the Contract.
- An Inspector is NOT a lawyer, although they must understand and enforce Contract Law.
- An Inspector is NOT a carpenter or other tradesman, although they must recognize qualified people.
- An Inspector is NOT an accountant, although they must be able to keep detailed records.

The ideal Inspector must have desire, reasonableness, firmness, good judgment, knowledge, and courtesy. Their interactions with construction crews must be friendly and firm without familiarity, and must be conducted with the skill of a diplomat. The fundamental requirements for a good Inspector are:

- Knowledge – It is of paramount importance that the Inspector has knowledge of the work inspected.
- Common Sense – The means to synchronize knowledge and specifications; apply one to the other.
- Observation – see with eyes as well as considered thought about the image observed.
- Physical Tools – Measuring devices, testing equipment, notebook, pencil; and the ability to use them.
- Courtesy – Valid criticism; how one says it can drastically effect how one receives it.

## Documentation

The importance of documentation on a construction project cannot be stressed enough. It is critical for recording quantities and quality of materials placed which allows the contractor to be paid and the Agency confirmation of quality. It is also critical to provide a history of how the project was built for future reference like for making adjustments in the contract time. In addition, it could be important for providing information for the Agency in resolving a dispute. The ODOT *Construction Manual* has a complete chapter on Project Records. To assist the Inspector, excerpts from the chapter are included in the *General Inspection Training Manual* under the documentation tab.

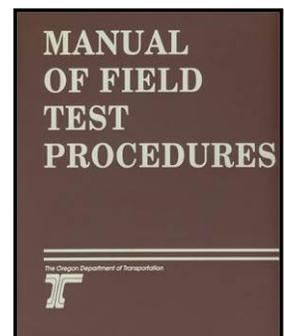
## Inspector Resources

Inspectors have many resources available to help them perform their job duties effectively. The most important construction resources are the project plans, special provisions and Oregon Standard Specifications, Volumes 1 and 2. These resources will be discussed in later sections.

Other important resources that may be referred to in the plans or specifications include:

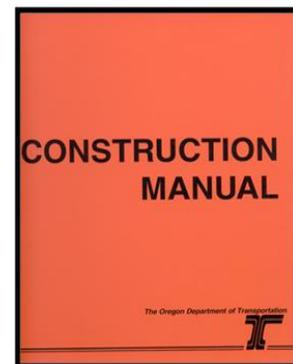
- **The *Manual of Field Test Procedures (Brown Book)***: The Brown Book applies to testing done at the jobsite like compaction and/or materials sampled at the jobsite like aggregate or concrete. The manual provides several sections including a description of the ODOT Quality Assurance Program; testing requirements and test methods for various materials used; report forms and examples; and *The Field Tested Materials Acceptance Guide for Type D or E Projects Only*.

*The Field Tested Materials Acceptance Guide for Type D or E Projects* section is



important for inspectors to understand as it details what tests are to be performed; who is to perform them and how frequently they must be performed. While the Quality Control Compliance Specialist (QCCS) is responsible for monitoring the testing, oftentimes it is the inspector's responsibility to notify the QCCS when testing will be needed. Also, it is important to be aware that the testing is occurring and that where possible, test results are documented in the Inspector's Daily Report.

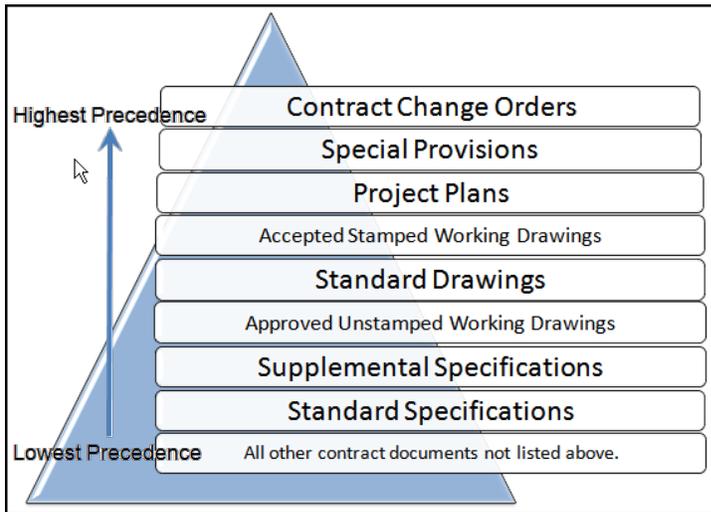
- **The Non-Field Tested Materials Guide:** Non-field tested materials include items like sediment barrier, geotextile, steel piling and bolts. The Guide provides a table of the materials covered along with a list of the required acceptance (quality) documents. A flow chart with guidance on how to use the NFTMG is included in the NFTMG tab in the *General Construction Inspection Training Manual*. For more navigational tips, refer to the Review Section of this Supplement.
- **Qualified Products List:** The "QUALIFIED PRODUCTS LIST" (QPL) is a comprehensive list of all finished products which have been evaluated and/or used by the Oregon DOT. Because there are items that are used over and over on projects, it makes sense to maintain a list of products that have been used and don't need to be re-evaluated every time they are to be incorporated. If an item is required to be taken from the QPL, the Non-Field Tested Materials Guide will provide direction to the QPL. For more navigational tips, refer to the Review Section of this Supplement.
- **Construction Manual:** An additional useful publication is the *Construction Manual* which you may find in the office bound in an orange binder. The Manual provides background and procedural guidance for Volume 1 of the Oregon Standard Specifications. Chapter 12, Project Records is of particular interest to an inspector as it provides guidance on preparing Daily Reports/Diaries and Quality Documentation, etc.



## Order of Precedence

Many documents may be referenced for a project and sometimes conflicting information is included. For example, the project plans may call out for a given dimension and the special provisions have something different. To reconcile the differences, an order of precedence has been established. The order of precedence is listed in Volume 1 of the ODOT Standard Specifications, under 00150.10(a).

The order is presented in the pyramid to the left indicating that the most general project document which is also, in most cases the oldest, has the least precedence. As you



move up the pyramid, the documents become increasingly more project specific and more current with contract change orders taking precedence over all other documents. Note that an order of precedence for material specifications and test methods also is established and can be found in section 00165.20.

## Specifications and Plans

As previously mentioned, the critical documents to have available when inspecting a project include the Special Provisions, Standard Specifications and Plans. The plans provide the requirements for constructing a project including the location and dimensions of all features that will be incorporated which make them unique for each project. To answer questions like how deep to install a feature or which side of the highway to place a pipe, the answers are going to be found in the plans. Answers to questions about the scope of the work, the construction limitations, the necessary equipment are going to be found in the specifications.

### Specifications

The Oregon Standard Specifications for Construction provide the basic guidelines for constructing a project. The Standard Specifications are printed about every six years so there are areas that require updates as technology changes or best practices are identified. To document the changes, ODOT posts boiler plate special provisions that include the recent changes for a given specification. When a project is developed, the standard specifications and/or boiler plate specifications are compiled and modified as needed and incorporated into the special provisions. From an inspector's perspective, the first check on a specification should be to the special provisions which may or may not refer back to the standard specifications.



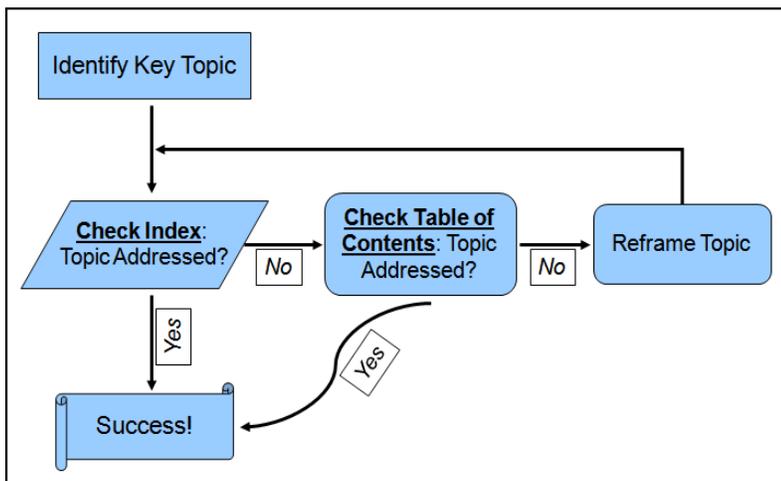
### Navigating the Specifications

The Oregon Standard Specifications for Construction include two volumes. Volume 1 contains Part 00100 and covers the defined terms, the bidding process and contractual relationships. Essentially, it covers the rules of the contract between the Agency and the Contractor. Volume 2 contains Parts 00200 through 03000 which describe the actual details of how a design feature is going to be constructed.

Believe it or not, ODOT standard specifications and special provisions (Sections 00200 through 01999) subsections are organized in the same way. The figure to the right shows the general organization of the subsections. Each specification will have unique subsections like scope, labor, construction, etc. but the individual subsections will always be listed under X.00 for Scope; X.30 for Labor and X.40 for construction, etc. For example, if the question was *what type of labor is required for Pipe Lining?* it could be answered by looking under 00410.30 (Pipe Lining, Personnel Qualifications). If the question was, *“How is pipe lining measured?”* The answer could be found by referencing 00410.80 (Pipe Lining, Measurement).

Scope	• X.00 to X.09
Material	• X.10 to X.19
Equipment	• X.20 to X.29
Labor	• X.30 to X.39
Construction	• X.40 to X.59
Maintenance	• X.60 to X.69
Finishing, Cleaning Up, and Warranties	• X.70 to X.79
Measurement	• X.80 to X.89
Payment	• X.90 to X.99

Specification Organization



Sometimes, however, more effort is required. Navigating the specifications could be as easy as referring to the table of contents and/or index. The key to finding answers in the specifications is to not give up – **and be sure to read the entire subsection.** The flow chart is provided as a tool to assist in searching the specifications. For more navigational tips, refer to the Review Section of this Supplement.

#### Searching for a Specification Special Provisions and Schedule of Items

An alternate method to find a specification is to refer to the special provisions. If the question is specific to a construction project, there should be a related bid item. The special provisions include a *Schedule of Items* toward the end of the document, which lists all of the project bid items with a specification reference. Hence, if the bid item can be found then the specification can be found.

The *Schedule of Items* is arranged by sections which are logically sequenced from activities that take place at the beginning of construction to those that take place later in a project. In the class project, the *Schedule of Items* has ten sections including Section 0001: Temporary Features and Appurtenances, Section 0002: Roadwork, Section 0003: Drainage and Sewers, etc. By narrowing the area of construction, a bid item can be found. A snapshot of Section 0006 Roadwork is shown below:

SCHEDULE OF ITEMS					
OR569: BELTLINE HWY @ COBURG ROAD INTERCHANGE WILDISH CONSTRUCTION CO.					
ITEM NO	ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE (IN FIGURES)	TOTAL (IN FIGURES)
SECTION 0006 WEARING SURFACES					
0560	0745 0301000M LEVEL 3, 3/4 INCH DENSE HMAC	TON	3,400.00	50.00	170,000.00
0570	0745 0302000M LEVEL 3, 1/2 INCH DENSE HMAC	TON	1,100.00	56.00	61,600.00
0580	0745 0311000M LEVEL 3, 3/4 INCH OPEN HMAC	TON	1,300.00	46.00	59,800.00
0590	0745 0640000M PG 70-22 ASPHALT IN HMAC	TON	330.00	50.00	16,500.00
0600	0748 0121000J 4 1/2 INCH ASPHALT CONCRETE PAVEMENT REPAIR	SQYD	60.00	100.00	6,000.00

Section Number

Specification Reference: e.g. 0745 refers to SP00745

Items number 560, 570, 580 and 590 reference 0745 which means that Special Provision Section 00745 Hot Mix Asphalt Concrete includes multiple pay items. Since hot mix asphalt concrete paving can include many materials, each material listed is required to be measured and paid for separately.

### Navigating the Plans

ODOT plans include the specific locations, dimensions, drawings, and installation notes for constructing the features on the project. The plans have consistent layouts that make them easy to navigate. The table below provides a description of what information is provided in a plan set by sheet number.

### Plan Set Organization

Page	Page Description	Information Included
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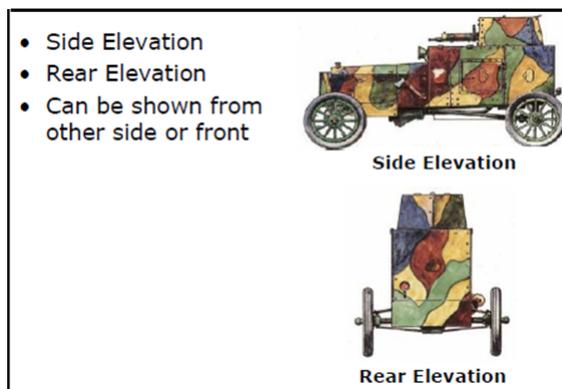
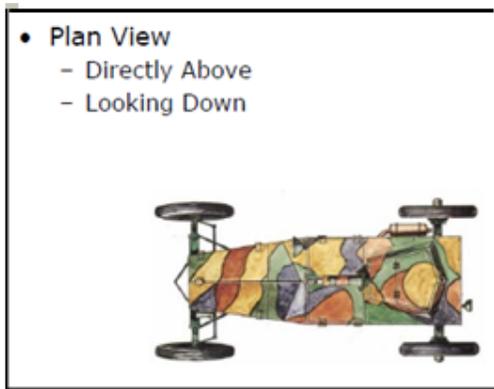
Page	Page Description	Information Included
1	Title page	<ul style="list-style-type: none"> <li>• Project limits, location</li> <li>• Work activities (below project name)</li> </ul>
1A's	<ul style="list-style-type: none"> <li>• Index of Sheets</li> <li>• Index of Standard Drawings</li> </ul>	<ul style="list-style-type: none"> <li>• List of project specific drawings</li> <li>• Standard drawings used specific to the project</li> </ul>
2A's	Typical Sections (listed by line and station)	<ul style="list-style-type: none"> <li>• Roadway dimensions</li> <li>• Widening dimensions</li> <li>• Pavement thicknesses (aggregate base, HMAC base course, HMAC wearing course)</li> <li>• HMAC mix type</li> </ul>
2B's	Details used specific to the project (modified standard drawings)	<ul style="list-style-type: none"> <li>• Construction information that could be needed at various locations.</li> <li>• HMAC pavement repairs</li> <li>• Subgrade stabilization</li> <li>• Miscellaneous</li> </ul>
2C's	Traffic Control Plans	<ul style="list-style-type: none"> <li>• Details of sign placements</li> <li>• Detour</li> <li>• Traffic control plans (including cross sections)</li> </ul>
2D's	Pipe Data Sheets	<ul style="list-style-type: none"> <li>• Size and length of pipe</li> <li>• Pipe Use</li> <li>• Pipe material</li> <li>• List of standard drawings related to pipe installation</li> </ul>
3's	General Construction (shown by line and station)	<ul style="list-style-type: none"> <li>• General construction alignment</li> <li>• General construction profile including excavation and fill estimates</li> <li>• Drainage and utilities</li> </ul>
G's	Geo/Hydro/Environmental Sheets	<ul style="list-style-type: none"> <li>• Erosion Control (GA-)</li> <li>• Geotechnical Data (GB-)</li> <li>• Retaining Walls (GC-)</li> <li>• Sound Walls (GD-)</li> <li>• Culverts (GE-)</li> <li>• Fish Passage (GF-)</li> <li>• Temporary Water Management (GG-)</li> <li>• Bank Protection (GH-)</li> <li>• Stormwater (GJ-)</li> <li>• Landslide Correction (GK-)</li> <li>• HazMat (GL-)</li> <li>• Material source/Disposal Sites (GM-)</li> <li>• Roadside Development (GN-)</li> <li>• Waterway Enhancement (GP-)</li> <li>• Rockfall Mitigation (GQ-)</li> </ul>
Drawing Numbers	From Bridge	See plan index (Sheet 1A) for what is included.
Drawing Numbers	From Traffic	<p>See plan index (Sheet 1A) for what is included. Most common sheets include:</p> <ul style="list-style-type: none"> <li>• Permanent Pavement Markings</li> <li>• Permanent Signing</li> </ul>

Page	Page Description	Information Included
		<ul style="list-style-type: none"> <li>• Illumination Plans</li> <li>• Signal Plans</li> </ul>

**Basic Plan Reading**

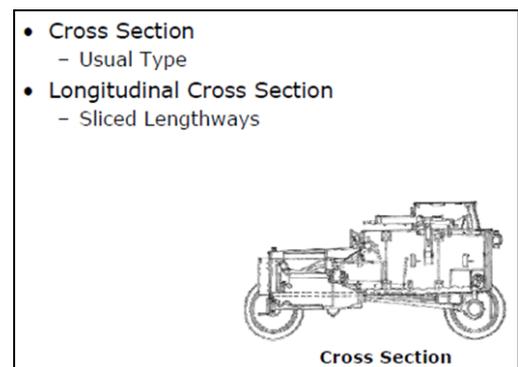
Construction plans include tabular information as well as graphical information. It is important to understand what the graphical depictions are in order to match up the information to the field. The fundamental graphical views are discussed here as background.

Common views presented include the plan, elevation, and cross section view. The views are presented below using a four wheel motorized vehicle, courtesy of NHI Course *134108 Plan Reading*. For more information and detail, check out the NHI website for on-line training modules.



The Plan View is a snapshot of a feature looking directly down on it. The elevation is looking at a feature straight on from one side or the back. The cross section view can either be a slice across the side or the middle as shown in the example to the right.

In the cross section view to the right, a section has been “sliced” away and the inside of the armored car is seen from the side. The inside of the car is also shown. In a drawing, dotted lines show parts not seen, such as the tires or other parts that cannot be seen.



**Select Plan Components**

Alignment

When building a project, oftentimes more than one roadway segment includes work activities. Each roadway segment is an alignment with a unique designation. The designation may apply to an off-ramp or an adjoining street or separate alignments on divided highways. For example, for a project constructed in Lane County for the Beltline Highway, one alignment was designated *BL* for *Belt Line* while another alignment was designated *EBO* for *East Bound Off-ramp*. Information in the plan set will be tied to an alignment which can typically be found on the Title Sheet.

Stationing

Stationing is used to identify the beginning and ending of a given section on an alignment or to identify a point where a feature is located. Stationing is designated continuously from a starting point of 0+00. Each 100 feet increases the stationing by one so that the stationing would run 1+00 to 2+00, etc. The 2+00 indicates that the point is 200 feet from a starting point. If the point was 3005 feet from a starting point, the station would be 30+05.

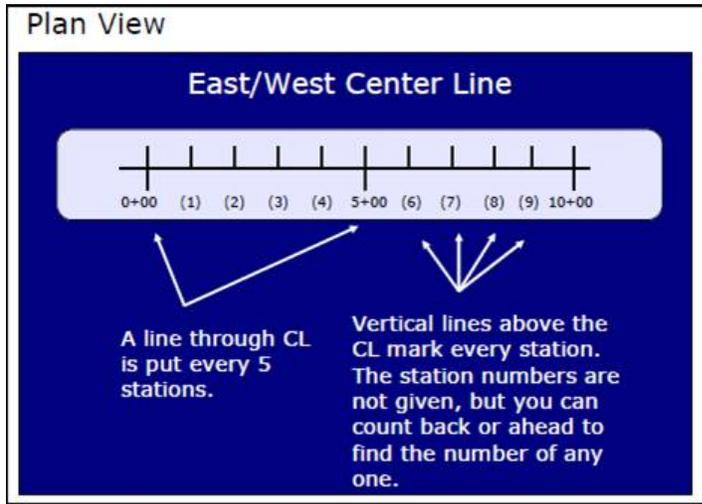
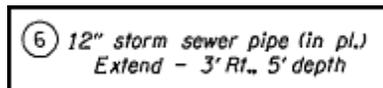


Image courtesy of NHI Course 134108

Stationing is marked along the centerline of a given alignment as shown in the example. Stationing allows the distance between any two points to be determined. For example, to determine the distance between Sta. EBO 104+00 to Sta EBO 105+07.5, remove the "+" in the stations and subtract the higher station from the lower station: 10507.5-10400=107.5 feet.

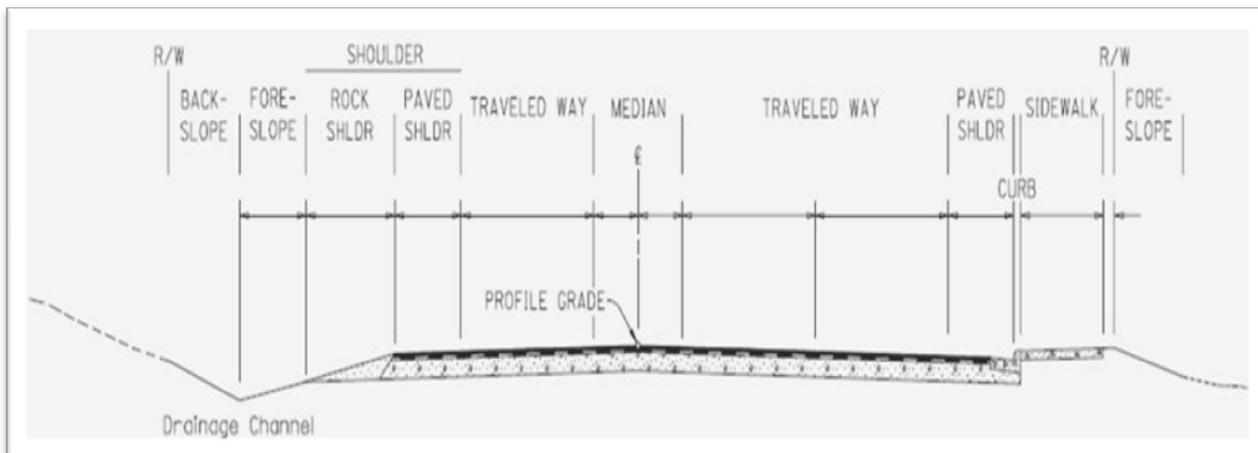
When a particular feature is located along an alignment, a station will be provided with an offset distance designated either left or right. To determine the orientation of left and right side of road, picture yourself standing on the beginning station looking ahead with the stationing increasing. From that perspective, the right offset is to your right and the left is to the left side of the roadway.



**Example of construction note with direction Rt. designated.**

Typical Sections – General

Typical sections are cross sectional views that define the configuration of a proposed roadway at right angles to the centerline. Typical sections show the width, thickness, and descriptions of the surfacing courses, as well as, the geometrics of the graded roadbed, side ditches, and side slopes. Typical sections will have the alignment designation and the beginning and ending stations to show where that typical section is used and what is going on between those stations.



**Typical Section Components**

Typical section requirements differ from project to project; however, all typical sections share the same general components as shown in the figure above and described below.

- **Median** – The portion of a divided highway separating the traveled way for traffic in opposing directions. The principal functions of a median are to separate opposing traffic, provide a recovery area for out-of-control vehicles, provide a stopping area in case of emergencies, allow space for speed changes, storage of left turning vehicles, minimize headlight glare, and to provide width for future lanes.
- **Profile Grade** – A control point referring to the design profile for maintaining proper roadbed grade.
- **Traveled Way** – The area of roadway surface designed for vehicular movement (traffic lanes) between fog lines.

- **Paved Shoulder** – The portion of the roadway contiguous with the traveled way for emergency use recovery of out of control vehicles, accommodation of pedestrians, bicyclists, and stopped vehicles, and for lateral support of subbase rock, base rock, and surface courses.
- **Rock Shoulder** – The shoulder created with rock drainage material used to cover the ends of the surface courses and bases, and for additional area for recovery of out of control vehicles.
- **Curb** – Edging along a street or roadway.
- **Foreslope** – Negative slope of drainage channel. Slope must accommodate recovery of out of control vehicles.
- **Backslope** – Positive slope of drainage channel. Slope must accommodate recovery of out of control vehicles.

### Typical Sections – ODOT

Typical sections are used in most contract plans developed in the ODOT format. They are an important part of the plans because they show a detailed cross-sectional view of the work to be done. Therefore, each subsequent typical section or partial section represents a change or variation in the design.

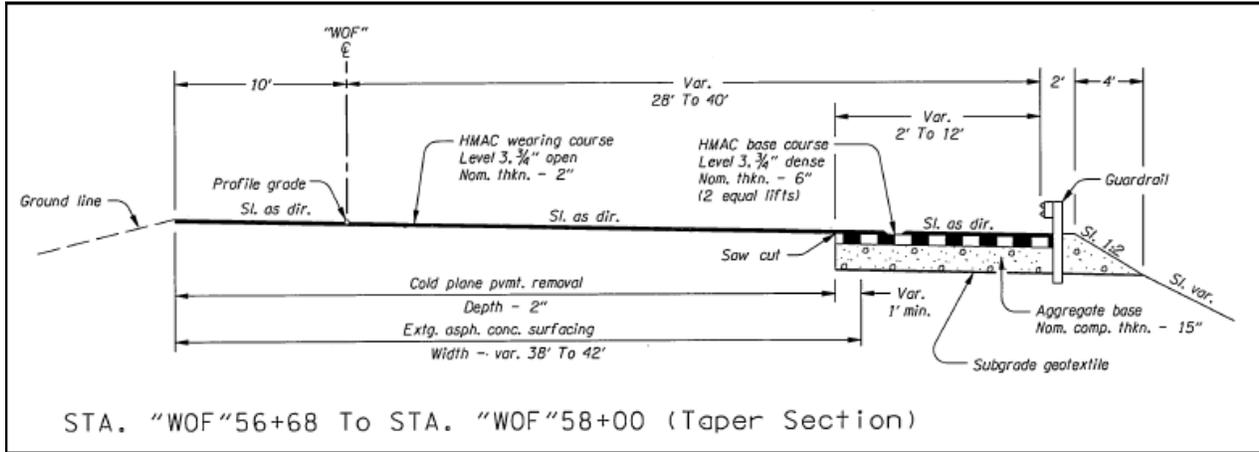
Typical Sections are listed in the following order:

- Mainline
- Frontage Roads or Intersecting Alignments
- Ramps

Check the Stationing on the typical sections to be sure that the entire project is represented with no gaps or overlaps. When looking for a feature, make sure to verify the proper alignment.

Working with the typical section above, many things can be determined including:

- This section is applicable for 5800 - 5668 = 132 feet
- The pavement section includes a subgrade geotextile, 15" of aggregate base, 6" of HMAC for base (Level 3 (*mix type*) dense mix (*aggregate gradation*) with  $\frac{3}{4}$ " aggregate (*largest aggregate size*)), and 2" of HMAC for a wearing course (Level 4 open mix with  $\frac{3}{4}$ " aggregate)
- The side slope is to be constructed at 1:2 which represents 1 vertical to 2 horizontal (*listed as a separate note in the plans*).



**ODOT Typical Section**

Taper Sections

The typical section above includes taper sections since the road width is changing over the 132 feet. At the beginning station for the typical section, the first taper width listed is used. At the ending station for the typical section, the final taper width listed is used. For the section above the taper widths would be:

- 2' at STA. WOF 56+68
- 12' at STA. WOF 58+00

Pipe Data Sheets

Pipe data sheets include a wealth of information that can easily be overlooked unless each section is carefully reviewed. Included in the data sheets are the sheet number that provides the location of the pipe installation, the pipe length, diameter, type, use, and appurtenances like attached manholes or inlets. The sheet also includes a list of standard drawings that are needed for the project. Examples of information included in the pipe data sheets are shown in the figures.

### Circular or Elliptical Pipe

**Diameter**

**Length**

**Sheet Number**

**Construction Note**

**Design Cover \***

\* Notice the ①

**FOOTNOTES:**

① Design height of cover is the critical design height used to select pipe materials. The height of cover for any given run of pipe may vary. Design height of cover shall be measured to subgrade.

### Pipe Materials – Metal

**Thickness**

**Cross Section\***

\* Footnote ③

③ Cross-sectional shape of pipe normal to longitudinal axis, prior to loading  
 A = Pipe - Arch  
 E = Elliptical (5% nominal elongation)

**Coating\***

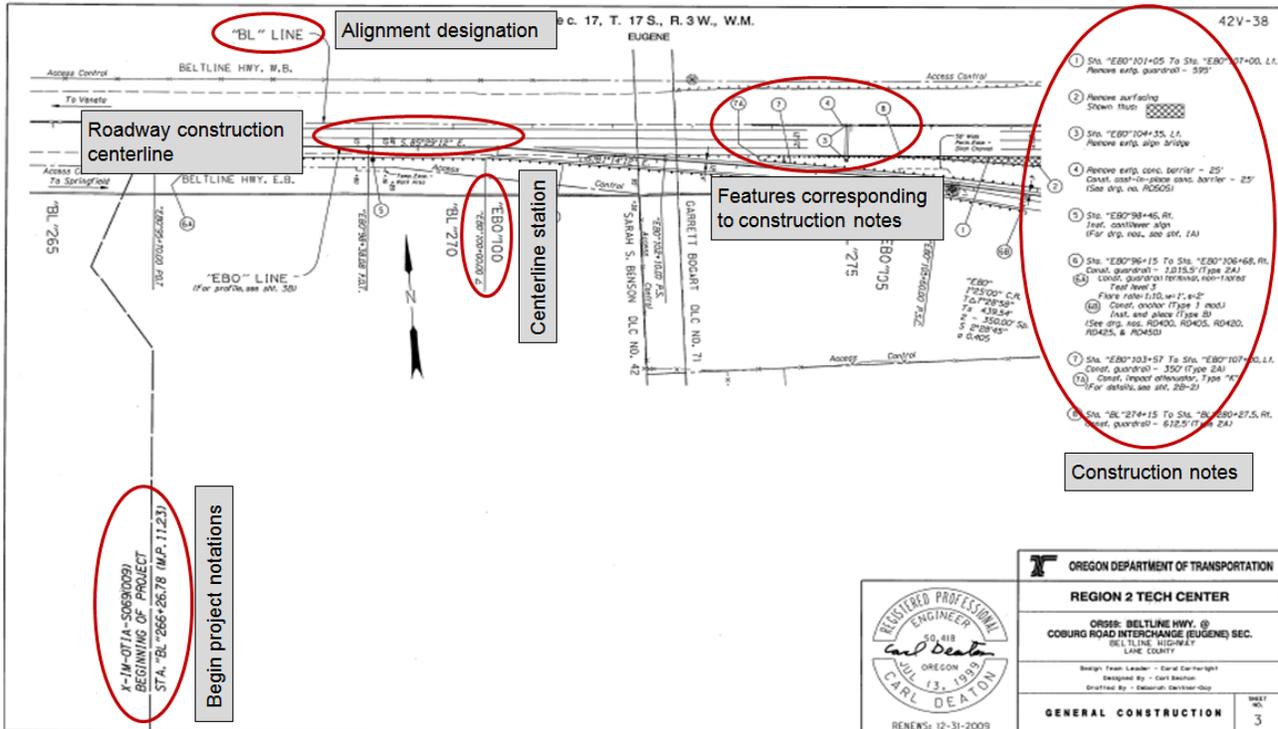
**Example Pipe Data Sheet Information**

### General Construction Information

After the pipe data sheet, the plans include general construction information. The sheets are bundled by station for easy navigation. The first sheet in the set is General Construction sometimes followed by Drainage and Utilities and then the Profile Sheet, The Profile Sheet may include information on manhole and inlet elevations, grades, and excavation and embankment quantities. For example, general construction information from station 1+00 to 2+00, would start on sheet 3, Sheet 3A would include drainage and utilities and 3B would be the profile. Station 2+00 to 3+00 would be covered by sheets 4 through 4B. Other sheets could be included in the packet like the alignment plan, detour information or removal plans. The other sheets would be linked to the General Construction, Drainage and Utilities and Profile sheets with the same number followed by the next letter in the alphabet. (See Plan Set Organization table.)

Plan View

The plan views for a project are included on the Construction Plan Sheets. The stationing on the sheets typically increases from left to right. The top of the sheet (above the centerline) is left to the centerline and the bottom of the sheet (below the centerline) is right. Installation location information for features like signs, fencing, guardrail, delineators, and/or guardrail is included.

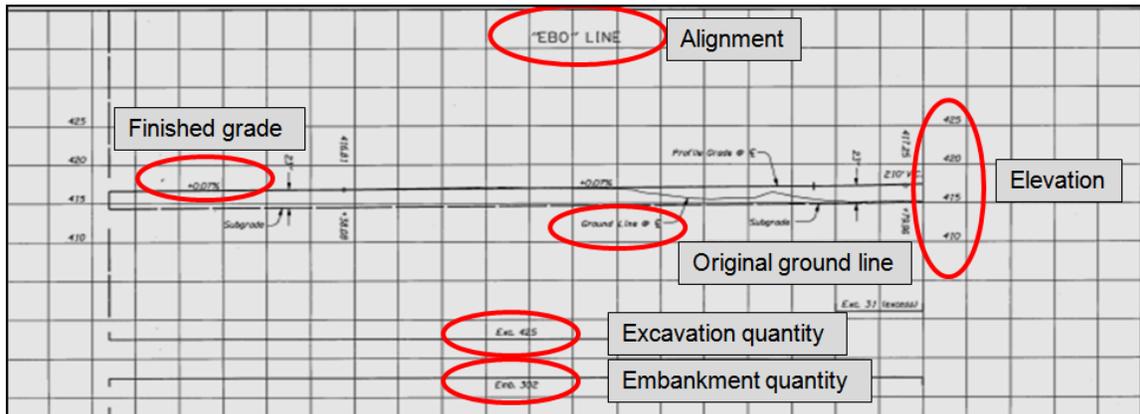


**Construction Plan Sheet**

Profile View

The profile view is like a longitudinal cross section of the road. Elevation, in feet is listed on the left and right hand sides of the section with station listed underneath the section. The profile grade is drawn on the scaled profile at an elevation taken at a point on the highway, usually at the centerline. The original ground line depicts the land before grading. If the original ground is excavated to match the profile grade, the section is a cut area. If the original ground is below the profile grade line, fill material will be required to bring it up to grade.

Information included on the profile sheet includes the elevation of the original ground, finished grade, subgrade elevation, curve information and grades. The sheet may also include excavation and embankment quantities, as shown below.



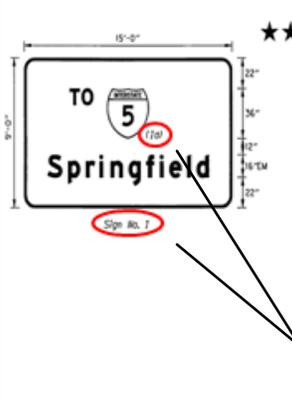
**Construction Profile Sheet**

Signing

Permanent signing sheets fall within the broad category of traffic. The sheets include information on the location of the sign, whether it is to be removed or left in place, the location of new signs and the type of sign support all referenced to a sign number. The actual signs are located on a separate plan sheet that shows new signs indicated with solid borders and existing signs indicated with broken borders.

Also included with the sign sheets, are a sign and post data table. The table includes a reference back to the sign number, the size, legend type and the post support type. The sign and post data table references the Oregon Standard Drawings needed for a particular sign construction. Like the pipe data sheet, the signing plan sheets are full of information and careful attention to detail is needed.

### Signing Plan Sheets – Sign and Post Data Table



SIGN NO.	SIGN LOCATION	SIGN DIMENSIONS		BORDER WIDTH		RADIUS		ARROW SIZE	SIGN TYPE <small>(PER 2008 SEC. 2910 SPEC. PROVISIONS)</small>	SUB-STRATE <small>PLYWOOD SHEET ALUMINUM EXTRUDED ALUMINUM</small>	COLOR 1/		LEGEND TYPE	
		WIDTH	HEIGHT	1 1/2"	2"	1 1/2"	3"				6"	9"		12"
★ 1	EBO 98+46	15'-0"	9'-0"	✓					G1'	✓	G		W	✓
7a	-	36"	36"						F1'	✓	R/B		W	✓

### Standard Drawings

Standard drawings include design features that are used over and over from project to project. That is, they are not project specific so they won't include the installation location only the construction information. Standard drawings are like the standard specifications in that they can apply to any project. Features like concrete inlets, guardrail installation, sidewalks, and pavement markings are included.

### Summary Table

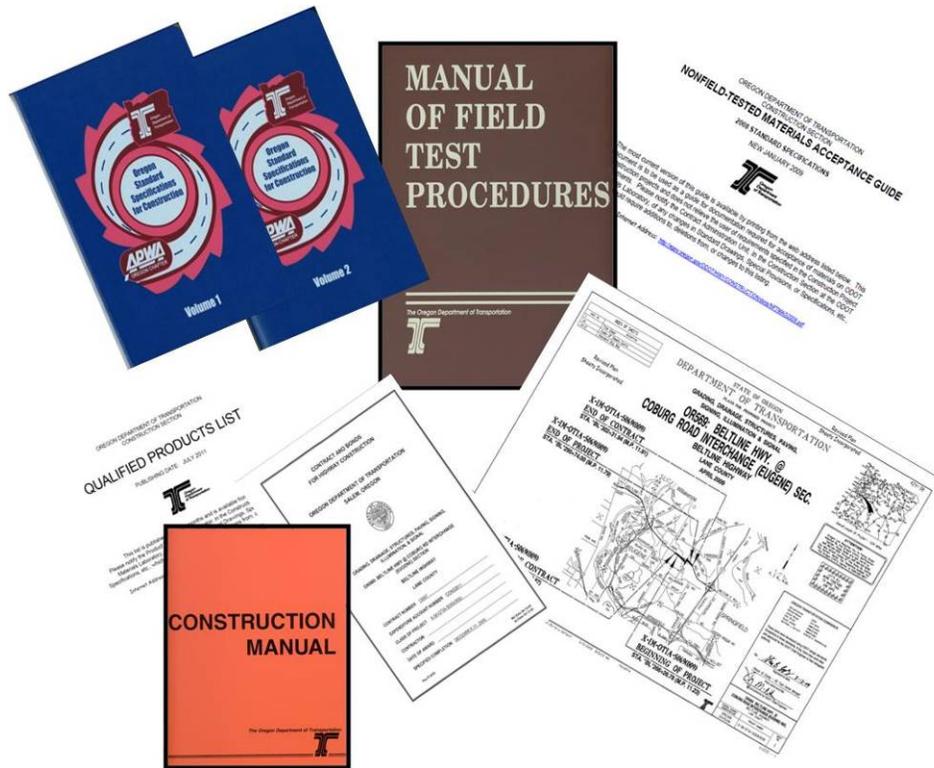
The following table provides a general overview of what information is provided in what resource.

### Summary of General Inspection Resources

	Topics Covered	Navigation Options	Important Sections
Special Provisions	Modifications to standard specifications for a specific project.	<ul style="list-style-type: none"> <li>Refer to Schedule of Items (bid item list) which includes spec reference</li> <li>Table of Contents in Standard Specifications.</li> </ul>	Schedule of Items (bid item list)
Standard Specifications	Volume 1 <i>Contract rules:</i> common to all contracts; administration.	<ul style="list-style-type: none"> <li>Table of Contents</li> <li>Index</li> </ul>	<ul style="list-style-type: none"> <li>Authorities</li> <li>Order of Precedence</li> <li>Prosecution and Progress</li> </ul>
	Volume 2 <i>How to:</i> directions/requirements for building a project.	<ul style="list-style-type: none"> <li>Table of Contents</li> <li>Index</li> </ul>	<ul style="list-style-type: none"> <li>200-1999 Deals with building;</li> <li>2000-End deals with material specifications.</li> </ul>
Plans	Information for specific dimensions, locations and features on the project.	<ul style="list-style-type: none"> <li>Table of Contents</li> <li>Some sheets have references for specific Standard Drawings that pertain to a specific item or action on the plans.</li> </ul>	<ul style="list-style-type: none"> <li>Typical Sections</li> <li>Details (specific to the project)</li> <li>General Construction Sheets</li> <li>Pipe Sheets</li> <li>Sign Sheets</li> <li>Standard Drawings</li> </ul>
NFTMG	Quality (acceptance) documentation needed for materials used on the project that aren't field tested. Ex: temporary traffic control devices; steel; pipe.	<ul style="list-style-type: none"> <li>Page 2 of NFTMG provides descriptions of quality documents</li> <li>Materials referenced by specification section.</li> </ul>	May refer to the QPL.
QPL	List of finished <b>products which have been evaluated and/or used</b> by ODOT; If the product is <i>Approved</i> or <i>Qualified</i> or <i>Rejected</i> for use.	<ul style="list-style-type: none"> <li>Alphabetical index by category in front of the document to get spec. number</li> <li>Products listed by specification number;</li> <li>Other products pulled out in front of doc.</li> </ul>	<ul style="list-style-type: none"> <li>Erosion control items</li> <li>Pavement markings</li> <li>Permanent impact attenuator attributes and types</li> </ul>
Brown Book	Testing requirements for materials tested <b>in the field</b> like rock, asphalt or subgrade, etc.		<ul style="list-style-type: none"> <li>4(B) Small Quantity Schedule</li> <li>4(D) Field Tested Materials Acceptance Guide</li> </ul>

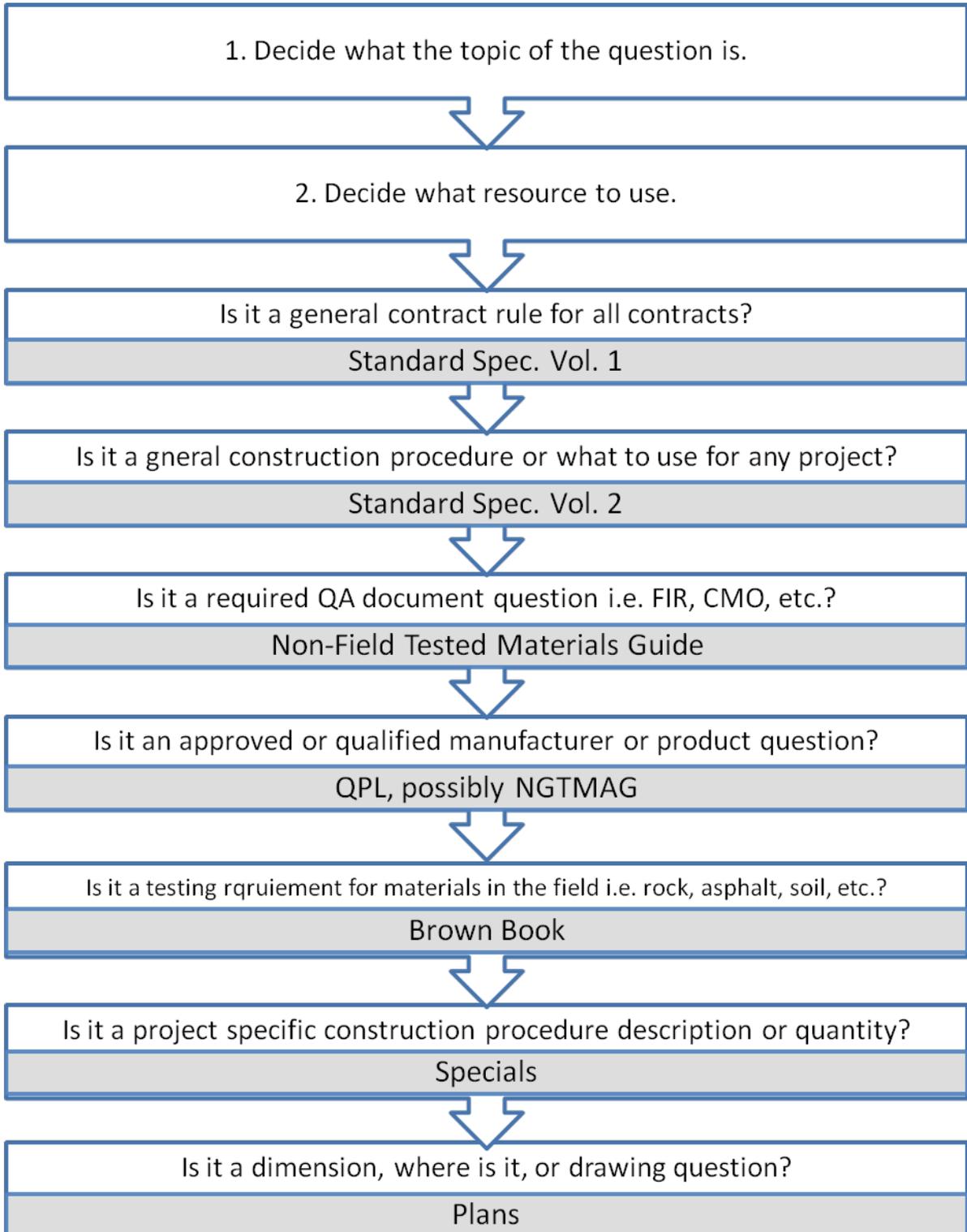
## Review: Putting It All Together

By now all of the resources available for inspection should be familiar. This section includes a quick review of navigating the materials available to you.



Can you list the information provided in each resource?

**General Inspection Navigation: Where to Start**



**Standard Specifications Review**

Standard Specifications Vol. 1 and Vol. 2 include Contract Rules and General Construction Procedures or Materials common to all contracts. There are two methods for navigating the Standard Specifications: Table of Contents and Index Method. Either method will get you to where you need to go. The Table of Contents method will take longer if you don't know where to start. The Index method is quicker if you know what the topic of question is. The methods are summarized below.

### Table of Contents

- a. Each general section is broken down to specific sections in the Table of Contents
- b. To use this method, decide what the topic of the question is and what the general section of the topic deals with.
- c. Once you find the General Section look down the list of Specific Sections to see which specific section your topic pertains to and go to that specific section.
- d. Once you are in a Specific Section then decide which Subsection you are dealing with.

### *Table of Contents Example:*

What are the requirements for removal and salvaging guardrail?

- This is a general construction procedure.
- Topic is removing and salvaging guardrail.
- General section would be Permanent Traffic Safety and Guidance Devices -800
- Part 800 starts on page toc-29. The Specific Section would be 810 – Metal Guardrail.
- Look down the subsection list and find Salvaged materials – page 533.

### Index

To use this method, decide what the topic of the question is, then look in the index for that specific topic.

### *Index Example:*

What are the requirements for removal and salvaging guardrail?

- This is a general construction procedure.
- Topic is removing and salvaging guardrail.
- Look in the Index for this topic.

- Index – page 17 has Removal – guardrail page 73, but it has Remove and Salvage Guardrail page 533.
- The second one fits our topic better, so start there.

### **Non-Field Tested Materials Guide (NFTMG)**

This Resource will show all of the required Quality Acceptance Documentation needed, if any, for a given material. This document will also reference the QPL if the product needs to be off of the QPL list.

- Definitions of each Quality Acceptance Document on the first page of NFTMG.
- Set up in Standard Specification order. Starting with 00225 and working up.

Navigating the Non-Field Tested Materials Guide includes:

- Decide what topic of question is.
- Look in Standard Specifications for the Specification number for that topic.
- Look in NFTMG for that specification number topic.
- Read what Quality Acceptance Document is required, if any, and who needs to submit them.

### **Qualified Products List (QPL)**

This resource is a list of manufacturers and products that have been evaluated by ODOT that is either on an approved/qualified list or a rejected list.

Navigating the QPL includes:

- Decide what topic of question is.
- Look in Standard Specifications for the Specification number for that topic.
- Look in Project Special Provisions for any change to the Standard Specifications or Special Directions.
- Look in NFTMG for that specification number topic and find out what quality documentation needs to go with that material if any.
- Look in QPL under that specification number to find the specific product or manufacturer.



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**Table of Contents**



# Table of Contents

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- Section 00225 – Work Zone Traffic Control
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- Section 00240 – Temporary Drainage Facilities
- Section 00245 – Temporary Water Management
- Section 00250 – Temporary Bridges
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## **Appendices**

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**Appendix B – Inspector Forms**

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**Appendix E – Documentation**

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**Section 00100**



## 100's – General Requirements

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The Section 100's are covered in Volume 1 of the Oregon Standard Specifications for Construction. The volume covers the rules of the contract between the Agency and Contractor versus Volume 2 which covers more of the "construction how to's" for different aspects of the project. The user's guide for the 100's is essentially the ODOT *Construction Manual* which is available on-line through the ODOT Construction Section website.

### (1) Roles, Responsibilities and Authority of the Inspector

The Inspector may be responsible for inspecting construction work on several projects that could be progressing simultaneously. If the Project Manager (PM) 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 PM, 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 ensure that the Contractor is aware of, and plans to utilize acceptable materials, methods, and workmanship.
- Identify key points, in each of the simultaneous activities, at which the Inspector can review the work to ensure that the work is properly accomplished with acceptable quality.
- Follow the Agency established processes and procedures for measuring work performed by the Contractor.

Refer to Section 00150.02 of the Standard Specifications and the *ODOT Construction Manual*, [Chapter 9 – Responsibilities of the Project Manager](#) for specific authority and duties of an Inspector.

The Inspector is the Agency's representative 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 *Training Manual*

- Those specifically assigned by the PM

Some of the general duties and responsibilities of the Inspector include, but are not limited to:

- Ensuring that the Contractor has properly located, laid out, and marked the facility, structure, or operation to be constructed.
- Ensuring that material(s) to be incorporated in the work meets contract requirements and the Contractor has properly performed all required testing and provided all quality documentation required by the Contract. *Refer to the ODOT Construction Manual, [Chapter 12B – Quality](#) and the [ODOT Manual of Field Test Procedures](#).* The Inspector should coordinate with the Quality Control Compliance Specialist (QCCS) when determining the quality documentation and testing requirements. Additionally, the Inspector needs to ensure that the Agency has inspected and performed the required testing of all manufactured materials at manufacturer facilities (such as signs, bridge beams, etc.).
- Ensuring 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. *Refer to the ODOT Construction Manual, [Chapter 21 – Permits](#).*
- Measuring the work performed by the Contractor and preparing the proper source documents as work is performed to justify payment to the Contractor. *Refer to the ODOT Construction Manual, [Chapter 12D – Quantities](#).*
- Acting as the Agency's representative on the project site, in all communications with the Contractor, the public, or other interested parties.
- Recording all project information daily in the Project Manager's Diary, General Daily Progress Report, or other required reports and forms. *Refer to the ODOT Construction Manual, [Chapter 12A – Daily Reports / Diaries](#).*

The Inspector must utilize good communication skills in order to:

- Develop and maintain a good working relationship with the Contractor. *Refer to [Section G – Communications with the Contractor](#).*
- Ensure that the Contractor both understands the quality requirements for all materials and incorporates acceptable quality of materials.
- Convey project concerns to the PM.
- Deal effectively with issues involving the public or other agencies. *Refer to the ODOT Construction Manual, [Chapter 4 – Relations with the Public or Other Agencies](#).*
- Resolve, or assist in resolving, project concerns, issues, or disagreements. *Refer to the ODOT Construction Manual, [Chapter 27 – Disagreements, Disputes and Claims](#).*

In relations with the Contractor, the Inspector must:

- Inspect all Contract work as needed and required. This requires the Inspector to be aware of the project schedule, and to discuss the planned work with the Contractor.
- Before a work process begins, the Inspector should discuss both the expectations and Contract requirements for that work to verify that the Contractor understands what is expected. Such expectations may include the quality of the materials or work, testing requirements, measurement of pay quantities, documentation, traffic control, safety, etc.
- Act in a courteous, but firm, manner.
- Never assume responsibility for the Contractor's operations, even though the Agency may be directing the work of the Contractor when performing force account or emergency work.
- Never operate or adjust the Contractor's equipment.
- Communicate only through the Contractor's appointed representative. *Refer to the ODOT Construction Manual, [Chapter 10 – Superintendence by the Contractor](#).*
- Respond in a timely manner to all requests, commitments, and needs.

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 PM when necessary.

## **(2) Inspectors Involvement during the Project Development Phase**

The Inspector should participate in the review of the preliminary Project Plans and Specifications. The PM is responsible for this preliminary review and it is very beneficial for the Inspector to participate. One specific item that must be checked and verified at this stage in the project development is any applicable escalation/de-escalation provisions. *Refer to the ODOT Construction Manual, [Chapter 12E – Adjustments to Lump Sum and Other Items](#), and [Chapter 36 – Acceptance of Project](#).*

## **(3) Unbalanced Bid Items**

Before the Contract is awarded, the ODOT Estimating Group will perform a bid analysis to identify any unbalanced bids. This information is then shared with the PM. The

Inspector needs to be aware of any unbalanced bid items as these work items are required to be tracked and reported on the PM Narrative Form at the completion of the project. Refer to the *ODOT Construction Manual*, [Chapter 7 – Evaluation for Unbalanced Bids](#) and [Chapter 37 – Submittal of Final Project Documentation](#).

#### **(4) Project Authorization**

The Inspector must be aware of the estimated project costs as compared to the Project Construction Authorization. When appropriate, the Inspector must remind the PM of anticipated increases in the estimated project costs due to increases in quantities or other reasons. Refer to the *ODOT Construction Manual*, [Chapter 5 – Construction Authorization](#) for details on establishing and managing the Construction Authorization.

#### **(5) Before On-site Work Can Begin**

Both Section 00180.40 of the Contract and the *ODOT Construction Manual*, [Chapter 11 – Before On-Site Work Can Begin](#) discuss the events that must occur before on-site project work can begin. These events include, but are not limited to:

- Notice to Proceed (NTP) issued.
- Pre-Construction Conference held.
- Submittal of the Project Schedule, Traffic Control Plan, Erosion and Sediment Control Plan and Pollution Control Plan.
- Submittal of the Steel Materials Selection notice, if applicable.
- Cooperative Agreement (“Partnering”) held, if requested.
- TOD and Business Logo Sketch Map and Narrative submittal.

Refer to the *ODOT Construction Manual*, [Chapter 11 – Before On-Site Work Can Begin](#) for full details and guidance on this subject.

#### **(6) Submittals**

The contract often requires the Contractor to submit its plans, working drawings, shop drawings, and other documents to the PM for review and comment, or review and approval. The PM may need to have the Professional of Record (POR) for the project also review and approve some documents. As needed, the Inspector must assist the PM in reviewing documents.

“Approval” of Contractor submittals by the PM, POR, or other Agency personnel, signifies that the submitted documents appear to fulfill all contract requirements.

“Approval” by the Agency does not guarantee that the submitted documents, with their processes and devices, will work in all situations or will not require modification.

Refer to the *ODOT Construction Manual*, [Chapter 16 – Working Drawings](#) for guidance on reviewing Contractor submittals, including electronic drawings.

## **(7) Communications with the Contractor**

It is extremely important that Agency 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 *ODOT Construction Manual*, [Chapter 9 – Responsibilities of the Project Manager](#).

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.

When communicating with the Contractor, ensure that you are communicating with the proper person. Also, determine whether written communication is needed to document an issue or to ensure 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.

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 ensure 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, ensure 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.
- The communication to the Contractor is addressed to the field office with a copy to the Contractor's home office.

- Copies of the communication are sent to others, including other agencies or persons and other ODOT staff, as appropriate.
- The Agency's person with the proper authority has signed the document (*typically this will be the PM*).

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 PM to assist or take actions necessary to restore good, effective communication and the relationship. These actions may involve discussions with the Contractor's Superintendent or its home office personnel, the ODOT Area Manager, or others.

## **(8) Safety**

Refer to the *ODOT Construction Manual*, [Chapter 17 – Safety](#).

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 training manual address safety issues specific to particular activities.

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 the Inspector must:

- Seek input from the Contractor.
- Review the Material Safety Data Sheet (MSDS) for the material, as appropriate.
- Prepare a Job Hazard Analysis for specific elements of construction activities.
- Seek other information to determine potential hazards and to determine what protective clothing or devices are needed.

The Inspector must work with the Contractor to ensure 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 *ODOT Construction Manual*, [Chapter 12A – Daily Reports / Diaries](#) and [Chapter 17 – Safety](#) for discussion of actions of the PM or Inspector if the public is involved in an accident within the limits of the project.

## **(9) Project Schedule**

As required by Section 00180.41 of the Contract and as discussed in the *ODOT Construction Manual*, [Chapter 11 – Before On-Site Work Can Begin](#), 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 PM may request the Inspector's assistance in reviewing the Contractor's submitted schedule.

After review, the PM will "accept" the project schedule if the schedule appears to meet the contract requirements.

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

- Plan work needed to be done by ODOT personnel.
- When requested, provide information to others, including the media.
- Ensure that the Contractor plans to complete the work within the timeframe(s) required by the Contract.
- Ensure 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 PM 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 (*refer to the ODOT Construction Manual*, [Chapter 13 – Contract Time](#)) or helping to analyze requests for damages due to unreasonable delay.

The Inspector must review all required schedule updates and must request, or ask the PM to request, a schedule update if the current schedule no longer reflects the project

work and specified timeframes. The PM 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 PM of any delays to the project and record necessary information that is needed to analyze those delays.

## **(10) Temporary Traffic Control**

As discussed Section 00225.05 of the Contract, and in the *ODOT Construction Manual*, Chapter 11 – Before On-Site Work Can Begin, the Contractor must submit a Traffic Control Plan (TCP) that is acceptable to the PM (*if the Contractor plans to use a TCP different from any shown in the project plans*).

The Inspector must be familiar with the TCP to ensure 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 (TCS), that person must also complete and submit a [Daily Traffic Control Inspection Report, form 734-2474](#) (*Section 00225.32 requires the TCS to use the ODOT form*).

As discussed in the later sections of this Training 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 activities start, the Inspector must discuss needed traffic control and the TCP with the Contractor to ensure 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, the Inspector must request the Contractor to correct the deficiencies. If necessary, and with the concurrence of the PM, the Inspector can suspend the Contractor's operations until the Contractor corrects the deficiencies.

Further discussion is included in Section 00225 of this Training Manual.

## **(11) Pre-Work Conferences**

The Contract requires key personnel of the PM 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 ensure 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 PM also participate in any 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 PM when necessary.

## (12) Utilities

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

Refer the *ODOT Construction Manual*, [Chapter 24 – Work Done by Utilities and Railroads](#) for additional information and guidance on this subject.

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 PM to involve all affected utilities, railroads or other parties in the Pre-Construction Conference or similar discussions.
- Ensure that owners of utility or railroad facilities are kept aware of the schedule of project work that will affect their facilities.
- Ensure 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, ensure that the facilities are adjusted or relocated to positions that will not conflict with project work.
- Record adjustment and relocation activities in the General Daily Progress Report or Project Manager's Diary. As appropriate, record information about location of facilities and ensure 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 PM, the facility owner, the Contractor, and the POR 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 PM and Contractor to record necessary information and to help resolve the issue.

### **(13) Affirmative Action Requirements (DBE, EEO, OJT, TERO)**

Refer to the Affirmative Action Program requirements in the *ODOT Construction Manual*, [Chapter 18 – Affirmative Action](#).

The Inspector must perform the Agency activities described in Chapter 18 of the Construction Manual to ensure that the Contractor fulfills its Affirmative Action obligations. These activities include, but are not limited to:

- Assisting in reviewing subcontracts for DBE subcontractors.
- Performing Commercially Useful Function (CUF) reviews on all Disadvantaged Business Enterprise (DBE) subcontractors.

- Completing source documents to compensate the Contractor for On-The-Job Training (OJT) hours.

## **(14) Labor Compliance**

Refer to the *ODOT Construction Manual*, [Chapter 19 – Labor Compliance](#) for Agency requirements and guidance on this issue. Inspector responsibilities may include conducting wage interviews with employees if delegated by the PM.

## **(15) Surveying**

Refer to either Section 00150.15 or Section 00305 of the Contract and the *ODOT Construction Manual*, [Chapter 20 – Construction Surveying/Monumentation](#), for guidance on this topic.

Also refer to Section 00305 of this Manual if the Contractor will perform the construction surveying. The *Construction Surveying Manual for Contractors* (October, 2009) can be found on the internet under Highway, Geometrics, Pages, Documents. The link is <http://cms.oregon.gov/ODOT/HWY/GEOMETRONICS/Pages/documents.aspx>.

## **(16) Permits**

Refer to the *ODOT Construction Manual*, [Chapter 4 – Relations With the Public or Other Agencies](#), and [Chapter 21 – Permits](#) for discussion and guidance on this subject.

## **(17) Contract Time**

Refer to the *ODOT Construction Manual*, [Chapter 13 – Contract Time](#) for discussion and guidance on this topic.

The Inspector must be aware of the specified contract completion date(s) for the project. Contract Time will be listed in Section 00180.50 of the Contract as a specified completion date, a specified number of Calendar Days, or a combination of both. Some projects may include one or more interim completion dates as well as a final completion date for all work on the project.

The Inspector must at all times be aware of any adjustments made to the contract time by Contract Change Order (CCO), and ensure that the project schedule submitted by the Contractor accurately reflects the contract time, or adjusted contracted time accurately.

## **(18) As-Constructed Plans and Project Manager's Narrative Form**

Refer to the *ODOT Construction Manual*, [Chapter 12H – As-Constructed Plans](#) and [Chapter 37 – Submittal of Final Project Documentation](#) for discussion and guidance on these items.

## **(19) Quality of Materials and Work**

All materials and workmanship incorporated into the Project by the Contractor must comply with the applicable Contract requirements, except as allowed under Section 00150.02. The Inspector should refer to the *ODOT Construction Manual*, [Chapter 12B – Quality](#), Section 00165 of the Contract, and the [Quality Assurance Program](#) in the [Manual of Field Test Procedures](#) for discussion and guidance on this topic. Also refer to the requirements for materials and workmanship that are included in the specifications for each work item.

If the Contractor has supplied or incorporated material that does not conform to contract requirements, and the material has determined by the Agency to be acceptable to remain in place, refer to the *ODOT Construction Manual*, [Chapter 12C – Quality Price Adjustments](#) for guidance on calculating and assessing quality price adjustments. Some contracts will also contain provisions allowing the Agency to pay a bonus payment to the Contractor for material or work that consistently meets or exceeds contract requirements. Guidance on processing bonus payments can also be found in [Chapter 12C](#).

Additional responsibilities of the Inspector regarding quality requirements include, but are not limited to:

- Ensure that the Contractor knows the quality requirements for each work item or material, what testing must be performed, and what quality documentation must be provided before the material can be incorporated into the project.
- 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.
- Ensure that the submitted quality documentation fulfills contract requirements. Do not just accept the quality documentation; it must be checked against the contract requirements to ensure compliance.
- Inspect the material, either visually or by other appropriate methods, to detect damage or contamination and ensure that the material is acceptable for use.

- Complete a Field Inspection Report or Sticker, as needed, to justify acceptance of material.
- Identify areas of deficient work or material. Work with the PM to determine whether the work or material must be removed and replaced or whether it may remain with an adjustment in price. Assist the PM in calculating the adjustment in price. Refer to the *ODOT Construction Manual*, [Chapter 12C – Quality Price Adjustments](#) for guidance.

## **(20) Material Sources**

Refer to the ODOT Construction Section, [Chapter 22 – Sources of Materials](#) for discussion and guidance on this topic.

## **(21) Quantities of Materials to Be Produced**

Refer to the *ODOT Construction Manual*, [Chapter 23 – Quantities of Materials to Be Produced](#), [Chapter 12F – Materials Stored or On Hand](#), and Chapter [33 – Materials Left Over or Produced for a Third Party](#) for discussion and guidance on this topic.

## **(22) Quantities of Work Performed**

Refer to the *ODOT Construction Manual*, [Chapter 12D – Quantities](#), for discussion and guidance on measuring, calculating, validating and paying the Contractor for work performed on the project.

## **(23) Public Relations**

Refer to the *ODOT Construction Manual*, [Chapter 4 – Relations with Public or Other Agencies](#) for discussion and guidance on this topic.

Since the Inspector is the representative of the PM and the Agency and is often at the project site, the public may contact the Inspector with questions or concerns about the project. The Inspector should always:

- Ensure that the PM has provided information to the media as needed, especially prior to events that will impact public traffic. Assist the PM 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 the Agency.
- Take action, as appropriate, to respond to or to mitigate concerns or complaints.

- Involve the PM 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 PM if they involve other authority or may be controversial, such as:
  - Interviews by the news media.
  - Discussion of condemnation of property for public use, and
  - Requests for opinions on controversial manners.

Record significant events, happenings, or communications in the General Daily Progress Report or Project Manager's Diary, including all changes made in response to a concern or complaint. Refer to the *ODOT Construction Manual*, [Chapter 12A – Daily Reports/Diaries](#) for guidance on completing a General Daily Progress Report or Project Manager's Diary.

#### **(24) Complaints about Improper Payment or Wages Paid**

Refer to the *ODOT Construction Manual*, [Chapter 26 – Prompt Payment/Claims Against Contractor's Bond](#) for discussion and guidance on complaints regarding improper or non-payment to subcontractors or suppliers.

Refer to the *ODOT Construction Manual*, [Chapter 19 – Labor Compliance](#) for discussion and guidance on handling prevailing wage complaints.

#### **(25) Changes to the Work**

Refer to the *ODOT Construction Manual*, Chapter 15 – Change Orders/Force Account/Work by Public Forces, as well as the pertinent portions of Sections 00140 and 00195 of the Contract for discussion and guidance on handling changes to the work.

The Inspector must:

- Be familiar with the contract documents and all Contract Change Orders (CCO's), State Force Orders (SFO's), or Extra Work Orders (EWO's) that have been issued on the project.
- 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, 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 PM 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. Refer to the specification for each pay item and to the *ODOT Construction Manual, Chapter 12D – Quantities*. The Inspector should alert the PM before the quantity of work accomplished reaches the bid quantity, assist the PM in taking the required action before the quantity exceeds the bid quantity, and prepare source documents or Daily Force Account Records as appropriate.

- Assist the PM in evaluating the cost of changes to the work.
- When a CCO is issued and the work is performed, prepare a source document to justify payment for the work.
- When an EWO (Force Account) is issued, record all relevant information as described in the *ODOT Construction Manual, Chapter 12G – Extra Work Performed on a Force Account* basis.
- When public forces perform work under an State Force Order that will be charged to the project, record information as needed to be able to review and justify payment for the work. Again, refer to the *ODOT Construction Manual, Chapter 15 – Change Orders, Force Account, SFO's* for guidance on handling Orders for Force Work (SFO's).

## **(26) Disagreements, Disputes and Claims**

Refer to Section 00199 of the Contract and the *ODOT Construction Manual, Chapter 27 – Disagreements, Disputes, and Claims* for discussion and guidance on this issue.



**INSERT TAB**

**Section 00200**



## **200's – Mobilization and Traffic Control**

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### **Section 00220 – Accommodations for Public Traffic**

In this Section, the Contractor is required to maintain and adequately protect all facilities being used by public traffic – including motor vehicles, bicycles and pedestrians.

#### **General**

The contractor is required to provide for the safety and mobility of the public through the use of a variety of traffic control devices and measures.

The Inspector should be ensuring the Contractor is providing:

- A safe clear zone (30 feet, min.) for the storage of all construction equipment, vehicles and materials from the travelled way.
- Clear and adequate protection and delineation between the work area and public traffic.
- Immediate passage for all emergency vehicles at all times.
- Adequate pedestrian facilities and routes (including detours) that comply with all applicable Americans with Disabilities Act (ADA) requirements.
- Adequate temporary pedestrian signing, per the MUTCD and the TCP.
- Adequate bicycle facilities and routes (including detours), as well as applicable warning and detour signing.
- Access to businesses, residences, intersections, and connections, whether as existing or temporary facilities.
- Adequate mobility through the work zone without delaying traffic for longer than 20 minutes, unless otherwise indicated in the project's Special Provisions.

#### **Construction**

This subsection describes a number of important contractor requirements, including:

- Traffic nuisance abatement – Keeping the roadway free of debris.
- Driveway access details – Details for providing reasonable access.
- Abrupt edge and adjacent excavation protection details.
- Lane restrictions – Times when lanes/shoulders/roads cannot be closed.

#### **Lane Restrictions**

The last bulleted item above – Lane Restrictions – is one of the most critical components of the contract. The Inspector should know and completely understand the Lane Restrictions for each project.

Enforcing the contract Lane Restrictions is crucial for maintaining mobility, efficient operation and overall traffic safety through the project limits.

Extensive efforts and planning have been made during project design to develop the Lane Restrictions. Lane and road closures can have a significant impact on traffic flow, commercial mobility; and, road user safety in advance of and through the work zone.

Bring any proposed modifications to the Lane Restrictions to the attention of the Project Manager. Also, before implementation, contact ODOT Region Traffic offices discuss impacts associated with any changes to the original Lane Restrictions.

If the Contractor exceeds or violates Lane Restrictions from Section 00220.40 of the Special Provisions, the Contractor may be subject to Liquidated Damages as described and identified in Section 00180.85(c). If the contract includes Liquidated Damages for lane closures exceeding Lane Restrictions, or for delays to public traffic in excess of given time limits, Inspectors should document these violations on a Source Document and report it to the Project Manager as soon as practical.

## **Quality Control**

In general, cost-related items (typically, labor costs) within Section 00220 are paid for under the Temporary Protection and Direction of Traffic (TP&DT) pay item. However, quantity and quality-related issues should be adequately documented to track Contractor progress and efficiency. Therefore, on a daily basis, complete and record pertinent information regarding temporary traffic control and public safety in the [“Daily Progress Report” \(Form 734-3474\)](#).

Concurrently, ensure the Contractor is completing and signing a [“Traffic Control Inspection Report” \(Form 734-2474\)](#) on a daily basis and submitting it by the end of the next working day.

## 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).

Prior to commencement of the project, review the Traffic Control Plan (TCP) and project Special Provisions with the Project Manager. During the review of the TCP, pay particular attention to the following:

- Modifications made to the TCP by the Contractor, if any. Look for inconsistencies in the standard application of TCM or TCD within their plan.
- Site or project-specific details added to the TCP to cover unique work items.
- Temporary Traffic Control Standard Drawings (TM800 series) to be used for the project.
- Constructability issues or other conflicts that may impact safety, mobility or construction schedule deadlines.

### General

Ultimately, the Contractor is responsible for the safe handling of traffic. Do not issue instructions that would shift responsibility from the Contractor to the agency.

Complete and submit Source Documents, as required, to justify payment for all temporary traffic control pay items – including the TCS.

Observe traffic conditions during the course of the project. If the current TCP is:

- Providing ineffective traffic control – including driver confusion or erratic behaviors.
- Creating adverse traffic conditions – including excess delay and long queues.
- Inadequately addressing the safety of workers or public traffic.
- Contact the Project Manager, who can then require the Contractor to revise their TCP.

### Quality Control

To maintain a consistent level of quality for all work zone traffic control features, do the following:

- Review all TCM, TCD, and other materials to ensure compliance with applicable Standard Specification and Special Provision requirements.

- Consult the [Non-Field Tested Materials Guide](#) for any quality documentation that must be submitted.
- Consult the [Qualified Products List \(QPL\)](#) for approved devices and products.
- Review temporary devices and materials, and record information about their condition, placement, usage, etc. in the [“Daily Progress Report” \(form 734-3474\)](#).

### Surveying and Layout

Ensure the Contractor has performed the following tasks to ODOT's satisfaction:

- Survey markings are laid out in a manner that provides smooth traffic flow.
- TCD placed on the project appear to meet the requirements of the TCP and specifications.
- 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 underground or overhead utilities.

## **Construction**

Review the traffic control measures and devices being used to ensure the Contractor is addressing the following:

### General

- TCM and TCD conform to the Traffic Control Plan.
- All TCD meet the “Acceptable” condition as described in the ATSSA “Quality Standards for Work Zone Traffic Control Devices” handbook. “Marginal” or “Unacceptable” devices must be replaced with new or “Acceptable” devices.
- All TCD are visible and legible during both day and night.
- Wiring connections to devices are constructed in a safe manner (i.e., no loose or stray wires exposed).
- The TCS is performing all required duties, if the contract includes a pay item quantity for a TCS.
- All TCM and TCD are being properly maintained by the Contractor – including washing, repairing, and replacing TCD as needed, through the life of the project.

### Temporary Signing

- The Oregon Utility Notification Center has been contacted and asked to identify conflicts between post locations and utilities.
- Signs are in “Acceptable” condition when first installed.

- Signs are mounted on wood or square tube steel posts, unless otherwise indicated in the specifications or shown in the plans.
- Signs are installed and secured so they will not be blown down or create a traffic hazard.
- Signs installed on a Temporary Sign Support (TSS) are not tipped over in the work zone and left exposed to public traffic. Tipping over a TSS is not an approved method for “covering” an inconsistent sign.
- Signs are installed at the proper angle to the roadway to insure reflectivity, and at the proper height according to the TCP and MUTCD.
- If called for in the specifications or the plans, flashers on signs are installed correctly and functioning properly.
- All inconsistent signs have been turned, covered or removed. Covered signs are completely covered by a sign cover from the QPL, or as approved by the Project Manager.
- Portable Changeable Message Signs (PCMS) are placed according to the Standard Drawings and serviced to ensure continuous function.
- PCMS messages being displayed are as shown in the plans, or as approved by the Project Manager.
  - If assistance is needed in developing additional PCMS messages, the Inspector may contact the State TCP Engineer in Salem.

#### Temporary Barricades, Guardrail, and Barrier

- Guardrail and barrier are aligned correctly, constructed or installed properly, and include all correct blunt end treatments.
- Sufficient barricades, of the correct type and orientation (“left”, “right”, “left/right”), are being used and placed as shown in the plans or Standard Drawings.
- Placement of TCD allows for safe and efficient flow of traffic (including bicycles and pedestrians), and accommodates all vehicles expected to use the roadway (e.g. over-dimensional trucks).

#### Temporary Traffic Delineation

- The correct number and type of devices are used per the TCP.
- The spacing between devices and taper lengths are correct per Standard Drawing TM800 and the TCP.
- Inconsistent and conflicting pavement markings are removed per the TCP. Ensure the removal method is allowed by Specification and does not excessively damage the pavement.

- Pavement markings are of the specified type for site conditions, and do not impede traffic flow.
- Replace pavement markers, as needed.
- Restripe worn or faded pavement markings, as needed.
- Temporary electrical signs, including PCMS and sequential arrows, are properly placed and will be serviced to ensure continuous function.
- Flaggers/Pilot Cars
- Signing used for flagging operations is placed and maintained per the TCP.
- Flaggers and pilot car operators have a current Flagger Certification card from Oregon, Washington, Idaho or Montana on their person.
- Flaggers and pilot cars have effective radio communications.
- Pilot cars are equipped with a "PILOT CAR FOLLOW ME" sign on the back of the vehicle, and have a yellow flashing, overhead light visible from behind the vehicle.
- Flaggers are wearing ANSI Class 2 or Class 3 apparel, and have other safety equipment per specifications and Oregon OSHA requirements.
- Flaggers have an "Acceptable" quality STOP/SLOW sign of the correct size.
- Flaggers are stationed away from vehicles and equipment and have identified their "escape route".
- Flaggers are standing out of areas of shade and in advance of sharp curves to maximize their visibility and provide drivers with adequate advance warning.
- Flaggers are using proper hand signals when directing, stopping, or starting traffic. Flaggers are making eye contact with motorists to ensure the Flaggers are seen, and that drivers are seeing the Flagger's instructions.
- Flagger stations are effectively illuminated at night using "Flagger Station Lighting" devices from the QPL.
- If queues are regularly extending beyond the first sign in the flagger signing sequence (typically a "ROAD WORK AHEAD" sign), additional advance warning signs are installed according to the "Extended Traffic Queues for Advance Flagging" detail shown in the Temporary Traffic Control Standard Drawings.

### Lighting Conditions

- Work area lighting and equipment-mounted lighting does not shine into passing traffic streams, and proper glare shades are in place.
- Brightness for PCMS, sequential arrows and other work area lighting is appropriate for the environmental conditions (e.g., daytime, nighttime, rain, fog, snow).

- The flagger can easily be seen at lighted flagger stations, as per the specifications.
- Lighted devices are placed to warn or guide traffic and should not be confusing to approaching motorists.
- All lighting devices are being maintained to ensure continuous operation.

### Maintenance

- All TCM and TCD are being maintained – including washing, servicing, repairing, or replacing, as needed.
- Temporary signs and other TCD are being replaced if their condition does not meet the specifications – including portable sign flags and STOP/SLOW signs.
- Damaged or missing pavement markers are being replaced; and, faded, worn or ineffective pavement markings are being reapplied.
- Elements of electrical signs are being monitored for brightness; and, are being replaced or repaired, as needed.

## **Bid Item Measurement and Payment**

Before measuring a pay item or paying for that item, carefully review the Standard Specifications and Special Provision subsections 00225.80 and 00225.90. Meet with the Project Manager to discuss and questions or confusion over any of the pay items included in the contract.

### **Measurement – Section 00225.80**

Measure all bid items on the unit, lump sum or incidental basis, as described in the Standard Specifications or project Special Provisions.

Do not agree to a price quoted directly to you by the Contractor if this price differs from the original contract bid item price. Contact the Project Manager to discuss differences in bid item prices.

As work is performed, take measurements or ensure that they are taken. To justify payment, prepare and submit the measurements on an [“Installation Sheet” \(Form 734-2605\)](#) as a Source Document.

## **Payment – Section 00225.90**

Payment for bid items is made at the contract bid item unit price – unless a different price is agreed to between the Project Manager and the Contractor as part of a Contract Change Order (CCO), or other arrangement.

In paying for damaged or destroyed traffic control devices, the following process should be followed:

All TCD listed in the Contract Schedule of Items or CCO's, and damaged by public traffic and replaced by the Contractor will be paid for at the contract price, EXCEPT:

- Temporary signs
- PCMS
- Sequential Arrows
- Portable Temporary Traffic Signals

Payment for replacing damaged TCD will only be made when:

- The Project Manager orders it.
- The replacement device(s) is used on the project site.
- The damaged devices are disposed of to the Project Manager's satisfaction.

For Temporary Striping, Stripe Removal, Flaggers and Pilot Cars, the bid item price is effective only for the original bid quantity for those items. Contact the Project Manager to discuss extending bid item quantities.

For additional information regarding documentation or measurement, see the ODOT Construction Manual, Section 12D.

For additional questions or information regarding temporary traffic control measures, devices, specifications, standard drawings or quality control, contact the State Traffic Control Plans Engineer in Salem.

## **Section 00240 – Temporary Drainage Facilities**

This work consists of constructing and removing temporary drainage facilities.

### **Quality**

The Inspector must record information about temporary facilities in [the Daily Progress Report \(form 734-3474\)](#).

Ensure that the materials and methods comply with specification requirements.

### **Construction**

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

Ensure that drainage will flow through the facilities, water does not flow around the installation, and construction will carry traffic loading and maintain a stable roadway. The size of the facilities shown on the plans is a minimum only. Temporary drainage facilities must be approved by the Engineer.

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

### **Measurement**

Unless specified otherwise, no measurement of quantities will be made for this work. As the work is performed, prepare and submit an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## **Section 00245 – Temporary Water Management**

This section is not a Standard Specification, and is included on projects by Special Provisions. This work consists of furnishing, installing, operating, maintaining, and removing temporary water management facilities in regulated work areas.

### **Quality**

The Inspector must record information about temporary water management facilities in the [Daily Progress Report \(form 734-3474\)](#).

Ensure that the materials and methods comply with the Standard Specification under which the material is covered.

## Construction

### Fish Removal

Ensure the Contractor:

- Contacts ODOT, ODFW biologists, or the ODOT consultant to remove the fish and aquatic life from the isolation work area.
- Before installing temporary water management facilities, ODOT, ODFW biologists, or the ODOT consultant will remove fish and aquatic life within the proposed isolated work area.
- After installing temporary water management facilities, begin reducing water level. ODOT, ODFW biologists, or the ODOT consultant will remove additional fish and aquatic life as the water is reduced. DO NOT de-water the isolation area until all of the fish and aquatic life have been removed.

### Installation, Operation, and Removal of Temporary Water Management Facilities

Ensure the Contractor:

- Provides safe passage around or through isolated work area for migratory fish.
- Maintains and controls water flow downstream of isolated work area for the duration of diversion to prevent downstream de-watering.
- Cleans and repairs water intake screening to maintain flow and protect aquatic life.
- Monitors water turbidity.
- Removes, re-waters, and restores the stream flow when approved.
- Maintains downstream water flow during the removal of the facility.

## Measurement

Unless specified otherwise there will be no measurement of quantities. As work is performed document the work with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00250 – Temporary Bridges

This section is not a Standard Specification, and is included on projects by Special Provisions. This section consists of designing, constructing, maintaining, and removing temporary detour bridges.

## Quality

The Inspector must record information about temporary bridges in the [Daily Progress Report \(form 734-3474\)](#).

Ensure that the materials and methods comply with Standard Specification Section 00500 requirements where applicable.

## Construction

Ensure that the Contractor provides stamped working and foundation drawings and calculations that have been “reviewed and accepted” by the Engineer. Ensure that the [Pile and Driving Equipment Data \(form 734-2608\)](#), has been approved by the Contractor EOR and has been “reviewed and accepted” by the Engineer.

Ensure that:

- The [Pile Driving Checklist \(form 734-2609\)](#), [Pile Record Book \(form 734-3485\)](#) and [Micropile Log \(form 734-2644\)](#), as applicable, are completed for the project file.
- Before any welding is permitted the following have been approved:
  - WPS-Welding Procedure
  - PQR-Procedure Qualification Records
  - WQTR-Welder Certification Test Records
  - MTR-Material Test Report
  - CWI-AWS Certificate Welding Inspector
- Prior to opening temporary bridge to traffic
  - The Contractor's EOR has completed an inspection of the structure to confirm the materials and construction conforms to the plans and specifications (any changes to the plans and specifications need to be approved by the Contractor's EOR and accepted by the Engineer).
  - The Engineer has received a written statement that states the structure will serve the intended use.
  - All concerns have been addressed and the Engineer agrees that the structure will serve the intended use.

## Measurement

Unless specified otherwise there will be no measurement of quantities. As work is performed document the work with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00280 / 00290 – Erosion and Sediment Control / Environmental Protection

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. This includes but is not limited to those elements identified in the project’s environmental documents or assessments.

*It is expected that the Inspector be a Certified Environmental Construction Inspector to inspect this work.*

## Quality

Quality requirements are specified in the [Non-Field Tested Materials Acceptance Guide](#) and [Qualified Products List](#).

Ensure 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 no quality acceptance documentation needs to be submitted then record relevant information in the daily report.

Ensure that the materials are not damaged and that installation is done according to specifications and manufacturer recommendations.

The Contractor must inspect the project and the erosion and sediment control devices frequently to ensure that they are 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 ensure proper control.

## Survey and Layout

Ensure that:

- The devices and measures comply with Specification 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.
- Both the Contractor and Inspector understand the markings.
- If new kinds or different devices are needed, they are identified, developed and utilized.

## Construction

It is expected that if there are any environmental questions or concerns that the Inspector notify the Region Environmental Coordinator (REC). The Inspector should also complete the Environmental Monitoring Checklist. It is also expected that if there are any questions regarding HazMat issues (if a material is hazardous or what is considered contaminated) that the Inspector will contact the Regional HazMat Coordinator. If the Region HazMat Coordinator is unavailable then contact the Statewide HazMat Lead.

### When dealing with Erosion and Sediment Control

Ensure that the Contractor complies with contract requirements, including:

- Copies of the approved ESCP are available at the project site.
- A contingency plan is developed for use in emergencies and the rainy season.
- The ESCM monitors rainfall, inspects the project and control devices and ensures their effectiveness, completes and submits an Erosion Control Monitoring form (734-2361).
- The ESCM maintains the control devices.
- The ESCM installs additional or new devices, as approved by ODOT.
- The Inspector periodically inspects the project site to evaluate whether the control devices are properly functioning and controlling erosion and sediment.
- If the implemented ESCP, PCP, or other submittal does not perform effectively, contact the Project Manager and require the Contractor to modify the submittal, processes, and devices as needed to provide effective performance.
- As devices are installed or removed, the ESCM records those dates on the ESCP.

### When dealing with Water Quality

Ensure that the Contractor:

- Does not discharge contaminated or sediment-laden water directly into any water way until it has been satisfactorily treated.
- Does not cause turbidity in waters of the State or U.S. greater than 10% above background reading (up to 100 feet upstream of the Project), as measured 100 feet downstream of the Project.
- If construction discharge water is released using an outfall or diffuser port, do not exceed velocities more than 4 feet per second, and do not exceed an appropriate aperture size.

### When dealing with Fish and Fish Habitat Regulated Work Areas

Ensure that the Contractor:

- Performs work within the regulated work area only during the in-water work period defined in the Special Provisions or permits; pile driving may have unique in-water work periods.
- Has a permit to work within a coffer dam outside the designated in-water work window.
- Has reviewed the *In-Water Work Window Extension Request Processes Advisory* for guidance and discussed the situation with the REC or agency biologist before requesting an in-water work variance.

### When dealing with Protection of Fish and Fish Habitat

Regulated Work Areas

Ensure that the Contractor:

- Performs work within the regulated work area only and during the designated in-water work period. (In-water work period may be different for Pile Driving. Check with the project Special Provisions, REC or Agency Biologist for any Pile Driving restrictions that may apply.)
- Contacts the REC or Agency Biologist before working within a coffer dam outside of in-water work period.
- Properly deploys bubble ring equipment.
- Monitors hydro acoustic noise levels.
- Adjusts attenuation equipment to keep noise levels within the specified noise limits. Check with the REC or Agency Biologist for specific hydro acoustic guidance.

- Treated wood used below the ordinary high water elevation (OHW) must be sealed with a sealant that is approved by the Project Special Provisions to prevent leaching of preservative agents into waters of the state.

#### When dealing with Wildlife

Ensure that the Contractor:

- Does not handle or hurt birds or their eggs, or destroy or move occupied bird nests unless allowed by permit.
- Does not disturb, destroy, or move an eagle nest.
- Adheres to noise and sight distance restrictions.
- Clears vegetation only within contract temporal windows.
- Coordinates activities with the Project Manager if bats are present.
- Does not deviate from bridge bat habitat plans.
- Does not disturb or injure marine mammals unless allowed by permit.
- Does not deviate from wildlife passage plans.

#### When dealing with Protected Plants or Habitats

Ensure that the Contractor:

- Installs and maintains “No Work Zone” fencing around sensitive areas denoted on plan sheets.
- Does not alter or impact fenced areas by any means.
- Does not alter or impact signed “Special Management Areas.”

#### When dealing with hazardous materials

Ensure that the Contractor:

- Provides copies of the approved PCP are on-site.
- At a minimum, contains hazardous materials and wastes, and that they are clearly labeled and stored in a location that prevents damage.
- Has a Spill Control and Countermeasures Plan (SPCC) If more than 1,320 gallons of fuel and petroleum are stored on site, in containers of 55 gallons or more, in a location where a spill could impact water.
- If the project involves demolition or repair of any structure (bridge, building, etc) ensure that there is a copy of the asbestos survey onsite.

- Provides all disposal receipts, recycling receipts or other documentation for all material that leaves the project site.

If unexpected contamination is encountered during excavation work (based on odor, staining, or sheen), stop work in that location and call the region HazMat coordinator to help get a qualified company on-site to ensure all requirements associated with the contamination are met.

If a Contractor spills any substance that could cause harm to the environment, immediately call ODOT dispatch. Ensure that the Contractor follows the Pollution Control Plan for clean up.

For 3<sup>rd</sup> party spills in the construction zone (accidents not related to the Contractor), call ODOT Dispatch to get maintenance responders on-site for wreck and material clean up.

For petroleum spills over 42 gallons, hazardous waste or materials spill that impact surface water, ask ODOT Dispatch to notify DEQ via Oregon Emergency Response System (OERS @ 1-800-452-0311). If the spill is hazardous material or impacts surface water, also ensure that the National Response Center (NRC @ 1-800-424-8802) is notified. These notifications are required regardless of who causes the spill.

#### When dealing with Archaeology

Ensure that the Contractor:

- Maintains No Work Zones and does not impact those protected areas.
- Stops work and reports inadvertent discoveries if archaeological material is identified during construction activities.
- Reports violations promptly to the appropriate authorities (REC, State Police, Project Manager, etc.).

#### **Measurement**

For Erosion and Sediment Control, unless specified otherwise, measurement will be on the lump sum, unit or length basis. As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

For Environmental Protection, unless specified otherwise, no measurement of quantities will be made for this work. As the work is performed, prepare and submit an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

**INSERT TAB**

**Section 00300**



## 300's – Roadwork

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### Section 00305 – Construction Survey Work

See the Special Provisions and *Construction Surveying Manual for Contractors* for all Survey Requirements. The *Construction Surveying Manual for Contractors* can be found on the ODOT, Technical Services webpage under Geometronics.

#### Quality

No quality documentation is needed for this item. The Inspector must record pertinent information in the [Daily Progress Report \(form 734-3474\)](#).

#### Construction

- If the Contractor is performing the survey work, ensure that both the Contractor and Inspector understand the staking and marks left by the survey. A general guide to reading slope stakes is presented in appendix.
- If ODOT is performing the survey work, ensure that the survey work is performed when needed and that both the Contractor and Inspector understand the staking and marks left by the survey.
- If the Inspector uses some of the Contractor's survey information to calculate quantities of work to be paid, perform cursory validation of the survey information to check for reasonable accuracy. Also refer to the [Quantities chapter \(12-D\) of the Construction Manual](#).
- If ODOT requires the Contractor to perform additional survey work, check that a change order is issued, if needed, and record the information needed to justify payment for the additional work.
- Ensure that the Contractor's surveyor provides required information to ODOT and files records of its surveys with the County Surveyor, if needed.

#### Measurement

Unless specified otherwise there will be no measurement of quantities for Construction Survey Work. As work is performed document the work with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If additional survey work is ordered and performed, record information on an [Installation Sheet \(form 734-2605\)](#) as work is performed as a source document to justify payment.

## Section 00310 – Removal of Structures and Obstructions

This work consists of removing and disposing of man-made materials, and cleaning up areas they occupy.

### Quality

No quality documentation is needed for this item. The Inspector must record pertinent information in the [Daily Progress Report \(form 734-3474\)](#).

Ensure that Removal of Structures and Obstructions does not include the following items:

- Those items designated to remain in place per specifications or plans.
- Items specifically designated in the specifications or plans to be removed incidental to other items of work.
- Items that are owned or controlled by third parties (i.e. city structures, utility structures.)

### Construction

Observe the Contractors work to ensure that:

- When guardrail, median rail, and concrete barriers have been removed, that during the same work shift new or salvaged units are installed, otherwise the Contractor must protect the area with temporary barrier units until the new or salvaged units are installed.
- The Contractor protects and maintains all milepost markers. This includes making sure that the markers remain visible to the traveling public.
- The Contractor does not damage any abutting structures. If damage does occur, the Contractor repairs or replaces the damaged structure as required.
- The Contractor removes, scarifies, or breaks down all material to the specified elevation.
- The Contractor may salvage metal grates, frames, rings, covers, or other metal fixtures or fittings if they are determined to be reusable per specifications.
- The Contractor disposes of all materials in accordance with the specifications.

### Measurement

Unless specified otherwise, measurement will be on a lump sum, or separate item basis (by length, area or each). As work is performed take measurements, or ensure that they

are taken, and prepare and submit the measurements on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

Review the Contractor's approved Lump-Sum breakdown so that this work can be tracked for progress payment (lump-sum pay item). Check to see if there are any items that are paid for on a separate unit basis. Sometimes the specials will give a list of anticipated items and their estimated quantities.

## Section 00320 – Clearing and Grubbing

Clearing and Grubbing is the removal and disposal of vegetation and similar buried matter. **Clearing** involves **Preserving** trees and vegetation designated to remain in place, along with cutting and removing weeds, grasses, crops, brush, and trees. **Grubbing** involves **Removing** tree stumps, tree roots, and other vegetation found below the ground surface.

### Quality

No quality documentation is needed for this item. The Inspector must record pertinent information in the [General Daily Progress Report \(form 734-3474\)](#).

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

### Surveying and Layout

Ensure that:

- Clearing and removal limits have been located as specified, and do not include inappropriate areas.
- If the Specification 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.
- 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 Specification 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 ensure that the work is completed as specified. Ensure that:

- The erosion control perimeter is set before beginning work.
- The Contractor is aware of any time period restrictions for removal.
- The Contractor is aware of areas where the Specification does not allow any disturbance. Areas designated for preserving vegetation, are protected from equipment and materials around the critical root zone.
- If the Contractor will dispose of material on private property, it has a written agreement with the property owner. If there is any question, request to see the agreement and obtain a copy of it. Attach the agreement to the General Daily Progress Report.
- 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 is to be chipped or ground and will remain on the project, acceptable areas and procedures have been identified or developed.
  - The Contractor restores affected areas or leaves them in a condition conducive for the succeeding construction operation.
- For clearing areas, tree stumps not required to be grubbed are cut flush with the ground within the clear zone. The stumps cannot be higher than 4 inches above the ground between the clear zone and clearing line.

## Measurement

Unless specified otherwise, measurement will be on a lump sum or area basis. As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00330 – Earthwork

This work consists of excavation, ditching, backfilling, embankment construction, grading, leveling, borrow, and other earth-moving work.

## Quality

Refer to the discussion of Quality and the Quality Assurance Program in the *ODOT Construction Manual*, [Chapter 12B – Quality](#), Section 00165 of the Contract, and the [Quality Assurance Program](#) in the *Manual of Field Test Procedures* for discussion and guidance for testing and other documentation required to ensure quality of the materials and work. Unless required differently in the Specification, the Contractor is responsible for all quality control, including testing, and ODOT must perform verification testing. Also refer to the requirements for materials and workmanship that are included in the specifications for each work item.

Ensure that the Contractor is aware of testing and documentation requirements, performs required testing with certified technicians, and check that required quality documentation and test results are provided. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for 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 ensure, that the material or procedure is acceptable or produces specified results. If additional testing is requested, inform the Project Manager to authorize extra payment, if applicable. If additional testing is required, record reasons and results on the [General Daily Progress Report \(form 734-3474\)](#).

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Complete the Earthwork Checklist in the checklists section for information.

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

- 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, check that 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 Training Manual.
- Clearing and grubbing have been acceptably completed.

Observe the earthwork as it is conducted to identify areas that deflect under loaded haul vehicle wheels. Note or mark suspect areas for testing.

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

- Springs
- Slides
- Unstable materials

If springs, slides and unstable materials exist, assist the Project Manager and Contractor to develop plans for handling them.

Embankment foundations that will not support the hauling or compaction equipment and **ONLY** if directed, place an initial layer of selected material. This layer will not be greater than necessary to support the equipment and not greater than 3 feet thick unless authorized.

Foundation benching is required when the slope is steeper than 1V:5H. The bottom bench should be at least 10 feet wide and each succeeding bench should be in the slope at least 3 feet beyond the vertical face of the previous bench. The bench should be wide enough to operate the placing and compaction equipment.

When building embankments **DO NOT** let the trucks herd (travel in the same path). Truck drivers seem to always want to herd like cattle. If one driver is on a certain path the rest will always try to follow that path.

During earthwork operations, ensure that:

- The Contractor is fulfilling its responsibilities under the Quality Assurance Program, including ensuring 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 ensure that the work complies with Specification requirements unless the Contractor fails to fulfill its responsibilities.
- The Contractor disposes of excess materials in an approved disposal area.

## Measurement

A project usually has a bid item for Excavation or Embankment which will be indicated in the Special Provisions and Schedule of Items. If the largest quantity is excavation, embankment construction is incidental to the excavation work. In special situations, a project may have both excavation and embankment pay items.

Measurement of earthwork will be as specified. If items will be calculated using the digital terrain model method, check that ODOT has obtained information on the original ground and has analyzed confidence points to verify the validity of the model. Assist the Project Manager, as needed, to calculate quantities from the digital terrain model.

If ODOT orders over-excavation, 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 ensure that measurements are taken, so that pay quantities can be calculated. If over-excavation was not anticipated, daily over-excavation quantities should be noted in the Daily to keep the PM aware of an over-run item.

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

As work is performed take measurements, or ensure that measurements are taken, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00331 – Subgrade Stabilization

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

## Quality

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

Ensure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Ensure that:

- The surveyor has marked 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 as specified, and both the Contractor and Inspector understand the markings.
- The excavation leaves smooth, firm surrounding soil.
- The excavated surfaces are 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 compacted and finished to specified finish grade and tolerances.
- Excess or unneeded materials are removed and affected areas are cleaned and restored.

The Engineer, with input from the Contractor, decides what areas get stabilization. This can be problematic when a Contractor starts work early in the year when subgrade materials are saturated. Once the stone embankment backfill is placed, there should be no deflection, pumping and/or yielding when the backfill material is proof rolled. Note that stone embankment is from a quarry, angular in nature, makes excellent stabilization material. It interlocks well and will tend to bridge soft areas better than smaller materials such as aggregate base.

Verify that the Contractor is using the correct geotextile and complete an FIR. Make sure that the Contractor overlaps the geotextile according to Section 00350.41(a-2). Place geotextile parallel to the roadway centerline. Lap the uphill sheets over the lower sheets so that sub-surface water doesn't flow under the fabric.

## Measurement

Unless specified otherwise, measurement is on the area basis to the specified depth.

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

As work is performed, note the location of the excavation (station and offset), measure all of the dimensions (length, width, and depth). If depths of stabilization are different than specified, record that information and calculate a proportional factor for payment

(actual excavated depth/the assumed plan depth), and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

An example of this is as follows:

- Depth per plans: 18 inches
- Depth authorized to dig: 36 inches
- Length: 10 feet
- Width: 5 feet
- Calculations:
  - Area: Length times width = 10 feet x 5 feet = 50 square feet
  - Proportionate number for excavated area: 36" (actually dug)/18" (per plans) = 2 (the excavated section is 2X deeper than that specified)
  - True area for subgrade stabilization: 50 square feet x 2 = 100 square feet

## **Section 00335 – Blasting Methods and Protection of Excavation Backslopes**

This work consists of excavating in rock using controlled blasting methods.

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 Specification.

### **Quality**

No quality documentation is needed for this work. If the material is to be utilized in project work, ensure that the size and gradation is acceptable. Record pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

### **Surveying and Layout**

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

Ensure that:

- The surveyor has 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

Ensure that the Contractor follows safe practices, including:

- Review the job hazard assessment prior to beginning blasting operations.
- Work is accomplished according to the acceptable blasting plan. The Contractor cannot deviate from the blasting plan without re-submitting it.
- Inspect nearby structures, wells, etc. for existing damage before blasting starts. Ensure the features are adequately protected during blasting.
- Effectively protect traffic, properties, and the public during blasting.
- Warn personnel to be sure they are safely removed from the blast area.
- Scale slopes to remove loose debris before allowing work to resume on the next blasting lift.

## Construction

Duties of the Inspector include:

- Ensure that the blasting operation follows the safe practices described above.
- Ensure that loose material is removed from the excavated slopes.
- If motorists or adjacent property owners complain about damage, ensure that the Contractor takes action on the complaints and modifies practices, as needed, to minimize complaints and damage. Note any complaints or damage on the [General Daily Progress Report \(form 734-3474\)](#).
- If the Contractor delays traffic movement beyond the provisions of Section 00220, record appropriate information so that liquidated damages can be assessed, if specified.
- Ensure that excess material is removed and affected areas are treated, finished, or restored, as specified.

## Measurement

Measurement will be as specified. Ensure that ODOT has recorded sufficient information before work starts, if needed, to calculate pay quantities.

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

As work is performed, measure, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If the Contractor violates the requirements of Section 00220 Accommodations for Public Traffic, notify the Project Manager and 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 prepare and compact earthwork, bases, and surfacings, and to control dust within the project

### **Quality**

No quality documentation is needed for this item. The Inspector must record pertinent information in the [General Daily Progress Report \(form 734-3474\)](#).

### **Construction**

The Inspector must:

- Check that the Contractor has a legal right to the source of water and that it has acquired the right to use the water from that source.
- Ensure that the watering operations are performed such that water is:
  - Not wasted or causing soft spots from a leaking truck.
  - Applied in a uniform manner, as specified.
  - Mixed with the specified additives when required. QPL approved additives can be used if called for in the Special Provisions.
- Ensure that the Contractor is recording watering work on [Sprinkling Tally Sheet \(form 734-3427\)](#).
- Ensure that the Contractor restores or repairs all damaged, or affected areas.

Water can cause compaction problems if lots of fine silt is introduced to base rock or other materials during compaction. The water shall contain no oils, sewage or contaminants that may cause harm to health, the environment, or the project. Watering can be used for other items such as seeding and mulching or other needs as directed by the Engineer.

## Measurement

Unless specified otherwise, measurement will be by weight, volume, known capacity tanks, or approved meters. Ensure that volumes are entered on a [Sprinkling Tally Sheet \(form 734-3427\)](#), as watering is performed. Agree with Contractor daily on watering quantities since there will be no way to go back and verify the quantities later.

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

- Ensure 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 cursory validation that the volumes on the Sprinkling Tally Sheet are appropriate.
- Additives are measured and paid for by the gallon for each separate additive.

Submit the Sprinkling Tally Sheet with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00344 – Treated Subgrade

This work consists of treating the upper layer of subgrade with water and either lime, chloride, or portland cement to form a stabilized course of material. Treating subgrade is done in lieu of installing subgrade stabilization. In this application the native material does not need to be excavated and hauled away and new material hauled in and placed.

## Quality

Quality requirements are specified in the *Manual of Field Test Procedures*. Provide only materials that are specified in the Specifications. Provide water that meets the requirements of Section 00340.

Ensure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Also, ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Ensure that:

- All underground work in the treated subgrade area will be completed prior to treatment.
- All depressions or ruts which contain water are drained.
- The materials are applied at a uniform rate with specified equipment.
- Equipment does not pass over the stabilizing material until it has been mixed into the soil. Water, applying, and mixing equipment are allowed to pass over the material.
- Mixing operations are performed until the material is uniformly mixed with no streaks or pockets.
- Immediately after treating the subgrade, grade the mixture to specified line, grade and cross section and compact to specified density.
- The Contractor limits the traffic over treated subgrade to equipment which will not cause damage and will not visibly deflect, ravel or wear the surface.
- Specified density of treated subgrade is achieved.
- The Contractor compacts the subgrade until firm and unyielding. Test and proof roll within 24 hours prior to placing base material on subgrade.

## Measurement

Unless specified otherwise, measurement for treated subgrade will be on the area basis, and for soil stabilizing materials will be measured on the dry weight basis.

As work is performed, measure, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00350 – Geosynthetic Installation

This work consists of furnishing, and placing geotextile in drains, under embankments, for embankment reinforcement, under riprap, buttresses, inlays, shear keys, over roadbed subgrades, and beneath pavement overlays.

## Quality

Quality requirements are specified in the Specification, in the Non-Field Tested Materials Acceptance Guide, and the Qualified Products List.

Ensure that the Contractor complies with those requirements, protects the materials, and provides acceptable quality documentation before the material is incorporated.

If the Contractor supplies material that does not conform to Specification requirements, contact the Project Manager

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Ensure that:

- The limits of the application, as marked, comply with Specification 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 stored and protected from damage as specified.
- Damage and/or defects are repaired, if the material is suitable to use.
- The surface, under or behind the geosynthetic, has been prepared as specified.
- The installation is performed as specified and in accordance with the manufacturer requirements.
- Specified overlap is acquired to ensure closure.
- There is no traffic or construction equipment allowed directly on the geotextile.
- The covering material type and depth is placed according to the specifications.
- The Contractor disposes of unwanted materials.
- Affected areas are smoothed and finished.

DO NOT place the geotextile too tightly because the overlying material will tear it.

## Measurement

Unless specified otherwise, measurement is on the area basis. As work is performed, measure all of the dimensions, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

For trench applications, measurement is computed by multiplying the length of the trench where the geotextile is used by the perimeter. Since the geotextile will be buried it is very important to get the measurements in a timely manner. As a general rule, take

width and depth measurements every 50' on tangent sections and every 25' in radius. Use the area formula of common shapes to break the section down into manageable pieces. No measurement is made for laps, seams, join, or repair patches. Make sure the geotextile isn't incidental to another bid item like subgrade stabilization before payment.

## Section 00360 – Drainage Blankets

This work consists of furnishing and placing drainage blanket materials.

### Quality

Refer to the *Manual of Field Test Procedures* for testing and other documentation required to ensure quality of the materials and work. Unless required differently in the Specification, the Contractor is responsible for all quality control, including testing, and ODOT must perform verification testing. Refer to the discussion of Quality and the Quality Assurance Program in Section 00100 of this Manual.

Ensure that the Contractor is aware of those requirements, performs required testing with certified technicians, and check that it provides required quality documentation and test results. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for 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 ensure, that the material or procedure is acceptable or produces specified results. If additional testing is requested, inform Project Manager to authorize extra payment, if applicable. If additional testing is required, record reasons and results General Daily Progress Report.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

### Construction

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

Ensure that the material:

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

- Is compacted as specified.

### **Measurement**

Unless specified otherwise, measurement is on the volume basis. As work is performed, measure all of the specified neat line dimensions, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## **Section 00370 – Finishing Roadbeds**

This work involves trimming, shaping and finishing the subgrade, ditches, slopes, and other graded 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 Inspector must record pertinent information in the [Daily Progress Report \(form 734-3474\)](#).

### **Construction**

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

- Subgrade is shaped and trimmed to grades as specified.
- Perform or observe testing to ensure that the subgrade meets the specified smoothness.
- The Contractor's surveyor submits elevation data to be verified to ensure tolerances.
- The subgrade has been compacted, and compaction testing has been performed with acceptable test results provided, as specified.
- Slopes have been trimmed and shaped as specified.
- Sewers, culverts, and drains have been cleaned as specified.
- Ditches have been cleaned, trimmed, and shaped as specified.
- The Contractor disposes of all unused/unwanted materials.

### **Measurement**

Unless specified otherwise there will be no measurement of quantities for Finishing Roadbeds. Ensure that an acceptable breakdown of the lump sum is developed. As

work is performed document the work with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00390 – Riprap Protection

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

### Quality

Quality requirements are in the Specification, the *Manual of Field Test Procedures*, and the Non-Field Tested Materials Acceptance Guide. Ensure that the Contractor is aware of those requirements.

Visually inspect the riprap material, as it is delivered, to ensure that it meets Specification requirements, is not contaminated, and does not contain unacceptable materials.

If there is any question about the quality of any material or work procedure, require the Contractor to demonstrate, or perform further testing to ensure, that the material or procedure is acceptable or produces specified results. If additional testing is requested, inform Project Manager to authorize extra payment, if applicable. If additional testing is required, record reasons and results General Daily Progress Report.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

### Construction

Ensure that:

- The location has been marked and both the Contractor and Inspector understand the markings.
- The layout of the installation complies with the plans.
- Vegetation has been removed, and slopes have been excavated to required dimensions and properly finished, as specified.
- Underlying materials have been compacted as specified.
- When allowed, the backing material has been properly supplied and installed.
- Riprap material has the specified gradation and is not segregated.
- The riprap is placed to the full course thickness in one operation.

- The underlying material, filter blanket, or geotextile is not displaced during riprap placement. Note that the geotextile or filter blankets prevent underlying soils from migrating up beneath the riprap.
- If specified, the riprap is keyed and grouted.

Rules of thumb:

- Class 50 includes the largest rock at 50 lbs at approximately 0.5 feet in diameter.
- Class 2000 includes the largest rock at 2000 lbs at approximately 5 feet in diameter.

### Measurement

Measure the work as specified to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform cursory validation with that information. As work is performed, measure all of the specified neat line dimensions, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00396 – Shotcrete Slope Stabilization

This work consists of constructing pneumatically applied shotcrete (concrete mortar) stabilization blankets onto slope surfaces.

### Quality

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

Ensure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Also, ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Ensure that:

- The Contractor performs Preproduction and daily Production Testing.
- The limits of the application, as marked, comply with the Specification, and both the Contractor and Inspector understand the markings.
- The surface to be treated is prepared as specified.
- The prepared surface is damp prior to application of shotcrete.
- Devices to control thickness of application have been installed.
- Anchors have been installed as specified.
- Reinforcement is positioned as specified.
- Piping for weep holes is in place.
- Weather conditions are as specified for shotcrete application, including required curing.
- Shotcrete has been batched and mixed (including steel or other fibers when required) as specified.
- The application is finished and cured as specified.
- The work is protected as specified during the cure period.
- The Contractor disposes of unwanted material.

## Measurement

Unless specified otherwise, measurement is on the area basis. As work is performed, measure all of the dimensions, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00398 – Rock Slope Stabilization and Reinforcement

This work consists of furnishing and installing rock slope stabilization and reinforcement as shown or specified.

## Quality

Quality requirements are in the Specification, the Non-Field Tested Materials Acceptance Guide, and the Qualified Products List.

Ensure that the Contractor complies with those requirements, protects the materials, and provides acceptable quality documentation before the material is incorporated.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## **Construction**

Ensure that:

- The Inspector has the most current version of the working drawings.
- The Inspector has a copy of the Field Construction Manual that is provided from the manufacturer of the proprietary rock fall net system.
- The Contractor is following the approved Work Plan.
- The Contractor has prepared the area for protection as specified, and has disposed of all excess/unwanted materials.
- The Contractor follows the installation instructions in the manufacturer's Field Construction Manual.

## **Measurement**

Measure the work as specified to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform cursory validation of that information. As work is performed, measure, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

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**Section 00400**



## 400's – Drainage and Sewers

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Ensure 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, elevation, or location of the inlet or outlet of a pipe.

### Section 00405 – Trench Excavation, Bedding and Backfill

This work consists of excavating trenches, constructing trench foundations, and placing bedding, pipe zone material, and backfill. This section applies to pipes under 72 inches as excavation for pipes greater than 72 inches is covered under major structures in Section 00510.

#### Quality

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

Ensure that the Contractor is aware of those requirements, performs required testing with certified technicians, and check that it provides required quality documentation and test results. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

Additionally, ensure that:

- Backfill material is not contaminated.
- Bedding and backfill material is compacted and density testing is performed as specified.

#### Safety

During underground construction:

- 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. The inspector and the contractor should review locate markings. Have a backup plan with Engineer approval if you think there could be conflicts with pipe.

- Ensure that excavated material, if it is placed near the excavation, does not create an unsafe condition.
- Ensure that the Contractor uses shoring or other devices or practices such as sloping the sides of trenches, to prevent trenches from collapsing. Shoring, sloping, or shielding is required if trench is over 5 ft deep.
- Ladders are required to be within 25' of workers in trenches over 4' deep. Know your "Competent Person" and their evaluation of trench wall sloping requirements if shoring is not used.
- Ensure that workers do not enter unsafe trenches, even for very short times.
- Ensure that placement of and compaction of materials in the trenches is performed as specified 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 chapter \(17\) of the Construction Manual](#).

## Construction

Review the layout and staking of each installation to detect errors and ensure that the installation will:

- Include specified appurtenances.
- Tie to inlet and outlet structures and locations as specified.
- Ensure that both the Contractor and Inspector understand the layout.
- Ensure that the Contractor effectively controls line and grade of the construction from the survey markings. Methods of accomplishing this include using a stringline, laser beam, or other method. Typically stakes should be provided every 25 feet or more frequent.

Ensure that:

- You are familiar with Standard Drawing RD300: *Trench Backfill, Bedding, Pipe Zone and Multiple Installations*.
- Pavements are sawcut full depth. Cut trench width to that shown on standard drawing RD302. Make sure that the existing surfacing that borders the trench

does not get undermined during excavation (i.e. roadway, sidewalks, curbs, etc.). Undermined surfaces need to be removed and replaced.

- Excavation is performed to the dimensions and slope specified in the plans and in the surveyor's markings.
- If water is present in the bottom of the trench excavation, provide an outlet at low end or pump from low end to an area that does not cause sedimentation of waterways.
- The foundation under the pipe and/or bedding is firm and rock or other hardpan has been removed to allow specified material between that and the pipe.
- The foundation is checked before placing pipe bedding to ensure a firm, non-yielding soil under foot pressure. Otherwise, overexcavate and backfill with a granular material. Typically granular pipe backfill is used to "bridge" over soft foundations. The pipe foundation is critical to ensure long term pipe function.
- Bedding materials, placement, compaction, and testing are performed as specified.
- All pipe materials comply with Specification requirements.
- Construction of pipes and other minor structures is completed as specified, including randomly checking line and grade of the installation, before backfilling is performed.
- For waterlines, thrust blocks have been constructed to the size and locations specified. Also refer to discussion in Part 01100 of this Manual.
- The Contractor compacts backfill under the haunches of the lower half of pipes and other, similar locations. Backfill with pipe equally on both sides in 6" lifts. WORK MATERIAL UNDER HAUNCHES OF PIPE. Compact. Work in this area is difficult -- poor compaction 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.
- The backfill under, around, and over the pipe is placed and compacted as specified. Get QC and QA tests early to ensure proper compaction methods are being used. Know how many passes of the compaction equipment is required to achieve required density.
- The pipe has not been displaced during backfilling operations or damaged. Lightweight pipe, Poly pipe or PVC pipe can easily be floated up by careless backfill operations.
- If equipment will be operating over a pipe, the backfill provides the specified cover to prevent damage to the pipe installation by the equipment.
- After the embankment is complete, verify each pipe and other minor structures have not been damaged or knocked out of alignment.

- Waterlines are pressure tested and disinfected as specified, including having owners of the facility observe those operations if requested. Also refer to Part 01100.
- If specified, the Contractor performs remote (television or video) inspection of underground facilities and corrects deficiencies.
- Surfacing (AC, PCC, Gravel, lawns etc) are restored to original or better condition. Get buy off from property owners if they will maintain area. Until such time as permanent surfaces are restored, provide an acceptable temporary surfacing. Maintaining temporary surfacing until permanent surfacing is installed is a contractor responsibility. Also refer to discussion in Section 00495 of this Manual.
- The Contractor disposes of unwanted material.
- The affected area is smoothed and finished.

### **Measurement**

Measure the work as specified to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform cursory validation of that information. As work is performed, measure all of the specified neat line dimensions, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

### **Section 00406 – Tunneling, Boring and Jacking**

This work consists of installing pipes, casings, linings, and sleeves by tunneling, boring, and jacking without excavating the overlying surface.

### **Quality**

Quality documentation for this work is specified in the Field Tested Material Acceptance Guide.

Ensure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Ensure that:

- Utilities within the area of construction are located and marked.
- The installation is 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 Specification or acceptable working drawings.
- Excavation or installation does not cause or result in voids in surrounding material, and all resulting voids are repaired or grouted as specified.
- Excavated material and/or water from the work area are disposed of, without impacting or damaging waterways or other environmentally sensitive areas.
- If specified, cradles are properly installed to support the pipe in the casing.
- The Contractor disposes of unwanted material.
- The affected area is restored, smoothed, and finished.

## Measurement

Unless specified otherwise there will be no measurement of quantities. As work is performed document the work with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00410 – Pipe Lining

This work consists of rehabilitating existing pipes by furnishing and installing pipe liners by pipe bursting and lining, slip lining, and cured-in-place lining.

## Quality

Ensure that all material used meets the Specification requirements and all of the documentation that the Non-Field Tested Materials Acceptance Guide (NFTMAG) requires are submitted.

Ensure that the Contractor uses only equipment that is specified or approved by the pipe manufacturer and the Engineer. Also make sure the Contractor uses approved technicians for installing and welding of pipes, per the Specification specifications.

Ensure that the Contractor is aware of those requirements, performs required testing. Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Ensure that:

- The Contractor has not damaged the pipe prior to installation.
- The Contractor cleans all pipes, and disposes of unused and contaminated materials, as specified.
- If required by the Specification, the Contractor has the pipe video inspected.
- The Contractor follows all post installation instructions prior to connecting pipes to any structure.
- The Contractor submits all specified documentation for the warranty.

## Measurement

Unless specified otherwise, measurement is on the length basis, for other than point repairs and service line reconnections which will be measured on the unit basis. As work is performed, measure, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00420 – Salvaging Pipe

This work consists of removing, cleaning, and either stockpiling or relaying culvert pipe and other pipe.

### Quality

Ensure 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 cleaned as specified and are not damaged.

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

## Construction

Ensure that:

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

## Measurement

Unless specified otherwise, measurement is on the length basis. As work is performed, measure, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00430 – Subsurface Drains

This work consists of constructing subsurface drains to the lines and grades shown or established using drain pipe, special filter material or granular drain material, and drainage geotextile.

## Quality

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

Ensure that the Contractor is aware of those requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

Additionally, ensure that:

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

## **Construction**

Ensure that:

- Installations have been located and marked, the layout complies with the Specifications, 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.
- The trench is excavated as per specifications.
- Pipe is installed as per specifications.
- Filter material or geosynthetic and drain backfill material is installed as specified, without contamination.
- Installation is backfilled and compacted to required elevation, as specified.
- Locations of outlet pipes, other than those connected to inlets or other structures, are properly marked so Maintenance forces can locate them.
- The Contractor disposes of unwanted material.
- The affected area is smoothed, restored, and finished.

## **Measurement**

Measurement will be as specified. If the Inspector uses information provided by the Contractor to calculate quantities, perform cursory validation of that information.

As work is performed, measure, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00432 – Wearing Surface Drains

This work consists of constructing wearing surface drains and outlets.

### Quality

Quality Documentation is specified in the Non-Field Tested Materials Acceptance Guide.

Ensure that the Contractor is aware of those requirements, and provides acceptable quality documentation before the material is incorporated. Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

### Construction

Ensure that:

- The Contractor provides equipment that produces a trench with clean and vertical sides.
- The Contractor compacts as per the specifications.
- The Contractor constructs wearing surface drain prior to placing open-graded HMAC wearing surface and in accordance with the specifications.
- The Contractor hauls, deposits, and places wearing surface drain material that is acceptable to the Engineer.
- The Contractor does not crush the outlet drain pipe during compaction.
- The Contractor disposes of unwanted material.
- That the wearing surface drain material is smoothed and finished as per specification.

### Measurement

Unless specified otherwise, measurement is on the length basis, except for drain outlets which will be measured on the unit basis. As work is performed, measure, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00435 – Prefabricated Vertical Drains

This work consists of furnishing and installing prefabricated vertical drains.

### Quality

Quality documentation is specified in the Non-Field Tested Materials Acceptance Guide and the Qualified Products List.

Ensure that the Contractor is aware of those requirements, and provides acceptable quality documentation before the material is incorporated. Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

Additionally, ensure that the drain materials are protected as specified until they are installed.

### Construction

The Inspector must:

- Ensure that the vertical drains have been located, numbered and staked, and both the Contractor and Inspector understand the markings.
- Check that the Contractor submitted proposed installation details for review at least 14 days before beginning the trial installation
- Observe the trial installation process to confirm an ability to follow the installation process. Coordinate with the Project Manager.
- Ensure that monitoring equipment, if needed or specified, is installed and protected.
- Ensure that drains are installed in the locations and to specified tolerances.
- Ensure that the drainage material is not contaminated.
- Ensure that the drains are not damaged during their installation.

If an obstruction is encountered:

- Coordinate with the Project Manager to order the Contractor to implement obstruction clearance procedures as specified.
- If the obstruction cannot be cleared, work with the Contractor to install the drain(s) at alternate locations. Coordinate with the Project Manager.
- Ensure that the Contractor disposes of unwanted material

- Ensure that the drainage material is smoothed and finished to the specified elevation and that any contaminated drainage material is removed and replaced with specified material.

## Measurement

Unless specified otherwise, measurement is on the length basis. As work is performed, measure, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00440 – Commercial Grade Concrete

This work consists of furnishing, placing, and finishing commercial grade concrete. Commercial grade concrete is typically used for non-structural applications like sidewalks, curbs, islands, thrust blocks and paved end slopes.

## Quality

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

Ensure that the Contractor is aware of those requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

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. This will need to be discussed with the Engineer of record and/or the technical specification owner for direction.

## Construction

Ensure that:

- Each structure is accurately located and staked and both the Contractor and Inspector understand the markings.
- The forms, into which the CGC is to be placed, appear to be constructed according to best common practice, as specified.

- Underlying and/or adjacent material is compacted, firm, or undisturbed, as specified.
- The CGC has been batched and mixed as specified.
- Weather conditions are as specified for placing the CGC.
- Every load of concrete that is plant-batched has a batch ticket. No batch ticket = No Pour.
- Concrete tests are done prior to adding water or admixtures.
- Water is added one time only as directed by the Quality Concrete Technician (QCT) to bring the slump of that particular load within the specified range for the project. Addition of water cannot increase the water-cement ratio above the maximum permitted by the mix design (ASTM C94).
- The CGC is placed and consolidated as specified.
- The CGC is placed within 90 minutes after batching and mixing.
- The concrete is placed with less than a 5-foot free fall.
- Special care is taken to vibrate concrete in areas that contain a lot of reinforcement.
- Surfaces are finished as specified, without addition of water.
- The CGC is cured and otherwise protected from unsuitable climatic conditions or damage as per specifications.
- When forms are removed, surfaces are finished as specified.

### **Measurement**

Unless specified otherwise there will be no measurement of quantities for Commercial Grade Concrete. As work is performed document the work with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00442 – Controlled Low-Strength Materials

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

### Quality

Quality requirements are in the specifications, and Field Tested Material Acceptance Guide.

Ensure that the Contractor is aware of those requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

### Construction

Ensure that:

- The limits of the CLSM placement are staked and both the Contractor and Inspector understand the markings.
- The materials are mixed and placed to fill the specified voids, spaces, volumes, or depths, as specified.
- CLSM material does not leak or flow into unwanted areas.

### Measurement

Unless specified otherwise there will be no measurement of quantities for CLSM. As work is performed document the work with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00445 – Sanitary, Storm, Culvert, Siphon and Irrigation Pipe

This work consists of constructing or reconstructing culvert, siphon, sanitary sewer, storm sewer, and irrigation pipes. This work includes constructing joints and connections to other drainage structures or systems for complete installation.

## Quality

Quality documentation is in the specifications, the Non-Field Tested Materials Acceptance Guide, and the Field Tested Material Acceptance Guide.

Ensure that the Contractor is aware of those requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

Inspect pipe shortly after it is unloaded. Identify sections of pipe or other materials that are unacceptable for use on the project.

In general, check the markings on the pipe as soon as it is delivered to the project and compare them with the "pipe data sheet" to ensure that proper materials were delivered. Pay particular attention to the thickness required and verify it during installation. Many times the plans allow the contractor options on material types.

Take a picture of the pipe markings and include it on your FIR. Make sure and get the manufacturer's name, pipe size, AASHTO/ASTM designation, etc. Make sure you have a [Certificate of Materials Origin \(CMO\) Form 734-2126](#) for all of the following; metal pipe, reinforced concrete pipe, slip joints, pipe anchors, connecting bands, and hardware BEFORE the contractor installs them.

Items to check include:

### Concrete pipe

Pipe is of the specified class with appropriate identifying markings. Gaskets and other materials conform to requirements. Check for chips and cracks. Concrete pipe should come from NFTMAG pre-approved manufacturer. No "Q" (quality compliance certification) is needed if the pipe comes from the pre-approved supplier list. A [Certificate of Materials Origin \(CMO\) Form 734-2126](#) is provided prior to installation if the concrete pipe is reinforced.

### Metal pipe

Materials are of proper size and type, with appropriate identifying markings. Gaskets, if specified, bands, and hardware are furnished. A [Certificate of Materials Origin \(CMO\) Form 734-2126](#) is provided prior to installation.

### Plastic or other pipe

Materials are of specified size and type, with appropriate identifying markings. Gaskets and other 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 so that the material may be able to be used 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.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## **Construction**

Ensure that:

- Installations are located and staked and both the Contractor and Inspector understand the markings. Obtain copies of the survey marking notes.
- The Contractor effectively controls line and grade of the installation from the survey markings.
- For excavation, bedding, and backfill work is accomplished as specified. See Section 00405.
- All damage to coatings is repaired, as specified, or the element is replaced.

For laying pipe:

- Pipe is of the specified size and type.
- Check staking to ensure pipe ends match ditches, side slopes or existing pipes or structures before work starts.
- Review line and grade tolerances listed in Section 00445.40(b)
- Pipe is handled during installation to prevent damage, including to ends and coatings. Repair all gouges, scrapes and all "field-cuts" on metal pipes with an appropriate method (i.e., Zinc primer, cold-stick galvanizing, etc.).
- Placement is started at the downstream end unless conditions specified otherwise.
- For elliptical pipe, the major axis is placed as specified.
- For riveted pipe, outside laps are placed upstream and seams at sides.
- Perforations in drain pipe are installed down unless otherwise specified.

- Bell or grooved ends are placed upstream.
- Start pipe at correct offset from center of manhole or inlet. Pipes are staked from center to center of structure in storm sewers.
- Check line and grade at first piece of pipe and several consecutive pieces to ensure starting out on correct line and grade. This should be done by contractor but a little assistance by Inspector can ensure this happens. Thereafter spot checks are the norm unless very flat pipe or poor workmanship is occurring.
- Verify pipe laser % slope is correct. These checks will help ensure pipe will not have to be removed and re-laid. Some pipe materials are extremely difficult to salvage pipe. If field adjustments are made to start and end point of pipe or grade adjustments are made, the Inspector or the Contractor will need to correct the pipe staking note to reflect the “as-built” pipe.
- The paved invert is installed in the pipe’s flowline.
- Most pipes use gaskets to prevent infiltration or exfiltration of water from pipe. These are known as water tight connections. Make sure gaskets are installed in the proper direction and a joint lube is used to ease installation. If bands are used for metal or poly pipe, use and install manufacturer’s bands. Fully engage spigot end into bell ends for water tight connection.
- The Contractor uses and places tracer wire per specifications. Test all tracer wire with locating equipment prior to acceptance of pipe (00445.48).
- TV storm pipe (if there is a bid item) and review tape *before* surfacing is placed in case repair is needed.
- Deflection tests are for PVC and Poly pipe. These pipes are flexible and can be squashed by backfilling or construction traffic. The deflection test uses a “mandrel”, to pull through pipe to check for squashed pipe. Be present to witness this test.
- All sanitary gravity systems, siphon systems, and irrigation systems need to pass a hydrostatic or air test prior to acceptance.

For joining pipe:

- The specified type of joint is used, including gaskets or other materials.
- Joints are assembled per manufacturer recommendations for the type of joint used.
- Joints fit close and tight and, when specified, are watertight.
- Dirt and foreign material is cleaned from the pipe and joint areas as specified.
- Mortar joints for concrete pipe are constructed as specified.
- Bands are aligned and installed as specified.
- Bolts are tightened as specified.

- For corrugated pipe, the Contractor may tap the band with a mallet while the bolts are being tightened, to jar the corrugations together and allow a tight fit.

Ensure that the Contractor:

- Properly places the pipe zone material as specified.
- Performs all compaction of pipe zone material as required.
- Performs all compaction testing of pipe zone material as required.
- As the Inspector, pay special attention to the compaction of trench backfill. This is the area between the pipe zone and the bottom of the base rock. This is especially important with shallow buried pipes.
- The Contractor disposes of unwanted material.
- The Contractor performs all post installation testing as specified.
- The Contractor makes any and all necessary repairs that were identified.
- Affected areas are smoothed, restored, and finished.

## Measurement

Measurement will be as specified. Ensure that ODOT has recorded sufficient information before work starts, if needed, to calculate pay quantities.

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

As work is performed, measure, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00450 – Structural Plate Pipe, Pipe Arch and Arch

This work involves the construction of structural plate pipe, pipe arches, plate arches, horizontal ellipses, vehicular underpasses, and special shaped structures.

## Quality

Quality documentation is in the specifications, the Non-Field Tested Materials Acceptance Guide, and the Field Tested Material Acceptance Guide.

Ensure that the Contractor is aware of those requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT

QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

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

## **Construction**

### Surveying and Layout

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

### Excavation, Bedding, and Backfill

Ensure that this work is accomplished as specified.

### Erection

Ensure that:

- Footings have been constructed to the specified line and grade.
- The Contractor understands the Specification requirements and the manufacturer's assembly instructions, and performs the work according to those requirements.
- Bolts are of lengths according to the plans or as specified.
- Bolts are installed and tightened in the sequence as specified.
- Strutting is installed as required by the manufacturer's specifications and as specified.
- To monitor changes in shape and alignment, monitoring devices, such as tell-tales, are utilized.
- Damage to coatings is repaired as specified.
- Headwalls, aprons, and other appurtenances are constructed as specified to line and grade.

### Work Quality

The Inspector should check for:

- Dents or bends in the metal.
- Legible brands.
- Loose or unevenly spaced bolts.
- Ragged edges.
- Scaled, unrepaired, or broken coating.
- Uneven laps.
- Variation from the specified alignment.
- Wrong plate locations.

### **Measurement**

Measurement will be as specified. Ensure that ODOT has recorded sufficient information before work starts, if needed, to calculate pay quantities.

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

As work is performed, measure, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

### **Section 00460 – Paved Culvert End Slopes**

This work consists of constructing portland cement concrete paved culvert end slopes.

### **Quality**

Quality requirements are specified in the Non-Field Tested Materials Acceptance Guide and in the *Manual of Field Test Procedures*. Refer to Section 00440 of this Manual and the specifications for Commercial Grade Concrete quality requirements.

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

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Ensure that:

- The dimensions and layout for each installation comply with the Specification documents.
- The underlying material is compacted per specifications.
- The forms appear to be constructed according to best common practice, as specified, and are of the specified size and shape to match the end of the culvert or other pipe and adjacent finished surface.
- The welded wire fabric is of specified spacing and dimensions, and is supported so that it will be in the specified location in the completed structure.
- Weather conditions are as specified for placing concrete.
- The specified concrete has been batched and delivered.
- Surfaces are finished as per specifications.
- Concrete is cured and protected from unsuitable climatic conditions or damage, as specified.
- After removal of forms, the surfaces are finished as per specifications.
- The Contractor disposes of unwanted material.
- The affected areas are smoothed and finished.

## Measurement

Unless specified otherwise, measurement is on the area basis. Measurement will be based on the paved end slope area table identified on the plans

As work is performed, measurements should be taken to verify and check work. Prepare and submit an [Installation Sheet \(form 734-2605\)](#) as a source document 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 in the Specifications, the Non-Field Tested Materials Acceptance Guide, the Field Tested Material Acceptance Guide, and the Qualified Products List.

Ensure that the Contractor is aware of those requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Surveying and Layout

Ensure 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 Specification documents or modifications ordered by the Project Manager.
- Installations have been properly located and staked and both the Contractor and Inspector understand the markings.
- There are no apparent errors in location or elevations.

## Construction

Ensure that:

- Precast units come from one of the NFTMAG pre-approved suppliers. No “Q” (quality compliance certification) is needed if the units come from the pre-approved supplier list. An “O” (Certificate of Materials Origin) is needed for all steel materials including; reinforcement in the precast units, ladders, frames, grates, and covers.
- The delivered materials are inspected for damage.
- Precast sections of manholes or inlets have key ways or connecting pins to interlock sections together.
- Two stakes are used to establish line and grade.
- Manholes are not placed in the wheel paths of the roadway. Check the proposed placement prior to the Contractor beginning the connecting run of pipe to see if an adjustment is needed.
- Excavation, bedding, and backfill are performed as specified.
- A stable foundation is established that provides full and adequate support for the element and the element is installed to the specified elevation and orientation. A poor foundation will be a long term maintenance problem and may break pipe and

cause catastrophic failure of roadway, walls or bridges. The foundation must not deflect under firm foot pressure. Check with probe or lath for ease of penetration. If poor foundation is observed, over excavate backfill and compact with a granular material.

- Reinforcement is installed as specified and will have the specified coverage with concrete.
- The orientation of the structure is properly set. It may need to fit a curb line or other roadway feature to function properly. This starts at the base and is difficult to correct if installed incorrectly, the pipes are grouted and the structure is backfilled.
- Structure is plumb to ensure good line and grade at surface and that traffic loading does not fail structure from eccentric or point loading.
- Structures are water tight between sections and pipe to structure connections by use of mortars, gaskets or mastic sealants.
- Base or subgrade drain pipes are installed as specified
- The Contractor performs all tests that are specified and required.
- Grates, frames, and covers are installed to the specified 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.
- For manholes, the first ladder rung is within 26" of the top of the manhole. See Standard Drawing RD336.
- The Contractor disposes of unwanted materials.
- The affected area is smoothed, restored, and finished.

## Measurement

Unless specified otherwise, measurement will be on a unit basis. As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00475 – Drain Wells

This work consists of drilling 8 inch diameter wells, including furnishing and installing steel well casings, for the purpose of intersecting large voids in underlying rock.

## Quality

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

Ensure that the Contractor is aware of those requirements, and provides acceptable quality documentation before the material is incorporated. Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Ensure that:

- The installation, as laid out, complies with the Specification requirements.
- Drill the drain wells at the specified locations prior to constructing manholes and inlets.
- Test each drain well per specifications.

## Measurement

Unless specified otherwise, measurement will be on a unit basis. As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00480 – Drainage Curbs

This work consists of constructing mechanically extruded curbs using either commercial grade concrete or asphalt concrete.

## Quality

Quality requirements and documentation are in the Specification, Non-Field Tested Materials Acceptance Guide, and the *Manual of Field Test Procedures*.

Ensure that the Contractor is aware of those requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Surveying and Layout

Ensure that:

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

## Construction

Ensure that:

- The area, upon which the curb is to be placed, is clean and free of extraneous matter.
- Where the curb is placed with a curb machine following a string line, there are no sags or high spots in the string where they shouldn't be.
- A bonding agent has been placed under the curb location and is still in a condition to bond the curb to the underlying material when the curb material is placed, as specified.
- Curb material includes materials and has been mixed and handled, as specified.
- Placement and finishing results in a well-compacted mass and the surface is smooth.
- Expansion joints are placed and contraction joints are constructed, as specified.
- Defective sections are removed and replaced.
- Line and grade of the finished product meet Specification requirements.
- Portland cement concrete is cured as specified.
- Curb is protected as specified.
- The Contractor cleans up and disposes of unwanted material.

## Measurement

Unless specified otherwise, measurement will be on a length basis. As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00490 – Work on Existing Sewers and Structures

This section consists of joining new work to existing work, repairing or abandoning of sewer lines and structures, and adjusting existing manholes, sumps, inlets, boxes, and similar structures. Also, removal and disposal of pipe, manholes and catch basins scheduled for removal.

### Quality

Quality requirements are in the Specification and the Non-Field Tested Materials Acceptance Guide and in the Field Tested Material Acceptance Guide.

Ensure that the Contractor is aware of those requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

Inspect the delivered materials for damage shortly after delivery. Ensure 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

Ensure that:

- Installations have been 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 specification requirements.
- The Contractor does not allow material and debris to enter the facility.
- Specified materials are used.
- Joints and connections are constructed per specifications.
- Adjustments are performed to the specified elevation and slope and match the adjacent finished surface.
- All facilities to be abandoned are drained, plugged, and filled if specified.
- The Contractor disposes of unwanted materials.
- The affected area is smoothed, finished, and resurfaced as specified.

## Measurement

Unless specified otherwise, measurement will be on a unit basis. As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00495 – Trench Resurfacing

This work consists of resurfacing pipe trenches, including replacing pavement, curbs, sidewalks, rock surfacing, topsoil, landscaping and other features damaged or removed during pipe trenching operations.

## Quality

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

Ensure that the Contractor is aware of those requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Ensure that:

- The area to be restored is excavated to the depth, the underlying material is compacted, and the area to be restored is clean, as specified.
- The materials are of the quality and type specified, and are placed to the depth, as specified.
- Replacement materials are smoothed, compacted, and finished, and are cured and protected from damage as specified.
- Surfacing (AC, PCC, Gravel, lawns etc) are restored to original or better condition. Get buy off from property owners if they will maintain area. Until such time as permanent surfaces are restored, provide an acceptable temporary surfacing. Maintaining temporary surfacing until permanent surfacing is installed is a contractor responsibility.
- The Contractor disposes of unwanted material.

- Affected areas are smoothed, restored, and finished as specified.

**Measurement**

Unless specified otherwise, measurement will be on a area basis. As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.



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**Section 00500**



## 500's – Bridges

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### Safety

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

The Inspector should ensure that:

- 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 constructed, supported, and maintained according to the specifications or accepted working drawings.

### Section 00501 – Bridge Removal

This work consists of removing and disposing of existing bridges or portions of existing bridges as shown or specified.

### Quality

There generally are no quality requirements for this work, unless specified differently. The Inspector, though, should record pertinent information in the [General Daily Progress Report \(form 734-3474\)](#).

### Construction

Check that:

- The Contractor is aware of, and does not knowingly violate, the requirements and restrictions of the specifications or regulatory agencies. This includes work in-water or other sensitive environments, and treatment of hazardous materials. The Project Manager may involve the Region Environmental Coordinator in reviewing the Contractor's plan for removal, etc.
- If an unknown, potentially hazardous material(s) is discovered, ensure that the Contractor works with the affected regulatory agencies to develop a method to handle it.

Ensure that:

- If only part of a structure is to be removed, the removal line is performed as specified.
- The Contractor handles and disposes of the removed material, including:
  - If removed material is to remain on the project, it is placed, obliterated, or broken as specified.
  - If material is to be removed from the project, the Contractor's operations comply with the specifications.
  - The affected area is repaired, smoothed, and finished

### **Measurement**

No measurement of quantities will be made for this work. Payment is on a lump sum basis unless specified otherwise. As work is performed, prepare and submit a source document, such as an [Installation Sheet \(form 734-2605\)](#), to justify payment.

## **Section 00503 – Bridge Deck Cold Plane Pavement Removal**

This work consists of removing existing pavement from bridge deck surfaces.

### **Quality**

There generally are no quality requirements for this work, unless specified differently. The Inspector should record pertinent information in the [General Daily Progress Report \(form 734-3474\)](#).

### **Construction**

Ensure that:

- The Contractor uses one of the specified equipment types.
- The Contractor blocks all deck drains and catch basins. Continuously verify that no grindings, chippings, sweepings, or shot blasting material enters them.
- The Contractor does not damage any joints.
- The Contractor cleans all deck surfaces as specified.
- The Contractor repairs all damage to abutting concrete surfaces or other surfaces that are damaged by the Contractor's operations.
- For asphalt concrete surfacing, the Contractor does not grind into the existing concrete bridge deck.

- The Contractor removes full width and length of travel lane pavement in one work shift.
- The Contractor removes the shoulder area within 24 hours after removing travel lane pavement.
- The Contractor verifies the surface tolerance with straight edge and the results are documented on the [General Daily Progress Report \(form 734-3474\)](#).
- The Contractor handles and disposes of the removed material, as specified
- The Contractor cleans and sweeps the surface prior to exposing to traffic.

### **Measurement**

Measurement for cold plane pavement removal will be by area, unless specified otherwise. As work is performed sketch and calculate the area of cold plane pavement removal completed daily, and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment

### **Section 00510 – Structure Excavation and Backfill**

This work consists of excavating, backfilling, and disposing of materials in connection with the construction of bridges, grade separation structures, rigid frame structures, and other major structures.

This work does not include any earthwork that may be specifically included and provided for as incidental work for particular items or parts of the work. The construction, measurement, and payment of embankment at bridge ends and engineered fills will be covered in other specifications.

### **Quality**

Quality requirements are as specified, and in the [Non-Field Tested Materials Acceptance Guide](#), and the [Manual of Field Test Procedures](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes as specified certified personnel to sample and test materials for quality control.
- For backfilling, the Contractor uses a method to ensure that the material will be placed, compacted, and tested, as specified.

Ensure that:

- The ODOT Quality Control Compliance Specialist (QCCS) is aware of the work schedule, and required verification testing is performed.
- The Contractor provides quality documentation as required.

Gather and submit specified quality documentation.

## **Construction**

Check that:

- Construction does not cause an impact to the stream, waterway, or other environmentally sensitive area.
- The Contractor has involved utilities and others in identifying and locating underground facilities.
- If the excavation is specified to require a cofferdam, cribbing, shoring, or other bracing, the Contractor has provided a plan for that work, the plan and construction has been accepted by the Project Manager prior to commencing work.
- If shoring or other bracing will be needed, the Contractor has the materials and other resources needed to construct it, available before the excavation work starts.

Ensure that:

- If the excavation is specified to require a cofferdam, cribbing, shoring, or other bracing, the Contractor follows the plan accepted by the Project Manager.
- The location and limits for the work are identified and marked, and both the Contractor and Inspector understand the markings.
- Clearing, grubbing, and other removal work is performed as specified.
- Excavated materials are stored or removed to prevent dangerous conditions or damage to water or other environmental concerns, as specified.
- The Contractor removes water from the excavated area and disposes of it as specified.
- If blasting is required, the Contractor utilizes controlled blasting techniques as specified.
- 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 bottoms of excavations are made to the correct depth, loose material is removed, and the surface is compacted, as specified.

- 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 specification and regulatory agency.

For cofferdams, shoring, cribs, etc.:

- The cofferdam, shoring, crib, etc. is constructed according to the Contractor's accepted plan.
- Work is performed as specified.
- For backfilling:
  - The concrete, against which the backfill is to be placed, has reached the specified strengths.
  - All forms and other unacceptable material have been removed from the area to be backfilled.
  - Concrete surfaces have been finished as specified.
  - Structures are backfilled in a manner that prevents unbalanced loading, as specified
  - Backfill is placed in a manner that does not damage the structure or cause other damaging stresses, as specified.
  - Backfill is placed, compacted, and tested as specified.
  - Affected areas are smoothed, restored, and finished.
  - The Contractor disposes of excess material.

## Measurement

Refer to the specifications for the method of measurement.

If measurement is by volume in the original position, calculate the volume based on the "neat-lines" specified or within the limits specified. As work is performed sketch and calculate the volume of material placed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If payment is on a lump sum basis no measurement of quantities will be made for this work. As work is performed, prepare and submit a source document, such as an [Installation Sheet \(form 734-2605\)](#), to justify payment.

## Section 00512 – Drilled Shafts

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

*It is expected that inspection will be performed by a Certified Drilled Shaft Foundation Inspector.*

### Quality

Quality requirements are as specified, and in the [Manual of Field Test Procedures](#), and the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes as specified certified personnel to sample and test materials for quality control.

Ensure that:

- The ODOT Quality Control Compliance Specialist (QCCS) is aware of the work schedule, and required verification testing is performed.
- The Contractor provides quality documentation as required.

Gather and submit specified quality documentation.

### Construction

Check that:

- The specified Drilled Shaft Coordination meeting has been held.
- The Project Manager and Contractor have agreed on the required quality control for the work.

Ensure that:

- The Contractor follows the accepted mix design for the concrete to be used in the drilled shafts.
- The locations for the drilled shafts have been accurately located and marked, and both the Contractor and Inspector understand the markings.

- If applicable, measures are installed as specified to control slurry, mud, and other materials that could damage the surroundings, drainage, or environmentally sensitive areas.
- Only qualified individuals meeting the specification requirements are used to perform the specified elements of the work.
- Drilling and other excavation does not cause damage to, or disturbance of, the surrounding soil.
- The Contractor disposes of excavated material as specified.
- The Contractor ensures the stability of the excavation, including use of slurry or casing.
- If drilling slurry is utilized, the Contractor is conducting the required slurry tests and using approved qualified personnel to perform the specified testing.
- The shaft is excavated within the specified 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 contact the Project Manager.
- If groundwater seepage is encountered the amount and rate of groundwater seepage is measured and documented
- The shaft excavation is performed to the specified elevation or dimension into specified soil or rock material.
- While excavation is being performed, the Inspector must complete the [Drilled Shaft Excavation Log \(734-2604\)](#).
- The excavated shaft is cleaned of loose material prior to placement of reinforcement and concrete.
- The reinforcement is assembled as specified and placed to prevent settlement and ensure adequate concrete cover,
- The crosshole sonic log (CSL) access tubes are installed, as specified.
- The concrete slump is as specified and the concrete is placed to avoid segregation and contamination and ensure a continuous, dense mass, as specified.
- Prior to placement of concrete, the Inspector must complete the [Drilled Shaft Concrete Volume form \(734-2603\)](#).
- As the concrete is placed, the Inspector must complete the [Drilled Shaft Concrete Placement Log \(734-2597\)](#).
- The Contractor contains and disposes of all displaced water, slurry, and contaminated concrete as specified.
- All temporary casing is removed without causing damage to the excavation, concrete, or other work.

- All CSL tubes are filled with water immediately after concrete placement and then capped.
- If unacceptable work happens, the Contractor prepares and submits a repair plan to the Project Manager for approval to correct the work, or stops the work.
- The top of the shaft concrete is placed to the specified elevation and is prepared as specified.
- The Contractor cures the exposed concrete as specified.
- CSL testing of the drilled shafts is conducted, as specified.
- After completion of each drilled shaft, the Inspector must complete the [Drilled Shaft Inspection Report \(734-2598\)](#).
- The Contractor disposes of unwanted material.
- The affected area is smoothed, restored, and finished

## Measurement

Measurement shall be as specified.

Where measurement is by length, measure and record the length of drilled shaft along its longitudinal axis. As work is performed, sketch and total the length constructed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

Where measurement is on the unit basis, count each test completed daily and document that count with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00520 – Driven Piles

This work consists of furnishing and driving piles.

### Quality

Quality requirements are specified in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes as specified certified personnel to sample and test materials for quality control.
- The Contractor arranges for inspection to be done at supplier or manufacturer facilities as specified.

Ensure that:

- The ODOT Structure Services Unit is informed of work schedule to perform all required inspection and verification testing.
- The Contractor provides quality documentation as required.

Gather and submit specified 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.

Check that the Contractor:

- Will not violate noise ordinances or 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.
- 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 Inspectors.
- If work is over water, provides life jackets to workers and the Inspectors.
- Safely handles the pile material during the cutoff and removal operation.

## **Construction**

Complete the [Pile and Driving Equipment Data \(form 734-2608\)](#), [Pile Driving Checklist \(form 734-2609\)](#), [Pile Record Book \(form 734-3485\)](#), as applicable, for the project file.

Check that:

- The Contractor provides required information to allow approval of the pile driving equipment by the Project Manager, as specified.
- If utilities are present, the Contractor arranges to have them moved or implements other safety precautions to prevent damage to the facilities or equipment or injury to workers and others.
- The person performing welding for pile splices is certified per specifications.

Ensure that:

- The surface, into which the piles are to be driven, has been excavated or embanked to the specified elevation and the excavation is supported or restrained, as specified.
- The location for each pile is 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.
- The piles have pile tips as specified.
- Piles are not damaged. If any pile is damaged, the Contractor repairs the damage or replaces the affected pile.
- The piles are driven in the specified sequence.
- If the pile hammer cannot effectively drive the piles, contact the Project Manager immediately.
- The Contractor does not pre-bore the holes, or jet the piles, unless specified or specifically allowed in writing by the Project Manager.
- The Inspector marks and measures each pile, before it is used, to be able to calculate the pay quantity and tip elevation.
- As it is driven, the pile does not deviate from specified tolerances.
- Each pile is driven to the specified required tip elevation and bearing.
- The finished location of the cutoff elevation of each pile is within specified tolerances to plan location.
- If needed, splices are constructed and welds are inspected by Contractor according to the AWS D1.1.
- If piles are not achieving the specified minimum tip elevation, consult the Project Manager.
- The elevations for cutoffs are accurately located and marked.
- 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 removes the excess material to the specified elevation.
- Pile heads are treated, as specified.
- As each pile is constructed, all pertinent information is recorded by the Inspector, in the [Pile Record Book \(734-3485\)](#) for the project.
- The Contractor disposes of excess material, makes smooth and finishes affected areas.

## Measurement

Measurement shall be as specified.

Where measurement is by length, measure and record the length of piles along their longitudinal axis. As work is performed, sketch and total the length constructed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

Where measurement is on the unit basis, count each item/test used/completed daily and document that count with an [Installation Sheet \(form 734-2605\)](#) as 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 as specified and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes as specified certified personnel to sample and test materials for quality control.
- The Contractor arranges for inspection to be done at supplier or manufacturer facilities as specified.

Ensure that:

- The ODOT Structure Services Unit is informed of the work schedule to perform all required inspection and verification testing.
- The Contractor provides quality documentation as required.

Gather and submit specified quality documentation.

## Construction

Complete the Steel Reinforcement Checklist for the project records.

Ensure that:

- As material is delivered, it is stored and protected as specified.
- The location or placement of reinforcement within the structure is within the specified tolerance of plan locations.
- Reinforcement is not exposed to any welding, unless specifically allowed in writing.
- All debris and other material, such as grease or oil, are cleaned from reinforcement and other material, before placement.
- Reinforcement and other material is placed, supported, and secured in a manner to ensure specified final location and coverage with concrete.
- Only specified materials are used to secure and support reinforcement and other materials, and no material will be used on or near an exposed surface.
- All lap splices have at least the length of material and are tied per specifications.
- Mechanical splices are constructed according to the specifications.
- All splices are staggered.
- Reinforcement is tied at least at the specified locations.
- Coated reinforcement is tied with non-metallic or coated ties.
- All damage to coated reinforcing is repaired per specification.
- Before starting concrete placement, all required reinforcement and materials are in place, including excessive ends of tie materials, to ensure specified coverage with concrete.
- Concrete placement operations will not damage the reinforcement or its placement or support.

## Measurement

Unless specified otherwise, measurement is lump sum or by weight.

If payment is by lump sum no measurement of quantities will be made for this work. As work is performed, prepare and submit a source document, such as an [Installation Sheet \(form 734-2605\)](#), to justify payment.

If measurement is by weight, compute the weight for the sizes and lengths of reinforcement specified or authorized. As work is performed prepare a sketch on an [Installation Sheet \(form 734-2605\)](#) of where the reinforcement is placed. Calculate the sum of reinforcement installed each day and submit that calculation on an Installation Sheet as a source document to justify payment.

## Section 00535 – Resin Bonded Anchor Systems

This work consists of drilling and preparing holes in hardened concrete and providing and installing anchor bolts and/or reinforcement using a resin bonded anchor system.

### Quality

Quality requirements are as specified and in the [Non-Field Tested Materials Acceptance Guide](#). Check that the Contractor is aware of those requirements.

Ensure that the Contractor provides quality documentation as required.

Gather and submit specified quality documentation.

### Construction

Check that:

- Placement of the epoxy resin and anchor device is coordinated to ensure that no air pockets remain in the installation.

Ensure that:

- Resin bonded anchor systems have been tested according to specifications prior to installation.
- Locations for the work are accurately located and marked, and both the Contractor and Inspector understand the markings.
- Weather conditions meet specified limits 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 size, depth, and method of drilling as required by the manufacturer of the anchor or as specified.
- The holes are cleaned of dust, foreign matter, and excess water with a brush or compressed air as specified.
- Epoxy resin is mixed and placed as recommended by the manufacturer.
- Installations are protected until the epoxy resin has adequately set.
- The nuts on anchor bolts are tightened to  $\frac{1}{4}$  turn beyond snug tight unless specified otherwise.
- The affected area is cleaned and restored.

## Measurement

Unless specified otherwise there will be no measurement of quantities for Resin Bonded Anchor Systems. As work is performed document the work with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00540 – Structural Concrete

This work consists of furnishing, placing, and finishing portland cement concrete, for bridges and other structures.

*It is expected that inspection will be performed by a Certified Bridge Construction Inspector.*

## Quality

Quality requirements are as specified in the [Manual of Field Test Procedures](#) for concrete, and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes as specified certified personnel to sample and test materials for quality control.
- For those manufactured elements that require inspection at the manufacturer facility, the required inspection is performed.

Ensure that:

- The ODOT Quality Control Compliance Specialist (QCCS) is aware of the work schedule, and required verification testing is performed.
- The Contractor provides quality documentation as required.

Gather and submit specified quality documentation.

## Construction

Complete the [Pre-pour Checklist \(form 734-2626\)](#), the Bridge Deck Pour Checklist and/or the Retaining Wall Checklist, as applicable, for the project records.

Check that:

- ODOT has furnished the required and correct survey information and elevations of final surfacing to the Contractor.
- If the work will restrict travel lanes or vertical clearances, the Motor Carrier Services Section is notified in a timely manner to allow them to notify haulers of oversized loads.
- The Contractor is aware of all environmental and other restrictions specified or required by regulatory agencies, and the Contractor does not plan work in violation of those restrictions.
- The Contractor submits the specified working drawings and they are accepted by the Project Manager before beginning the affected work.

Ensure that:

- As the Contractor performs surveying to locate and mark elevations for the work, both the Contractor and Inspector 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 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:

Check that:

- The Contractor has obtained approval and permits as required for the temporary structure from the appropriate regulatory agencies.
- The temporary structure is removed before it violates restrictions of the specification or regulatory agencies.

Ensure that:

- The Contractor constructs the temporary structure according to the accepted working drawings.
- The temporary structure is fully removed and the affected area is smoothed and restored.

For placement of concrete:

- Forms have been constructed to the specified shape and depth, and reinforcement and other appurtenances, including electrical conduit and anchor bolts, have been placed, secured, and supported as specified.
- The Contractor has marked the elevation to which the concrete is to be placed to ensure the specified depth.
- The space in which the concrete is to be placed has been cleaned of deleterious material, and the forms and reinforcement have been dampened prior to placement of the concrete.
- Forms are set and maintained to the specified line and grade until the concrete hardens. If forms appear to deviate from specified line and grade, either before or during concrete placement, notify the Project Manager.
- Weather and climatic conditions are as specified.
- The Contractor has resources and equipment to place, consolidate, finish, and cure the concrete as specified.
- The concrete will be placed within the specified allowable time from mixing to placement. Review the information on the delivery ticket that must accompany each load.
- The concrete is placed in its final position by the delivery device and no segregation of the mix occurs.
- The concrete is consolidated with a vibrator and the vibrator is not used to move the concrete.
- The concrete is smoothed and finished as specified, including the construction of required shear keys.
- The concrete is protected and kept moist for the period specified, including requirements regarding strength and subsequent loading.
- If the air temperature is forecast to be below 40°F 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 specifications, the forms are removed and any damaged or deficient areas are repaired.
- The surfaces are finished as specified, including removal of all metal to at least the specified distance below the surface.

For foundations:

## Check that:

- ODOT records information on existing ground and the required excavation to calculate pay quantities.

## Ensure that:

- Embankment is constructed to the specified density and is smoothed and finished to the specified elevations.
- The Contractor constructs cofferdams, shoring, and other restraining devices according to the accepted working drawings.
- Excavation is performed as specified and provides a smooth, firm foundation, at the specified elevations.
- If a cofferdam protects the foundation work:
  - The cofferdam is constructed according to the accepted working drawings.
  - Construction of the coffer dam and all subsequent work does not violate restrictions in the specifications or required by regulatory agencies.
  - Excavation is performed to the specified elevation, including any possible heaving caused by subsequent pile driving, and the Contractor disposes of or stores the excavated material.
  - If specified, the Contractor places seal concrete to the specified 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 water begins seeping through the cofferdam, the Contractor seals the seepage and removes the water from the work area.
  - The Contractor places backfill and other material, as specified, and removes the cofferdam without violating restrictions.
- If a spread footing will be constructed, the underlying soil material is stable and firm, and is cleaned and finished. Unstable material is removed and replaced with concrete or other stable material.
- The Contractor constructs forms that will produce a concrete element of the specified dimensions and geometry. If concrete is to be placed against undisturbed material, the material is firm and unyielding.
- Reinforcement of the size, number, and dimension is placed, secured, and supported, as specified to prevent movement during concrete placement or other work.

- Other appurtenances, such as electrical conduit or fasteners, are placed and secured.
- Concrete is placed per industry standards and specifications
- Concrete is cured, forms are removed, defects and damage are repaired, and finishing is performed.
- Backfill is placed as specified and affected areas are smoothed and finished.

For substructure elements:

- All prior work has been performed, including:
- Concrete has been placed and cured and has achieved the specified strength.
- All underlying soil materials have been excavated or placed to the specified elevations, have been compacted, and are smooth.
- All unwanted material, within the area of the substructure construction, has been removed and surfaces have been cleaned.
- All elements have been located and marked, and both the Contractor and Inspector understand the markings.
- Falsework, if specified, is constructed according to the accepted working drawings.
- All reinforcement is placed and secured as specified.
- Forms of the dimensions, geometry, and height are constructed and secured as specified.
- Reinforcement is secured/blocked to ensure specified coverage of concrete.
- All other appurtenances, including bolts, drain pipe, fasteners, and electrical conduit, have been installed and secured in the location, orientation, and height as specified.
- If elements of the substructure will be constructed in multiple lifts, devices are installed in the lower lifts to allow the upper lift of forms to be attached, and the concrete achieves the specified strength before the forming for the next lift is started.
- All unwanted material is removed from the formed area prior to placing concrete.
- Forms are set and maintained to the specified line and grade until the concrete hardens. If forms appear to deviate from specified line and grade, either before or during concrete placement, notify the Project Manager.
- Concrete is mixed, placed, finished, and cured as specified.
- When forms are removed, all damage is repaired and the surface is finished as specified.

For superstructure elements:

- All prior work has been completed and unwanted material has been removed from the superstructure area.
- Placement of all superstructure concrete conforms to the sequencing specified.
- The locations and elevations for all portions of the superstructure are located and marked, and both the Contractor and Inspector understand the markings.
- For cast-in-place girders:
  - Falsework is constructed, including:
    - According to the accepted working drawings.
    - If piles are used for the falsework, they are driven to the bearing capacity specified in the accepted working drawings.
    - It is adjusted to provide the specified elevations, slope, and cross section for the work.
    - 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 constructed to the line, slope and height, including placement of a chamfer strip, as specified.
    - Reinforcement and post-tensioning ducts are placed, secured, and supported to ensure location and coverage of concrete, as specified.
    - Construction joints are formed at the specified locations.
    - Required access holes, and drains at the low points of the box girder, are located and formed.
    - Other appurtenances, such as luminaire blockouts, electrical conduit, and bolts or connectors for utility lines, are installed and secured.
    - All unwanted material is removed prior to placement of concrete.
    - Elevations of the top of concrete placement are marked to ensure specified thickness of concrete.
    - Concrete is placed and cured as specified.
  - For stems and diaphragms:
    - All damaged or missing reinforcing, post-tensioning ducts and anchors, electrical conduit, utility blockouts, and other appurtenances are repaired or installed.

- Forms are constructed and reinforcement is blocked to ensure required coverage of concrete.
- The elevations for the top of concrete are marked to ensure 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 constructed per specification.
- All unwanted material is removed prior to placement of concrete.
- Concrete is placed and cured as specified.
- All formwork and unwanted material is removed prior to constructing the deck.
- If precast concrete or structural steel girders are utilized, they are placed, assembled, and stabilized as needed.
- For deck construction ensure that:
  - The specified pre-placement conference between key ODOT and Contractor personnel occurs,
  - Elevations for construction of the deck formwork are marked on the girders, stems, etc. Ensure that appropriate camber has been included in the grades.
  - If precast concrete or steel girders have excessive camber, notify the Project Manager and work with the Contractor to adjust the deck elevations to avoid constructing any section of the deck with insufficient thickness.
  - Forms for the deck are constructed to ensure that the deck is constructed to the specified thickness, dimensions, and cross section.
  - Outside forms for the deck are constructed at the location, vertical and to the specified height, are secured to accommodate all forces on them during construction, and will produce the line and grade on the outside of the deck, including placement of a chamfer strip.
  - Reinforcement and other appurtenances are placed and secured and all damage to coatings is repaired.
  - If the Contractor must construct additional build-up over girders due to camber in the girders, additional reinforcement must be placed in that build-up as specified.
  - The deck finishing machine support system is constructed as detailed in the accepted working drawings.
  - The Contractor surveys and sets the elevation of the support system rail to be a uniform distance above the specified deck elevations, including camber. Remember that the concrete will cause the finishing machine drum to float.
  - Prior to placement of concrete:

- Ensure that all drawings are cross checked for rail, transition, deck, and end panel placements are correct.
- The Contractor adjusts the deck finishing machine carriage rails to match the required cross section for the deck. Remember that the concrete will cause the finishing machine drum to float.
- The Contractor operates the finishing machine over the entire area of the deck and ensures that:
  - The finishing machine will produce a deck surface with the specified thickness of deck beneath.
  - 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.
- The Contractor cleans the deck area of all unwanted material and checks all reinforcement and other appurtenances to ensure that they are secured.
- Weather and climatic conditions, on the day of concrete placement and for the specified following period, comply with specified requirements.
- The Contractor 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 a rate to allow timely placement, as specified.
  - 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 roughened or has required shear keys constructed, as specified.
- 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 ensures the specified deck thickness and smoothness, including ensuring that the finished surface at the ends of the placement will match the grade line of adjoining surfaces.
- Texturing is performed at the specified time in the process to ensure adequate texturing, but to avoid tearing of the surface.
- The concrete is protected from 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 repaired and surfaces are finished as specified.
- For above deck construction:
  - Required post-tensioning has been done and supporting forms and falsework have been removed or released.
  - Reinforcement and other appurtenances, such as electrical conduit and bolts, have been placed and secured, including allowance for expansion and contraction joints.
  - Forms have been constructed, or an approved slipform system is used, that will produce a structural element of the specified dimensions and height with the specified line, elevation, and grade.
  - Concrete is placed and cured, forms are removed if used, damage is repaired, and the surfaces are finished as specified.
  - Other elements, such as metal rail, sign mounts, and luminaries, are installed.
- The Contractor and Inspector test the smoothness of the roadway surface as specified, and, if needed, the Contractor grinds or repairs areas of unacceptable smoothness.
- Required utility fixtures and other appurtenances are attached to or installed in the structure.
- The Contractor removes and disposes of all unwanted materials.
- All approach work is completed.

## Measurement

Measurement will be on the lump sum or volume basis, unless specified otherwise, for concrete. Unless otherwise specified, measurement for saw cut texturing will be on the area basis.

If payment is by lump sum no measurement of quantities will be made for this work. As work is performed, prepare and submit a source document, such as an [Installation Sheet \(form 734-2605\)](#), to justify payment.

If measurement is by volume, measure each structure, and record those measurements. As work is performed sketch and calculate the volume of each structure completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If measurement is by area, as work is performed, sketch and calculate the area of texturing completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document 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 as specified, in the [Manual of Field Test Procedures](#) for field-tested materials, and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes as specified certified personnel to sample and test materials for quality control.
- For those manufactured elements that require inspection at the manufacturer facility, the required inspection is performed.

Ensure that:

- The ODOT Quality Control Compliance Specialist (QCCS) is aware of the work schedule, and required verification testing is performed.
- The Contractor provides quality documentation 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 ensure that the transition will be smooth. Among other things, that involves ensuring that:

- The roadway and bridge deck are on the same grade line, cross section, and superelevation.
- The backfill and embankment in the area are placed and compacted as specified.
- Forms for the panels will produce a panel of the specified 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 is of the specified grade and smoothness.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Ensure that:

- 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.
- Elevations set for the panel will result in a panel of the specified depth, dimensions, geometry, line, and grade.
- The underlying material is compacted and is smoothed and finished as specified.
- Reinforcement of the size and type is placed and supported to provide the cover of concrete specified.
- Weather conditions are as specified to perform quality work.
- The forms and underlying material are dampened prior to placing concrete.
- Prior to placement of concrete:
  - Ensure that all drawings are cross checked for rail, transition, deck, and end panel placements are correct.
  - The concrete is mixed, furnished, and tested as specified.
- 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 specified finished elevation of, and to seal, the surface.
- The Contractor checks and ensures the specified finished elevations and grades of the panel using a straightedge, string line, or other device(s).
- The surface is textured as specified.
- The concrete is cured by keeping it moist for the specified period.
- The Contractor removes forms and unwanted material, disposes of it, 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

Measurement will be on the area basis, unless specified otherwise. As work is performed, sketch and calculate the area completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00550 – Precast Prestressed Concrete Members

This work consists of the manufacture, storage, transport and installation of precast, prestressed, concrete members.

### Quality

Quality requirements are as specified, in the [Manual of Field Test Procedures](#) for field tested materials, and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes as specified certified personnel to sample and test materials for quality control.
- For those manufactured elements that require inspection at the manufacturer facility, the required inspection is performed.

Ensure that:

- The ODOT Quality Control Compliance Specialist (QCCS) is aware of the work schedule, and required verification testing is performed.
- The Contractor provides quality documentation as required.

### Construction

In most cases, representatives of the ODOT Structural Services Engineer will inspect the production of precast, prestressed concrete members. If so, check that the ODOT Structural Services Engineer is aware of the work schedule.

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

- The surface, on which each member will be supported, is cleaned and prepared as specified, including placement of bearing pads or other devices if required.
- Each precast member is located on the supporting member, with the correct clearance from adjacent construction.
- 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

Unless specified otherwise, measurement is by length. Measure and record the length of structure as work is performed, and sketch and total the length constructed daily. Submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment

## Section 00555 – Post-Tensioning

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

*It is expected that inspection will be performed by a Certified Bridge Construction Inspector.*

## Quality

Quality requirements are as specified and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes as specified certified personnel to sample and test materials for quality control.
- For those manufactured elements that require inspection at the manufacturer facility, the required inspection is performed.
- The Contractor submits stamped working drawings for review by the Engineer.
- Samples of the tensioning strand, bolts, or other material are submitted to the ODOT Materials Laboratory for testing as required. Check that test results meet specifications before the material is incorporated.

Ensure that:

- The Contractor provides quality documentation as required.
- As the tensioning strand, bolts, or other tensioning material is delivered, it is protected from moisture or other damage until it is encapsulated in the work.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Complete the [Post-Tension Record \(form 734-2594 or 2594a\)](#), [Post-Tensioning Grouting Record \(form 734-2697\)](#), and the [Post-Tensioning Strand Installation Record \(form 734-2696\)](#) for the project records.

Ensure that:

- As the ducts are installed:
  - The specified number of ducts is located with the specified geometry and within specified tolerances at the specified location.
  - Anchor devices are installed at the location and angle specified.
  - 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 secured to reinforcement or other materials to prevent displacement during the placement of concrete.
  - All damage to the ducts is 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 Contractor provides certified calibration information for 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 debris when strand is placed in them.
  - The concrete achieves the specified strength before tensioning is performed.
  - All tendons are tensioned as specified, and the Contractor and Inspector verify the 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 bonded and grouted as specified within the specified timeframe and after the strands are placed in the ducts.
  - Each duct is cleaned before grout is installed.
  - The Contractor furnishes a commercial, pre-packaged, thixotropic grout as specified.
  - All grout is mixed to the manufacturer recommended proportions and is installed in the ducts within the specified allowable timeframe after mixing.
  - Vents are plugged only after grout has replaced all water, air, and other unacceptable materials.
  - All grouting and anchorage recesses are filled with concrete and finished as specified.

## Measurement

Unless specified otherwise there will be no measurement of quantities. As work is performed document the work with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00560 – Structural Steel Bridges

This work consists of furnishing, fabricating and erecting structural steel structures as shown or specified.

*It is expected that inspection will be performed by a Certified Bridge Construction Inspector.*

## Quality

Quality Documentation is as specified, and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes as specified certified personnel to sample and test materials for quality control.
- For those manufactured elements that require inspection at the manufacturer's facility, the required inspection is performed.

- The Contractor prepares and submits working drawings for review by the Project Manager.
- Samples of the steel, bolts, finishes, or other material are submitted to the ODOT Materials Laboratory for testing as required. Check that test results meet specifications before the material is incorporated.

Ensure that:

- The Contractor provides quality documentation as required.
- As the bolts or other material is delivered, it is protected from moisture or other damage until it is incorporated into the work.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## **Construction**

Check that:

- The Project Manager, with assistance from the ODOT Structural Services Engineer as appropriate, identifies the ODOT Inspector of the structural steel fabrication process
- The Project Manager, Contractor, Steel Fabricator, the ODOT Inspector of the structural steel fabrication, and ODOT Structural Services Engineer, as appropriate, meet for a prefabrication conference to discuss all phases of the steel fabrication and work.

Check that:

- The ODOT Inspector of the steel fabrication process ensures that:
  - The Contractor provides quality documentation, and only utilizes material and labor that meets specified requirements.
  - Discrepancies in the shop or working drawings are identified, as soon as possible, and corrected or resolved.
  - Elements are fabricated and joined as specified.
  - All required testing is performed, including ultrasonic and magnetic particle inspection of welds.
  - The Contractor removes and replaces elements that have been improperly fabricated or constructed.
  - All material is handled and stored as specified.

- Elements are prepared, coated and protected as specified until they are shipped to the project site.
- All elements are marked or identified to ensure specified sequence of shipping and erection.
- Bolts are tightened and tested as specified.

Ensure that:

- As materials and elements are delivered and erected:
  - If work is over or near a waterway or other environmentally sensitive area, the Contractor complies with all requirements.
  - All material is handled, stored, and supported to prevent damage.
  - If material has been damaged, it is replaced.
  - The Contractor implements 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 located and marked, and both the Contractor and Inspector understand the markings.
  - All areas of erection have been constructed, cleaned of unwanted materials, and have received the specified treatment before erection starts.
  - Required falsework or temporary supports have been constructed in the specified/designed locations and to the specified/designed elevation and grade.
  - Bolts and other materials are as specified.
  - Bearings and anchorages are installed as specified.
  - All elements are erected and assembled as specified and as appropriate according to industry practice.
- All damage is repaired and all structural steel is prepared and coated as specified.
- The Contractor removes all falsework, temporary supports, and other unwanted materials, disposes of them, makes smooth and restores affected areas, as specified.

## Measurement

Unless specified otherwise there will be no measurement of quantities for Structural Steel Bridges. As work is performed document the work with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00570 – Timber Bridges

This work consists of furnishing and installing timber and glued laminated timber bridges.

*It is expected that inspection will be performed by a Certified Bridge Construction Inspector.*

### Quality

Quality Documentation is as specified, and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes as specified certified personnel to sample and test materials for quality control.
- For those manufactured elements that require inspection at the manufacturer facility, the required inspection is performed.
- The Contractor prepares and submits working drawings for review by the Project Manager.
- Samples of the timber, fasteners, finishes, or other material are submitted to the ODOT Materials Laboratory for testing as required. Check that test results meet specifications before the material is incorporated.

Ensure that:

- The Contractor provides quality documentation as required.
- As the material is delivered, it is protected from moisture or other damage until it is incorporated into the work.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

### Construction

In most cases, representatives of the ODOT Structural Services Engineer will inspect the manufacture of timber members. Check 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.

Check that the ODOT Structural Services Engineer ensures that:

- Each member is constructed of the material and dimensions specified.
- Beams or stringers are constructed such that all knots or other defects are in the top, or compressive, portion of the member.
- Members do not have checking, cracking, warping, or other defects. If needed.
- Material is handled, stored, stacked, and protected as specified.
- If wood material must be treated, the manufacturer performs tests to ensure specified treatment.

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

- 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 locations dimensions and spacing, as specified.
- Beams or stringers are installed such that all knots or other defects are in the top, or compressive, portion of the member.
- Members have not developed 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.
- All cuts and abrasions in treated timber are treated with a field preservative.
- All damaged wood and other material is removed and replaced.
- All fasteners are installed and tightened, as required, and damage to treatment is repaired.
- Trusses show no irregularity of line.
- Line and grade of wheel guards and railings is smooth and true.
- The Contractor cleans up all unneeded or unwanted material and disposes of it.

## Measurement

Refer to the specification for measurement. As work is performed, measure, and prepare and submit the measurements, and supporting calculations, on [an Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00581 – Bridge Drainage Systems

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

*It is expected that inspection will be performed by a Certified Bridge Construction Inspector.*

### Quality

Quality Documentation is as specified, and in the [Non-Field Tested Materials Acceptance Guide](#). Check that the Contractor is aware of those requirements. Ensure that the Contractor provides quality documentation as required.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

### Construction

Ensure that:

- Locations for the deck drains are accurately located and marked, and both the Contractor and Inspector understand the markings.
- 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 specified 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 secured to the supporting surface.
- The Contractor tests the systems to ensure that each system is water tight and free of obstructions.
- The Contractor cleans up unwanted material and disposes of it and repairs any damage.

### Measurement

Unless specified otherwise, measurement will be on a unit basis. Count each location where a drainage system is constructed. Sketch and calculate the number of systems completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00582 – Bridge Bearings

This work consists of constructing and installing bearings for bridges.

*It is expected that inspection will be performed by a Certified Bridge Construction Inspector.*

### Quality

Quality Documentation is as specified, in the [Non-Field Tested Materials Acceptance Guide](#), and in the [Qualified Products List](#). Check that the Contractor is aware of those requirements. Ensure that the Contractor provides quality documentation as required.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

### Construction

Ensure that:

- Bearings are constructed of the specified components.
- All exposed steel surfaces are prepared and coated as specified.
- All materials have been protected, as recommended by the manufacturer, including protection from physical damage.
- If work is over or near a waterway or other environmentally sensitive area, the Contractor complies with all requirements.
- Elastomeric bearings are placed over a concrete surface as specified.
- 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 repair all damage, and removes and disposes of all unwanted material.

### Measurement

Unless specified otherwise, measurement will be on a unit basis. As work is performed, prepare and submit the quantities on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00583 – Electrical Conduit in Structures

This work consists of furnishing and installing electrical conduit in structures.

### Quality

Quality Documentation is as specified, and in the [Non-Field Tested Materials Acceptance Guide](#). Check that the Contractor is aware of those requirements. Ensure that the Contractor provides quality documentation as required.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

### Construction

Ensure that:

- All electrical installation is performed by a licensed Electrician.
- The Contractor is aware of all required locations for electrical conduit and other devices in structures, and ensures their installation before concrete forming and concrete placement is done at each location.
- Conduit is of the size and type that is specified.
- Where conduit is to be imbedded in concrete, the conduit is secured and supported to prevent displacement during placement of concrete and other work.
- Expansion joints are 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 specified.
- Elbows, junction boxes, cabinets, and other appurtenances are also 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

Unless specified otherwise, measurement will be on a length basis. As work is performed take measurements, and prepare and submit the measurements on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00584 – Elastomeric Concrete Nosing

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

### Quality

Quality Documentation is as specified, and in the [Non-Field Tested Materials Acceptance Guide](#). Check that the Contractor is aware of those requirements. Ensure that the Contractor provides quality documentation as required.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

### Construction

Ensure 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.
- As material is delivered to and stored on the project, it is protected as recommended by the manufacturer.
- The manufacturer's representative has advised the Contractor and the Inspector about installation procedures and is on-site during installation.
- The Contractor has trained its installers, and complies with and provides all health and safety requirements for the product(s) that will be used.
- Abutting pavement is sawcut to provide a smooth, solid surface.
- The surface, for the application, has been cleaned and prepared, including the removal of the wearing surface material, bond breaker, concrete, and other material, as specified.
- Primer is applied as specified by the manufacturer.
- Elastomeric concrete is mixed and placed, before the primer has set, and is compacted, smoothed, and finished to the required shape, as specified.
- Nosing is protected until cured.
- The Contractor cleans up and disposes of unwanted material.

## Measurement

Refer to the specification for measurement. As work is performed, measure, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00585 – Expansion Joints

This work consists of fabrication, joint preparation, and installation of expansion joints in structures.

*It is expected that bridge related inspection will be performed by a Certified Bridge Construction Inspector.*

## Quality

Quality Documentation is as specified, in the [Non-Field Tested Materials Acceptance Guide](#), and in the [Qualified Products List](#). Check that the Contractor is aware of those requirements. Ensure that the Contractor provides quality documentation as required.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Ensure that:

- The Contractor is providing and installing a product that complies with specified requirements, and has been approved by the Project Manager.
- As material is delivered to, handled, and stored on the project, it is protected as recommended by the manufacturer.
- All manufactured materials comply with shop or accepted working drawings and all specified coatings have been applied.
- The manufacturer's representative has advised the Contractor and the Inspector about proper installation procedures and is present during construction of joints.
- The Contractor has trained its installers, and complies with and provides all health and safety requirements for the product(s) that will be used.
- Abutting existing concrete and pavement is sawcut to provide a smooth, solid surface.
- Existing concrete, that is unacceptable, has been removed and repaired.
- The surface, for the application, has been cleaned and prepared, including the removal of unacceptable concrete and other material.

- For filled expansion joints:
  - The Contractor 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 installation is constructed according to the accepted working drawings.
  - The Contractor performs a leakage check and performs all needed repair.
- For armored corner joints:
  - The new devices are installed to specified elevation, slope, and cross-section, and are secured and supported to prevent movement during subsequent work.
  - Concrete or elastomeric concrete is mixed, placed, compacted, smoothed, and finished as specified.
  - The preformed strip seal is 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 removed to the specified dimensions.
  - The joint is constructed and the materials are mixed, placed, compacted, smoothed, and finished, as specified.
- For poured sealant joint seals:
  - The backer rod is placed and secured to prevent loss of the sealant.
  - Sealant is placed to the depth and finished as specified.
- For preformed compression joint seals:
  - The Contractor provides the specified size of preformed seal.
  - 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 specified location in the joint.
- For preformed strip seals:
  - Steel retainers are 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 specified location in the assembly.

- For modular expansion joint seals:
  - Each device is installed according to the shop drawings and provides the specified elevation, slope, and cross section to match the abutting deck.
- Each installation is protected from damage until all materials have set or achieved the specified strength.
- The specified three levels of inspection are satisfied.
- The Contractor cleans and disposes of all unwanted material.

## Measurement

Refer to the specification for measurement. As work is performed, measure, and prepare and submit the measurements, and supporting calculations, on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00587 – Bridge Rails

This work consists of constructing bridge rails.

*It is expected that inspection will be performed by a Certified Bridge Construction Inspector.*

## Quality

Quality Documentation is as specified, and in the [Non-Field Tested Materials Acceptance Guide](#). Check that the Contractor is aware of those requirements. Ensure that the Contractor provides quality documentation as required.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Ensure that:

- The Contractor removes existing rails and disposes of the unwanted material as specified.
- For constructing concrete rails:
  - Specified reinforcement was placed in previous construction to allow placement of rail reinforcement or anchor devices are installed in existing construction.

- Specified size, shape, and quantity of reinforcement is installed and secured to ensure specified coverage by concrete.
- Contraction and expansion joints areas are installed in the reinforcing as specified.
- If required, electrical conduit and other appurtenances are installed and secured.
- Expansion joint materials, including those in electrical conduit or other appurtenances, are placed and secured.
- If used, fixed forms:
  - Are of a composition and finish to provide a smooth concrete surface without excessive finishing.
  - Are of the shape to produce the specified rail shape.
  - Are secured to prevent movement during concrete placement.
  - Have indentations or other devices to construct expansion and contraction joints and the location of those devices matches the locations in the reinforcement and conduit, as specified.
  - Are placed such that the specified width and other dimensions of the rail will result.
- If the Contractor will use a slipform operation:
  - The reinforcing is braced to prevent longitudinal movement.
  - The mold is of the specified shape and size.
  - The concrete and slipforming operation complies with the requirements of Section 00587.42(c)
- Prior to placement of concrete:
  - Ensure that all drawings are cross checked for rail, transition, deck, and end panel placements are correct.
- After placement of concrete:
  - Concrete is furnished, mixed, and placed as specified.
  - Contraction joints are constructed as specified.
  - Surfaces are finished as specified.
  - Concrete is cured and protected from damage as specified.
  - **THE INSPECTOR MUST REMAIN ON-SITE UNTIL THE CURE IS COMPLETELY IN PLACE.**
  - All damage is repaired and surfaces are finished and coated as specified.
- For metal rails:
  - Bolts or other anchors are located and cast into prior concrete construction.

- Rails are coated as specified.
- Posts and rails are installed and adjusted to provide a smooth line and grade.
- All connections are tightened
- Grout pads are constructed under the posts as specified.
- All damage is repaired.
- The Contractor cleans up and disposes of unwanted materials.

## Measurement

Unless specified otherwise there will be no measurement of quantities for Bridge Rails. As work is performed document the work with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00591 – Waterproofing Membrane

This work consists of furnishing and placing bridge deck waterproofing membrane on bridge decks.

It is expected that inspection will be performed by a Certified Bridge Construction Inspector.

## Quality

Quality requirements are as specified, in the [Non-Field Tested Materials Acceptance Guide](#), in the [Manual of Field Test Procedures](#) – Field Tested Materials Acceptance Guide, and in the [Qualified Products List](#).

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

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Determine which type of system that the Contractor will construct, and become familiar with the manufacturer's recommendations and the specified requirements.

Check that the specified pre-placement meeting with the Project Manager has been held.

Also, ensure that:

- Limits for the installation are 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.
- The weather and surface conditions are as specified 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 prepared and cleaned.
- If required, the Contractor applies a leveling course of asphalt pavement to specified thickness, grade, cross section, and smoothness.
- The Contractor has adequate personnel, equipment, and materials on hand before starting the membrane work.
- The Contractor performs the work according to the manufacturer's recommendations.
- The Contractor removes or releases bubbles beneath the membrane.
- The Contractor protects the work from traffic or other damage until the subsequent layer of surfacing is in place and repairs any damage.
- The Contractor contains and disposes of waste or excess material.

### **Measurement**

Measurement for waterproofing membrane will be by area, unless specified otherwise. As work is performed sketch and calculate the area of membrane completed daily, and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment

### **Section 00593 – Powder Coating Metal Structures**

This work consists of preparing and powder coating new and existing metal structures and features.

### **Quality**

Quality requirements are as specified, in the [Non-Field Tested Materials Acceptance Guide](#), and in the [Manual of Field Test Procedures](#)– Field Tested Materials Acceptance Guide, and in the [Qualified Products List](#).

Check that:

- The Contractor is aware of those requirements.

- The Contractor utilizes specified certified personnel to sample and test materials for quality control.
- For those manufactured elements that require inspection at the manufacturer facility, the required inspection is performed.

Ensure that:

- The ODOT Quality Control Compliance Specialist (QCCS) is aware of the work schedule, and required verification testing is performed.
- The Contractor provides quality documentation as required.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## **Construction**

Ensure that:

- The Contractor follows the manufacturer's recommendations.
- When not in conflict with the Specifications or Special Provisions, the Contractor follows best practices of the trade.
- The Contractor protects the material surfaces from damage and contamination.
- The Contractor protects the material during storage on the project site.
- The Contractor repairs any damaged surface and coating.

## **Measurement**

Unless specified otherwise there will be no measurement of quantities for Powder Coating Metal Structures. As work is performed document the work with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00594 – Preparing and Coating Steel Structures

This work consists of preparing and coating new metal structures and features in the shop and in the field.

### Quality

Quality requirements are as specified, in the [Non-Field Tested Materials Acceptance Guide](#), and in the [Manual of Field Test Procedures](#)– Field Tested Materials Acceptance Guide, and in the [Qualified Products List](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes specified certified personnel to sample and test materials for quality control.
- For those manufactured elements that require inspection at the manufacturer facility, the required inspection is performed.

Ensure that:

- The ODOT Quality Control Compliance Specialist (QCCS) is aware of the work schedule, and required verification testing is performed.
- The Contractor provides quality documentation as required.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

### Construction

Complete [Structure Coating Daily Progress Report \(form 734-1789\)](#).

Check that:

- The specified Pre-coating Conference with the Project Manager has occurred.

Ensure that:

- 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:

- 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, ensure that compressed air is checked for contaminants, air for breathing is monitored for carbon monoxide or other hazardous substances, the containment meets specified 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.
  - Verify that workers receive specified 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.
  - Ensure that processes will contain the removed materials.
- Immediately prior to application of each coat:
  - Verify that environmental conditions are appropriate for coating application.
  - Ensure that areas of unacceptable surface preparation have been 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 specified requirements and the manufacturer's recommendations.
  - Verify that coverage is complete and as specified, 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 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 ensure complete coverage and uniform appearance.
  - Ensure that the Contractor repairs all deficient, non-compliant, or damaged areas.
- The Contractor:
  - Protects pedestrians, traffic, other structure surfaces, and elements of the environment
  - Constructs the containment system according to shop or working drawings and the requirements of the specification 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 filtered and monitored for presence of carbon monoxide and other hazardous substances.
- Oil, grease, bird droppings, and other similar material are removed prior to required surface preparation.
- Surfaces are prepared to the required specification and are protected or restored until coating is applied.
- Removed material is collected, stored, and disposed. Also, no material is allowed to leak from containers.
- The containment system does not allow any leaking of material.

- All surfaces and elements, that are not to be prepared or coated, are protected and any damage is repaired.
- Coatings are:
  - Mixed, thinned, and applied according to the manufacturer's recommendations.
  - Applied only when weather, climatic, and other environmental conditions are as recommended by the manufacturer or as specified.
  - Applied to the thickness, in the number of applications required by the manufacturer, product, or application conditions, as specified.
  - Allowed to cure between applications or coats.
  - Protected until the next application, including exposure to the cleaning process.
  - Repaired, if damage or improper application occurs.
  - Tested for thickness and deficient or unacceptable areas are corrected.
- 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 repaired and restored.
- The Contractor cleans up and restores the site and removes and disposes of all unwanted material.

## Measurement

No measurement of quantities will be made for this work. Payment is on a lump sum basis unless specified otherwise. As work is performed, prepare and submit a source document, such as an [Installation Sheet \(form 734-2605\)](#), to justify payment.

## Section 00595 – Reinforced Concrete Box Culverts

This work consists of constructing cast-in-place reinforced concrete box culverts and precast reinforced boxes.

## Quality

Quality requirements are as specified in the Specification, in the [Manual of Field Test Procedures](#), and the [Non-Field Tested Materials Acceptance Guide](#) – Field Tested Materials Acceptance Guide, and in the [Qualified Products List](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes specified certified personnel to sample and test materials for quality control.
- For those manufactured elements that require inspection at the manufacturer facility, the required inspection is performed.

Ensure that:

- The ODOT Quality Control Compliance Specialist (QCCS) is aware of the work schedule, and required verification testing is performed.
- The Contractor provides quality documentation as required.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## **Construction**

Check that:

- The Contractor complies with all specified environmental and in water restrictions or those required by regulatory agencies.
- That ODOT performs verification testing for concrete.

Ensure that:

- The location and limits for the structure have been located and marked, and both the Contractor and Inspector understand the markings.
- The location and limits for the structure match the waterway or other feature that will go through the structure.
- Flowing water is re-routed or handled during construction.
- The surface underlying the structure is constructed or excavated to the specified elevation and limits, and is compacted as specified.
- If the work will tie into an existing structure, all affected portions of the existing structure have been removed, abutting surfaces have been finished, and required anchors have been installed.
- For precast elements:
  - The underlying material will uniformly support the new elements to the specified line and grade.

- Joints between elements are clean and sealed.
- Surfaces and damage are repaired and finished.
- Reinforcement is placed, secured, and supported to ensure placement in the structure with coverage of concrete, as specified.
- Forming for all elements will ensure that specified thickness will be controlled and specified shapes and dimensions will result.
- Construction joints are placed in the specified orientation.
- The timing and sequence of concrete placement for walls and top slab comply with specified requirements.
- Concrete is mixed, delivered, tested, placed, and finished as specified. Ensure that ODOT performs verification testing as needed.
- Concrete receives the specified cure after placement.
- **THE INSPECTOR MUST REMAIN ON-SITE UNTIL THE CURE IS COMPLETELY IN PLACE.**
- Before forms or falsework are removed or subsequent loading is applied, the concrete has achieved the specified strength or the specified time has elapsed since the concrete was placed.
- The concrete surfaces are finished as specified.
- Backfilling is performed according to Section 00510 and affected areas are smoothed and finished.

## Measurement

Unless specified otherwise, quantities of reinforced concrete box culverts will be measured on the length basis, no measurement of quantities will be made for wingwalls and aprons, and no separate measurement will be made for concrete and reinforcement used.

Where measurement is by length, measure and record the length of box culvert along its longitudinal axis. As work is performed, sketch and total the length constructed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment

## Section 00596 – Retaining Walls

This work consists of constructing retaining walls.

### Quality

Quality requirements are as specified, in the [Manual of Field Test Procedures](#), and in the [Non-Field Tested Materials Acceptance Guide](#) – Field Tested Materials Acceptance Guide, and in the [Qualified Products List](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes specified certified personnel to sample and test materials for quality control.
- For those manufactured elements that require inspection at the manufacturer facility, the required inspection is performed.

Ensure that:

- The ODOT Quality Control Compliance Specialist (QCCS) is aware of the work schedule, and required verification testing is performed.
- The Contractor provides quality documentation as required.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

### Construction

Check that:

- 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 tests the material and ODOT QA performs required verification testing.
- 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.

Ensure that:

- The location for each wall is located and marked, and both the Contractor and Inspector understand the markings.
- For excavation and backfill:
  - Excavation is performed to the specified lines, grades, and slopes and slopes are supported or restrained as specified.
  - Unsuitable and unstable material in the bottom of the excavation is either stabilized or removed and replaced with suitable material.
  - The bottom of the excavation is to the specified elevation, and is smooth, firm, and compacted as specified.
  - Backfill is placed in the specified lift thickness, compacted to the specified density and stability, and tested as required and needed. Unacceptable density or compaction must be corrected or the affected material is removed and replaced.
- Drainage systems for the wall are installed or constructed as specified.
- Forming for each element of cast-in-place concrete is done to ensure the specified size, shape, thickness, and surface treatment of the element.
- Reinforcement of the specified size and spacing, and other appurtenances are placed, including expansion and contraction joints.
- For cast-in-place concrete:
  - Concrete is mixed, delivered, placed, consolidated, and finished to the specified elevations.
  - Concrete is cured and protected.
  - **THE INSPECTOR MUST REMAIN ON-SITE UNTIL THE CURE IS COMPLETELY IN PLACE.**
  - Before forms are removed, concrete has reached the specified time or strength requirement.
  - After forms are removed, concrete is finished as specified.
  - After concrete has achieved the specified strength, backfill material is placed, and compacted. Unacceptable compaction is repaired or the material is removed and replaced, as specified.
- For walls and wall elements other than cast-in-place concrete:
  - Leveling pads or footings, if specified, are constructed.
  - Elements are placed in the specified sequence, connected or attached, and backfilled with specified materials placed and compacted in specified lift thickness.
  - The work is continually checked for deviations in wall line, grade, etc. Unacceptable work is corrected or the unacceptable elements are removed and replaced.

- The Contractor cleans up and disposes of unwanted material, makes smooth and finishes the affected area as specified.

## Measurement

Measurement for retaining walls will be by area, unless specified otherwise, and will be the area shown in the plans, in a vertical plane, for each retaining wall. Calculate the area wall shown in the plans. As work is performed, sketch the walls completed daily, and submit that sketch along with the related area calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00597 – Sound Walls

This work consists of furnishing and constructing sound walls.

## Quality

Quality requirements are as specified, in the [Manual of Field Test Procedures](#), and in the [Non-Field Tested Materials Acceptance Guide](#) – Field Tested Materials Acceptance Guide, and in the [Qualified Products List](#).

Check that:

- The Contractor is aware of those requirements.
- The Contractor utilizes specified certified personnel to sample and test materials for quality control.
- For those manufactured elements that require inspection at the manufacturer facility, the required inspection is performed.

Ensure that:

- The ODOT Quality Control Compliance Specialist (QCCS) is aware of the work schedule, and required verification testing is performed.
- The Contractor provides quality documentation as required.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## Construction

Ensure that:

- The location of each sound wall is located and marked, and both the Contractor and Inspector understand the markings.
- The Contractor ensures that buried utilities and other facilities are located and marked.
- Excavation is performed to the limits, shoring or other slope protection is constructed, unsuitable or unstable material is repaired or replaced, and the excavated area is smoothed and compacted, all as specified.
- Wall components are installed in the specified manner and to produce the specified alignment, grade, and finish.
- All damage is repaired or the element is replaced.
- For concrete block walls:
  - The specified reinforcement and grout is furnished and placed as specified.
  - Specified surfaces are waterproofed or damp proofed.
  - The Contractor cleans up and disposes of unwanted materials and makes smooth and finishes the affected area.

## Measurement

Measurement for sound walls will be by area, unless specified otherwise, and will be the actual wall face area projected onto a vertical plane along one side of the wall. As work is performed sketch and calculate the area of walls completed daily, and submit that sketch along with the related area calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00599 – Concrete Slope Paving

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

## Quality

Quality requirements are as specified, in the [Manual of Field Test Procedures](#), and in the [Non-Field Tested Materials Acceptance Guide](#) – Field Tested Materials Acceptance Guide, and in the [Qualified Products List](#).

Check that:

- The Contractor is aware of those requirements.

- The Contractor utilizes specified certified personnel to sample and test materials for quality control.
- For those manufactured elements that require inspection at the manufacturer facility, the required inspection is performed.

Ensure that:

- The ODOT Quality Control Compliance Specialist (QCCS) is aware of the work schedule, and required verification testing is performed.
- The Contractor provides quality documentation as required.

Gather and submit required quality documentation. Record other pertinent information on the [General Daily Progress Report \(form 734-3474\)](#).

## **Construction**

Ensure that:

- The location and limits for the work have been located and marked, and both the Contractor and Inspector understand the markings.
- The surfaces, on which the work will be performed, are compacted as specified, and smooth, and have been finished to specified line, slope, and grade.
- Bedding material has been placed to the thickness and compacted as specified.
- Curbs are constructed to the specified elevation, grade, orientation, and geometry to result in the specified exposure from the slope or berm paving and the surrounding surface.
- Joints of the blocks or panels form a smooth line in the specified orientation.
- Joints between precast blocks are preserved by placement of spacers until the joint filler material is placed.
- Joints between the precast blocks are filled with specified material and excess joint material is removed from the surface.
- The Contractor disposes of excess materials.
- Affected areas are smoothed and finished.

**Measurement**

Measurement shall be as specified.

Where measurement for slope or berm paving is by area, as work is performed, sketch and calculate the area of paving completed daily, and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

Where measurement is by length measure, record the length of slope paving curb along the longitudinal axis. As work is performed, sketch and total the length constructed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.



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**Section 00600**



## 600's – Bases

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### Section 00610 – Reconditioning Existing Roadway

This work consists of reconditioning and preparing existing subgrades, bases, surfacings and pavements on which an additional layer or course of material is to be placed. The work includes existing shoulders, cut ditches, road connections, approach roads, ramps bridge decks if not provided for elsewhere, and other roadbed areas on which construction work under the contract is to be performed.

#### Quality

Unless required differently in the specifications, no quality documentation is required for this work. If no quality documentation is required, record pertinent information in the [General Daily Progress Report \(form 734-3474\)](#).

#### Construction

- Removal and replacement of unsuitable materials -- ensure that:
  - The Contractor removes all unstable materials in the subgrade, subbase, base, surfacing or pavement areas as directed and disposes the materials according to the specifications.
  - The Contractor replaces the removed materials with materials furnished for other purposes under the contract.
- Ditches and subgrades -- ensure that:
  - The Contractor cleans, trims, and restores existing cut ditches to designated cross section and condition.
  - The Contractor reshapes, waters, processes, prepares, and compacts the existing subgrade to the lines, grades, slopes, and cross sections established.
- Aggregate subbase, base, and surfacing -- ensure that:
  - The Contractor reshapes, waters, processes, prepares the upper layer of existing surface to the lines, grades, slopes, and cross sections established.
  - The Contractor compacts to the densities required for similar new work.
- Surfacing -- ensure that:

- The Contractor cleans existing surfacings of all loose material, dirt, and dust by an approved method.

### **Measurement**

Unless specified otherwise there will be no measurement of quantities for reconditioning and preparation. Materials used in the replacement of unstable materials according to the specification will be measured in the manner applicable to the pay item for which the materials are furnished. As work is performed document the work with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## **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 specifications, no quality documentation is required for this work. If no quality documentation is required, record pertinent information in the [General Daily Progress Report \(form 734-3474\)](#).

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

### **Construction**

Ensure that:

- Locations for the work are accurately identified and marked and both the Contractor and Inspector understand the markings.
- Existing catch basins and manholes are marked to avoid damage.
- Line, grade, and cross slope will be accurately controlled, including use of independent grade control if needed.
- The Contractor does not use a heating device with the planing machine.
- The planing machine leaves a smooth edge.
- Planing 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.
- The planed or ground surface is cleaned and loose material is removed.
- Asphalt concrete wedges and appropriate warning signs are installed if planing/grinding is not completed during one shift.

- The Contractor tests the surface tolerance with 12-foot straight edge after planing. The variation of the top of any two ridges and the straight edge shall not exceed the specified value.
- Coordinate with the Project Manager to have sections of loose material within the underlying pavement layer(s), exposed as a result of the cold planing operation, removed. The exposed localized sections would typically be areas of stripped or otherwise failed asphalt concrete. Contractor should repair these sections as directed by the Project Manager prior to allowing traffic on the cold plane surface. Document any repairs on the [General Daily Progress Report \(form 734-3474\)](#) directed by the Project Manager, and refer to any other specific Standard Specification Section that applies.
- After traffic has been allowed to drive on the cold planed surface, check for areas of rutting, raveling, delamination, or cracking caused by traffic in coordination with the Project Manager, prior to paving leveling course. Document any repairs on the [General Daily Progress Report \(form 734-3474\)](#) directed by the Project Manager, and refer to any other specific Standard Specification Section that applies.

### **Measurement**

Measurement for cold plane pavement removal will be by area, unless specified otherwise. As work is performed sketch and calculate the area of cold plane pavement removal completed daily, and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

### **Section 00635 – Grid-Rolled Aggregate Subbase**

### **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. Sections 00635 and 00641 also require the aggregates to be mixed with water before final placement.

### **Quality**

Unless required differently in the specifications, no quality documentation is required for Section 00640 work. If no quality documentation is required, acceptance is visual by the Project Manager. Record all pertinent information in the [General Daily Progress Report \(form 734-3474\)](#).

Quality requirements for Sections 00635, 00640 and 00641 are in the Standard Specifications and in the [Manual of Field Test Procedures](#) – Field Tested Materials Guide.

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

For Sections 00635, 00640, and 00641:

- Check that required quality control testing is performed and the material is acceptable, before it is placed
- Check that aggregates are stockpiled in accordance with Section 00680.40 and .41 and non-specification material is removed as required, or is not placed in the stockpile
- Ensure that the ODOT Quality Control Compliance Specialist is aware of the aggregate delivery schedule, and required verification testing is performed

## Construction

Ensure that:

- For foundation preparation, prior to placement of base material:
- The work area is laid out and marked and both the Contractor and Inspector understand the markings.
- The underlying surface (normally the subgrade) has been prepared, including:
  - The surface has been trimmed and finished to the specified grades and cross section.
  - That topsoil or other unacceptable debris has been removed.
  - The surface has been compacted and compaction testing has been done, including checking for deflection under movement of a loaded haul vehicle.
  - All areas of inadequate compaction or instability have been repaired and retested.
  - Loose material has been removed.
- For mixing, hauling, and placing:
  - Observe loads for proper size and make-up.
  - Placement should generally begin nearest the source of material supply.
  - Water is mixed with the aggregate as specified.

- If the material is mixed with water after it is delivered to the project, the water is 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 does not separate between fines and coarse aggregate, becoming “boney”, especially during final grading under construction traffic prior to paving.
- If geotextile is required between subgrade and base, the first lift of material is placed directly on the fabric without road mixing.
- The material is placed, in uniform layers that do not exceed the specified allowable thickness, and is compacted to specified line and grade.
- Compaction is tested as specified and areas of inadequate compaction are repaired, re-compacted, and retested before placing the next lift.
- The final surface of the material is constructed to the specified elevations, cross section, and smoothness.
- The final surface is not contaminated with soil from construction activities or other source since sampling and testing.
- The Contractor maintains each layer as specified and repairs loose, soft, or rutted areas.
- The Contractor smoothes and finishes the edge areas and slopes.

## Measurement

Refer to the specifications for the method of measurement.

If measurement is by weight, ensure that the Contractor has a scale to measure the weight of each load. Ensure 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. Adjust the weight for excess percentage of water as specified.

Establish a procedure to gather the Weigh Memo – Material Receipt forms for each load incorporated. Calculate the sum of all loads delivered each day and submit that calculation, with the Weigh Memo – Material Receipt forms, as a source document to justify payment.

If measurement is by volume in the haul vehicle, measure each haul vehicle. As work is performed sketch and calculate the volume of material placed daily and submit that

calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If measurement is by area, verify that material has been placed to the required depth. As work is performed, sketch and calculate the area of material placed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## **Section 00680 – Stockpiled Aggregates**

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

### **Quality**

Quality requirements are specified and in the [Manual of Field Test Procedures](#) – Field Tested Materials Guide.

Ensure that the Contractor is aware of those requirements, performs the specified testing, and provides copies of the test results.

Check that ODOT performs verification testing as specified.

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

### **Construction**

Ensure that:

- Stockpile sites are properly marked and are prepared as specified or directed.
- Stockpiles are constructed in lifts, no thicker than specified, and in a manner that minimizes segregation and allows 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 shaped and finished to allow easy measurement.
- The stockpile areas are cleaned up and restored as specified.

## Measurement

Refer to the specifications for the method of measurement.

If measurement is by weight, ensure that the Contractor has a scale to measure the weight of each load. Ensure 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. Adjust the weight for excess percentage of water as specified.

Establish a procedure to gather the Weigh Memo - Material Receipt forms for each load stockpiled. Calculate the sum of all loads delivered each day and submit that calculation, with the Weigh Memo - Material Receipt forms, as a source document to justify payment.

If measurement is by volume in the stockpile, measure each stockpile and record those measurements. Sketch and calculate stockpile volume using the cross-section measurement of the completed stockpile. Submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.



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**Section 00700**



## **700's – Wearing Surfaces**

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The pavement wearing surface is a key aspect of how the public judges the quality of a construction project. Because of that, the finished wearing surface must provide a smooth ride. If work on the wearing surface is not producing a smooth ride, require the Contractor to modify processes and procedures such that it produces a smooth riding surface, as well as meets other requirements.

### **Section 00705 – Emulsified Asphalt Prime Coat and Emulsified Asphalt Fog Coat**

This work consists of applying asphalt, with or without aggregate cover materials, to a prepared surface. The prime coat is a penetration treatment applied to aggregate surfaces to bind the material with a hard surface like asphalt concrete pavement. A fog coat is a treatment applied to existing asphalt concrete pavement surfaces to renew and seal the pavement surface.

#### **Quality**

Quality requirements are specified and in the [Manual of Field Test Procedures](#) – Field Tested Materials Guide.

Check that:

- The Contractor is aware of its responsibilities regarding material quality, performs sampling and testing as specified, and provides copies of test results to the Quality Control Compliance Specialist (QCCS).
- The Contractor samples the liquid asphalt and submits the sample to ODOT, as specified.
- ODOT performs verification sampling and testing as specified

Gather and submit required quality documentation.

#### **Construction**

Ensure that:

- Limits for the work are identified and marked and both the Contractor and Inspector understand the markings.
- Cover aggregates, if required, comply with specified requirements.

- A document accompanies shipment of emulsified asphalt showing delivered material matches the approved material.
- The Contractor's equipment is applying the material uniformly and at the specified application rate.
- The distributor's spray bar is set at the correct height to provide triple lap coverage of liquid asphalt.
- Weather conditions are as specified to perform the work and to allow the asphalt to cure or set.
- Emulsified asphalt is applied to only one designated lane at a time.
- The surfaces, upon which the application is to be made, meet the conditions specified.
- Cover aggregate, if required, is applied immediately after the emulsified asphalt is spread and before the emulsified asphalt starts to cure or set.
- Only the fog coat surface may be power broomed, 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.

### **Measurement**

Unless specified otherwise, measurement for emulsified asphalt will be by weight. As work is performed, gather the weight ticket or [Weigh Memo - Material Receipt \(form 734-3082\)](#) from each delivery vehicle. If only a partial load is used, ensure that the vehicle is weighed and the weight used is properly determined. If possible, weigh the vehicle on the project before it returns to the plant. Calculate the sum of all emulsified asphalt used daily and submit that calculation, with the weight ticket or Weigh Memo - Material Receipt form as a source document to justify payment.

### **Section 00706 – Emulsified Asphalt Slurry Seal Surfacing**

This work consists of applying one or more layers of slurry seal consisting of asphalt, water, aggregate, and additives on a prepared surface.

### **Quality**

Quality requirements are specified and in the [Manual of Field Test Procedures](#)– Field Tested Materials Guide.

Check 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 QCCS.
- The Contractor samples the liquid asphalt, as specified, and submits the sample to ODOT.
- The Contractor submits the Job Mix Formula (JMF) to ODOT for approval, as specified.
- ODOT performs verification sampling and testing as specified.

Gather and submit required quality documentation.

## **Construction**

Ensure that:

- The surface and air temperature are above 45° F and rising before placing slurry seal, and it is not raining or predicted to rain before the slurry seal has cured.
- A document or documents identifying that the delivered mix matches the approved JMF is provided with the deliveries.
- Limits for the work are identified and marked and both the Contractor and Inspector understand the markings
- The Project Manager has accepted the sample strip and street cleaning details before slurry seal surfacing proceeds.
- The surfaces, upon which the application is to be made, meet the conditions specified. The surfaces may be wetted by fogging, as specified.
- The mixer is specifically designed for slurry seal. Concrete transit mixer trucks are not used as mixers.
- There is a back-up mixer on-site and another off-site.
- Aggregates comply with specified requirements.
- The Project Manager has accepted the mixer calibration before proceeding with slurry seal surfacing.
- The Contractor's equipment is applying the material uniformly and at the specified application rate.
- Both the emulsified asphalt and the aggregate are applied uniformly at appropriate rates to leave a streak free surface.
- The spreading equipment has a steering device, flexible strike-off, adjustable width, only one tail rubber, and a Project Manager approved drag.

- The slurry does not segregate, lump, ball, or cure (break) in the spreading equipment.
- Only self-propelled steel-wheeled or pneumatic-tired type rollers with a water spray system are used, if specified.
- If specified, the surfaced areas receive a minimum of two full coverage passes by the roller.
- If construction equipment is running on the treated surface, the Contractor repairs and maintains the treated surface as needed.
- Hand work is limited to the beginning and end of panels.
- The treated area is protected from traffic for the full cure period, or as specified otherwise.

### **Measurement**

Measurement for slurry seal surfacing will be by area, unless specified otherwise. As work is performed sketch and calculate the area of slurry seal surfacing placed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as 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 and in the [Manual of Field Test Procedures](#) – Field Tested Materials Guide.

Check 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 QCCS.
- The Contractor samples the liquid asphalt, as specified, and submits the sample to ODOT for approval. Sampling should be witnessed by the Inspector or QCCS for proper sampling technique, container, etc.

- ODOT performs verification sampling and testing as specified.

Gather and submit required quality documentation.

## **Construction**

Ensure that:

- Limits for the work are identified and marked and both the Contractor and Inspector understand the markings.
- Aggregates comply with specified requirements and are stockpiled as specified.
- A document accompanies shipment of emulsified asphalt showing delivered material matches the approved material.
- The Contractor's equipment is applying the emulsified asphalt uniformly and at the specified application rate.
- The distributor's spray bar is set at the correct height to provide a triple lap coverage of liquid asphalt.
- The surfaces, upon which the application is to be made meet the conditions specified and are approved by the Project Manager.
- The application process works toward the aggregate stockpile from the furthest section of the project, unless otherwise approved by the Project Manager.
- The Contractor schedules and performs its operations as specified to ensure 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.
- The emulsified asphalt is applied to completely cover the intended surface, but does not overlap adjacent coverages. If overlaps occur, ensure 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 emulsified asphalt.
- Aggregate is spread uniformly at the specified rate on the emulsified asphalt immediately after its application and before the emulsified asphalt starts to set or cure (break).
- The aggregate is applied to completely cover the intended surface, but not to overlap adjacent coverages. If overlaps occur, ensure that excess aggregate is removed to prevent a bump or area with excess aggregate.
- Buildup of aggregate (piles) is immediately removed.
- Compaction is performed immediately behind the aggregate application.

- Only steel-wheeled or pneumatic-tired rollers are used.
- A minimum of 2 pneumatic-tired and 1 steel-wheeled rollers are used.
- The surfaced areas receive a minimum of 2 coverages with a pneumatic-tired roller and 1 coverage with a steel-wheeled compactor for a Single Application, and 4 full coverage passes by the rollers, as directed by the Project Manager, for a Multiple Application.
- Speed of the compactors is compatible with the surface treatment operation, but no greater than 5 MPH, and the compactors do not pick up aggregates from the surface.
- The treated surface is swept to remove loose aggregate as specified.
- The Contractor measures the finished surface of Multiple Applications as specified with a straightedge to ensure specified smoothness, and corrects all deficiencies in surface tolerance.
- Traffic is controlled until the treatment is cured and the loose aggregate is removed.
- Damage, including that resulting from traffic, is repaired.
- Unless specified otherwise or allowed by the Project Manager, the work is completed at least 3 hours before sunset.
- The pavement is not opened to traffic until authorized by the Project Manager.

### **Measurement**

Measurement for the emulsified asphalt and aggregate will be by weight, unless specified otherwise. As work is performed, gather the weight ticket or [Weigh Memo - Material Receipt \(form 734-3082\)](#) from each delivery vehicle. If only a partial load is used, ensure that the vehicle is weighed and the weight used is properly determined. Reweigh the vehicle on the project, if possible. Calculate the sum of all emulsified asphalt used daily and submit that calculation, with the Weigh Memo - Material Receipts form, as a source document to justify payment.

Measurement for the asphalt surface treatment of approaches will be by unit basis, unless specified otherwise. Count each location where an approach is treated. Sketch and calculate the number of approaches completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

### **Section 00730 – Emulsified Asphalt Tack Coat**

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

## Quality

Quality requirements are specified and in the [Manual of Field Test Procedures](#) – Field Tested Materials Guide.

Check that:

- The Contractor is aware of its responsibilities regarding material quality and has qualified technicians to perform sampling as required.
- The Contractor performs sampling, as specified, before additional water is added, and submits the sample to ODOT for approval.
- ODOT performs verification sampling as specified

Ensure that:

- The emulsified asphalt is not contaminated.

Gather and submit required quality documentation.

## Construction

Ensure that:

- A document accompanies shipment of emulsified asphalt showing delivered material matches the approved material.
- Emulsified asphalt is diluted as specified and approved by the Project Manager.
- Emulsified asphalt is not excessively pumped prior to application, as specified.
- The distributor is applying the material uniformly and at the specified application rate.
- The distributor's spray bar is set at the correct height to provide triple lap coverage of liquid asphalt.
- Temperature and climatic conditions are as specified.
- Traffic, other than appropriate construction equipment, will not operate over the tacked surface.
- Tack is not applied to more than one half the traveled way width at one time.
- The surface, to receive the application, is cleaned and dry as specified.
- 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.

## Measurement

Measurement for emulsified asphalt tack coat will be by weight, unless specified otherwise. As work is performed, gather the weight ticket or [Weigh Memo - Material Receipt \(form 734-3082\)](#) from each delivery vehicle. Ensure that weight of the haul vehicle or distributor is measured to determine the quantity of material used. Calculate the sum of all emulsified asphalt tack coat used daily and submit that calculation, with the Weigh Memo - Material Receipt form, as a source document to justify payment.

## Section 00735 – Emulsified Asphalt Concrete Pavement

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

## Quality

Quality requirements are specified and in the [Manual of Field Test Procedures](#) – Field Tested Materials Guide.

Check that:

- The Contractor is aware of its responsibilities regarding material quality, has certified technicians to perform sampling and testing as specified, and provides copies of test results to the Inspector.
- The Contractor has developed and submitted a job mix formula (JMF) for approval by the Project Manager.
- The Contractor samples the emulsified asphalt, as specified, and submits the sample to ODOT.
- During aggregate production sampling and testing is done, with copies of test results provided to the QCCS.
- Aggregates are handled in a manner that prevents segregation or intermixing of sizes. (Segregation is defined as separation of the coarse aggregate particles in the mix from the rest of the mix.)
- ODOT performs verification sampling and testing as specified.
- Aggregates and asphalt are of the specified quality.
- Material is stockpiled as specified.
- Failing or unacceptable material is separated and not incorporated, as specified.

Ensure that:

- Materials are not contaminated at any time.

- The mixing and placement processes produce a product that meets specified requirements.
- The Contractor measures the finished surface as specified to ensure specified smoothness and corrects all deficiencies in surface tolerance.

Gather and submit required quality documentation.

## Construction

A key element in constructing a quality pavement is ensuring that the mixture is consistently and uniformly delivered and placed.

Check that:

- Prior to starting paving work, appropriate Contractor and ODOT personnel meet for the required pre-paving conference.

Ensure that:

- For delivery of the mixture to the paving machine:
  - A document or documents identifying that the delivered mix matches the approved JMF is provided with the deliveries.
  - 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 – use of diesel oil is prohibited.
  - Mixture is loaded into the haul vehicles such that segregation is minimized (Segregation is defined as separation of the coarse aggregate particles in the mix from the rest of the mix.)
  - 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.
- For placement and compaction of the EAC mixture:
  - Paving limits are clearly 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.

- 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.
- There is enough equipment to ensure that the paving machine can place EAC without stopping, as nearly as possible.
- Weather and surface conditions are as specified for construction of EAC pavement.
- The underlying surface is finished and has been cleaned and tack coat applied, as specified.
- If required, depressions, potholes, etc. have been prepared and filled.
- The pick-up machine, if used, picks up substantially all mixture from roadway.
- EAC is uniformly coated, does not segregate or otherwise result in a non-uniform 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. (Segregation is defined as separation of the coarse aggregate particles in the mix from the rest of the mix. Areas with segregation have a rougher surface texture appearance than the surrounding areas.)
- EAC that has segregated, separated, is solidifying, or is crusting is rejected.
- The Contractor and Inspector verify the pavement is constructed to the specified width, thickness, line, grade, cross section, and smoothness.
- Compaction is performed with a steel-wheeled or pneumatic-tired roller, as specified, including:
  - The Contractor develops and performs rolling patterns to ensure uniform and adequate coverage, as specified.
  - Rollers are operated at acceptable speeds, but no greater than 3 MPH.
  - The drive wheel of each roller is nearest the paver.
  - All roller marks are removed.
  - Areas not accessible to rollers are compacted by other means to specified density.
- The Contractor removes or disposes of unacceptable material and replaces it with acceptable material.
- Choke aggregate is applied as specified and does not create unacceptable dust under traffic.

- Loose choke aggregate is removed as specified.
  - 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 mat has a uniform appearance and is free of longitudinal seams, tears, or other blemishes or defects.
- The Contractor cleans up and disposes of unwanted materials – use of diesel oil to coat or clean equipment is prohibited.

## Measurement

Refer to the specifications for the method of measurement.

If measurement is by weight, ensure that the Contractor has a scale to measure the weight of each load. Ensure that overweight loads are not allowed on the roadway.

Establish a procedure to safely gather the weight ticket or [Weigh Memo - Material Receipt \(form 734-3082\)](#) from each delivery vehicle. Calculate the sum of all loads delivered each day and submit that calculation, with the Weigh Memo - Material Receipt form as a source document to justify payment.

If measurement is by volume in the haul vehicle, measure each haul vehicle and record those measurements. As work is performed calculate the volume of aggregate placed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00744 – Minor Hot Mixed Asphalt Concrete (MHMAC) Pavement

### Section 00745 – Hot Mixed Asphalt Concrete (HMAC)

This work consists of constructing a hot plant mixed, uniformly coated mixture of asphalt cement, graded aggregate and additives to result in an asphalt concrete (HMAC) pavement.

*It is expected that the Inspector be a Certified Hot Mixed Asphalt Concrete Inspector to inspect this work.*

## Quality

Quality requirements are specified and in the [Manual of Field Test Procedures](#) – Field Tested Materials Guide. Unless specified otherwise, acceptance of the MHMAC mixture will be by visual inspection by the Project Manager.

For HMAC check 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 QCCS.
- The Contractor has developed and submitted a job mix formula (JMF) for approval by the Project Manager.
- ODOT performs verification sampling and testing as specified.
- For production of the aggregates:
  - Material is stockpiled as specified.
  - Failing or unacceptable material is separated and not incorporated, as specified.
- For production of the HMAC mixture:
  - The Contractor performs required testing and takes appropriate corrective action if test results or other indicators show that the mixture is deviating from specified or JMF requirements.
  - Aggregates are handled in a manner that prevents segregation or intermixing of sizes. (Segregation is defined as separation of the coarse aggregate particles in the mix from the fine aggregate particles.)

For HMAC, ensure that:

- Material is not contaminated.
- The mixing and placement processes produce a product that meets specified requirements.
- The Contractor measures the finished surface as specified to ensure specified smoothness, and corrects all deficiencies in surface tolerance .

Gather and submit required quality documentation.

## Construction

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

Document daily the workers, hours, equipment, stations paved, course depth, width, tonnage, yield, weather, temperature, tack spread rate, and problems encountered. Complete the [General Daily Progress Report \(form 734-3474\)](#) or the attached Paving Inspectors Daily Report to document this information.

Complete the HMAC Checklist for your information.

Check that:

- Prior to starting paving work, appropriate Contractor and ODOT personnel meet for the required pre-paving conference.
- For delivery of the MHMAC and HMAC mixture to the paving machine:
  - A document or documents identifying that the delivered mix matches the approved JMF is provided with the deliveries.
  - Mixture is loaded into the haul vehicles such that segregation is minimized. (Segregation is defined as separation of the coarse aggregate particles in the mix from the rest of the mix.)
  - Mixture is unloaded without segregation or bumping or moving 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 – use of diesel oil is prohibited for M/HMAC.
  - Loads are covered, as specified, or otherwise protected to maintain specified temperature of the mixture.
  - Estimate the required number of delivery trucks using the attached Mix Delivery Production Calculation Form.
  - For M/HMAC, 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.
  - M/HMAC is rejected before placing if it is below the specified placing temperature limit, slumping, separating, solidifying, crusting or absorbing moisture.
- For placement and compaction of the MHMAC and HMAC mixture:
  - Calculate the anticipated length paved for the first 10 loads (plan length X plan width X plan thickness X specific gravity of mix X 62.4 X (%

compaction/100) / 2000 = tons of mix). Compare with actual tons placed to check yield. Document yield calculation on [Material Delivery and Yield Check Sheet \(form 734-2792\)](#).

- Paving limits are clearly 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.
- 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.
- There is enough equipment to ensure that the paving machine can place M/HMAC without stopping, as nearly as possible.
- Weather and surface conditions are as specified for construction of M/HMAC pavement.
- The underlying surface is finished and has been cleaned, tack coat applied with triple lap coverage, and approved, as specified, prior to the start of paving.
- The entire paving train (mixture delivery, pick-up machine, paver hopper, paver augers, paver screed, paver screed operator, raker, breakdown roller, intermediate roller and finish roller) is observed.
- The pick-up machine, if used, picks up substantially all mixture from roadway.
- M/HMAC that is below the specified placing temperature limit, slumping, separating, solidifying, crusting or absorbing moisture is rejected.
- The longitudinal and transverse joints are tight, even and straight.
- Compaction is performed with a steel wheeled or vibratory roller to achieve the specified density, including:
  - Vibratory rolling is not performed for lifts thinner than 2 times the maximum aggregate size.
  - The Contractor, its workers, and its testing technicians are working together to achieve the required product quality and are resolving all problems.
  - Performing breakdown and intermediate rolling before the M/HMAC drops below 180° F, or as otherwise specified.
  - The Contractor develops and performs rolling patterns to ensure uniform coverage and compaction, accelerating or delaying rolling patterns as necessary to resolve tenderness problems.
  - Rollers are operated at acceptable speeds.
  - Rollers are not parked on the pavement when it is hot.

- The drive wheel of each roller is nearest the paver.
- All roller marks are removed.
- Areas not accessible to rollers are compacted to specified density by other methods.
- 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.
- Contractor notifies the Project Manager if compaction exceeds 95% of maximum density.
- The Contractor and Inspector verify the pavement is constructed to the specified width, thickness, line, grade, cross section, and smoothness.
- The Contractor removes or disposes of unacceptable material and replaces it with acceptable material as needed.
- The mixture does not segregate or otherwise result in an improper finished product and all defects are repaired. Ensure that the Contractor immediately addresses and resolves the cause of the segregation and other defects. (Segregation is defined as separation of the coarse aggregate particles in the mix from the rest of the mix. Areas with segregation have a rougher surface texture appearance than the surrounding areas.)
- The mat has a uniform appearance and is free of longitudinal seams, tears, or other blemishes or defects. Clumps, crusted mix, etc. are removed and replaced with acceptable mixture.
- 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.
- The pavement is protected from damage and all damage is acceptably repaired.
- For placement and compaction of the MHMAC mixture:
  - Compaction is performed to achieve the required density, including:
    - Performing breakdown and intermediate rolling until the entire surface has been compacted by at least 6 coverages of the roller.
  - MHMAC is removed and replaced if it is loose, broken, mixed with dirt, too much/too little asphalt, or is defective in any way.
- For placement and compaction of the HMAC mixture:
  - The base/foundation is approved by the Project Manager prior to placement of HMAC.

- HMAC in transit at the time adverse conditions occur is placed only if it has been covered during transit, the HMAC temperature is satisfactory, it is placed on a foundation free from pools or flow of water, and all other requirements are met.
- Temperature behind the paver is as specified.
- The Contractor performs all specified compaction testing.
- Compaction is performed to achieve the specified density, including:
  - Pneumatic rollers are operated no faster than 3 MPH and vibratory rollers are operated at frequencies of at least 2,000 vibrations per minute.
  - For thin pavement (leveling, patches, or less than 2" thickness) performing breakdown and intermediate rolling until the entire surface has been compacted by at least 4 coverages of the roller, but not to a specified density.
  - For open graded HMAC use of only steel-wheeled rollers and performing breakdown and intermediate rolling until the entire surface has been compacted by at least 4 coverages of the roller, but not to a specified density.

## Measurement

Unless specified otherwise, measurement for M/HMAC is by weight. Ensure that the Contractor has a scale to measure the weight of each load. Ensure that overweight loads are not allowed on the roadway.

Establish a procedure to gather the weight ticket or [Weigh Memo - Material Receipt \(form 734-3082\)](#) from each delivery vehicle. Record the load data on the [Material Delivery Record and Tally Sheet \(form 734-2792\)](#), the [General Daily Progress Report \(form 734-3474\)](#), or the Paving Inspectors Daily Report. As work is performed a sketch of where the loads are placed may also be prepared on an [Installation Sheet \(form 734-2605\)](#). Calculate the sum of all loads delivered each day and submit that calculation, with the Weigh Memo - Material Receipt form, Material Delivery and Yield Check Sheet and/or Installation Sheet as a source document to justify payment.

## Section 00758 – Reinforced Concrete Pavement Repair

This work consists of saw cutting and removing existing concrete pavement and constructing new reinforced and continuously reinforced portland cement concrete pavement repairs as shown and specified.

## Quality

Quality requirements are specified and in the [Manual of Field Test Procedures](#), along with [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of its responsibilities regarding material quality and has qualified technicians to perform sampling as required for production.
- The Contractor performs sampling, as specified, and submits the sample to ODOT for approval.
- ODOT performs verification sampling as specified
- The concrete mix design is a 1½ inch concrete mix as specified.

Gather and submit required quality documentation.

## Preparation

Ensure that:

- Saw cuts are full depth through the concrete pavement before the contractor starts to remove the pavement. The depth of existing pavement is shown in the project plans.
- The saw cuts are in the locations shown on the plans or as marked by the Agency and not moved by the contractor for convenience.
- The contractor DOES NOT saw into the adjacent lane, and has the proper equipment listed in the specifications to prevent this from occurring.
- The Contractor removes existing reinforced concrete pavement full depth as shown or directed.
- Removal of concrete pavement is with equipment approved by the Engineer and does not damage remaining pavement.
- The Contractor removes the existing terminal expansion joint steel W-beam top flange and web as shown or as directed.
- The Contractor cuts the steel web so that no more than 1/4 inch remains above the existing sleeper slab.
- The Contractor repairs any damage to the existing pavement or sleeper slab due to the Contractor's operations.
- If the existing base requires removal, it is replaced it with materials conforming to the applicable parts of this Specification and to the depth shown. Note whether or not the repairs were greater or less than 2 inches deep since this affects payment.

- The Contractor places a non-woven geotextile or liquid curing compound as a bond breaker between the new plain concrete base and the new reinforced concrete pavement as shown or directed.
- If shown on the plans, the Contractor saw cuts the existing reinforced concrete pavement to a nominal depth of 2 inches.
- The Contractor removes existing concrete with jack hammers and chipping hammers that will not damage reinforced concrete pavement to remain in place or the underlying base as directed. Do not use jackhammers heavier than nominal 30 pounds class. Do not use chipping hammers heavier than nominal 15 pounds class to remove concrete within 3/4 inch of reinforcing steel.
- The Contractor protects and keeps reinforcing steel clean of grease, oil, dirt, grout, or other contaminants at all times.
- Before placement of concrete, the repair area is blown clean with compressed air and a coat of epoxy grout or bonding agent is applied to all vertical surfaces.
- If full-depth saw cut and texturing with a bush hammer is shown on the plans, the contractor textures the full face of the cut as specified.

## Placing Reinforcement

Ensure the Contractor:

- Places reinforcement as shown and specified.
- Laps splices according to Section 00530.
- Uses reinforcement that is straight, clean, and free of scale or other matter which would interfere with its bonding to the concrete.
- Places the reinforcement on support devices that maintains it in specified position during concrete placement.
- Ties or clips at every other transverse bar intersection, as a minimum, in a manner that does not allow for displacement.
- Ties or clips every lap splice as shown.
- Obtains approval of the proposed support devices before use.
- Places tie bars required for contact-type longitudinal joints by drilling the hardened concrete section and then inserting and grouting the tie bars into place.
- Does not damage the existing reinforcement when drilling the holes.
- Provides smooth, round dowel bars.
- Coats dowel bars with plastic, heavy oil, or other approved material that will not bond with or be harmful to the PCC.

- Places dowels in supporting framework or support devices that hold dowels parallel with each other, parallel with the surface of the pavement, and perpendicular to the joint.

## Placing Concrete

Ensure the Contractor:

- Vibrates throughout the concrete until it is uniformly consolidated and does not segregate.
- Following the vibrating and strike-off operations, floats the concrete.
- Keeps the surface free from laitance, soupy mortar, marks or irregularities.
- Places the concrete in final position in one lift so a minimum of finishing will be necessary to provide a dense, homogenous pavement conforming to true grades and cross sections.

## Curing Concrete

Ensure the Contractor:

- Immediately after the final floating, surface finishing and edging have been completed, and while the concrete surface is still moist, applies liquid membrane-forming compound uniformly to the concrete by pressure-spray methods at a rate of at least 1 gallon per 150 square feet so that the concrete is completely white like painting a wall.
- Uses other approved curing methods from the specifications if a curing compound is not used.

## Measurement

Pavement repair will be measured on the area basis, and will be determined by measuring the width and length of each constructed panel of pavement. The width will be measured from edge-to-edge on the surface of the pavement, perpendicular to the centerline. The length will be measured from end-to-end of the pavement along the centerline, including the length of bar lap splices.

If depths are other than those specified then a proportionate volume ratio will be used for an equivalent number of square yards.

Bar lap areas will be measured on the unit basis. The reinforced bar lap area consists of an area of one 12-foot lane width and from 24 inches to 30 inches long. Where the bar lap areas consist of an area less than one lane width, the quantity of bar lap area will be

adjusted by converting to a proportionate quantity based on a 1- foot lane width. A 6-foot wide pavement repair will be counted as one-half of a bar lap area.

## **Section 00746 – Crack Sealing Flexible Pavements**

This work consists of repairing and resealing cracks in pavements.

### **Quality**

Quality requirements are specified and in the [Non-Field Tested Materials Acceptance Guide](#).

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

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

Gather and submit required quality documentation.

### **Construction**

Ensure that:

- All locations for the work are identified.
- Cracks to be sealed are cleaned and dried as specified.
- Sealing material is heated and mixed as specified and recommended by the manufacturer. (Obtain copy of manufacturer's recommendations from the material package or have the Contractor furnish before work begins.)
- Climatic conditions are as specified for installing the sealing material.
- Cracks are completely filled and the surface is finished as specified.
- When crack sealing is performed prior to a pavement overlay, the sealed cracks are completely covered with a clean sanding material, as specified.
- The work is protected from traffic as specified.

### **Measurement**

Refer to the specifications for the method of measurement.

If measurement is by weight, ensure that the Contractor has a scale to measure the weight of each load. Ensure that overweight loads are not allowed on the roadway.

Establish a procedure to safely gather the weight ticket or [Weigh Memo - Material Receipt \(form 734-3082\)](#) from each delivery vehicle. 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 - Material Receipt form as a source document to justify payment.

If measurement is by length, measure and record the length of sealed cracks. As work is performed, sketch (as possible) and total the length of cracks sealed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## **Section 00748 – Asphalt Concrete Pavement Repair**

This work consists of removing existing asphalt concrete surfaces. Replacement of aggregate subbases, aggregate bases and asphalt concrete pavement are covered under Sections 00641, 00735, 00744 and 00745, as applicable.

### **Quality**

Unless specified otherwise acceptance of the asphalt concrete pavement repair will be by visual inspection by the Project Manager. Tests may be requested to verify that the materials meet the appropriate specifications.

### **Measurement**

Measurement for asphalt concrete pavement repair is by area, unless specified otherwise. Verify that material has been placed to the required depth. Where the repair depth is directed to be different than the required depth, adjust the area by converting to an equivalent area on a proportional volume basis. As work is performed, sketch and calculate the area of asphalt concrete pavement repair completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## **Section 00749 – Miscellaneous Asphalt Concrete Structures**

This work consists of constructing asphalt concrete in road approaches, street connections, driveways, guard rail flares, mailbox turnouts, raised traffic islands, sidewalks, footpaths, gutters, ditch linings, spillways, dikes, and other miscellaneous or minor items of asphalt concrete, except asphalt curbs.

## Quality

Quality requirements are specified.

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

Gather and submit required quality documentation.

## Construction

Ensure that:

- The location for each miscellaneous asphalt concrete structure is 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 compacted, smoothed, and shaped to allow the correct depth and dimension of structure to be constructed, as specified.
- If the underlying surface is concrete or bituminous material, it is dry and free of unsuitable material and a tack coat has been applied to all surfaces that will be contacted by the asphalt concrete, as specified.
- Asphalt concrete mixture has been mixed and is in a condition to allow placement and compaction as specified.
- Asphalt concrete mixture is placed, by mechanical devices or by hand methods, to specified thickness and dimensions.
- Compaction is performed to achieve the required density, including:
  - Performing breakdown and intermediate rolling until the entire surface has been compacted by at least 4 coverages of the roller, but not to a specified density.
  - In areas not practically accessible to rollers compact to a firm, dense mass.
- The Contractor checks the smoothness of the structure and corrects all deficiencies
- As required, the Contractor constructs adjacent slopes with material and smoothes, compacts, and finishes affected areas as specified

## Measurement

Refer to the specifications for the method of measurement. Measurement will be by one of the following methods, unless specified otherwise.

If measurement is by the unit basis, count each location where the structure is constructed. Sketch and calculate the number of structures completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If measurement is by area, verify that material has been placed to the required depth. As work is performed, sketch and calculate the area of asphalt concrete pavement repair completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If measurement is by length, measure and record the length of structure along its longitudinal axis. As work is performed, sketch and total the length constructed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If measurement is by weight, ensure that the Contractor has a scale to measure the weight of each load. Ensure that overweight loads are not allowed on the roadway.

Establish a procedure to safely gather the weight ticket or [Weigh Memo - Material Receipt \(form 734-3082\)](#) from each delivery vehicle. Calculate the sum of all loads delivered each day and submit that calculation, with the Weigh Memo - Material Receipt form, as a source document 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 [Manual of Field Test Procedures](#) – Field Tested Materials Guide, and in the [Non-Field Tested Materials Acceptance Guide](#).

Check 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.

- The Contractor has developed and submitted a mix design, and that mix design has been approved by the Project Manager.
- ODOT performs verification sampling and testing as specified.
- During production of aggregates:
  - Sampling and testing is done and test results are provided to the QCCS.
  - Material is stockpiled as specified.
  - Failing material is separated and not incorporated, as specified.
- For production of the concrete mixture:
  - Prior to starting paving work, appropriate Contractor and ODOT personnel meet for the required pre-paving conference.
  - Concrete mixing occurs in a batch plant mixer only, unless specified otherwise.
  - Aggregates are handled in a manner that prevents segregation and intermixing of sizes. (Segregation is defined as separation of the coarse aggregate particles in the mix from the fine aggregate particles.)
  - The Contractor performs required testing, rejects or modifies all unacceptable material, and provides copies of test results to the QCCS.

Ensure that:

- Material is not contaminated or damaged at any time.
- The mixing and placement processes produce a product that meets specified requirements.
- The Contractor measures the finished surface as specified to ensure specified smoothness, and corrects all deficiencies in surface tolerance.

Gather and submit required quality documentation.

## **Construction**

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

Check that before proceeding with paving operations a test strip is constructed and accepted by the Project Manager, as specified.

Unless specified otherwise, ensure at least two lanes are constructed in one paving strip, when the pavement consists of two or more traffic lanes.

Complete the Concrete Pavement Pour checklist for your information.

Ensure that:

- For delivery of the concrete mixture to the spreader:
  - Mixture is delivered to the spreader in non-agitating equipment, unless specified otherwise, with no unexpected change in its characteristics and within the timeframe after mixing as allowed by specification.
  - Haul vehicle beds are clean, free of build-up of any material.
  - Concrete mixture is loaded into the haul vehicles such that the mixture does not segregate. (Segregation is defined as separation of the coarse aggregate particles in the mix from the rest of the mix.)
  - Prohibit concrete delivery vehicles from driving on the subgrade or base, except for the minimum number of right angle or near right angle crossings.
  - 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.
  - 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 marked and both the Contractor and Inspector understand the markings.
  - Grade controls have been set.
  - Grade controls indicate a smooth grade line for the finished pavement.
  - Reinforcement size, grade, lap, ties, depth, spacing, and minimum clearance are as specified.
  - All reinforcing, joints, traffic signal detector loops, conduit, and other required appurtenances are placed, supported, and restrained as specified to prevent movement during placement and finishing of the concrete.
  - Self-supporting working platforms are located at each construction joint in continuously reinforced concrete pavement.
  - The procedure for ensuring that manholes and other devices are set in the proper location to the proper elevation and slope is effective.
  - 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 spreader and finishing machine(s) has an effective means to control grade and cross-slope.
- The Contractor has tested the vibrators to ensure that they operate in the specified manner or as recommended by the manufacturer.
- The underlying surface is cleaned, smooth, compacted, and at proper grade and cross-slope.
- The surface of subgrade or base in front of the paving operation is moistened.
- Weather conditions are as specified for construction of concrete pavement.
- If cold or wet weather is expected during the curing period, the Contractor has a process and devices on site to protect the concrete.
- Quality of the concrete mixture is not affected by the placement and finishing operations.
- Concrete that has not been placed within 1 hour of mixing, has begun to take an initial set, or has been retempered with water is rejected.
- Defective material is not placed or is removed.
- The Contractor ensures that the beginning section of the pavement is constructed, including consolidation and finishing, to provide a smooth surface that matches adjoining pavement.
- Delivery of concrete mixture allows continuous operation of the spreader and finishing machines, except as allowed by specification.
- A construction joint is constructed wherever there is an interruption of 20 minutes in concrete placement operations.
- 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.
- The surface is textured, as specified, 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, including consolidation, hand finishing, and assurance of smoothness and grade to produce a quality work and to match the adjoining surface.
- The exposed surfaces of the concrete mixture are protected immediately after final floating, surface finishing and edging for at least 72 hours to prevent moisture loss either by:
  - Application of an approved curing membrane-forming compound is as specified.
  - Placement of other materials, as specified, to prevent loss of moisture from the concrete mixture and to prevent damage to the concrete surfaces.
- **THE INSPECTOR MUST REMAIN ON-SITE UNTIL THE CURE IS COMPLETELY IN PLACE.**
- 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 cleaned and filled with specified filler, as specified.
- The concrete surfaces are protected from moisture loss, vehicle or equipment use, and other damage or use as long as specified.
- The Contractor cleans up and disposes of unwanted material and repairs any damaged areas, as specified.

### Smoothness Testing and Correction

- The Contractor tests the smoothness of the pavement surface as specified.
- No traffic is allowed on the concrete pavement until the Contractor corrects all required deficiencies.
- The Contractor corrects all deficiencies that are greater than allowed by grinding.

### Measurement

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

Measurement for continuously reinforced and plain concrete pavement is by area, unless specified otherwise. Verify that material has been placed to the required depth. As work is performed, sketch and calculate the area of concrete pavement repair completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00758 – Concrete Pavement Repair

This work consists of saw cutting and removing existing concrete pavement and constructing new reinforced and continuously reinforced portland cement concrete pavement repairs as shown and specified.

### Quality

Quality requirements are specified and in the [Manual of Field Test Procedures](#), along with [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of its responsibilities regarding material quality and has qualified technicians to perform sampling as required for production.
- The Contractor performs sampling, as specified, and submits the sample to ODOT for approval.
- ODOT performs verification sampling as specified
- The concrete mix design is a 1 ½ inch concrete mix as specified.

Gather and submit required quality documentation.

### Preparation

Ensure that:

- Saw cuts are full depth through the concrete pavement before the contractor starts to remove the pavement. The depth of existing pavement is shown in the project plans.
- The saw cuts are in the locations shown on the plans or as marked by the Agency and not moved by the contractor for convenience.
- The contractor DOES NOT saw into the adjacent lane, and has the proper equipment listed in the specifications to prevent this from occurring.
- The Contractor removes existing reinforced concrete pavement full depth as shown or directed.
- Removal of concrete pavement is with equipment approved by the Engineer and does not damage remaining pavement.
- The Contractor removes the existing terminal expansion joint steel W-beam top flange and web as shown or as directed.

- The Contractor cuts the steel web so that no more than 1/4 inch remains above the existing sleeper slab.
- The Contractor repairs any damage to the existing pavement or sleeper slab due to the Contractor's operations.
- If the existing base requires removal, it is replaced it with materials conforming to the applicable parts of this Specification and to the depth shown. Note whether or not the repairs were greater or less than 2 inches deep since this affects payment.
- The Contractor places a non-woven geotextile or liquid curing compound as a bond breaker between the new plain concrete base and the new reinforced concrete pavement as shown or directed.
- If shown on the plans, the Contractor saw cuts the existing reinforced concrete pavement to a nominal depth of 2 inches.
- The Contractor removes existing concrete with jack hammers and chipping hammers that will not damage reinforced concrete pavement to remain in place or the underlying base as directed. Do not use jackhammers heavier than nominal 30 pounds class. Do not use chipping hammers heavier than nominal 15 pounds class to remove concrete within 3/4 inch of reinforcing steel.
- The Contractor protects and keeps reinforcing steel clean of grease, oil, dirt, grout, or other contaminants at all times.
- Before placement of concrete, the repair area is blown clean with compressed air and a coat of epoxy grout or bonding agent is applied to all vertical surfaces.
- If full-depth saw cut and texturing with a bush hammer is shown on the plans, the contractor textures the full face of the cut as specified.

## Placing Reinforcement

Ensure the Contractor:

- Places reinforcement as shown and specified.
- Laps splices according to Section 00530.
- Uses reinforcement that is straight, clean, and free of scale or other matter which would interfere with its bonding to the concrete.
- Places the reinforcement on support devices that maintains it in specified position during concrete placement.
- Ties or clips at every other transverse bar intersection, as a minimum, in a manner that does not allow for displacement.
- Ties or clips every lap splice as shown.
- Obtains approval of the proposed support devices before use.

- Places tie bars required for contact-type longitudinal joints by drilling the hardened concrete section and then inserting and grouting the tie bars into place.
- Does not damage the existing reinforcement when drilling the holes.
- Provides smooth, round dowel bars.
- Coats dowel bars with plastic, heavy oil, or other approved material that will not bond with or be harmful to the PCC.
- Places dowels in supporting framework or support devices that hold dowels parallel with each other, parallel with the surface of the pavement, and perpendicular to the joint.

## Placing Concrete

Ensure the Contractor:

- Vibrates throughout the concrete until it is uniformly consolidated and does not segregate.
- Following the vibrating and strike-off operations, floats the concrete.
- Keeps the surface free from laitance, soupy mortar, marks or irregularities.
- Places the concrete in final position in one lift so a minimum of finishing will be necessary to provide a dense, homogenous pavement conforming to true grades and cross sections.

## Curing Concrete

Ensure the Contractor:

- Immediately after the final floating, surface finishing and edging have been completed, and while the concrete surface is still moist, applies liquid membrane-forming compound uniformly to the concrete by pressure-spray methods at a rate of at least 1 gallon per 150 square feet so that the concrete is completely white like painting a wall.
- Uses other approved curing methods from the specifications if a curing compound is not used.

## Measurement

Pavement repair will be measured on the area basis, and will be determined by measuring the width and length of each constructed panel of pavement. The width will be measured from edge-to-edge on the surface of the pavement, perpendicular to the centerline. The length will be measured from end-to-end of the pavement along the centerline, including the length of bar lap splices.

If depths are other than those specified then a proportionate volume ratio will be used for an equivalent number of square yards.

Bar lap areas will be measured on the unit basis. The reinforced bar lap area consists of an area of one 12 foot lane width and from 24 inches to 30 inches long. Where the bar lap areas consist of an area less than one lane width, the quantity of bar lap area will be adjusted by converting to a proportionate quantity based on a 12 foot lane width. A 6 foot wide pavement repair will be counted as one-half of a bar lap area.

## **Section 00759 – Miscellaneous Portland Cement Concrete Structures**

This work consists of constructing commercial grade concrete curbs, islands, traffic separators, driveways, walks, monolithic curbs and sidewalks, miscellaneous surfaces, and stairs with metal handrail.

### **Quality**

Quality requirements are specified and the [Non-Field Tested Materials Acceptance Guide](#).

Check 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 check that ODOT performs required verification testing.

Inspect materials for damage. Do not allow concrete to be incorporated if it is improperly mixed or more than 90 minutes has elapsed since it was originally mixed.

Gather and submit required quality documentation.

### **Construction**

Ensure that:

- Each structure location is accurately located and marked and both the Contractor and Inspector understand the markings.
- The underlying surface is cleaned, smooth, compacted, wetted, and at proper grade and cross-slope.
- Forms will result in a finished structure of the required dimensions and in the required locations.

- Reinforcement, dowels, joint materials, electrical conduit and devices, and other required appurtenances are placed as specified and anchored to prevent movement during placement and finishing of the concrete.
- The finished product will allow drainage of surface water.
- If extruding machines will be used to construct the structure:
  - The molds are of proper size.
  - Effective 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.
- If cold or wet weather is expected during the curing period, the Contractor has a process and devices on site to protect the concrete.
- Concrete mixture is of quality and is placed and consolidated, as specified.
- Joints are constructed at the proper locations, as specified – contraction joints are at maximum 15-foot spacing, and ½" thick preformed expansion joint filler is placed between new and existing concrete, unless specified otherwise.
- Finishing is performed in a timely manner.
- The surface is checked, using straightedge, string line, or other effective method, and deficiencies are corrected.
- Concrete is cured and protected as specified.
- **THE INSPECTOR MUST REMAIN ON-SITE UNTIL THE CURE IS COMPLETELY IN PLACE.**
- If forms were used during construction, the resulting surface is finished as specified after their removal.
- The Contractor cleans up and disposes of unwanted material.
- Affected areas are smoothed, restored, and finished as specified.

## Measurement

Refer to the specifications for the method of measurement and payment. Measurement and payment will be by one of the following methods:

If measurement is by volume, measure each structure, and record those measurements. As work is performed sketch and calculate the volume of each structure placed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If measurement is by area, verify that material has been placed to the required depth. As work is performed, sketch and calculate the area of structures completed daily and

submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If measurement is by length, measure and record the length of structure. As work is performed sketch and total the length constructed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment

If measurement is by the unit (each) basis, count each location where the structure is constructed. Sketch and calculate the number of structures completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.



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**Section 00800**



# 800's – Permanent Traffic Safety and Guidance Devices

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## Section 00810 – Metal Guardrail

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

### Quality

Quality requirements are specified and in the [Non-Field Tested Materials Acceptance Guide](#).

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

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

Gather and submit required quality documentation.

### Construction

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

Ensure that:

- Guardrail locations have been located and marked, and both the Contractor and Inspector understand the markings. Review the marked locations to ensure that the guardrail installation will protect traffic and structures.
- The installation locations have been reviewed for conflicts with buried facilities and utilities have located buried facilities, as appropriate.
- 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 constructed to the limits shown in the contract documents.
- Wood posts do not have excessive seasoning checks. No individual check can exceed ½ inch, whether or not other seasoning checks are evident.

- Posts and anchors are installed and damaged material is repaired or replaced, as specified.
- The material around each post or anchor is compacted as specified to ensure performance of the guardrail installation.
- The height of the installation is as specified.
- The specified end treatments and anchors are used.
- All damage to coatings has been repaired as specified.
- Rail members are lapped so that exposed ends do not face approaching traffic, except as allowed by specification.
- All fasteners and elements are tightened as specified.
- If required, delineators are installed as specified.
- The Contractor cleans up and disposes of unwanted material.
- Affected areas are smoothed and finished as specified.

### **Measurement**

Unless specified otherwise, measurement is by length. Measure and record the length of guardrail by either the count or length method, as specified. As work is performed, sketch and total the length of guardrail installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

### **Section 00811 – Cable Barrier**

This work consists of furnishing and installing cable barrier.

### **Quality**

Quality requirements are specified and in the [Qualified Products List](#).

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

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

Gather and submit required quality documentation.

## Construction

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

Ensure that:

- Barrier locations have been located and marked, and both the Contractor and Inspector understand the markings.
- The installation locations have been reviewed for conflicts with buried facilities and utilities have located buried facilities, as appropriate.
- The posts/post bases, cable, terminals, and fittings are installed per manufacturer's instructions to ensure performance of the barrier installation.
- The height of the installation is as specified.
- The specified terminals are used.
- All damage to coatings and components have been repaired as specified.
- All fasteners and elements are tightened as specified.
- The specified tension log is kept and submitted.
- If required, delineators are installed as specified.
- The Contractor cleans up and disposes of unwanted material.
- Affected areas are smoothed and finished as specified.

## Measurement

Unless specified otherwise, measurement is by length. Measure and record the length of barrier as specified. As work is performed, sketch and total the length of barrier installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as 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 and in the [Non-Field Tested Materials Acceptance Guide](#).

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

Gather and submit required quality documentation.

## **Construction**

Ensure that:

- Locations of the adjustment work are located and marked and both the Contractor and Inspector understand the markings.
- 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 approved by the Project Manager for reinstallation or adjustment, work with the Project Manager to establish requirements for replacement materials.
- The Contractor uses a specified method to raise the elevation of the installation.
- Material is placed and compacted under the bottom of the adjusted post to prevent settlement.
- Material is placed and compacted around the adjusted post to keep the installation vertical and provide required lateral support.
- The height, line, and grade of the adjusted installation are as specified.
- All fasteners and elements are tightened as specified.
- If required, delineators are reinstalled on the guardrail as specified.
- The Contractor cleans up and disposes of unwanted material.
- Affected areas are smoothed and finished.

## **Measurement**

Unless specified otherwise, measurement is by length. Measure and record the length of guardrail by either the count or length method. As work is performed, sketch and total the length of guardrail installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as 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 and in the [Non-Field Tested Materials Acceptance Guide](#).

Check 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.

Ensure that:

- 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 (free of visible cracks, chips, spalls, or corroded loops, of uniform surface texture and appearance, free of markings, other than those specified, and given 2 coats of water-based coating after installation).
- All Contractor caused damage is repaired.
- The Contractor measures the top and face surfaces with a straightedge, as specified, to ensure specified smoothness and corrects all deficiencies in surface tolerance.

Gather and submit required quality documentation.

### Construction

Ensure that:

- Barrier locations have been located and marked, and both the Contractor and Inspector understand the markings.
- Line and grade of the surfacing at the barrier locations are as specified, and require correction of the surfacing if not as specified.

- For cast in place barrier:
  - The underlying surface is cleaned.
  - Specified line and grade is established.
- Forms or equipment for construction are effective and functional.
- Reinforcement size, grade, lap, ties, depth, spacing, and minimum clearance are as specified.
- Construction, contraction and expansion joints are located and constructed as specified.
- Appurtenances are placed and secured as specified.
- The concrete is mixed, placed, cured, finished, and protected as specified.
- Concrete is not placed, without prior approval of the Project Manager, if the air temperature is below 35° F.
- Concrete is placed within 90 minutes of batching and mixing.
- If temperature is expected to drop below 35° F during the first 5 days after placement, the Contractor has a process and devices on site to protect the concrete. The exposed surfaces of the concrete mixture are protected immediately after final floating, surface finishing and edging for at least 7 calendar days to prevent moisture loss either by:
  - Application of an approved curing membrane-forming compound is as specified.
  - Placement of other materials, as specified, to prevent loss of moisture from the concrete mixture and to prevent damage to the concrete surfaces.
- **THE INSPECTOR MUST REMAIN ON-SITE UNTIL THE CURE IS COMPLETELY IN PLACE.**
- Surface finishing is as specified.
- 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 constructed.
- All damage is repaired as specified.
- Reflector devices are installed when specified.
- The barriers are cleaned and painted as specified.
- The Contractor cleans up and disposes of unwanted materials.

## Measurement

Unless specified otherwise, measurement is by length. Measure or count the barrier sections and record the length of barrier as specified. As work is performed, sketch and total the length of barrier installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as 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 and in the [Non-Field Tested Materials Acceptance Guide](#).

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

Gather and submit required quality documentation.

### Construction

Ensure that:

- The locations for the work are identified and marked, and both the Contractor and Inspector understand the markings.
- The Contractor understands and follows the manufacturer's instructions for installing the glare shields.
- The Contractor does not cause detrimental damage when drilling holes or installing anchor devices in the barrier.
- The glare shields are installed at the specified angle to traffic.
- The glare shields are installed vertical and in-line, as specified.
- All elements in a continuous run are of the same manufacture and like appearance.
- The Contractor repairs all damage from the work.
- The Contractor cleans up and disposes of unwanted material.

## Measurement

Unless specified otherwise, measurement is by length. Measure and record the length of shield as specified. As work is performed, sketch and total the length of shield installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as 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 [Qualified Products List](#), and the [Non-Field Tested Materials Acceptance Guide](#).

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

Gather and submit required quality documentation.

### Construction

Ensure that:

- The installation has been located and marked, and both the Contractor and Inspector understand the markings.
- Concrete elements are of the dimensions and are constructed as specified.
- The installation is constructed according to manufacturer directions and recommendations.
- The Contractor cleans up and disposes of unwanted materials.
- Affected areas are smoothed, restored, and repaired if needed.

### Measurement

Unless specified otherwise, measurement is by the unit (each) basis. Count each location where the attenuator is constructed. Sketch and calculate the number of attenuators completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as 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 [Qualified Products List](#), and in the [Non-Field Tested Materials Acceptance Guide](#).

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

Gather and submit required quality documentation.

### Construction

Ensure that:

- Locations of installations are accurately marked, including the distance from the pavement, and both the Contractor and Inspector understand the markings.
- Delineator spacing is as specified.
- The portion installed in the ground is driven or installed to the depth specified or recommended by the manufacturer, whichever is greater.
- If the portion installed in the ground is installed in rock, the excavated hole is of the size and depth, and the hole is filled with grout after the device is set, as specified.
- Split, cracked, or otherwise damaged devices are not left in the final installation.
- If devices will be attached to guardrail or barrier, they are attached as specified.
- Target members are secured to the support as specified.
- Mileposts are installed at the proper location and in the proper sequence.
- If galvanized parts are used, all damage is repaired as specified.
- The Contractor cleans up and disposes of unwanted material.
- The affected area is cleaned and shaped.

### Measurement

Unless specified otherwise, measurement is by the unit (each) basis. Count each location where a delineator is installed and where a milepost marker is installed. Sketch and calculate the number each of delineators and milepost markers completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00850 – Common Provisions for Pavement Markings

This work consists of furnishing, preparing, and installing all forms of pavement markings.

### Quality

Quality requirements are specified, in the [Qualified Products List](#), and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of the quality requirements and provides quality documentation before the material is incorporated

Ensure that:

- The Contractor is furnishing only a material that is allowed in the QPL. Do not allow the Contractor to furnish or utilize other material.

Gather and submit required quality documentation.

### Construction

Check that:

- Prior to starting striping work, appropriate Contractor and ODOT personnel meet for the required pre-striping conference.
- Control points and guidelines are laid out and approved by the Project Manager.
- For projects without striping plans, the existing striping is documented by survey and approved by the Project Manager. Striping is installed to match existing striping.
- If required by specification, a Project Manager approved manufacturer certified installer is utilized.
- For inlaid/grooved markings, the Project Manager and manufacturer have approved of the slot.

Ensure that:

- Climatic and surface conditions are as specified for the work.
- Locations are marked, and both the Contractor and Inspector understand the markings.
- Apply pavement markings as specified and in accordance with manufacturer's instructions.
- A manufacturer's representative is present during all placement of the pavement materials, when required by the specification.
- For inlaid/grooved markings, grind and clean the slot, and place marking material, as specified.
- Existing or conflicting markings are removed.
- The area of placement is cleaned, according to the specifications and the manufacturer's recommendations.
- Primer is applied as required and specified.
- Material is prepared and placed, as required by the specifications and the manufacturer's recommendations, including that liquid materials are placed to the specified thickness.
- If installation is not done as specified, or markings are not aesthetically acceptable, require the markings to be removed and replaced to result in acceptable markings.
- Markings are protected until hardened or cured as specified.
- The Contractor cleans up and disposes of unwanted material.
- The Contractor provides the warranty specified by contract.

## **Section 00851 – Pavement Marking Removal**

This work consists of removing markings from the pavement surface.

### **Quality**

There are no quality requirements for this work. The Inspector, should record pertinent information in the [General Daily Progress Report \(form 734-3474\)](#) or project diary.

Check with the Regional Environmental Coordinator for proper handling and disposal of grindings.

## Construction

Ensure that:

- Markings to be removed are clearly identified.
- The removal equipment contains the removed material.
- Markings are 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 repairs any damage to the pavement surface.
- The Contractor cleans up and disposes of removed material or other unwanted material.

## Measurement

The quantities for pavement line removal will be measured on the length basis to the nearest foot. The quantities of pavement bars removed will be on the area basis, measured to the nearest square foot. The quantities of pavement legends to be removed will be on the unit basis, by actual count. Measure and record the length of line removed. As work is performed, sketch and total the length removed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00855 – Pavement Markers

This work consists of furnishing and installing reflective and non-reflective pavement markers.

## Quality

Quality requirements are specified, in the [Qualified Products List](#), and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of the quality requirements and provides quality documentation before the material is incorporated.

Ensure that:

- The Contractor is furnishing only a material that is allowed by the QPL. Do not allow the Contractor to furnish or utilize other material.

Gather and submit required quality documentation.

## **Construction**

Ensure that:

- Locations are accurately located, including alignment of installations, as specified.
- Existing or conflicting markers are removed as needed or specified.
- Climatic and surface conditions are as specified for the work.
- The location for each marker is prepared by the specified treatment, sandblasting, etc., including grooving of the pavement for recessed markers, and the installation area is cleaned and dry.
- Markers do not span pavement joints or cracks.
- The adhesive is prepared and placed, according to the specifications and the manufacturer's recommendations.
- Markers are aligned on the adhesive and protected until the adhesive hardens.
- Excess adhesive is removed from the exposed surfaces of the markers and pavement.
- The Contractor cleans up and disposes of unwanted material.

## **Measurement**

Unless specified otherwise, measurement is by the unit (each) basis. Count each location where a marker is installed. Sketch and calculate the number of markers completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00856 – Surface Mounted Tubular Markers

This work consists of furnishing and installing permanent surface mounted tubular markers.

### Quality

Quality requirements are specified and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of the quality requirements and provides quality documentation before the material is incorporated.

Ensure that:

- The Contractor is furnishing only a material that is allowed by the QPL. Do not allow the Contractor to furnish or utilize other material.

Gather and submit required quality documentation.

### Construction

Ensure that:

- Locations are accurately located, including alignment and spacing, as specified.
- Existing or conflicting markers are removed as needed or specified.
- Climatic and surface conditions are as specified for the work.
- The location for each marker is prepared by the specified treatment.
- The adhesive is prepared and placed, according to the specifications and the manufacturer's recommendations.
- Markers are aligned on the adhesive and protected until the adhesive hardens.
- Excess adhesive is removed from the exposed surfaces of the markers and pavement.
- The Contractor cleans up and disposes of unwanted material.

## Measurement

Unless specified otherwise, measurement is by the unit (each) basis. Count each location where a marker is installed. Sketch and calculate the number of markers completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00857 – Rumble Strips

This work consists of forming rumble strips by constructing indentations in the pavement surfacing.

## Quality

There are no quality requirements for this work. The Inspector, should record pertinent information in the [General Daily Progress Report \(form 734-3474\)](#) or project diary.

## Construction

Ensure that:

- Locations are accurately located, including alignment, as specified.
- Climatic and surface conditions are as specified for the work.
- The Contractor cleans up and disposes of unwanted material.

## Measurement

Unless specified otherwise, measurement will be by length. Measure and record the length of rumble strip formed to the nearest 0.01 mile. As work is performed, sketch and total the length formed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00860 – Longitudinal Pavement Markings - Paint

This work consists of installing painted longitudinal pavement markings.

### Quality

Quality requirements are specified in the [Qualified Products List](#) and the [Non-Field Tested Materials Acceptance Guide](#).

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

Ensure that the Contractor is furnishing only a material that is allowed in the QPL. Do not allow the Contractor to furnish or utilize other material.

Gather and submit required quality documentation.

### Construction

Complete the Permanent Pavement Striping checklist for your information.

Check that:

- The locations for the painted lines will provide smooth flow and direction of traffic. If needed, ask the Region Traffic representative to review the layout.

Ensure that:

- The locations for the painted lines are marked; both the Contractor and Inspector understand the markings.
- Areas where paint is to be applied are cleaned as specified.
- Climatic and surface conditions are as specified for the work.
- Paint and beads are applied with the specified number of coats and at the specified rate. Periodically, compare the amount of stripe placed to the quantities of product used to verify minimum coverage.
- Lines are constructed within specified tolerances. If not, require the Contractor to remove and replace the unacceptable segments.
- Over open-graded HMA, a second application is made as specified.
- Dribbling or tracking of paint is cleaned up and striping is retraced as specified.
- If temporary flexible pavement markers had been installed, the Contractor removes and disposes of them.
- The Contractor cleans up and disposes of unwanted material.

## Measurement

Unless specified otherwise, measurement will be by length. Measure and record the length of marking applied. As work is performed, sketch and total the length applied daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00865 – Longitudinal Pavement Markings - Durable

## Section 00866 – Longitudinal Pavement Markings – High Performance

## Section 00867 – Transverse Pavement Markings – Legends and Bars

This work consists of applying durable and high performance longitudinal pavement marking materials, and pavement markings for legends and bars.

## Quality

Quality requirements are specified, in the [Qualified Products List](#), and in the [Non-Field Tested Materials Acceptance Guide](#).

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

Ensure that the Contractor is furnishing only a material that is allowed in the QPL. Do not allow the Contractor to furnish or utilize other material.

Gather and submit required quality documentation.

## Construction

Complete the Permanent Pavement Striping checklist for your information.

Check that:

- The locations of the permanent markings will provide smooth flow and direction of traffic. If needed, ask the Region Traffic representative to review the layout.

Ensure that:

- The locations of the permanent markings are marked; both the Contractor and Inspector understand the markings.

- A representative of the manufacturer is on the project site during this work, if required by the specification, and, among other things, approves of the application equipment and process.
- Climatic and surface conditions are as specified for the work.
- The surface on which the material is to be applied is clean and dry and has been prepared as required by specification or the manufacturer.
- The Contractor performs a test stripe, if specified.
- Do not place markings on longitudinal pavement joints.
- 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 protected and all damage is repaired.
- The Contractor records specified measurements, including thickness of application.
- The markings are constructed to specified tolerances. If not, require the Contractor to remove and replace, or otherwise repair, the unacceptable portions.
- The retro-reflectivity is measured as specified.
- If temporary flexible markers were used, the Contractor removes and disposes of them.
- The Contractor cleans up and disposes of unwanted material.
- The Contractor provides the specified warranty.

## Measurement

Unless specified otherwise, measurement for longitudinal markings will be by length for a specified width. Measure and record the length of marking applied. If the width of marking applied is wider/narrower than specified, apply an appropriate conversion factor (e.g. double the length if the marking is twice as wide as specified). As work is performed, sketch and total the length applied daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

Unless specified otherwise, measurement is by the unit (each) basis for legends. Count each location where a marking is installed. Sketch and calculate the number of markings completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

Unless specified otherwise, measurement is by area basis for bars. Measure the bars to the nearest square foot. Sketch and calculate the number of markings completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

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**Section 00900**



# 900's – Permanent Traffic Control and Illumination Systems

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## Section 00905 – Removal and Reinstallation of Existing Sign Installations

This work consists of removing existing signs, as specified, and reinstalling them at new locations, when specified.

### Quality

No quality documentation is generally required; however, ensure that:

- The removed material, if reinstalled, will provide an installation at the new location that meets the specified requirements. If not, notify the Project Manager.
- The reinstalled installation is constructed as specified. If needed, the Contractor furnishes and uses new parts.
- Each reinstallation properly serves its specified purpose.

Although no quality documentation is required, record pertinent information in the [General Daily Progress Report \(form 734-3474\)](#).

### Construction

Ensure that:

- The location of each removal and reinstallation is located and marked and both the Contractor and Inspector understand the markings.
- The removed item or material, if it will not be reinstalled, shall be disposed of onsite or removed from the project site, as specified.
- Items to be salvaged or reinstalled are handled, with appropriate temporary support, to prevent damage.
- Reinstallation is done immediately, unless specified differently.
- If new or different materials are required to accomplish a reinstallation, the Contractor furnishes and uses the specified materials.
- Protect any/all business logos and tourist-oriented directional signs not to be reinstalled as they may be wanted by the Oregon Travel Experience (OTE) for reuse elsewhere.

- The reinstallation, and the resulting installation, comply with specified requirements, and provide specified guidance to traffic.
- The Contractor smoothes and finishes affected areas.

## Measurement

No measurement of quantities will be made for this work. Payment is on a lump sum basis unless specified otherwise. As work is performed, prepare and submit a source document, such as an [Installation Sheet \(form 734-2605\)](#), 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, such as a [General Daily Progress Report \(form 734-3474\)](#), to justify assessing the liquidated damages specified.

If new parts are needed and are not specified as incidental under the contract, notify the Project Manager. As the materials are incorporated, prepare and submit a source document, such as an [Installation Sheet \(form 734-2605\)](#), to justify payment and possible supporting documentation for a contract change order.

## Section 00910 – Wood Sign Posts

This work consists of furnishing and installing preservative treated wood sign posts.

### Quality

Quality requirements are specified and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of the quality requirements.

Ensure that:

- The Contractor provides quality documentation before the material is incorporated.

Review the delivered wood posts for checking and other damage and ensure that unacceptable posts are not incorporated. .

Gather and submit required quality documentation.

## Construction

Ensure that:

- Locations for wood sign posts are located and marked and both the Contractor and Inspector understand the markings.
- Post lengths are verified on the Sign Data Sheet in the plans. Contractor has information to know exact lengths and sizes of required posts. See Post Length Forms available on the ODOT Construction website.
- Holes for the posts are excavated to the specified depth or deeper. Caution should be exercised in going too deep as the result may affect the sign clearances and result in the Contractor needing a longer post.
- Rock or other hard material is removed to allow the specified depth of installation.
- The post is of the specified dimension and is placed in the specified orientation.
- If cutting of posts is required, only the bottom is cut.
- If required, holes for breakaway are drilled as specified (correct size hole, elevation, and orientation).
- The sign, or other device to be mounted on the post, will be at the specified elevation and orientation after installation.
- The hole is backfilled and compacted full depth and the post is vertical, as specified.
- The finished installation exhibits specified line and grade and that the posts have firm foundations to prevent settlement and loss of structural capacity.
- The Contractor cleans up and disposes of unwanted material.
- The affected area is smoothed and finished.

## Measurement

Measurement for wood sign posts is on a foot board measure basis, unless specified otherwise. Record the information, by installation location as the work is performed on an [Installation Sheet \(form 734-2605\)](#) as a source document, calculate the quantity, and submit to justify payment.

## Section 00920 – Sign Support Footings

This work consists of constructing major and minor sign support footings.

### Quality

Quality requirements are specified, in the [Non-Field Tested Materials Acceptance Guide](#), and in the [Manual of Field Test Procedures](#) – Field Tested Materials Guide.

Check that:

- The Contractor is aware of quality requirements, arranges for specified inspection of manufactured material, performs required testing, and furnishes quality documentation before the material is incorporated.
- Manufactured materials are inspected, generally, by representatives of the ODOT Structure Services Engineer, sometimes at the manufacturer facility, and required documentation is furnished. Inspected signs should arrive onsite with an Inspection Sticker on the back.

Gather and submit required quality documentation.

### Construction

Ensure that:

- Installations are 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 specified 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.
- Excavation is performed to allow concrete to be placed against undisturbed material or to allow compaction of backfill materials, as specified.
- Forming, if performed, will result in specified dimensions of the installation.
- Reinforcement, conduit, ground rod, anchor bolts, and other devices are placed and secured against movement during concrete placement, as specified.
- Damage to coatings is repaired.
- Concrete is furnished, tested if required, placed, finished, cured, and protected against damage, as specified.

- Forms are removed and the resulting surface is finished as specified.
- Backfill materials meet specified requirements, are compacted to full depth, and are tested for density as specified.
- The Contractor cleans up and disposes of unwanted material.
- The affected area is smoothed, compacted if required, and finished.

### **Measurement**

No measurement of quantities will be made for this work. Payment is on a lump sum basis unless specified otherwise.

As work is performed, prepare and submit a source document, such as an [Installation Sheet \(form 734-2605\)](#), to justify payment.

### **Section 00930 – Metal Sign Supports**

This work consists of fabricating, galvanizing, furnishing and installing metal sign supports.

### **Quality**

Quality requirements are specified, in the [Qualified Products List](#), and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that:

- The Contractor is aware of quality requirements, arranges for inspection of manufactured material, and furnishes quality documentation before the material is incorporated.
- Manufactured materials are inspected, generally, by representatives of the ODOT Structure Services Engineer, sometimes at the manufacturer facility, and required documentation is furnished.

Gather 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, ensure that:

- Installations are accurately located and marked.
- The specified identifying tags are present.
- 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, notify the Project Manager.
- The sign supports are oriented so that no twist or warp will be imparted to the sign panels.
- All required parts of the connection to the footing support, as well as other portions of the installation, are furnished and installed.
- All connectors, bolts, and other parts of the installation are of the specified size and quality, and have the specified coating.
- Bolts have been tested as specified.
- Bolts have been tightened as specified.
- Any damage to coatings is repaired.
- As specified, the installation is painted or otherwise coated.
- The Contractor cleans up and disposes of unwanted material.

### **Measurement**

No measurement of quantities will be made for this work. Payment is on a lump sum basis unless specified otherwise.

As work is performed, prepare and submit a source document, such as [an Installation Sheet \(form 734-2605\)](#), to justify payment.

### **Section 00940 – Signs**

This work consists of furnishing, fabricating and erecting traffic signs.

### **Quality**

Quality requirements are specified, in the [Qualified Products List](#) and in the [Non-Field Tested Materials Acceptance Guide](#).

Check 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, sometimes at the manufacturer facility, and required documentation is furnished.

Ensure that:

- The signs, as delivered, have the specified construction, the legend is as specified, and are not damaged.

Gather and submit required quality documentation.

## **Construction**

Ensure that:

- The location for each sign is accurately marked.
- The Contractor will have all signs installed before making any change in traffic control.
- Delivered signs are of specified 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 per specification, signs are covered (with covers from the [Qualified Products List](#)) until ready for service.
- Signs are installed at the specified elevation with the specified angle and orientation to the roadway.
- Damaged signs are replaced or the damage is repaired.
- Mounting devices, including all specified components, are furnished and installed or constructed, as specified.
- The Contractor cleans up and disposes of unwanted material.

## **Measurement**

Measurement for signs will be by area, unless specified otherwise. As work is performed sketch and calculate the area of signs installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

On that source document, list for each installation by pay item:

- Location of installation
- Type, legend, or other identification of sign, including pay item identification
- Dimensions of sign
- Calculated area of sign

## **Section 00960 – Common Provisions for Electrical Systems**

This work consists of furnishing and installing materials for electrical systems and for modifying existing systems.

*Inspection of Electrical System construction requires the Inspector to be a Certified Traffic Signal Inspector.*

Certified Traffic Signal Inspectors will be issued an *Inspector's Manual for Signal Construction* during training that should be used and consulted throughout construction. Use the most current version (this manual is updated on a yearly basis in January). It can be downloaded or purchased at the following website:

[http://www.oregon.gov/ODOT/HWY/CONSTRUCTION/pages/traffic\\_signal\\_manual.aspx](http://www.oregon.gov/ODOT/HWY/CONSTRUCTION/pages/traffic_signal_manual.aspx)

Work with the Project Manager to consult with the Region electrical crew, Traffic Signal Services Unit, or Region Traffic representative for assistance or guidance regarding this work.

Ensure that:

- The Contractor furnishes quality documentation before the material is incorporated.

Gather 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.

**Check that:**

- The Region electrical crew or Region Traffic representative has been consulted for 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 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 correctly licensed electricians or registered apprentices to perform electrical work. Verification can be made by checking workers' electrical cards.
- For electrical services:
  - The Project Manager contacts the utility to arrange for the electrical hookup.

**Ensure that:**

- The Contractor accurately marks the locations for elements of the work, and both the Contractor and Inspector understand the markings.
- 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, the Contractor must submit the specified number of copies of those plans or documents, depicting the changes, to the Project Manager.
- For coatings, coatings have been applied and any damage is repaired.
- The Contractor cleans up and disposes of unwanted material.
- The affected areas are smoothed, finished, and restored.

**Measurement**

No measurement is required for this section. Work is measured and paid under other pay items.

## Section 00962 – Metal Illumination and Traffic Signal Supports

This work consists of furnishing, fabricating, galvanizing and installing materials for illumination and traffic signal supports and foundations. The locations of illumination/signal material shown are approximate, with exact locations established in the field.

*Inspection of Illumination/Signal Support construction requires the Inspector to be a Certified Traffic Signal Inspector.*

### Quality

Quality requirements are specified, in the [Qualified Products List](#), and in the [Non-Field Tested Materials Acceptance Guide](#). Quality requirements for field tested items are specified in the [Manual of Field Test Procedures](#) – Field Tested Materials Guide.

Check that:

- The Contractor is aware of quality requirements, arranges for inspection of manufactured material, and furnishes quality documentation before the material is incorporated.
- Manufactured materials are inspected, generally, by representatives of the ODOT Structure Services Engineer, sometimes at the manufacturer facility, and required documentation is furnished.

Gather 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.

For the support foundation ensure that:

- Installations are accurately located and marked and both the Contractor and Inspector understand the markings.
- The installation, as located, will allow the support(s) to be installed at the specified 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.
- Excavation is performed to allow concrete to be placed against undisturbed material or to allow compaction of backfill materials, as specified.
- Forming, if performed, will result in specified dimensions of the installation.
- Reinforcement, conduit, ground rod, anchor rods, and other devices are placed and secured against movement during concrete placement, as specified.
- Anchor rods are not adjusted after the concrete has set.
- Damage to coatings is repaired.
- Concrete is furnished, tested if specified, placed, finished, cured, and protected against damage, as specified.
- Forms are removed and the resulting surface is finished as specified.
- Backfill materials meet specified requirements, are compacted to full depth, and are tested for density as specified.
- The affected area is smoothed, compacted if required, and finished.

Also, ensure that:

- As needed, installations are accurately located and marked.
- The specified identifying tags are present.
- The support, with its support footing, will allow the support(s) to be installed at the specified elevation and orientation. If the support is of the incorrect length or the footing is of incorrect elevation or orientation, notify the Project Manager.
- The supports do not deviate from the specified straightness.
- All required parts of the connection to the footing support, as well as other portions of the installation, are furnished and installed.
- All connectors, bolts, and other parts of the installation are of the specified size and quality, and have the specified coating.
- Verify that the mast arm flanges are not warped to a point where the flanges cannot be bolted together or do not make a complete full contacted surface.
- Bolts have been tightened and tested as specified.
- 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 the specified number of copies of those plans or documents, depicting the changes, to the Project Manager.
- Any damage to coatings is repaired.
- As specified, the installation is painted or otherwise coated.
- The Contractor cleans up and disposes of unwanted material.

## Measurement

No measurement is required for this section. Work is measured and paid under other pay items.

## Section 00963 – Signal Support Drilled Shafts

This work consists of excavating and constructing drilled, cast-in-place, reinforced concrete shafts for signal supports.

## Quality

Quality requirements are specified, in the [Non-Field Tested Materials Acceptance Guide](#), and in the [Manual of Field Test Procedures](#) – Field Tested Materials Guide.

Check that:

- The Contractor is aware of quality requirements, arranges for specified inspection of manufactured material, performs required testing, and furnishes quality documentation before the material is incorporated.
- Manufactured materials are inspected, generally, by representatives of the ODOT Structure Services Engineer, sometimes at the manufacturer facility, and required documentation is furnished.

Gather and submit required quality documentation.

Record the pertinent information in the [Drilled Shaft Concrete Placement Log \(form 734-2597\)](#), [Drilled Shaft Concrete Volumes \(form 734-2603\)](#), [Drilled Shaft Excavation Log \(form 734-2604\)](#), and [Drilled Shaft Inspection Report \(form 734-2598\)](#).

## Construction

Check that:

- The drilled shaft installation and repair plans have been submitted as specified.
- Prior to starting drilling work, appropriate Contractor and ODOT personnel meet for the required drilled shaft coordination meeting.

Ensure that:

- Installations are accurately located and marked and both the Contractor and Inspector understand the markings.
- The installation, as located, will allow the signal(s) to be installed at the specified 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.
- The Contractor's drilled shaft installation plan has been reviewed prior to commencement.
- Excavation of the shaft is performed to the specified dimensions, elevations, and tolerances.
- Reinforcement, conduit, ground rod, anchor bolts, and other devices are placed and secured against movement during concrete placement, as specified.
- Damage to coatings is repaired.
- Concrete is furnished, tested if specified, placed, finished, cured, and protected against damage, as specified.
- The first drilled shaft foundation has been approved by the Project Manager before proceeding with additional shafts.
- The Contractor cleans up and disposes of unwanted material.
- The affected area is smoothed, compacted if required, and finished.

### **Measurement**

Unless specified otherwise, measurement is by length. Measure and record the length of drilled shaft, as specified. As work is performed, sketch and total the length of each drilled shaft foundation completed and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 00970 – Highway Illumination

This work, in conjunction with Section 00960 and Section 00962, involves installation of highway illumination.

*Inspection of Highway Illumination construction requires the Inspector to be a Certified Traffic Signal Inspector.*

### Quality

Refer to the discussion and requirements of Section 00960 and Section 00962.

Also, check that the Contractor furnishes the required information regarding the luminaire(s) that it intends to install.

Gather and submit required quality documentation.

### Construction

In addition to the requirements of Section 00960 and 00962, ensure 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.
- The Contractor verifies the illumination pole height with the submitted shop drawings.
- Cable and wire are of the specified types and are installed as specified.
- The inspector should check that the Contractor installs all electrical systems with the “electrical safety requirement” in ODOT Specifications and according to the National Electric Code (NEC) for correct insulation, wire connections, grounding, etc.
- The Contractor does not de-activate existing or temporary systems until the new system is operating, unless specifically allowed.
- Each luminaire is marked with the date of installation, as specified.
- The Contractor performs specified 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 specified field test and performs all required replacement, modification, and maintenance.
- The Contractor cleans up and restores the affected areas and disposes of unwanted material.

## Measurement

No measurement of quantities will be made for this work. Payment is on a lump sum basis unless specified otherwise.

As work is performed, prepare and submit a source document, such as an [Installation Sheet \(form 734-2605\)](#), to justify payment.

## Section 00990 – Traffic Signals

This work, in conjunction with Section 00960, involves installation of traffic signals.

*Inspection of Traffic Signal construction requires the inspector to be a Certified Traffic Signal Inspector.*

Certified Traffic Signal Inspectors will be issued an *Inspector's Manual for Signal Construction* during training that should be used and consulted throughout construction. Use the most current version (This manual is updated on a yearly basis in January). It can be downloaded or purchased at the following website:  
[http://www.oregon.gov/ODOT/HWY/CONSTRUCTION/pages/traffic\\_signal\\_manual.aspx](http://www.oregon.gov/ODOT/HWY/CONSTRUCTION/pages/traffic_signal_manual.aspx)

Work with the Project Manager to consult with the Region electrical crew, Traffic Signal Services Unit, or Region Traffic representative for assistance or guidance regarding this work.

Check that the Region electrical crew or Region Traffic representative has been consulted for assistance or guidance regarding this work.

Gather and submit required quality documentation.

## Construction

Check that:

- The Contractor performs specified testing, in the presence of the Project Manager or Inspector, prior to the field test of the signal.
- The Contractor provides all manufacturer warranties or guaranties.
- The Contractor cleans up and restores the affected areas, including disposing of unwanted material.

**Measurement**

No measurement of quantities will be made for this work. Payment is on a lump sum basis unless specified otherwise.

As work is performed, prepare and submit a source document, such as an [Installation Sheet \(form 734-2605\)](#), to justify payment.

**INSERT TAB**

**Section 01000**



# **1000's – 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, and in the [Non-Field Tested Materials Acceptance Guide](#).

Check that the Contractor is aware of those requirements, provides samples for testing when required, and provides quality documentation before the material is incorporated.

Gather and submit required quality documentation.

### **Materials**

Refer to specs for requirements for Topsoil, Soil Conditioners, Amendments, and Bio-Amendments.

Availability and source for all specified seed will be provided by Contractor within 60 days of execution of the Contract.

### **For Seeding**

Ensure:

- Seed will be delivered in sealed containers and labeled, particularly for species, location obtained, weight of each species, presence of Noxious Weeds, percent germination and date of testing, and other items.
- Must be tested within 18 months of delivery to site.
- Seed must be plump, not sprouted, not moldy or otherwise damaged.
- Each lot of seed is subject to inspection when delivered.

### For Fertilizers

Ensure:

- Fertilizer must be labeled for NPK and be appropriate for area of use (West / East of Cascades).
- Low Phosphorous only near sensitive areas.

### For Mulches and Tackifiers

Ensure:

- Mulch and tackifiers must be free of all weed or plant seeds, and all substances detrimental to plant life.
- If straw is used it must be of good quality and certified free of noxious weed seeds or plant parts.

### For Pesticides

The use of pesticides must be approved prior to application. Pesticides may be excluded from Sensitive Areas by ODOT.

## **Labor**

The Weed Control Coordinator certification must be submitted at the pre-construction conference.

A pesticide license must be held by all applicators.

## **Construction**

Site must be properly prepared before seeding (multiple options, depending upon specific area to be seeded) according to the Special Provisions and Standard Specifications. Retain existing vegetation as much as possible. Remove all non-approved, target and noxious weed plants.

Contractor must provide soil samples to a certified lab for testing and analysis of nutrient composition. Expect a report from the lab recommending conditioners, amendments and soil bio-amendments to bring soil to healthy medium for seeding. Incorporate into seeding operation.

When specified, ensure that the Contractor:

- Presents a Weed Control Work Plan at the pre-construction conference, including name of coordinator, specific weeds for control mapped on plan sheets (includes disposal sites), methods and schedule for actions.
- Inspects prior to beginning removal or construction activities and at least monthly.
- Disposes of weeds at approved offsite facility and documents each disposed load.
- Keeps the Weed Management Area weed free during active project.
- Uses only hand methods within 50 feet of Sensitive Areas.
- Notifies Agency not less than 24 hrs prior to seeding. Seeding must be done in mild temperature, no wind; soils must be tillable.

Temporarily seed areas which are not at finished grade but will not be disturbed for 2 months or longer. Include all soil amendments necessary to achieve target coverage within next permanent seeding window (locale specific).

Permanently seed areas within the specified windows for the locale, unless otherwise approved by the Agency. Target coverage must be achieved, otherwise re-seed and fertilize.

Several alternatives exist for applying seed, amendments, tracer and mulch, refer to project Special Provisions. Protect structures, objects, vehicles, people, and vegetation to remain from drift of material.

## **Maintenance**

Coverage must be achieved per specifications and be uniform, healthy and weed free.

The establishment period for erosion control begins upon initial acceptance of the work and ends when coverage achieved.

The establishment period for all other permanent seeding ends 45 days after initial acceptance, providing coverage and other establishment responsibilities have been met. If establishment responsibilities have not been met (seeding construction was completed and accepted outside the permanent seeding dates) then the establishment period ends 45 calendar days after reseeding is completed and accepted during the following seeding season.

Establishment activities include protection from damage, fertilizing and watering, weed control, mowing and repair / restoration of damaged areas.

## Finish and Clean-up

Remove all weeds, trash, debris, stones and dispose of appropriately. Ensure all documentation and disposal receipt tickets are gathered and accounted for.

## Measurement and Payment

Measure work, as specified, on an actual count (Unit Basis) or by surface area (Area Basis). As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements on an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

Payment will be paid for at the contract unit price, with no separate or additional payment for mobilization for blowers or spreaders, inspections or maintenance, or seeding mobilization if not included in Contract Schedule of Items. Partial Payments will be made for permanent seeding as follows: completion of seeding – 70%; completion of establishment period – 30%.

## Section 01040 – Planting

This work consists of planting and associated work.

### Quality

Quality requirements are specified, in the [Qualified Products List](#), and in the [Non-Field Tested Materials Acceptance Guide](#).

Ensure that the Contractor:

- Submits soil samples for testing to a certified lab. The lab will prepare a report of conditioners, amendments and bio-amendments to be added.
- Provides fertilizers that are labeled for NPK and are appropriate for the area of use. Low Phosphorous only near sensitive areas.
- Provides plants that are named by species.
- Provides plants that are free from disease and pests.
- Provides plant protection from extreme weather conditions.
- Provides plants that have a state inspection certificate for each load. Verify the delivered plants with the Project Special Provisions.
- Provides mulch and tackifiers that are free of weeds and plant seeds. If straw is used, it must be certified free of noxious weed seeds or plant parts.
- Has prior approval before the application of herbicides.

Gather and submit required quality documentation.

## **Construction**

Ensure that:

- Site is prepared per the Specifications before the planting begins.
- If working in wetlands, excavate wetland mitigation area first. Prepare sub-soil per Standard Specifications and Project Special Provisions.
- Incorporated plants are not wilted, dying or dead. As possible, inspect and reject plants before they are offloaded from the delivery truck.
- Fertilizers are incorporated per the soil report and at a rate per Specifications.
- Planting pits are approximately two (2) times the diameter of the root ball and the same depth of the root ball.
- The root systems are spread out in the pit. Balled and burlapped plants may have burlap left in place. If burlap is left in place, remove twine and fold top half of burlap down.
- The backfill is topsoil and additives.
- The backfill is watered after placement.
- Construction materials are removed at the end of each working shift.
- The Contractor cleans all pavement surfaces of debris.

Plant Establishment Period:

- The plant establishment period begins when all original planting is complete.
- Plant establishment work consists of water, weeding, adjustment of stakes and guys, control pests, removal of dead and dying plants, replacing missing plants, and re-mulching as needed.
- Ensure the Contractor removes all plants that have wilted, are dead or dying, and do not meet Specifications.
- Ensure the Contractor replaces all the plants that have been removed for the previous reasons with healthy plants.
- Inspect jointly with the Contractor in spring, summer, and fall. Corrective work must occur within 15 calendar days after receiving written notice of the work to be conducted.
- Ensure the Contractor notifies the Agency when complete.

Ensure that:

- The Contractor submits the Planting Work Plan as specified.
- Areas or locations to be planted are accurately 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.
- The Contractor has ensured that all utilities in the affected area have been identified and located.
- Required irrigation facilities have been installed prior to planting.
- The Contractor is aware of and protects vegetation that is to remain, as specified.
- The affected areas are shaped, cleaned, repaired, and finished as needed and the Contractor disposes of unwanted material.

## Measurement

Refer to the specifications for the method of measurement. Measurement will be by one of the following methods, unless specified otherwise:

If measurement is by the unit basis, count each location where the unit is completed. Sketch and calculate the number of units completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If measurement is by area, as work is performed, sketch and calculate the area completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If measurement is by volume in the haul vehicle, measure each haul vehicle and record those measurements. If measurement is by volume on an in-place basis, ensure that material is placed to the specified depth throughout the specified area by performing spot checks for depth. Take measurements to calculate the area covered and the resulting volume. Do not include areas where material was placed contrary to the specifications. As work is performed sketch and calculate the volume of material placed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If measurement is by length, measure and record the length of material installed. As work is performed, sketch and total the length of material installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 01050 – Fences

This work consists of constructing fences, gates and gateways.

### Quality

Quality requirements are specified, in the [Non-Field Tested Materials Acceptance Guide](#), and in the [Manual of Field Test Procedures](#)- Field Tested Materials Guide.

Check that:

- The Contractor is aware of the required quality documentation, performs sampling and testing as required, and provides quality documentation before the material is incorporated.
- The Contractor submits samples of materials, as specified, to the ODOT Materials Laboratory for testing. If materials fail to meet specified requirements notify the Project Manager.

Inspect all wood materials for checking or other damage. Reject material not in compliance with the specifications.

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.

Gather and submit required quality documentation.

### Construction

Ensure that:

- The surveyor has located and marked the fence construction (normally 1 foot inside and parallel to Right of Way lines), including gates and gateways, both the Contractor and Inspector understand the markings.
- The fence location varies, as specified 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.
- All ground disturbance, outside of ODOT Right of Way, is minimized and is repaired.
- All vegetation and other debris is removed from the fence line area.
- All specified grading, to allow fence construction to specified line and grade, is performed.
- Footings are excavated to specified dimensions, and backfill or concrete is placed and constructed as specified.
- 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 or the material is replaced.
- The fence fabric is installed and secured as specified.
- Corners, connections of fence sections, and connections to structures or existing facilities do not have gaps exceeding specified limits.
- The fence is electrically grounded as specified.
- Gates and gateways operate as specified.
- The Contractor cleans up and disposes of unwanted material.
- The affected area is smoothed and shaped.

## Measurement

Refer to the specifications for the method of measurement. Measurement will be by one of the following methods, unless specified otherwise:

If measurement is by the unit basis, count each location where the unit is completed. Sketch and calculate the number of units completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If measurement is by length, measure and record the length of material installed. As work is performed, sketch and total the length of material installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

## Section 01070 – Mailbox Supports

This work consists of removing and maintaining mailboxes and supports at temporary locations during construction, and installing mailboxes and newspaper boxes affected by construction on the new supports.

### Quality

Quality requirements are specified, in the [Qualified Products List](#), in the [Non-Field Tested Materials Acceptance Guide](#), and in the [Manual of Field Test Procedures –Field Tested Materials Guide](#).

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

Gather and submit required quality documentation.

### Construction

Ensure that:

- Delivery personnel have functional access to the mailboxes and newspaper boxes at all times during the project.
- As applicable, mailboxes and newspaper boxes are installed on specified temporary supports until placed on permanent supports.
- Locations of the permanent supports are marked and located, 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 size and location to allow installation of each box as specified.
- All damage is repaired as specified.
- The Contractor cleans up and disposes of unwanted material.
- The affected area is smoothed and finished.

**Measurement**

Unless specified otherwise, measurement is by the unit basis. Count each location where the unit is completed. Sketch and calculate the number of units completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

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**Section 01100**



# 1100's – Water Supply Systems

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## Section 01120 – Irrigation Systems

This work consists of constructing irrigation systems.

### Quality

Quality requirements for most materials are specified, and in the [Non-Field Tested Materials Acceptance Guide](#). Quality requirements for bedding material, concrete, and other field-tested materials are specified in the [Manual of Field Test Procedures](#) – Field Tested Materials Guide.

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

Gather and submit required quality documentation.

### Construction

Check 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 ensure 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 conducts a training session, arranged by the Project Manager, for personnel who will operate and maintain the system, as specified.

Ensure that:

- The Contractor marks the layout of the irrigation system before starting construction, ensuring that the finished system will provide complete coverage. If alterations or changes are needed notify the Project Manager.
- The Contractor has identified buried facilities and utilities and others have located and marked their buried facilities.
- 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 protects existing plants, as specified.
  - Trenching is performed to the specified depth and 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 depth and replaced with sand or other suitable material, as specified.
  - Detectable marking tape is placed with the pipe in the trench as specified.
- For piping:
  - Piping is constructed as specified.
  - 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 constructed as specified.
  - Concrete thrust blocks are constructed as specified.
- For electrical installation:
  - Wiring is of the specified specification, size, and numbers.
  - Splicing is done only at specified locations.
  - Wires are bundled as specified.
  - Wires are placed in the trench as specified.
- All piping is flushed to remove foreign material, air is purged, and piping is pressure tested, as specified.
- All sprinkler heads and other appurtenances are constructed as specified, and at required locations elevations, and are protected during construction, as specified.
- For backfilling pipes:
  - Backfilling is not done until all piping has been inspected, tested, and approved by the Project Manager.
  - If sufficient backfill material is not available notify the Project Manager.
  - Backfill type, material, method and compaction is as specified.
  - The top material is topsoil or other specified 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 ensure specified 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 cleans up and disposes of unwanted material.
- The affected areas are smoothed and restored.
- The Contractor provides all parts lists and service manuals, as specified.

### **Measurement**

No measurement of quantities will be made for this work. Payment is on a lump sum basis unless specified otherwise. As work is performed, prepare and submit a source document, such as an [Installation Sheet \(form 734-2605\)](#), to justify payment.

### **Section 01140 – Potable Water Pipe and Fittings**

### **Section 01150 – Potable Water Valves**

### **Section 01160 – Hydrants and Appurtenances**

### **Section 01170 – Potable Water Service Connections, 2-Inch and Smaller**

This work consists of constructing potable water pipe and fittings 16 inches in diameter and smaller within the Right of Way or easement.

### **Quality**

Quality requirements for most materials are specified, and in the [Non-Field Tested Materials Acceptance Guide](#). Quality requirements for bedding material, concrete, and other field-tested materials are specified in the [Manual of Field Test Procedures](#) – Field Tested Materials Guide.

Check that:

- The Contractor is aware of those requirements.

Ensure that:

- The Contractor performs testing as required.
- The Contractor provides 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 repaired.

Gather and submit required quality documentation.

## **Construction**

Check that:

- The Project Manager or owner of the facility collects samples and conducts bacteriological tests.
- 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.

Ensure that:

- Locations of installations are 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.
- 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 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 notify the Project Manager.
- Pipe is of the size, material, and construction for each installation, as specified.
- All foreign material is removed from the pipe before the pipe is placed in its final position.

- All cut ends of pipe are smoothed and reamed as specified.
- Pipe is laid as specified and in accordance with the recommendations of the manufacturer.
- Valves, hydrants, connections, and other appurtenances are constructed at the specified location, elevation, and orientation.
- Joints are cleaned, lubricated if required, and constructed as specified or recommended by the manufacturer.
- When specified, the pipe is encased, with polyethylene or other specified material, as specified or recommended by the manufacturer.
- Concrete for thrust blocks is mixed, tested, placed to the dimensions against undisturbed material, and allowed to develop the specified strength before the pipe is pressurized, as specified.
- For all non-metallic pipes, detectable marking tape or wire is installed above the pipe, as specified.
- Hydrants that are not in service are covered with a burlap or plastic bag, as specified.
- Valve boxes and similar appurtenances are marked as specified.
- The Contractor:
  - Flushes, disinfects, and tests all pipes as specified.
  - Performs the testing in the presence of the Inspector or owner of the facility, as specified.
  - Repairs or replaces any defective material or workmanship.
  - Disposes of the flushed or treated water as specified.
  - 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:
  - If water service must be interrupted, the Contractor notifies affected parties, as specified.
  - The owner of the facility is present during the connection process, if they so desire.
  - The Contractor constructs the connection according to the approved process and restores interrupted service as rapidly as possible.
- The inspection issues in Section 00495 (Trench Resurfacing) of this Manual are fulfilled for restoring existing surfacings in the trench areas.
- The Contractor cleans up and disposes of unwanted material.
- All affected areas are smoothed, finished, and restored as specified.

## Measurement

Refer to the specifications for the method of measurement. Note depth of pipe installation. Measurement will be by one of the following methods, unless specified otherwise:

If measurement is by the unit basis, count each location where the unit is completed. Sketch and calculate the number of units completed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If measurement is by volume in the haul vehicle, measure each haul vehicle and record those measurements. If measurement is by volume on an in-place basis, ensure that material is placed to the specified depth throughout the specified area by performing spot checks for depth. Take measurements to calculate the area covered and the resulting volume. Do not include areas where material was placed contrary to the specifications. As work is performed sketch and calculate the volume of material placed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

If measurement is by length, measure and record the length of material installed. As work is performed, sketch and total the length of material installed daily and submit that calculation with an [Installation Sheet \(form 734-2605\)](#) as a source document to justify payment.

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**Inspector Tables**



# Introduction to General Construction

## Inspector Manual Tables

The *General Construction Inspector Manual* tables provide guidelines for inspecting and documenting work on ODOT contracts. Currently, only the ODOT Standard Specifications 0200's through 0400's sections are included. Plans are underway to develop tables for the remaining sections at a later date.

This Inspector Training Manual tables refer to the Oregon Standard Specifications (2008 or earlier version), Manual of Field Test Procedures (MFTP), Non-Field Tested Materials Guide (NFTMG), and the Qualified Products List (QPL).

In this table format, you will find the following:

- Important material inspection items,
- Inspection work items,
- Workmanship items,
- Required documentation and forms,
- Measurement and payment items as per Standard Specification (for project specific Measurement and Payment check the Project Special Provisions).

For work items not covered in the table the Inspector should refer to the full version of the *General Construction Inspector Training Manual* and/or work with the Project Manager and others as needed.

This table and the Inspector Training Manual do not take precedence over the Project Special Provisions, Standard Specifications, or the Construction Manual; rather they are an additional tool for the Inspector.



Forms: **D** = Daily 734-3474, **I** = Installation Sheet 734-2605, **T** = Traffic Control Installation Report 734-2474, **F** = Flagger/Pilot Car Receipt 734-3955, **P** = Pile driving Equipment Data 734-2608, **E** = Erosion Control Monitoring form 734-2361, **S** = Sprinkling Tally Sheet 734-3474

Specification	Inspection Highlights/Checks	Field Test Materials	Non-Field Test Materials	QPL	Form
<b>220</b>					
Accommodations for Public Traffic	Provide adequate access to businesses, residences, intersections, and connections.				D
	Adequately protect adjacent excavations.				D
<b>225</b>	Record liquidated damages, if applicable, for excess delays to public traffic.				I,D
Work Zone Traffic Control	Review Traffic Control Plan (TCP) with Project Manager prior to the commencement of project.				
	Observe traffic conditions during all project work. Notify the TCP of any non-effective traffic control, adverse traffic conditions, or anything that threatens the safety of the workers or traveling public. Notify the PM and require the contractor to revise the TCP.				D
	Inspect traffic control measures, traffic control devices and other materials to ensure compliance.		✓	✓	D
	When the condition of any TCD falls to "marginal" or "unacceptable condition, ensure the contractor fixes or replaces it with an acceptable TCD.		✓	✓	D
Temporary Signage	All temporary signs are in new condition when first installed, unless authorized by the specification to be in like new or other condition.			✓	D,T
	All temporary signs are mounted on wood posts, unless allowed by the specifications or as shown on plans.				
	Signs are installed and secured in such a way that they do not blow down and create a traffic hazard.				
	Signs are installed at the proper angle to the roadway to insure visibility and reflectivity.				
	Ensure the contractor has covered or removed the appropriate signs. Covered signs must be completely covered by a sign cover from the QPL.			✓	D,T
	Portable Changeable Message Signs (PCMS) are placed according to the standard drawings and serviced to ensure continuous function. Messages displayed are according to specifications and are as shown in plans.			✓	D,T
Temporary Barricades, Guardrail, and Barrier	Guardrail and barrier is aligned and constructed or installed per plans, and has the correct end treatment.			✓	D,T
<b>225</b>	Sufficient barricades, of the specified type, are used and placed per plans.			✓	D,T

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Specification		Inspection Highlights/Checks			Form
		Field Test Materials	Non-Field Test Materials	QPL	
<b>Temporary Traffic Delineation</b>	Ensure the correct number and type of devices are used per the Traffic Control Plan.			✓	D,T
	Ensure the spacing and taper lengths are correct for tubular markers and barrels per the Traffic Control Plan.			✓	I,D,T
	When contractor removes the appropriate striping, ensure that the method of removal is allowed by specification and that the pavement is not damaged.				I,D,T
	Ensure that the contractor replaces pavement markers and worn or faded striping as needed.			✓	D,T
<b>Flaggers/Pilot Cars</b>	Ensure Signing is placed and maintained per Traffic Control Plan.				D,T
<b>Flaggers/Pilot Cars</b>	Ensure Flaggers and Pilot Car Operators have a valid Flagger Certification card from Oregon, Washington, Idaho, or Montana on their person.				D,T
	Ensure Pilot cars have "Pilot Car Follow Me" sign and yellow overhead light.				D,T
	Ensure Flaggers have proper attire and safety equipment per specifications.				
<b>Lighting Conditions</b>	Ensure Flaggers are stationed so that motorists and equipment can see them.				
	Ensure flagger stations are properly illuminated for nighttime activities.			✓	
	Ensure work and equipment lighting does not blind or impede traffic.				
	The flagger can be easily seen at the illuminated flagging station.				
	Ensure that the devices are placed to direct traffic, rather than confuse the motorists.				
<b>Measurement</b>	Measure work, as specified, on a unit, lump sum, or incidental basis. As work is performed take measurements, prepare and submit the measurements on an installation sheet as a Source Document to justify payment.				I,T,F

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<b>Inspection Highlights/Checks</b>				
<b>Specification</b>	<b>Field Test Materials</b>	<b>Non-Field Test Materials</b>	<b>QPL</b>	<b>Form</b>
<b>240</b>				
<b>Temporary Drainage Facilities</b>				
This work consists of constructing and removing temporary drainage facilities.				
Ensure that all materials and methods comply with the specifications and plans.				
Ensure that the location for each temporary facility is located and marked according to the plans.				<b>D</b>
Ensure that drainage will flow through the facility and water does not flow around the installation.				
Ensure the contractor removes the facility from the project and restores the affected area per specifications.				<b>D</b>
Unless otherwise specified, no measurement of quantities will be made for this work. As work is performed, prepare and submit an installation sheet as a Source Document to justify payment.				<b>I</b>
<b>245</b>				
<b>Temporary Water Management</b>				
This section is not a Standard Specification, and will be included in the projects Special Provisions.				
Ensure that the materials and methods used comply with the Specification under which the material is covered.				
Ensure the contractor contacts ODOT, ODFW biologists, or the ODOT consultant to remove fish and aquatic life from the isolation work area prior to installation of any temporary facilities.				<b>D</b>
<b>Fish Removal</b>				
<b>Operation of Temporary Water Management Facilities</b>				
Ensure the contractor provides safe passage around or through isolated work areas.				<b>D</b>
Maintain and control water flow downstream of isolated work area for the duration of diversion to prevent downstream dewatering.				<b>D</b>
Ensure contractor monitors water turbidity.				<b>D</b>
Unless otherwise specified, no measurement of quantities will be made for this work. As work is performed, prepare and submit an installation sheet as a Source Document to justify payment.				<b>I</b>

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Specification	Inspection Highlights/Checks	Field Test Materials	Non-Field Test Materials	QPL	Form
<b>250</b>					
<b>Temporary Bridges</b>	This section is not a Standard Specification, and is included on projects by Special Provisions. This section consists of designing, constructing, maintaining, and removing temporary detour bridges Ensure that the materials and methods comply with Standard Specification Section 00500 requirements where applicable.				
	Ensure that the Contractor provides stamped working and foundation drawings and calculations that have been "reviewed and accepted" by the Engineer.				
	Ensure that the Pile and Driving Equipment and methods have been approved by the Contractor EOR and has been "reviewed and accepted" by the Engineer.				<b>P</b>
<b>Before any welding is permitted</b>	WPS-Welding Procedure				
	PQR-Procedure Qualification Records				
	WQTR-Welder Certification Test Records				
	MTR-Material Test Report				
	CWI-AWS Certificate Welding Inspector				
<b>Prior to opening temporary bridge to traffic</b>	The Contractor's EOR has completed an inspection of the structure to confirm the materials and construction conforms to the plans and specifications (any changes to the plans and specifications need to be approved by the Contractor's EOR and accepted by the Engineer).				
	The Engineer has received a written statement that states the structure will serve the intended use.				
	All concerns have been addressed and the Engineer agrees that the structure will serve the intended use.				
<b>Measurement</b>	Unless specified otherwise there will be no measurement of quantities.				<b>I</b>

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Specification		Field Test Materials	Non-Field Test Materials	QPL	Form
<b>280</b>					
<b>Erosion and Sediment Control</b>					
<b>290</b>	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. This includes but is not limited to those elements identified in the project's environmental documents or assessments.				
<b>Environmental Protection</b>					
	<i>It is expected that the inspector be a Certified Environmental Construction Inspector to inspect this work.</i>				
	The Contractor must inspect the project and the erosion and sediment control devices frequently to ensure that they are 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 ensure proper control.				<b>I</b>
<b>When dealing with Erosion and Sediment Control</b>	ensure that the Contractor complies with contract requirements, including: Copies of the approved ESCP are available at the project site. A contingency plan is developed for use in emergencies and the rainy season.				
	The ESCM monitors rainfall, inspects the project and control devices and ensures their effectiveness.				<b>E</b>
	The ESCM maintains the control devices.				<b>E,D</b>
	The ESCM installs additional or new devices, as approved by ODOT.				<b>E,D,I</b>
<b>280/290</b>	The Inspector periodically inspects the project site to evaluate whether the control devices are properly functioning and controlling erosion and sediment			✓	<b>D,I</b>
	If the implemented ESCP, PCP, or other submittal does not perform effectively, contact the Project Manager and require the Contractor to modify the submittal, processes, and devices as needed to provide effective performance.			✓	<b>D</b>
	As devices are installed or removed, the ESCM records those dates on the ESCP.			✓	<b>D,I</b>
<b>When dealing with Water Quality</b>	Ensure that the contractor: Does not discharge contaminated or sediment-laden water directly into any water way until it has been satisfactorily treated.				
<b>280/290</b>	Does not cause turbidity in waters of the State or U.S. greater than 10% above background reading (up to 100 feet upstream of the Project), as measured 100 feet downstream of the Project				<b>D</b>

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Specification	Inspection Highlights/Checks	Field Test Materials	Non-Field Test Materials	QPL	Form
	If construction discharge water is released using an outfall or diffuser port, do not exceed velocities more than 4 feet per second, and do not exceed an appropriate aperture size.				<b>D</b>
<b>When dealing with Fish and Fish Habitat Regulated Work Areas</b>	Ensure that the contractor: Performs work within the regulated work area only during the in-water work period defined in the Special Provisions or permits; pile driving may have unique in-water work periods.				
	Has a permit to work within a coffer dam outside the designated in-water work window.				
<b>When dealing with Protection of Fish and Fish Habitat</b>	Ensure that the contractor: Performs work within the regulated work area only and during the designated in-water work period. (In-water work period may be different for Pile Driving. Check with the project Special Provisions, REC or Agency Biologist for any Pile Driving restrictions that may apply.)				<b>D</b>
	Contacts the REC or Agency Biologist before working within a coffer dam outside of in-water work period.				
	Monitors hydro acoustic noise levels.				<b>D</b>
	Treated wood used below the ordinary high water elevation (OHW) must be sealed with a sealant that is approved by the Project Special Provisions to prevent leaching of preservative agents into waters of the state.		✓	✓	<b>D,I</b>
<b>When dealing with Wildlife</b>	Ensure that the contractor: Does not handle or hurt birds or their eggs, or destroy or move occupied bird nests unless allowed by permit.				
	Adheres to noise and sight distance restrictions.				<b>D</b>
	Clears vegetation only within contract temporal windows.				<b>D,I</b>
	Does not deviate from wildlife passage plans.				
<b>When dealing with Protected Plants or Habitats</b>	Ensure that the contractor: Installs and maintains "No Work Zone" fencing around sensitive areas denoted on plan sheets. Does not alter or impact fenced areas by any means.				<b>D,I</b>
<b>280/290</b>	Does not alter or impact signed "Special Management Areas."				<b>D</b>

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Specification	Inspection Highlights/Checks	Field Test Materials	Non-Field Test Materials	QPL	Form
<b>When dealing with hazardous materials</b>	Ensure that the contractor: Copies of the approved PCP are on-site. At a minimum, hazardous materials and wastes should be contained, clearly labeled and stored in a location that prevents damage.				<b>D</b>
	If the project involves demolition or repair of any structure (bridge, building, etc) ensure that there is a copy of the asbestos survey onsite.				
	Provides all disposal receipts, recycling receipts or other documentation for all material that leaves the project site.				<b>D</b>
	If unexpected contamination is encountered during excavation work (based on odor, staining, or sheen), stop work in that location and call the region HazMat coordinator to help get a qualified company on-site to ensure all requirements associated with the contamination are met.				
	If a contractor spills any substance that could cause harm to the environment, immediately call ODOT dispatch. Ensure that the contractor follows the Pollution Control Plan for clean up.				<b>D</b>
	For 3rd party spills in the construction zone (accidents not related to the contractor), call ODOT Dispatch to get maintenance responders on-site for wreck and material clean up.				<b>D</b>
	For petroleum spills over 42 gallons, hazardous waste or materials spill that impact surface water, ask ODOT Dispatch to notify DEQ via Oregon Emergency Response System (OERS @ 1-800-452-0311). If the spill is hazardous material or impacts surface water, also ensure that the National Response Center (NRC @ 1-800-424-8802) is notified. These notifications are required regardless of who causes the spill.				<b>D</b>
<b>When dealing with Archaeology</b>	Ensure that the contractor: Maintains No Work Zones and does not impact those protected areas. Stops work and reports inadvertent discoveries if archaeological material is identified during construction activities.				<b>D</b>
	Reports violations promptly to the appropriate authorities (REC, State Police, Project Manager, etc.).				<b>D</b>
<b>Measurement</b>	For Erosion and Sediment Control, unless specified otherwise, measurement will be on the lump sum, unit or length basis. As work is performed take measurements, or ensure that they are taken.				<b>I</b>
	For Environmental Protection, unless specified otherwise, no measurement of quantities will be made for this work				<b>I</b>

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<b>Inspection Highlights/Checks</b>		Field Test	Non-Field Test	QPL	Form
<b>Specification</b>					
<b>305</b>					
<b>Construction Survey</b>	See the Special Provisions and Construction Surveying Manual for Contractors for all Survey Requirements.				
<b>Measurement</b>	Unless specified otherwise there will be no measurement of quantities for Construction Survey Work.				<b>I</b>
	If additional survey work is ordered and performed, record all information.				<b>I</b>
<b>310</b>					
<b>Removal of Structures and Obstructions</b>	This work consists of removing and disposing of man-made materials, and cleaning up areas they occupy.				
	Observe the Contractors work to ensure that:				
	When guardrail, median rail, and concrete barriers have been removed, that during the same work shift new or salvaged units are installed. Otherwise the Contractor must protect the area with temporary barrier units until the new or salvaged units are installed.				<b>D</b>
	The Contractor does not damage any abutting structures. If damage does occur, the Contractor repairs or replaces the damaged structure as required.				<b>D</b>
	The Contractor removes, scarifies, or breaks down all material to the specified elevation.				<b>D</b>
<b>Measurement</b>	Unless specified otherwise, measurement will be on a lump sum, or separate item basis (by length, area or each). As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements.				<b>D,I</b>
<b>320</b>					
<b>Clearing and Grubbing</b>	Clearing and Grubbing is the removal and disposal of vegetation and similar buried matter. It also includes preserving vegetation and objects designated to remain in place.				
	Ensure that disposal operations do not violate permit requirements or local ordinances. If some of the material will be left on the project, Ensure that the material is broken down or processed and its placement does not jeopardize contract work or future work, as specified.				
	Review the Specification and project information to be aware of any restrictions on use or disposition of property involved in or to be salvaged from the work.				<b>D</b>

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Specification	Inspection Highlights/Checks	Field Test Materials	Non-Field Test Materials	QPL	Form
<b>320</b>	Observe the Contractor's operations to ensure that the work is completed as specified.				<b>D</b>
<b>Measurement</b>	Unless specified otherwise, measurement will be on a lump sum or area basis. As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements				<b>D,I</b>
<b>330</b>					
<b>Earthwork</b>	This work consists of excavation, ditching, backfilling, embankment construction, grading, leveling, borrow, and other earth-moving work.				
	Unless required differently in the Specification, the Contractor is responsible for all quality control, including testing, and ODOT must perform verification testing. Refer to the discussion of Quality and the Quality Assurance Program in Section 00100 of this Manual.	✓			
	If there is any question about the quality of any material or work procedure, require the Contractor to demonstrate, or perform further testing to ensure, that the material or procedure is acceptable or produces specified results. If additional testing is requested, inform Project Manager to authorize extra payment, if applicable. If additional testing is required, record the reasons and all results.	✓			<b>D,I</b>
	Before work begins, review the geology or geotechnical report for the project to learn of the concerns during design.				
	The Contractor maintains access for affected properties and businesses.				<b>D</b>
	Utilities have been located, marked, and protected.				<b>D</b>
	Observe the earthwork as it is conducted to identify areas that deflect under vehicle wheels. Note or mark suspect areas for testing.				
	During earthwork operations, ensure that: The Contractor is fulfilling its responsibilities under the Quality Assurance Program, including responsibility for ensuring 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 ensure that the work complies with Specification requirements.	✓			

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Specification		Inspection Highlights/Checks				Form
		Field Test	Non-Field Test	QPL	Materials	
<b>330</b>	<b>Measurement</b>	Measurement of earthwork will be as specified. If items will be calculated using the digital terrain model method, check that ODOT has obtained information on the original ground and has analyzed confidence points to verify the validity of the model. Assist the Project Manager, as needed, to calculate quantities from the digital terrain model.				<b>D,I</b>
		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 ensure that measurements are taken, so that pay quantities can be calculated. If the Inspector uses information provided by the Contractor to calculate quantities, perform cursory validation of that information.	✓			<b>D,I</b>
		As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements, and supporting calculations.				<b>D,I</b>
<b>331</b>						
	<b>Subgrade Stabilization</b>	This work consists of excavating and disposing of unstable materials in excavation areas only and placing geotextiles, stone embankment, and aggregate backfill as required.	✓	✓		
		Ensure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Also Ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.	✓	✓		<b>D,I</b>
		Ensure that: Excavation leaves smooth, firm surrounding soil. Placement of replacement material does not damage additional subgrade area or the excavated area. The replacement material is compacted and finished to specified finish and tolerances.	✓			<b>D,I</b>
	<b>Measurement</b>	Unless specified otherwise, measurement is on the area basis to the specified depth.				<b>D</b>
		If the Inspector uses information provided by the Contractor to calculate quantities, perform cursory validation of that information.				<b>D</b>
		As work is performed, note the location of the excavation (station and offset), measure all of the dimensions (length, width, and depth). If depths of stabilization are different than specified, record that information and calculate a proportional factor for payment (actual excavated depth/the assumed plan depth), and prepare and submit the measurements and supporting calculations.	✓			<b>D,I</b>

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Specification	Inspection Highlights/Checks	Field Test Materials	Non-Field Test Materials	QPL	Form
<b>335</b>					
<b>Blasting Methods and Protection of Excavation Backslopes</b>	This work consists of excavating in rock using controlled blasting methods. 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 Specification.				<b>D</b>
	No quality documentation is needed for this work. If the material is to be utilized in project work, ensure that the size and gradation is acceptable. Record all pertinent information.				
	Ensure that the Contractor follows safe practices.				
	Ensure that loose material is removed from the excavated slopes.				
	If motorists or adjacent property owners complain about damage, ensure that the Contractor takes action on the complaints and modifies practices, as needed, to minimize complaints and damage. Note any complaints or damage.				<b>D</b>
	If the Contractor delays traffic movement beyond the provisions of Section 00220, record appropriate information so that liquidated damages can be assessed, if specified.				<b>I,D</b>
<b>Measurement</b>	Measurement will be as specified. ensure that ODOT has recorded sufficient information before work starts, if needed, to calculate pay quantities.				
	If the Inspector uses information provided by the Contractor to calculate quantities, perform cursory validation of that information.				<b>I,D</b>
	As work is performed, measure, and prepare and submit the measurements, and supporting calculations.				<b>I,D</b>
	If the Contractor violates the requirements of Section 00220 Accommodations for Public Traffic, notify the Project Manager, record and submit all of the appropriate information.				<b>I,D</b>
<b>340</b>					
<b>Watering</b>	This work consists of furnishing and applying water, with additives if required, to prepare and compact earthwork, bases, and surfacings, and to control dust within the project.				
	Check that the Contractor has a legal right to the source of water and that it has acquired the right to use the water from that source.				

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Specification	Inspection Highlights/Checks	Field Test Materials	Non-Field Test Materials	QPL	Form
<b>340</b>	Ensure that the Contractor is recording watering work.				<b>S</b>
<b>Measurement</b>	Unless specified otherwise, measurement will be by weight, volume, known capacity tanks, or approved meters. ensure that volumes are entered on a Sprinkling Tally Sheet, as watering is performed.				<b>S,D,I</b>
	Ensure 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.				<b>S,D,I</b>
	Perform cursory validation that the volumes on the Sprinkling Tally Sheet are appropriate.				<b>S,D,I</b>
<b>344</b>					
<b>Treated Subgrade</b>	This work consists of treating the upper layer of subgrade with water and either lime, chloride, or Portland Cement to form a stabilized course of material.				
	Provide only materials that are specified in the Specification. Provide water that meets the requirements of Section 00340.	✓			
	Ensure that the Contractor is aware of those requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Also Ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.	✓			<b>I,D</b>
	Ensure that: The materials are applied at a uniform rate with specified equipment.				<b>D</b>
	Mixing operations are performed until the material is uniformly mixed with no streaks or pockets.				<b>D</b>
	Immediately after treating the subgrade, grade the mixture to specified line, grade and cross section and compact to specified density.				<b>I,D</b>
	Specified density of treated subgrade is achieved.	✓			<b>D</b>
	The Contractor compacts the subgrade until firm and unyielding. Test and proof-roll within 24 hours prior to placing base material on subgrade.	✓			<b>D</b>
<b>Measurement</b>	Unless specified otherwise, measurement for treated subgrade will be on the area basis, and for soil stabilizing materials will be measured on the dry weight basis.				<b>I,D</b>
	As work is performed, measure, and prepare and submit the measurements, and supporting calculations	✓			<b>I,D</b>

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Specification	Inspection Highlights/Checks	Field Test Materials	Non-Field Test Materials	QPL	Form
<b>350</b>					
<b>Geosynthetic Installation</b>	This work consists of furnishing, and placing geotextile in drains, under embankments, for embankment reinforcement, under riprap, buttresses, inlays, shear keys, over roadbed subgrades, and beneath pavement overlays.		✓		
	Quality requirements are specified in the Standard Specifications and Special Provisions.				<b>D</b>
	Ensure that the Contractor complies with those requirements, protects the materials, and provides acceptable quality documentation before the material is incorporated.				<b>D</b>
	If the Contractor supplies material that does not conform to Specification requirements, contact the Project Manager.				<b>D</b>
	The limits of the application, as marked, comply with Specification requirements, or the limits ordered by the Project Manager or Inspector, and both the Contractor and Inspector understand the markings.				<b>I,D</b>
	The geosynthetic materials have been stored and protected from damage as specified.				
	Specified overlap is acquired to ensure closure.				<b>D</b>
	There is no traffic or construction equipment allowed directly on the geotextile.				
	The covering material type and depth is placed according to the specifications.	✓	✓		<b>I,D</b>
<b>Measurement</b>	Unless specified otherwise, measurement is on the area basis. As work is performed, measure all of the dimensions, and prepare and submit the measurements, and all supporting calculations.				<b>I,D</b>
<b>360</b>					
<b>Drainage Blankets</b>	This work consists of furnishing and placing drainage blanket materials.				
	Unless required differently in the Specification, the Contractor is responsible for all quality control, including testing, and ODOT must perform verification testing.	✓			<b>D</b>
	Ensure that the Contractor is aware of those requirements, performs required testing with certified technicians, and check that it provides required quality documentation and test results. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.	✓			<b>D</b>

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Specification	Inspection Highlights/Checks	Field Test	Non-Field Test	QPL	Form
<b>360</b>	If there is any question about the quality of any material or work procedure, require the Contractor to demonstrate, or perform further testing to ensure, that the material or procedure is acceptable or produces specified results. If additional testing is requested, inform Project Manager to authorize extra payment, if applicable. If additional testing is required, record reasons and results. Ensure that the material: Does not become segregated during hauling, placing, or compacting. Is not contaminated by underlying or other material. Is compacted as specified.	✓			<b>D</b>
<b>Measurement</b>	Unless specified otherwise, measurement is on the volume basis. As work is performed, measure all of the specified neat line dimensions, and prepare and submit the measurements, and all supporting calculations.	✓			<b>I,D</b>
<b>370</b>					
<b>Finishing Roadbeds</b>	This work involves trimming, shaping and finishing the subgrade, ditches, slopes, and other graded surfaces to the shape and condition specified, as well as blending obliterated elements into the adjacent terrain. Most of this work occurs at or near the end of the earthwork operations. Ensure that: Subgrade is shaped and trimmed to grades as specified. Sewers, culverts, and drains have been cleaned as specified. The Contractor disposes of all unused/unwanted materials.				<b>D</b>
<b>Measurement</b>	Unless specified otherwise there will be no measurement of quantities for Finishing Roadbeds. ensure that an acceptable breakdown of the lump sum is developed. As work is performed document all work.				<b>I,D</b>
<b>390</b>					
<b>Riprap Protection</b>	This work consists of placing an erosion resistant covering for protecting slopes, trenches, and basins. Visually inspect the riprap material, as it is delivered, to ensure that it meets Specification requirements, is not contaminated, and does not contain unacceptable materials.	✓			<b>I,D</b>

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Specification	Inspection Highlights/Checks	Field Test Materials	Non-Field Test Materials	QPL	Form
<b>390</b>	If there is any question about the quality of any material or work procedure, require the Contractor to demonstrate, or perform further testing to ensure, that the material or procedure is acceptable or produces specified results. If additional testing is requested, inform Project Manager to authorize extra payment, if applicable. If additional testing is required, record the reasons and the results.	✓	✓		<b>D</b>
<b>Measurement</b>	Measure the work as specified to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform cursory validation of that information. As work is performed, measure all of the specified neat line dimensions, and prepare and submit the measurements, and all supporting calculations.	✓			<b>I,D</b>
<b>396</b>					
<b>Shotcrete Slope Stabilization</b>	This work consists of constructing pneumatically applied shotcrete (concrete mortar) stabilization blankets onto slope surfaces.				
	Ensure that the Contractor is aware of the requirements, performs required testing, and provides acceptable quality documentation before the material is incorporated. Also Ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.	✓			<b>D</b>
	Ensure that: The surface to be treated is prepared as specified.				<b>D</b>
	The prepared surface is damp prior to application of shotcrete.				<b>D</b>
	Devices to control thickness of application have been installed.		✓	✓	<b>I,D</b>
	Reinforcement is positioned as specified.		✓	✓	<b>I,D</b>
	The application is finished and cured as specified.	✓	✓	✓	<b>D</b>
	The work is protected as specified during the cure period.				<b>D</b>
<b>Measurement</b>	Unless specified otherwise, measurement is on the area basis. As work is performed, measure all of the dimensions, and prepare and submit the measurements, and all supporting calculations.				<b>I,D</b>

Specification	Inspection Highlights/Checks	Field Test Materials	Non-Field Test Materials	QPL	Form
<b>398</b>					
<b>Rock Slope Stabilization and Reinforcement</b>	This work consists of furnishing and installing rock slope stabilization and reinforcement as shown or specified.				
	Ensure that the Contractor complies with the requirements, protects the materials, and provides acceptable quality documentation before the material is incorporated.		✓	✓	<b>D</b>
	Ensure that: The Inspector has the most current version of the working drawings.				
	The inspector has a copy of the Field Construction Manual that is provided from the manufacturer of the proprietary rock fall net system.				
	The Contractor follows the installation instructions in the manufacturer's Field Construction Manual.				<b>D</b>
<b>Measurement</b>	Measure the work as specified to calculate quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform cursory validation of that information. As work is performed, measure, and prepare and submit the measurements, and all supporting calculations.				<b>I,D</b>
<b>405</b>					
<b>Trench Excavation, Bedding, and Backfill</b>	This work consists of excavating trenches, constructing trench foundations, and placing bedding, pipe zone material, and backfill for pipes smaller than 72 inches. Pipes larger than 72 inches follow specification 510.				
	Prior to excavation, verify that existing underground utilities and other facilities have been located and staked.				<b>D</b>
	Review the layout and staking of each installation to try and help detect errors.				
	Ensure that: Excavated material, if placed near the excavation, does not create an unsafe condition.				
	The excavation is performed to the dimensions and slope specified in the plans and according to the slope stakes.				<b>I,D</b>
	The trench foundation is compacted and tested as specified.	✓			<b>D</b>
	The bedding material is placed, compacted and tested as specified.	✓			<b>D</b>
	All pipe materials comply with specification requirements.		✓		<b>D</b>
<b>405</b>	Randomly check line and grade of pipe installation before backfilling is performed to ensure the construction is as specified.				<b>I,D</b>
	For waterlines, ensure thrust blocks are constructed to the size and locations specified.				<b>D</b>

<b>Inspection Highlights/Checks</b>				
<b>Specification</b>	Field Test	Non-Field Test	QPL	Form
	✓			<b>D</b>
	✓			<b>D</b>
<b>Measurement</b>				<b>I,D</b>
<b>406</b>				
<b>Tunneling, Boring, and Jacking</b>				
				<b>D</b>
		✓	✓	<b>D,I</b>
				<b>D</b>
<b>Measurement</b>				<b>D,I</b>
<b>410</b>				
<b>Pipe Lining</b>				
		✓		<b>D</b>
				<b>D</b>
<b>410</b>				<b>D</b>
				<b>I,D</b>
		✓		<b>D</b>

Specification	Inspection Highlights/Checks	Field Test Materials	Non-Field Test Materials	QPL	Form
<b>Measurement</b>	Unless otherwise specified, measurement is on the length basis, for other than point repairs and service line reconnections which will be measured on the unit basis. As work is performed, measure, prepare, and submit the measurements and all supporting calculations.				<b>I,D</b>
<b>420</b>					
<b>Salvaging Pipe</b>	This work consists of removing, cleaning, and either stockpiling or relaying culvert pipe and other pipe.				
	Ensure that materials are properly cleaned and are not damaged or defective.				<b>I</b>
	Ensure that: If reinstalled, installed according to appropriate requirements of Section 00445.				<b>I,D</b>
	If stockpiled, placed as directed or specified, including protecting the pipe from damage during any part of the operation, including the stockpiling operation.				<b>D</b>
<b>Measurement</b>	Unless specified otherwise, measurement is on the length basis. As work is performed, measure, and prepare and submit the measurements, and all supporting calculations.				<b>I,D</b>
<b>430</b>					
<b>Subsurface Drains</b>	This work consists of constructing subsurface drains using drain pipe, special filter material or granular drain material, and drainage geotextile.				
	Ensure that the Contractor is aware of the requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing.	✓	✓	✓	<b>D</b>
	Ensure that: The drainage material does not get contaminated.				
	No material is damaged or, if damaged, is replaced or acceptably repaired, if allowed.				<b>D</b>
	Filter material or geosynthetic and drain backfill material is installed as specified, without contamination.	✓	✓		<b>I,D</b>
	Installation is backfilled and compacted to required elevation, as specified.	✓			<b>I,D</b>
<b>430</b>	Locations of outlet pipes, other than those connected to inlets or other structures, are properly marked so Maintenance forces can locate them.				<b>D</b>
<b>Measurement</b>	Measurement will be as specified. If the Inspector uses information provided by the Contractor to calculate quantities, perform cursory validation of that information. As work is performed, measure, and prepare and submit the measurements, and all supporting calculations.				<b>I,D</b>
<b>432</b>					

<b>Inspection Highlights/Checks</b>				
<b>Specification</b>	<b>Field Test Materials</b>	<b>Non-Field Test Materials</b>	<b>QPL</b>	<b>Form</b>
<b>Wearing Surface drains</b>				
This work consists of constructing wearing surface drains and outlets.				
Ensure that the Contractor is aware of the requirements, and provides acceptable quality documentation before the material is incorporated. Gather and submit required quality documentation.	✓			
Ensure that: The Contractor provides equipment that produces a trench with clean and vertical sides.				
The Contractor compacts as per the specifications.	✓			<b>D</b>
The Contractor hauls, deposits, and places wearing surface drain material that is acceptable to the Engineer.				<b>I,D</b>
The Contractor does not crush the outlet drain pipe during compaction.				<b>D</b>
Unless specified otherwise, measurement is on the length basis, except for drain outlets which will be measured on the unit basis. As work is performed, measure, and prepare and submit the measurements, and all supporting calculations.				<b>I,D</b>
<b>435</b>				
<b>Prefabricated Vertical Drains</b>				
This work consists of forming and installing prefabricated vertical drains.				
Ensure that the Contractor is aware of the requirements, and provides acceptable quality documentation before the material is incorporated. Gather and submit required quality documentation.	✓		✓	<b>D</b>
Check that the Contractor submitted proposed installation details for review at least 14 days before beginning the trial installation.				
Observe the trial installation process to confirm an ability to follow the installation process. Coordinate with the Project Manager.				<b>D,I</b>
<b>435</b>				
Ensure that: Monitoring equipment, if needed or specified, is installed and protected.	✓		✓	<b>D,I</b>
Drains are installed in the locations and to specified tolerances.				<b>D,I</b>
Drains are not damaged during their installation.				<b>D</b>
If an obstruction is encountered: Coordinate with the Project Manager to order the Contractor to implement obstruction clearance procedures as specified.				<b>D</b>
If the obstruction cannot be cleared, work with the Contractor to install the drain(s) at alternate locations. Coordinate with the Project Manager.				<b>D</b>

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<b>Inspection Highlights/Checks</b>				
<b>Specification</b>	Field Test Materials	Non-Field Test Materials	QPL	Form
<b>Measurement</b>				<b>D,I</b>
<b>440</b>				
<b>Commercial Grade Concrete</b>				
Unless specified otherwise, measurement is on the length basis. As work is performed, measure, and prepare and submit the measurements, and all supporting calculations.				
This work consists of furnishing, placing, and finishing commercial grade concrete.				
Ensure that the Contractor is aware of the requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing. Gather and submit all of the required quality documentation.	✓			<b>D,I</b>
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.	✓			
Ensure that: The forms, into which the CGC is to be placed, appear to be constructed according to best common practice, as specified.				
The CGC has been batched and mixed as specified.	✓			<b>D</b>
The CGC is placed and consolidated as specified.				<b>D,I</b>
The CGC is cured and otherwise protected from unsuitable climatic conditions or damage as per specifications.				<b>D</b>
Unless specified otherwise there will be no measurement of quantities for Commercial Grade Concrete. As work is performed document all of the work.				<b>D,I</b>

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<b>Inspection Highlights/Checks</b>				
<b>Specification</b>	<b>Field Test Materials</b>	<b>Non-Field Test Materials</b>	<b>QPL</b>	<b>Form</b>
<b>442</b>				
<b>Controlled Low-Strength Materials</b>				
This work consists of furnishing and placing controlled low-strength materials (CLSM).				
Ensure that the Contractor is aware of the requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing. Gather and submit all required quality documentation.	✓			<b>D</b>
Ensure that: The materials are mixed and placed to fill the specified voids, spaces, volumes, or depths, as specified.	✓			<b>D,I</b>
CLSM material does not leak or flow into unwanted areas.				<b>D</b>
Unless specified otherwise there will be no measurement of quantities for CLSM. As work is performed document all of the work.				<b>D,I</b>
<b>445</b>				
<b>Sanitary, Storm, Culvert, Siphon and Irrigation Pipe</b>				
This work consists of constructing or reconstructing culvert, siphon, sanitary sewer, storm sewer, and irrigation pipes. This work includes constructing joints and connections to other drainage structures or systems for complete installation.				
Ensure that the Contractor is aware of the requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing. Gather and submit all of the required quality documentation.	✓	✓	✓	<b>D</b>
Inspect pipe shortly after it is unloaded. Identify sections of pipe or other materials that are unacceptable for use on the project. Items to check include:				
<u>Concrete pipe</u>				
Pipe is of the specified class with appropriate identifying markings. Gaskets and other materials conform to requirements.		✓		<b>D</b>

Specification	Inspection Highlights/Checks	Field Test Materials	Non-Field Test Materials	QPL	Form
<b>445</b>	<u>Metal pipe</u>				
	Materials are of proper size and type, with appropriate identifying markings. Gaskets, if specified, bands, and hardware are furnished.		✓		<b>D</b>
	<u>Plastic or other pipe</u>				
	Materials are of specified size and type, with appropriate identifying markings. Gaskets and other connecting materials are furnished.		✓		<b>D</b>
	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 so that the material may be able to be used elsewhere, even though it is unacceptable on this project.		✓	✓	<b>D,I</b>
	If material is rejected, describe the reasons and disposition of rejected material.				<b>D,I</b>
	For siphon and sanitary sewer installations, obtain a copy of the Contractor's records of the watertightness testing or record the results.				<b>D</b>
	Ensure that:				
	For excavation, bedding, and backfill: Work is accomplished as specified.	✓			
	For laying pipe: Pipe is of the specified size and type.		✓		<b>D,I</b>
	Laying is started at the downstream end unless conditions specified otherwise.				<b>D</b>
	For elliptical pipe, the major axis is placed as specified.				<b>D</b>
	Bell or grooved ends are placed upstream.				<b>D</b>
	For joining pipe: The specified type of joint is used, including gaskets or other materials.		✓		<b>D,I</b>
	Joints are assembled per manufacturer recommendations for the type of joint used.		✓		<b>D,I</b>
	Dirt and foreign material is cleaned from the pipe and joint areas as specified.				<b>D</b>
	Bands are aligned and installed as specified.		✓		<b>D,I</b>
	Bolts are tightened as specified.		✓		<b>D</b>
	The Contractor uses and places tracer wire per specifications.		✓		<b>D,I</b>
	Ensure that the contractor: Properly places the pipe zone material as specified.	✓			<b>D</b>

<b>Inspection Highlights/Checks</b>				
<b>Specification</b>	<b>Field Test</b>	<b>Non-Field Test</b>	<b>QPL</b>	<b>Form</b>
<b>445</b>	✓			<b>D</b>
Performs all compaction of pipe zone material as required.	✓			<b>D</b>
Performs all compaction testing of pipe zone material as required.	✓			
As the inspector, pay special attention to the compaction of trench backfill. This is the area between the pipe zone and the bottom of the base rock. This is especially important with shallow buried pipes.	✓			
All damage to coatings is repaired, as specified, or the element is replaced. The Contractor makes any and all necessary repairs that were identified.		✓	✓	<b>D</b>
Measurement will be as specified. Ensure that ODOT has recorded sufficient information before work starts, if needed, to calculate pay quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform cursory validation of that information. As work is performed, measure, prepare and submit all of the the measurements, and all of the supporting calculations.				<b>D,I</b>
<b>450</b>				
<b>Structural Plate Pipe, Pipe Arch and Arch</b>				
This work involves the construction of structural plate pipe, pipe arches, plate arches, horizontal ellipses, vehicular underpasses, and special shaped structures.				
Ensure that the Contractor is aware of the requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing. Gather and submit all required quality documentation.	✓	✓		<b>D,I</b>
Inspect the delivered materials for damage shortly after delivery, including damage to shape and coatings.		✓		<b>D,I</b>
<u>Surveying and Layout</u>				
Ensure that the structure, as located and marked, conforms to the plans and matches the adjacent terrain.				
<u>Excavation, Bedding, and Backfill</u>				
Ensure that this work is accomplished as specified.	✓			<b>D</b>

		<b>Inspection Highlights/Checks</b>				
<b>Specification</b>		Field Test	Non-Field Test	QPL	Form	
<b>450</b>	<u>Erection</u>					
	Ensure that: The Contractor understands the Specification requirements and the manufacturer's assembly instructions, and performs the work according to those requirements.					
	Bolts are of lengths according to the plans or as specified.		✓		D,I	
	Bolts are installed and tightened in the sequence as specified.		✓		D,I	
	Strutting is installed as required by the manufacturer's specifications and as specified.				D,I	
	Damage to coatings is repaired as specified.		✓		D	
<b>Measurement</b>	Measurement will be as specified. Ensure that ODOT has recorded sufficient information before work starts, if needed, to calculate pay quantities. If the Inspector uses information provided by the Contractor to calculate quantities, perform cursory validation of that information. As work is performed, measure, prepare and submit the measurements, and all of the supporting calculations.				D,I	
<b>460</b>						
<b>Paved Culvert End Slopes</b>	This work consists of constructing portland cement concrete paved culvert end slopes.					
	Refer to Section 00440 of this Manual and the specifications for Commercial Grade Concrete quality requirements. Ensure that the Contractor is aware of the requirements, and provides acceptable quality documentation before the material is incorporated. Gather and submit all of the required quality documentation.	✓	✓		D,I	
	Ensure that: The underlying material is compacted per specifications.	✓			D	
	The forms appear to be constructed according to best common practice, as specified, and are of the specified size and shape to match the end of the culvert or other pipe and adjacent finished surface.				D,I	
	The welded wire fabric is of specified spacing and dimensions, and is supported so that it will be in the specified location in the completed structure.		✓		D,I	
	The specified concrete has been batched and delivered.				D	
	Concrete is cured and protected from unsuitable climatic conditions or damage, as specified.			✓	D	

<b>Inspection Highlights/Checks</b>				
<b>Specification</b>	Field Test	Non-Field Test	QPL	Form
<b>460 Measurement</b>				<b>D,I</b>
Unless specified otherwise, measurement is on the area basis. Measurement will be based on the paved end slope area table identified on the plans. As work is performed, measurements should be taken to verify and check work.				
<b>470</b>				
<b>Manholes, Catch Basins and Inlets</b>				
This work involves the construction of cast in place or precast manholes, inlets, and similar structures.				
Ensure that the Contractor is aware of the requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing. Gather and submit required quality documentation.	✓	✓		<b>D,I</b>
Ensure that: The installation, as marked, complies with the Specification documents or modifications ordered by the Project Manager.				<b>D</b>
There are no apparent errors in location or elevations.				
The delivered materials are inspected for damage.		✓	✓	<b>D</b>
Reinforcement is installed as specified and will have the specified coverage with concrete.		✓		<b>D,I</b>
For precast elements, the underlying material provides full and adequate support for the element and the element is installed to the specified elevation and orientation.	✓			<b>D,I</b>
Grates, frames, and covers are installed to the specified 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.		✓	✓	<b>D,I</b>
The Contractor performs all tests that are specified and required.				<b>D</b>
Unless specified otherwise, measurement will be on a unit basis. As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements.				<b>D,I</b>

Forms: **D** = Daily 734-3474, **I** = Installation Sheet 734-2605, **T** = Traffic Control Installation Report 734-2474, **F** = Flagger/Pilot Car Receipt 734-3955, **P** = Pile driving Equipment Data 734-2608, **E** = Erosion Control Monitoring form 734-2361, **S** = Sprinkling Tally Sheet 734-3474

<b>Inspection Highlights/Checks</b>		Field Test Materials	Non-Field Test Materials	QPL	Form
<b>475</b>					
<b>Drain Wells</b>	This work consists of drilling 8 inch diameter wells, including furnishing and installing steel well casings, for the purpose of intersecting large voids in underlying rock.				
	Ensure that the Contractor is aware of the requirements, and provides acceptable quality documentation before the material is incorporated. Gather and submit all of the required quality documentation.		✓		
	Ensure that: The drain wells are drilled at the specified locations prior to constructing manholes and inlets.				<b>D,I</b>
	Test each drain well per specifications.				<b>D</b>
<b>475 Measurement</b>	Unless specified otherwise, measurement will be on a unit basis. As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements .		✓		<b>D,I</b>
<b>480</b>					
<b>Drainage Curbs</b>	This work consists of constructing mechanically extruded curbs using either commercial grade concrete or asphalt concrete.				
	Ensure that the Contractor is aware of the requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing. Gather and submit all required quality documentation.	✓	✓		
	Ensure that: Curb breaks for outlet drainage and other needs are properly located.				<b>D</b>
	The area, upon which the curb is to be placed, is clean and free of extraneous matter.				<b>D</b>
	A bonding agent has been placed under the curb location and is still in a condition to bond the curb to the underlying material when the curb material is placed, as specified.	✓	✓	✓	<b>D</b>
	Placement and finishing results in a well-compacted mass and the surface is smooth.	✓			<b>D,I</b>
	Line and grade of the finished product meet Specification requirements.				
	Defective sections are removed and replaced.				<b>D</b>
	Portland cement concrete is cured as specified.				<b>D,I</b>
<b>480 Measurement</b>	Unless specified otherwise, measurement will be on a length basis. As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements.				<b>D,I</b>

<b>Inspection Highlights/Checks</b>		Field Test	Non-Field Test	QPL	Form
<b>490</b>					
<b>Work on Existing Sewers and Structures</b>	This section consists of joining new work to existing work, repairing or abandoning of sewer lines and structures, and adjusting existing manholes, sumps, inlets, boxes, and similar structures. Also, removal and disposal of pipe, manholes and catch basins scheduled for removal.				
	Ensure that the Contractor is aware of the requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing. Gather and submit all required quality documentation.	✓	✓		
	Inspect the delivered materials for damage shortly after delivery. Ensure 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.		✓		<b>D</b>
	Ensure that: There are no apparent errors in final elevation or location of the facilities.				
	The planned adjustment, connection, or removal procedure conforms to specification requirements.				<b>D,I</b>
	Joints and connections are constructed per specifications.				<b>D</b>
	Adjustments are performed to the specified elevation and slope and match the adjacent finished surface.				<b>D</b>
	All facilities to be abandoned are drained, plugged, and filled if specified.				<b>D,I</b>
<b>Measurement</b>	Unless specified otherwise, measurement will be on a unit basis. As work is performed take measurements, or ensure that they are taken, and prepare and submit the measurements.				<b>D,I</b>
<b>495</b>					
<b>Trench Resurfacing</b>	This work consists of resurfacing pipe trenches, including replacing pavement, curbs, sidewalks, rock surfacing, topsoil, landscaping and other features damaged or removed during pipe trenching operations.				
<b>495</b>	Ensure that the Contractor is aware of the requirements, and provides acceptable quality documentation before the material is incorporated. Also ensure that the ODOT QCCS is aware of scheduled work so he/she can arrange with the ODOT QAC for required verification testing. Gather and submit all required quality documentation.	✓			
	Ensure that: The area to be restored is excavated to the depth, the underlying material is compacted, and the area to be restored is clean, as specified.	✓			<b>D</b>

Forms: **D** = Daily 734-3474, **I** = Installation Sheet 734-2605, **T** = Traffic Control Installation Report 734-2474, **F** = Flagger/Pilot Car Receipt 734-3955, **P** = Pile driving Equipment Data 734-2608, **E** = Erosion Control Monitoring form 734-2361, **S** = Sprinkling Tally Sheet 734-3474

Specification	Inspection Highlights/Checks	Field Test	Non-Field Test	QPL	Form
	The materials of the quality and type, and are placed to the depth, as specified.				D,I
	Replacement materials are smoothed, compacted, and finished, and are cured and protected from damage as specified.	✓			D,I
<b>Measurement</b>	Unless specified otherwise, measurement will be on an area basis. As work is performed take measurements, or ensure that they are taken, and prepare and submit all of the measurements.	✓			D,I

**INSERT TAB**

**Inspector Forms**



## Construction Forms Table

Form and Number	General Information
Daily Force Account Record (734-3428) Disadvantaged Business Enterprise Form (734-2165) Employee Interview Report (734-3475) Prevailing Wage Complaint Form (734-2547) Force Account Invoice for Equipment and Materials (734-1864)	These are general forms from sections 100's. Not all forms will be used on all projects
General Daily Progress Report (734-3474) Installation Sheet (734-2605) Field Inspection Sticker (734-2207) Field Inspection Report (734-3469)	These are general forms that will be used on all projects. These are used in almost every specification section.
Flagger and Pilot Car Receipt (734-3955)	Section 200's
Tare Sheet (734-2394) Weigh Memo – Material Receipt (734-3082) Sprinkling Tally Sheet (734-3427) Materials Delivery and Yield Check Sheet (734-2792) Material Daily Progress Report (734-2599) Material Delivery Record and Tally Sheet (734-2792)	Sections 300's and 600's
Drilled Shaft Excavation Log (734-2604) Drilled Shaft Inspection Report Drilled Shaft Concrete Placement Log (734-2597) Drilled Shaft Concrete Volumes (734-2603) Micropile Installation Log (734-2644) Pile and Driving Equipment Data (734-2608) Pile Record Book (734-3485) Post-Tensioning Record From one End (734-2594) Post-Tensioning Record from Both Ends (734-2594a) Post-Tensioning Grouting Record (734-2697) Post-Tensioning Strand Installation Record (734-2696) Structure Coating Daily Progress Report (734-1789)	Section 500's
Paving Inspectors Daily Report Mix Delivery Production Calculation	Section 700's

The forms provided are the most frequently used for ODOT projects. For a complete list of inspection forms, check the ODOT website at

<http://www.oregon.gov/ODOT/HWY/CONSTRUCTION/Pages/HwyConstForms1.aspx>



**INSERT TAB**

**Checklists**



## ODOT Available Checklists

<b>Checklist Topic</b>	<b>Related Specification</b>
Drilled Shaft Inspector (734-2625) Pile Driving (734-2609) Pre-Pour Concrete (734-2626)	Section 500's
Pre-Pour Concrete (734-2626)	Section 700's

For the electronic versions of the checklist forms, check the ODOT website at <http://www.oregon.gov/ODOT/HWY/CONSTRUCTION/Pages/HwyConstForms1.aspx>





# PREPOUR CHECKLIST

PROJECT NAME (SECTION)	CONTRACT NO.
HIGHWAY	FEDERAL AID NO.
CONTRACTOR OR SUBCONTRACTOR	

**PLACEMENT:**

	<u>DATE</u>	<u>INITIALS</u>	<u>REMARKS</u>
<b>REINFORCEMENT</b>			
FABRICATION	_____	_____	_____
INSTALLATION	_____	_____	_____
CLEARANCE	_____	_____	_____

<b>FORMS</b>			
DIMENSIONS	_____	_____	_____
CONST JOINTS	_____	_____	_____
IMBEDDED ITEMS	_____	_____	_____
BLOCKOUTS	_____	_____	_____
SURVEY/GRADE	_____	_____	_____

<b>CONCRETE PLACEMENT</b>			
PLACING METHOD	_____	_____	_____
QUANTITY	_____	_____	_____
POUR CREW	_____	_____	_____
VIBRATION	_____	_____	_____
LIFT SIZE	_____	_____	_____
WEATHER	_____	_____	_____
DURATION	_____	_____	START _____ FINISH _____

<b>TESTING</b>			
MIX DESIGN #	_____	_____	_____
QCT	_____	_____	_____
TEST RESULTS	_____	_____	_____
REJECTED LOADS	_____	_____	_____
REMARKS	_____	_____	_____

REMARKS

PREPARED BY:	WORK DATE:
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## Drilled Shaft Inspector's Checklist

The following is a general checklist to follow when constructing a drilled shaft. The answer to each of these questions should be "Yes" or "No" unless plans, specifications or specific approval has been given otherwise. Any answer of "No" should be explained in the Notes/Comments.

**CONSULT WITH PROJECT MANAGER FOR YOUR SPECIFIC PROJECT RESPONSIBILITIES.**

### Pre-Construction

- Yes  No  NA 1. Has the Contractor submitted a Drilled Shaft Installation Plan (00512.40)?
- Yes  No  NA 2. Has the Drilled Shaft Installation Plan been approved?
- Yes  No  NA 3. Does the Contractor have an approved concrete mix design (00512.12)?
- Yes  No  NA 4. Has the Contractor run the required Trial Mix and slump loss tests for their concrete mix design (00512.12)?
- Yes  No  NA 5. If concreting is estimated to take over two hours, has the Contractor performed a satisfactory slump loss test for the extended time period in accordance with Section 00512.12, Concrete Mix Design?
- Yes  No  NA 6. If the Contractor proposed a polymer slurry, do you have a copy of the quality control plan for the slurry (00512.43(f) and the name and phone number of the slurry manufacturer's representative who will be providing technical assistance?
- Yes  No  NA 7. Have you reviewed the Foundation Data Sheet and drill logs and understand the subsurface conditions?
- Yes  No  NA 8. Has the Contractor addressed the Protection of Existing Structures?
- Yes  No  NA 9. Does the Contractor have all the equipment and tools shown in the Drilled Shaft Installation Plan (Section 00512.40)?
- Yes  No  NA 10. If casing is to be used, is it the right size and material in accordance with the plans and Section 00512.13?
- Yes  No  NA 11. If the Contractor plans to use a manufactured slurry, do they have the proper equipment to mix it?
- Yes  No  NA 12. Is a desander required?
- Yes  No  NA 13. If a desander is required, does the Contractor have it on site and operational?
- Yes  No  NA 14. Does the Contractor's tremie meet the requirements of Section 00512.47(a), Concrete Placement?
- Yes  No  NA 15. Do you have all the required drilled shaft forms that need to be filled out during shaft construction?

### Shaft Excavation & Cleaning

- Yes  No  NA 16. Is the shaft being constructed in the correct location and within tolerance (00512.42, Construction Tolerances)?
- Yes  No  NA 17. Does the Contractor have a benchmark so the shaft can be constructed and inspected to the proper elevations?
- Yes  No  NA 18. If the Contractor is using slurry, can they perform tests and report results in accordance with 00512.43(g), Drilling Slurry Inspection and Testing?
- Yes  No  NA 19. Is the slurry level being properly maintained in accordance with 00512.43(f), Drilling Slurry Installation?
- Yes  No  NA 20. Are the proper number of types of tests being performed on the slurry in accordance with 00512.43(g)?
- Yes  No  NA 21. Are all excavated materials (spoils) properly contained and disposed of (00512.43(a))?
- Yes  No  NA 22. If temporary casing is being used, does it meet the requirements of Section 00512.43(c), Casing Removal?
- Yes  No  NA 23. Is the shaft within allowable vertical alignment tolerances (Section 00512.42, Construction Tolerances)?
- Yes  No  NA 24. Is the shaft of proper depth?
- Yes  No  NA 25. Does the shaft bottom meet the clean-out requirements of Section 00512.43(h), Clean-out?
- Yes  No  NA 26. Have the Drilled Shaft Excavation forms been completed?

## Reinforcing Cage

- Yes  No  NA 27. Is the rebar the correct sizes and configured in accordance with the project plans?
- Yes  No  NA 28. Is the rebar properly tied in accordance with Section 00530.41(b), Ties and Supports?
- Yes  No  NA 29. Are the proper number of CSL tubes furnished and installed according to the plans?
- Yes  No  NA 30. Does the Contractor have the proper spacers for the steel cage in accordance with 00512.45(d), Concrete Cover?
- Yes  No  NA 31. Does the Contractor have the proper amount of spacers for the steel cage in accordance with the approved Drilled Shaft Installation Plan?
- Yes  No  NA 32. Is the reinforcing cage bracing the same as shown on the steel shop drawings?

## Reinforcing Steel Cage Construction and Placement

- Yes  No  NA 33. If the steel cage was spliced, was it done in accordance with the details shown on the contract plans?
- Yes  No  NA 34. Is the steel cage secured from settling and from floating? (During concrete placement steel cages sometimes rise with the placement of concrete.) (00512.45(a) & 00512.47(e), Reinforcing Steel and Casing Removal)
- Yes  No  NA 35. Is the top of the steel reinforcement at the proper elevation (00512.45)?

## Concreting Operations

- Yes  No  NA 36. Prior to concrete placement, has the slurry (both manufactured and natural) been tested in accordance with Section 00512.43(g), Drilling Slurry Inspection and Testing?
- Yes  No  NA 37. If required, was the casting removed in accordance with 00512.47(e), Casing Removal?
- Yes  No  NA 38. Was the discharge end of the tremie maintained in the concrete mass with proper concrete head above it at all times (00512.47(c), Concrete Placement)?
- Yes  No  NA 39. Did concrete placement occur within the specified time limit (00512.47(a), Concrete Placement)?
- Yes  No  NA 40. Have the Concrete Placement and Volume forms been completed?
- Yes  No  NA 41. When placing concrete, did the Contractor overflow the shaft until good concrete flowed out of the top of the excavation (00512.47(a), Concrete Placement)?
- Yes  No  NA 42. Were concrete acceptance tests performed as required?

## Post Installation

- Yes  No  NA 43. Is all casing removed to the proper elevation in accordance with 00512.47(e), Casing Removal?
- Yes  No  NA 44. Has all Crosshole Sonic Log Testing been completed in accordance with the Specifications (Section 00512.48, Crosshole Sonic Log Testing)?
- Yes  No  NA 45. Is the shaft within the applicable construction tolerances (00512.42, Construction Tolerances)?
- Yes  No  NA 46. Has the Contractor completed the Drilled Shaft Inspection Report (Section 00152.40(c))?
- Yes  No  NA 47. Have you documented the pay items (Section 00512.90)?

NOTES / COMMENTS

# Pile Driving Checklist

It is intended that all checklist items will be used when inspecting pile projects.

## Pre-Construction

- Yes  No  NA 1. Is the Contractor using the same approved hammer system provided in the Pile & Driving Equipment Data Sheet?
- Yes  No  NA 2. Do you have the Hammer Approval Letter?
- Yes  No  NA 3. Has the Contractor met the requirements for Protection of the Existing Structures (vibration and excavation)?
- Yes  No  NA 4. Has the embankment and excavation work been completed according to Section 00520.40(a) and (b)?
- Yes  No  NA 5. If a cofferdam is required, has the Contractor submitted a design in accordance with the specifications?
- Yes  No  NA 6. If jetting is required, are the jets and supporting equipment approved?
- Yes  No  NA 7. If preboring is required, have the equipment and methods been approved?
- Yes  No  NA 8. If followers are to be used, were they approved by the Engineer or specified in the contract documents?
- Yes  No  NA 9. Do you have a reference elevation so that you know where the pile cut-off is and can determine tip elevations and penetration?
- Yes  No  NA 10. Do you have the required inspection and reporting forms?

## Piles Arrive On Site

- Yes  No  NA 11. Are the piles the right size, length, type and grade for the job?
- Yes  No  NA 12. Are there any visual defects on the pile? (If yes, please explain in the Notes / Comments section below.)
- Yes  No  NA 13. Did the Contractor supply you with the mill certification reports on the piles?
- Yes  No  NA 14. Do the piles on site match the mill certification reports on the piles?
- Yes  No  NA 15. Is all pile splicing properly performed (00520.43(f))?
- Yes  No  NA 16. Are the pile tips the right type and size and welded on properly (reinforced tips or closed end plates)?

## Prestressed Concrete Piles (00520.44)

- Yes  No  NA 17. During delivery, are the piles being lifted by the correct number of pick points and at the correct locations?
- Yes  No  NA 18. Do the piles have the required information on the pile (stamp, casting date, pile #, length, prestressed yard #)?
- Yes  No  NA 19. Is the casting date older than 21 days for normal installation and 30 days for exposure to seawater and sulfate soils?
- Yes  No  NA 20. Is the length/cross-section/size/prestress configuration correct for the job?
- Yes  No  NA 21. Did you physically measure the piles?
- Yes  No  NA 22. Are the lifting eyes removed and coated with epoxy?
- Yes  No  NA 23. Are there spalling/cracks or other damage visually apparent? Any damage should be reported to your supervisor for evaluation. (If so, please explain in the Notes / Comments section below.)
- Yes  No  NA 24. Are prestress strands cut off below the surface of concrete?
- Yes  No  NA 25. For storage on job site, is dunnage placed at correct lifting positions and is it placed so that it won't settle?
- Yes  No  NA 26. Other special details that are in the specifications, such as vents, centerhole jet pipes, voids, etc., should be explained in the Notes / Comments section below.

## Begin Pile Driving

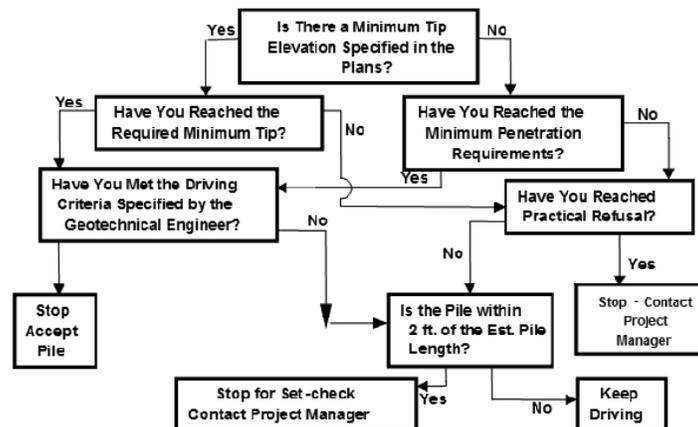
- Yes  No  NA 27. Is the ODOT Pile Record Book properly filled out?
- Yes  No  NA 28. Has all available pre-driving data been entered into the Pile Record Book?
- Yes  No  NA 29. Is the saximeter being used to record stroke?
- Yes  No  NA 30. Has the "Minimum Tip" mark been determined?
- Yes  No  NA 31. Has the "Stop for Set-Check" mark been determined?
- Yes  No  NA 32. Are the piles within allowable tolerances (00520.41(f))?
- Yes  No  NA 33. Are the piles marked in the correct intervals?
- Yes  No  NA 34. Is the hammer warmed up and set on the proper fuel setting for starting out?
- Yes  No  NA 35. If using jetting to advance pile, has the Contractor removed the jets a minimum of 5 ft. above the specified tip elevation and used an impact hammer to drive to the required bearing capacity (00520.41(e))?
- Yes  No  NA 36. If concrete piles require splicing, is it in accordance with 00520.44?
- Yes  No  NA 37. If steel piles require splicing, is it in accordance with 00520.43(f) and (g)?
- Yes  No  NA 38. Are the proper number of record piles being recorded?
- Yes  No  NA 39. If using a pile cushion, does it need replacing?
- Yes  No  NA 40. Is the hammer cushion being regularly checked out?

## When to Stop

- Yes  No  NA 41. Is there a Required Tip Elevation specified?
- Yes  No  NA 42. If "Yes" to #41, has the pile reached the Required Tip Elevation?
- Yes  No  NA 43. If "No" to Required Tip Elevation specified, has the pile achieve Minimum Penetration requirements (00520.41(c))?
- Yes  No  NA 44. Is the top of pile within 2 feet of cut-off elevation.
- Yes  No  NA 45. Has the pile met the Driving Criteria specified by the Geotechnical Engineer?
- Yes  No  NA 46. Has the pile reached Practical Refusal?
- Yes  No  NA 47. Have any of the piles heaved (00502.41(g))?

NOTES / COMMENTS

Sample Pile Acceptance Decision Chart



**INSERT TAB**

**NFTMG**

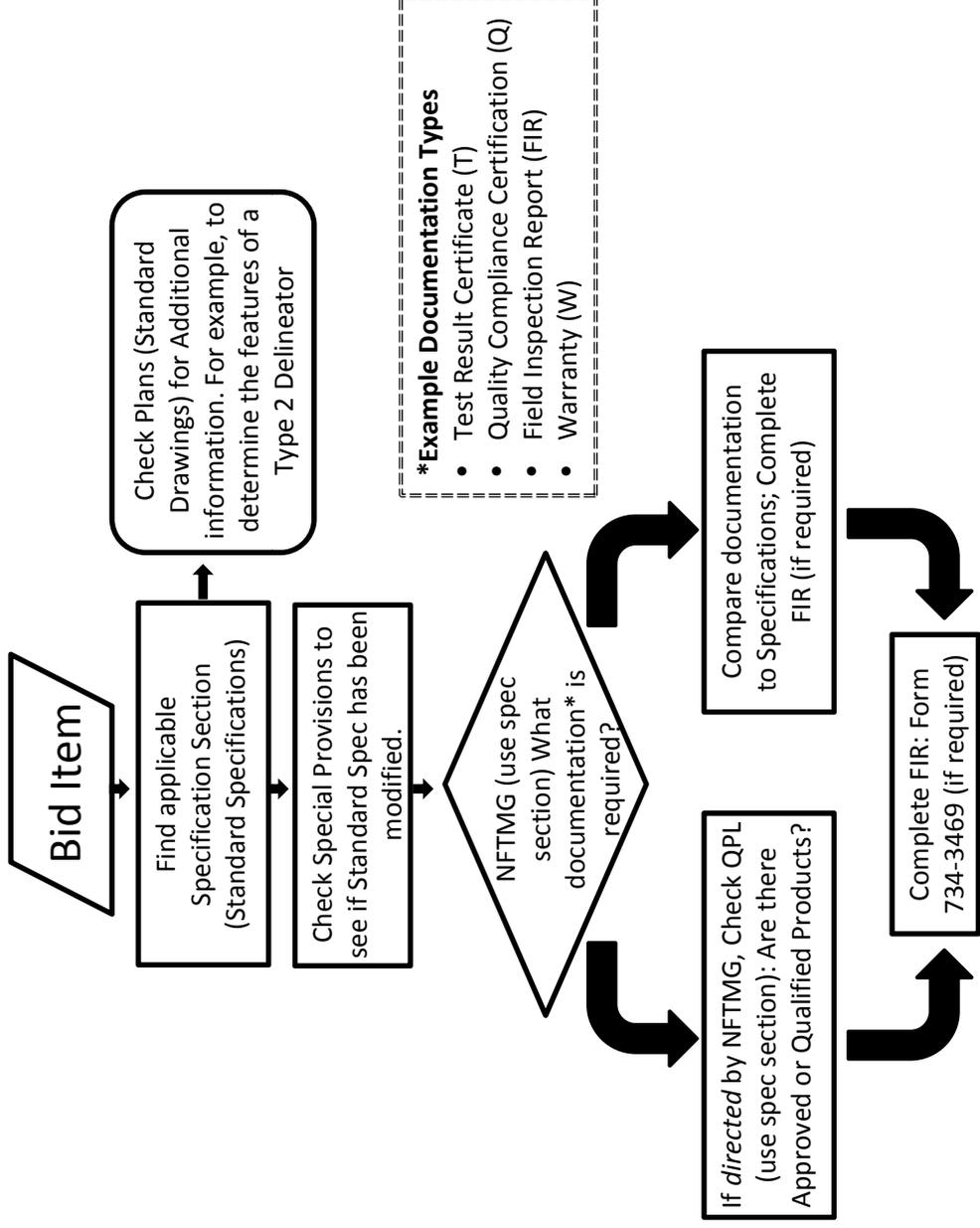


# General Construction Inspector Training

## Inspector Quality Assurance Program



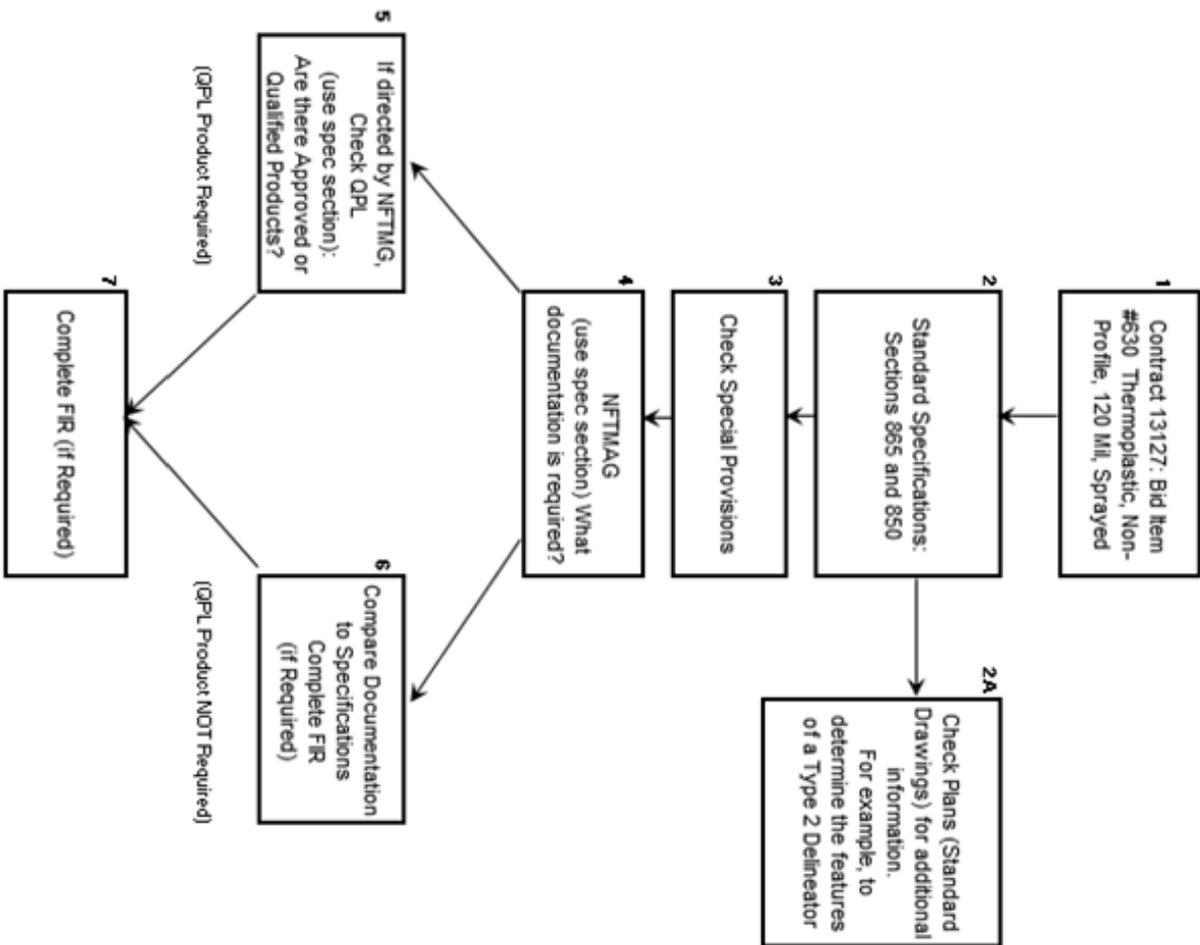
### Non-Field Tested Materials Guide Flow Chart



**Non-Field Tested Materials Guide Flow Chart - Example**

**Notes for Non-Field Tested Materials Guide Flow Chart - Examp**

**Question: What are the documentation requirements for Bid Item #630?**  
**Determine all applicable products.**



- 1 Bid Items located in back of Special Provisions
- 2 Look in Table of contents or index to find Longitudinal Pavement Markings - Durable
- 2A Not applicable.
- 2 Check specs for material requirements and acceptance  
 865.00 -- Scope -- In addition to the requirements of Section 00850.  
 850.10 -- Materials from QPL.  
 850.10 -- Reflective Elements -- used with materials other than marking paint are not re  
 be from the QPL. Use reflective elements according to the manufacturer's recommenda  
 00865.45 -- Application (Method F, Sprayed)
- 3 Do specials modify standards  
 Yes. 850.47(c) -- Retroreflectivity. Use a 30 meter geometry retroreflector to  
 measure the retroreflectivity within 48 hours of curing, except for paint applications:
- 4 What are documentation requirements for 865 and 850?  
 Test Results Certificate: Yes for Retro-Reflective Testing  
 Quality Compliance Certificate -- Yes  
 Field Inspection Report -- Yes  
 Qualified Product List -- Yes  
 Certificate of Materials Origin -- No (especially for this project -- state funded)  
 Warranty -- Yes; How long?
- 5 Test Results Certificate (for Retro-Reflective Testing), and FIR. See QPL for Approved  
 Don't Use Rejected List  
 Section 862 -- Two products listed for Method F (NOTE: Section 862 is used  
 from notes on page 1 of QPL).  
 Permaline -- White  
 Permaline -- Yellow
- 6 Check remarks for additional requirements
- 6 Not applicable for this product, QPL required
- 7 Complete FIR

**INSERT TAB**

**Documentation**



## Documentation, Documentation, Documentation

In real estate, the expression is that the three most important features are location, location, location. In construction inspection, an argument could be made that the three most important activities are documentation, documentation, documentation. While visually watching the contractors' work is a major part of Inspector duties, it is understood that proper documentation is provided in a timely manner to ensure the quality of workmanship and materials are met per the specifications. Proper documentation is also a vital piece for finalizing a project.

A comprehensive discussion of project documentation reports is included in Chapter 12 of the ODOT *Construction Manual* complete with examples. The Chapter includes:

Chapter 12-A [Daily Reports/Diaries](#)

Chapter 12-B [Quality](#)

Chapter 12-C [Quality Price Adjustments](#)

Chapter 12-D [Quantities](#)

Chapter 12-E [Adjustments to Lump Sum and Other Items](#)

Chapter 12-F [Materials Stored or On Hand](#)

Chapter 12-G [Extra Work Performed on Force Account Basis](#)

Of special interest to inspectors are the sections on **Dailies, Quality and Quantity** from the *Construction Manual*. The information included in each section includes:

### **Chapter Title**

#### **Chapter 12A – Daily Reports / Diaries**

- 12A-1 General Daily Progress Report / Project Manager's Diary
- 12A-2 Traffic Control Inspection Report
- 12A-3 Erosion Control Monitoring (NPDES Reports)
- 12A-4 Turbidity Monitoring and Reporting ("In-Water Work")
- 12A-5 Material Daily Progress Report
- 12A-6 Accident Investigating and Reporting

#### **Chapter 12B – Quality**

- 12B-1 Non-Field Tested Materials
  - (a) Non-Field Tested Materials Quality Documentation
  - (b) Additional Non-Field Tested Materials Quality Documentation
- 12B-2 Field-Tested Materials
  - (a) Test Summary Sheets
- 12B-3 Review Procedures for Quality Documentation
  - (a) Review by the Project Manager
  - (b) Review by the Region Assurance Specialist (RAS)

## **Chapter 12D – Quantities**

### 12D-1 Quantity Documentation

- (a) Source Documents
- (b) Computer-Generated Source Documents
- (c) Record Keeping

### 12D-2 Measurement

- (a) Area, Linear and Volume
- (b) Vehicle Measure
- (c) Weight/Volume Measurement Method Change
- (d) Weighing
- (e) Lump Sum
- (f) Each
- (g) Temporary Striping & Temporary Tape
- (h) Flagger and Pilot Car Hours
- (i) Temporary Sign Quantities
- (j) Earthwork
- (k) Watering
- (l) Piling
- (m) Asphalt Cement in Asphalt Concrete Mixture
  - 1. Asphalt Inventory (Inventory) Method
  - 2. Testing Method
  - 3. Small Quantity Method
- (n) Weigh Memos and Scale Diary
  - 1. Scale Diary
  - 2. Check Weighing
  - 3. Weigh Memos
  - 4. Receipt of Material on the Project

### 12D-3 Review Process for Quantity Documentation

- (a) Review by PM
- (b) Review by Region Assurance Specialist (RAS)

**INSERT TAB**

**Slope Stake Guide**



## Slope Stake Survey Verification for Inspectors

Before beginning earthwork construction, the extremities of the cuts and fills must be identified for equipment operators. Slope stakes establish the intersection of either the top of cut or the toe of fill with the natural ground. They also reference the centerline location and quantify the depth of material to be excavated or placed. Slope stakes should remain in place until the slopes are completed, inspected and permanently seeded.



*Survey Stake on Kobernik 2 Slide Project on US101*

The Inspector's role in reading slope stakes is to verify the

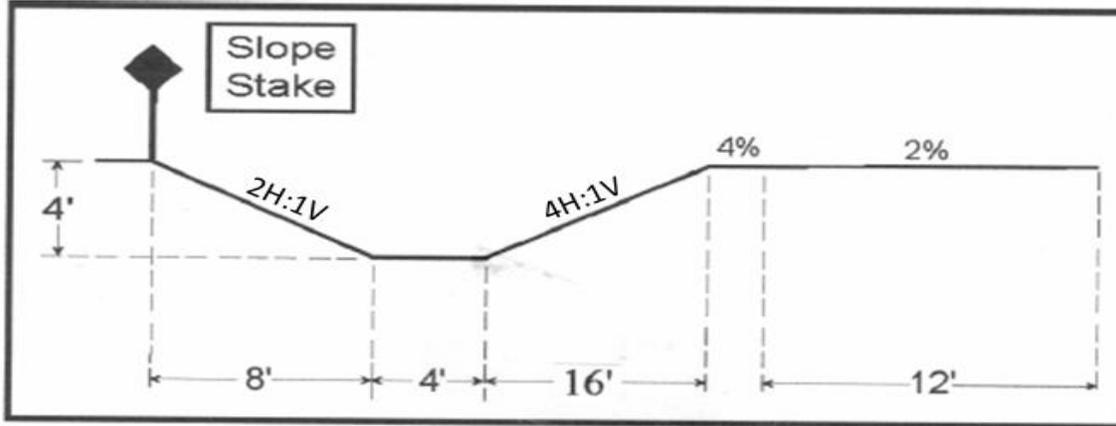
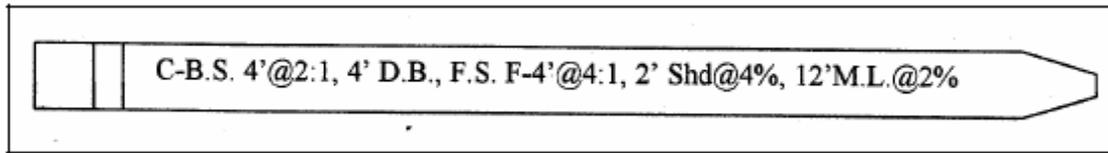
sections match the plans and are in the correct location. Basic tools can be used to ensure the location makes sense. If in doubt, step back and reassess. Like carpentry – measure twice cut once!

If more information is needed, ODOT provides a *Survey Verification* class for Inspectors.

### **Reading Slope Stakes**

Every surveyor has their own system for writing slope stakes. To be sure the information on the stake is clear, check with the surveyor for a description. Examples of slope stakes and how to read them are provided as a guide on the next two pages.

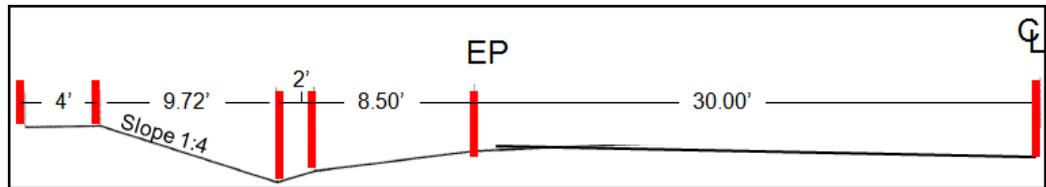
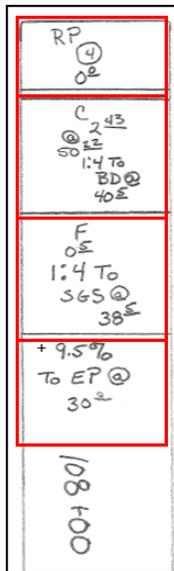
**Example 1 (Graphics and description from Indiana DOT):**



Starting at the slope stake, the following steps are taken:

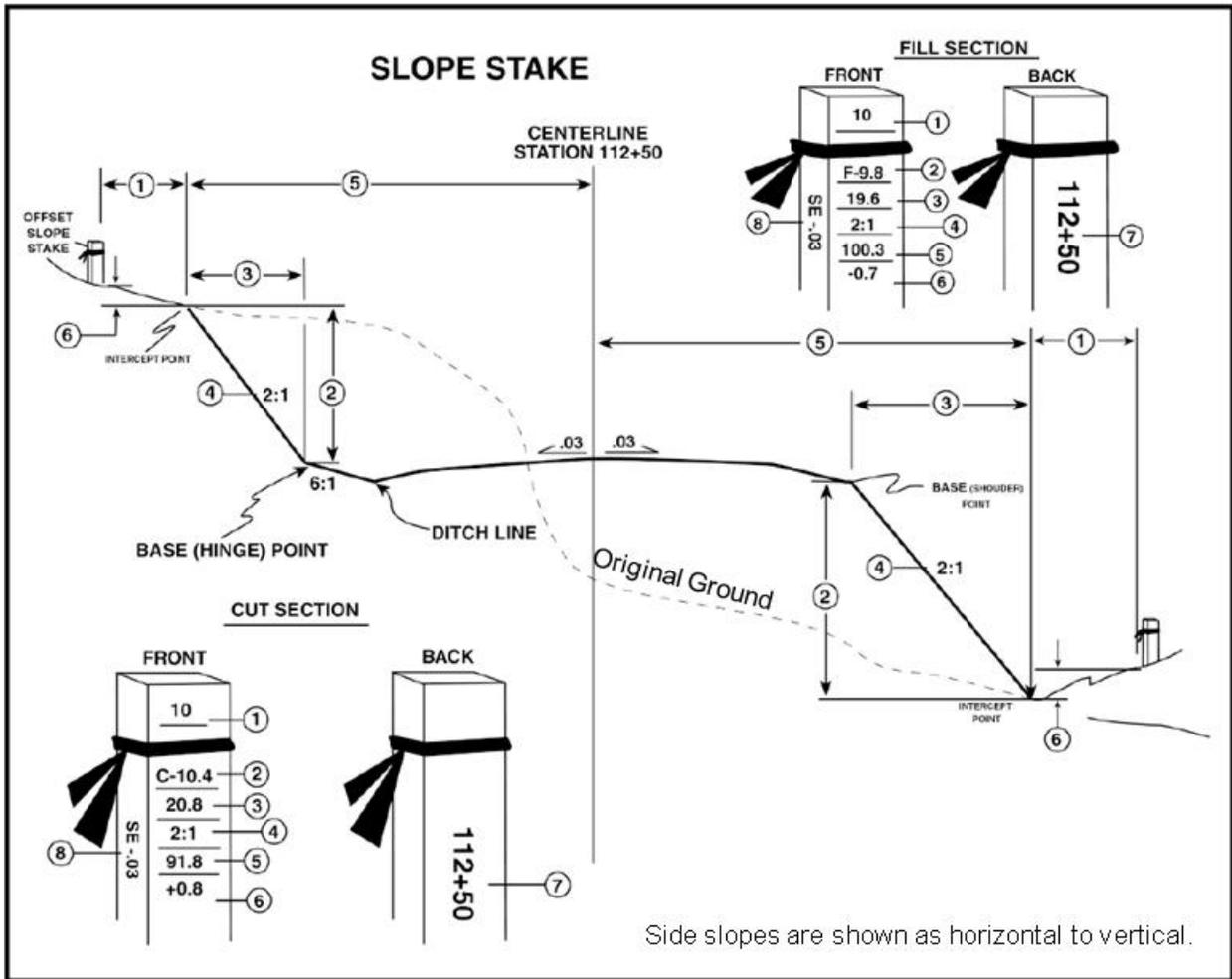
- 1) Cut the back slope 4' deep at a 2:1 slope.
- 2) Grade a 4' ditch bottom.
- 3) Go up the foreslope 4' at a 4:1 slope.
- 4) Go 2' at a 4% slope for the shoulder.
- 5) Go 12' at a 2% slope to the centerline.

**Example 2 (Excerpted from the General Inspection Training Presentation):**



- 1) Reference Point – 4' offset.
- 2) Begin a Cut of 2.43' at a distance of 50.22' from centerline at 1V:1H to Bottom of Ditch at 40.50' from centerline.
- 3) Begin a Fill of 0.5' at a 1V:4H to Subgrade Shoulder at 38.50' from centerline.
- 4) Fill at 9.5% to the Edge of Pavement at 30.0' from centerline.

**Example 3 (Graphics from North Carolina DOT)**



Cut Section	Fill Section
① From the reference point (RP or offset slope stake) go out 10' to the catch point (intercept point).	① From the reference point (RP or offset slope stake) go out 10' to the catch point (intercept point).
② From the catch point, cut 10.4' vertical,	② From the catch point, fill 9.8' vertically,
③ over a distance of 20.8' horizontal,	③ over a horizontal distance of 19.6',
④ on a 2H:1V slope.	④ on a 2H:1V slope.
⑤ The distance from the catch point to the centerline is 91.8'.	⑤ The distance from the catch point to the centerline is 100.3'.
⑥ The difference in elevation between the RP and the catch point is 0.8'.	⑥ The difference in elevation between the RP and the catch point is -0.7'.