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100 INTRODUCTION

100-1 Uniformity in Traffic Control Standards

100-1.1 General

Uniform traffic control standards throughout the country have long been recognized as necessary to meet the ever increasing demands of modern transportation. Once established, it is very important that standards are kept current. Developments in traffic control devices often lead to changes in the design or application of them. As improvements (or problems/concerns with existing devices) are identified, needed changes should be incorporated into the standards and the revisions disseminated in a way to assure that they are implemented.

100-1.2 National Standards

To meet the need for nationwide uniformity of standards for signs, signals, markings and other devices on or adjacent to streets and highways, the Federal Highway Administration (FHWA) publishes the Manual on Uniform Traffic Control Devices (MUTCD) (see Section 193-10) and periodic revisions. Federal regulations (23 CFR Part 655), as well as Section 4511.09 of the Ohio Revised Code (ORC), require that the Ohio Department of Transportation (ODOT) adopt a State manual of uniform traffic control devices that correlates with, and so far as possible conforms to, “the system approved by the federal highway administration.”

The national MUTCD is available on-line (also see Table 197-1). Proposed changes to the national standards in the MUTCD are published by FHWA using the Federal Register Docket system.

100-1.3 State Standards

The Ohio Manual of Uniform Traffic Control Devices (OMUTCD) (see Chapter 101) is the State manual adopted by the ODOT Director of Transportation to establish standards for traffic control devices in Ohio in general conformance to the national manual. To promote statewide uniformity in the design and application of traffic control devices, the OMUTCD standards apply to all public streets and highways, regardless of type or the level of governmental agency having jurisdiction, and private roads open to public travel. The OMUTCD is available on-line.

100-1.4 Additional Specific Standards

As noted in the OMUTCD Introduction, ORC Sections 4511.10 and 4511.11 “address the responsibilities that ODOT, local highway authorities, and owners of private roads open to public travel have to place and maintain traffic control devices on all highways within their respective jurisdictions in conformance with the OMUTCD.”

For ODOT, the Traffic Engineering Manual (TEM), Traffic Standard Construction Drawings (Traffic SCDs), Traffic Plan Insert Sheets (Traffic PISs) and the Construction and Materials Specifications (C&MS) establish traffic control policies, standards, guidelines and specifications which supplement the basic standards established in the OMUTCD. These publications are discussed in detail in Chapters 102, 103, 104 and 105, respectively. See Table 197-3 for a list of available traffic engineering publications from the ODOT Office of Roadway Engineering (ORE) and the Office of Traffic Operations (OTO). Contact information for both ORE and OTO is provided on page ii.
100-2 **ODOT’s Role/Responsibility**

As required by law (ORC Section 4511.09), the Ohio Department of Transportation (ODOT) is responsible for adopting a manual which establishes traffic control standards that apply to all public streets and highways in Ohio, regardless of facility type or the level of governmental agency having jurisdiction.

The Traffic Control Design Section of the Office of Roadway Engineering (ORE) is responsible for developing and maintaining the Ohio Manual of Uniform Traffic Control Devices (OMUTCD), and any additional ODOT traffic engineering design policies, guidelines, standards, etc.

The ORE Traffic Control Design Section is also responsible for coordinating ODOT’s review of proposed changes to the national MUTCD (see Section 193-10) and preparing ODOT’s response. Comments are solicited from related offices in Central Office and, time permitting, the Districts and others.

The procedures for revising the OMUTCD, TEM, SCDs, PISs and the C&MS are addressed in Sections 101-5, 102-5, 103-5, 104-4 and 105-3, respectively.

The Office of Traffic Operations (OTO) is generally responsible for ODOT’s traffic engineering operations and maintenance concerns.

100-3 **Jurisdiction**

As noted earlier, the OMUTCD establishes standards for all public streets and highways in Ohio, and private roads open to public travel. Unless noted otherwise, all other ODOT policies, guidelines, standards, manuals and handbooks apply only to highways under ODOT’s jurisdiction, but are also recommended for use by local jurisdictions.

When referring to highways under ODOT’s jurisdiction, generally this involves Interstate Routes, State Routes and U.S. Routes outside municipal limits.

Some TEM standards and guidelines are referenced in the OMUTCD as recommended practice or examples. Also, due to publishing constraints, guidelines that ODOT is sometimes required by legislation to develop for use by ODOT and other highway agencies may be contained in this publication, rather than the OMUTCD.

100-4 **Contacts**

General traffic engineering inquiries should be directed to the Ohio Department of Transportation, Administrator, Office of Roadway Engineering, see the contact information on page ii of this Manual and in Table 197-1.

Comments, questions and proposed revisions of the TEM should be submitted to the Office of Roadway Engineering Traffic Control Design Section at that same address. Submissions by email are also welcome.

Comments or questions involving a specific area of concern handled by one of the ORE or OTO section supervisors or their staff may be referred directly to the appropriate area. For your convenience in addressing questions or concerns related to specific traffic engineering topics, a roster of ORE and OTO personnel is available on the respective Office websites, noted on page ii.
100-5 ODOT Organization

Figure 198-1 presents an overall organization chart for ODOT. The most current update of this information is available by typing “organization” in the Search ODOT box on the Ohio Department of Transportation (ODOT) Home Page. Information is also provided in Table 197-2 and Figure 198-2 about the ODOT Districts, including addresses and phone numbers for contacting each District. Current information on the Districts and contact information for them is also available online.

100-6 ODOT Training Available

100-6.1 General

There are various training opportunities available within ODOT in the traffic engineering field. In addition to the ORE Traffic Academy (see Section 1401-2), ORE and OTO provide additional courses related to various aspects of traffic control design and application. At this time, OTO offers courses in Traffic Signal Maintenance and in Overhead Sign Supports.

Also, the intranet web page for the Office of Training: Employee Development & Enrichment provides a link to the ODOT Training Course Catalog which contains courses for the Highway Technician (HT) Series. ODOT employees should consult their local Training Coordinator for additional information on these courses.

Courses presented by the Ohio LTAP (Local Technical Assistance Program) Center are also available for ODOT personnel sometimes, depending on space availability.

100-6.2 Traffic Academy

The Traffic Academy provides training for consultants. It is also open to ODOT employees who wish to attend. Successful completion of the appropriate course is an ODOT requirement for consultant pre-qualification.

Detail information about the Traffic Academy and copies of some of the manuals used are available on-line at: www.dot.state.oh.us/Divisions/Engineering/Roadway/TrafficAcademy/.

100-6.3 Overhead Sign Supports

Purpose: This course provides basic information regarding the inspection and repair of overhead sign supports.

- Designed For: Persons responsible for the inspection, maintenance and/or repair of overhead sign supports.
- Prerequisites: None
- Course Time: Varies
- Course Size: 4 Minimum, 12 Maximum
- Location: District or Central Office
- Program Manager: Jim Roth, Office of Traffic Operations (614) 752-0438

100-6.4 NEMA Traffic Signal Maintenance

The NEMA Signal Maintenance Course is provided to the Districts upon request, on a first come first served basis by the OTO Signals and ITS Section. The course objectives are to help Signal Electricians, Project Engineers and Highway Technicians understand the operation, installation and maintenance of traffic signals.

This course is held only in Central Office at the Sign and Signal Shops, 1606 West Broad St. The class is restricted to six employees at a time because of limited classroom and equipment availability.
Course topics include:

- Understanding the terminology of traffic signals.
- Understanding traffic signal construction plans.
- Understanding NEMA traffic signal cabinet diagrams.
- Recognizing NEMA TS-1 and TS-2 traffic signal equipment.
- Basic programming of traffic signal equipment, including the use of laptops.
- Basic electrical safety and safe maintenance of traffic signals in the field.
- Trouble shooting malfunctioning traffic signals.

To schedule a class or get additional information, please contact the OTO Signals and ITS Section.

100-6.5  2070 Traffic Signal Maintenance

The 2070 Signal Maintenance Course is provided to the Districts upon request, on a first come first served basis by the OTO Signals and ITS Section. The course objectives are to help Signal Electricians, Project Engineers and Highway Technicians understand the operation, installation and maintenance of 2070 traffic signal operation.

This course is held only in Central Office at the Sign and Signal Shops, 1606 West Broad St. The class is restricted to six employees at a time because on limited classroom and equipment availability.

Course topics include:

- Understanding the terminology of 2070 traffic signals.
- Understanding 2070 traffic signal cabinet diagrams.
- Recognizing 2070 traffic signal equipment.
- Basic programming of 2070 traffic signal equipment, including the use of laptops.
- Basic electrical safety and safe maintenance of traffic signals in the field.
- Trouble shooting malfunctioning traffic signals.

To schedule a class or get additional information, please contact the OTO Signals and ITS Section.

100-6.6 Strain Pole Design (SWISS Software)

The SWISS course provides training for consultants in the design of strain poles. It is also open to ODOT employees. The course objective is to provide assistance in the use of the computer program for the design of span wire signal supports. The SWISS software is available on-line at: [http://www.dot.state.oh.us/Divisions/Engineering/Roadway/TrafficControl/](http://www.dot.state.oh.us/Divisions/Engineering/Roadway/TrafficControl/).

This course is held only in Central Office at the Sign and Signal Shops, 1606 West Broad Street. The class size is restricted to twelve people.

To schedule a class or get additional information, please contact the ORE Traffic Control Design Section.

100-7 Other Resource Reference and Contact Information

Table 197-1 provides information to help in locating various resource references and contacting agencies and organizations at the local, State (including ODOT) and national levels. In addition to mailing addresses, when available, telephone and fax numbers and web and e-mail addresses have been provided. Suggestions for additions to this list are welcome.
101 OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES

101-1 Legal Authority

As noted in TEM Section 100-1.3, the Ohio Manual of Uniform Traffic Control Devices (OMUTCD) is the State manual adopted by the ODOT Director of Transportation to establish standards for traffic control devices in Ohio in general conformance to the national manual (see Section 193-10). This is also addressed in the OMUTCD Introduction and in OMUTCD Section 1A.07.

As noted in TEM Section 100-1.4, ORC Sections 4511.10 and 4511.11 make ODOT and local authorities within their respective jurisdictions, as well as owners of private roads open to public travel responsible for placing and maintaining traffic control devices that conform to this manual. The OMUTCD and subsequent revisions apply to all traffic control devices erected in Ohio after the date of their adoption.

101-2 Organization

The organization of the OMUTCD is very similar to that of the national manual and most of the text is the same. Currently, the OMUTCD is organized as follows:

► Part 1 provides general information about the purpose of, and requirements for, traffic control devices, the legal authority of the manual, definitions and procedural information.
► Part 2 provides information about signs, and includes barricades, gates and object markers.
► Part 3 provides information about Markings, i.e., Pavement and Curb Markings, Delineators, Colored Pavements, and Channelizing Devices. Information about traffic control islands is also located in Part 3.
► Part 4 provides information about highway traffic signals.
► Part 5 provides information about low-volume roads.
► Part 6 provides information about temporary traffic control, including traffic incident management.
► Part 7 provides information about traffic controls for school areas.
► Part 8 provides information about traffic controls for highway-rail grade crossings and light rail transit grade crossings.
► Part 9 provides information about traffic controls for bicycle facilities.
► Appendix A provides information about federal legislation related to the national MUTCD.
► Appendix B provides a cross-reference to various related ORC sections, and provides reprints of some of the most often referenced ORC sections.
► Appendix C provides a visual, graphical quick reference for signs addressed in the manual, with cross-referencing to related sections in the manual.

101-3 Format

101-3.1 General

For the convenience of those who may not be familiar with the OMUTCD (and as a record and reminder for those developing text for it), various format conventions used in that manual have been consolidated in this Section.
100 GENERAL

Traffic Engineering Manual

101-3.2 Numbering/Labeling Conventions

Given the size of the publication, and for convenience in handling future revisions, the following numbering conventions have been used for the text, figures and tables in the O MUTCD:

1. Page numbers are sequential beginning with Page 1 in Chapter 1 and ending with the last page in Chapter 9. The Table of Contents is numbered separately, and consists of a “TC” designation and the page number within the Table of Contents. Page numbers in Appendices A, B and C use the first letter of the particular appendix and the page number within it (e.g., Page C-3).

2. Section, figure and table numbers consist of the Chapter number and a sequential number for the Section, figure or table within the Chapter. For example, “2C” identifies Sections, figures and tables from the Warning Signs and Object Markers Chapter.

3. Text in the header has been used as a reminder that the page is part of the 2012 Edition.

101-3.3 Text

The following formatting conventions have been used in the O MUTCD:

1. Numbers related to time and quantities are usually written out, but dimensions are generally shown as numbers.

2. Dimensions are shown in English units. (Metric equivalents can be determined by using the appropriate tables in O MUTCD Appendix A2.)

3. For consistency, the terms “Standard,” “Guidance,” “Option” and “Support” are defined in the O MUTCD Introduction, and a general listing of definitions of other terms used in the manual is provided in Part 1.

4. To provide emphasis and to differentiate between Standard, Guidance, Option and Support text, the text has been separated using these titles.

5. The format of the text copied from the MUTCD has also been used to help differentiate between the types of information.

   a. Text addressing Standards information is in bold, 11 point Times New Roman font.
   b. Text addressing Guidance information is italicized in 11 point Times New Roman font.
   c. Text addressing Support and Option information is in 11 point Times New Roman font.

6. The format of the O MUTCD text has also been used to help identify Ohio text, as opposed to that copied from the MUTCD. The Ohio text is shown in 10 point Arial font (the same font used in the TEM).

7. In referring to a sign by name, if the name used is also the sign legend it will be shown in all capital letters, if not, just the initial letters will be capitalized, e.g., STOP sign and Winding Road sign.

101-3.4 Artwork

The following formatting conventions have been used in the O MUTCD:

1. The numbering format for the figures is described in Section 101-3.2.

2. Dimensions are as described in Section 101-3.3.

3. A gray background is typically used to depict the pavement.
4. Colors, conforming to the specifications published on-line by FHWA at http://mutcd.fhwa.dot.gov/kno-colorspec.htm, are used for traffic control devices. For printing purposes, the Pantone color specifications noted on that same MUTCD web page may be used.

5. Sign cuts are shown in figures as groupings of similar signs (rather than individually with the related Sections).

6. Sign size tables have been included in signing related chapters showing groups of signs, instead of individual notations about sign sizes with the sign cuts.

7. A sign index (OMUTCD Appendix C) has been included to provide a quick visual cross reference guide to text about signs discussed in the manual.

101-4 Distribution

The OMUTCD is available electronically on-line. It can be accessed directly from the OMUTCD website. It can also be accessed from the ODOT Office of Roadway Engineering (ORE) and ODOT Design Reference Resource Center (DRRC) websites (the web addresses are provided on page ii of this Manual).

The OMUTCD is also available in paper format and is distributed through the Office of Contracts. Copies are distributed free to local jurisdictions, other government agencies and public libraries.

101-5 Revisions

For convenience in reviewing and updating the OMUTCD, the basic ODOT policy (since publication of Revision 13 of the OMUTCD 1972 Edition) has been to adopt the related text from the national manual (MUTCD) when preparing an OMUTCD revision, unless it is determined that there is a good reason to be different.

Maintaining/updating the OMUTCD is an ongoing function of the Office of Roadway Engineering. OMUTCD Table I-1 depicts the evolution of the OMUTCD, listing the various editions and revisions.

Comments and suggestions from users of the OMUTCD about the manual or proposed revisions of it are anticipated and welcome. OMUTCD Section 1A.10 addresses the procedures for requesting interpretations, experimentations, changes and interim approvals. Design, application and placement of traffic control devices other than those adopted in the OMUTCD are prohibited unless the procedures outlined in Section 1A.10 are followed. Requests for interpretations or changes in the OMUTCD shall be submitted to the ODOT Office of Roadway Engineering. As noted in Chapter 180, OMUTCD Section 1A.10 requires that requests for permission to experiment or for interim approval of a device be submitted to the Federal Highway Administration (FHWA).

All proposed revisions to the OMUTCD will be reviewed according to the following process:

1. All proposed revisions should be submitted to the ORE Administrator. Preferably, a proposal for a revision of the text should include a marked-up copy of the related manual text.

2. The ORE Traffic Control Design Section will review the proposal and circulate it within ODOT for review and comment. For major revisions, a special task team or advisory committee, including representatives from the ODOT Districts as well as agencies and organizations outside ODOT, including FHWA, may be established to review the matter and provide comments. If a change is recommended, a draft revision will be prepared.

3. If approved by the ORE Administrator, the draft revision will be circulated among the Districts, related offices in Central Office, and other agencies and organizations as
appropriate for review and comment.

4. The Traffic Control Design Section will coordinate review of comments received and preparation of revised text as needed. A final draft plus a list of any major technical difficulties, and proposed solutions, will be submitted to the ORE Administrator for approval.

5. If a revision of the OMUTCD is to be made, it will be prepared by the Traffic Control Design Section and a copy will be submitted to the local FHWA office for review and concurrence.

6. If the scope of the revision results in a complete new edition of the OMUTCD, it will be published to the website; otherwise, a copy of the Revision Set will be posted on the OMUTCD website with an updated copy of the Manual. In either case, an e-mail announcement will also be sent to all those who have subscribed to the list service for the OMUTCD on the ODOT Design Reference Resource Center (DRCC) web page.
102 TRAFFIC ENGINEERING MANUAL

102-1 General

Over the years, as a supplement to the information in the OMUTCD, a variety of policies, standards, procedures, guidelines, standard drawings, typical drawings and publications regarding ODOT’s traffic engineering practices were developed and disseminated in various ways. Many of these were originally published in the ODOT Traffic Control Application Standards Manual (ASM); however, others were issued separately.

As noted in the Preface, the purpose of the Traffic Engineering Manual (TEM) is to assure, as much as possible, uniformity within ODOT regarding traffic engineering concerns by consolidating all this supplemental information into one manual. Some of this information can be critical in addressing the needs of our customers, and some may just be useful in simplifying or clarifying information published elsewhere. The TEM should be a useful tool in training personnel new to the subject, as well as providing a resource in addressing the wide range of inquiries from our customers, ODOT personnel, consultants, contractors, other government agencies and private citizens.

Except as noted in specific Sections, the policies, guidelines, procedures and standards established in this Manual are applicable only to ODOT-maintained highways and not local roads and streets. However, local jurisdictions are encouraged to use this publication and, as noted in Section 100-3, may need to reference it at times, e.g., the OMUTCD references the TEM for some information.

102-2 Organization

The TEM has been arranged generally in the sequence of topics addressed in the OMUTCD. The Manual includes fifteen parts, arranged in the following sequence:

- **Part 1, General**, provides information about the organization and use of this and other publications, as well as general traffic-related materials, planning/programming, design, construction and maintenance/operations information.
- **Part 2, Signs**, provides information about traffic control signs that supplements information in OMUTCD Part 2.
- **Part 3, Markings**, provides information about markings and islands that supplements OMUTCD Part 3.
- **Part 4, Signals**, provides information about traffic signals that supplements the basic standards in OMUTCD Part 4.
- **Part 5, Low-Volume Roads**, has been reserved to address additional information, as needed, supplementing OMUTCD Part 5.
- **Part 6, Temporary Traffic Control**, provides information about temporary traffic control devices and applications, including traffic incident management, supplementing information in OMUTCD Part 6.
- **Part 7, School Areas**, provides information about standards for traffic control in school areas, including school zone extensions, supplementing OMUTCD Part 7.
- **Part 8, Railroad and Light Rail Transit Grade Crossings**, provides information about traffic controls at railroad-highway and light rail grade crossings, supplementing information in OMUTCD Part 8.
- **Part 9, Bicycle Facilities**, provides information about traffic control devices related to Bicycle Facilities and supplements information found in OMUTCD Part 9.
- **Part 10**, has been reserved for future use.
Part 11, Highway Lighting, provides information about highway lighting.

Part 12, Zones and Traffic Engineering Studies, provides information about traffic control zones and traffic engineering studies.

Part 13, Intelligent Transportation Systems (ITS) provides information about various aspects of this subject, such as Systems Engineering Analysis (SEA) and Freeway Management Systems.

Part 14, Miscellaneous, provides information about miscellaneous related devices, procedures, etc., such as rumble strips and driveway mirrors, that are not directly related to any single topic discussed in one of the other Parts of the TEM.

Part 15, Appendix provides information about definitions for terms used in this Manual, which are not already defined in the OMUTCD, and an explanation of various acronyms (see Chapter 1501). Information about other ODOT policies and guidelines is also provided, as well as copies of traffic-related policies and procedures referenced in the Manual.

102-3 Format

102-3.1 General

Various format conventions have been adopted for this Manual. For convenience (and as a record and reminder for those developing text for the Manual), they have been consolidated in this Section.

A Table of Contents has been provided for each Part, listing each Section, form, table or figure. An overall Table of Contents has also been provided in the front of the Manual; however, to conserve space, only the Part and Chapter headings and the underlined Section headings are shown (including the forms, tables and figures). However, to avoid clutter, the Subsection titles in the overall Table of Contents do not include the underlining used in the text.

102-3.2 Numbering/Labeling Conventions

The following numbering conventions have been used in this Manual to provide a consistent organization for each Part. This is intended to help locate information and to simplify cross-references within the TEM:

1. Chapters and Sections within each Part are numbered based on the Part or Chapter number. For example, in Part 1 the Chapter and Section numbers start with 100. The Chapter headings in each Part are identified with a slightly larger font shown in bold and all capital letters. Typically, the Chapter headings begin on a new odd-numbered page.

2. Material within each Part in the TEM is generally arranged in a set pattern, for example (with “x” representing the Part number):
   a. Chapters x10 thru x29 – general standards and guidelines information presented.
   b. Chapter x30 – Planning/Programming information.
   c. Chapter x40 – Design Information.
   d. Chapter x41 – Plan Preparation/Production information.
   e. Chapter x42 – Plan Notes and related designer information.
   f. Chapter x43 – a listing of related specification items.
   g. Chapter x50 – Construction-related material. This is generally intended to include information used in inspecting installation of traffic control devices on construction projects; however, this information may also be useful for ODOT force account installation of various devices.
h. Chapter x60 – Maintenance/Operations information. This generally addresses preventive maintenance and other operational issues.

i. Chapter x95 – has been reserved in each Part to incorporate discussion, as appropriate, about related, but separately published publications. For example, although the Sign Designs and Markings Manual (SDMM) is formally “incorporated” into the TEM as Section 295-2, due to its size, and the fact that some people will not need both the TEM and the SDMM, the SDMM is published separately. To help avoid unnecessary reference to these other volumes, a brief description of each of these publications is included in the TEM text, with an indication of how it relates to the other information in this Manual (see Sections 295-2).

j. Chapter x96 – Forms referenced in the text, including a Forms Index with cross-references to related text Sections.

k. Chapter x97 – Tables referenced in the text, including a Tables Index with cross-references to related text Sections.

l. Chapter x98 – Figures referenced in the text, including a Figures Index with cross-references to related text Sections. Some figures may include charts.

3. Subdivisions of Chapters, Sections, have been labeled with a hyphenated number based on the Chapter number, e.g., Section 102-3. The titles of these Sections are bold and underlined.

4. If further subdividing of information in a Section is needed, decimals are used with the number, e.g., Section 102-3.2 and Section 205-2.3.1. The titles of these subdivisions are bold, but not underlined.

102-3.3 Text

Text format in the TEM generally follows that used in the OMUTCD; however, a few additional conventions have also been used.

1. The type font used is Arial. The default font size is 10; however, size 12 has been used for the Chapter headings and the titles for the forms, tables and figures.

2. References to Sections, forms, tables and figures within the TEM are highlighted using bold/italic text, e.g., Chapter 102.

3. References to organizations, titles, documents, etc. are highlighted using bold text, e.g., OMUTCD.

102-3.4 Units of Measure

ODOT’s policy is to use English units as the standard.

If metric equivalents are required on a particular project and they are not available herein, or in OMUTCD Appendix A2 or a related SCD, the English units shall be converted to metric units using the English to SI (Metric) Conversion Factors provided in Table 109.02-1 of the Construction and Materials Specifications. The appendix of ASTM E 380 shall be utilized for any additional conversion factors required. Conversions shall be appropriately precise and shall reflect standard industry English values where suitable. The contractor and the project engineer are responsible for the accuracy of the conversions used for a construction project.

102-3.5 Definitions

As noted earlier (Section 102-2), in addition to OMUTCD Part 1, Chapter 1501 of this Manual provides definitions of terms (including acronyms) used in this and related documents.
102-3.6 Artwork

Sign cuts for signs addressed in the TEM and not shown in the O MUTCD are included in the TEM. They are accurate, proportional representations of the signs.

Each form, table and figure is individually numbered and appears in the Table of Contents. Editable copies of the forms and tables are available, as well as most of the figures. Generally, editable full-size copies and pdfs of most of the forms are available on the Forms web page on the Office of Traffic Operations website.

102-4 Distribution

The TEM is available electronically from the ODOT Office of Roadway Engineering (ORE) and the ODOT Design Reference Resource Center (DRRC) websites (the addresses are provided on page ii of this Manual).

As needed, revisions of the TEM are currently posted to the web on a semi-annual basis (starting January 2014). It is the responsibility of the individual receiving or downloading the Manual to update it as needed. A subscription service is available on the DRRC website to allow interested individuals to receive e-mail notifications when updates and notices are posted. Separate Revision Sets are also available for updating paper copies.

102-5 Revisions

Maintaining/updating the TEM is an ongoing ORE function. The Publication Record (located in the front of the Manual, after the Title Page, Preface and Mission Statement) documents revisions of this Manual. Comments and suggestions from users of the Manual are anticipated and welcome.

All revisions to this Manual will be reviewed according to the following process:

1. All proposed revisions from outside ORE should be submitted to the ORE Administrator or the ORE Traffic Control Design Engineer. Preferably, a revision proposal should include a marked-up copy of the related Manual text.

2. The proposal is circulated within ORE for review and comment. Depending on the subject and the scope of the proposed revision, the proposal should also be circulated to the Districts and related Offices in Central Office for review and comment. For major revisions, a special task team, including representatives from outside ORE, may be established to review the matter and provide comments. If a change is recommended, a draft revision will be prepared by the Traffic Control Design Section.

3. Per Standard Procedure 122-004(SP), an approved TEM revision proposal is submitted to the ODOT Standards and Specifications Committee for review and approval; and then to the Executive Committee for final approval.

4. If approved, a TEM revision is finalized and posted to both the TEM website and the ODOT Design Reference Resource Center (DRRC). An e-mail announcement is sent to all those who have subscribed to the list service for the TEM/SDMM (on the DRRC web page).
103 STANDARD CONSTRUCTION DRAWINGS

103-1 General

Numbered Standard Construction Drawings (SCDs) published by ORE have been established to standardize inclusion of certain traffic control information in ODOT contract plans. The drawings are developed and published by ORE. In addition to contract plans, they should also be used by ODOT operational forces as directed in this Manual and at other times when considered appropriate. Designer Notes have been developed to help define the intended use of SCDs (see Section 140-3).

Copies of the drawings are available on-line from the ORE Traffic SCD website and may be purchased from the Office of Contracts (see Table 197-4).

103-2 Organization

The Traffic Standard Construction Drawings (SCDs) set is composed of individual standard drawings, grouped in four general categories, Highway Lighting (HL), Maintenance of Traffic (MT), Intelligent Transportation Systems (ITS) and other Traffic Control items (TC). The drawings in the Traffic Control group are subdivided into the following groups:

- Overhead Sign Supports, beginning with TC-7.65;
- Overhead Sign Supports - Associated Details, beginning with TC-21.10;
- Signing Electrical Details (currently there are no SCDs in this category);
- Ground-Mounted Sign Supports and Signs, beginning with TC-41.10;
- Delineation and Pavement Marking, beginning with TC-61.10; and
- Traffic Signals, beginning with TC-81.10.

103-3 Format

To promote uniformity within ODOT, CADD standards have been established for published documents. Generally, these standards should be used in all MicroStation drawings that are intended to be incorporated within the various publications. The CADD Engineering Standards Manual establishes specific CADD standards for use in developing plan sheets, including plan detail sheets developed for individual plans.

Although there is not one set of CADD standards for all SCDs, each Office developing SCDs has established general guidelines for its standard drawings. The Traffic SCDs follow the standards established in the CADD Engineering Standards Manual for the regular plan sheets.

Each person developing or creating SCDs should use good graphical judgment in the arrangement and placement of both graphic objects and blocks of text. A drawing that is loaded with text or too many highly detailed drawings may be overwhelming to the end user.

103-4 Distribution

Traffic SCDs, and the index for them, are available for downloading, as MicroStation or .pdf files, from both the Office of Roadway Engineering (ORE) SCD and the ODOT Design Reference Resource Center (DRRC) websites. The web addresses are also provided on page ii of this Manual. Paper copies can be purchased through the Office of Contracts.

Revisions are currently posted on a semi-annual basis (started January 2014). It is the responsibility of the individual receiving or downloading the drawings to update them as needed. A subscription service is available on the DRRC website to allow interested individuals to receive e-mail notifications when updates and notices are posted.
103-5 Revisions

Comments or questions about the drawings should be directed to the ORE Traffic Control Design Section.

The Section maintains a log of work needed on the Traffic SCDs, assigns drawing numbers as needed, and generally coordinates development and approval of the drawings. The ORE Traffic Control Design Section reviews and develops new or revised, and when considered complete, submits the proposed new or revised drawing for review and approval by the Standards and Specifications, and Executive Committees. When approved, the official “revision date” is added to the drawing and it is scheduled for distribution in the next revision. (The semi-annual revision date is used as the official “revision date” for each drawing.)

104 PLAN INSERT SHEETS

Plan Insert Sheets (PISs) are standardized drawings that may be included in plans, to modify standard details to more closely depict conditions for an individual location, to show methods of work that are not currently shown in an SCD, or to show a modification or variation of an existing SCD. They are drawings that are expected to be used in more than one plan, but for various reasons have not yet been developed into a Traffic SCD. Since the SCDs and PISs now follow the same review process, generally, as PISs are being revised they are being updated to SCDs.

The Office of Roadway Engineering (ORE) currently has a set of Traffic PISs that supplements the Traffic SCDs. These Traffic PISs are, available on-line from the ORE website, or from the DRRC website. For other situations, a Plan Detail Sheet (prepared for the individual plan) should be used.

The Traffic Plan Insert Sheets (PISs) use the same format as described in Chapter 103 for the Traffic SCDs. They also follow the same distribution and revision process as established for the Traffic SCDs.
100 GENERAL

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105 CONSTRUCTION & MATERIAL SPECIFICATIONS

105-1 General

For purposes of the TEM, the general term “construction and material specifications” includes: the Construction & Materials Specifications Book (C&MS), Supplemental Specifications (SS), Supplements, Special Provision Specifications, Proposal Notes and Plan Notes. As needed, these are addressed individually by number reference within the TEM Parts.

The Construction and Material Specifications Book (C&MS) contains detailed provisions, which, together with the plans and the Proposal, constitute the Contract for performance of required work. It is the official legal and technical document by which ODOT bids and constructs highway projects. Provisions within the C&MS are numbered as individual items, and generally, the reference format used herein is C&MS Item xx when a specific bid item is involved and C&MS xxx when the referenced section does not involve a bid item. For convenience, as appropriate, Chapter x43 (where x is the Part number) has been reserved in each Part to provide a consolidation of information about specifications related to the topic addressed in that TEM Part. For example, Chapter 443 provides a summary of C&MS sections, Supplemental Specifications and Supplements related to traffic signal equipment.

Supplemental Specifications (SS) are individual numbered documents describing the construction and material specifications for new items.

Special Provision Specifications are individual numbered specifications prepared in loose-leaf form describing the construction and material specifications for items whose requirements are not covered in the C&MS or in Supplemental Specifications.

Supplements provide necessary information such as laboratory methods of test, and certification or pre-qualification procedures for materials.

Proposal Notes contain a wide variety of legal and technical requirements necessary for the proper bidding and sale of an individual project. These notes override all other requirements in the Plan, C&MS, Supplemental Specifications and Standard Construction Drawings.

Plan Notes describe non-standard pay items that deviate from the C&MS, Supplemental Specifications or Standard Construction Drawings. As appropriate, these notes are addressed in TEM Parts in Chapter x42, where x is the Part number.

The current C&MS is available on-line via the Division of Construction Management website and from the DRRC website. The Supplemental Specifications (SS), Supplements, and Proposal Notes are also available on-line via the Division of Construction Management website.

105-2 Distribution

In addition to these publications being available on-line (see above), the C&MS may also be purchased from the Office of Contracts.

105-3 Revisions

As noted in Standard Procedure 122-004(SP) (see Section 1599), six standards and specifications committees process revision proposals in the major work items: Contract Administration, Geotechnical, Pavement, Structures, Hydraulics and Environmental and Traffic and Roadway. An Executive Committee gives final review and approval of all ODOT specifications.
All specification issues are to be addressed to the specific Committee Chairs. The Chair for Traffic and Roadway items is the Administrator of the Office of Roadway Engineering.

For information on requests for new product evaluations see Section 120-3.
106 OTHER PUBLICATIONS

It is intended that, as much as possible, all ODOT traffic engineering information, especially any information pertinent to designers, will be incorporated into the TEM, eliminating separate publications, guidelines, standard operating procedures, etc. However, for various reasons some related traffic engineering publications may not have been physically incorporated into the text of this Manual. In some cases, they are expected to remain physically separate publications. In others, this is expected to be a temporary situation. For example, some new publications may initially be developed separately and incorporated (physically or by reference) later.

Table 197-3 provides a consolidated list of ODOT traffic engineering publications. These publications are available electronically from both the ODOT Office of Roadway Engineering website and the ODOT Design Reference Resource Center (DRRC) website. The respective addresses for these websites are also provided on page ii of this Manual.

Chapter 195 provides information about ORE publications not addressed in Chapters 101 through 105.

Chapter 193 provides a listing of related national publications and Chapter 194 addresses other ODOT publications which may contain information needed, or useful, for traffic engineering projects or studies.
Intentionally blank.
120 TRAFFIC CONTROL DEVICES AND MATERIALS

120-1 General

In general, only traffic control devices addressed in the OMUTCD are approved for use on public highways, and private roads open to public travel. However, new devices are being developed regularly and the fact that they are not addressed specifically in the OMUTCD is not intended to exclude them from use. OMUTCD Section 1A.10 states that “Design, application, and placement of traffic control devices other than those adopted in this Manual shall be prohibited unless the provisions of this Section are followed.” OMUTCD Section 1A.10 then describes the review and approval processes for experimentation, interim approval, interpretation and changes related to traffic control devices. TEM Section 120-3 provides additional details regarding ODOT’s procedures for reviewing and evaluating new products.

In general, information about traffic control materials is located within each TEM Part according to the type of material involved. Information that addresses more than one type of material, such as the guidelines for handling patented or proprietary materials, or the process whereby local agencies can purchase traffic control materials and equipment using Federal funds, is addressed in TEM Part 1.

120-2 Specifications

Per ODOT Policy 16-004(P), Standard Procedure 122-004(SP), Development of Standards and Specifications, describes the procedures for development, approval, distribution and implementation of all new and revised ODOT specifications. For further information on ODOT specifications in general, see Chapter 105 of this Manual. Information on specific types of traffic control devices are addressed in the individual TEM Parts related to the particular types of traffic control.

120-3 New Products

Per ODOT Policy 27-014(P), Standard Procedure 515-001(SP) establishes the process by which new products are evaluated and approved/disapproved for use. Information about the ODOT new products program is available on-line from the Office of Materials Management’s New Products web page. Also see OMUTCD Section 1A.10.

120-4 Patented or Proprietary Materials, Specifications or Processes

Patented or proprietary materials, specifications, or processes shall not be included in a contract unless one of the following conditions applies:

1. The item is to be purchased or obtained through competitive bidding with equally suitable items. In which case, the plans shall specify a minimum of two acceptable items and include the phrase “or approved equal.”
2. No equally suitable alternate exists.
3. The item is essential for compatibility with existing highway facilities.
4. The item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.
5. There is a determination by the District Deputy Director (DDD) that it is in the best public interest to specify one such item to the exclusion of any other acceptable alternate.

A request and justification shall be submitted by the maintaining agency to the Office of Roadway Engineering (ORE) with a copy to the appropriate District. Forms to assist maintaining agencies make a proprietary bid item request are available for download from the ODOT Office of Local Programs website. It is very important that each item requested include:
1. model and/or manufacturer
2. an engineering justification that details why the proprietary item is necessary.

ORE shall evaluate the request; coordinate with FHWA if appropriate; and subsequently notify the requesting agency of the disposition of the request. Proprietary Product Approval Request forms are available at the Local Projects office website:
http://www.dot.state.oh.us/Divisions/Planning/LocalPrograms/Forms/Forms/AllItems.aspx

All requests for traffic signal equipment shall include a table listing all signalized intersections under the agency’s jurisdiction, the brand of equipment installed at each and the date of installation. A separate form is generally needed for each item and must clearly state one or more engineering reasons for each proprietary bid item request.

Requests shall be submitted in accordance with the Project Development Process (PDP) or the Local-let procedures, whichever is applicable.

Where research or experimentation is proposed, it will also be necessary to set up an evaluation program per the New Product Development Policy 27-014(P).

In the case of traffic signals, the vast majority of alternate bid requests are made for controller items or emergency vehicle preemption. Proprietary bids shall be considered instead of alternate bids when:

1. The signal controllers are an extension of an existing arterial coordinated signal system. Typically the number of controllers being added is less than the number of existing controllers in the system. The coordinated arterial may be controlled by on-street masters, directly by a central control center or simple hardwire with time based control.

2. Greater than fifty percent of the agency’s controllers are of a single brand.

3. Greater than fifty percent of the agency’s signalized intersections operate with a single brand of emergency vehicle preemption equipment. Alternatively, for agencies with 40 or more signalized intersections, the same fifty percent criterion may be applied to the subset of signalized intersections located on roadways with Functional Classification Minor Arterial, Principal Arterial or Expressway. The extension of preemption equipment on an existing preempted arterial will not be a basis for approval of proprietary bids for preemption equipment.

4. Greater than fifty percent of the agency’s signalized intersections operate with a single brand of video detection equipment.

5. Greater than fifty percent of the agency’s signalized intersections operate with a single brand of spread spectrum radio equipment. Proprietary bids will be considered if the spread spectrum radios are an extension of an existing coordinated signal system and the number of radios being added is less than the number of existing radios in the system.

6. Greater than 50% of the agency’s signalized intersections operate with a single brand of UPS equipment.

There should be no upgrading of the existing equipment (controllers, preemption, video detection, spread spectrum radio, etc.), or the upgraded existing equipment will be evaluated as new/added equipment.

In accordance with FHWA guidance, items provided to an agency at any price below normal fair market value shall not be included as part of the proprietary calculation. Documentation may be requested verifying purchase at fair market value.

If greater than fifty percent of the agency’s equipment is comprised of two brands, consideration may be given to limiting the bids to the two brands without the use of the phrase “or approved equal.”

If at least fifty percent of the agency’s controllers are of a single brand, central control software upgrades may be considered. The single brand controllers do not have to be currently connected to the central control. Upgraded existing controllers will be evaluated as new/added controllers.
The addition of an interconnection card to an existing controller is not considered an upgrade to the controller.

Proprietary bids for aesthetically designed luminaries, highway lighting or signal supports shall not be considered because of the numerous manufacturers of similar support designs.

In lieu of proprietary bids for aesthetically designed signal or lighting supports, alternate bids may be taken using three brands of similar aesthetically designed supports for the generic bid and an alternate bid for the preferred choice. If three brands of similarly designed signal supports are not utilized, the generic bid will be for a standard painted TC-81.21 mast arm support.

When the Office of Roadway Engineering (ORE) determines that a proprietary bid is justified, written documentation must be kept on file supporting the use of proprietary items. Should the request not be approved, ORE will inform the requesting agency they may consider alternate bidding procedures and that Federal-aid participation will be based on the lowest price so established. ORE will copy the District on all correspondence related to the proprietary bid request.

120-5 Cooperative Purchasing Program

Under the Cooperative Purchasing Program, political subdivisions may purchase machinery, materials, supplies and other articles from the ODOT Annual Term Contracts and the ODOT Single Purchase Contracts with their own funds. A copy of the program may be obtained from the ODOT Office of Contracts, Purchasing Services (see Table 197-1).

120-6 Alternative Purchasing Program for Local Agencies

120-6.1 General

ODOT also sponsors another program with respect to the purchase of traffic control materials for installation and use by local government agencies. In this program, funding for the purchase of traffic control materials for installation and use by a requesting local governmental agency is allocated by ODOT to the local governmental agency and does not involve the use of ODOT term purchase contracts. This method was developed primarily for traffic control materials, but can encompass the purchase of other roadway appurtenances such as roadway lighting, signing and street beautification items.

This purchase order procedure was originally created to provide local agencies with a means of purchasing traffic signal materials with Federal project funds. The procedure has also been used to purchase signing materials and can be expanded to include other roadway appurtenances. All materials acquired using this procedure are to be installed by the local agency without cost to ODOT.

If traffic signal material is involved, data must be submitted for evaluation of traffic signal warrants as contained in OMUTCD Part 4. The signal warrant data shall be evaluated and approved by the District. Assistance is available from ORE upon request. Only the intersections with District approved signal warrants are eligible for Federal funding of traffic signal materials.

The following procedure has been the process to be followed in procuring materials and equipment for purchase order contracts. These functions are also shown as a flow chart in Figure 198-3. The steps shown in Sections 120-6.7 through 120-6.10 are initiated concurrently.

120-6.2 Programming and Funding

The District shall prepare and submit the programming package to the Office of Systems Planning and Program Management. Any State or Federal funds allocated to the agency that
are eligible may be utilized, except for nontraditional transportation funds. Funds shall be sufficient to encompass the material costs, plus preliminary and construction engineering if requested. Any additional cost in the procurement of materials due to increased costs, or to insure a completed installation, shall be the agency's responsibility unless changes are approved in advance and funds are available.

The agency's cost participation, the local share, whether due to normal project funding splits or 100 percent local cost items, shall be based on the estimate as provided by the agency in Section 120-6.6(2a).

120-6.3 Alternate Bids

Alternate bids cannot be used in the automated purchase order system. There must be only one bid item for each item.

120-6.4 Proprietary Bids (also see Section 120-4)

The purchasing regulations allow a vendor to supply a comparable item for any proprietary brand listed in the bid package. There are two ways to purchase approved proprietary items:

1. Appear before the State Controlling Board and request an exemption from the Department of Administrative Services purchasing regulations.

2. Have the agency use their own purchasing system to purchase the approved proprietary items. ODOT utilizes a “Pass Through of Federal Funds” account in the Office of Accounting so that the agency does not have to use their own funds in the purchase. The agency submits the invoices from the vendors to the District for payment. This process requires that all preliminary engineering documents and approvals be processed as if ODOT were the sole purchasing agent.

120-6.5 Prequalification of Materials

The agency can prequalify a number of manufacturers of a purchase order item. A minimum of three brands should be listed and the supplied item must be one of these specified brands. The agency must document the procedure or reasons for limiting bidding.

120-6.6 Bid Documents Package

The agency shall prepare the bid documents package and submit it to the District. The District shall coordinate and consolidate review comments and respond to the agency. The bid documents package shall include the following information as required:

1. Preliminary Plans or Sketches.
   a. For traffic signal projects, plans or sketches should depict existing and proposed signal operation and equipment locations. The complexity of the detail drawings will be determined by the District based on the extent of the signal work involved.
   b. If the work is not signal related, the drawings shall show the locations of all proposed items and any existing conditions that will be affected. Roadway lighting work may require an illumination review to determine the effect the proposed lighting will have on the roadway. Based on the scope of the roadway lighting, the District will determine if this review is necessary.
   c. Plans and sketches shall show right-of-way.

   a. Detailed sub-summaries with item descriptions and quantities shall be prepared. They shall be subdivided by each intersection and separately subtotaled for any funding splits.
b. Two general summaries shall also be submitted; one with the cost estimate included for ODOT’s use and the other without the cost estimate. The general summary without the cost estimate is used in the bid package that will be sent to the vendors and will provide places for the bid prices to be stated by the vendors.

c. Usually, the project must be separated into multiple bid packages in order to group similar items so that the various vendors can bid on only the item group that they can supply.


a. ODOT’s Construction and Material Specifications (C&MS) and Supplemental Specifications shall be used where feasible, but may be supplemented by the agency’s requirements, as necessary.

b. ODOT does not review and approve shop drawings or catalog sheets. If the agency wants to review and approve these items, this requirement must be included in the material specifications.


a. Assurance that all pavement markings, signing and signal installations within the project area are, or will be, in compliance with the MUTCD. This should be accomplished by a field inspection by District and agency personnel, with any deficiencies documented.

The deficiencies shall be corrected by the agency prior to completion of their installation of the purchased materials. By performing this inspection early in the project development, materials can be included in the bid package to correct the deficiencies.

b. Assurance that all work is within the right-of-way.

c. A proposal for disposition of removed equipment.

d. Justification of any proprietary items or specialized equipment.

e. A schedule of the agency’s installation work, based on equipment delivery dates. This should also be referenced in the agreement.

f. Maintenance of Traffic standards which will govern the agency’s work.

All plans and documents in the bid document package shall be on 8 ½ x 11 inch sheets, and the agency shall submit all computerized plans and document files to the District by disk or by electronic file transfer.

After the agency provides the District with the final, District approved, version of the bid documents package, the District will provide ORE with the originals of the bid documents package.

120-6.7 Requisitions

The District or the Office of Accounting will enter the project into the automated purchasing system. The ORE Administrator shall be added as a required authorization on the requisition.

120-6.8 Agreement

ORE will send to the District an agreement to be forwarded to the agency for signature.

The agreement will be reviewed by the agency, signed by the agency's contractual officer, and returned to the District for the Deputy Director to sign.

The District will keep the original of the executed agreement and provide copies to the agency and ORE.

If the agency is responsible for a share of the project costs:

1. A check shall accompany the agreement when returned to the District.
2. The District shall forward the check to the Office of Payroll and Project Accounting and that office will ensure that the agency’s check is properly credited to the project and processed. The District will furnish ORE with a copy of the check transmittal letter.

### 120-6.9 Federal Approval

If Federal funding is involved, ORE will submit a bid document package, excluding the agreement, to the Office of Payroll and Project Accounting to obtain PS&E approval from FHWA.

### 120-6.10 Pass Through of Federal Funds

If a “Pass Through of Federal Funds” process is used, as described in Section 120-6.4:

ORE will request that the Office of Accounting establish the account and create the requisition for the agency's items. The Office of Accounting shall add the ORE Administrator as a required authorization on the requisition.

### 120-6.11 Approval and Invitation to Bid

When all of the concurrently initiated actions in Sections 120-6.7 through 6.10 are finalized, ORE will:

1. Approve the electronic requisitions so they proceed to Purchasing Services in the ODOT Office of Contracts;
2. Forward the bid documents package to Purchasing Services to process an Invitation to Bid; and
3. Advise the agency to proceed with their purchase process if a “Pass Through of Federal Funds” process is used (see Section 120-6.4).

### 120-6.12 Recommendation for Award of Bids

After the bids have been received and reviewed by Purchasing Services, they will be tabulated and sent to ORE. ORE shall process the bids as follows:

1. Discuss the bids with the District and the agency and make award recommendations.
2. In the case of Federal projects with active Federal oversight, obtain FHWA's concurrence with the award recommendations.
3. Forward award recommendations to Purchasing Services for further processing.

### 120-6.13 Purchase Order

Purchasing Services will create the purchase orders to be issued to the supplier. The purchase order shall include:

1. A “Shop Drawing” note indicating that material catalog sheets or data sheets shall be submitted to the agency before any material is shipped; and
2. A note that all invoices are to be mailed directly to the District and materials shipped to the agency.

For those items requiring certified test data as determined by the District, the Purchase Order shall also indicate that submissions are required to be submitted to the District by the supplier. This would include any submissions which contain a material composition analysis which must be in accordance with a recognized standard.
120-6.14 Catalog Sheets, Certified Test Data and Testing

If specified in the project specifications, catalog sheets shall be received and reviewed by the agency. The agency will indicate comments on the catalog sheets as to the acceptability of the submitted items and their compliance with the material specifications. The submittal shall be marked “Approved,” “Approved as Noted,” or “Not Approved,” and will be transmitted to the various affected parties.

The agency shall notify the material supplier as to the acceptability of the submitted product, thus enabling them to commence fabrication and/or shipping in the case of an approval, or to make other arrangements in the case of disapproval. The supplier will be advised to send invoices to the District.

Certified test data shall be received by the agency with material shipment. It shall be sent to the District for review and retention.

Submittals requiring testing shall be conveyed to the District Highway Management Administrator and the Office of Materials Management for review and approval.

120-6.15 Inspection of Material Received

Upon receipt of materials, the agency shall contact the District to arrange for the inspection of the materials and completion of the necessary Receiving Forms (MR-541) and Field Inspection Report (TE-30) if required. If only Receiving Forms (MR-541) are necessary, the District may direct the agency to fulfill this function.

120-6.16 Invoice Payment

The following shall be submitted to the District for payment: invoice, Invoice Coding Strip (AU-60), Receiving Form (MR-541), Field Inspection Report (TE-30) if required, and certified test data if required.

120-6.17 Project Completion

Upon project completion, the agency shall contact the District to arrange a final field inspection. If Federal funding was used and the project has direct Federal oversight, FHWA shall be included in the process and its representative should be given copies of all approved certified test data submittals.

After completion of the inspection and correction of any deficiencies, the District will document that ODOT accepts the physical work as performed by the agency. The District will also document that any deficiencies identified in the engineering phase of project development have been corrected.

The District shall formally advise the Office of Payroll and Project Accounting when the project is completed and acceptable to ODOT and FHWA. With this information the Office of Payroll and Project Accounting will seek final Federal reimbursement of project funds. This process will finalize the project.

120-7 Alternate Bids for Traffic Control and Lighting Items

120-7.1 General

The alternate bid procedure has been established to permit a local agency to obtain a specific brand, feature or design of traffic control or lighting device for use on a project.

Some of the generalized uses of the procedure are as follows:
1. To obtain a specific brand and model of equipment, which is expected to simplify maintenance and operation or reduce operating costs.

2. To obtain supports which include architectural features or designs used exclusively within the jurisdiction of the local agency, and which are more expensive than the support designs normally used in ODOT plans. This may include items in local areas with historic or theme backgrounds.

3. To obtain a specialized design feature which is patented or manufactured by only one supplier, and which the agency expects will improve maintenance or operation.

4. To obtain devices which are not presently justified for efficient use on the project or are not acceptably justified by agreed future conditions, but which the local agency believes will be necessary at some future time.

5. To obtain items whose extra costs are not justified when lower cost items can provide acceptable results.

120-7.2 Eligibility

The local agency should inquire from the District Planning and Engineering Administrator as to whether or not an item is eligible for normal project participation. In many cases where a precedent has not been established, the request is reviewed with FHWA (when Federal funds are involved) and a decision is rendered. This request may be made informally or in writing depending on the nature of items involved and precedents already established. If it is determined that alternate bids are necessary, the local agency shall submit a request in writing through the appropriate District that alternate bids be taken. Figure 198-5 shows a sample letter which may be used by local authorities to request alternate bids.

Each request must include the following information:

1. Specific brand (and model) or design features desired.
2. Reasons why the local agency desires the product or feature in question.
3. Locations for use on the project under consideration.
4. Past history or experience with the product where applicable.
5. Confirmation that the local agency understands the procedures of the alternate bid process (Section 120-7.3).
6. Name and telephone number or email address of the responsible authority within the local agency to be contacted after the bid opening to determine the disposition of the alternate bids.

120-7.3 Procedure

The alternate bid procedure consists of adding a second bid item (alternate bid) for each general (generic) bid item which is affected by the local agency's special requirements. The generic bid item reflects the customary item that is sufficient to meet the needs of the project and is eligible for normal project participation. The alternate bid item describes a similar item that will satisfy the same needs of the project but also contains the local agency's special requirements. After bid opening, ODOT compares the costs of generic versus alternate bids for the affected bid items. In the event the generic items are bid at a higher price than the alternate items by the successful bidder, the award will normally be made on the basis of the alternate items with no additional cost incurred by the local agency. In the event the alternate items are bid at a higher price than the generic items, the maintaining agency will have the opportunity to either reject the alternate bids or to agree to accept the alternate bids with the understanding that local agency funds will pay the entire cost differential between the alternate bid and the generic bid.
A representative of the District will contact the responsible authority of the maintaining agency (see Section 120-7.2, item 6) by telephone or email and furnish unit prices and total bids for the generic and alternate bid items involved, including cost differentials for the apparent low bidder. Where the alternate bid process involves more than one item description, alternate bids can be selectively accepted or rejected; however, similar equipment types should be grouped together, such as all controller bid items or all preemption bid items. Only a limited period of time (one or two days) will be available for the maintaining agency to make known their preference by return telephone call or email (if time is needed to deliberate the preference) and to forward a letter with written confirmation to the District.

The apparent low bidder for the project will be determined solely on the lowest bid prices submitted. The cost differential presented to the local agency will be based only upon generic and alternate bid prices submitted by the apparent low bidder. Alternate bid prices submitted by other bidders will not be considered when determining the local agency’s added costs.

The project must be awarded or rejected within ten days of the bid opening; therefore, ODOT must receive the local agency’s written acceptance of the alternate bids within the time period or ODOT may award the project on the basis of the lowest bids. If the local agency refuses the alternate bids, written confirmation is still required for ODOT documentation. The letter of confirmation must be sent directly to the District Planning and Engineering Administrator. The letter shall also include a statement of willingness of the maintaining agency to pay the entire difference in cost, if the local choice is alternate bids involving a higher cost than that for generic bid items. The letter shall be signed by the contractual officer for the local agency. Figure 198-6 shows a sample letter that may be used by local authorities to acknowledge acceptance or rejection of the alternate bids.
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This Chapter is intended to provide general background information in the planning and programming areas. Specific planning and programming concerns will be addressed as needed in the individual Parts.

130-2 Engineering Studies

130-2.1 General

**OMUTCD Section 1A.09** states that “the decision to use a particular device at a particular location should be made on the basis of either an engineering study or the application of engineering judgment.” Therefore, while the **OMUTCD** and this Manual provide standards and policy information, neither manual can be a substitute for engineering judgment.

130-2.2 Scope of Studies

The scope of the study needed to determine what traffic control device to use, and how to use it, in a particular situation will depend on the specifics of the situation. As noted in **Section 193-14**, the **ITE Manual of Transportation Engineering Studies** is useful in providing guidance on preparing, conducting and analyzing different types of traffic studies. Additional information about specific types of traffic engineering studies (e.g., Safety Studies, Speed Studies, Ball Banking Studies and Systematic Signal Timing and Phasing Program and Road Safety Audits) is provided in **Part 12**.

130-2.3 Assistance to Other Jurisdictions

For those jurisdictions with responsibility for traffic control that do not have engineers on their staff, **OMUTCD Section 1A.09** indicates that they should seek such advice from others, including **ODOT**. Aside from the community service aspect, this sharing of experience and ideas will help encourage uniformity in the design and use of traffic control devices. Hopefully, this Manual will provide some help in supporting these jurisdictions. However, it is inevitable that questions will arise, and **ODOT** will continue to help other jurisdictions as much as possible within the constraints of **ODOT**'s personnel and workload limitations.

The Circuit Rider Program sponsored by the **Ohio LTAP (Local Technical Assistance Program) Center** is designed to provide free on-site training classes on subjects such as work zone traffic control and safety to local governments. The **Ohio LTAP Center** also has other resources available to help local agencies, including a quarterly newsletter.

130-3 Design and Roadside Safety Issues

Generally, the **OMUTCD** addresses design and roadside safety issues only as they apply to the application of specific traffic control devices. Additional detail information on such issues as clear zone, barriers, supports, impact attenuators and rumble strips are available in the **L&D Manual Volume One**, the **C&MS**, and in the **Roadway and Traffic SCDs**.

130-4 Functional Classification

The Functional Classification System is a method of classifying streets and highways based on their general characteristics. This classification system has been used over the years to establish a systematic method of categorizing the range of facilities that make up the overall highway network. Historically, one of the most important and common uses of this tool has been to identify streets and highways eligible for certain types of funding.
The Functional Classification System groups streets and highways in a hierarchy based on the type of highway service they provide. The *Highway Functional Classification - Concepts, Criteria and Procedures* manual, published by FHWA, basically established the current system in 1974. The different functional systems are defined in that manual, and general concepts and characteristics used to identify each are presented, as well as the procedure to follow in designating a system. The Office of Program Management (Division of Planning) is responsible for administering this system.

In general, highways can be categorized as arterials, collectors or locals. However, depending on whether the route is considered urban or rural, the classifications are also broken down into smaller categories, e.g., rural principal arterial, rural minor arterial, rural major collectors and urban collectors. Additional information, as well as an inventory of the functional classifications of streets and highways in Ohio, including maps, is available from the Program Management website. This information is also now available through TIMS (Transportation Information Mapping System).

130-5 National Highway System (NHS)

The National Highway System (NHS) consists of interconnected urban and rural principal arterials and highways (including toll facilities) which serve major population centers, international border crossings, ports, airports, public transportation facilities, other intermodal transportation facilities and other major travel destinations. NHS routes meet national defense requirements and serve interstate and interregional travel. All routes on the Interstate System are a part of the NHS.

The NHS includes all high-priority corridors identified in Section 1105(c) of the ISTEA. It was originally not permitted to exceed 178,250 miles; however, legislation known as MAP-21 expanded the system. Most of the state highway system is on this national network. Maps of the system are available on-line. This information is also now available through TIMS (Transportation Information Mapping System).

130-6 Access Management

Access is critical to the usefulness of any transportation system. However, the combination of increasing travel demands and an increasing demand for access points (intersections and driveways) along the highways can result in increased congestion and delay, and can contribute to an increase in accidents. By controlling access to our highway system, a better balance can be achieved between these competing demands.

ODOT has developed an Access Management Program based on the functional classification of roadways (*Section 130-4*). The program is administered by Central Office with input from the Districts. The State Highway Access Management Manual (*see Section 194-17*) was developed to support this program. It is available from the Office of Roadway Engineering (ORE) website. The purpose of this program and the manual is to establish uniform permit procedures for use in considering requests for new or revised highway access.

Access management involves many areas of concern, including planning, design, construction, maintenance and traffic operations. Anyone expected to address traffic operations concerns should become familiar with the permit procedures and best practice information contained in the Access Management Manual.

130-7 Railroads and Highway-Rail Grade Crossings

The presence of a railroad within a project creates an area where specific planning is necessary in order to successfully complete a project. Generally, railroads have very specific requirements in regards to working within their property, commonly referred to as the right-of-way. Access is granted through an agreement intended for such purpose and may impact many stakeholders.
including ODOT, local agencies, engineering firms and contractors. Many of the requirements are
imposed upon the railroad by the Federal Railroad Administration and for which the railroad
has no authority to grant a waiver or exception. These include items such as working distance
from an active track, flagging, protection of train moves, railroad protective insurance, etc. Each
of the parties involved in the project will usually be required to execute an agreement prior to
having access to the right-of-way. Time must be allocated for execution of agreements as well as
funding for railroad work.

When a project involves a highway-rail grade crossing, it requires attention from the beginning of
the project to properly plan for railroad related costs. Any work regarding surface or signal
improvements will require coordination with the railroad which will result in the production of an
estimate of cost for the proposed improvements. The process adds time and complexity
whenever a traffic signal is located within the distance from the crossing that preemption and
interconnection with the railroad warning system is required. In some cases, the cost of the
railroad signal work may well exceed the cost of the entire signal project. The Ohio Rail
Development Commission (ORDC) and the Public Utilities Commission of Ohio (PUCO) are
both valuable assets to assist with railroad coordination. Refer to TEM Part 800 for additional
information required to properly plan for projects which require railroad signal work.
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140 DESIGN INFORMATION

140-1 General

This Chapter addresses information related to traffic control design in general. Design information related to specific areas of traffic control is located in the individual TEM Parts.

140-2 Traffic Control Plan Requirements

140-2.1 General

Submissions of traffic control plans shall conform to the requirements noted herein.

140-2.2 Base Plan Scale

The Base Plan shall consist of two parts:

1. Part A, to a scale of 1" = 200' (1:2000) or 1" = 100' (1:1000) continuous for the entire project, shall show all proposed roadways and connections to existing construction.

2. Part B of the Base Plan shall show supplemental coverage to a minimum scale of 1" = 50' (1:500) for all interchanged crossroads and mainline at-grade intersections, and for other critical at-grade intersections in urban areas.

On some projects, particularly in urban areas, it may be more efficient to show the entire project on one plan at 1" = 50' (1:500) or 1" = 20' (1:200) scale.

Information on traffic signal Base Plans is contained in Section 441-2.

140-2.3 Plan Information

Plans and details involving permanent traffic control items, such as pavement markings, signing and signalization, shall be prepared in accordance with the OMUTCD and the Signal Design Reference Packet (Section 495-2).

Base Plans shall contain the following design information:

1. Clearly defined pavement edges, speed change lanes, ramps, transitions, raised medians, islands and bridge structures on mainline, ramps and crossroads.

2. Number of lanes on each roadway, shown by directional arrows (one for each lane); and lane widths (plans should show all lane widths).

3. Pavement width at each overhead sign support spanning the roadway at a location not conforming to the typical roadway section.

4. Location of proposed traffic control devices, using the OMUTCD as a guide. Plan symbols, levels, weights and colors for CADD drawings shall conform to standards contained in the CADD Engineering Standards Manual.
   a. Proposed sign legends at each sign location. All the Regulatory and Warning Signs proposed for the crossroads or at-grade intersections may be shown on Part B.
   b. For Part A show pavement marking at merging, diverging or intersecting roadways. Show painted gore stations for merging and diverging roadways. For Part B, complete pavement marking should be shown.
   c. Indicate “Signalized Intersection,” if existing or proposed.
   d. Other special devices that may be required.
140-2.4 Miscellaneous Data

Each submission should include:

1. Existing overhead electrical and communication lines.
2. Underground utility facilities as required by ORC Section 153.64. “Underground utility facilities” includes any item buried or placed below ground or submerged under water for use in connection with the storage or conveyance of water or sewage; or electronic, telephonic, or telegraphic communications; electricity; electric energy; petroleum products; manufactured, mixed, or natural gas; synthetic or liquefied natural gas; propane gas; or other substances. "Underground utility facilities" includes, but is not limited to, all operational underground pipes, sewers, tubing, conduits, cables, valves, lines, wires, manholes, and attachments…”
3. Available power source service points and poles available.
4. Location of existing traffic control items and ownership in the project area (this can be a separate plan and/or listing).
5. Corporation lines.
6. Right-of-way lines.

140-2.5 Supplemental Plan Information

Each submission shall be accompanied by one print of each of the following:

1. Roadway profiles for all roadways within the project showing vertical clearance at grade separations (i.e., copy of line and grade submission, as approved).
2. Typical sections for all roadways within project.

140-2.6 Supplemental Design Information

Each submission shall include a summary or checklist addressing the following items:

1. Signs.
   a. Level of signing proposed, ground mounted or overhead.
   b. Comment or indication on the Base Plan whether signs or other traffic control devices on adjoining projects under construction, or open to traffic, should be revised to fit the traffic pattern change resulting from the proposed project.
2. Highway lighting.
   Extent of lighting proposed to be installed for the project, or status of determination; and type of voltages available.
   a. A review of traffic volumes at each intersection shall be made to determine the possible need for traffic signals.
   b. If the geometric design is predicated on signalization (submit statement to this effect) or a review of volumes reveals the need, an analysis of traffic signal warrants (OMUTCD Chapter 4C) shall be made for the intersection, based on the traffic projected to the estimated construction completion year.
   c. If signals are warranted, a warrant analysis for each intersection shall be submitted along with capacity analysis.
   d. Indication of location and reason for any temporary signalization that may be required for traffic control during construction.
e. If any existing traffic signals are affected by the proposed project, furnish complete information on the existing signal to the extent possible, including type of controller, location of poles, type of poles, ownership of poles, signal heads, detectors, etc.

4. Miscellaneous Data
   a. Design Year, Design Speed, Legal Speed Limit and Directional Design Hourly Volume for all roadways. At intersections show all through and turning volumes.
   b. A list of all design exceptions.

140-2.7 Reuse of Equipment

Any signs or overhead sign supports to be reused should be indicated on the plans. Ground-mounted supports may be reused in place, but shall not be removed and re-erected. Any decision to reuse existing equipment must be based on a field check of the structural integrity and condition of the devices.

140-3 Designer Notes

As deemed necessary, Designer Notes are prepared to help define the intended use of SCDs and Plan Notes. The information is also addressed in Chapter x41 (Plan Preparation / Production), where x is the related TEM Part number. Designer Notes related specifically to the use of the Plan Notes are located in this Manual with the individual Plan Notes (Section 140-4).

140-4 Plan Notes

Plan Notes for Maintenance of Traffic concerns and other traffic control items are currently in Chapter x42 (where x is the Part number) in each TEM Part.

140-5 Plan Detail Sheets

Plan Detail Sheets are similar to Traffic Plan Insert Sheets, but are prepared for use in an individual, specific plan (see Chapter 104).

140-6 Estimating

Compilations of previous Contract Bid Item information are available on-line from the Office of Estimating. That Office should be contacted for any additional information needed on estimating.

140-7 Review Submissions

As part of ODOT’s Project Development Process (see Section 194-10), the following traffic control design submissions may be required:

   a. Maintenance of Traffic Alternative Analysis (MOTAA) including Queue Analysis (for interstate or interstate look-alikes) (see Section 630-5).
   b. Documentation of highway lighting considerations and warrants (see Chapter 1103).
   c. Maintenance of Traffic investigations (for non-interstate or non-interstate look-alikes).
   d. MOT Policy Exception Request (MOTEC/PIAC), if necessary (see Section 601-2).
   e. Signal warrants (see Chapter 402). This submission, based upon an analysis of traffic counts, traffic projections, pedestrian information, intersection geometrics and physical conditions, speeds, gaps, delay data and accident history is prepared according to the requirements of the Ohio Manual of Uniform Traffic Control Devices (OMUTCD). It is intended to determine locations where traffic signals are justified. New traffic signals, or
significant modifications to existing signals, will not be included in contract plans unless
acceptably justified.
f. Documentation of Proprietary Bid Justification *(see Section 120-4).*
g. Documentation of alternate bid considerations for signal and lighting equipment *(see
Section 120-7).*

2. Stage 1 Design – Task 2.7 – ITS Systems Engineering Analysis *(see Section 1301-3).*

3. Stage 2 Design – Task 3.3.

This submission is intended to present a complete concept of how traffic control devices
(signing, signals, markings, highway lighting and maintenance of traffic) will control traffic in
relation to the roadway geometric design, physical conditions, traffic characteristics, and the
surrounding environment. These submissions portray the type, approximate locations, size,
color, shape, legend and operational characteristics of the proposed traffic control devices.
These concepts, applications and preliminary designs shall be in accord with the ODOT
Construction and Material Specifications (C&MS), SCDs, and TEM, as well as other current publications
dealing with the proper use of traffic control devices.

a. Maintenance of Traffic sequence of operations and local alternated detour notes.
b. Maintenance of Traffic Phasing Plans including:
   i. Location of proposed work, by phase.
   ii. Existing and maintenance of traffic signing and pavement marking.
   iii. Median crossovers.
   iv. Channelizing devices (e.g., barriers, drums).
   v. Work zone lane widths.
   vi. Pavement for maintaining traffic.
   vii. Sections showing existing and proposed pavement and lane widths.
   viii. Crash cushions.
c. Detour map.
d. Pavement Marking and Signing Plan Sheets *(see Chapter 211 and Sections 240-8, 340-2
   and 341-2)* with SignCad files on a CD *(see Section 211-4).*
e. Signal Plan sheets *(see Section 440-7).*
   i. SWISS files on a CD *(see Section 440-5).*
   ii. Synchro files on a CD *(see Section 440-6).*
f. Lighting Plan sheets *(see Chapter 1141).*

4. Stage 3 Detailed Design – Task 4.2

These are a complete set of construction plans, submitted as ready for Contract Sales *(see
Sections 240-8, 340-2 and 440-7 and Chapter 1141).* It contains, or properly refers to, all
information and details necessary to furnish, erect and complete the required traffic control
devices. It includes notes, details, calculations, specifications, quantities and information on
payment and other contractual obligations.

**140-8 Salvage of Project Materials**

The costs associated with delivery of salvaged project materials are eligible for Federal funds. The
contractor may be directed to deliver the salvaged items to a maintaining agency’s facility. The
facility shall be located a limited distance from the project; within the same County for an ODOT
project.

If the maintaining agency elects not to have the salvaged materials delivered, the contractor shall
be directed to temporarily store salvaged project materials on site for pick-up by the maintaining
agency. If the maintaining agency does not pick up the materials within the designated time
period with their own forces, then the materials shall become the property of the contractor.

140-9  **Spare Parts**

Spare parts purchased as part of a project are not eligible for Federal participation.
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150 CONSTRUCTION

150-1 General

The C&MS, together with the plans and Proposal, constitute the contract for the performance of required work. It is the legal and technical document by which ODOT bids and constructs highway projects. Traffic control provisions in these documents are required to be in conformance with the OMUTCD.

Temporary traffic control issues are addressed in Part 6 of this Manual. Other construction issues that are related to specific areas of traffic engineering are addressed in the applicable TEM Parts.

Although the related information provided in individual TEM Parts is intended primarily to serve as a guide for construction personnel where the contractor furnishes and installs traffic control devices, it may also be useful for maintenance personnel performing the same functions. It can also be useful in helping designers understand/visualize the work involved. Typically, inspection procedures for the various types of traffic control devices are outlined to assist project personnel in performing their duties. The information points out the various important features of each device and references the applicable specification or standard drawing. Illustrations are often used for easy recognition of the device or feature being discussed.

150-2 Pre-Construction Conference

During the Pre-Construction Conference held for the project the following items relative to traffic control devices may be reviewed:

1. Inspection of signs, supports and other traffic control devices.
2. Traffic control devices for maintaining traffic.
3. Any work zone speed zones related to the project.
4. Certifications of sign and signal supports.
5. Approval requirements for catalog cuts of traffic control devices.
6. Delivery schedule of traffic control devices.
7. Storage and special care for traffic control devices.
8. Plans for maintenance of traffic.
10. Location of overhead utilities and underground facilities.
11. Coordination required with utilities for necessary relocations and attachments to their facilities.
12. Sequence of construction for traffic control devices.
13. Coordination required with local agencies for erection of new devices and removal or relocation of existing devices.
14. Work by other contractors and agencies.
15. Layout procedure for pavement markings.
16. Visibility inspection of traffic control devices.
17. Partial and final acceptance and opening to the road users.
150-3 Local Government Agency / Utility Force Account Work

150-3.1 General

Procedures for administering force account work (see Section 1501-3) associated with an active construction project are described herein, and they are also shown as a flow chart in Figure 198-4.

Federal requirements for the use of force account work on Federal-Aid projects can be found in 23 CFR 635 Subpart B and FHWA Order 5060.1.

150-3.2 Procedure

Force account proposals shall be submitted and evaluated prior to PS&E so that funds can be encumbered in a timely manner.

The agency proposing to perform the work shall submit the following information to the appropriate District for review and approval:

1. A Force Account Proposal documenting the work to be performed and why. It should include a detailed work description, an estimate, and explanation of the need for the work and why it is best performed by the force account method.

2. Plan Drawings that are clear enough to be followed by an engineer not familiar with the project. They shall define the extent and details of the necessary work, and they should include or refer to standards of quality which the work must meet (i.e., ODOT Specifications, Ohio Manual of Uniform Traffic Control Devices, National Electric Code, National Electric Safety Code, etc.)

3. A cost comparison which includes a comparison between the agency’s proposed cost and the cost of having the work performed by the contractor.

In order to be approved, the above submittal must show that the force account method is cost effective assuring the lowest overall cost.

The District shall: review the submittal; and if it finds the proposal and other documentation to be acceptable, draft a tentative agreement between ODOT and the requesting agency. The agreement shall be sent to the requesting agency for signature.

Upon its return, the agreement shall be sent to the Office of Project Coordination which will arrange to obtain the Director’s signature. As part of the transmittal IOC to the Office of Estimating, an encumbrance number shall be requested for the force account work. The IOC shall also contain the estimated cost associated with the force account work.

After the agreement is signed and an encumbrance number assigned, the District shall return a copy of the executed agreement along with formal approval of the proposal to the agency.

At such time as the work is being performed, the responsible agency will submit its billings to the District for review and approval. If the charges are reasonable and are in conformance with the proposal, they shall be forwarded to the District Business and Human Services Administrator for payment.
160 MAINTENANCE / OPERATIONS

As needed, specific operational issues will be addressed in the related TEM Parts. In general, it is intended that, when included, these issues will be addressed in Chapters numbered in the x60's, where x is the TEM Part number.

Although the construction information provided in the individual Parts (in Chapters numbered in the x50s, where x is the TEM Part number) is intended to serve as a guide for construction personnel where the contractor furnishes and installs traffic control devices, it may also be useful for maintenance personnel performing the same functions. Typically, inspection procedures for the various types of traffic control devices are outlined to assist project personnel in performing their duties. The information points out the various important features of each device and references the applicable specification or standard drawing. Illustrations are often used for easy recognition of the device or feature being discussed.

ODOT personnel performing work involving signing, traffic signals, lighting, markings or maintenance of traffic are required to comply with the requirements of the OMUTCD. Other requirements, such as other ODOT policies, standards, procedures, etc. that are related to specific areas of traffic engineering will be addressed in the applicable TEM Parts.

The C&MS and the SCDs should be used by ODOT operational forces as directed by this Manual and at other times when considered appropriate. They provide a wealth of information on construction requirements, materials and details that should prove helpful in the performance of maintenance, upgrading, removal and inspection of traffic control devices. However, it should be recognized that the information in the C&MS and the SCDs is designed for contract work and does not necessarily provide the only acceptable method or materials to achieve a given objective.

170 OTHER CONSIDERATIONS

Depending on the specifics of a particular location, various special considerations, such as pedestrians, bicycles, motorcycles, public transit vehicles, commercial vehicles, airports and waterways, may have to be addressed in developing traffic control standards. As needed, information on these concerns will be incorporated within the individual Parts of this Manual.

180 RESEARCH

This Chapter in each TEM Part has been reserved to document pertinent research information.

OMUTCD Section 1A.10 prohibits the design, application and placement of traffic control devices other than those adopted in the OMUTCD unless the provisions of Section 1A.10 are followed. All such requests are sent to FHWA. For ODOT, the Office of Roadway Engineering (ORE) coordinates this process. Local authorities submit such requests to FHWA with a copy to the ORE Administrator.
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193 NATIONAL REFERENCE RESOURCES

193-1 General

This Chapter provides a brief description of related national publications (based on on-line descriptions), and how they apply to ODOT projects and work. Copies of these publications can be ordered by contacting the agency or organization publishing the document. For documents published by FHWA, contact the Government Printing Office (GPO). See Table 197-1 for contact information for the GPO and other resource agencies and organizations.

The following publications have been listed generally in alphabetical order; however, for convenience later additions to the list may be added to the end of the group, rather than renumbering all other entries.


A Policy on Geometric Design of Highways and Streets, published by the American Association of State Highway and Transportation Officials (AASHTO) and commonly known as the AASHTO Design Guide or the “Green Book,” discusses nationwide policies, practices and criteria for the geometric design of highways and streets. It is intended to present a consensus view on the most widely accepted approach to the design of a variety of geometric design elements including design speed, horizontal and vertical alignment, cross section widths, intersections and interchanges.

The geometric design treatments addressed in the ODOT L&D Manuals are based, at least in part, on the AASHTO Design Guide.

193-3 AASHTO Guide for the Development of Bicycle Facilities

The AASHTO Guide for the Development of Bicycle Facilities provides information on the development of new facilities to enhance and encourage safe bicycle travel. Planning considerations, design and construction guidelines, and operation and maintenance recommendations are included.

193-4 AASHTO Roadside Design Guide (RSDG)

The Roadside Design Guide (RSDG), published by AASHTO, is a synthesis of current information and operating practices related to roadside safety. It focuses on safety treatments that can minimize the likelihood of serious injuries when a motorist leaves the roadway.

The OUMUTCD, the TEM and the L&D Manuals address roadside safety issues. The roadside safety criteria are generally based on the criteria presented in the Roadside Design Guide.

193-5 AASHTO Roadway Lighting Design Guide

The Roadway Lighting Design Guide, published by AASHTO, replaces the 1984 publication entitled An Informational Guide for Roadway Lighting and provides a general overview of lighting systems from the point of view of the transportation departments and recommends minimum levels of quality.

The TEM addresses highway lighting in Part 11. The highway lighting criteria in that Part are based on this AASHTO publication and other documents, and tailored to the prevailing practices and conditions in Ohio. Also, the TEM is intended to clarify, where needed, the issues presented in this AASHTO publication and to discuss lighting information not included in it.
193-6 **ADA Accessibility Guidelines**

The **ADA Accessibility Guidelines**, published by the **U.S. Access Board**, presents nationwide accessibility criteria for individuals with disabilities. Initially these guidelines were intended to establish the criteria mandated by the **Americans with Disabilities Act (ADA) of 1990**, providing accessibility criteria for interior and exterior facilities, including parking spaces, sidewalks, hallways, doorways, curb ramps, ramps, stairs, telephones, drinking fountains, rest rooms, elevators, etc. They have since been updated to include communications and IT systems, recreation facilities, streets and sidewalks, etc.

193-7 **(ANSI/IES Approved) Roadway Lighting (RP-8)**

This Recommended Practice (RP) for **Roadway Lighting (RP-8)** provides the design basis for lighting roadways, adjacent bikeways and pedestrian ways. It deals entirely with lighting and does not give advice on construction. It is not intended to be applied to existing lighting systems until such systems are redesigned. Roadway lighting is intended to produce quick, accurate and comfortable vision at night that will safeguard, facilitate, and encourage vehicular and pedestrian traffic. The proper use of roadway lighting is also associated here with certain economic and social benefits including a reduction in nighttime accidents, aid to the police, facilitation of traffic flow, and the promotion of business during nighttime hours.

193-8 **(ANSI Approved) Tunnel Lighting (RP-22-11)**

The information in the **Illuminating Engineering Society's Recommended Practice Tunnel Lighting (RP-22-11)** assists engineers and designers in determining lighting needs, recommending solutions, and evaluating resulting visibility at tunnel approaches and interiors. The design criteria and procedures included in this Recommended Practice (RP) are based on theory and on information drawn from practical experience and engineering judgment.

193-9 **FHWA Lighting Handbook**

This **Lighting Handbook** presents guidance in the planning, design, operation and maintenance of roadway lighting systems. It is intended to present a consensus view on the most widely accepted approach to providing a reasonable roadway lighting system.

The TEM addresses highway lighting in **Part 11**. The lighting criteria in it are based on the criteria presented in this handbook and other documents. They are tailored to meet the prevailing practices and conditions in **Ohio**.

193-10 **FHWA Railroad-Highway Grade Crossing Handbook**

The **Railroad-Highway Grade Crossing Handbook**, published by **FHWA**, presents guidelines for prioritizing improvements to highway-rail grade crossings and information on the various types of improvements that can be made to the crossing. Procedures, models and computer programs which will assist making these selections are described.

193-11 **Highway Capacity Manual (HCM)**

The **Highway Capacity Manual (HCM)**, published by the **Transportation Research Board (TRB)**, presents nationwide criteria for capacity analyses for highway projects. The HCM includes methodologies for freeways, weaving areas, freeway/ramp junctions, two-way two-lane facilities, signalized intersections, non-signalized intersections, etc. The latest HCM is also available on a CD-ROM, which adds tutorials, narrated example problems, explanatory videos, navigation tools, and hyperlinks between sections.

**ODOT** uses the **HCM** for capacity analyses with some adjustments for local factors.
193-12 **Highway Safety Manual (HSM)**

The **Highway Safety Manual (HSM)** was developed to help measurably reduce the frequency and severity of crashes by providing a variety of tools/methods for considering safety in the project development process. The HSM assists practitioners in selecting countermeasures and prioritizing projects, comparing alternatives, and quantifying and predicting the safety performance of roadway elements considered in planning, design, construction, maintenance and operation.

193-13 **ITE Manual of Traffic Signal Design**

The **Manual of Traffic Signal Design**, published by the **Institute of Transportation Engineers (ITE)**, presents fundamental concepts and standard practices related to traffic signal design commensurate with the state of the art. It contains information on operational requirements, signal display and design configuration, traffic signal controllers, detectors, wiring, cabling, signal timing, etc.

This manual may be used by designers for additional guidance on design elements not addressed in the TEM.

193-14 **ITE Manual of Transportation Engineering Studies**

The **Manual of Transportation Engineering Studies**, published by **ITE**, shows in detail how to conduct several transportation engineering studies in the field; discusses experimental design, survey design, statistical analyses, data presentation techniques, and report writing concepts; and provides guidelines for both oral and written presentation of study results. Useful forms for various transportation studies are included.

**TEM Sections 130-2, 1203-3 and 1204-3** address engineering studies. For additional guidance on the actual procedures for conducting these studies, the designer may reference the **ITE** manual.

193-15 **ITE Traffic Engineering Handbook**

The **Traffic Engineering Handbook**, published by **ITE**, provides a current, updated source of information for people entering the practice and for those already practicing. It provides a convenient desk reference of the principles and proven techniques in traffic engineering.

This handbook may be used by designers for additional guidance on design elements not addressed in the **TEM**.

193-16 **ITE Trip Generation Manual**

The **Trip Generation Manual**, published by **ITE**, provides guidance for various types of traffic generators. This is a three-volume report, with basically two volumes of data and one volume explaining how to use it. It contains data from more than 5,500 individual trip generation studies and provides information on multi-use projects and pass-by trips. It includes trip generation data for commercial development, office development, residential, etc.

Unless local data is available or where a developer can substantiate its basis, **ODOT** requires that all traffic impact analyses use the **ITE Trip Generation** data.

193-17 **Manual on Uniform Traffic Control Devices (MUTCD)**

193-17.1 **General**

As noted in **TEM Section 100-1.2**, the **Manual on Uniform Traffic Control Devices**

Revised July 17, 2015 October 23, 2002 1-49
(MUTCD), published by FHWA in coordination with the National Committee on Uniform Traffic Control Devices (NCUTCD), presents nationwide criteria for the selection, design and placement of signs, pavement markings, traffic signals, temporary traffic control, and traffic controls for school areas, highway-rail grade crossings, bicycle facilities, and highway-light rail transit grade crossings. The basic objective of the MUTCD is to establish effective means to convey traffic control information to the driver for uniform nationwide application.

Ohio Revised Code Section 4511.09 requires ODOT to adopt a manual which conforms as much as possible to this national MUTCD. The O MUTCD is that manual (see Chapter 101). In Ohio, the MUTCD is basically a resource manual which supports the OMUTCD.

193-17.2 MUTCD Review Process

Proposed changes to the national standards in the MUTCD are published by FHWA using the Federal Register Docket system. The ORE Traffic Control Design Section is responsible for coordinating ODOT's review of these proposals and preparing ODOT's response. Comments are solicited from the Districts and related offices in Central Office, as well as others outside ODOT, as appropriate.

Proposed changes to the national standards are also reviewed by the National Committee on Uniform Traffic Control Devices (NCUTCD). As a member of this committee, AASHTO periodically circulates Ballots to its member agencies, including ODOT, soliciting comments on proposed changes that have been posted in the Docket, as well as other proposed changes technical subcommittees may be reviewing. As with the Docket proposals, the ORE Traffic Control Design Section is responsible for coordinating ODOT's review and preparing the response to the AASHTO Ballots.

193-18 Standard Highway Signs and Markings Book

The Standard Highway Signs and Markings book, published by FHWA, presents sign designs for standard highway signs and criteria for laying out information on highway signs, as well as standard alphabets and symbols for highway signs and pavement markings. The book is to be used in conjunction with the MUTCD. Symbols which are used on signs are provided on grids to allow the designer to change the symbol size and yet present it in proper proportion.

ODOT has adopted the standard alphabets found in Chapters 9 and 10 of the Standard Highway Signs and Markings book for all of its signs and pavement markings. TEM Parts 2 and 3 and the SCDs provide additional guidance on the application of letters and numerals on the highway signs and pavement markings.

In Ohio, the Standard Highway Signs and Markings book published by FHWA is used as a reference resource for the design and layout of all signs. Designs shown in the (ODOT) Sign Designs and Markings Manual (SDMM) (see Section 295-2) include some which are basically duplicates of those in the Standard Highway Signs and Markings book and others developed by ODOT.

193-19 Traffic Control Devices Handbook (TCDH)

The Traffic Control Devices Handbook (TCDH), published by ITE, provides guidance and information to implement the provisions of the MUTCD. The objective of the handbook is to bridge the gap between the MUTCD requirements and field applications. It is meant as guidance material to assist in determining the appropriate device(s) for a specific condition based on judgment and/or study.
194  ODOT REFERENCE RESOURCES

194-1 General

ODOT traffic engineering information and publications have been addressed in Chapters 101 through 106 and Chapter 195. ODOT also has various other publications which may provide needed or useful information for traffic engineering projects or studies. This Chapter briefly discusses these other ODOT publications.

ODOT’s design-related publications are also listed on the Design Reference Resource Center (DRRC) website (also see page ii). When posted electronically, the references are also available by hyperlink from the DRRC website. Some of these publications can be ordered through the responsible Office or the Office of Contracts (see Table 197-4); however, some may be available only from the ODOT website.

The following publications have been listed generally in alphabetical order; however, for convenience later additions to the list may be added to the end of the group, rather than renumbering all other entries.

194-2 Bridge Design Manual (BDM)

The Office of Structural Engineering publish the Bridge Design Manual (BDM). The purpose of this manual, and its addendum, is to provide general guidelines, procedures and instructions, for the design and preparation of bridge plans and specifications for ODOT. The manual includes information on preliminary and detail design, structure rehabilitation and repair, general and detail Plan Notes, temporary structures, noise barriers and bridge structure ratings. This manual is available only on-line.

194-3 Construction Administration Manual of Procedures

The Construction Administration Manual of Procedures addresses procedures in various areas of construction, e.g., concrete, earthwork, flexible pavement, rigid pavement, structures and pipe. It is intended to serve as a guide to the engineer and inspector during construction. Personnel need to have a thorough knowledge of the plans, specifications, proposal notes, and standard drawings. The manual does not in any manner alter or replace these governing regulations, but is a supplement to them. The normal sequence of inspection procedures are outlined to assist project personnel in performing their duties.

194-4 Construction and Materials Specifications (C&MS)

The specifications used in ODOT contract plans are contained in the C&MS and Supplemental Specifications published on the website and discussed earlier in Chapter 105.

194-5 Consultant Contract Administration Manual

The Consultant Contract Administration Manual from the Office of Consultant Services is intended to provide uniform guidelines for ODOT employees to follow in administering contractual agreements between ODOT and consultants who are hired to provide technical services. These services include, but are not limited to environmental studies, design and plan preparation, construction inspection, bridge inspection and right-of-way acquisition. Also see the Specifications for Consulting Engineers described in Section 194-11.

194-6 L&D Manual Volume 1- Roadway Design

The purpose of L&D Manual Volume 1- Roadway Design, published by the Office of Roadway Engineering, is to consolidate and document ODOT design policies, standards, guidelines and practices. Criteria included in the manual closely conform to the AASHTO publications A Policy...

This manual is intended to establish uniform procedures for implementing design decisions, assure quality and continuity in design of state highways, and assure compliance with Federal criteria. The manual is considered a primary source of reference by ODOT roadway design personnel; however, as noted in the Preface of the manual “it must be recognized that the practices suggested in it may be inappropriate for some projects because of fiscal limitations or other reasons.” Also, design standards adopted by city, county or other local agencies must be taken into consideration on projects under their jurisdiction. This manual is available only on-line.

194-7  L&D Manual Volume 2 - Drainage Design

The purpose of L&D Manual Volume 2 - Drainage Design, published by the Office of Hydraulic Engineering, is to provide guidance for the hydraulic design of highway drainage features. As noted in the Preface of the manual, adhering to the recommended design procedures and controls outlined in the manual should result in drainage facilities that will not cause: “a) damaging flooding of private property; b) undue inconvenience to the motorist during moderate to heavy rainfall; [or] c) undue disturbance to the environment.”

This manual is intended to establish uniform procedures for implementing drainage design decisions, assure quality and continuity in design of state highways, and assure compliance with Federal criteria. The manual is considered a primary source of reference by ODOT roadway design personnel; however, as noted in the Preface of the manual “it must be recognized that the practices suggested in it may be inappropriate for some projects because of fiscal limitations or other reasons.” Also, design standards adopted by city, county or other local agencies must be taken into consideration on projects under their jurisdiction. This manual is available only on-line.

194-8  L&D Manual Volume 3 - Highway Plans

The purpose of L&D Manual Volume 3 - Highway Plans, published by the Office of CADD and Mapping Services, is to standardize the form and process for ODOT highway plan preparation. However, it is also recognized that many projects will involve unusual circumstances requiring deviations from the manual guidelines. This manual is available only on-line.

194-9  Pavement Design Manual (PDM)

The Pavement Design Manual is published by the Office of Pavement Engineering and is intended to bring all pavement design and rehabilitation procedures together in one document, reduce the selection of design variables to those most appropriate for Ohio, to document Ohio’s interpretation of various policies and to include design criteria which may be unique to Ohio.

Information in this manual is based on the results of the AASHTO Road Test, the AASHTO Guide for Design of Pavement Structures, FHWA guidelines and technical advisories, various training course manuals, as well as the experience of the authors. In addition, the application of other studies, experiences and engineering judgment have been included to fit Ohio’s conditions. The pavement engineering concepts described are intended for use with all new or reconstruction projects, major and minor maintenance projects, and with all ODOT preventative maintenance projects.


This manual is an integral part of ODOT’s Project Development Process (PDP) which provides a detailed process designed to improve not only the quality of highway construction plans, but also the reliability of project delivery.
194-11 **Specifications for Consulting Engineers**

The ORC authorizes the Director of Transportation to "employ consulting engineers and with the consent of the controlling board may enter into contracts for consulting engineering services..." Specifications for Consulting Engineers, from the Office of Consultant Services, is written from the standpoint of a contractual relationship between ODOT and a consultant. It includes definitions, general conditions, auditing and bidding aspects of all agreements, the consultant selection process, the agreement modification process, requirements for price proposals and explains preparation of consultant cost data for supporting documentation. The specifications are included by reference in each agreement, thereby substantially reducing the agreement text. Also see the Consultant Contract Administration Manual described in Section 194-5.

194-12 **Specifications for Subsurface Investigations**

The Office of Geotechnical Engineering publishes standards and guidelines related to subsurface investigations, such as Specifications for Geological Explorations and the Rock Slope Design Guide.

194-13 **Standard Bridge Drawings**

Bridge standard drawings are published by the Office of Structural Engineering. They consist of SCDs, Plan Insert Sheets and Design Data Sheets. They include details for bridge railings, abutments, vandal protection, fence and approach slabs, etc.

194-14 **Standard Roadway Drawings**

Roadway standard drawings are published by the Office of Roadway Engineering. They consist of Roadway Standard Construction Drawings (Roadway SCDs) and Roadway Plan Insert Sheets (PISs). On the DRRC website and the Office of Contract’s list, these drawings are currently listed under “Standard Drawings: Construction” or “Standard Construction Drawings.”

194-15 **Standard Pavement Construction Drawings**

Pavement Standard Construction Drawings (Pavement SCDs) are maintained by the Office of Pavement Engineering. These drawings cover Pavement Design Features (BP Series). On the DRRC website and the Office of Contract’s list, these drawings are currently listed under “Standard Drawings: Construction” or “Standard Construction Drawings.”

194-16 **Standard Hydraulic Construction Drawings**

Hydraulic Standard Construction Drawings (Hydraulic SCDs) are maintained by the Office of Hydraulic Engineering. These drawings cover Drainage Design Features. On the DRRC website and the Office of Contract’s list, these drawings are currently listed under “Standard Drawings: Construction” or “Standard Construction Drawings.”

194-17 **State Highway Access Management Manual**

The purpose of the State Highway Access Management Manual, published by the Office of Roadway Engineering, is to establish statewide uniform, equitable standards and procedures, prolong the service life of the state highway system, reduce public maintenance costs, promote orderly development, and maintain accessibility to adjacent land uses, and to accomplish all of this while preserving traffic mobility. The manual establishes access classes, uniform permit application procedures, variance and appeal procedures, and change of use conditions. It provides for monitoring access construction. The manual also encourages local jurisdictions to develop access control plans consistent with ODOT and/or local access policies. See Section 130-6 for additional information.
194-18 **Straight Line Diagrams (SLDs)**

A **Straight Line Diagram (SLD)** is a two dimensional graphic representation of the physical roadway characteristics of a highway as if it had no turns or curves. Mileage is based on the centerline of the roadway as measured from the western or southern county line or other true beginning. All routes on the Interstate, U. S. and State Route Systems are shown on these diagrams. The Office of Technical Services provides these diagrams on-line.

194-19 **Supplemental Specifications**

As noted in **Section 105-1**, Supplemental Specifications are part of ODOT’s construction and materials specifications. They are individual numbered documents describing the construction and material specifications for new items. These are available only on-line.

194-20 **Supplements**

As noted in **Section 105-1**, Supplements are part of ODOT’s construction and materials specifications. They provide necessary information such as laboratory methods of test, and certification or pre-qualification procedures for materials.
195 TRAFFIC ENGINEERING REFERENCE RESOURCES

195-1 General

Table 197-3 provides a consolidated list of ODOT traffic engineering publications. This Chapter provides brief descriptions of traffic engineering publications/reference resources from the Offices of Roadway Engineering and Traffic Operations that were not discussed in detail in the earlier Sections of TEM Part 1.

195-2 Guidelines for Traffic Control in Work Zones

This is a pocket-sized consolidation of information regarding temporary traffic control. The information is based on that in the Ohio Manual of Uniform Traffic Control Devices (OMUTCD), but some additional guidelines/handbook information is included. See Section 695-7 for additional information. This “pocket guide” may be viewed on-line. It may also be purchased from LTAP or the Office of Contracts. Districts should also contact the Office of Contracts for copies of this publication.

195-3 Quality Standards for Temporary Traffic Control Devices and Acceptable Delineation Methods for Vehicles

This document sets standards for acceptability of conditions of temporary traffic control devices and addresses delineation methods for vehicles. This guide may be viewed on-line or downloaded from the website. See Section 695-4 for further information.

195-4 Sign Designs and Markings Manual (SDMM)

Although published separately because of its size, the Sign Designs and Markings Manual (SDMM) has been incorporated into the TEM by reference, as Section 295-2. The SDMM contains standard Sign Designs, design guidelines and letter spacing information, for standard traffic control signs and major Guide Signs addressed in the OMUTCD and the TEM, as well as some additional signs that are not presently addressed in either of these manuals. The pavement marking alphabet and symbols are also provided. The SDMM is referenced in the OMUTCD and is used to assure uniformity in the design of standard traffic signs in Ohio. See Section 295-2 in Part 2 for further information about the SDMM. This manual is only available on-line.

195-5 Signal Design Reference Packet

The Signal Design Reference Packet (Section 495-2) is published by the Office of Traffic Operations. The purpose of this packet is to provide guidance on designing and reviewing traffic signal plans. The packet and design files are available on the Office of Traffic Operations website.

195-6 Temporary Traffic Control Manual (TTCM)

Parts 1 (General), 5 (Low-Volume Roads) and 6 (Temporary Traffic Control) of the OMUTCD have been reprinted in a separate Temporary Traffic Control Manual (TTCM) to provide a convenient size copy of this information. See Section 695-2 for further information. This manual can be viewed or downloaded on-line; however, it is also currently available in paper format and can be purchased by contacting the Office of Contracts.
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196 FORMS INDEX

196-1 ORE Publications Order Form

Form 196-1 may be used by a local jurisdiction or public agency to order Traffic publications. An electronic copy of this form is available on-line.
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Form 196-1. Traffic Publications Order Form

Date ______________________

TRAFFIC PUBLICATIONS ORDER FORM
FOR
LOCAL JURISDICTIONS AND PUBLIC AGENCIES

<table>
<thead>
<tr>
<th>Publication</th>
<th>Unit Cost</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012 Temporary Traffic Control Manual (TTCM) (Reprint of OMUTCD Parts 1, 5 and 6)</td>
<td>$12.00 *</td>
<td>________</td>
</tr>
<tr>
<td>2014 Guidelines for Traffic Control in Work Zones (Pocket Guide)</td>
<td>$2.50 *</td>
<td>________</td>
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</tbody>
</table>

(The publications may also be ordered directly from the Office of Contracts at 800-459-3778 or 614-466-3778.)

* Price per copy, plus shipping and handling based on quantities ordered.

Name: ____________________________________________________________________________

Title: ___________________________________________________________________________

Organization: _____________________________________________________________________

**Street Address __________________________________________________________________

City: ___________________________ State: _______ Zip Code: ______________

Telephone: ________________________________________________________________________

** If available, please provide street address, not a P.O. Box. Whenever possible we use UPS to ship our publications.

Please return the completed form by mail to:

Ohio Department of Transportation
Office of Contracts / Mail Stop 4110
1980 W. Broad St., 1st floor
Columbus, Ohio 43223
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197 TABLES INDEX

197-1 Resource Reference/Contact Information

As noted in Section 100-6, Table 197-1 provides contact information for various agencies and organizations (including ODOT), and other resource references that may be useful.

197-2 Ohio Counties and ODOT Districts

As noted in Section 100-5, Table 197-2 provides a list of the eighty-eight counties in Ohio with the three-letter designation used in ODOT records and cross-references to the related Districts.

197-3 Traffic Engineering Publications

As noted in Section 195-1, Table 197-3 presents a consolidated list of all ODOT traffic engineering publications. All the publications listed are available for viewing and downloading from the ORE and DRRC websites. Those that are also available in paper format are noted in the comments column of this table.

197-4 Reserved for Future Information
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Table 197-1. Resource Reference/Contact Information

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<tr>
<th>Resource Name / Mailing Address</th>
<th>Telephone / Fax / Web Address</th>
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<tr>
<td>ADA Accessibility Guidelines</td>
<td>Telephone: 202-272-0080</td>
</tr>
<tr>
<td></td>
<td>Toll Free: 800-872-2253</td>
</tr>
<tr>
<td></td>
<td>Fax: 202-272-0081</td>
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<tr>
<td></td>
<td>Website: <a href="http://www.access-board.gov">www.access-board.gov</a></td>
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<tr>
<td>American Association of State Highway and Transportation Officials (AASHTO)</td>
<td>Telephone: 202-624-5800</td>
</tr>
<tr>
<td></td>
<td>Fax: 202-624-5806</td>
</tr>
<tr>
<td></td>
<td>Website: <a href="http://www.transportation.org">www.transportation.org</a></td>
</tr>
<tr>
<td>American Traffic Safety Services Association (ATSSA)</td>
<td>Telephone: 540-368-1701</td>
</tr>
<tr>
<td></td>
<td>Toll Free 1-800-272-8772</td>
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<tr>
<td></td>
<td>Fax: 540-368-1717</td>
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<td></td>
<td>Website: <a href="http://www.atssa.com">www.atssa.com</a></td>
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<tr>
<td>American National Standards Institute (ANSI)</td>
<td>Telephone: 202-293-8020</td>
</tr>
<tr>
<td></td>
<td>General Inquiries: 212-642-4900</td>
</tr>
<tr>
<td></td>
<td>Fax: 202-293-9287</td>
</tr>
<tr>
<td></td>
<td>Website: <a href="http://www.ansi.org">www.ansi.org</a></td>
</tr>
<tr>
<td>Bureau of Transportation Statistics</td>
<td>Telephone: 800-853-1351</td>
</tr>
<tr>
<td></td>
<td>Main Fax: 202-366-3759</td>
</tr>
<tr>
<td></td>
<td>Website: <a href="http://www.bts.gov">www.bts.gov</a></td>
</tr>
<tr>
<td>U.S. Army Corps of Engineers, Great Lakes and Ohio River Division</td>
<td>Telephone: (513) 684-3010</td>
</tr>
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<td></td>
<td>Executive Fax: 513-684-2085</td>
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<tr>
<td></td>
<td>Website: <a href="http://www.lrd.usace.army.mil/">www.lrd.usace.army.mil</a></td>
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<tr>
<td>County Engineers Association of Ohio</td>
<td>Telephone: 614-221-0707</td>
</tr>
<tr>
<td></td>
<td>Fax: 614-221-5761</td>
</tr>
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<td></td>
<td>Website: <a href="http://www.ceao.org/">www.ceao.org</a></td>
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<tr>
<td>Design Reference Resource Center (ODOT)</td>
<td>Website: <a href="http://www.dot.state.oh.us/drrc/">www.dot.state.oh.us/drrc/</a></td>
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<td>Docket Management System (DMS)</td>
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<tr>
<td>Federal Emergency Management Administration (FEMA) Region V</td>
<td>Telephone: 312-408-5500</td>
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<td>Website: <a href="http://www.fema.gov/region-v-il-mi-mn-oh-wi">http://www.fema.gov/region-v-il-mi-mn-oh-wi</a></td>
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<tr>
<td>Federal Highway Administration (FHWA)</td>
<td>Telephone: 202-366-0537 (Personnel locator)</td>
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<td></td>
<td>Website: <a href="http://www.fhwa.dot.gov">www.fhwa.dot.gov</a></td>
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<tr>
<td>Federal Highway Administration (FHWA)</td>
<td>Telephone: 614-280-6896</td>
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<tr>
<td></td>
<td>Fax: 614-280-6876</td>
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<td>Website: <a href="http://www.fhwa.dot.gov/ohdiv/">http://www.fhwa.dot.gov/ohdiv/</a></td>
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<td><strong>FHWA - other websites:</strong></td>
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<td>➢ ITS Standards</td>
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<td>➢ MUTCD (includes links to Interim Approvals, Interpretations, etc.)</td>
<td><a href="http://mutcd">http://mutcd</a> fhwa dot gov/</td>
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<tr>
<td>➢ Roadside Hardware (includes NCHRP 350 information)</td>
<td><a href="http://safety">http://safety</a> fhwa dot gov/roadway_dept/policy_guide/road_hardware/</td>
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<td><strong>U.S. Government Printing Office</strong></td>
<td>Telephone: 202-512-0000</td>
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<td>732 North Capital St. NW</td>
<td>Website: <a href="http://www.gpo.gov/">http://www.gpo.gov/</a></td>
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<tr>
<td>Washington, DC 20401</td>
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<tr>
<td><strong>U.S. Government Online Bookstore</strong></td>
<td>Telephone: 212-248-5000</td>
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<td></td>
<td>Website: <a href="http://bookstore.gpo.gov/">http://bookstore.gpo.gov/</a></td>
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<td><strong>Illuminating Engineering Society of North America (IESNA)</strong></td>
<td>Telephone: 212-248-5017/8</td>
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<tr>
<td>120 Wall Street, Floor 17</td>
<td>Website: <a href="http://www.iesna.org/">http://www.iesna.org/</a></td>
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<tr>
<td>New York, NY 10005</td>
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<tr>
<td><strong>Institute of Transportation Engineers (ITE)</strong></td>
<td>Telephone: 222-289-0222</td>
</tr>
<tr>
<td>1099 14th St, SW, Suite 300 West</td>
<td>Fax: 202-289-7722</td>
</tr>
<tr>
<td>Washington, DC 20005-3438</td>
<td>Website: <a href="http://www.ite.org/">http://www.ite.org/</a></td>
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<td><strong>ITS Architecture, National</strong></td>
<td>Website: <a href="http://itsarch.iteris.com/itsarch/">http://itsarch.iteris.com/itsarch/</a></td>
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<td><strong>McTrans</strong></td>
<td>Telephone: 352-392-0378</td>
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<td>Center for Microcomputers in Transportation</td>
<td>Toll Free: 1-800-226-1013</td>
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<td>University of Florida</td>
<td>Fax: 352-392-6629</td>
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<td>P.O. Box 116585</td>
<td>Website: <a href="http://www.mctrans.ce.ufl.edu">www.mctrans.ce.ufl.edu</a></td>
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<td><strong>Metropolitan Planning Organizations (MPOs)</strong></td>
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<td><strong>National Highway Institute</strong></td>
<td>Telephone: 1-877-558-6873</td>
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<tr>
<td>Arlington Center Building</td>
<td>Fax: 703-235-0593</td>
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<tr>
<td>4600 North Fairfax Drive, Suite 800</td>
<td>Website: <a href="http://www.nhi.fhwa.dot.gov/Home.aspx">http://www.nhi.fhwa.dot.gov/Home.aspx</a></td>
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<tr>
<td>Arlington, VA 22203</td>
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<tr>
<td><strong>National Highway Traffic Safety Administration (NHTSA)</strong></td>
<td>Toll Free 1-888-327-4236</td>
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<tr>
<td>400 7th Street, SW</td>
<td>Website: <a href="http://www.nhtsa.gov/">http://www.nhtsa.gov/</a></td>
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<tr>
<td>Washington, DC, 20590</td>
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<td><strong>National Incident Management System (NIMS)</strong></td>
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<td><strong>National Transportation Safety Board</strong></td>
<td>Telephone: 202-314-6000</td>
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<td>490 L’Enfant Plaza, SW</td>
<td>Website: <a href="http://www.ntsb.gov/Pages/default.aspx">http://www.ntsb.gov/Pages/default.aspx</a></td>
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| **Ohio Contractors Association**                                     | Telephone: 614-488-0724 or 800-229-1388  
Fax: 614-488-0728  
Website: [http://www.ohiocontractors.org/](http://www.ohiocontractors.org/) |
| 1313 Dublin Road  
P.O. Box 909  
Columbus, OH 43216                                                 |                                                                                             |
| **Ohio Development Services Agency**                                 | Telephone: 800-848-1300  
Website: [http://development.ohio.gov/contact/contact_phoneadress.htm](http://development.ohio.gov/contact/contact_phoneadress.htm) |
| 77 S. High Street, 29th Floor  
Columbus, OH 43215                                                    |                                                                                             |
| **Ohio Department of Natural Resources (ODNR)**                     | Telephone: 614-265-6565  
Website: [http://ohiodnr.com/](http://ohiodnr.com/)                                      |
| 2045 Morse Road, Building D  
Columbus OH 43229                                                     |                                                                                             |
| **Ohio Department of Natural Resources Division of Natural Areas & Preserves** | Telephone: 614-265-6717  
FAX: 614-447-9503  
| 2045 Morse Rd., Bldg. B-floors 1 and 2  
Columbus, OH 43229-6693                                               |                                                                                             |
| **Ohio Department of Natural Resources Division of Wildlife**        | Telephone: 614-265-6300  
| 2045 Morse Rd, Building G  
Columbus OH 43229-6693                                                 |                                                                                             |
| **Ohio Department of Public Safety (ODPS)**                         | Telephone: 614-466-2550  
Fax: 614-752-8410  
Website: [www.publicsafety.ohio.gov/](http://www.publicsafety.ohio.gov/) |
| Charles D. Shipley Building  
1970 W. Broad Street  
P.O. Box 182081  
Columbus, OH 43218-2081                                              |                                                                                             |
| **Ohio Department of Public Safety Bureau of Motor Vehicles (BMV)** | Telephone: 614-752-7500  
Website: [http://bmv.ohio.gov/](http://bmv.ohio.gov/)                                        |
| 1970 W. Broad Street  
P.O. Box 16520  
Columbus, OH 43216-6520                                               |                                                                                             |
| **Ohio Department of Public Safety Ohio State Highway Patrol (OSHP)**| Website: [www.statepatrol.ohio.gov/](http://www.statepatrol.ohio.gov/)                      |
| 1970 W. Broad Street  
P.O. Box 182074  
Columbus, OH 43218-2074                                               |                                                                                             |
| **Ohio Department of Transportation (ODOT)**                        | Telephone: 614-466-7170  
Fax: 614-644-8662  
Website: [www.dot.state.oh.us/pages/home.aspx](http://www.dot.state.oh.us/pages/home.aspx) |
| 1980 W. Broad Street  
P.O. Box 899  
Columbus, OH 43216-0899                                               |                                                                                             |
| **Ohio Environmental Protection Agency (OEPS)**                     | Telephone: 614-644-3020  
Website: [www.epa.ohio.gov/](http://www.epa.ohio.gov/)                                |
| 50 West Town Street, Suite 700  
P.O. Box 1049  
Columbus, OH 43215                                                    |                                                                                             |
| **ODOT Office of Traffic Operations (OTO)**                         | Telephone: 614-466-3601  
Fax: 614-466-8199  
Website: [www.dot.state.oh.us/Divisions/Operations/Traffic/](http://www.dot.state.oh.us/Divisions/Operations/Traffic/) |
| 1980 W. Broad Street – Mailstop 5160  
P.O. Box 899  
Columbus, OH 43216-0899                                               |                                                                                             |
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<td><strong>Ohio Historical Society</strong></td>
<td>Telephone: 614-297-2300</td>
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<tr>
<td>1982 Velma Avenue</td>
<td>Web site: <a href="http://www.ohiohistory.org/">http://www.ohiohistory.org/</a></td>
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<td>Columbus, OH 43211</td>
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<td><strong>Ohio General Assembly</strong></td>
<td>Web site: <a href="https://www.legislature.ohio.gov/">https://www.legislature.ohio.gov/</a></td>
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<tr>
<td><strong>Ohio Local Technical Assistance Program (LTAP) Center</strong></td>
<td>Telephone: 614-387-7359</td>
</tr>
<tr>
<td>1980 W. Broad Street, 2nd Floor</td>
<td>Toll Free 877-800-0031</td>
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<td>P.O. Box 899</td>
<td>Fax: 614-466-2120</td>
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<td>Columbus, OH 43216-0899</td>
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<td><strong>The Ohio Turnpike Commission</strong></td>
<td>Telephone: 440-234-2081</td>
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<tr>
<td>682 Prospect Street</td>
<td>Website: <a href="http://www.ohioturnpike.org/">http://www.ohioturnpike.org/</a></td>
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<td>Berea, OH 44017</td>
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<td><strong>PC Trans</strong></td>
<td>Telephone: 785-864-5658</td>
</tr>
<tr>
<td>KU Transportation Center</td>
<td>Fax: 785-864-3199</td>
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<tr>
<td>Room 2011 Learned Hall</td>
<td>Website: <a href="http://www.kutc.ku.edu/cgiwrap/kutc/pctrans/index.php">http://www.kutc.ku.edu/cgiwrap/kutc/pctrans/index.php</a></td>
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<td>1530 W 15th Street</td>
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<tr>
<td>Lawrence, KS 66045</td>
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<td><strong>Public Utilities Commission of Ohio (PUCO)</strong></td>
<td>Telephone: 614-466-3292</td>
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<td>180 E. Broad Street</td>
<td>Toll Free (Ohio) 1-800-686-7826</td>
</tr>
<tr>
<td>Columbus, OH 43215-3793</td>
<td>Fax: 614-752-8351</td>
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<td><strong>State Agencies</strong></td>
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<td><strong>State Cities, Townships &amp; Counties</strong></td>
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<td><strong>Keck Center of the National Academies Transportation Research Board</strong></td>
<td>Telephone: 202-334-2934</td>
</tr>
<tr>
<td>500 Fifth Street, NW</td>
<td>Fax: 202-334-2003</td>
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<td>Washington DC 20001</td>
<td>Website: <a href="http://www.trb.org/Main/Home.aspx">http://www.trb.org/Main/Home.aspx</a></td>
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<tr>
<td><strong>U.S. Department of Transportation</strong></td>
<td>Telephone: 202-366-4000</td>
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<td>400 7th Street, SW</td>
<td>Website: <a href="http://www.dot.gov/">http://www.dot.gov/</a></td>
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<tr>
<td>Washington, DC 20590</td>
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### Table 197-3. Traffic Engineering Publications

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<tr>
<th>Publication Name</th>
<th>Audience</th>
<th>Comments</th>
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<tr>
<td>Ohio Manual of Uniform Traffic Control Devices (OMUTCD), 2012 Edition</td>
<td>State, county officials and other local jurisdictions, contractors, consultants, utilities, public</td>
<td>Available on-line from the DRRC and ORE websites; paper copies are available from the Office of Contracts. *</td>
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<tr>
<td>Guidelines for Traffic Control in Work Zones (pocket guide)</td>
<td>State, county officials and other local jurisdictions, contractors, utilities</td>
<td>Available on-line from the ORE and LTAP websites, and in paper format by contacting LTAP or the Office of Contracts. *</td>
</tr>
<tr>
<td>Plan Insert Sheets (PISs) - Traffic</td>
<td>State, county officials and other local jurisdictions, contractors</td>
<td>Available on-line from the DRRC and ORE websites.</td>
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<tr>
<td>Quality Standards for Temporary Traffic Control Devices and Acceptable Delineation Methods for Vehicles</td>
<td>State, county officials, and other local jurisdictions, contractors</td>
<td>Available on-line from the DRRC and ORE websites.</td>
</tr>
<tr>
<td>Sign Designs and Markings Manual (SDMM) – TEM Section 295-2</td>
<td>State, county officials and other local jurisdictions, contractors, consultants</td>
<td>Available on-line from the DRRC and ORE websites. (Maintained by the Office of Traffic Operations; published on-line by the Office of Roadway.)</td>
</tr>
<tr>
<td>Standard Construction Drawings (SCDs) - Traffic</td>
<td>State, county officials and other local jurisdictions, contractors, consultants</td>
<td>Available on-line from the DRRC and ORE websites; paper copies are available from the Office of Contracts. *</td>
</tr>
<tr>
<td>Temporary Traffic Control Manual (TTCM), 2012 Edition (Reprint of Parts 1, 5 and 6 of the OMUTCD.)</td>
<td>State, county officials and other local jurisdictions, contractors, consultants, utilities, public</td>
<td>Available on-line from the DRRC and ORE websites; paper copies are available from the Office of Contracts. *</td>
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* See Table 197-4 for pricing information.
Table 197-4. Reserved for Future Information
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198 FIGURES INDEX

198-1 ODOT Table of Organization

*Figure 198-1* is a reproduction of the overall Table of Organization for ODOT that is posted on the ODOT website.

198-2 ODOT Districts - Locations and Addresses

*Figure 198-2* presents a map of Ohio showing the ODOT Districts and contact information (addresses and phone numbers) for each of them.

198-3 Alternative Purchasing Program for Local Agencies

*Figure 198-3* presents a chart which visually depicts the process described in detail in Section 120-6.

198-4 Administering Local Government Agency / Utility Force Account Work

*Figure 198-4* presents a chart which visually depicts the process described in detail in Section 150-3.

198-5 Sample Letter Requesting Alternate Bids

*Figure 198-5* shows a sample letter from local authorities requesting alternate bids as referenced in Section 120-7.2.

198-6 Sample Letter Stating Local Decision on Alternate Bids

*Figure 198-6* shows a sample letter of acceptance or rejection by local authorities of the alternate bids as referenced in Section 120-7.3.
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Figure 198-1. ODOT Table of Organization
Figure 198-2. ODOT District Locations and Addresses
Figure 198-3. Alternative Purchasing Program for Local Agencies

(Page 1 of 3)
Figure 198-4. Local Government Agency / Utility Force Account Work

1. Submission made to the District
2. Evaluate
3. Draft Agreement and Send to Agency for Signature
4. Send to Project Coordination for Director's Signature and Encumbrance Number
5. Return copy of Executed Agreement and Formal Approval to Local Agency or Utility.
6. Work Performed
7. Billings Submitted to District.
8. Reviewed by District.
9. Submit to Business & Human Services Administrator for Payment.
Figure 198-5. Sample Letter/Email Requesting Alternate Bids

Date: ___________

District Planning and Engineering Administrator
Ohio Department of Transportation
Street
City

Re: County – Route – Section

Dear ________________:

We request that alternate bids be incorporated into the subject plan for the following item(s):

1.
2.

This item(s) will be used at the following locations:

1.
2.

We further request that the alternate bids describe the following brand and model of equipment:

1.
2.

We make this request because…

At such time as bids have been taken, please contact (phone _____________; email _____________) to advise us of the comparative prices. We understand that our decision concerning acceptance or rejection of the alternates must be made quickly and reported by telephone/email. We also understand that our letter confirming this decision and agreeing to pay any extra costs must be in your hands within 10 calendar days following opening of bids.

Signed
Figure 198-6. Sample Letter/Email Stating Local Decision on Alternate Bids

Date: ____________

District Planning and Engineering Administrator
Ohio Department of Transportation
Street
City

Re: County – Route – Section
Project ________
Alternate Bids

Dear _______________

We have been advised, by a telephone call/email from _______________ of your office, of the bid price received for the alternate items on this project.

This letter/email confirms our recent (telephone) conversation concerning disposition of those alternate bids.

We request that the award be based upon the alternate (Brand Name) bids for reference items _____-A, _____-A….,-A. We understand that this will increase our financial obligation to the project by $_______ and agree to pay this when invoiced.

OR

We request that the award be based upon the generic bids for reference items ____, ____, … and ____. This decision will not increase our project financial obligation.

Signed