

Chapter 19

Contents

19 Specifications, Bid Items, & Cost Estimate..... 19-1

19.1 Preparing the Special Provisions 19-2

19.2 Review & Approval of the Special Provisions 19-4

19.3 Bid Items..... 19-5

 19.3.1 Permanent Signal Bid Items (00990.90)..... 19-6

 19.3.2 Permanent Signal Bid Items - Foundations (00921.90 & 00963.90) 19-8

 19.3.3 Removal of Electrical Systems Bid Items (00950.90) 19-9

 19.3.4 Temporary Signal Bid Items (00227.90) 19-9

 19.3.5 Crosswalk Closure Support Bid Item (00902.90) 19-9

19.4 Letter of Public Interest Finding (LPIF) 19-11

19.5 Cost Estimate 19-12

 19.5.1 Anticipated Items..... 19-12

19 Specifications, Bid Items, & Cost Estimate

Two separate documents are needed to complete the specifications for a project:

- The *Oregon Standard Specifications for Construction*; and
- Project-specific Special provisions.

The *Oregon Standard Specifications for Construction* is also known as Standard Specifications and remain static for 5 to 10 years. In contrast to the Standard Specifications, the Special provisions add, modify, and/or delete portions of the *Oregon Standard Specifications for Construction* based on project-specific needs.

The Oregon Standard Specifications for Construction and Special Provision Boiler Plates can be found at http://www.oregon.gov/ODOT/Business/Pages/Standard_Specifications.aspx

NOTE: Always download new copies of the Special provisions for each project since modifications to the Special provisions can occur at any time.

The following is a list of specifications directly related to traffic signals

- 00227 - Work Zone Traffic Control (for temporary signals)
- 00921 – Major Sign Support Drilled Shafts (for mast arm poles with mast arms 60' to 75')
- 00950 – Removal and reinstallation of highway illumination and traffic signals
- 00960 – Common provisions for highway illumination and traffic signals
- 00962 – Metal Illumination and Traffic Signal Supports
- 00963 – Signal Support Drilled Shafts (for mast arm pole with mast arms up to 55')
- 00990 – Traffic Signals

The following is a list of specifications indirectly related to traffic signals

- 00440 – Commercial grade concrete
- 00442 – Controller low strength materials
- 00902 – Crosswalk closure supports
- 00970 – Highway illumination
- 02530 – Structural steel

Note that there may be references to other sections of the specifications not highlighted above. These references, while important, typically fill a minor role in the overall specifications related to traffic signals.

19.1 Preparing the Special Provisions

Below is an outline of the step-by-step process required in the preparation of the Special provisions for the project:

1. Determine which specifications are applicable to the project.
2. Download the current Special provisions boiler plates of each applicable specification from the Specifications Website.
3. Edit each special provision according to the project needs using Microsoft Word with “Track Changes” turned on. If “track changes” is not used, review and future modifications become difficult.
 - a. Instructions are provided in orange italic font within parentheses. For example:
(Use the following subsection .42 when removed materials are to be stockpiled. Contact Region electrician for Region number, phone number, and all information regarding equipment to be salvaged. List materials and stockpile locations.)
 - b. The instructions shall be removed from the Special provisions, and will appear similar to what is shown below:
~~*(Use the following subsection .42 when removed materials are to be stockpiled. Contact Region electrician for Region number, phone number, and all information regarding equipment to be salvaged. List materials and stockpile locations.)*~~
 - c. Edits are limited to the instructions provided. Anything other than what’s contained in the current special provision **REQUIRES** Traffic Standards review and concurrence as per TSB 12-01(B). Changes to measurement and payment require approval by the Specifications Engineer.

The example below, according to the instruction set, is used on projects with loop splices. See Figure 19-1.

Figure 19-1 | Example: Special Provision Boiler Plate (Unaltered)

(Use the following subsection .40(a) on projects with loop splices.)

00990.40(a) General - In the paragraph that begins "Install wire between pole or...", replace the second sentence with the following:

Do not use junction boxes for splicing, except for loop wire splicing of loop wires to loop feeder cables.

Traffic-Roadway Section

Traffic Signal Design Manual – Specifications, Bid Items & Cost Estimate

For projects that will have loop splices, the instruction information in orange italics within parenthesis must be deleted. The special provision should look like Figure 19-2:

Figure 19-2 | Example: Special Provision Boiler Plate (Modified for Use on Project)

(Use the following subsection .40(a) on projects with loop splices.)

00990.40(a) General - In the paragraph that begins "Install wire between pole or...", replace the second sentence with the following:

Do not use junction boxes for splicing, except for loop wire splicing of loop wires to loop feeder cables.

For projects that **DO NOT** have loop splices, the entire subsection must be deleted. The special provision should look like Figure 19-3:

Figure 19-3 | Example: Special Provision Boiler Plate (Deleted text for Use on Project)

(Use the following subsection .40(a) on projects with loop splices.)

~~**00990.40(a) General** - In the paragraph that begins "Install wire between pole or...", replace the second sentence with the following:~~

~~Do not use junction boxes for splicing, except for loop wire splicing of loop wires to loop feeder cables.~~

The edits shown in Figure 19-2 and Figure 19-3 are simply following the instructions that are provided within the special provision boiler plate (information in orange italics within parenthesis) and therefore do not require additional review or concurrence from Traffic Standards.

Traffic Signal Design Manual – Specifications, Bid Items & Cost Estimate

If for some reason the current Special Provision doesn't meet the project needs, modifications that fall outside of the instructions within the special provision boiler plates may be proposed. Again, this needs review and concurrence from Traffic Standards. The request for modifications may look something like Figure 19-4, where text has been added (shown in blue underline):

Figure 19-4 | Example: Special Provision Boiler Plate (Proposed Modification for Use on Project)

~~(Use the following subsection .40(a) on projects with loop splices.)~~

00990.40(a) General - In the paragraph that begins "Install wire between pole or...", replace the second sentence with the following:

Do not use junction boxes for splicing, except for loop wire splicing of loop wires to loop feeder cables and interconnect cable to interconnect cable.

It is important to note that the single line strikethrough for removal and signal line underline for additions are generated by track changes, not by changes in formatting. So when "Final" is chosen in the track changes tool all these marks disappear and the final clean document remains. If toggled from "Final" to "Final Showing Markup" all these markups will reappear for review purposes.

Always use Track Changes when modifying the special provision boiler plates!

19.2 Review & Approval of the Special Provisions

Special provisions that have been created by making modifications according to the instructions that are provided within the special provision boiler plate (information in orange italics within parenthesis) do not require review and approval from the Traffic Roadway Section. However, the Traffic Roadway Section will do a courtesy review if requested.

Special provisions that have modifications that fall outside of the instructions that are provided within the special provision boiler plate (e.g. revisions shown in Figure 19-4) require review and concurrence of the Technical Expert (Traffic Standards) and the Specifications Engineer as per Technical Services Bulletin TSB12-01(B):

http://www.oregon.gov/ODOT/Engineering/Doc_TechnicalGuidance/TSB12-01b.pdf

Modifications to the special provision boiler plates that fall outside of the instructions provided within the boiler plate require review and concurrence of the Technical Expert!

19.3 Bid Items

Bid items are defined in the Standard Specifications and special provisions and are the means by which the contract work is paid. The specifications define the title of bid item, the unit of measurement, and what work is included in the bid item. The following sections are used (depending on the scope of the project):

- 00227.90 contains the list for all temporary signal bid items
- 00902.90 contains the bid items for crosswalk closure supports
- 00921.90 – contains the list for all permanent signal pole foundation for mast arm poles with mast arms 60 to 75 feet (foundations are the only item that is not inclusive in the 00990.90 bid items)
- 00950.90 contains the list for removal of electrical systems
- 00990.90 contains the list for all permanent signal bid items
- 00963.90 contains the list for all permanent signal pole foundations for mast arm poles with mast arms up to 55 feet (foundations are the only item that is not inclusive in the 00990.90 bid items)

These bid item lists are explained in more detail below and can be found on the Specifications website. The vast majority of project work should fit within these existing, standard bid items. If the standard bid item lists do not meet the needs of the project, contact the State Traffic Signal Engineer for guidance. The solution may involve use of an existing, standard bid item or creation of a new bid item. Use of a new, unique bid item requires approval of the State Traffic Signal Engineer and Specifications Engineer.

When detailing design items on signal plan sheets that have the potential to also be detailed in other discipline's plan sheets (e.g. Signs, Illumination, ITS), always coordinate with the other discipline to ensure the design item is only detailed (e.g. all information needed to fabricate and install) in one plan sheet, not on others. Other sheets may make reference to the design item (e.g. see sheet X for installation information) if deemed useful. If the item is detailed on multiple sheets, it causes confusion as to how the item is paid for. This can result in paying twice for the same item or extra paperwork and time to define how the item will be paid for.

New, unique bid items are discouraged and require the approval of the State Traffic Signal Engineer.

19.3.1 Permanent Signal Bid Items (00990.90)

The standard bid items available in the 00990.90 section of the specifications applies to permanent signal installations:

- **TRAFFIC SIGNAL INSTALLATION – LUMP SUM**
Used for all new installations and for re-builds of existing signals. Includes the new permanent traffic signal, detector system, and removal of existing electrical features. Specifically includes what is shown on the “Signal Plan” sheet, “Detector Plan” sheet, and “Removal Plan” sheet. Excludes the interconnect system. Excludes mast arm pole foundations (See Section 19.3.2 for foundation bid items).
- **TRAFFIC SIGNAL MODIFICATIONS – LUMP SUM**
Used for existing installations where the traffic signal is modified. This includes the detection system. Excludes the interconnect system. Excludes mast arm pole foundations (See Section 19.3.2 for foundation bid items).
- **RAMP METER SIGNAL INSTALLATION – LUMP SUM**
Includes the new permanent ramp meter signal, detection system, and removal of existing features. Specifically includes what is shown on the “Ramp Meter Plan” sheet. Excludes the interconnect system.
- **FLASHING BEACON INSTALLATION – LUMP SUM**
Includes the new permanent flashing beacon and removal of existing features. Specifically includes what is shown on the “Flashing Beacon Plan” sheet.
- **INTERCONNECT SYSTEM – LUMP SUM**
Includes the new or modifications to the existing interconnect system and removal of existing features. Specifically includes what is shown on the “Interconnect Plan” sheet.

All of the bid items above, except for the INTERCONNECT SYSTEM – LUMP SUM, are location specific. For example, if the project included three new traffic signals, three separate TRAFFIC SIGNAL INSTALLATION – LUMP SUM bid items would be used, one for each location. Each bid item contains a description of the location (typically labeled “mainline at sidestreet”) as shown:

US20 at Main St.

TRAFFIC SIGNAL INSTALLATION – LUMP SUM \$125,000

US20 at 9th St.

TRAFFIC SIGNAL INSTALLATION – LUMP SUM \$95,000

US20 at High St.

TRAFFIC SIGNAL INSTALLATION – LUMP SUM \$140,000

Traffic-Roadway Section

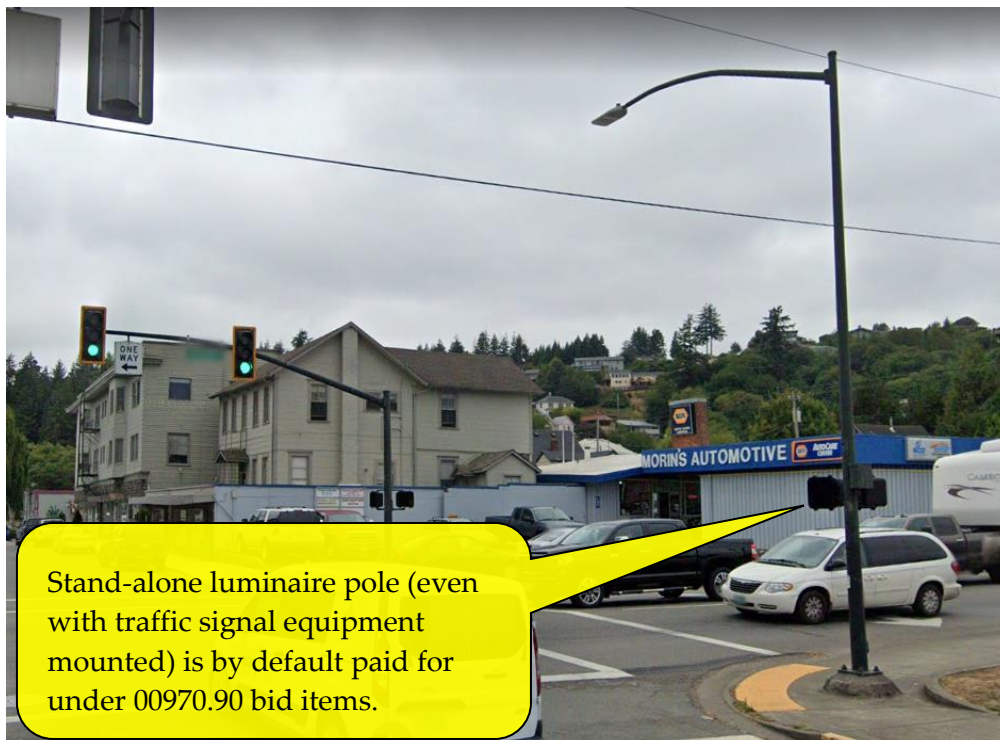
Traffic Signal Design Manual – Specifications, Bid Items & Cost Estimate

It is also important to note that any items that are detailed on the signal plan sheets are paid for under the applicable traffic signal bid item. Any items that are referenced on the signal plan sheet are not paid for under the traffic signal bid items. A common example of this pertains to signs attached to signal equipment; if a sign is detailed on the signal plan sheet it is paid for under the Traffic Signal Installation bid item which is Lump Sum. If the same sign is only referenced on the signal plan, but detailed on the signing plan sheet, it is paid for under by the square area under that specific sign type (see special provision 00940.90). Note that crosswalk closure supports should now be paid under 00902.90 (see section 19.3.5 for more info).

Make sure that items detailed on the signal plan sheets are NOT detailed on other plan sheets (signing is a common item); otherwise double payment for the same item can occur.

Stand-alone luminaire poles that are located at a signalized intersection (even in the rare case when they have traffic signal equipment mounted to them) are by default not included in the 00990.90 traffic signal lump sum bid item. The appropriate bid items listed 00970.90 should be used. See Figure 19-5 for example. However, depending on the scope of the project, modifying the default standard via special provision and including the stand-alone luminaire pole in the traffic signal lump sum bid item may be a good option (for example, if there is only one stand-alone luminaire pole on the project or there are no separate illumination plans).

Figure 19-5 | Example of stand-alone luminaire pole at signalized intersection (not included in the traffic signal lump sum bid item)



19.3.2 Permanent Signal Bid Items - Foundations (00921.90 & 00963.90)

Foundations for mast arm poles are excluded from the traffic signal lump sum bid items as per 00990.90. These foundations were intentionally separated from the lump sum bid item in approximately 2005 (when the new SM poles were designed) in order to track to the costs of the updated foundation design that resulted in a larger foundation and different installation method. There was concern that the new foundation installation would increase the cost of a traffic signal significantly, which over time has proven to not be the case. However, with the recent addition of mast arm poles that can accommodate 60 to 75 mast arms in 2020 (which have an even larger foundation) tracking the foundation costs of mast arm poles separately is still desired. At some point in the future, tracking these costs separately may no longer be desired and foundations may once again become part of the traffic signal lump sum bid items.

The standard bid items available in the 00963.90 section of the specifications applies to the foundations for permanent signal installations for mast arm poles with mast arms up to 55 feet.

- 36 INCH DIAMETER SIGNAL SUPPORT DRILLED SHAFT – FOOT
Used for all standard foundations that require an “FD” minimum diameter of 36 inches as per standard drawing TM653 (see table in upper left hand corner of drawing).
- 42 INCH DIAMETER SIGNAL SUPPORT DRILLED SHAFT - FOOT
Used for all standard foundations that require an “FD” minimum diameter of 42 inches as per standard drawing TM653 (see table in upper left hand corner of drawing).

The standard bid items available in the 00921.90 section of the specification applies to foundations for permanent signal installations for mast arm poles with mast arms 60 to 75 feet.

- 54 INCH DIAMETER SIGN SUPPORT DRILLED SHAFT FOUNDATION – FOOT
Used for all standard foundations for as per standard drawing TM655 (use design no. 6 on TM628)

If the project has a non-standard foundation, work with the structural designer to determine the correct “FD” minimum diameter and which bid item to use. Use of an “FD” minimum diameter that is not 36” or 42” is very rare and should be avoided if possible.

This is the only signal bid item where a quantity is measured for payment and is not location specific. For the entire project, add up the foundation depths for all 36 inch “FD” minimum diameter foundations. Do the same for all 42 inch “FD” minimum diameter foundations and for all 54 inch sign support drilled shaft foundations on the project.

19.3.3 Removal of Electrical Systems Bid Items (00950.90)

The standard bid items available in the 00950.90 section of the specifications applies to removal of traffic signal equipment:

- **INCIDENTAL TO INSTALLATION BID ITEM** - If the removal work meets the criteria for “Method A”, which occurs when existing electrical systems are removed and replaced with new electrical systems, no separate bid item for removal is used. The removal work is inclusive to the new electrical system bid item (e.g. TRAFFIC SIGNAL INSTALLATION – LUMP SUM).
- **REMOVAL OF ELECTRICAL SYSTEMS – LUMP SUM**
By definition in the specifications, this bid item is used when the removal work meets the criteria for “Method B”, which occurs when existing electrical systems are removed and are not replaced with new electrical systems. This bid item is location specific. See section 19.3.1 for more information on location specific bid items.

19.3.4 Temporary Signal Bid Items (00227.90)

The standard bid items available in the 00225.95 section of the specifications applies to temporary signal installations:

- **TEMPORARY TRAFFIC SIGNAL INSTALLATION – LUMP SUM**
By definition in the specification, this bid item includes all required materials called for by the plans and specifications. This includes all temporary appurtenances such as what is shown on the temporary “signal plan”, the “detector plan”, the “interconnect plan”, etc. This bid item is location specific. See section 19.3.1 for more information on location specific bid items.
- **PORTABLE TRAFFIC SIGNAL – EACH**
This bid item is normally used by the traffic control plans designer, not the signal designer. See Chapter 11 for more information on portable traffic signals and their use in projects.

19.3.5 Crosswalk Closure Support Bid Item (00902.90)

The standard bid item available in the 00902.90 section of the specifications applies to crosswalk closure supports:

- **CROSSWALK CLOSURE SUPPORTS – EACH**
Crosswalk closures supports use to have two different methods for payment (as part of the lump sum traffic signal bid item and each) since the majority of these signs were installed at traffic signals. Since the ADA settlement agreement, the use of these sign at unsignalized intersections has greatly increased. To avoid payment confusion at

Traffic-Roadway Section

Traffic Signal Design Manual – Specifications, Bid Items & Cost Estimate

unsignalized and signalized intersections on a project, the option to include these signs in the traffic signal lump sum bid item was removed. Coordinate with the sign designer to ensure the correct number of signs and who will be responsible for stamping this specification.

19.4 Letter of Public Interest Finding (LPIF)

Letters of Public Interest Finding (LPIF) are required to document why it is in the public's interest to not follow a Code of Federal Regulation (CFR) or Oregon Statute requirement.

FHWA requires competition not only for the award of a construction contract, but also competition for the various materials and processes involved in the work. Whenever competition for materials or processes is eliminated, an LPIF is required.

General examples of materials or processes that require an LPIF are:

- Proprietary or patented materials
- Sole Source materials
- Agency supplied materials
- Salvaged materials
- Work performed by Agency forces

Typical traffic signal items that require and LPIF are:

- ITS equipment (processed by the ODOT ITS Unit – Doug Spencer, typically agency furnished by price agreement contract)
- ATC controller (agency furnished, by price agreement contract)
- Video/radar equipment that is called out by brand name (without allowing the option of “or approved equal”)
- Preemption detection equipment that is called out by brand name (without allowing the option of “or approved equal”)
- LED illumination fixtures that are called out by brand name (without allowing the option of “or approved equal”)
- Salvaged poles and controller cabinets

Additional guidance and instructions for developing and processing LPIF's can be found in the [LPIF Guidance Document](#) on the [Project Control Office Website](#). LPIF examples and templates are also included on the website.

You can also request LPIF examples for traffic signal specific items from the [State Traffic Signal Engineer](#).

NOTE: The LPIF needs to be submitted and approved at least two weeks prior to PS&E submission. LPIF's should be submitted as early as possible. They are not always approved. The project schedule could be impacted if changes to the plans are needed due to the LPIF not being approved.

19.5 Cost Estimate

Once the appropriate bid items are chosen a cost estimate must be completed for each bid item. The bid item estimates must be based on historical data, available industry data, manufacturer quotes, and project specific research.

For ODOT signal designers, an excel spreadsheet (updated yearly by the Traffic Roadway Section) can be downloaded from the Signal Specs share drive to assist in cost estimating: <\\sodata\signal specs> (file name “Signals2017-3.xls”. The date in the file name will change to reflect the current year)

ODOT internal estimating tools cannot be given to external staff

19.5.1 Anticipated Items

Anticipated items are used to provide a funding mechanism for non-biddable elements of work that may be needed to complete a project. Anticipated items should not be used for items of work that can be competitively bid, e.g. unfinished and incomplete design work. Anticipated items are included with the cost estimate.

For signal work the following items require an anticipated item:

- Power hook-up (when installing a BMCL, BMC, or SC & MS). This should include conduit, trenching, and wiring from the power source to the traffic signal service cabinet. Coordinate with the Region Utility Specialist to determine a reasonable cost estimate.
- Anything that is on price agreement, such as communication gear.