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Part 2 - SIGNS

200 GENERAL

200-1 Introduction

The information provided in this chapter is intended to supplement the **OMUTCD Part 2** by presenting **ODOT** policies, standards, guidelines, practices and procedures concerning the design, construction, operations and maintenance of various types of traffic control signing.

After some general discussion of the overall subject of signing in ***Section 200***, this part of the **TEM** is organized to generally address the various types of signs (i.e., Regulatory, Warning and Guide Signs) separately. Given the range of signs covered under the general heading of Guide Signs, that category has also been subdivided further, with separate sections on Route Markers, Conventional Road Destination and Distance Signs, General Information Signs, Motorist Services Signs, Rest Area Signs, and Freeway and Expressway Destination and Distance Signs. A general Miscellaneous Signs section has also been provided. Separate sections have been provided for information specifically related to guidelines and design, construction and maintenance information related to sign designing, sign lighting, sign materials and sign supports.

The **OMUTCD** provides general information on the design of traffic control signs, including the basic concepts of shape and color. It also provides specific information on the application of standard signs. Information on the location of signs, including height, lateral offset, and longitudinal placement, is included as well.

Since the **OMUTCD** applies to jurisdictions statewide, some of the requirements contained therein are general rather than specific in nature. This allows the respective jurisdictions, where appropriate, to develop their own standards and policies within the framework of the **OMUTCD**. For example, **OMUTCD Section 2A.08** requires that traffic control signs be reflectorized to show the same shape and color both by day and night, but does not indicate how this reflectorization is to be accomplished. As noted in ***Section 220-6***, Type G reflective sheeting, commonly referred to as high intensity, shall be used for all permanent traffic control signs on **ODOT**-maintained highways. Other jurisdictions may elect to use different reflective materials for their traffic control signs.

200-2 Construction Projects

Section 140 addresses the general application of **ODOT** standards, specifications and standard construction drawings to construction projects and ***Section 250*** provides additional construction related information specific to traffic control signs.

200-3 Force Account (ODOT Operations) Work

Districts performing force account signing work must comply with the requirements in the **OMUTCD** and this Manual. It is recommended that the **Districts** follow the provisions in the applicable signing related **SCDs** and **CMS** sections as well.

It should be recognized, however, that the information in the **CMS** and **SCDs** does not necessarily provide the only method to achieve a given objective. For instance, **SCD TC-41.20** provides details on the use of yielding posts that are typically used for flat sheet signs. If a **District** instead wanted to use a breakaway support, this departure from common practice would be acceptable provided the support system met breakaway requirements, was installed accordingly, and had sufficient capacity to support the sign load.

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201 REGULATORY SIGNS

201-1 General

Regulatory Signs are covered in **OMUTCD Chapter 2B.**. As noted in **OMUTCD Section 2B.51**, there may be circumstances where a jurisdiction determines that signing is needed, but related signing is not addressed in the current **OMUTCD** text. In this situation, the jurisdiction may develop the needed signing, as long as the design conforms to the **OMUTCD** standards.

The following sections address Regulatory Signs not in the **OMUTCD,** or provide additional information about the intended use of signs that do appear in the **OMUTCD**. ***Figure 298-4a*** illustrates Regulatory Signs discussed in this chapter which are not shown in the **OMUTCD**.

201-2 Prohibition of U-Turns at Median Crossovers

ORC Sections 4511.35 and 4511.37 permit indiscriminate use of median openings for the purpose of making U-turns. Experience has shown this to be an unsafe practice on high speed, limited access divided highways. It has been determined that U-turns may be prohibited at median openings on divided highways by authority granted under **ORC Section 4511.10**.

When a median opening is restricted to emergency or authorized vehicles only, the standard treatment consists of erecting the U-Turn Prohibition sign (R3-4) and the EMERGENCY AND AUTHORIZED VEHICLES ONLY sign (R3-H4a) as shown in ***Figure 298-1 (*****See also OMUTCD Section 2B.17)*****.** This standard treatment should be used at all median crossovers on the Interstate system and at median crossovers on other divided highways where the **District Deputy Director** has determined that a median opening should be restricted to emergency and authorized use only.

201-3 STOP Signs

The STOP sign (R-1) is one of the most important devices used to control traffic at intersections. Its purpose is to assign the right-of-way to drivers of vehicles so that they may proceed through an intersection in an orderly and safe manner. The use of STOP signs at highway-rail grade crossings is addressed in ***Section 801-2.***

STOP signs are used upon the approaches to through roadways so that a driver may proceed along the highway for a considerable distance and be given the right-of-way at succeeding intersections. The principles contained herein should be used in determining which highway approach or approaches to an intersection should have STOP sign control. **OMUTCD Sections 2B.04 and 2B.05** provide additional information on the use of STOP signs.

ORC Section 4511.41 defines the “Right Hand Rule” regarding the right-of-way at an intersection, **Section 4511.43** defines the obedience required to a STOP sign, and **Section 4511.65** defines the right-of-way at through highways.

Normally, the selection of the highway approach to be stopped should be made in accordance with the functional class of the highway. The classification of the various types of highways in order of priority for assignment of right-of-way is as follows: (1) Interstate, (2) Freeway, (3) Expressway, (4) Principal Arterial, (5) Minor Arterial, (6) Major Collector, (7) Minor Collector, and (8) Local Street or Road.

The highway with the lower functional class should normally be stopped. Generally, a lower-volume highway should be stopped for a higher-volume highway where the intersecting highways have the same functional classification.

The preceding principles may be modified when any of the following conditions exist at an intersection:

1. A higher class route approach may be stopped for a lower class route when the traffic volume on the lower class route is at least 25 percent greater than the traffic on the higher class route, or when unusual intersection geometrics exist.

2. The selection of the highway approaches to be stopped should include consideration of conflicting uncontrolled travel paths. For example, drivers who are making a left turn usually recognize that they are required by law to yield to oncoming traffic on the same roadway. But there are instances, such as where a State Route turns, where the drivers on the State Route may not expect to yield to a vehicle on an adjacent approach ***(see Figure 298-2(A), (B) and (C))***.

   In the case illustrated in ***Figure 298-2(A)***, STOP signs should normally be placed on the State Route approach with the lower volume and the opposing County Road. In all cases, STOP signs (and YIELD signs where applicable) shall be placed so there are no conflicting movements which have the right-of-way.

   A driver approaching a Y-type intersection may not recognize that he will be executing a left-turn movement across the path of oncoming traffic ***(see Figure 298-2(C))***. Whenever this condition exists, the selection of the highway approaches to be stopped shall be made so as to eliminate this conflict.

3. The location and type of traffic control at intersections upstream or downstream may influence the selection of STOP sign controlled approaches. For example, if drivers on a highway have the right-of-way at successive major intersections for a considerable distance it may be desirable to give them the right-of-way at the subject intersection rather than create an unexpected stop.

STOP signs shall not be used at intersections with traffic control signals.

STOP signs shall be used in conjunction with the flashing red indication of intersection control beacons.

At an intersection the higher classification street or highway should be used to determine the size of the STOP sign to be erected at that intersection. STOP signs on freeway ramps should be the 48 inch (1200 mm) size.

A STOP sign shall be erected at the point where the vehicle is to stop or as near thereto as possible, and may be supplemented with a Stop Line and the word STOP on the pavement, as shown in the **OMUTCD figure 2A-2.** In no case shall the sign be placed farther than 50 feet (15 m) from the intersected roadway. Where there is a marked or unmarked crosswalk, the sign should be erected approximately 4 feet (1.2 m) in advance of the crosswalk edge nearest to approaching traffic.

201-4 <u>No Turn on Red Signing</u>

ORC Section 4511.13 indicates that unless a sign prohibiting such action is in place: vehicular traffic, after stopping, may cautiously make a right turn on a steady red signal unless such turn is prohibited; and that vehicular traffic, after stopping, may cautiously make a left turn on a steady red signal from a one-way street to a one-way street on which traffic moves to the left unless such turn is prohibited. It also authorizes local authorities by ordinance, or the **Director of Transportation** on state highways, to “prohibit a right or a left turn against a steady red signal at any intersection, which shall be effective when signs giving notice thereof are posted at the intersection.”

The **District** or any maintaining agency may prohibit or restrict turns against a steady red signal. The following factors should be considered in making the determination:

1. Sight distance from the stop position to approaching traffic is less than adequate for the right or left-turning driver to observe safe gaps.

2. Geometrics of the intersection are such that the path of the right or left-turning vehicle crosses rather than merges with the path of the vehicle which has a green indication.

3. Right or left-turning vehicles conflict with other traffic which has been given a green arrow indication.

4. Right or left-turning vehicles create a storage or capacity problem on the street onto which they are turning.

5. Right or left-turns are permitted from two or more lanes on an approach. (Consideration can be given to restricting turns against a steady red signal to the curb lane only.)

6. An intersection has five or more approaches.

7. An intersection is used by a substantial number of school children, elderly persons or other pedestrians where right or left-turning vehicles would be a hazard to the pedestrians.

8. An intersection is near a railroad grade crossing.

9. Other hazards or conflicts.

The **District** or maintaining agency should document reasons where turns against a steady red signal are prohibited.

201-5 Safety Belt Signing (R16-H2, R16-H1)

Safety belt signing is intended to remind motorists of the mandatory safety belt law, and to encourage safety belt use. There are two Regulatory Signs (R16-H2 and R16-H1) approved for this purpose. The symbol R16-H1 is described in **OMUTCD Section 2B.51**. The R16-H2 word message sign and the R16-1 symbolic sign may be used interchangeably.

A sign should be used in rest areas at a point where traffic leaves the rest area to re-enter the highway. For freeway rest areas, the suggested location is at the first part of the freeway entrance ramp in a conspicuous location that does not interfere with other signs. For rest areas on other routes, the sign should be located in a conspicuous location that does not obstruct sight distance.

A sign should be erected near the state line for traffic entering **Ohio**. It should be erected on all **ODOT**-maintained highways, unless a suitable location cannot be found, or the route is minor in nature with insignificant traffic volumes. Where the state line location falls within a municipality, arrangements should be made with the municipality for erection of a sign.

A sign should also be erected on selected highways outside municipalities for traffic leaving the municipality. To limit the number of signs to a reasonable amount, consideration should be given to traffic volumes, the distance between municipalities, and the number of signs on a particular route.

The red, white and blue N-84 information sign, which includes the message BUCKLE UP! IT'S OUR LAW and a symbol of two hands and a seat belt, had been used in locations off the mainline,

principally in rest areas. Its use has been discontinued since a standard national symbol has now been established. Existing N-84 installations can remain in place until they have reached the end of their service life, at which time they should be replaced with an R16-H2 or R16-H1 sign.

R16-H2

R16-H1

201-6 Reserved for Future information

This section is reserved for future information.

201-7 Signing for Engine Brake Restrictions (R16-H4, R16-H5, R16-H13, R16-H14)

An engine brake is a device used on vehicles, principally large trucks, that changes the timing of the exhaust valves to slow the vehicle. The engine brake is used instead of, or in addition to, the friction brakes and produces an audible “popping” noise that is sometimes perceived as objectionable.

The slang term “Jake Brake” is sometimes used to refer to engine brakes in general. However, this term is a registered trademark of **Jacobs Vehicle Systems**, a major manufacturer of engine brakes. Since this term actually refers to all of **Jacobs Vehicle Systems** retarding products and is brand specific, it should not be construed as being equivalent to “engine brake,” and should not be used on highway signing.

The **Ohio Office of the Attorney General** has determined that, pursuant to **ORC Sections 505.17(A) and 4513.221(E)(4)**, a **Board of County Commissioners** or **Township Trustees** may enact a regulation prohibiting the use of engine brakes on vehicles within the unincorporated area of the **County** or **Township**. This includes **ODOT**-maintained highways within the boundary of the **County** or **Township**, as well as **County** and **Township** Roads.

Section 4917 of the United States Code is part of the **Noise Control Act of 1972**, and sets maximum noise emissions for motor carriers engaged in interstate commerce. According to an opinion issued by the **Ohio Office of the Attorney General**, local regulations restricting the use of engine brakes to control noise for motor carriers engaged in interstate commerce “may be inconsistent with federal law, and thus preempted and unenforceable.” For this reason **ODOT** will not install NO ENGINE BRAKE signs (R16-H4) on the mainline and ramps of Interstate Routes.

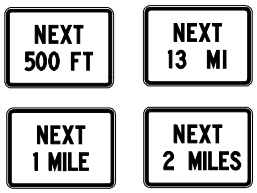
The NO ENGINE BRAKE sign (R16-H4) shall be used where the use of engine brakes has been restricted by the proper resolution per the **ORC**. The R16-H13 and R16-H14 auxiliary plates may be used to indicate specifics regarding when or where the restriction applies, and may be combined with the R16-H4 sign on a single panel. Sample legends for these plates are “6 PM - 6 AM” for the R16-H13 and “NEXT ½ MILE” or “NEXT 500 FT” for the R16-H14. The END ENGINE BRAKE RESTRICTION sign (R16-H5) may be used to indicate the terminus of the restriction.

For a **Township** restriction, typically only one NO ENGINE BRAKE sign (R16-H4) in each direction of travel within the **Township** should be installed on a state highway. More than one sign in each direction of travel may be needed for a countywide restriction, based on the length of the route with the **County**. The signs should be placed at strategic locations where the use of engine brakes has been a problem, such as at the beginning a downgrade or approach to an intersection. Alternately,

signs may be placed near where the state highway enters the **County** or **Township** or where a state highway begins within a **County** or **Township**. Overuse of signing should be avoided.

When a **County** or **Township** has passed a resolution restricting the use of engine brakes pursuant or **ORC Sections 505.17(A) and 4513.221(E)(4)**, **ODOT** will install signs on the rural state highway system indicating such a restriction. The **County** or **Township** is responsible for furnishing all signs to **ODOT**. The signs shall be fabricated in accordance with **ODOT** design standards and material specifications. **ODOT** will supply the sign supports and necessary hardware.

R16-H13



R16-H14

R16-H4

R16-H5

Type	Code No.	Size Inches (millimeters)
Standard and Major Std.	R16-H4, R16-H5	24 x 30 (600 x 750)
	R16-H13	24 x 8 (600 x 200)
	R16-H14	24 x 18 (600 x 450)
Expressway	R16-H4, R16-H5	36 x 48 (900 x 1200)
	R16-H13	36 x 12 (900 x 300)
	R16-H14	36 x 24 (900 x 600)
Freeway	R16-H4, R16-H5	48 x 60 (1200 x 1500)
	R16-H13	48 x 16 (1200 x 400)
	R16-H14	48 x 30 (1200 x 750)

201-8 MOVE OVER or SLOW DOWN Signs (R16-H15)

R16-H15 signs were installed at 75 locations on **ODOT**-maintained highways in 2000. These signs were installed at the request of the **Ohio State Highway Patrol (OSHP)** to publicize the provisions in **House Bill 86** which enacted **ORC Section 4511.213**. This bill provides that a driver approaching a stationary public safety vehicle displaying its emergency flashers must move over or slow down. The legend on the R16-H15 sign is STATE LAW / MOVE OVER OR SLOW DOWN FOR STOPPED LAW ENFORCEMENT AND PUBLIC SAFETY VEHICLES.

The **OSHP** provided funding for initial sign fabrication, and the **Districts** provided the materials and labor for installation. However, no funding has been provided by **OSHP** to cover fabrication costs of signs needed for maintenance replacements. The **Districts** should order and install replacement signs as needed using established procedures.

R16-15
120" x 60"
(3000 mm x 1500 mm)

201-9 Truck Restrictions in Municipal Corporations

A municipal corporation may restrict truck traffic on State or U.S. Routes through the municipal corporation only by regulating weight limits on the route, and only with the approval of the **Director of Transportation**.

A municipal corporation can regulate the use of its streets and can restrict the type of vehicles that travel over those streets pursuant to **ORC Section 4511.07**. However, **ORC Sections 4511.06 and 4513.33** restrict the use of that power for trucks traversing designated State or U.S. Routes. Thus, a municipal corporation may establish its own truck weight limits for streets and highways within its jurisdiction that differ from those established in **ORC Chapter 5577** and must post signs notifying the traveling public. However, when such weight limits involve an **ODOT**-maintained highway, **ORC 4513.33** requires the approval of the **Director** to alter them. Otherwise, the ordinance may conflict with **ORC Sections 4511.06 and 4513.33** and be found ineffective

201-10 Lane-Use Control Signs

OMUTCD Sections 2B.18 through 2B.21 address Lane-Use Control Signs and show some of them. However, there are many more of these signs that have been designed and assigned code numbers than could practically be shown in the **OMUTCD**. For reference purposes, ***Table 297-1*** provides a listing of them with their standard sizes and ***Figure 298-22*** provides an illustration of them.

201-11 YIELD Signs (R1-2)

OMUTCD Sections 2B.08, 2B.09 and 2B.10 discuss YIELD Signs.

A YIELD sign shall be erected at the point where the vehicle is to stop if necessary to yield the right-of-way. In no case shall the sign be placed further than 50 feet (15 meters) from the intersected roadway. Where there is a marked or unmarked crosswalk, the sign should be erected approximately 4 feet (1.2 meters) in advance of the crosswalk edge nearest to approaching traffic. See **OMUTCD Figure 2A-2.**

201-12 DO NOT ENTER Signs (R5-1)

OMUTCD Section 2B.29 discusses the DO NOT ENTER Sign.

When DO NOT ENTER and STOP signs are mounted Back-to-back in an intersection, the R5-1-30 shall not be used with a STOP sign smaller than the R1-1-36, and only the R1-1-48 shall be used with the R5-1-36.

201-13 KEEP RIGHT (LEFT) Signs (R4-7. R4-8)

OMUTCD Section 2B.28 discusses KEEP RIGHT (LEFT) Signs.

On a median, the KEEP RIGHT (LEFT) sign should be mounted not more than 50 feet (15 meters) beyond the approach end of the island. To facilitate guidance of left-turning traffic entering from a cross street, the KEEP RIGHT (LEFT) sign may be erected at an angle of up to 45 degrees with the cross street.

Intentionally blank.

202 WARNING SIGNS

202-1 General

Warning Signs are addressed in **OMUTCD Chapter 2C**. As noted in **OMUTCD Section 2C.02**, there may be circumstances where a jurisdiction determines that signing is needed, but related signing is not addressed in the current **OMUTCD** text. In this situation, the jurisdiction may develop the needed signing, as long as the design conforms to the **OMUTCD** standards.

The following sections address Warning Signs not in the **OMUTCD**, or provide additional information about the intended use of signs that do appear in the **OMUTCD**. ***Figures 298-4a and 4b*** illustrates Warning Signs discussed in this chapter which are not shown in the **OMUTCD**.

202-2 Children at Play Signs

Signs intended to alert drivers that children may be present in an area, such as CHILDREN AT PLAY or WATCH FOR CHILDREN, have not been shown to have a discernable benefit to traffic safety but still remain popular with the public. No factual evidence has been presented to document the success of this type of signing in reducing pedestrian accidents, operating speeds or legal liability. Studies have shown that many types of signs attempting to warn of normal conditions in residential areas, or conditions that are not always present, have failed to achieve the desired safety benefits.

Children should not be encouraged to play in the roadway. If signs encourage parents and children to believe they have an added degree of protection, which the signs do not and cannot provide, this can result in a disservice. This type of signing has long been rejected since it is a direct and open suggestion that this behavior is acceptable.

For these reasons, **ODOT** does not provide CHILDREN AT PLAY or similar signing. This type of signing is not recommended for use on any roadway at any time.

202-3 HIDDEN DRIVE Signs

The use of this sign was discontinued on **ODOT**-maintained highways in 1970 when traffic observations and experience disclosed that drivers on the through roadway were ignoring the sign message. The signs had little or no effect in alerting drivers or in reducing their speed.

The erection of HIDDEN DRIVE signs could create a false sense of security for the driveway user. The driveway traffic should be fully aware of the hazard of entering the through roadway, and should not be misled into thinking that the through traffic will be prepared to yield or stop.

For these reasons, **ODOT** does not provide HIDDEN DRIVE or similar signing.

202-4 No Reentry Signing (W13-H7, W13-H8)

Some freeway and expressway interchanges have been built as “half-diamonds,” with the exit and same direction entrance ramps several miles apart. Since this is not the usual situation it is not expected by drivers. Although trailblazing to the entrance ramp may be provided, the lack of direct reentry can be confusing and irritating and some through drivers would choose not to exit at such an interchange if they were given advance warning.

The black on yellow NO REENTRY _____BOUND sign (W13-H7) has been developed for this situation. When this interchange configuration creates a problem on **ODOT**-maintained freeways and expressways, this sign should be mounted as a supplemental panel with one or more of the Guide

Signs for the exit. For signs less than the 12 feet in width, the two-line sign (W13-H8) is available. The sign width of the W13-H7 or W13-H8 may be increased to match the width of the Guide Sign.

W13-H7

W13-H8

202-5 Narrow and One-Lane Bridges

On **ODOT**-maintained highways, narrow bridges shall be identified using the NARROW BRIDGE sign (W5-2 or W5-2a) in accordance with **OMUTCD Section 2C.14**, and the ONE LANE BRIDGE sign (W5-3) shall be used at one-lane bridges in accordance with **OMUTCD Section 2C.15**.

A NO PASSING ZONE sign (W14-3) shall be erected in accordance with **OMUTCD Section 2C.32**; however, the W14-3 sign shall only be used where the No-Passing Zone and the narrow or one-lane bridge treatment begin at the same location.

Figure 398-3 illustrates the signing and markings guidelines for narrow and one-lane bridges. Additional information is also provided in ***Sections 302-6, 303-2 and 304-5***.

202-6 Amish Buggy Signing where Paved Shoulder Narrows (W11-H14a, W5-H6p)

In order to accommodate buggy traffic, paved shoulders are being provided along some **ODOT**-maintained highways in the vicinity of Amish communities. This allows the slow moving buggies to operate on the shoulder instead of the roadway.

A potential conflict exists where a paved shoulder ends, and buggies enter the roadway. Motorists seeing a buggy ahead who have become accustomed to them being on the shoulder may not be expecting to encounter a buggy on the roadway. As shown in ***Figure 298-7***, Warning Signs may be used to inform drivers that the shoulder is narrowing and to be prepared for buggies on the roadway ahead.

W11-H14a

Code No.	Size Inch (mm)
W11-H14a	36" x 36" (900 x 900)
W5-H6p	24" x 18" (600 x 450)

W5-H6p

202-7 Low Clearance Signs

OMUTCD Section 2C.20 discusses Low Clearance Signs.

The low Clearance Sign (W12-2), indicating low overhead clearance at bridges, underpasses and

other overhead structures, shall be used at all points where clearance is 13 feet- 6 inches (4.1 meters) or less.

The Center Clearance Sign (W12-2p) is intended to show the vertical clearance measured to the bottom of a chord (lane width) not less than 10 feet (3.0 meters) in length projected across the structure opening. Where the 10 foot (3.0 meter) chord (center) clearance of an overhead structure is 13 feet - 6 inches (4.1 meters) or less, the vertical clearance shall be clearly marked on the structure itself using the Center Clearance sign. It should also be used where the 10 foot (3.0 meter) chord (center) clearance is more than 13 feet - 6 inches (3.0 meters) but less than 14 feet - 6 inches (4.4 meters). When used, the Center Clearance sign should be centered over the approach lane(s) with the low vertical clearance.

The Side Clearance Sign (W12-H3) is intended to show the height clearance directly above the face of the side rail or curb. For a structure under which the clearance varies greatly, this sign shall be used on the structure where the vertical clearance at the side of the variable height opening is 13 feet - 6 inches (4.1 meters) or less. Side Clearance signs should be used as necessary on variable clearance structures where the side clearance is more than 13 feet - 6 inches (4.1 meters) but less than 14 feet - 6 inches (4.4 meters). If Side Clearance Signs are used on a structure, the Center Clearance Sign shall also be used even if the center clearance is more than 13 feet - 6 inches (4.1 meters).

If the side clearance is 13 feet - 6 inches (4.1 meters) or less, but the 10 foot (3.0 meter) chord (center) clearance is more than 13 feet - 6 inches (4.1 meters), the W12-H3 shall be used but the W12-2 is optional.

The W12-2p and the W12-W12-2 should display the same clearance height.

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203 GUIDE SIGNS

203-1 General

Guide Signs are addressed in **OMUTCD Chapters 2D and 2E**. Additional guidance related to these signs is provided in ***Sections 204 through 209***. Various Guide Signs discussed in this Manual which are not shown in the **OMUTCD** are illustrated in ***Figures 298, 5a - 5d, and 6a - 6c***.

203-2 Minor Intersections

OMUTCD Section 2E.48 allows for reduced signing at minor interchanges. However, there are no minor interchanges on the ODOT- maintained highway system.

204 ROUTE MARKER SIGNS

204-1 General

The following sections address Route Marker signs not in **OMUTCD Section 2D.11**, or provide additional information about the intended use of signs that do appear in the **OMUTCD**. ***Figure 298-5a*** illustrates Route Marker signs discussed in this section which are not shown in the **OMUTCD**.

204-2 Ohio Byway Signing (M8-H3, M8-H3p)

The Ohio Byway program is administered by the **Office of Local Assistance**. A route must be approved by **ODOT** as an Ohio Byway before signs can be installed.

Ohio Byways are not limited to **ODOT**-maintained highways, and may follow **County**, **Township** and municipal roads as well. **ODOT** is responsible for installing and maintaining Ohio Byway signs and auxiliary markers on **ODOT**-maintained highways, including state route extensions within municipalities. To assure uniformity of appearance, **ODOT** will provide signs to the local authority for use on local roads. The local authority is responsible for installing and maintaining the signs on local roads.

The Ohio Byway sign (M8-H3) is considered a Route Marker. Auxiliary markers used with the Ohio Byway sign shall have a white legend on a green background (e.g., M5-1, M6-1).

The Ohio Byway sign should be installed as a Route Marker in accordance with **OMUTCD** standards **(OMUTCD Sections 2D.27 through 2D.32)**. Signs should be installed in both directions along an established route. A sign should be installed at the beginning of the route. A sign and directional arrow should be placed before each turn in the route and at each intersection where the route turns or changes direction. A sign should also be installed after each turn to confirm the routing. Additional signs should be installed at 5 to 10 mile (8 to 15 kilometer) intervals and at other key locations along the route. Signs may also be placed on major intersecting highways informing of the junction with the Ohio Byway route as appropriate. An Ohio Byway sign with an END auxiliary marker (M4-6) should be installed at the end of the route. The Ohio Byway sign may be installed in an assembly with other Route Markers.

The Ohio Byway supplemental sign (M8-H3p) may be used at the discretion of the sponsoring agency. If used, the signs shall be fabricated by the sponsoring agency and supplied to the appropriate jurisdictions for erection. The M8-H3p sign should be mounted directly below the M8-H3 sign in accordance with **OMUTCD** standards. The decision by the sponsoring agency to have M8-H3p

signs installed does not necessitate their use with all M8-H3 signs along the route. The M8-H3p signs can be selectively utilized at key locations as determined by the sponsoring agency, with the concurrence of the responsible jurisdiction. Their use may be particularly beneficial where overlapping Ohio Byways diverge.

M8-H3

M8-H3p

204-3 Business Routes (E3-H1, M1-2, M1-1, M4-3, D11-H2, D11-H3)

Ordinarily, when an **ODOT**-maintained highway bypasses the central business district (CBD) of a municipal corporation, standard Guide Signs and route marking for the routes which remain in the urban area will be adequate to guide drivers from the bypass route to the CBD and back. In cases where existing signing does not adequately perform this function, additional guidance may be provided by establishing an official Business Route.

A Business Route may be either a business loop or a business spur. A business loop is a route which begins at an **ODOT**-maintained interchange or intersection, traverses over adequate streets and highways to and through the CBD of the bypassed municipal corporation, and returns to the **ODOT**-maintained highway at another location. A business spur is a route which begins at an **ODOT**-maintained interchange or intersection, leads traffic into the CBD of the bypassed municipal corporation, and returns to the **ODOT**-maintained highway along the same route to the point where it began.

A Business Route may be established by the **District** where an **ODOT**-maintained highway has been constructed on a new alignment which bypasses the CBD of a municipality and no other **ODOT**-maintained highway provides a direct two-way connection between the bypass route and the CBD, or where the existing guide signing does not adequately direct the driver from the bypass route to the CBD and back to the bypass route. A business loop or spur from an **ODOT**-maintained highway may be routed over the existing State and U.S. Routes, County Roads, and municipal streets as applicable. The business loop or spur route should be clearly marked by appropriate signing.

Where portions of a proposed Business Route will follow County Roads or municipal streets (including state route extensions within the corporation limits), appropriate resolutions should be submitted from the County and/or municipality (see ***Forms 296-1 and 296-2)***.

Business Route signing should be installed in accordance with **OMUTCD** standards. The Interstate Business Route Markers (M1-2, M1-1) should be used where appropriate. The BUSINESS marker (M4-3) should be used with standard State or U.S. Route Markers and auxiliary markers and arrow plates. Supplemental Guide Signs (E3-H1) or supplemental panels may be used on freeway and expressway routes. On conventional roads, the D11-H2 and D11-H3 signs may be used.

Normally, **ODOT** will furnish and install the signing for the business route, and the local jurisdictions will be responsible for the future replacement and maintenance of the signing on their respective portions of the route.

D11-H2

D11-H3

204-4 Lake Erie Circle Tour Signing (M8-H1, M8-H2)

Due to their proximity to the Lake Erie shoreline or connecting waterways, the **ODOT**-maintained highways in ***Table 297-2*** have been designated as the Lake Erie Circle Tour (LECT). **ODOT** is responsible for installing and maintaining LECT signs (M8-H1) and auxiliary markers on these routes, including state route extensions within municipalities.

The M8-H1 sign has a white legend on a green background, and is considered a Route Marker. Auxiliary markers used with the M8-H1 sign shall also have a white legend on a green background (e.g. M5-1, M6-1).

The M8-H1 sign should be installed as a Route Marker in accordance with **OMUTCD** standards **(see Sections 2D.27 through 2D.32)**. Signs should be installed in both directions along the established route. A sign should be installed at the beginning of the route near the state lines. A sign and directional arrow should be placed before each turn in the route, and at each intersection where the route turns or changes direction. A sign should also be installed after each turn to confirm the routing. Additional signs should be installed at 5 to 10 mile (8 to 15 kilometer) intervals and at other key locations along the route. Signs may also be placed on major intersecting highways informing of the junction with the LECT route as appropriate. An LECT sign may be installed in an assembly with other Route Markers.

To help establish a link between the Lake Erie Circle Tour and the overall Great Lakes Circle Tour (GLCT) system, GLCT signs (M8-H2) should be erected near the state lines. One sign should be placed on southbound I-75 near the Michigan state line and another on westbound U.S. Route 20 near the Pennsylvania state line.

Local communities may identify, promote and sign spur and loop routes from the LECT system. Proposals for such routes and the related signing must be reviewed jointly by representatives of the **Ohio Departments of Development, Transportation, and Natural Resources**.

Sign placement criteria for approved spur and loop routes is the same as described for the LECT signs; and the sign used is identical to the M8-H1 sign, except that the sign has a white legend on a brown background. Auxiliary markers shall also have a white legend on a brown background.

Markers for approved spur and loop routes should be furnished, installed and maintained by the agency having jurisdiction over the roadway, at the cost of the agency or group sponsoring the spur or loop route. When the approved spur or loop is on an **ODOT**-maintained highway, **ODOT** shall furnish, install and maintain the signs; however, all expenses shall be reimbursed per an agreement between **ODOT** and the route sponsor executed prior to sign placement.

M8-H1

M8-H2

205 CONVENTIONAL ROAD DESTINATION AND DISTANCE SIGNS

205-1 General

Conventional Road Distance and Destination Signs are addressed in **OMUTCD Sections 2D.33 through 2D.37**. For purposes of the **OMUTCD** and **TEM** “conventional” highway basically refers to any non-freeway, non-expressway highway.

The following sections address signs not in the **OMUTCD**, or provide additional information about the intended use of signs that do appear in the **OMUTCD**.

205-2 Signing for Traffic Generators at Intersections

205-2.1 General

OMUTCD Chapter 2H discusses the use of Guide Signs on conventional highways to provide guidance to traffic generators. These are generally places of recreational or cultural interest determined to be a significant destination. In order to control the proliferation of such signing, each responsible jurisdiction is encouraged to establish a traffic generator policy in general agreement with the “official **ODOT** policy.” This section establishes the **ODOT** criteria for determining when a destination qualifies as a traffic generator for which Guide Signs, typically containing the name of the generator, may be erected at intersections on **ODOT**-maintained conventional highways.

As used in this section, "non-profit" also refers to facilities or organizations described as "not for profit".

205-2.2 Procedure for Reviewing Requests

For signing requests for traffic generators at intersections, the following procedures apply:

1. Signs may be erected at intersections on **ODOT**-maintained highways after a written request has been received from the operator of the generator (with all data necessary to determine eligibility) and an investigation by the **District** has confirmed the eligibility of the generator as defined by this standard.

2. Requests for generator signing which would be erected completely inside a municipality should be forwarded to the local authority for their consideration. Where part of the warranted signing for a generator will be within a municipality and part outside, the **District** shall request the municipality to furnish and erect the necessary signing within its corporation limits. When the municipality is unable to furnish and erect generator signs which should be placed on a state route extension within the municipality, **ODOT** may furnish and erect such signs with the concurrence of the local authorities.

3. The erection of signs for eligible generators shall be in accordance with standards for sign type, height, lateral placement and location as specified in the **OMUTCD**. Not more than three names shall be used in any one destination sign assembly. The legend size of generator signing shall be consistent with the legend size of other existing destination signs in the vicinity.

4. Signs for eligible generators shall not be erected when the proposed signs would conflict with existing primary Guide Signs or other traffic control signs. Therefore, no commitment should be made to erect signs until an on-site inspection has been conducted at the proposed sign

location in order to determine that sufficient space exists.

5. Signs erected for eligible generators should be placed on the nearest **ODOT**-maintained highway at its intersection with the road or highway which leads to the generator. If the nearest **ODOT**-maintained highway is not used by the majority of the drivers traveling to the generator, the signs may be erected at the intersection of the **ODOT**-maintained highway which is used by the majority of the drivers traveling to the generator instead of the lesser used highway.

6. When the generator is located on an **ODOT**-maintained highway, a sign indicating the entrance to the generator should only be erected when the entrance to the generator is not conspicuously marked or readily visible.

7. **ODOT** shall not erect signs until necessary trailblazing signs off the state system have been erected by others.

8. Under exceptional circumstances, additional signs may be necessary to adequately sign for a traffic generator. Additional signs should be approved by the **District Deputy Director** based on an engineering study that documents the need.

9. Not all demands for generator signing can be accommodated. Therefore, the **District** should develop a priority system to determine which of the generators should get the limited space available. If signs for the generator requesting signing would result in too many signs or too many destinations on a sign, the **District** shall review the information and determine which generators would receive signing. To minimize future conflicts and removals of existing generator signs, consideration should be given to future expectations and priorities of signing at intersections before erecting signs.

205-2.3 Criteria and Eligible Generators

Signing for traffic generators may vary in color depending on the category of the generator. **ODOT** has established the following criteria in determining which generators will qualify for signing and what color will be used for the sign.

205-2.3.1 Signs with a Green Background

Signs for the following generators shall have a white legend on a green background:

1. **Airport, Heliport, Ferry, Train Stations and Bus Stations.**

   Signs may be erected for any public airport or ferry shown on the official **Ohio Transportation map**, or any public heliport, train station, or bus station which has regularly scheduled departures and/or arrivals.

   To warrant signing at a particular intersection, an airport should also be within 15 miles (24 kilometer) of the intersection. Optional guide (trailblazer) signing may also be provided along routes other than the primary route within a 10 mile (15 kilometer) radius of the airport for commercial airports and within a 7.5 mile (12 kilometer) radius of other airports. Guide signing shall not be permitted for privately owned airports that are not open to the public.

2. **College, University and Other Post High School Educational Institution.**

   Signs may be erected when the institution is duly accredited, provides multiple associate,

bachelors, masters, and/or doctorate degree programs of the traditional academic variety, and is within 5 miles (8 kilometers) of the intersection.

3. **Joint Vocational School.**

   A joint vocational school is a public school primarily intended for vocational training for high school juniors and seniors. Signs may be erected when the school is within 5 miles (8 kilometers) of the intersection.

4. **Boarding Schools.**

   Signs may be erected when the school provides a traditional academic curriculum and has a substantial portion of the student enrollment comprised of individuals whose permanent residence is not considered to be local to the community in which the school is located. This includes college preparatory schools and military academies.

5. **Major Military Installations.**

   Signs may be erected when the military installation has at least 500 permanently assigned personnel or employees and the installation is within 5 miles (8 kilometers) of the intersection.

6. **Privately Owned Non-Profit Campgrounds.**

   Signs may be erected when the privately owned non-profit campground is within 5 miles (8 kilometers) of the intersection. This includes scout, church, **4-H**, youth, and **YMCA/YWCA** camps.

7. **Hospice Facility.**

   Signs may be erected when the hospice is licensed by the **Ohio Department of Health**, is within 5 miles (8 kilometers) of the intersection, and is a freestanding facility.

205-2.3.2 Signs with a Blue Background

Signs for the following generators shall have a white legend on a blue background:

1. **Law Enforcement Agencies.**

   Signs may be erected when the law enforcement agency facility is within 5 miles (8 kilometers) of the intersection, and the agency headquarters approves of or requests the installation.

2. **Motorist Services.**

   Signing for hospitals is addressed in ***Section 207-4*** and signing for generic motorist services is addressed in ***Section 207-5***. In addition, signing for tourist information centers is addressed in ***Section 207-6***.

3. **Tourist Oriented Directional Signing (TODS).**

   The TODS program is described in ***Section 207-3***.

205-2.3.3 Signs with a Brown Background

Permanent signs may be erected for the following generators provided: (1) the generator is a publicly owned or a privately owned non-profit facility; and (2) the generator has an annual attendance of 100,000 plus 10,000 per mile in urban areas, or 50,000 plus 5,000 per mile in rural areas, where the distance is measured from the generator to the intersection. In rural areas, where generators are less common and more space for generator signing is available, attendance requirements may be reduced by up to 60 percent by the **District Deputy Director**. Signs for these generators shall have a white legend on a brown background:

1. **Miscellaneous Generators** - Arenas, coliseums, stadiums, auditoriums, convention halls, fairgrounds, parks (national, state, county, municipal, etc.), race tracks and zoos.

2. **Recreation Areas** - Recreation areas (e.g., beaches and lakes). Where recreational areas are established at a large lake, reservoir or forest and many recreational facilities are available, boundaries may be established for the purpose of informing oncoming traffic. On roadways entering the region, the D7-H3 sign may be erected at the boundary.

3. **Tourist Attractions** - Aquariums, arboretums, botanical gardens, geological sites, historical sites, state memorials, restorations, monuments, museums, planetariums and other attractions of historic or cultural interest.

Also, permanent signs may be erected for privately-owned major tourist attractions (e.g., large amusement parks) where the traffic volumes are such as to warrant additional signing to facilitate an orderly flow of traffic to the facility. Signs for these generators shall have a white legend on a brown background.

205-2.4 Generators That Do Not Normally Warrant Signing

Except as covered in the previous paragraph, activities signed for under the Tourist Oriented Directional Signing (TODS) program do not qualify for generator signing under this section.

Also, it has been determined that the following facilities do not normally qualify for signing under these provisions for traffic generators:

1. **Businesses** - Industrial parks, shopping centers, shopping malls, television stations, radio stations and theaters.

2. **Cemeteries** - National, local, state, military, public and private.

3. **Community Facilities** - Churches, civic centers, libraries and subdivisions.

4. **Educational** - Grade schools and high schools (except as provided in ***Section 205-2.3.1***).

5. **Governmental** - Courthouses, disaster assistance facilities, civil defense facilities, drivers license centers, jails, prisons, local government highway buildings, post offices, research facilities, experimental facilities.

6. **Medical** - County homes, fraternal homes, nursing homes, humane facilities (i.e., animal shelters), infirmaries, treatment centers, mental facilities, research facilities, retirement facilities, sanitariums, veteran facilities.

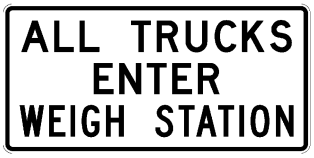
7. **Military** - Armories, arsenals, sites and detachments.

8. **Recreational** - Amusement parks, country clubs and golf courses.

205-3 Weigh Station Signing for Conventional Roads

205-3.1 General

Weigh Station signing for conventional roads is addressed in **OMUTCD Section 2D.43 and Figure 2D-3.** Four signs, as indicated in **OMUTCD Section 2D.43 and Figure 2D-3**, shall be used; however, on **ODOT**-maintained highways, the R13-1 sign shall be replaced with the R13-H1 sign, and the D8-2 sign shall be replaced with the D8-H2 sign. The locations of the four signs shall be as shown in **Figure 2D-3**.



R13-H1
72 x 36

D8-H2
60 x 30

205-3.2 Exit Direction Sign (D8-H2)

The bottom line of this sign consists of a changeable message panel capable of displaying the words “OPEN” and “CLOSED”. The legend “CLOSED” shall be displayed when the station is closed and the legend “OPEN” shall be displayed when the station is open and shall be controlled from the scale house.

Intentionally blank.

206 GENERAL INFORMATION SIGNS

206-1 General

General Information Signs on conventional highways are addressed in **OMUTCD Section 2D.47**, and for freeways and expressways these signs are addressed in **OMUTCD Section 2E.55**. For purposes of the **OMUTCD** and **TEM** "conventional" highway basically refers to any non-freeway, non-expressway highway.

The following sections address signs not in the **OMUTCD**, or provide additional information about the intended use of signs that do appear in the **OMUTCD**. ***Figures 298, 5a through 5c*** illustrate Guide Signs that fall into the general Information Signs category discussed in this section which are not shown in the **OMUTCD**.

206-2 Reserved for Future Information

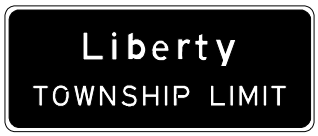
This section is reserved for future information.

206-3 Township Limit Signing (I-H2e, E8-H2a)

ORC Section 503.061 requires **ODOT** to erect Township Limit signs on **ODOT**-maintained highways, other than freeways and expressways, located within the **Township** and outside the limits of an incorporated municipality, indicating the boundaries of the **Township**, when a resolution requesting signs has been adopted by the **Township**. The I-H2e sign is used for this purpose.

Although there is no legal requirement to erect signs on freeways and expressways, **Districts** may decide, at their discretion, to erect signs on these facilities for townships which have populations in excess of 5,000 outside of municipal corporation limits. The E8-H2a sign is used for this purpose.

I-H2e



E8-H2a

206-4 Signing for Unincorporated Communities (I-H2d)

The Unincorporated Community Name sign (I-H2d) may be erected on **ODOT**-maintained conventional highways in accordance with **OMUTCD Section 2D.47**. Requests should be referred to the local **Board of County Commissioners** to confirm the spelling and the boundaries of the community. Unincorporated communities which claim to be historically significant should furnish confirmation from the **Ohio Historical Society** or a local historical society.

A driver should be able to recognize a change from rural conditions. A community usually has a cluster of homes, schools, churches, businesses furnishing motorist services, stores, parking, pedestrians, or other land development. Signs should not be erected where the unincorporated community name is synonymous with that of a developer, contractor or real estate broker where the sign could be considered an advertisement.

I-H2d

206-5 Highway Advisory Radio (HAR) Signing (D12-H6, D12-H7, D12-H8, D12-H9)

206-5.1 General

Signing for HAR systems is not specifically addressed in the **OMUTCD**. The following guidelines and criteria have been developed based on guidelines issued by **FHWA** in 1981.

HAR signing may be authorized for systems installed by local jurisdictions or governmental agencies when the criteria set forth in this section are met, and after receiving approval by the **District**, as outlined below.

The owner/operator of the HAR system will be responsible for the fabrication, erection and maintenance of the signs under an Agreement (and Occupancy Permit) with the **Director of Transportation**. With a written notice, the **Director** may require the owner/operator to remove signs that have not been properly installed or maintained.

D12-H6

D12-H7

D12-H8

D12-H9

206-5.2 Guidelines

For situations which cannot be addressed by conventional signing, the following guidelines have been established to support a determination for the use of signs to supplement HAR systems installed by local jurisdictions or governmental agencies on high-volume or high-speed roadways. However, these should not be considered the only justification for the erection of this signing.

1. Extraordinary circumstances in one or both of the following categories:

   a. Unusual road conditions, including extended construction or maintenance operations, detours, and road emergencies.

   b. Traffic and parking advisories - information for traffic destined for specific events (e.g., World's Fair) or major traffic generators (e.g., transportation terminals or stadiums).

2. As a component of a traffic surveillance and control system.

206-5.3 Procedures for Approval, Installation and Removal

The following procedure shall be used for approval, installation and removal of an HAR system:

1. The owner/operator shall submit a written request to the **District** including, but not limited to, the following information:

   a. Map of the region showing transmitter location, broadcast frequency, area of coverage and route(s) on which signs are requested.

   b. A general description of message content, anticipated frequency of message repetition and message changes, and hours of transmission.

   c. Names of persons operating the HAR station and where it is located.

   d. Number of signs requested, including approximate location and legend for each sign.

2. The **District** reviews the information provided and makes a field check to determine if the system is eligible and if the signs and locations are appropriate.

3. If approved by the **District**, an Agreement is prepared (see ***Form 296-3*** for a **Sample Agreement**) and returned to the owner for review and execution.

4. When the executed Agreement and a copy of the station's **Federal Communications Commission (FCC)** license are returned to the **District** by the owner, the following package of information is then provided by the **District** to the owner:

   a. **Occupancy Permit Application** for work in the right-of-way.

   b. Sample plan sheets including design information, applicable **ODOT** specifications and **Standard Construction Drawings**.

   c. Specific sign locations determined by **District** review of requested sign locations.

5. Owner/operator submits **Occupancy Permit Application** and construction plans for installation of the signs to the **District**.

6. After approval of the construction plans by the **District** and issuance of the **Occupancy Permit**, the owner/operator has the signs installed. The completed installation shall be inspected and approved by the **District**.

7. The owner/operator shall immediately notify the **District** of any event or condition which may significantly affect its ability to perform in accordance with the provisions of its Agreement with **ODOT**.

8. Any modifications or alterations of the signing will require written approval of the **Director**.

9. As provided in the Agreement, the owner/operator will be responsible for removal of the signs and restoration of the area when the HAR system ceases to operate.

206-5.4 Operational Criteria

The following operational criteria shall apply:

1. Only traffic advisory or directional messages shall be broadcast over the radio station.

2. No message of a commercial or promotional nature may be broadcast at any time.

3. Messages concerning disruptions of normal traffic flow or road conditions due to highway construction or maintenance activities shall be broadcast when requested by **ODOT**.

4. The radio station shall be operated at all times in accordance with **FCC** rules and regulations.

5. The HAR system shall be operated on a permanent year-round basis, twenty-four hours a day unless otherwise approved by the **District**.

6. The location(s) of the broadcast receptions zone(s) shall not be altered subsequent to placement of the related signs.

206-5.5 Signing for HAR Systems

The following criteria shall apply when signing has been approved for an HAR system:

1. The design and placement of HAR signs shall be in accordance with standards in the **OMUTCD**. These signs usually have a white legend on a blue background; however, if used as work zone or Warning Signs the standard colors shall be used (i.e., black legend with an orange background for work zone situations and a yellow background for warning). The signs and their sizes are shown in the **Sign Design Manual (SDM)**.

2. Signing for an HAR zone normally consists of three signs in each direction of travel: the D12-H6 sign 1 mile in advance of the broadcast zone, the D12-H7 at the beginning of the broadcast zone and the D12-H9 at the end of the zone. Depending on the circumstances (e.g., length of zone and sign crowding in the area) it may be desirable to erect more than one of the D12-H7 signs in the broadcast zone and/or not use the D12-H9 sign.

3. Other legend elements such as AIRPORT or VISITORS instead of TRAFFIC may be warranted.

4. When circumstances warranting the signing are seasonal, the owner/operator shall remove or cover the signs when the HAR system is not in use.

5. When the HAR system is not operated on a twenty-four hour basis, yellow lights which flash when the system is operational shall be mounted on the sign at the beginning of the broadcast zone, and the words WHEN FLASHING shall be added at the beginning of the legend (D12-H8).

206-6 Carpool Signing (D12-H2)

The availability of rideshare opportunities is publicized with the D12-H2 sign. The local rideshare agency (LRA) is responsible for furnishing all signs to **ODOT**. The signs shall be fabricated in accordance with **ODOT** design standards and material specifications. **ODOT** will supply the sign supports and necessary hardware. The locations for the signs may be suggested by the local rideshare agency, but must be approved by **ODOT** prior to installation.

The **Districts** should maintain the signs. Replacement signs should be obtained from the LRA as needed.

D12-H2

206-7 Signing for Countywide 9-1-1 Systems (D12-H14)

206-7.1 General

ORC Section 4931.46 indicates that upon installation of a countywide 9-1-1 system, the **Board of County Commissioners** may direct the **County Engineer** to erect and maintain at the **County** boundaries on **County** Roads and **State** and Interstate Routes, signs indicating the availability of a countywide 9-1-1 system. Any sign erected by a **County** under this section shall be erected in accordance with and meet the specifications established in ***section 206-7.2.*** All expenses incurred in erecting and maintaining the signs shall be paid by the **County**.

For other signing dealing with the 9-1-1 system, see ***Section 207-7.***

206-7.2 Sign Details

ORC Section 4931.46(B)(2) requires the **Director of Transportation** to develop design specifications for signs giving notice of the availability of a countywide 9-1-1 system and establish standards for erection of the signs. Consequently, the N-96 sign was developed. The standard size for use on conventional streets and highways is 36 x 24 inches (900 x 600 millimeters), and on expressways and freeways the standard size is 60 x 36 inches (1500 x 900 millimeters). Type G reflective sheeting **(CMS Item 730.19)** shall be used for the signs.

The signs will be flatsheet material or plywood. **SCD TC-52.20** provides information about bolt hole spacing for flatsheet signs. The sign blank material, sign supports and mounting hardware shall conform to **CMS Item 730**. **SCD TC-41.20** provides post information.

D12-H14

206-7.3 Procedure

If a countywide 9-1-1 system exists and the **Board of County Commissioners** directs the **County Engineer** to erect signs on an **ODOT**-maintained highway, the **County Engineer** shall contact the local **ODOT District Office** in writing to obtain: (1) approval of the proposed sign locations, and (2) a permit to work within the state right-of-way. The request should include specific information about the proposed sign locations and a proposed traffic control plan.

Unless the **District** agrees to another arrangement, the **County Engineer** shall have the proposed sign locations marked by stake or paint to assist in **District** review; no paint marks shall be permitted on the pavement surface. The D12-H14 sign shall be placed for traffic entering the **County** at or near the location where the route crosses the County Line. It should be placed on the right side of the highway, except that when the existing County Line sign is in the median, the 9-1-1 sign(s) may also be placed in the median. Further, the D12-H14 sign is a separate installation and shall not be mounted with the County Line sign or any other signs. Existing signs shall not be moved to accommodate placement of the D12-H14 on **ODOT**-maintained highways.

The **District** shall field check each proposed site to assure the placement of the signs will be in accordance with **OMUTCD Sections 2A.18, 2A.19, and 2C.23**, which establish horizontal and vertical placement criteria, and **SCDs TC-42.10 and TC-42.20**. If the **District** concurs with the proposed location and the traffic control plan, the **County Engineer** may schedule erection of the sign once the permit is approved.

When the signs have been erected, the **District** should have the locations checked for compliance to **ODOT** standards. All discrepancies will be corrected by the **County Engineer**.

206-7.4 Maintenance

The **County Engineer** shall maintain these signs in good condition and shall advise the **District** of who should be contacted for repair or replacement of signs erected on **ODOT**-maintained highways. Damage reports received by **ODOT** concerning the signs shall be forwarded to the **County Engineer's** office or a designated contact.

If the **County** should choose to discontinue the countywide 9-1-1 signing program, the **County Engineer** will notify the **District** in writing. The **County Engineer** will be responsible for removing all D12-H14 signs and supports on the state right-of-way.

If D12-H14 signs erected on **ODOT**-maintained highways become a hazard or nuisance and the problem is not corrected by the **County** within a reasonable time, the **District** shall remove the signs and supports. The **County** shall be billed for the work and advised where the sign(s) and supports can be picked up.

206-8 Memorial Highway/Bridge Signing (E8-H5, D6-H4, D6-H5)

Any street or highway that is part of the **State's** highway system may be officially assigned a distinctive name, commemorative of an historical event or personage or a commonly accepted and appropriate name, by which the highway is known. The **Office of Traffic Engineering (OTE)** maintains a list of named highways on the **ODOT**-maintained system.

There are three processes by which **ODOT**-maintained highways can be memorialized or named. They are as follows:

1. The most frequently used process is by legislation. **ORC Chapter 5533** contains numerous examples of action by the legislature to name or memorialize a highway.

2. Where the section of state highway is completely rural, **ORC Section 5511.01** allows the **Director**, by administrative action, to assign a distinctive name to the highway. (We have, however, been advised that this does not include naming individual bridges.)

3. Local governments may request the naming of a U.S. or State Route that lies within their boundaries. This is also accomplished by administrative action of the **Director**, but requires unanimous agreement of the local governments in accordance with **ORC Section 5511.09**. Requests from local governments should be submitted to the **District** for approval. The decision on approval should be made by the **District Deputy Director** on behalf of the **Director**. The **District** shall notify **OTE** of such approvals.

For rural roads that are totally under the maintenance and operational authority of local governments, the **Director of Transportation** has no involvement in the naming/memorializing process. **ORC Sections 5541.04 and 5543.04** assign responsibility for naming/memorializing County and Township Roads to **County** officials.

Municipal corporations also do not require action by the **Director of Transportation** to name/memorialize city streets located totally within their boundary. **ORC Section 723.01** grants broad authority for the control of city streets to the municipality officials, and **ORC Section 5511.09** addresses the authority of municipal officials to name a portion of the U.S. and State Routes within the municipal corporation without action of the **Director**.

Signing of memorial highways/bridges should be in accordance with **OMUTCD Sections 2D.48 and 2E.08**. Signs for memorial highways established by the legislature in accordance with **ORC 5533** or by the **Director** in accordance with **ORC 5511.01** should be furnished and installed by the **District**. Signs for memorial highways on the U.S. and State Routes established by local governments in accordance with **ORC Section 5511.09** should be furnished and installed by the requesting agency at locations approved by the **District**.

The D6-H4 sign is used in rest areas, scenic overlooks and other off-highway locations. The D6-H5 sign is used on the mainline of conventional highways. The E8-H5 is a Level III sign used on the mainline of freeways and expressways. For sign design details of the D6-H4 and D6-H5 refer to the **Sign Design Manual** ***(see Section 295-2)***. For the E8-H5 sign see ***Figure 298-5C***.

D6-H4

D6-H5

E8-H5

206-9 <u>TARGET ENFORCEMENT AREA Sign (D12-H15)</u>

Every six months the **Ohio State Highway Patrol (OSHP)** produces a list of their high accident locations for each patrol post. These locations may be targeted for increased enforcement efforts.

ODOT has agreed to cooperate with the **OSHP** in posting signs indicating the target enforcement areas. The TARGET ENFORCEMENT AREA sign (D12-H15) is used for this purpose.

Each post will have one location to be marked with these signs. The size of the target enforcement area is determined by **OSHP**, and may consist of an intersection or section of highway. The location may change every six months.

A sign should be installed on each **ODOT**-maintained approach to the target enforcement area, including locations on **ODOT**-maintained highways inside **Villages**.

D12-H15

206-10 <u>Signing for Over/Underpasses on Freeways and Expressways</u>

Districts may, at their discretion, elect to provide signing on freeways and expressways to identify roads that pass over or under the mainline. For those **Districts** that decide to provide such signing, a D3-H2 sign may be ground mounted in advance of the structure. Other signing methods, such as the use of direct applied sheeting on the bridge beams, can be considered, if acceptable to the **District**.

Use of this signing is optional and can be selectively applied at over/underpasses in the **District**.

206-11 Drinking Water Protection Area Signs (I-H15)

The **Ohio Environmental Protection Agency (Ohio EPA)** has requested that signs be erected to designate those areas that have been scientifically determined to be contributing ground water to public drinking water systems serving populations of 500 or more persons. The I-H15 sign has been developed for this purpose.

The I-H15 sign is 36 x 24 inches (900 x 600 millimeters) and blue on white. The sign color was selected to distinguish this sign from other traffic control signs. The signs are intended to increase public awareness, and alert emergency response teams that they are entering a **Drinking Water Protection Area**. The clean-up of spills is handled differently in these areas.

The I-H15 sign includes a phone number. The statewide **Ohio EPA** emergency response phone number is 1-800-282-9378. The public drinking water provider will decide what phone number to include on the sign. This can be the statewide emergency response number or a local emergency response number (including 9-1-1).

ODOT has agreed to fabricate and erect I-H15 signs at locations where an **ODOT**-maintained highway crosses the five-year time of travel zone for aquifers serving populations of 500 or more persons. Specific locations for the signs are determined by the **Ohio EPA**. Signs for locations within municipal corporation limits should be provided and erected by the municipal corporation.

I-H15

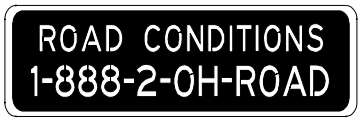
206-12 TOURISM INFO 1-800-BUCKEYE Sign (D7-H6)

The TOURISM INFO 1-800-BUCKEYE sign (D7-H6) is intended for installation as a supplemental panel below Recreational and Cultural Interest Area (E3-H2) signs to acquaint drivers with the toll-free tourist information telephone number. This sign should be installed on all E3-H2 signs on the Interstate system that do not have another supplemental panel.

D7-H6

206-13 ROAD CONDITIONS 1-888-2-OH-ROAD Sign (D12-H10)

The ROAD CONDITIONS 1-888-2-OH-ROAD sign (D12-H10) is intended for installation as a supplemental panel below existing Highway Patrol (D12-H16) signs to acquaint drivers with the toll-free weather and highway construction telephone number. These panels should be installed on all D12-H16 signs on freeways and expressways that do not already have supplemental panels.



D12-H10

206-14 Community Recognition Signing

Periodically, communities desire signing for the purpose of recognizing a local achievement, such as a state high school championship athletic team or an award it has received from a professional organization. This signing does not provide pertinent information to drivers to enable them to perform their driving task, nor does it meet the basic principles for traffic control devices outlined in the **OMUTCD**. To control proliferation of this type of signing along the rights-of-way of **ODOT**-maintained highways, the following guidelines should be used when determining whether a community that has requested such signing should receive it.

Under Ohio law, state route extensions within municipal corporations are the responsibility of the local authority. **ODOT** does not endorse installation of Community Recognition Signing on such extensions, nor does it accept any responsibility for such signs. However, **ODOT** generally does not question decisions made by local authorities regarding signs erected thereon. As such, those requesting Community Recognition signing should be referred to the local authority. If the authority agrees to erect this signing inside the municipality, the requesting community is responsible for obtaining the signing. In addition, any such signing should not be erected on Community Name signs (I-H2a or I-H2d). Furthermore, it is recommended that only one such sign be erected on a particular state route extension into a municipality.

Similarly, **ODOT** does not generally endorse installation of signing recognizing a **County's** achievement on **ODOT**-maintained highways except when approved by the **County Commissioners** and the **District** office. When this occurs, such signing may be installed on County Line signs (I-H2f, I-H2g) by the **District** office after the sign's design has received the approval of the **District Deputy Director**. Only one Community Recognition sign should be erected on any I-H2f or I-H2g sign.

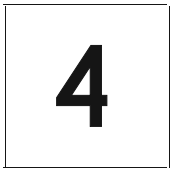
The **ODOT Sign Shop** will normally not fabricate Community Recognition signs. Also, these signs shall not be installed on Interstates or other freeways.

206-15 Reference Marker Sign (D10-H4, D10-H4a)

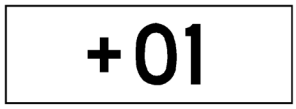
The Reference Marker sign should be used on all non-Interstate **ODOT**-maintained highways. These signs give the distance in miles along the route, and should be installed in accordance with the mileages contained in the **ODOT Straight Line Diagrams**.

The signs may be single faced for mounting on both sides of the road. For mounting on one side of the road, the signs may be double faced or mounted back to back. Where physical restrictions prevent the installation of the D10-H4 sign at the even mile, the D10-H4a sign may be used with the D10-H4 sign indicating the distance in hundredths of a mile that the sign is located from the proper location.

The D10-H4 signs should be mounted at a minimum height above the pavement edge of 4 feet (1.2 meters).



D10-H4



D10-H4a

Intentionally blank.

207 GENERAL SERVICE SIGNS

207-1 General

Motorist Services Signs on conventional highways are addressed in **OMUTCD Section 2D.44**,and for freeways and expressways these signs are addressed in **OMUTCD Section 2E.51**. For purposes of the **OMUTCD** and **TEM** "conventional" highway basically refers to any non-freeway, non-expressway highway. ***Figures 298-5b and 298-5d*** include illustrations of Motorist Services type Guide Signs discussed in this section which are not shown in the **OMUTCD**.

The following sections address signs not in the **OMUTCD**, or provide additional information about the intended use of signs that do appear in the **OMUTCD**.

207-2 LOGO (Specific Service) Program

207-2.1 General

LOGO (Specific Service) signs are addressed in the **OMUTCD Chapter 2F**. The Ohio Logo Signing Program established by **ODOT**, also known as the Specific Service Sign Program, permits eligible businesses which provide gas, food, lodging, camping or attraction services to drivers to have their logos placed on specific service (logo) signs. Mainline logo signs are placed in advance of eligible interchanges, and directional logo signs are also placed along the exit ramps.

Logo program documents that define the logo program adopted by **ODOT** are available upon request from the **Office of Traffic Engineering**. Two document packages exist, one for interchanges on the Interstate system and one for interchanges on multi-lane divided non-Interstate highways. Generally, each document package contains the following: (1) Contract with **Program Manager**; (2) **Program Administrative Rules and Regulations**; (3) **Signing Standards and Guidelines**; (4) **Ohio Revised Code Section 4511.101 and 5516.02**; and (5) **ODOT SOP PH-P-403, Permits to Use or Occupy Highway Rights-of-Way**.

207-2.2 District Procedures and Responsibilities

District procedures to be followed are contained in the documents referred to in ***Section 207-2.1***. **District** responsibilities include, but are not necessarily limited to, the following:

1. Approve work plans for each interchange.

2. Approve relocation of exiting signs to accommodate specific service signs.

3. Provide written notice to the **Program Manager** to remove or relocate logo signs due to other necessary non-specific service sign or a highway improvement project.

4. Remove the danger when any specific service sign, logo sign panel or support becomes, or is in danger of becoming, a clear and present danger to the public, and the **Program Manager** is unavailable.

5. Notify the **Program Manager** of needed relocations or removal of specific service signing.

207-2.3 Central Office Procedures and Responsibilities

Central Office procedures to be followed are also contained in the documents referenced in

Section 207-2.1. **Central Office** responsibilities include, but are not necessarily limited to, the following:

1. Approve the **Program Manager's** advertising agreement.

2. Approve the general plans for work zone traffic control.

3. Review and approve logo designs, including alternative fuel legends or symbols.

4. Approve form and content of consent legislation drafted and processed by **Program Manager**.

5. Approve "bumping" occurrences.

207-3 TODS Program

207-3.1 General

Tourist-Oriented Directional signs (TODS) are addressed in the **OMUTCD Chapter 2G**. This section describes the Ohio Tourist-Oriented Directional Signs (TODS) Program as established by **ODOT**. This program permits eligible tourist oriented activities to be identified on directional signs established for the program. These signs are placed in advance of intersections on **ODOT**-maintained highways, but not at interchanges on freeways and expressways.

The following documents, available upon request from the **Office of Traffic Engineering**, define the TODS program, including the procedures, standards and guidelines: (1) **Contract with Program Manager**; (2) **Program Administrative Rules and Regulations**; (3) **Signing Standards and Guidelines**; (4) **ORC Sections 4511.102 to 4511.107**; and (5) **ODOT SOP PH-P-403, Permits to Use or Occupy Highway Rights-of-Way**.

207-3.2 District Responsibilities

The documents referenced in ***Section 207-3.1*** outline the responsibilities assigned to the **Districts**. They include, but are not necessarily limited to, the following:

1. Approving advanced signing at an intersection.

2. Providing construction project information to the **Program Manager**.

3. Approving work plan for each intersection.

4. Removing the danger when any TODS installation becomes, or is in danger of becoming, a clear and present danger to the public and the **Program Manager** is unavailable .

5. Notifying **Program Manager** of needed relocations or removal of TODS signing.

6. Determining which existing **ODOT**-maintained signs will continue to be maintained at each intersection prior to the **Program Manager** marketing the program at that intersection.

7. Determining where safety or operational features preclude sign installation.

207-3.3 Central Office Responsibilities

The documents referenced in ***Section 207-3.1*** also outline **Central Office** responsibilities for this

program. They include, but are not necessarily limited to, the following:

1. Extending, modifying or terminating the contract as needed.

2. Approving the **Program Manager's** advertising agreement.

3. Approving the general plans for the work zone traffic control.

4. Approving all forms, applications, agreements and other documents necessary for carrying out the program.

5. Coordinating the review of proposed non-standard symbols and submitting to the **FHWA**.

6. Canceling individual advertising agreements with reasonable cause.

207-4 Emergency Hospital Signing (D9-2, D12-H17, D12-H17a)

207-4.1 General

Hospital service signs should be erected for hospitals that meet the requirements of ***Section 207-4.3***. Signs may be erected by **ODOT** for the following types of routes:

1. Interstate Routes inside and outside of corporation limits.

2. Freeways and expressways outside of corporation limits.

3. Other National Highway System (NHS) routes ***(Section 130-5)*** outside of corporation limits.

207-4.2 Procedures for Reviewing Requests

In order to avoid a proliferation of hospital service signs, the following limitations shall apply:

1. On Interstate Routes within corporation limits, not more than one hospital should be signed in each direction of travel for each route. The intent is that a driver traveling through a municipality on an Interstate Route will see service signing for not more than one hospital.

2. On numbered routes that bypass a municipality, not more than one hospital should be signed in each direction of travel for each route. The intent is that a driver bypassing a municipality on a numbered route will see service signing for not more than one hospital.

When two or more hospitals fulfill the requirements for signing, preferences should be based on how each hospital fulfills the "physician on duty" requirement in ***Section 207-4.3*** and accessibility from the numbered route.

When non-Interstate numbered routes enter municipalities, signing will normally not be erected by **ODOT** since the most appropriate interchange (intersection) for signing is usually inside the corporation limits.

Signing will normally not be erected on NHS routes when the hospital is located adjacent to the highway.

ODOT will erect necessary trailblazing signs on numbered routes outside the corporation limits. Local officials shall furnish, erect, and maintain necessary trailblazing signs that conform to the **OMUTCD** within their jurisdiction. The **District** shall not erect signs until necessary trailblazing

signs have been erected by local authorities having jurisdiction over the roadway.

207-4.3 Criteria for Emergency Hospital Signing

The hospital shall operate an emergency care facility twenty-four hours a day, seven days a week with a physician on duty at all times. A "physician on duty" is defined as follows:

1. Physician on duty within the emergency department, or

2. Registered nurse on duty within the emergency department with a physician in the hospital on call, or

3. Registered nurse on duty within the emergency department with a physician on call from his office or house.

The hospital shall be located within 5 roadway miles (8 roadway kilometers) of the interchange or intersection where signing is initiated.

To qualify as a hospital, based on criteria from the **Ohio Department of Health**, the facility must have hospital beds available.

207-4.4 Signing

Signing for hospitals should be in accordance with **OMUTCD Section 2D.44** for conventional roads, and **OMUTCD Section 2E.51** for freeways and expressways.

The name of the hospital shall not be included on the signs.

When trailblazing signs are required, they shall consist of the D9-2 sign (hospital symbol sign) and an arrow plate.

207-5 Generic General Service Signing

207-5.1 General

The TODS and LOGO programs discussed in ***Sections 207-2 and 207-3***, respectively, address signing for various fuel, food, lodging and camping facilities. See those sections for details of those programs.

This section establishes guidelines and criteria for the use of generic General Service signing for fuel (gas, diesel), food, lodging and camping. However, this standard does not apply to privately-owned, non-profit campgrounds which are addressed in ***Section 205-2.***

For purposes of this discussion, the term "non-profit" also refers to facilities or organizations described as "not for profit".

207-5.2 Guidelines

The following guidelines shall be used in determining when to use generic General Service signing:

1. Generic General Service signing should only be provided for facilities meeting the criteria established in ***Section 207-5.3***.

2. Under the terms of **Ohio's** TODS program contract ***(Section 207-3)***, certain food, lodging

and camping establishments may be eligible for TODS signing in advance of intersections on U.S. and State Routes. Fuel establishments are not eligible for this program.

New generic General Service signs for fuel, and those food, lodging and camping establishments not eligible for the TODS program, are not normally warranted at intersections on U.S. and State Routes.

However, existing generic General Service signs for fuel, food, lodging and camping may remain in place until they have reached the end of their effective performance life, or until the facilities have been signed for under the TODS program, if eligible.

3. Signing for fuel, food, lodging and camping at interchanges on the Interstate system should be in accordance with the Specific Service Signing (LOGO) program described in ***Section 207-2***. Generic General Service signing for fuel, food, lodging or camping at interchanges eligible for LOGO signing is only warranted for a specific type of service when none of that type of service is signed for with LOGO signing at that interchange and the criteria in ***Section 207-5.3*** are met. Interchanges on the Interstate system not eligible for LOGO signing would normally not be eligible for generic General Service signing for fuel, food, lodging and camping.

4. Signing for fuel, food, lodging and camping at interchanges on expressways and non-Interstate state freeways should be in accordance with the Specific Service Signing (LOGO) program described in ***Section 207-2***. Under the terms of Ohio's LOGO program contract with the **LOGO Program Manager**, existing generic General Service signing for fuel, food, lodging or camping at interchanges eligible for LOGO signing are to be removed by the **Program Manager**. Interchanges on these roadways not eligible for LOGO signing would normally not be eligible for generic General Service signing for fuel, food, lodging and camping.

5. Generic General Service signs for fuel, food, lodging and camping are not normally warranted in urban areas.

6. Generic General Service signs for fuel, food, lodging and camping should only be erected where the driver can directly return to the highway and continue in the same direction of travel.

7. The erection of signs for general services shall be in accordance with standards for sign type, height, lateral placement and location as specified in the **OMUTCD Section 2A**.

8. Signs for General services shall not be erected when the proposed signs would conflict with existing primary Guide Signs or other traffic control devices. Therefore, no commitment should be made to erect signs until an on-site inspection has been conducted at the proposed sign location in order to determine that sufficient space exists.

9. **ODOT** shall not erect signs until necessary trailblazing signs off the state system have been erected by others.

207-5.3 Criteria

Specific criteria have been established for generic General Service signing, depending on the type of service:

1. Fuel

    a. Is located within 3 miles (4.8 kilometers) of the highway for which signing is sought.

    b. Provide vehicle services to include fuel, oil and water.

    c. Provide public restroom facilities and drinking water.

    d. Be in continuous operation for at least sixteen hours a day, seven days a week, all weeks of the year.

    e. Provide a public telephone.

2. Food

    a. Is located within 3 miles (4.8 kilometers) of the highway for which signing is sought.

    b. Provide seating capacity for twenty-four or more persons.

    c. Serve meals for at least twelve consecutive hours, six days a week.

    d. Display a valid permit from the **Ohio Department of Health** or appropriate public agency as required by law.

    e. Provide a public telephone.

3. Lodging

    a. Is located within 3 miles (4.8 kilometers) of the highway for which signing is sought.

    b. Provide eight or more units of overnight accommodations, each unit consisting of at least a sleeping room and bathroom.

    c. Be in continuous operation twenty-four hours a day, seven days a week, all weeks of the year.

    d. Possess a valid permit from the appropriate public agency, as required by law.

    e. Provide a public telephone.

4. Camping

    a. Is located within 3 miles (4.8 kilometers) of the highway for which signing is sought. If within the 3 mile (4.8 kilometers) limit no campground is available, the distance requirement may be extended in 3 mile (4.8 kilometers) increments, up to 15 miles (24 kilometers), to allow the first closest eligible campground to be signed.

    b. The campground shall provide a minimum of fifty well defined campsites capable of accommodating a tent, tent-trailer, pickup camper, travel trailer or motor coach.

    c. The access road to the campground shall have an adequate all-weather surface suitable for safe operation of a motorized vehicle and camping trailer.

    d. The campground shall not be operated on a “reservation only” basis.

e. The campground shall have sanitary facilities and water approved by the **Ohio Department of Health**.

f. The campground shall provide toilets and shower accommodations and shall have hot and cold running water. Janitorial service must be provided daily for the toilet and shower facilities.

g. The campground operator shall provide refuse and sewage disposal facilities in accordance with the **Ohio Sanitary Code**.

h. Any food service operation at the campground shall meet the requirements of **ORC Sections 3732.01 to 3732.08** and **Ohio Sanitary Code Regulations 300 to 306**.

i. The campground shall have a valid permit from the local health department.

j. The campground shall have rules and regulations applying to the operation of the campground posted in a conspicuous location.

k. The area shall be restricted to registered campers only, and rates applying to the campground shall be posted.

l. The grounds within the campground shall be properly drained and maintained neat and clean at all times.

m. The campground shall be protected from natural and unnatural hazards which may exist.

n. The main circulatory roads shall be well drained and maintained dust free.

o. Provide a public telephone.

p. The camping area and all facilities shall be available twenty-four hours a day on a yearly basis. Where the camping area fully complies with all other criteria, but is open only during the portion of the year normally associated with camping (early spring to late fall), seasonal signing may be erected which shall be in place only when the camping area is open.

5. Other Facilities

Signing for emergency medical treatment facilities is addressed in ***Section 207-4***. Signing for law enforcement agencies is addressed in ***Sections 205-2 and 209-2.*** Signing for privately owned, non-profit campgrounds is addressed in ***Section 205-2.3***. Signing for tourist information centers is addressed in ***Section 207-6***.

207-6 Tourist Information Center Signing

207-6.1 General

OMUTCD Section 2E.53 establishes standard signing for Tourist Information Centers. Such signing is only provided from freeways and expressways. The following procedure and criteria shall be used in addressing requests for public and privately-owned Tourist Information Centers signing for freeways and expressways.

Signs should not be erected unless requested by the Tourist Information Center operator. Upon

receipt of a request, the **District's** designee should visit the center to check for compliance with the following criteria. Signs shall not be erected unless the criteria noted in ***Section 207-6.2*** are met and the **District** recommends signing for the Tourist Information Center.

If a local Tourist Information Center meets the criteria, except that the information available pertains only to the local area, signing may be provided at the discretion of the **District**. These centers shall be signed for as described herein, except that the sign legend should be revised to read LOCAL TOURIST INFO CENTER.

207-6.2 Criteria for Signing

When evaluating a request for Tourist Information Center signing on a freeway or expressway, the following criteria shall apply:

1. The Tourist Information Center shall be located either:

    a. Within a rest area on a freeway or expressway, or

    b. Within 1 mile (1.6 kilometer) of a freeway or expressway interchange.

2. The Tourist Information Center shall be open or in continuous operation at least eight hours a day, seven days a week. If operated on a seasonal basis, signs indicating TOURIST INFO shall be removed or covered during the off-season.

3. Unless approved by the **District Deputy Director**, the Tourist Information Center shall not be located within a building, or on the same property, as a building used for the primary purpose of selling services to the motoring public.

4. The center shall have an adequate number of free parking spaces for automobiles with and without trailers, campers and motor homes. If located within an urban area, a turnaround shall be available to accommodate trailers, campers and motor homes.

5. The center shall provide, or be located adjacent to, well-maintained public restroom facilities.

6. The center shall provide, or be located adjacent to, at least one public telephone.

7. A privately-owned center should be endorsed by local authorities and/or civic organizations.

8. Information available to tourists should normally include, but is not limited to, the following:

    a. Local Tourist Services - Hotels, motels, restaurants, churches, hospitals with twenty-four hour emergency services and camping facilities.

    b. Local and Regional Points of Interest - Cultural locations, historical sites and geographical landmarks.

    c. Local and Regional Attractions - Recreation areas, amusement parks, festivals and fairs, concerts, outdoor dramas, state parks and national parks.

9. It is desirable, but not mandatory, that facilities for Tourist Information Centers located off of freeways and expressway include the following:

    a. Benches and picnic tables on the lawn,

b. Feminine napkin vendor in the women's restroom, and

c. Sanitary drinking water.

10. The Tourist Information Center may be either a manned or self-service facility.

207-6.3 Signing for Centers on Freeways and Expressways

In general, if the Tourist Information Center meets the criteria in ***Section 207-6.2*** and is recommended for signing by the **District**, the center shall be signed in accordance with **OMUTCD Sections 2E.51 and 2E.53**.

If the Tourist Information Center is located within a rest area the following shall apply:

1. If the rest area signing is in place, a supplemental panel with the legend TOURIST INFO CENTER (D5-H12) or TOURIST INFO (D5-H12a) should be attached above the Rest Area Advance sign (D5-1) and above the Rest Area Exit Direction sign (D5-2 or D5-H2a). The width of the supplemental panel (D5-H12 or D5-H12a) should not be wider than the existing signs. Alternatively, the Tourist Information symbol (D9-10) may be appended beneath the Rest Area Advance sign.

2. If the signing for the Tourist Information Center is to be erected as part of the initial rest area signing, either of the following signing methods may be used:

   a. Erect D5-1 and D5-H2a (or D5-2) signs with the TOURIST INFO CENTER (D5-H12) or TOURIST INFO supplemental panel (D5-H12a); or

   b. Erect the D5-H8 and D5-H8a (or D5-H9) signs.

      The D5-H8 sign has the legend REST AREA TOURIST INFO CENTER xx MILES. The D5-H9 sign has the legend REST AREA TOURIST INFO CENTER ↗. The D5-H8a sign has the legend REST AREA TOURIST INFO CENTER NEXT RIGHT.

      The D5-H8 and D5-H8a (or D5-H9) signs may also be erected if the existing rest area signs are being replaced because of safety upgrading, sign damage or deterioration. Serviceable rest area signs should not be replaced with D5-H8 and D5-H8a (or D5-H9) signs solely for the purpose of adding the TOURIST INFO CENTER or TOURIST INFO legend.

3. The D5-H8 and D5-H8a (or D5-H9) sign shall not be erected for Tourist Information Centers which operate on a seasonal basis.

207-6.4 Signing for Centers Off the Freeway or Expressway

For a Tourist Information Center located off the freeway or expressway, the following additional provisions shall apply:

1. If a Multiple General Services sign (D9-H17) is in place for the interchange, a Tourist Information symbol (D9-10) should be added to the sign. If space is not available to add the symbol, a larger Multiple General Services sign may be installed.

2. If no Multiple General Services sign is in place at the interchange, the Tourist Information symbol (D9-10) may be appended to ground mounted interchange guide signs. Alternatively, a Tourist Information Center word message sign (D5-H12b) may be erected.

3. Tourist Information symbol signs (D9-10) with appropriate arrow plates (I-H12) should be erected:

   a. On multi-lane ramps, and

   b. At the end of a ramp when the Tourist Information Center is not within sight of the interchange.

4. Signs shall not be erected by **ODOT** for Tourist Information Centers located off the state right-of-way until the operator or appropriate local authorities have provided, at other than state expense, any additional signing necessary to direct tourists to the center.

5. **ODOT** shall not erect trailblazing signs on city streets, or **County** or **Township** roads.

207-7 Motorist Assistance Signs (D12-H11, D12-H12)

NEED HELP? 1-877-7-PATROL signs (D12-H11) were installed by **ODOT** at 153 locations on **ODOT**-maintained highways in early 1999. These signs were installed at the request of the **Ohio State Highway Patrol (OSHP)**, to publicize their toll-free phone number. This phone number is intended for non-emergency calls.

In mid-1999, the EMERGENCY CALL 911 signs (D12-H12) were installed by **ODOT** as supplemental panels with the D12-H11 signs. These signs, also installed at the request of **OSHP**, were to remind drivers to call 9-1-1 in an emergency. The D12-H12 signs were installed in all counties with 9-1-1 service. Counties without 9-1-1 service at the time were **Hocking**, **Meigs**, **Monroe**, **Morgan**, **Noble**, **Vinton** and **Washington Counties** in **District 10**, and **Carroll**, **Columbiana** and **Harrison Counties** in **District 11**.

OSHP provided funding for initial sign fabrication. The **Districts** provided the materials and labor for installation.

No funding has been provided by **OSHP** to cover fabrication costs of signs needed for maintenance replacements. The **Districts** should order and install replacement signs as needed using established procedures.

With this signing program, use of the N-92 signs (HIGHWAY PATROL MONITORS CB 9 AND CELLULAR 911) was discontinued.

D12-H11

D12-H12

The D12-H14 sign also deals with the 9-1-1 system ***(See Section 206-7).***

208 REST AREA SIGNS

208-1 General

The **OMUTCD** addresses signing for rest areas in **Sections 2D.41 and 2E.52**. Additional signing has been developed over the years for use in **ODOT** rest areas. For the most part, these address specific requests from the **Department of Public Safety (ODPS)** or the offices responsible for maintaining the facilities. This section addresses additional signing approved for use in advance of, and within rest areas. ***Figures 298-6a through 298-6c*** illustrate Rest Area Signs discussed in this section which are not shown in the **OMUTCD**.

208-2 REST ROOMS CLOSED Sign (D5-H33)

The REST ROOMS CLOSED sign (D5-H33) shall be erected on conventional roads and on the mainline of freeways and expressways when rest rooms are closed for other than routine maintenance of short duration. This sign should be erected under the Advance Rest Area sign (D5-1 or D5-H1). On freeways and expressways, an additional sign may be erected under the Exit Direction Rest Area sign (D5-2 or D5-H2a).

If the rest area signs are supplemented with panels, the D5-H33 sign should be erected under the bottom panel. If the sign support has a breakaway connection, care must be taken to assure that the D5-H33 sign does not interfere with the breakaway action.

Code No.	Route Type	Legend	Size Inch (mm)
D5-H33	Freeway & Expressway	REST ROOMS CLOSED	48 x 48 (1200 x 1200)
D5-H33	Standard & Major Standard		24 x 24 (600 x 600)

208-3 SAFETY BREAK FREE COFFEE Sign (D5-H16)

The SAFETY BREAK FREE COFFEE sign (D5-H16) may be erected when authorized by the **District Deputy Director**. These signs shall not be easel-mounted and should not be erected on separate supports under normal conditions. If the D5-H16-144 sign is used, extreme care must be taken to assure that it does not interfere with the breakaway (or yielding) aspect of the supports and that the supports are of sufficient size to accommodate the extra signing area and wind loading.

Code No.	Route Type	Legend	Size inch (mm)
D5-H16-48	All	SAFETY BREAK FREE COFFEE	48 x 60 (1200 x 1500)
D5-H16-108	Expressway	SAFETY BREAK FREE COFFEE / PHONE	108 x 36 (2700 x 900)
D5-H16-132	Freeway	SAFETY BREAK FREE COFFEE / PHONE	132 x 48 (3300 x 1200)
D5-H16-144	Freeway & Expressway	SAFETY BREAK FREE COFFEE	144 x 48 (3600 x 1200)

208-4 NO FACILITIES Sign Panel (D5-H17)

The NO FACILITIES panel (D5-H17) may be used on freeways and expressways when a rest area is constructed with the rest room facilities to be added at a later date. This panel is erected below the Advance Rest Area sign (D5-1). An additional panel may be erected below the Exit Direction Rest Area sign (D5-2 or D5-H2a).

Code No.	Route Type	Legend	Size inch (mm)
D5-H17	Freeway & Expressway	NO FACILITIES	72 x 36 (1800 x 900)

208-5 Other Rest Area Signs

Additional approved signs for use within the rest area are shown in ***Figures 298-6a through 298-6c***. Color and size information can be obtained by referring to the **SDM** ***(see Section 295-2)***.

208-6 Report Drunk Drivers Sign (D12-H13)

The D12-H13 sign is intended to assist the **Ohio Department of Public Safety's** campaign to encourage reporting of drunk drivers. The legend on this sign is REPORT DRUNK DRIVERS 1-800-GRAB DUI CELLULAR DIAL *DUI FREE AIR TIME.

This sign should be erected in all **ODOT** rest areas. It should be erected on separate supports along the ramp exiting the rest area when possible, but may be erected elsewhere in the rest area if space

is unavailable along the ramp.

D12-H13

Intentionally blank.

209 FREEWAY & EXPRESSWAY DISTANCE & DESTINATION SIGNS

209-1 General

Freeway and expressway Distance and Destination Signs are addressed in **OMUTCD Sections 2E.01 through 2E.50**. The following sections address signs not in the **OMUTCD**, or provide additional information about the intended use of signs that do appear in the **OMUTCD**.

209-1.1 Freeway and Expressway Guide Sign Design

The **OMUTCD** provides information regarding the design of freeway and expressway guide signs. Under the "Option" in **Section 2E.01**, an alternative method is referenced. This method is based on the Level of Signing concept that has been used by ODOT for many years, and is described in the **Sign Design Manual (SDM) Appendix C (Section 295-2)**.

For ODOT purposed, the alternative Guide Sign method described in **SDM Appendix C (Section 295-2)** shall be used in designing freeway and expressway guide signs for use on ODOT maintained highways. This applies to all freeway and expressway guide signs for use on ODOT maintained highways, whether designed by ODOT or consultant, or fabricated by the ODOT Sign Shop or private sign fabricator.

209-2 Signing for Generators at Interchanges on Freeways & Expressways

209-2.1 General

This section establishes criteria for determining when a destination qualifies as a traffic generator for which Guide Signs, typically containing the name of the generator, may be erected at interchanges on freeways and expressways.

209-2.2 Participation Within a Municipality

Within the corporation limits of a municipality, **ODOT's** involvement with generator signing shall only occur in the following ways:

1. On Interstate Routes, in conformance with the provisions of **SOP OPS-111**, **ODOT** will furnish signing for eligible traffic generators. The municipality is responsible for acquiring necessary data and determining eligibility before requesting signs from **ODOT**.

2. At interchanges on other freeways and expressways, federal or State funding may participate in the costs of furnishing or installing generator signing as part of a highway improvement. The signing must meet the generator signing criteria established by local authorities which, in turn, must be in substantial agreement with the criteria contained herein **(see OMUTCD Section 2E.55 and Chapter 2H)**.

209-2.3 Procedures for Reviewing Signing Requests

Signs may be erected at interchanges on freeways and expressways: (1) after a written request has been received from the operator of the generator (with all data necessary to determine eligibility) and an investigation by the **District** has confirmed the eligibility of the generator as defined by this standard; or (2) after receipt of a written request from local authorities for generator signs on an Interstate Route within a municipality where the requirements of ***Section 209-2.2.*** are satisfied.

The design and erection of signs for eligible generators shall be in accordance with standards for sign type, height, lateral placement and location as specified in the **OMUTCD**. The signs typically contain the name of the generator, and are typically classified as supplemental guide signs. As noted in **OMUTCD Section 2E.32**, supplemental Guide Signs may show one or two destinations not shown on the major Guide Signs. However, only one supplemental Guide Sign should be used on each interchange approach.

Signs for eligible generators shall not be erected when the proposed signs would conflict with existing primary Guide Signs or other warranted signs. Therefore, no commitment should be made to erect signs until an on-site inspection has been conducted at the proposed sign location in order to determine that sufficient space exists.

Generator signs should normally not be erected at freeway-to-freeway interchanges.
Normally, the supplemental Guide Sign for each direction of travel on the mainline should be at the same interchange. Where it would be more appropriate to erect the generator signs for each direction of travel at separate interchanges, this may be done. The operator of the generator may recommend an interchange for signing in each direction on the mainline. However, the final decision as to sign placement rests with **ODOT**. Within the corporate limits of a municipality, this determination of sign location shall be coordinated with local authorities.

Under exceptional circumstances, additional signs may be necessary at interchanges on other freeways and expressways to adequately sign for an eligible generator. Additional signs should be approved by the **District Deputy Director** based on an engineering study that documents the need.

Erection and maintenance of signs which trailblaze from the freeway or expressway interchange to the generator are the responsibility of **ODOT** on **ODOT**-maintained highways, and local officials for municipal, County and Township Roads. Generator signs on freeways and expressways shall not be erected until trailblazer signs are in place.

Not all demands for generator signing can be accommodated. Therefore, the **District** should develop a priority system to determine which of the generators should get the limited space available. If signs for the generator requesting signing would result in too many signs or too many destinations on a sign, the **District** shall review the information and determine which generators will receive signing. To minimize future conflicts and removals of existing generator signs, consideration should be given to future expectations and priorities of signing at interchanges before erecting signs.

209-2.4 Criteria and Eligible Generators

Signs for a traffic generator may be erected on a freeway or expressway when the generator meets the criteria specified in ***Table 297-4***.

209-2.5 Traffic Generators that Do Not Normally Warrant Signing

Activities signed for under the Specific Service Signing (LOGO) program ***(Section 207-2)*** do not qualify for generator signing under this section.

It has also been determined that the following traffic generators do not normally warrant signing:

1. Businesses - Industrial parks, shopping centers, shopping malls, television stations, radio stations and theaters.

2. Cemeteries - National, local, state, military, public and private.

3. Community Facilities - Churches, civic centers, libraries, subdivisions and privately-owned historical facilities.

4. Educational - Grade schools and high schools, except as provided in ***Table 297-4***.

5. Governmental - Courthouses, disaster assistance facilities, civil defense facilities, drivers license centers, jails, prisons, local government highway buildings, post offices, research facilities and experimental facilities.

6. Medical - County homes, fraternal homes, nursing homes, humane facilities (animal shelters), infirmaries, treatment centers, mental facilities, research facilities, retirement facilities, sanitariums and veteran facilities.

7. Military - Armories, arsenals, sites and detachments.

8. Recreational - Country clubs, golf courses, planetariums, fish hatcheries, game farms, game preserves, game refuges, arboretums and privately-owned campgrounds.

209-2.6 Signing on Freeways and Expressways for Other Generators

Emergency Hospital signing is addressed in ***Section 207-4***, signing for generic Motorist Services is addressed in ***Section 207-5***, and signing for Tourist Information Centers is addressed in ***Section 207-6***. Also, signing for the LOGO Program is described in ***Section 207-2***.

209-3 Control City Destinations for Ohio's Interstate Highway System

Control cities are major destinations and population centers of national significance, located on or near the Interstate Highway System, that have been identified through a process established by **AASHTO** for use in guide signing. Each state is involved in the process, and the list is subject to change. The list of all control cities in the **United States** is in the **AASHTO** publication **"List of Control Cities for Use in Guide Signs on Interstate Highways."**

Guide Sign directional and distance information shall be uniformly based on these control cities, instead of presenting a variety of short-range destinations at small mileage intervals that are of little value to the non-local, unfamiliar traveler. Consequently, the number of control cities should be kept to the minimum necessary to provide broad directional information, and they should be used as legends in the following situations:

1. Interchanges between freeways.

2. Separation points of overlapping freeways.

3. On directional signs on intersecting routes, to guide traffic entering the freeway.

In addition, **OMUTCD Section 2E.11** addresses the use of control cities on Pull-Thru (E6-2 or E6-2a) signs and **Section 2E.36** addresses their use on the bottom line of Post-Interchange Mileage (E7) signs.

Control cities for loop, spur, outerbelt or innerbelt type facilities should be determined from the linear Interstate Routes to which they connect. Control cities identified for **Ohio's** Interstate Highway System are listed in ***Table 297-5***.

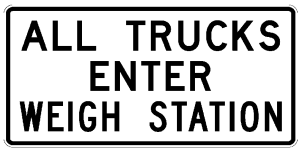
209-4 Weigh Station Signing for Freeways and Expressways

209-4.1 General

Weigh Station Signing for freeways and expressways is addressed in **OMUTCD Section 2E.58 and Figure 2D-3**. Four signs, as indicated in **OMUTCD Section 2E.58 and Figure 2D-3**, shall be used; however, on **ODOT**-maintained highways, the R13-1 sign shall be replaced with the R13-H1 sign and the D8-2 sign shall be replaced with the D8-H2 sign.

209-4.2 Exit Direction sign (D8-H2)

As noted in **OMUTCD Section 2E.58**, on Expressways and Freeways this sign shall be erected at a minimum of 1500 feet (450 m) in advance of the gore. The bottom line consists of a changeable message panel capable of displaying the words “OPEN” and “CLOSED”. The legend “CLOSED” shall be displayed when the station is closed and the legend “OPEN” shall be displayed when the station is open and shall be controlled from the scale house.



R13-H1
72 x 36

D8-H2
60 x 30

209-5 Interchange Exit Numbering and Reference Posts

The OMUTCD discusses interchange exit numbering and reference posts in Section 2E.28 and 2E.54, respectively. For ODOT maintained highways, interchange exit numbering and reference posts shall be used on all routes which are continuous as freeways for their entire length within the State and have a minimum length of 25 miles. For routes which are not continuous as freeways for their entire length with the State, or are continuous as freeways for their entire length within the State but are shorter than 25 miles in length, the use of interchange exit numbering and reference posts is not required.

210 MISCELLANEOUS SIGNS

210-1 General

The following sections address miscellaneous signs not in the **OMUTCD**.

210-2 Extrusheet Sign Identification System

The D10-H7 and D10-H6 signs may be used with extrusheet signs for identification purposes. These signs are typically mounted below the extrusheet sign and used in sign inventories. Sign designs are contained in the **Sign Design Manual (SDM) (see *Section 295-2*)**.

The D10-H7 sign is used on the mainline, and includes on the first line the route number with two letter suffix indicating the route direction (e.g., 71 SB, 30 WB). The second line is the mile marker with accuracy to nearest hundredth of a mile (e.g., 2.61, 131.04).

The D10-H6 sign is used on the ramps, and includes on the first line the route number with two letter suffix and “EXIT”. The second line consists of the exit number and one letter ramp location code (e.g. 101-J, 80B-K). ***Table 297-3*** and ***Figure 298-3*** describe the one letter ramp location codes. The third line is determined by continuing the mainline logging on exit ramps from the point where the ramp begins at the mainline, and by logging backwards up entrance ramps from the point where the ramp ends at the mainline. Collector-distributors are treated as exit ramps. The intersection of two ramps is treated the same as the intersection of the mainline and a ramp.

The D10-H7 and D10-H6 signs can also be used to establish a freeway or expressway location identification system, to facilitate the reporting of accidents for emergency response crews. For this use, the signs should be erected as independent installations at periodic spacings of one or two- tenths mile intervals.

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211 SIGN DESIGN

211-1 General

Detailed information used for the fabrication of highway signs is contained in the **Sign Design Manual (SDM)** ***(see Section 295-2)***. The **FHWA** counterpart to this manual is the **Standard Highway Signs (SHS)** manual ***(see Section 193-11)***.

Basic information on designable freeway and expressway type Guide Signs is contained in **OMUTCD Sections 2E.01 through 2E.18**. Detailed information is contained in **Appendix C of the Sign Design Manual (SDM)** (*see Section 295-2*).

211-2 Sign Design Computer Program

A computerized sign design package is currently in use in the **Office of Traffic Engineering**. This program, called **SignCAD**, greatly simplifies the design of directional Guide Signs. The long range plan is to have this program installed in all of the **Districts**. **OTE** can assist the **Districts** in the designing of directional Guide Signs for construction project or force account installation purposes.

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212 SIGN LIGHTING

212-1 General

Sign lighting is addressed in this Section as well as ***Sections 240-7, 241-4, 242-2 and 1103-6.7***. Construction information is addressed in ***Section 250-8***.

212-2 Sign Lighting for Overhead Guide Signs

Sign lighting should be provided for overhead Guide Sign installations reflectorized with Type F sheeting, and for diagrammatic signs, lane drop signs and left exit signs, reflectorized with Type F or Type G sheeting.

Sign lighting should also be provided for all other overhead Guide Signs, except:

1. Where an engineering study has determined that signs have sufficient reflectivity to meet driver needs without lighting, or

2. In rural areas, where signs installed on tangent roadways have a constant grade approach for at least 1200 feet (360 meters) prior to the sign, or

3. Where installation would require extending electrical service over 2000 feet (600 meters) to supply the sign luminaires, or

4. Where signs are fabricated with reflectorized legends, shields and symbols (e.g., route shields, hazardous cargo plaque, airport symbol, arrows, borders) of Type H or Type J reflective sheeting on reflectorized backgrounds of Type G reflective sheeting.

Where two or more signs are supported by the same overhead sign structure, the need for lighting on one sign shall require lighting to be provided for all other overhead signs on that structure.

If it is decided that sign lighting will not be provided or that existing sign lighting will be eliminated, the criteria used in making the decision should be documented.

212-3 Sign Lighting Fixtures

As noted in ***Sections 1104-3 and 1130-5***, a High Pressure Sodium (HPS) light source is generally used for lighting **ODOT**-maintained highways. While HPS lighting provides reasonable color delineation, it is not usually considered to be best suited for sign lighting. The most commonly used light source for exclusive sign lighting in **Ohio** is mercury vapor. As noted in ***Section 240-7***, mercury vapor luminaires are the standard on **ODOT**-maintained highways.

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220 MATERIALS AND HARDWARE

220-1 General

Refer to the **ODOT Construction and Materials Specifications and Supplemental Specifications (CMS)** for details regarding signing materials. ***Section 241*** lists the related **CMS** references and ***Sections 240 and 250*** address additional design and construction information related to signing materials and hardware.

220-2 Patented or Proprietary Materials, Specifications or Processes

The use of patented or proprietary materials, specifications or processes is discussed in ***Section 1202-3***.

220-3 Purchasing Materials for Installation and Use by Local Agencies

To help encourage uniformity and provide a method whereby local agencies can buy traffic control materials and equipment using federal funds, ***Sections 1220-4 and 1220-5*** describe processes that have been established whereby local agencies can purchase such items through **ODOT**.

220-4 Sign Reflectivity

Highway signs utilize reflective sheeting materials containing optical elements designed to return a large portion of the incident light back towards the source. At night, this property, known as retroreflectivity, redirects incident light from a vehicle's headlights back toward the vehicle's occupants. This allows highway signs to remain visible after dark.

The retroreflective properties of highway signs degrade over time, due principally to exposure to ultraviolet radiation from the sun and environmental contaminants. Signs that may appear satisfactory during the day may have insufficient retroreflectivity to be visible at night. Highway sign retroreflectivity should be periodically checked to verify its adequacy.

220-5 Sign Reflectivity Inspections

Sign reflectivity should be checked annually using the night driving inspection method. **Districts** that have implemented a systematic sign replacement program should not need to conduct reflectivity checks, provided the replacement intervals are followed and are within the expected performance life of the reflective sheeting.

Retroreflectivity can also be measured with a retroreflectometer. However, this is a time consuming and labor intensive method, as it requires that measurements be physically taken with the meter at each sign. In addition, at this time, the usefulness of the data obtained is questionable, as there are currently no established required minimum retroreflectivity levels.

Section 2D-2 of the Traffic Control Devices Handbook (TCDH) (*see Section 193-15*) describes a method for measuring sign reflectivity. This method uses a two-person crew (driver-observer and recorder) to drive the roads at night under dim headlight illumination at the posted speed and to evaluate individual signs based on the amount of time that they are visible (legible) to the driver. Signs that are visible for two seconds or less should be replaced as soon as possible. Signs that are visible for three seconds are considered borderline and should be scheduled for replacement. Signs that are visible for four or more seconds are usually considered acceptable.

The formation of dew or frost on the face of a sign will negatively impact the sign's retroreflective

properties. When performing night inspections, evaluators should be aware of this potential condition. Night inspections should only be conducted when atmospheric conditions do not allow the formation of dew or frost on the sign face.

220-6 Use of Reflective Sheeting for Permanent Traffic Control Signs

All permanent traffic control signs shall be reflectorized with Type G reflective sheeting. Reflectorized legends on permanent traffic control signs shall be of Type G sheeting. For fluorescent colors where no Type G material is available, Type H or Type J reflective sheeting may be used. Legends, shields and symbols (e.g., route shields, hazardous cargo plaque, airport symbol, arrows, borders) on overhead Guide Signs may be fabricated with Type H or Type J reflective sheeting.

Existing Type F signs may remain in the field until they have reached the end of their sign service life. Existing stocks of new Type F signs may continue to be installed until December 31, 2002. After December 31, 2002, remaining stocks of Type F signs should be disposed of by the **District.**

Existing signs with legends of demountable embossed copy with reflector units may remain in the field until they have reached the end of their sign service life. Existing stocks of signs with legends of demountable embossed copy with reflector units may continue to be installed until December 31, 2002. After December 31, 2002, remaining stocks of signs with legends of demountable embossed copy with reflector units should be disposed of by the **District.**

220-7 Use of Fluorescent Yellow-Green Sheeting

The **OMUTCD** allows for the optional use of fluorescent yellow-green (FYG) sheeting for pedestrian, bicycle, and school Warning Signs. It also states that the mixing of standard yellow and fluorescent yellow-green signs within a zone or area should be avoided.

For **ODOT**-maintained highways, the following signs will normally be fabricated with fluorescent yellow-green reflective sheeting: School Advance Warning (S1-1), SCHOOL BUS STOP AHEAD (S3-1), SCHOOL BUS TURN AHEAD (S3-H2), SCHOOL ENTRANCE (S3-H3), SCHOOL (S4-3), yellow portions of School Speed Limit (S5-H3, S5-H4, S5-H5), Bicycle Crossing (W11-1), Pedestrian Crossing (W11-2), Handicap Crossing (W11-9), SAFETY ZONE (W11-H15) and Playground (W15-1). The process **ODOT** will follow to transition to fluorescent yellow-green sheeting is described herein.

Existing yellow signs of the above code numbers may remain in the field until the signs have reached the end of their effective performance life, except that when upgrading a sign within a zone or area to fluorescent yellow-green, all yellow signs of the above code numbers within the zone or area should be replaced with fluorescent yellow-green signs. Yellow signs that have been removed prior to the end of their effective performance life may be returned to **District** stocks for use in maintenance activities.

Signs of the above code numbers will be provided from the **ODOT Sign Shop** in fluorescent yellow-green, unless specified otherwise by the **District**. The intent is to convert the above signs to fluorescent yellow-green as the existing signs are upgraded.

Supplemental sign plaques, such as Advisory Speed Plate (W13-1), SHARE THE ROAD (W16-1), Distance Plates (W16-2, W16-2a), Arrow Plate (W16-7p) and AHEAD Plate (W16-9p) should be ordered to match the color of the primary sign.

220-8 Production and Purchasing of Signs and Related Materials

220-8.1 General

In accordance with **ORC Section 5147.07**, the **Office of Traffic Engineering (OTE)** operates a sign production facility and is responsible for the manufacture and coordination for procurement of all signs and related items required for use by **ODOT**.

Actual sign production is accomplished by the **OTE's Sign Shop** located in Columbus or the **Ohio Penal Industries (OPI)**. **Districts** are responsible for placing orders with **OPI**.

Except for normal field maintenance of Guide Signs or in extreme emergencies, no **District** shall fabricate, repaint or re-stencil any sign for use on **ODOT**-maintained highways.

Temporary non-standard signing, if used, shall be replaced by standard signs as soon as possible.

220-8.2 Sign Shop Orders

All orders for signs, markers and any other materials or equipment to be supplied by or manufactured by the **Sign Shop** shall be submitted to **OTE** on the appropriate order form ***(see Form 296-5)***. The **OTE Traffic Control Section** reviews each order and, after approval, submits those orders to the **Sign Shop** for processing and fabrication. All orders are to be filled out in accordance with the detailed instructions in ***(Section 296-5)***. Excluding warehouse orders, standard sign orders shall be submitted in advance with as much lead time as possible, to afford the **Sign Shop** sufficient time to integrate fabrication into regular production schedules. "Rush Orders" shall be kept to a minimum.

In extreme situations, when circumstances dictate urgent need, orders may be made by telephone. Orders for standard signs or "material only" should preferably be called in to the **Traffic Control Section**. However, the **Sign Shop** may be called directly when an emergency situation arises. Orders for "special" signs must always be phoned in or sent to the **Traffic Control Section** for review and approval. A confirming **Sign Shop Order** must be submitted following any telephone order.

220-8.3 Delivery

The **Sign Shop** will strive to fill and deliver all orders for flatsheet signs within 30 days after receipt of order (ARO), all extrusheet sign orders within 45 days ARO. The only exception to the preceding timeline is warehouse signs, which can be accessed on a daily basis. Delivery schedules are based on two deliveries per month to each **District**. In the event that the amount of completed signs does not warrant a scheduled delivery, the **Sign Shop** will either send the signs through the **District** pony service or deliver the signs on the next scheduled delivery.

220-8.4 Special Projects

Special work shall be held to an absolute minimum and must have the approval of the **Assistant Administrator of the Sign & Signal Shops**. If approved, the **Sign Shop** will accept special requests from various **ODOT** offices and other state agencies. Regular highway sign production work will have priority in the scheduling of work through the **Sign Shop**.

220-8.5 Sign Costs

July1, 2000 the **Sign Shop's** operating budget was decentralized to the **Districts**. This funding measure now requires the **Districts** to designate a portion of their operating budget for the

acquisition of traffic signs used in **District** sign maintenance activities. Billable sign costs that are passed on to the **Districts** are for materials only, labor, benefits and overhead are excluded.

220-9 Salvaging Sign Material

The **Sign Shop** does not reclaim, recycle or reuse salvaged flatsheet aluminum sign blanks or extrusheet sign panels. This has not been found to be cost-effective for our operation. Used sign blanks and extrusheet panels should be disposed of by the **Districts**. Preferably, the used material should be sold to local area scrap aluminum dealers. These types of transactions will be in accordance with the **ODOT's Purchasing Guidelines, Procedures and General Terms and Conditions** set forth by the **Office of Contracts**. Profits from the aluminum scrap sales can supplement the **District's** operating budget.

221 SIGN SUPPORTS

221-1 General

In addition to the guidelines provided in this section, ***Sections 240 and 250*** provide design and construction information on the selection and use of standard sign supports. Also, overhead sign supports are addressed in **SCDs TC-7.65 through TC-22.20**, and ground-mounted sign supports are covered in **SCDs TC-41.10 through TC-42.20**. Design charts are included to facilitate the selection of the proper support for the proposed sign area.

All sign supports used in exposed locations must meet the breakaway requirements of the **National Cooperative Highway Research Program (NCHRP) Report 350**. Sign supports detailed in the **Traffic SCDs** meet these requirements when installed as specified.

FHWA maintains a list of approved sign supports and breakaway connections that have passed crash testing requirements and are acceptable for use in exposed locations. Sign supports used in exposed locations on **ODOT**-maintained highways must be approved for use by **FHWA**, and must be installed in accordance with the conditions of their approval.

221-2 Splicing of U-Channel Posts

The splicing of U-channel drive posts can be accomplished with steel or aluminum bolts. When the connection is made with steel bolts, the drive posts are considered as acting as a one piece post. When using aluminum bolts, the connection would be expected to come open upon impact.

With steel bolts, the connection between the stub post and upper post should be made with a minimum of two 5/16 inch (8 millimeters) bolts with a minimum center-to-center spacing of 4 inches (100 millimeters). No restrictions to stub height are imposed when using steel bolts for the connection. To reduce the possibility of vehicle snagging, the upper post should be attached behind the stub post when splicing posts of the same weight per unit length.

Stub height should be limited to 4 inches (100 millimeters) above the ground when using aluminum bolts for the connection.

221-3 Overhead Sign Support Inspection

Inspection of overhead sign supports on construction projects is addressed in ***Sections 250-4 and 250-5***.

Bridge-mounted overhead sign supports and overhead sign supports with bridge-mounted foundations should be inspected annually, preferably at the time of, and included with, the annual bridge inspection. All other overhead sign supports should be inspected at a maximum five-year interval. New overhead sign supports should be inspected at the time of construction.

A statewide uniform practice for the periodic inspection of the structural components of existing **ODOT**-maintained overhead sign supports is also necessary to assure their structural integrity. All overhead sign supports, including but not limited to cantilever, butterfly, box truss, monotube, span wire, semi-overhead and bridge-mounted supports should be periodically inspected. The inspections should be conducted in a systematic and organized manner that will be efficient and minimize the possibility of any item being overlooked. The use of an inspection form is recommended. A sample form ***(Form 296-4)***, has been provided which may be used as is or modified by the **District** as desired.

Supports should be visually inspected from the ground. Binoculars should be used as an aid for visual inspections. Use of a bucket truck or other means is not necessary on a routine basis, but may be used to more closely examine a defect that has been detected from the ground. Anchor bolts should be tested for structural integrity by sounding with a hammer. Non-destructive testing procedures, such as dye penetrant, ultrasonics and magnetic particle, are not necessary on a routine basis, but can be used to define the extent of a defect that has been detected by visual means. Written documentation of all inspections should be kept.

Items to be inspected should include, but not be limited to, foundation concrete, soil around the foundation, anchor bolts and nuts, structural members, structural connections, sign attachment assemblies and structural components of the sign lighting.

Deficiencies to be inspected for should include, but not be limited to, cracks in the concrete, soil erosion, non-bearing leveling nuts, loose anchor nuts, bent or distorted structural members, cracked welds, missing or loose hardware and corrosion.

Appropriate corrective action, in accordance with sound engineering practices, should be taken to correct detected deficiencies. Repairs should be made within a reasonable time frame, commensurate with the extent of the deficiencies found. Temporary remedial actions, up to and including complete removal of the structure, may be appropriate until permanent repairs can be accomplished. Written documentation of corrective actions should be kept.

Overhead sign support training is available from the **OTE Traffic Control Section**.

221-4 Erecting Highway Signs On or Near Utility Poles

Highway signs should normally be mounted on supports installed by **ODOT**. These installations should, whenever practical, be placed at a minimum of 4 feet (1.1 meters) from utility poles.

However, **ORC Section 5515.04** authorizes **ODOT** to attach signs to utility poles along the public highway. Permission of the pole owner is not required.

221-5 Solid Wood Posts

Solid wood posts have been crash tested and are approved for use as sign supports. Approved post sizes are 4 x 4, 4 x 6, 6 x 6 and 6 x 8 inches (100 x 100, 100 x 150, 150 x 150, and 150 x 200 millimeters)(nominal dimensions), which must be installed as per the details in ***Figure 298-26*** to meet breakaway requirements.

For the two larger post sizes (6 x 6 and 6 x 8 inches (150 x 150, 150 x 200 millimeters)), only one post is permitted in a 7 foot (2.1 meters) path. This means that a minimum of 7 feet (2.1 meters) clear distance must be maintained between the two posts. For the two smaller post sizes (4 x 4 and 4 x 6 inches (100 x 100 and 100 x 150 millimeters)), two posts are permitted in a 7 foot (2.1 meters) path.

More than two posts can be used for a sign. However, no more than two of the smaller posts (4 x 4 and 4 x 6 inches (100 x 100 and 100 x 150 millimeters)) or one of the larger posts (6 x 6 and 6 x 8 inches (150 x 150, 150 x 200 millimeters)) is permitted within any 7 foot (2.1 meters) width. For instance, if three 4"x 6" (100 mm x 150 mm) posts are used for a sign, a minimum clear distance of 7 feet (2.1 meters) shall be maintained between the outermost posts. If three 6 x 8 inches (150 x 200 millimeters) posts are used, a minimum clear distance of 7 feet (2.1 meters) shall be maintained between the left and center post, and between the center and right post. Please note that these are clear distances, not center-to-center distances.

The three larger post sizes must have holes drilled perpendicular to the roadway centerline at 4 inches

(100 millimeters) and 18 inches (450 millimeters) above the groundline after installation. The hole size is dependent upon the post size, and is shown in ***Figure 298-26***. The 4 x 4 inch (100 x 100 millimeter) post does not require any drilled holes.

Grade 2 southern yellow pine was used in the crash tests. The **FHWA** approval letter notes that:

Southern Yellow Pine is a relatively strong softwood; therefore, most other softwoods and some hardwoods will be acceptable for use as breakaway signposts. Care should be taken in specifying wood for posts to ensure that the strength does not significantly exceed that of the Grade 2 Southern Yellow Pine.

The wood used should be pressure treated with CCA (chromated-copper-arsenate) preservative. Retention should be a minimum of 0.40 lbs/ft^3, with 0.60 lbs/ft^3 preferable.

Flatsheet signs can be attached directly to the wood posts with lag screws. For extrusheet signs, sections of U-channel drive post of the same height as the sign can be attached to the wood posts with lag screws. The extrusheet sign can then be installed using standard sign clips.

Additional Information regarding wood sign posts is contained in ***Figure 298-26***. This includes the recommended wind pressures, minimum embedment depths and maximum allowable moment per post. The wind pressures are based on a 60 mile per hour sustained wind speed.

Figure 298-27 shows a sample calculation to select post size based on sign size, centroid height and post width. The actual post widths should be used in the calculation. The nominal and actual posts sizes are as follows:

Nominal Post Size (inches)	Actual Post Size (inches)
4 x 4	3½ x 3½
4 x 6	3½ x 5½
6 x 6	5½ x 5½
6 x 8	5½ x 7¼

230 PLANNING / PROGRAMMING

This area has been reserved to address, as needed, planning and programming information related to traffic control signs.

240 DESIGN INFORMATION

240-1 General

The **L&D Manual Volumes One and Three** and ***Section 140*** provides general background regarding design information for **ODOT** projects, including the three-stage review process typically used for traffic control plans. Additional design information has been provided in this chapter. See ***Section 241*** for additional information specifically related to plan preparation. Plan Notes are addressed in ***Section 242*** and ***Section 243*** provides a listing of related **CMS** Items.

240-2 Signs and Sign Attachments

240-2.1 General

The furnishing and erecting of permanent signs on all construction projects shall be the responsibility of the contractor. The bid item "Signs Erected, by Type" will not be used except, possibly, in very special circumstances.

240-2.2 Sign Attachments

The standard drawings and specifications provide several methods of attaching signs to supports, depending on the circumstances. The summary below lists the applicable bid items with reference to standards and specifications:

1. Sign Attachment Assembly: Used to attach extrusheet signs to overhead sign supports **(SCD TC-22.20)**. This consists of a sign bracket, U-bolts and hardware. They are furnished with new overhead sign supports. The bid item is only necessary if the support is an existing installation. The bid item is "Sign Attachment Assembly" **(CMS Item 630.06(E))**.

2. Sign Backing Assembly: This item provides the necessary posts and hardware to attach a supplemental sign or exit number panel to the main Guide Sign. It also provides the back bracing for multiple flatsheet sign installations **(SCD TC-42.10)**. One is required for each group of flatsheet signs on an individual post. The bid item is "Sign Backing Assembly."

   This item is typically included within other items of work and does not require a separate bid item **(CMS 630.14)**.

3. Sign Hanger Assembly: This item provides for attachment of signs to span wire and mast arm signal supports **(SCD TC-41.41)**. The item includes all necessary hardware to attach one individual sign. The bid items are "Sign Hanger Assembly, Span Wire" or "Sign Hanger Assembly, Mast Arm."

   "Sign Hanger Assembly, Span Wire" is furnished with new **SCD TC-17.10** span wire sign supports.

4. Sign Support Assembly: This item is provided for the attachment of flatsheet type signs to bridge parapets or miscellaneous poles **(SCD TC-41.40)**. The bid items are "Sign Support Assembly, Pole Mounted" or "Sign Support Assembly, Bridge Mounted" **(CMS 630.06(E) and 630.14)**.

240-2.3 Overhead Lighted Signs

When overhead lighted signs are part of the traffic control plans the following criteria shall be used

concerning their inclusion in the plans:

1. On the base plans, the sign height shown shall be the effective sign height. This is the height from the **Sign Design Manual, Appendix C *(Section 295-2)***. It does not include the glare shield.

2. In the subsummary, the actual sign height shall be used. The actual sign height is the effective sign height plus the glare shield height of 6 inches (150 millimeters). The quantity of "Signs, Extrusheet" paid for in the plans is the length times the actual sign height.

3. In the elevation views, the overall sign height is to be used. This height is the effective sign height plus 12 inches (300 millimeters) (luminaire support tube of 6 inches (150 millimeters) plus glare shield height of 6 inches (150 millimeters)).

240-3 Overhead Sign Clearance After Pavement Overlay

As noted in **OMUTCD Section 2A.18**, the standard minimum clearances for an overhead sign on the Interstate system is 17 feet (5.2 meters) or 1 foot (0.3 meter) more than the bridge clearances on that section of roadway, whichever is less. Most actual installations were in excess of this when first erected.

As a result of the build-up of pavement due to various types of pavement overlays, this minimum may be violated. When a roadway surface increment of more than 6 inches (150 millimeters) is to be added, or when the total of all resurfacing courses will become more than 10 inches (250 millimeters), the clearances of overhead signs shall be checked and appropriate corrections made.

The Stage 2 submission will identify the clearance each sign would have, if it were not raised, the future clearance of adjacent bridges and the recommendations of signs to be raised including the distance to be raised and the method. The following steps should be taken:

1. Determine or obtain clearance requirements for major structures on the section of roadway.

   a. New construction or major reconstruction

Interstate, Priority and Rural	16 to 17 feet	(4.9 to 5.2 meters)
Interstate, Urban non-priority	15 to 17 feet	(4.6 to 5.2 meters)
Other Freeway, Expressway or Arterial	15 to 16.5 feet	(4.6 to 5.0 meters)
Collectors	14.5 to 15 feet	(4.4 to 4.6 meters)
Locals	14.5 to 15 feet	(4.4 to 4.6 meters)

   b. Resurfacing, minor rehabilitation

Interstate, Priority and Rural	16 feet	(4.9 meters)
Interstate, Urban non-priority	14 feet	(4.3 meters)
Other Freeway, Expressway or arterial	14 feet	(4.3 meters)
Collectors/Locals	14 feet	(4.3 meters)

2. For new supports, provide sign clearance based on new structure clearance plus 1 foot (0.3 meter).

3. For existing supports, establish the desired sign clearance criteria as; (1) 1 foot (0. 3 meter) more than the clearance for major structures which will be provided on the section, or (2) as 1 foot (0.3 meter) more than the clearance prescribed for major rehabilitated structures plus an allowance for any resurfacing anticipated in the next 15 years, whichever is greater.

Then measure individual sign clearances which are expected when the project is completed and compare to the desired sign clearance above. If the sign clearance will be greater than or within 3 inches (75 millimeters) of the desired sign clearance no action is required at that time. If the sign clearance will be greater than 3 inches (75 millimeters) below desired sign clearance, the sign clearance should be increased.

4. If grading can be accomplished around the existing foundation to avoid standing water around the anchor bolts, it may be possible to simply raise the signs on the supports to obtain one foot (0.3 meter) of extra clearance. If raising the sign results in the sign being an unsupported distance of more than 4 feet (1.2 meter) above the centerline of the top support chord, intermediate (dummy) sign brackets will be required. Also, if the existing sign support is at it's maximum capacity prior to raising the sign, the support will have to be evaluated in detail to determine if this is feasible.

5. If grading around the existing foundation can be accomplished, another possibility might involve design of a "pole extension" which would engage the anchor bolts of the existing foundation and connect to the support base plates with new bolts. These would have stub shafts to provide a variable amount of raise to the support. This should not be done if the present foundation design is marginal.

6. If the system cannot be properly graded or the sign cannot be raised on the support for other reasons, the foundation top can be raised using a system of barrel nuts and anchor bolt extension studs, repouring the top of the foundation and re-erecting the sign support.

   When a sign is raised on an existing support a new item of work must be described in a note to cover raising each sign.

   If the support must be raised, items of work and notes may be needed for:

   - Removing the support with sign.
   - Modifying the foundation or inserting the pole extension(s).
   - Re-erecting the sign and support.
   - Replacing any electrical power cable between the disconnect switch and the pullbox.
   - Re-connecting the ground wire.

240-4 Overhead Sign Supports

240-4.1 General

Overhead sign supports and foundations shall be included in the contract plans. All overhead sign supports shall be electrically grounded.

240-4.2 Location

The exact location (by station to the nearest 1 foot (0.3 meter)) of the overhead supports should be determined according to the following criteria:

1. Refer to standard placement drawings ***(see Figures 298-8 through 298-11)***.

2. The preferred location for overhead sign supports is in the middle one-third of the design spacing for conventional roadway lighting units.

3. When the desired location criteria for a sign support does not place the support within the preferred area, the following minimum separation between overhead sign installations and

lighting units should be maintained:

Mounting Height for Lighting	Minimum Separation
32.5 feet (9.9 meters)	40 feet (12.2 meters)
40 feet (12.2 meters)	60 feet (18.3 meters)
50 feet (15.2 meters)	90 feet (27.4 meters)

If the lighting unit or the sign support locations cannot be adjusted to maintain the above minimum separation, the lighting unit may be placed immediately in advance of the sign support when a 40 foot (12.2 meter) or 50 foot (15.2 meter) mounting height is used for the lighting. However, this position cannot be used effectively when the mounting height is 32.5 feet (9.9 meters), and consideration should be given, particularly for complete or intermediate lighting design, to an adjustment of the mounting height for several light pole units in the general vicinity of the sign support.

At intersections, it is preferable to combine lighting units with overhead sign and/or traffic signal supports, when practical to do so, in consideration of current safety criteria, and in order to minimize the cost or clutter effect of a number of separate support poles.

4. Supports should be shown at 90 degrees to the roadway centerline in plan view, or with the angle shown on the plan if not 90 degrees.

5. For medians 30 feet (9.0 meters) or less, the sign support should be centered in the median.

240-4.3 Design of Cantilever Sign Supports

Cantilevers supports are addressed in **SCDs TC-12.30 and TC-16.20**. Standard practice for choosing a specific design for cantilever type overhead supports is as follows:

1. For supports in **SCD TC-12.30**,

   a. Determine the sign area. Include glare shield, luminaire support tube and Exit Number Panel, if applicable. For design purposes, use the total sign area or a minimum of 120 square feet (11.0 square meters) for mainline signs or a minimum of 80 square feet (7.5 square meters) for lead-in signs, whichever is larger.

   b. Determine the lateral location of the sign over the pavement (use ***Figure 298-9*** and item g below).

   c. Determine the lateral location of the support pole centerline with respect to the pavement. The standard location is 6.5 feet (2 meters) behind face of guardrail.

   d. Determine the distance from the centerline of the sign to the center of the pole.

   e. Choose an adequate design from the design chart for the **SCD TC-12.30** support ***(Figure 298-12)***.

   f. Compare the standard arm length with the nominal length required for the sign location originally determined.

   g. Adjust the lateral sign location (normal tolerance is within ±2 feet (0.6 meter) of the

desired location) to enable use of an arm length in whole foot (tenth of a meter) increments, using the standard length if possible.

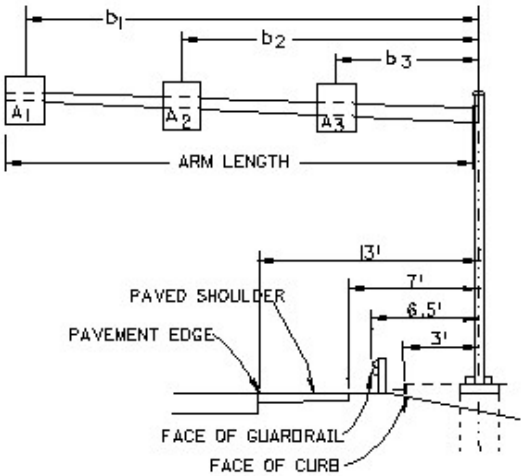
h. Determine the required elevation of the top of the foundation to provide proper clearance to the sign. Clearance shall be determined using the highest elevation of the pavement or shoulder under the sign. For design, use overall sign height or 10 feet (3 meters) on mainline, 8 feet (2.4 meters) on lead-in signs, whichever is larger.

2. For supports in **SCD TC-16.20**, the following instructions are used in designing supports, in conjunction with the **SCD**:

a. Determine the approximate arm length as the horizontal distance from the pole flange plates to the outer edge of the most remote sign.

b. Calculate the area moment design factor "K" by multiplying each sign area by the distance from its centerline to the pole centerline and add the products.

$K=A_1b_1+A_2b_2+A_3b_3$



c. Select the design number from Table A for unlighted signs or table B for lighted signs. Choosing a design number that provides both an adequate design factor and maximum arm length that meets or exceeds the actual arm length.

Table A - Unlighted		
K	**Design No.**	**Max. Arm**
235	1	23
355	2	31
735	3	35
935	4	43

Table B - Lighted		
K	**Design No.**	**Max. Arm**
720	5	24
855	6	27
990	7	30
1125	8	33
1485	9	36
1690	10	39
1890	11	42
2095	12	45

d. A given design number may have an adequate design factor "K" but have a maximum arm length that is too short for the intended application. If the arm length cannot be adjusted as explained below, the proper design will be controlled by the arm length. Do not exceed the maximum arm length for any design number.

   The arm length may be adjusted by carefully choosing the proper lateral pole location and sign placement. The most remote sign on the arm may be positioned 2 feet (0.6 m) short of being centered over its applicable lane. Minimum pole offsets are shown on the illustration.

   The dimensions shown above are minimum lateral clearances. If more than one of the above conditions is applicable, use the offset that provides the greater lateral clearances.

e. The design pole length and attachment point may be increased 1 foot (0.3 meter) if necessary to provide adequate vertical clearance.

Figure 298-20 provides an example of a table used to present design information for this support in the plans.

240-4.4 Design of Center-Mount Sign Supports

Center-mount supports are addressed in **SCDs TC-9.10 and TC 9.30**.

The **SCD TC-9.10** support is intended for use with Guide Sign installations, generally in urban areas, where the sign is not over the roadway and reduced vertical clearance is required for visibility (typically 10 feet (3 meters) minimum).

For either support, the sign is normally centered on the pole laterally, but may be eccentrically located if necessary. The design number selected must accommodate within its maximum allowable area, and maximum arm length L, the actual area and sign length.

Plan details shall show the actual lateral arm position and sign bracket locations. Sign brackets shall be spaced to avoid the arm attachment plate.

240-4.5 Design of Span Sign Supports

This type of support is addressed in **SCDs TC-7.65, TC-15.115 and TC-17.10**. Standard practice for choosing a specific design for the span type overhead support is as follows:

1. For supports in **SCD TC-17.10**,

   a. Determine the total sign area.

   b. Determine the lateral location of strain poles with respect to the pavement.

   c. Determine the length of the span.

   d. Choose an adequate design from the **SCD TC-17.10** design chart ***(Figure 298-18)***.

   e. Calculate the wire sag as 5 percent of the span length.

   f. Calculate the elevation of the attachment point of the top wire by adding to the critical pavement elevation the clearance, height of the sign and the sag.

g. Determine the elevation of the top of foundation.

h. Determine pole lengths by subtracting the foundation elevation from the attachment elevation and selecting a value, to the nearest whole foot (tenth of a meter), that will result in attachment at a point from 12 to 24 inches (300 to 600 millimeters) below the pole top.

i. Special design calculations must be made in the following circumstances:

i Sign areas or span lengths exceeding the limits of the design chart.

ii Required pole heights that exceed the standard (a higher design number with an adequate pole height may be selected if practical).

iii Special conditions, such as a large difference in the two pole lengths or an installation requiring attachment points at unequal elevations.

j. ***Figure 298-21*** provides an example of a table used to present design information for span-wire sign supports in the plans.

2. For supports in **SCDs TC-7.65 and TC-15.115**

a. Determine the total sign area. Include glare shields, luminaire support tubes and Exit Number Panels, if applicable. For design, use the total sign area or 120 square feet (11.0 square meters) per lane spanned for mainline signs or 80 square feet (7.5 square meters) per lane spanned for lead-in signs, whichever is larger.

b. Determine the lateral location of support end frame centerlines with respect to the pavement. The standard location is 6.5 feet (2 meters) behind face of guardrail.

c. Determine the length of span. The span length shall be in whole foot (tenth of a meter) increments unless structures or other physical restrictions require special lengths.

d. Choose an adequate design from design chart for overhead support trusses ***(Figure 298-13)***.

e. Determine the required elevations of the top of the end frame foundations and end frame lengths to provide proper clearance of the signs. Clearance shall be determined using the highest pavement or shoulder elevation under the span to the bottom of the largest sign (or critical sign) on the span. For design, use overall sign heights or 10 feet (3 meters) on mainline, 8 feet (2.4 meters) on lead-in signs, whichever is larger.

240-4.6 Vertical Clearance and Modification of Designs

As noted in ***Section 240-3***, the standard minimum vertical clearance for overhead signs is 17 feet (5.2 meters) or 1 foot (0.3 meter) greater than the minimum design clearance of other structures on the highway, whichever is less.

To obtain required vertical clearance and maintain a minimum of exposed concrete foundation, pole or end frame lengths may be varied from the standard lengths shown on the **SCDs**. Lengths may be shortened as necessary, but increased a maximum of 2 feet (0.6 meter) over standard length. For increases over 2 feet (0.6 meter) a special design will be necessary.

240-4.7 Elevation Views

Elevation views in the direction of viewing sign faces shall be prepared to a scale of 1"= 5' (1:50) showing the following for each sign support:

1. Total span or arm lengths for horizontal support members, to the nearest 1 foot (0.3 meter), unless physical conditions dictate greater precision.

2. Pavement elevations at outside edges of pavement and crown or highest critical pavement or shoulder point, to the nearest 0.1 foot (30 millimeters).

3. Pavement width and shoulder widths to the nearest 1 inch (25 millimeters).

4. Concrete foundation elevations at top and bottom to the nearest 0.1 foot (30 millimeters) if foundation dimensions are not as shown on the **SCDs**, or when steep roadside slopes or roadway superelevation would make foundation elevations difficult to determine.

5. Ground line elevation at the foundations to the nearest 0.1 foot (30 millimeters). The amount of exposed concrete should be restricted to the range from 0.1 foot (30 millimeters) minimum to 0.3 foot (90 millimeters) maximum.

6. Guardrail placement dimensions laterally from the centerline of the sign support pole or end frame to the face of guardrail to the nearest 1 inch (25 millimeters). The standard offset is 6.5 feet (2 meters) ***(see Section 240-6.2)***.

7. Minimum design vertical sign clearance and actual sign clearance to the nearest 0.01 foot (5 millimeters). Signs (including glare shield and luminaires) shall be centered vertically on the span or arms. Exit Number Panels are excluded from this positioning.

8. Horizontal sign placement with sign dimensions and spacing continuous across span or arm supports to horizontal limits of the support to the nearest 1 inch (25 millimeters). The minimum lateral clearance between signs is 2 feet (0.6 meter) (1 foot (0.3 meter) acceptable if more than two signs on support).

   All signs carrying lane arrows shall be placed so that lane arrows are centered over lanes with a maximum 2 feet (0.6 meter) offset from lane arrow to lane centerline where required.

9. Overall sign height including glare shield and luminaire support tubes.

10. Sign bracket spacing for the center mount supports **(SCDs TC-9.10 and TC-9.30)**, otherwise only if it varies from that shown on the **SCDs**.

    Additional sign brackets shall be provided whenever the sign (excluding Exit Number Panels) extends more than 4 feet (1.2 meters) above or below the attachment point.

11. Station location, sign reference number and design number of the support.

12. Sign bracket lengths if different from overall sign height.

240-4.8 Concrete Barrier Median Foundations

Concrete barrier median foundations for overhead sign support foundations are addressed in **SCD TC-21.40**.

The median will be widened maintaining typical wall slope configuration. A 10 foot (3 meter) length of the special section will be provided at each sign support location. For a typical median section with a 6 to 12 inch (152 to 305 millimeters) top width, provide a 40 foot (12.0 meter) taper transition on either side of the 10 foot (3 meter) foundation section.

The transition section of the median barrier will be shown on the roadway plans with a reference note to that portion of the traffic control plans showing the details.

Even if roadway lighting circuits are located in the median, electrical sign service will typically remain on the right end frame or support (looking at signs), and crossover conduit will be provided from the median to a pull box located 10 feet (3 meters) beyond the sign support in the direction of travel. Conduit, cable, pull boxes and connector kits will be included in the roadway lighting quantities.

Payment for the 10 foot (3 meter) foundation section of the barrier median will be included in the **Item 630** "Rigid Overhead Sign Support Foundation."

The transition sections will be included in the regular roadway quantities for the barrier median. Details of the transition section are shown on **SCD RM-4.4M**.

240-4.9 Barrier Wall Assemblies for Sign Supports

The barrier wall assembly **(see SCD TC-21.41)** may be used where concrete barrier is being installed on an existing section of highway and overhead supports will remain undisturbed. Use of this metal insert will maintain the continuity and safety aspects of the concrete barrier.

It should be recognized that the use of the Barrier Wall Assembly will result in increased maintenance as this design will tend to accumulate debris that will need to be periodically removed to avoid vegetation growth. For this reason, consideration should be given to upgrading the sign supports and using the Concrete Barrier Median Foundation **(SCD TC-21.40)** whenever possible.

240-4.10 Overpass Structure-Mounted Sign Supports

The following information should be included in the plans for structure-mounted sign supports **(see SCDs TC-18.24 and TC-18.26)**:

1. Elevation view with the following:

    a. Lateral location of the sign with respect to the edge of the pavement.

    b. Bracket spacing, if different from that shown on the **SCD**.

    c. Minimum design and actual vertical clearance from the critical pavement elevation or, for a roadside location, from the ground line.

2. Adjacent to the elevation view, a cross-section view of the bridge parapet and sign attachment showing the frame height.

3. When the bridge is being designed concurrently with the signing plan, the designer shall consider these support loads and incorporate them into the bridge design. If the bridge is existing, the designer shall contact the **Office of Structural Engineering** to make sure that they have no objections to the use of this type of support.

240-5 Ground-Mounted Sign Supports

240-5.1 General

Ground-mounted sign supports included in the contract plans shall be either yielding posts or structural beams.

240-5.2 Yielding Sign Supports

Yielding posts are addressed in **SCD TC-41.20** and the design of these posts shall be in accordance with design charts in ***Figures 298-14 and 298-15***. They are designated:

No. 2 Post
No. 3 Post
No. 4 Post (all except single post Type S installations shall be used only behind guardrail or concrete barrier)
No. 6 Post (shall be used only behind guardrail or concrete barrier)

240-5.3 Structural Beam Sign Supports

Structural Beams are addressed in **SCD TC-41.10** and ***Figure 298-19*** the design of beam supports shall be in accordance with design charts in ***Figures 298-16 and 298-17***. They are designated:

S4 x 7.7 (S100x11.5)	W8 x 18 (W200x26.6)
W6 x 9 (W150x13.5)	W10 x 22 (W250x32.7)
W10 x 12 (W250x17.9)	W12 x 30 (W310x44.5)

When structural beams are used, breakaway accessories will be provided if the sign cannot be placed behind an adequate length guardrail or concrete barrier ***(see Section 240-6)***.

Signs requiring beams larger than W8 x 18 (W200x26.6), with a clear distance between supports of less than 7 feet (2.1 meters), shall be protected by guardrail in accordance with ***Section 240-6.3***. Also, beam support installations subject to multidirectional impacts at intersections should use only the S4 x 7.7 (S100x11.5) beams (or require the use of the alternate breakaway design described in Note 8 of **SCD TC-41.10**).

240-5.4 "One Way" Sign Supports

The "One Way" Sign Support shown in **SCD TC-41.50** is used when it is necessary to mount two or more signs at 90 degrees to each other on the same post.

240-5.5 Breakaway Connections

When the breakaway connections shown in **SCD TC-41.10** are used, there will be one each required as pay item for each beam installed (i.e., a sign requiring three beams will have three breakaway connections).

240-5.6 Lateral Offset and Vertical Clearance

Lateral offset and vertical clearance details for signs are addressed in **SCDs TC-42.10 and TC-42.20**.

A 30 foot (9.0 meter) offset from the edge of pavement should be provided on all mainline freeway

or expressway Guide Signs unless adequately protected by guardrail or concrete barrier installed for other purposes. Minimum clearances above the pavement are shown on **SCD TC-42.10**.

Signs supports shall not be placed in drainage ditches. The sign should be adjusted laterally or longitudinally to avoid ditches.

240-5.7 Elevation Views

Elevation views in the direction of viewing sign faces shall be prepared to a scale of 1"= 5' (1:50) for all Guide Signs mounted on beam supports. The elevation views shall typically contain the following:

1. Edge of pavement, shoulder and break point elevations.
2. Size, placement, support size, length and elevations at the groundline at each leg.
3. Existing and proposed guardrail, fence and/or related devices.
4. Foundation elevations and depth.
5. Station, placement right (Rt) or left (Lt) and sign support number.

Regulatory, Warning and Route Marker Signs shall be installed in conformance with **SCD TC-42.20**. If placement is different than shown, typical placement details should be shown on the plans.

240-5.8 Street Name Sign Supports

Street Name signs are typically erected and maintained by local authorities, but they may be included in contract plans **(see SCD TC-41.40)**.

240-6 Guardrail Protection For Signs

240-6.1 General

An effort should be made to locate signs behind proposed lengths of standard guardrail or concrete barrier used for other purposes. Be sure to recheck sign distance to the exit when so doing. Distance should be correct to the nearest one-quarter mile. No independent guardrail shall be provided for beam supports except as described below or in ***Section 240-5.3.***

If the sign cannot be relocated, standard guardrail may be extended up to 100 feet (30 meters) to provide the required protection in advance of the sign, as described in ***Section 240-6.3***.

240-6.2 New Overhead Installations

Guardrail protection is required for all overhead sign installations not protected by concrete barrier on highways where the operating speed is anticipated to be 50 miles per hour or more. Where independent guardrail is required, a total of 112.5 feet (34.29 meters) should be provided. These measurements do not include the anchor assembly at each end. See **SCDs GR-5.1, GR-5.2 and GR-5.3** for further details.

In median locations, guardrail protection will be required on the opposite roadway if the sign support is less than 30 feet (9.0 meters) from the pavement edge. For details refer to **SCD GR-6.1**. (treat similar to bridge pier).

240-6.3 Ground-Mounted Installations

Beam supports located behind roadway guardrail require the following minimum advance protection (assumes that the near-edge of the sign is typically 4 feet (1.2 meters) offset from the face of guardrail):

Sign Length		Advance Guardrail
< 15 feet	(5.0 meters)	100 feet (30.48 meters)
16 to 19 feet	(5.0 to 5.9 meters)	125 feet (38.10 meters)
20 to 24 feet	(6.0 to 7.4 meters)	150 feet (45.72 meters)
≥ 25 feet	(≥ 7.5 meters)	175 feet (53.34 meters)

These measurements do not include the anchor assembly.

240-6.4 Existing Overhead Installations

At existing overhead sign supports with less than 6.5 feet (2 meters) but more than 4 feet (1.2 meters) clearance from the face of the guardrail to the centerline of the support, additional posts shall be added to obtain one-quarter panel spacing. The reduced spacing shall start 12.5 feet (3.81 meters) upstream of the support and continue to just downstream of the support. At supports with 4 feet (1.2 meters) or less clearance, Type D concrete barrier shall be used.

240-7 Sign Lighting

240-7.1 General

Current guidelines governing lighting of signs are contained in ***Section 212***.

When signs are to be lighted, mercury vapor luminaires shall be used and the method of mounting shall be as shown on **SCD TC-31.21**.

Luminaires are normally mounted at the bottom of the sign; however, in specifically justified cases, top mounting may be required (**OTE** will supply details to be included in plans).

All overhead-mounted signs that will have sign lighting shall include a glare shield as specified in **CMS Item 630.04**. It should be noted that the top 6-inch (150 millimeters) portion of the glare shield shown in **SCD TC-31.21** (Mercury Vapor Sign Lighting Detail II) is an extension of the sign and is not notched. The remaining 6-inch (150 millimeters) portion of the glare shield is part of the structural member of the sign lighting support system.

240-7.2 Sign Service

Details for sign service are shown on **SCDs TC-32.10 and TC-32.11**. As described in **CMS Item 631.04**, Sign Service includes all cable and equipment to make the connection between the disconnect switch and a source, which is a pull box or the point of an overhead drop.

Electrical services will normally be provided for overhead signs as an integral part of highway lighting circuits. This will be accomplished by providing a pull box located 10 feet (3 meters) beyond the sign support in the direction of traffic. The total ballast wattage for each installation shall be shown on the highway lighting plans.

Where highway lighting circuits do not exist, or are impractical to use for sign lighting, separate independent circuits may be used. Highway lighting circuits may be extended beyond the last unit

to service a lighted sign to the extent that the cost does not exceed separate service if power is available. If the sign is not near an area with highway lighting, which was provided as a part of the facility, the sign lighting may be fed from a separate independent source arranged with the local power company. See ***Section 240-7.7*** for further details regarding getting electrical power from a local power company for lighted signs.

Photoelectric control of sign lighting shall be provided by one of the following, listed in order of preference:

1. Within highway lighting circuit controls.

2. On sign supports or independent service poles when uncontrolled independent circuits are required.

If one or more sign installations is to be provided with separate underground electrical service, the plans must include the necessary service in conformance with the guidelines in ***Part 11*** (Highway Lighting).

If the source is uncontrolled, the payment item “631 Photoelectric Control" shall be included for each sign service.

240-7.3 Ground Rods

All overhead sign installations shall be grounded. Overhead sign supports shown in **SCDs TC-18.24 and TC-18.26** will always require a ground rod. All other overhead sign supports will require an item for ground rods unless mounted on a bridge parapet, where grounding is included in the Item for structure grounding system. Sign supports shown in **SCD TC-17.10** will require a ground rod for each strain pole. Grounding details are shown on **SCDs TC-32.10 and TC-32.11**.

240-7.4 Disconnect Switch with Enclosure, Type X

This item shall be required for all new lighted installations. Existing overhead sign supports will usually be equipped with a switch and enclosure.

Switch enclosure mounting bracket assemblies are furnished with new supports and the bid item is required only for overpass structure-mounted supports or existing supports not equipped with brackets.

240-7.5 Ballasts

Each mercury vapor luminaire requires a separate ballast. The typical location is within the luminaire (integral) or in a weatherproof housing attached to or beside the luminaire (contiguous).

The bid item is "Ballast, By Type”.

In the ballast bid item, an example of "By Type" is CMRI-100-480 where 100 indicates the lamp wattage and 480 indicates the operating voltage.

Any reuse of ballast items will require special plan notes and details relating to the specific situations and circumstances.

240-7.6 Mercury Vapor Luminaires

This item is required for all lighted sign installations. The bid item "Mercury Vapor Luminaire, Type

TC-31.21, with ___ watt lamp" will provide new equipment.

If existing fixtures can be reused the bid item "Removal of luminaire and reerection" should be included in the plans.

New sign supports include luminaire support assemblies. This bid item will only be required for existing supports not equipped, installations being converted from fluorescent to mercury vapor fixtures and installations being converted from the old Type TC-31.20 mercury vapor to Type TC-31.21 mercury vapor fixtures.

240-7.7 Electrical Power Provided by the Power Company

When it has been determined that the most appropriate power source for sign lighting is the local power company, it is reasonable to use a different ballast/luminaire combination which matches an existing supply voltage already available from the power company in the area. Normally this will be 120/240 single phase using three-wire service; however, this should be confirmed with the power company.

Design development in such a situation should include:

1. A check with the power company to determine the most advantageous location for the service pole or other facility, which will separate their work from the contractor's:

    a. If a meter will be used, it should be placed and oriented to allow easy reading by power company personnel without the need of stopping on mainline or high speed ramp areas.

    b. Meters, disconnect switches and photocells should be reasonably sheltered from casual vandalism.

    c. A service pole should be readily accessible for maintenance.

    d. If the contractor will install underground service to the sign, a disconnect switch should protect the circuit before it goes underground.

    e. If the power company will install overhead cable to our pole, it should be routed down the outside of the pole in separate conduit and into the (meter if used and on to the) disconnect switch.

    f. If the power company offers either metered or unmetered service, the designer should check with the maintaining agency to determine their preference.

2. A photocell will normally be provided at each sign support.

3. The submittal of detailed plans to the power company should clearly request written response to the following:

    a. That the extent of the contractor's proposed work shown in the plans to make power connections will be sufficient to establish the needed electrical service, and no added work by the contractor, **ODOT** or local maintaining agency; such as providing or installing conductors, conduit, trench, service disconnect equipment transformers, etc.; will be needed to complete the service later.

    b. Will the power company require any payment by the contractor, **ODOT** or the local agency to establish or continue the power service shown in the plans? Examples of such costs

might include: underground or overhead hook-up charges, conduit, trench, conductors, poles, transformers, etc. Also if such charges will be made by the contractor, an itemized estimate should be provided which will be in sufficient detail to satisfy **ODOT** and **FHWA** requirements.

c. Are any proposed features in conflict with the company's underground or overhead facilities? (Conflict with underground utility facilities is covered by the requirements of **ORC Section 153.64**).

d. Will any proposed features require that the power company rearrange their existing facilities to allow the contractor to proceed? Examples might include rearrangement of electrical service wires (or telephone or coaxial cable) on a pole to allow proper clearances to attach a signal messenger or signal interconnect cable to the pole. Also, if such work will be needed, an itemized estimate of any costs which will be charged to the contractor, **ODOT** or local agency should be requested.

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241 PLAN PREPARATION / PRODUCTION

241-1 General

The **L&D Manual Volume Three** and ***Section 140*** generally describes **ODOT** plan preparation and production guidelines and standards. Additional information is provided in this Section and ***Section 240*** regarding signing items in plans.

241-2 Signs

Proposed sign legends shall be shown at each sign location. Also, the supplemental design information should include a comment or indication as to whether signs on adjoining projects under construction, or opened to traffic, should be revised to fit traffic pattern changes resulting from the proposed project.

241-3 Signal and Sign Supports

Section 441-2 describes location requirements for both signal and sign supports that apply to Stage 2 plans.

241-4 Power Service

Service for sign lighting is usually through the power service provided for traffic signals or highway lighting. See ***Sections 240-7.7, 441-3 and 441-8*** for information on handling power service details in the plans.

241-5 Quantities

In the General Summary, all quantities should be shown in whole units of measurement, except concrete which shall be shown to a tenth of a cubic yard (hundredth of a cubic meter).

On metric plans, sign area shall be shown in tenths of a square meter and support lengths shall be shown in tenths of a meter.

241-6 Bid Item Descriptions

Bid item descriptions are required to exactly match the descriptions published in the "Bid Item Dictionary."

When the standard bid item description is inappropriate, the words "As Per Plan" shall be added to the description, and a note shall be provided to describe the deviation from the standard specifications and/or details. See ***Section 242*** for examples of typical plan notes.

241-7 Sign Support, Detail Design Requirements

Instructions for designing the sign support included in the related **SCDs** and ***Section 240***. ***Figures 298-19 and 298-20*** provide examples of tables for presenting signal support information in the plans for support types described in **SCDs TC-16.20 and TC-17.10**.

Use of the sample tables is recommended as a means of uniformly presenting support information to the contractor or support manufacturer. The support designer should note that the orientation angles consist of:

- A field angle that establishes the angular relationship between the project centerline perpendicular

and a pole feature (handhold or mast arm) which serves as an index; and

- Angles for all pole appurtenances that are measured from this index pole feature.

242 PLAN NOTES

242-1 General

Typical **Plan Notes** have been consolidated here for convenience in preparing plans. The number used for the **Plan Note** will be the same as the section number. When a **Plan Note** revises the material or contractor requirements from that which is specified in the **CMS**, both the note and the bid item will be "as per plan". Where there are design instructions pertaining to a specific note, they are listed at the end of the note. These notes may be modified to further define the conditions of a project or maintaining agency.

In keeping with traditional format of **Plan Notes**, various format changes are used here that are not typical throughout the **TEM**, e.g., the terms Contractor and Engineer are capitalized.

Also, at this time the **Plan Note** number that has been used is shown in parentheses at the beginning of the title for the note.

See ***Sections 442-10 and 442-11*** for Plan Notes related to combination signal/sign supports.

242-2 (625-B) Power Supply for Sign Lighting

Electric power shall be obtained from the _____ at the location indicated on the plans. Power supplied shall be ___ volts.

Designer Note: This note should be included on projects with lighted signs when separate service is required for one or more signs which cannot be integrated with the roadway lighting circuits. The name and address of the power company and voltage to be supplied shall be specified in the appropriate blanks.

242-3 (630-A) 630 Overhead Sign Support Modification, by Type

Overhead sign supports shall be modified as shown in the plans. The modification shall consist of - (see examples below):

1. The insertion of a new box truss section of ___ feet (meters).

2. The replacement of an existing arm with a new arm of ___ feet (meters).

3. The replacement of an existing end frame with a new end frame.

4. The replacement of the existing pole with a new pole of ___ feet (meters).

5. The relocation of an existing end frame.

Payment will be at the contract unit price for the modification of the overhead sign support, including all necessary material, parts, equipment and labor, using the designation: 630 Each - Overhead Sign Support Modifications, By Type.

Designer Note: This note should be included on projects which require the modification of overhead sign supports. The note should be edited as required and blanks filled. When example 1 is used, it is typically used in combination with 3 or 5.

The following is a Bid Item example: Overhead Sign Support Modification, Type TC-7.65, Design 6, New Box Truss Section ___ feet (meters).

242-4 (630-B) Mile Marker Location

The location of Mile Markers on the plans are approximate and a more precise location will be provided by the Department. The Contractor shall notify the Engineer at least 30 days in advance of planned date of marker installation. The Engineer will contact the Office of Technical Services which will locate the longitudinal position of Mile Markers by means of a paint mark on the pavement edge. Alternate marks will not be provided on divided highways and the Contractor shall set markers for the opposite roadway across from the provided mark. Delineators whose normal position falls within 50 feet (15 meters) of a Mile Marker shall be omitted.

Designer Note: This note should be included on all projects where Mile Markers are being installed.

242-5 (630C) 630 Modification of Barrier Wall Assembly

Barrier wall assembly **SCD TC-21.41**, provides a 3 inch (75 millimeter) high clearance below the bottom of the steel wall plates for the drainage of water away from the sign support foundation and for ventilation.

Asphalt concrete shall be placed and compacted around the sign support foundation so that no water will be trapped in this area when all project work is completed.

If the resurfacing of the shoulders reduces the clearance to less than 2 inches (50 millimeters) the following shall be done:

1. Remove the steel wall plates.

2. Remove, by sawing, cutting or grinding, enough material from the bottom of the steel wall plates and the center bulkhead to provide a 3 inch (75 millimeter) clearance from the finished asphalt.

3. Paint the cut edges and any damaged galvanized areas with two coats of zinc-rich paint.

4. Reinstall the steel wall plates in their proper positions, using new bolts, nuts and washers.

Payment will be at the contract unit price for each **Item 630** "Modification of Barrier Wall Assembly" including all necessary material, parts, equipment and labor at each foundation.

Designer Note: This note shall be included on resurfacing projects with existing barrier wall assemblies.

243 SPECIFICATIONS

ODOT specifications for furnishing and installing signing materials and hardware are contained in the following **CMS** sections:

630 and 730	Traffic Signs and Sign Supports, and Traffic Sign and Support Material
631 and 731	Sign Lighting and Electrical Signs, and Sign Lighting and Electrical Signs Material

250 CONSTRUCTION

250-1 General

This information is intended to serve as a guide for construction personnel where the contractor furnishes and installs traffic control devices and appurtenances. However, it may also be useful for maintenance personnel performing the same functions. Inspection procedures for various types of traffic control devices are outlined, mainly in the form of check lists to assist project personnel in performing their duties. This information points out the various important features of each device and references the applicable specification or standard drawing. Illustrations are used for easy recognition of the device or feature being discussed.

250-2 Sign Service

Sign service shall comply with **SCDs TC-32.10 and TC-32.11** and the plans. Additional information is provided in ***Section 240-7.2*** and **CMS Item 631.04**. Basically, it consists of cable and equipment to provide a complete electrical service from either an underground source or an overhead direct drop to separately furnished disconnect switch with enclosure. The equipment could include weather head, a conduit riser with necessary fittings, attachment clamps and cable.

A thorough review of the plans should be made to determine the specific requirements of the maintaining agency for sign service.

When required, an electric meter base will be furnished by the applicable utility and installed by the contractor as part of the sign service work.

The sign service is to terminate at the meter base, if used; otherwise termination will be at the switch enclosure. Sign service could be by:

1. Direct drop by means of a weatherhead and conduit riser routed to the switch enclosure;

2. Underground conduit and the pole interior to the enclosure; or

3. Underground and structure-attached conduit to the enclosure (for overpass mounted signs).

The conduit riser is to comply with **CMS Item 713.04, 725** and the plans, and the weatherhead is to be threaded aluminum or galvanized ferrous metal **(CMS Item 732.16)**.

The disconnect switch is to be a single-throw safety switch meeting the voltage and capacity requirements of the plans. The enclosure is to be a **NEMA** Type 4 ICS 1-110.15 with sufficient volume to accommodate an internal transformer when specified. The enclosure is to contain a solid neutral bar.

A ground wire is to be used as shown on **SCDs TC-32.10 and TC-32.11** leading to a ground rod installed in accordance with ***Section 240-7.3***.

250-3 Foundations

250-3.1 Staking

Sign support foundations are to be located so that the sign face is at a right angle to the roadway lanes served, unless the plans specify otherwise. An example of an exception is the W1-6 Large Arrow sign (black arrow on yellow background) which is located as shown in ***Figure 298-24***.

Foundations should be staked by the contractor in accordance with the locations shown on the plans.

The stakeout locations should be checked for:

1. The presence of obstructions which could restrict motorists' proper visibility of the sign from the point where they are expected to read the sign. Curved roadway locations should especially be checked.

2. Obvious conflicts with overhead power lines or other utilities. There should be available a proper safe clearance from overhead lines for construction operations, in compliance with the **National Electric Safety Code** and any local codes.

3. Possible conflict with underground facilities.

Foundation locations may be adjusted when necessary to overcome difficulties such as those shown in ***Figure 298-24*** and discussed herein, with the concurrence of the project engineer. Adjustment should not violate minimum clearance dimensions as shown on **SCDs TC-42.10 and TC-42.20** and the **OMUTCD**.

250-3.2 Excavation

Foundations shall be placed only in undisturbed soil or compacted embankment and excavation shall be by an earth auger of the specified diameter to the specified depth. See ***Figure 298-25*** for a diagram of a foundation excavation.

If a minor cave-in should occur, the contractor may continue excavation using an increased diameter; or use sleeving, casing or other method approved by the project engineer. However, the foundation concrete will be measured as determined from plan dimensions. The contractor must remove all extraneous material from the excavation before concrete placement.

When subsurface obstructions are encountered, permission may be granted by the project engineer to replace the excavated material and relocate the foundation.

When bedrock is encountered, that portion of the specified foundation depth within the bedrock may be reduced as much as 50 percent.

250-3.3 Placement

Anchor bolts and conduit ells are to be of the correct size and furnished with the support. At least one 2 inch (51 millimeters) minimum conduit ell is to be furnished and capped if unused. Anchor bolts, conduit ell(s) and EMT (Electric Metallic Tubing) are to be oriented in the foundation according to the plans, conduit runs and ground rod location. All anchor bolts are to be provided with standard steel hex nuts, leveling nuts, plain and lock washers. The nuts are to be capable of developing the full strength of the anchor bolts.

Reinforcing bars, tie loops and tie bars are to be of the correct size and arranged with the anchor bolts into cages according to the applicable **SCD TC-21.10 or TC-21.20**. A special foundation design will be required when soil with a load bearing capacity of less than 2,000 pounds per square foot (9700 kg/m^2) is encountered.

Anchor bolts are to be vertical with their ends projecting the correct distance above the foundation surface in compliance with the plans. When the distance the anchor bolts project above the foundation surface is not specified, a rule of thumb is four times the bolt diameter. The anchor bolts are to be tied to the cage tie bars according to standard details.

The cage is to be supported 3 to 4 inches (75 to 100 millimeters) above the bottom of the excavation by a piece of concrete block or similar material. The cage is to be positioned with a clearance of 3 inches (75 millimeters) from the excavation wall by similar blocking so that after concrete placement a full thickness cover is assured.

A template and/or frame is to be used to rigidly hold the anchor bolts and conduit ell(s) in the specified pattern during concrete placement. A form is to be oriented according to the plans to shape the foundation into a square from the surface or grade shown to a nominal 6 inches (150 millimeters) below groundline. The template and form may be combined. Gaps of 6 inches (150 millimeters) or less between the foundation and adjacent paved surfaces are to be eliminated by increasing the formed foundation.

Water encountered in the foundation excavation is to be pumped out before concrete placement. If this is not feasible, concrete should be placed by the tremi-tube method.

Concrete conforming to **CMS Item 499** and **CMS Item 511** is to be placed and vibrated to eliminate voids. Care should be exercised during vibrating to avoid disturbing the anchor bolts, conduit ell(s) and reinforcing cage.

Forms may be removed as soon as the concrete has hardened sufficiently so as not to be susceptible to damage **(CMS Item 511.13)**.

Minor earth caving external to the hole which may have occurred during excavation using sleeving or casing should be corrected after concrete placement by backfilling and tamping in accordance with **CMS Item 203**.

Joint filler complying with **CMS Item 705.03** is to be placed between the formed foundation and adjacent paved surfaces.

Supports and poles may be erected, signs installed and span wire load applied only after the concrete has aged sufficiently to be in compliance with ***Section 250-3.4***.

250-3.4 Curing and Loading

Curing and loading of concrete for traffic control devices is to comply with **CMS Item 511.14**. Concrete for foundations of sign supports is to be cured, have bracing removed and be loaded only when the concrete has achieved the age shown below:

	Age of Concrete in Days	
	Without Beam Test	With Beam Test **
Curing	7	5
Removing Bracing	7	3
Loading*	14	7

* No load is to be applied or other work done that will damage new concrete or interfere with its curing.

** Beam test specimens are to be poured from the same batch, immediately before, during or after foundation pour. Specimen configuration is to be to **ODOT** requirements. Specimens when tested must have at least an average modulus of rupture for two tests of not less than 650 pounds per square inch (4.5 MPa).

250-4 Overhead Supports in General

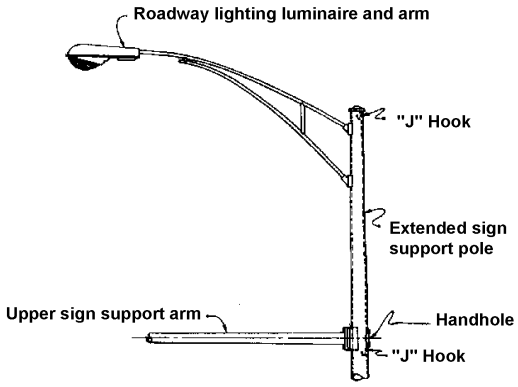
250-4.1 General

Various general aspects of overhead sign supports are addressed in this section. ***Table 297-7*** provides an overall summary of the structure types, allowable sign area on each and the span or arm length.

250-4.2 Pole and Support Inspection

This inspection checklist covers the general features of strain poles, mast arm type signal supports and overhead sign supports. Features pertaining only to specific pole or support types will be found in the sections of this manual covering exclusively those poles or supports.

1. When poles and supports of the combination type are specified, they are to provide extra length as necessary for a highway lighting function and welded-on bracket arm plate(s) complying with **SCD HL-10.12 or HL-10.11**, for attachment of a separately furnished luminaire arm. An upper handhole and an additional internal J-hook are to be furnished.



2. Supports may be of an alternate design utilizing all non-tapered tubing structural members.

3. Poles and supports should be inspected when received if possible, but certainly prior to erection.

4. General dimensions should be checked first, including pole length, base diameter, top diameter, and wall thickness. Similar mast arm dimensions should also be checked. Wall thickness is most easily measured with calipers at the end. Caps on poles may have to be removed.

5. Orientations of the various appurtenances should be checked against the plan's orientation diagram if such is available; otherwise orientations may be determined from certified shop drawings and the intersection drawing.

6. Base plate dimensions should be checked including thickness, bolt circle diameter and bolt hole size. Base plates may be plate or cast steel according to **CMS Item 730.04**.

7. A handhole with ground lug is to be furnished, with a cover plate complying with **CMS Item 730.05** and a stainless steel chain complying with **CMS Item 730.10**.

8. Blind half-couplings are to be provided where required. Sharp edges are to be rounded to prevent damage to cable or wires. Blind half-couplings are to be plugged when not in use. Couplings may be for signal or interconnect cable entrance or for attaching supports for traffic control equipment and for hubs for controller cabinets. Entrance couplings are to be threaded for use with threaded weatherheads.

9. An internal J-hook is to be furnished and located as indicated on the plans.

10. A pole cap conforming with **CMS Item 730.06** is to be furnished, and must be in place before final inspection.

11. An arm cap conforming with **CMS Item 730.07** is to be furnished for chords or mast arms.

12. All strain poles and overhead sign and signal supports are to be grounded (even if no power is available).

13. Welding is to be inspected in accordance with ***Section 250-4.3***.

14. Galvanizing is to be inspected in accordance with ***Section 250-4.4.***

15. When required by the plans, supports are to include sign brackets, U-bolts, clamps, luminaire support arms, bracing rods, other necessary structural members and signal hanger clamps with clevis.

16. The correct number and size of anchor bolts and conduit ells are to be furnished for placement in the foundation.

17. Anchor bolt diameter and length are to be according to the plans and **SCD TC-21.10 or TC-21.20**. Anchor bolt ends may have an L-bend or be fitted with a tapped steel plate. Threaded ends are not to be damaged and are to be galvanized at least 2 inches (50 millimeters) beyond the threads. The galvanizing should be in good condition, and absent or damaged galvanizing should be repaired by the application of two coats of zinc-rich paint. Galvanizing thickness should permit the turning of nuts by a wrench without difficulty. Loose rust on anchor bolts should be removed.

18. All anchor bolts are to be provided with standard steel hex nuts, leveling nuts, plain washers and lock washers. The nuts are to be able to develop the full strength of the anchor bolts.

250-4.3 Inspection of Welds

All welds of supports shall be inspected visually as soon as possible following support delivery. Welds should be inspected for flaws and imperfections under good lighting conditions using a magnifying glass as necessary. Evidence of any of the following faults or other imperfections such as warping and misalignment may be cause for rejection of the support. The following features of welds should be checked:

1. A check should be made for the actual presence of all welds called for by the certified shop drawings and standard drawings.

2. Welds on tapered tubes, pipe or structural shapes are to be continuous around the joint. Welds requiring terminations are to be of the correct length.

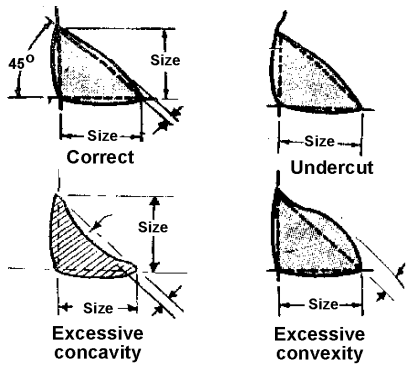
3. Welds are not to exhibit cracks or discontinuities in base metal or weld material and are not to show evidence of porosity, showing up as pitting or pinholes. The galvanizing layer may cover such flaws, but their existence should be checked.

4. Welds are to be full cross section without excessive concavity or convexity. Required weld terminations are to be filled to full section without depressions or craters.

5. There should be no evidence of undercut, a condition where a shallow groove is melted into the base metal adjacent to a weld and left unfilled by weld metal.

6. Base plates are to be welded to two ply poles with **AWS** prequalified welds in conformance with **CMS Item 730.04**.

7. Arm attachment plates are to be welded inside and outside with fillet welds. Each fillet weld is to be equal to the wall thickness of the respective tubing.



250-4.4 Inspection of Galvanizing

The galvanizing cover of supports is to be inspected visually as soon as possible following delivery. The galvanizing should be inspected externally and internally for flaws and imperfections in daylight or strong artificial light. In accordance with **CMS Item 513.22**, supports are to be loaded, transported, unloaded, stored and erected in a manner avoiding damage to any feature including the galvanizing. Supports stored in the field should be kept off the ground to prevent the galvanizing from contacting water which may result in a premature oxidation condition. The galvanizing should have the appearance of a uniform application. Supports should be checked for assurance that the following flaws or imperfections do not exist:

1. Loose or bare spots in the galvanizing where improper preparation has prevented metal adherence in the molten zinc bath. Poles should be rejected if the point of a penknife can flake off the galvanizing layer.

2. General overall roughness, a symptom of overpickling or of excess zinc bath temperature and/or immersion time.

3. Pimples, due to entrapped bath scum particles.

4. Blisters, due to hydrogen gas absorbed during pickling and coming out at the time of galvanizing.

5. Flux inclusions, picked up from the top of the bath when dipping and burnt-on during immersion.

6. Ash, usually in course lumps picked up from the top of the bath.

7. Patches of dull gray coating, due to the slow cooling of heavier cross sections of supports after immersion.

8. Excess zinc lumps or runs, due to delayed molten metal run-off from surface discontinuities such as joints, seams or holes.

9. Rust stains, due to the weeping of impurities from the pickling process at seams and folds. Excessive galvanizing faults and imperfections combined with general poor workmanship may be cause for rejection of the support. Gross imperfections may lead to the suspicion of inadequate protective cover which may require inspection with a magnetic instrument. Items 1 through 6 may be cause for rejection. Items 7 through 9, if extreme, may also be cause for rejection, because of poor appearance even if the protection of the support is not affected.

After erection, supports should be given a final inspection for any damage to the galvanizing due to improper handling in the erection process. Damage due to slings, etc., which is more serious than superficial brightening is to be repaired by the contractor with the application of two coats of zinc-rich paint.

250-4.5 Weight of Supports

Tables 297-8a through 297-8f provide information on the weight of various overhead sign supports. For all structures, the weight of the pipe support has been given where pipe has been frequently used in place of tapered tubes. In general, the tapered tube support will be lighter than the pipe support. The support numbers listed may be preceded by I-129, 815, 844 or other designation instead of TC.

For estimating purposes, a 10 x 10 foot (3.0 x 3.0 meter) sign (including the sign lighting) weighs approximately 400 pounds (181 kilograms).

250-4.6 Assembly and Erection Procedure

Erection procedures pertaining to specific pole or support types will be found in the sections of this manual devoted exclusively to those poles or supports. In general the following assembly and erection procedure applies:

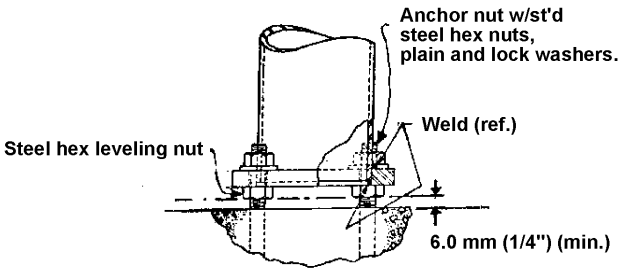
1. To minimize erection time and the hazard to workers and motorists where traffic is maintained, supports should be erected with mast arms attached, and horizontal sign support members (over the roadway) should be prewired for lighted signs or other traffic control devices. See the notes in plans for traffic maintenance requirements when span-type sign support members are erected.

2. Support components are to be assembled with their threaded fasteners tightened in accordance with **CMS Item 630.06**. Fasteners ½ inch (13 millimeters) or greater shall have anaerobic adhesive applied to the threads according to the manufacturer's recommendations. Nuts may be tightened by the "turn of the nut" method or by means of a torque wrench.

3. The "turn of the nut" method shall be in accordance with **CMS Item 513.15**. Nuts shall be made snug tight by the effort of a person using an ordinary spud wrench followed by an additional 1/12 to 1/3 turn.

4. Tightening by a torque wrench is to obtain a bolt tension between 80 percent and 100 percent of the proof load for the bolt size as listed in the **Society of Automotive Engineers Handbook** and shown in ***Table 297-10***.

5. Leveling nuts shall be placed on the anchor bolts, initially clearing the foundation surface by at least 1/4 inch (6 millimeters) and forming a horizontal plane.



6. Poles or supports shall be raised into position with equipment of adequate lifting capacity and used in a manner preventing damage to attached appurtenances (signs, brackets, luminaires, etc.) or to the galvanizing. The weight of poles or supports is given in ***Section 250-4.5*** for the use of the contractor in the erection procedure.

7. With the pole or support's baseplate resting on the leveling nuts, the lock washers and anchor nuts are to be placed on the anchor bolts, the support plumbed in a vertical position or raked as required, and anchor nuts given a preliminary tightening.

8. After any necessary leveling nut adjustments are made to assure that supports are essentially vertical after attachment of signs, sign lighting equipment or signals the anchor nuts are to have anaerobic adhesive applied and be final tightened in accordance with the instructions for assembling fasteners given in the foregoing paragraphs 2, 3 and 4.

9. Anchor nuts are to be covered with bolt covers or a cover base when poles are erected in sidewalks, traffic islands, curbed areas and seeded areas of urban character **(CMS Item 630.06 B and 632.15)**.

10. Poles or supports which are prewired before erection should be checked to determine if the erection procedure has disturbed the wiring. Wire for lighted signs should be supported by looping wire over the J-hook in the vertical support member **(CMS Item 631.05)**. Cable supported by cable support assemblies should be checked to determine if the sling is over the J-hook and adjustment is proper to eliminate strain on the cable jacket.

250-5 Overhead Sign Supports By Type

250-5.1 General

Section 250-4.6 addressed general assembly and erection guidelines for strain poles and supports. The following sections provide additional information specific to various types of supports. For the most part the information is provided in a checklist format.

250-5.2 Span Wire Support

Span Wire sign supports shall comply with **SCD TC-17.10** and the plans. These sign supports consist of strain poles, messenger wire with accessories and sign hangers. Strain pole size and type, anchor base or embedded, shall be as specified.

1. Strain poles are to be inspected in accordance with ***Section 450-6.1*** and general features of the poles inspected in accordance with **Section 250-4.2.** Welds are to be inspected according to ***Section 250-4.3*** and the galvanizing inspected according to ***Section 250-4.4.***

2. Erection is to be in accordance with the general procedure given in ***Section 250-4.6*** except as hereafter noted.

a. For the initial rake of strain poles of the anchor base type or embedded type poles, see ***Section 450-6.1***.

b. The upper messenger wire is to be assembled with its accessories according to the standard drawing. Preformed guy grips are not permitted because wind loads on the signs can cause failure of the grips. Alternate methods of attaching messenger wire to strain poles may be used:

   i Span wire clamp with clevis, anchor shackle and thimbles on the messenger wire, or

   ii Messenger wire wrapped twice around the strain pole and secured with a 3-bolt clamp of the proper size.

c. The upper messenger wire is to be fitted with its signs, furnished under other items of work, and the vertical clearance to sign bottoms adjusted within clearance limits over the roadway. The sag of the upper messenger wire is to be between 4 and 5 percent.

d. It is essential that the lower messenger wire have more slack than the upper wire. The sag should be approximately 3 inches (75 millimeters) greater than the upper wire. This sag adjustment is to be made before the sign hangers are attached to the lower wire.

e. Sign hangers are to be clamped snugly to the lower wire by U or J bolts. In the case of back-to-back signs, the lower messenger wire running in between the sign hangers, is clamped between bolted spacers that are slightly thinner than the messenger wire **(see SCD TC-17.10)**.

250-5.3 Single Arm Support

1. Single arm supports shall comply with certified shop drawings, **SCD TC-16.20** and the plans.

2. General features of the support shall be inspected in accordance with ***Section 250-4.2***. Welds shall be inspected according to ***Section 250-4.3*** and the galvanizing inspected according to ***Section 250-4.4.***

3. For arms of two telescoping pieces, a 15-inch (400 millimeters) overlap is required. The overlapped arms are to be secured with a stainless or galvanized steel hex head through-bolt with nut.

4. Arm caps are to cover at least 50 percent of the end area **(CMS Item 730.07)**.

5. A minimum of two brackets are to be provided for each sign, each attached to the arm by steel clamps with carriage bolts. The clamps should be able to be tightened in a manner to firmly grasp the arm so as to prevent sign rotation.

6. Only extrusheet type signs are normally lighted. If such signs are lighted, disconnect switch enclosure mounting brackets may be required on the support.

7. Erection is to be in accordance with the general procedure given in ***Section 250-4.5***, except as hereafter noted.

   a. The contractor may choose to attach the signs and any sign lighting items before erection.

   b. Signs are installed at the same elevation. For this purpose, adjustment is provided by two

pairs of slotted holes in the sign bracket for attachment of the arm clamp.

c. Contact between galvanized clamp flanges and aluminum sign brackets is to be prevented by the use of chloroprene gaskets.

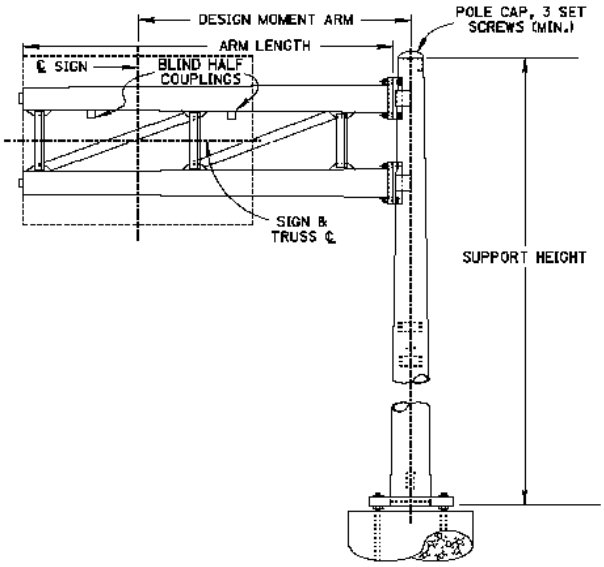
d. Initial rake is to be adjusted so that under the load of signs, the pole will assume an essentially vertical position and the arm rise be within the limits specified on the standard drawing, 3 inches (75 millimeters) minimum, 12 inches (300 millimeters) maximum.

250-5.4 Cantilever Support

1. Cantilever supports are to comply with certified shop drawings, **SCD TC-12.30** and the plans.

2. General features of the support are to be inspected in accordance with ***Section 250-4.2.*** Welds are to be inspected according to ***Section 250-4.3*** and the galvanizing inspected according to ***Section 250-4.4.***

3. Supports with arm lengths18 feet (5.5 meters) and over are to have truss members. Truss members may be angles or pipe.



4. One blind half coupling is to be welded to the top chord approximately 12 inches (300 millimeters) beyond or outside of the first sign bracket for a sign less than 20 feet (6.1 meters) long. A second blind half coupling is to be welded near the second sign bracket for signs 20 feet (6.1 meters) or longer.

5. Erection is to be in accordance with the general procedure given in ***Section 250-4.5,*** except as hereafter noted.

   a. The contractor may choose to attach the sign(s) and any sign lighting items before erection.

   b. Signs are centered vertically on the chords.

250-5.5 Center-Mount Support

1. Center-mount supports are to comply with certified shop drawings, **SCD TC-9.30** and the plans.

2. General features of the support are to be inspected in accordance with ***Section 250-4.2.*** Welds are to be inspected according to ***Section 250-4.3*** and the galvanizing inspected according to ***Section 250-4.4.***

3. Sign clearance above the roadway is to be a minimum of 17 feet (5.2 meters).

4. Arms may be either square or round tube. The arm attachment design is according to standard details for either square arms or round arms with separate cradle.

5. A blind half coupling is located on the pole.

6. Erection is to be in accordance with the general procedure given in ***Section 250-4.6***, except as hereafter noted.

   a. Signs are centered vertically on the arms.

   b. Signs may be mounted laterally on the support in an eccentric position. However, a minimum of 2 feet (0.6 meter) of sign length is to remain to one side of the pole centerline.

   c. The contractor may choose to attach the sign and any sign lighting items before erection.

250-5.6 Semi-Overhead Support

1. Semi-overhead supports are to comply with certified shop drawings, **SCD TC-9.10** and the plans.

2. General features of the support are to be inspected in accordance with ***Section 250-4.2.*** Welds are to be inspected according to ***Section 250-4.3*** and the galvanizing inspected according to ***Section 250-4.4***.

3. Sign clearance above the ground is to be at least 10 feet (3.0 meters) unless a lower height is approved by the project engineer to provide sign visibility through preceding overpass structure(s).

4. Arms may be either square or round tube. The arm attachment design is according to standard details for either square arms or round arms with separate cradle.

5. A blind half coupling is located on the pole.

6. Erection is to be in accordance with the general procedure given in ***Section 250-4.6***, except as hereafter noted.

   a. Signs are centered vertically on the arms.

   b. Signs may be mounted laterally on the support in an eccentric position. However, a minimum of 2 feet (0.6 meter) of sign length is to remain to one side of the pole centerline.

c. The edge of the sign is to be back at least 2 feet (0.6 meter) from the edge of the curb.

d. The contractor may chose to attach the sign and any sign lighting items before erection.

250-5.7 Span Truss Support

1. End frames for span truss supports are to comply with certified shop drawings, the plans and **SCD TC-7.65** for aluminum trusses and **SCD TC-15.115** for steel trusses.

2. General features of end frames are to be inspected in accordance with ***Section 250-4.2.*** Welds are to be inspected according to ***Section 250-4.3*** and the galvanizing inspected according to ***Section 250-4.4.***

3. Handholes are to be oriented on the end frame downstream vertical member on the side away from the direction of traffic.

4. The size of truss members is to be in accordance with standard details. Truss member joints may be of two different designs.

5. Switch enclosure mounting brackets are to be in place and a chase nipple installed on both end frame vertical members which are away from the direction of traffic.

6. An angle is to be furnished and welded onto the end frame, near the top, to support the lower chords of the span box. Stainless steel U-bolts are to be used with aluminum trusses and galvanized steel U-bolts used with steel trusses.

7. End frame vertical members are to be furnished with steel clamps and a separate tee or angle (alternate) for supporting the upper chords of the span box. Stainless steel U-bolts are to be used with aluminum trusses and galvanized steel U-bolts used with steel trusses.

8. An internal J-hook is to be in each end frame in the downstream vertical member.

9. When using an aluminum truss, the following shall apply:

   a. Aluminum trusses are to comply with certified shop drawings, **SCD TC-7.65** and the plans.

   b. Welds are to be inspected according to ***Section 250-4.3.***

   c. End caps are to be on each end of chords. The top front end caps are to be tapped for wiring.

   d. A blind half coupling is to be welded to the front top chord of the truss approximately 12 inches (300 millimeters) beyond or outside of the first sign bracket for each sign. Sharp edges are to be rounded to prevent damage to wires.

   e. Span length is to be according to shop drawings and the plans.

   f. Span box camber is to be in accordance with standard details.

   g. Flanges between span box sections may be cast or fabricated with forged flanges as an alternate.

   h. Flange attachment hardware is to be stainless steel bolts and nuts.

i. Supports are to be furnished with necessary sign brackets, U-bolts, luminaire support arms, bracing rods and other necessary structural members

10. When using a steel truss, the following shall apply:

    a. Steel trusses are to comply with certified shop drawings, **SCD TC-15.115** and the plans.

    b. Steel trusses' checking instructions are the same as those for aluminum trusses, except as hereafter listed.

        i The galvanizing is to be inspected according to ***Section 250-4.4.***

        ii Flanges between span box sections are to be forged.

        iii Flange attachment hardware is to be galvanized steel bolts and nuts.

11. See the notes in the plan for traffic maintenance requirements when span type sign support members are erected.

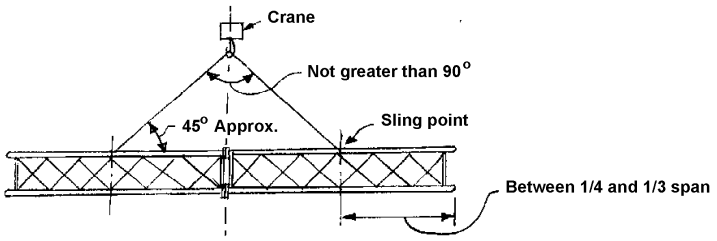
12. The base plates of end frames are to be placed on anchor bolt leveling nuts, lock washers and anchor nuts placed, the frames plumbed into a vertical position in both longitudinal and lateral directions, and nuts made tight in accordance with ***Section 250-4.6.***

13. Truss camber is to be correct. The various truss sections are to be assembled in the arrangement and sequence shown on the shop drawing.

14. Trusses may be assembled into a total span while lying on blocks with wedges. Flanges on truss section ends may be aligned by driving in the wedges as necessary. All flange bolts are then assembled and made tight.

15. Two cranes may be necessary when lifting very long trusses or the heavier steel trusses. For reference, truss weights are given in ***Section 250-4.5.***

16. Care should be taken in the attachment of slings. Trusses should be lifted at positions of a quarter to a third of the total span. Slings should be attached to the top chords and the horizontal diagonals.



17. Trusses may be easily overstressed by poor handling, and care should be taken when moving assembled trusses for temporary storage, transportation to the erection location and in the erection procedure.

18. Trusses are not to be erected unless at least one sign is in place within eight hours, or the trusses are fitted within the same period with damping devices approved by the project engineer **(CMS Item 630.06 B)**.

19. Attachment of the box truss to the end frames is to be by four U-bolts. Aluminum trusses are

attached by 5/8 inch (16 millimeters) stainless steel bolts according to **SCD TC-7.65** and steel trusses are attached by 3/4 inch (19 millimeters) galvanized steel bolts according to **SCD TC-15.115**.

20. The contractor may choose to attach the sign(s) and any sign lighting items before erection.

21. Signs are centered vertically on the chords (not considering the height of Exit Panels).

250-5.8 Overpass Structure-Mounted Support

1. Overpass structure-mounted supports are to comply with the plans and **SCD TC-18.24** for flush type supports and **SCD TC-18.26** for skewed type supports.

2. Overpass structure-mounted supports include sign brackets and two different kinds of steel Z-bars which are fastened to bridge concrete. For steel beam bridge mounting, aluminum angles at the bottom are to extend between sign brackets and short steel bars welded to the bridge steel. For overpass structures essentially perpendicular to the roadway underneath, sign brackets are flush mounted to Z-bars for direct sign viewing. For overpass structures skewed to the roadway underneath, a wedge-shaped box structure is inserted between the sign brackets and Z-bars to provide for direct sign viewing.

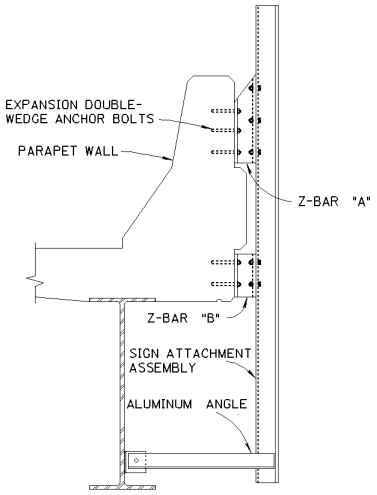
3. The number of sign brackets will vary according to the bracket spacing as required by **SCD TC-22.20**. Bracket details are also shown on the standard drawing.

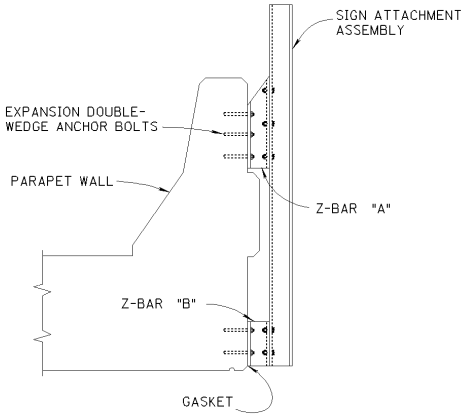
4. The number of aluminum frames in skewed supports is to equal the number of sign brackets. Frame details are to be according to standard details and are to include two angles placed diagonally.

5. Front upper and lower members of skewed supports are to be aluminum angles with a length equal to the sign length.

6. The skewed support structure is to be internally braced by two aluminum angles extending diagonally and horizontally through the interior.

7. For bridge clearance above a roadway of less than 17 feet (5.2 millimeters), the sign clearance above the bottom of the bridge is to be 3 inches (75 millimeters) minimum without, or 15 inches (400 millimeters) minimum with, sign lighting fixtures on the lower edge of the sign.





8. Supports are to be mounted on the overpass structure so the sign is horizontal regardless of bridge slope **(CMS Item 630.06 D)**.

9. Expansion double wedge steel anchor bolts are to be used to fasten the support's Z-bars to the overpass structure concrete parapet. Intended locations of anchor bolts are to be approved by the project engineer before any field drilling. Z-bars "A" are used at the top and Z-bars "B" used at the bottom of parapet concrete.

10. For a steel beam bridge mounting, aluminum angles at the bottom are to be fastened to short steel bars welded to the bridge steel. The bars are to be painted.

11. Chloroprene gaskets are to be used to prevent contact between aluminum sign brackets or support frames and steel Z-bars or bridge welded-on bars.

12. If the sign extends more than 4 feet (1.2 meters) above or below the attaching Z-bars, intermediate sign brackets are to be provided.

13. For precast beam bridges, aluminum angles at the bottom are to be fastened to short steel angles and two expansion double wedge steel anchor bolts are to be used.

14. After sign erection, the sturdiness of the support to bridge attachment should be checked.

250-6 Ground-Mounted Sign Supports

250-6.1 General

This section provides additional information, generally in the form of checklists, about various ground-mounted supports. ***Section 221*** addressed general guidelines about sign supports and ***Section 240-5*** provides additional design information about ground-mounted supports.

250-6.2 Posts

1. Ground-mounted sign supports of the post type are to be U-channels or square posts of the number specified and be as shown on **SCD TC-41.20**.

2. Post lengths appearing on the plans are approximate and the contractor is responsible for determining the exact length of required posts before cutting to length **(CMS Item 630.06A1)**.

3. No. 4 U-channel posts consist of two No. 2 posts bolted back to back. Back-to-back posts are assembled by 5/16 inch (8 millimeters) steel bolts, lockwashers and nuts on 4 inch (100 millimeters) centers below the groundline and 16 inch (400 millimeters) centers above the groundline.

4. Posts should have a line of paint 42 inches (1.05 meters) from the end which will be in the earth. The mark when driven to a distance of 6 inches (150 millimeters) above the ground indicates a post driven to the proper depth.

5. If it is necessary to cut posts to correct length in the field, the cut end should be covered with two coats of zinc-rich paint and the cut end driven in the earth or embedded when required (except for back-to-back posts).

6. Posts are to yield when hit and are to be driven to a depth of 42 inches (1.05 meters). Posts are typically not to be embedded in concrete unless specified in the plans or ordered by the project engineer to overcome problems such as adverse soil conditions or generally prevalent bedrock close to the surface. The driven depth has been established to assure best yielding

characteristics. Deeper depths are not beneficial in this regard.

7. Caution is to be used when driving posts in areas of buried cable.

8. Posts are not to be driven in drainage ditches.

9. Posts are to be installed vertically and at right angles to the edge of pavement, unless otherwise required. Exceptions may be NO PARKING signs and STOP signs located at intersections with curved approaches. In this situation STOP signs should be placed perpendicular to a line from the viewing point where they are normally recognized and stopping action would begin.

10. Posts are to be driven without bending, distortion or end mutilation. Mutilation may be prevented by the use of a driving cap. Posts should be checked to see if the paint mark is 6 inches (150 millimeters) out of the ground after driving.

11. Posts located in paved areas are to be driven through a hole provided by sleeving or core drilling. After driving, the hole is to be patched with asphaltic concrete or approved bituminous material.

12. At locations where posts cannot be driven, the post may be moved at no additional cost to **ODOT**, when approved by the project engineer.

13. Typical vertical and horizontal clearances of signs are shown on **SCDs TC-42.10 and TC-42.20**.

250-6.3 "One Way" Sign Supports

Square posts which are capable of supporting signs at right angles to other signs on the post are designated as "one-way" sign supports for the most common application. This is shown on **SCD TC-41.50**.

250-6.4 Standard Beams

1. Ground-mounted sign supports of the non-breakaway beam type are to be rolled steel, wide flange sections of the size and weight specified (from the list on **SCD TC-41.10**). Non-breakaway beams are to be protected by guardrail or concrete barrier installed for another purpose. Inspection of beams of the breakaway type is covered in ***Section 250-6.5.***

2. Beam lengths appearing on the plans are approximate and the contractor is responsible for determining the exact length of required beams before fabrication **(CMS Item 630.06 B)**.

3. Galvanizing is to be inspected in accordance with ***Section 250-4.4.***

4. Beams are to be embedded in a concrete foundation in accordance with **SCD TC-41.10**.

5. Beams are to be raised into position with equipment of adequate lifting capacity and used so as to prevent damage to the galvanizing. The beams are to be braced in a plumb and square position until the concrete has cured. The age of the concrete before it is considered cured and before signs are permitted to be erected is to be according to ***Section 250-3.4***.

250-6.5 Breakaway Beams and Connections

1. Ground-mounted sign supports of the breakaway beam type are to be rolled steel, wide flange sections of the size and weight specified (from the list on **SCD TC-41.10**).

2. Beam lengths appearing on the plans are approximate and the contractor is responsible for determining the exact length of required beams before fabrication **(CMS Item 630.06 B)**.

3. Beams are slip base design. Alternate designs of breakaway connections are permitted.

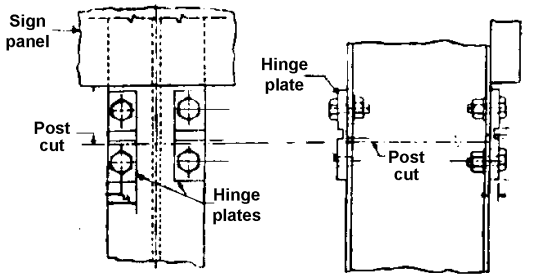
4. Base plates are fabricated to standard details and welded-on with a bead equal to the beam flange and web thickness respectively, but not less than 1/4 inch (6.4 millimeters).

5. Welding is to be inspected in accordance with ***Section 250-4.3.***

6. Galvanizing of beams is to be inspected in accordance with ***Section 250-4.4.***

7. All portions of beams should be shop assembled, in accordance with **SCD TC-41.10**.

8. The beam upper portions are to be joined by the bolts attaching the fuse and hinge plates. The plates are fabricated to standard details with the fuse plate having notched holes at the bottom and the hinge plate having unnotched holes. The steel hex head bolts, with washers under both head and nut, are to have been tensioned in the shop to the final specified value.



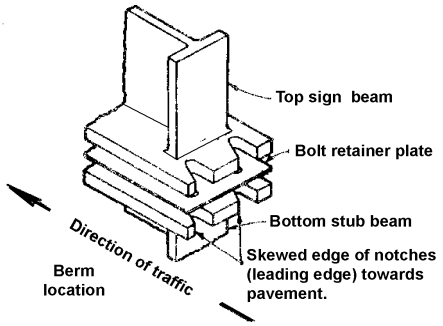
Hinge Details

9. Torque limiting nuts may be used instead of conventional nuts on the fuse and hinge plates **(SCD TC-41.10, Note 5)**.

10. The beam lower portions are recommended to be joined by steel hex head bolts inserted with their nuts uppermost. A galvanized bolt retainer plate is sandwiched between the base plates. Flat washers are used under both bolt head and nut as well as under the bolt retainer plate. For S4x7.7 (S100 x 11.5) beams only, malleable iron beveled washers are used under bolt head and nuts. Bolts are to be snug tightened for delivery to the site with final torquing to be done after erection.

11. Torque limiting nuts may be used instead of conventional nuts on the base plates **(SCD TC-41.10, Note 5)**. The nuts are to be snug tightened, but not to the point where the upper area shears away.

12. Base plate skewed notches should point toward the roadway along the path of typical vehicle collision. The skewed notches of both base plates should match.

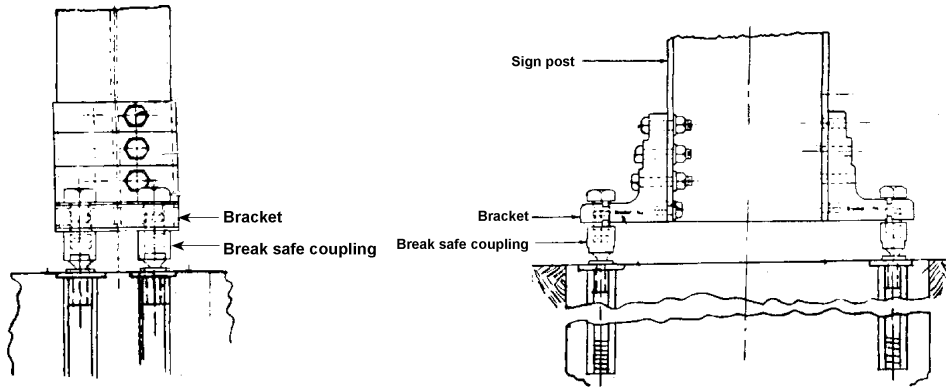


Base Plate Orientation

13. For beams located in medians, the base plates should be welded-on upside down as compared with those of beams located on the right side of the roadway, so the base plate skewed notches will point toward each roadway along the path of vehicle collision from either direction of traffic.

14. For beams located in medians, fuse plates are to be used on both sides of the beam.

15. For beams located on the right side of the roadway, fuse plates are to be on the side of the beam facing traffic.



16. For the alternate design, special foot brackets are bolted to the upper beam portion, and four couplings incorporating a breakable reduced section are connected between the foot brackets and threaded anchor inserts embedded in the foundation. The couplings permit use of the design in medians where collision can occur in either direction of traffic.

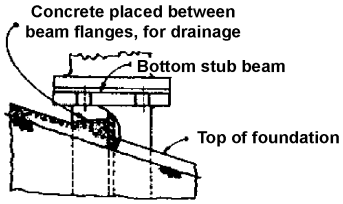
17. The alternate design uses four/hinge plates incorporating a thinned section and bolted where the beam is cut through just under the sign. The pair of plates on the impact side of the beam sever upon impact and a pair on the opposite side bend to allow the beam to swing upward out of the path of the impacting vehicle.

18. It is recommended that beams be erected in a single unit because they are easier to plum, square and brace when the entire assembly is raised and set in concrete.

19. Beams are to be erected in accordance with the procedure given for non-breakaway beams in ***Section 250-6.4.***

20. A sloping concrete foundation top surface is required on the high ground side to prevent a

water pooling pocket and permit drainage as per **SCD TC-41.10**. For the alternate design, the foundation top must be level in the area of the breakable couplings.



21. When a supplemental panel is required below an extrusheet sign, the panel is fastened by sign backing assemblies to the parent sign. The panel is to be separated from the sign by the width of the fuse plate plus 1 inch (25 millimeters). This is to permit unhindered hinge plate bending in the event of a vehicle collision.

22. After the foundation concrete is cured, base plate nuts are to be loosened in turn and re-tightened with a torque wrench in a systematic manner to the specified maximum torque shown in the table on **SCD TC-41.10**, also shown in ***Table 297-9***. Torque wrenches used should be calibrated daily.

23. When torque limiting nuts are used on base plates, the nuts are to be loosened in turn and tightened in a systematic manner until the upper area shears away, assuring that the correct torque has been applied.

24. At least four weeks following the erection of signs on breakaway beams, the breakaway feature is to be inspected by the contractor for evidence of shifting or loose fasteners.

25. All loose fasteners are to be re-torqued to specified values. Base plate fasteners are to be loosened and re-torqued even if no shifting or looseness is detected. However, if the base plate connection was made with torque limiting nuts, re-torquing will only be required if looseness can be detected. Re-torqued conventional nuts at this time are to have anaerobic adhesive applied, or as an alternate, new torque limiting nuts of the proper range may be used.

250-7 Signs

250-7.1 General

Signs should be inspected when received on the job site if possible, but certainly prior to erection. The signs should be inspected for conformance with the plans, certified shop drawings, catalog cuts and material specifications.

Flatsheet signs are typically of aluminum sheet cut into geometric shapes of the size specified. Dimensions and thickness are to be as shown on **SCDs TC-52.10 and TC-52.20**. Bolt holes are to be drilled or punched **(CMS Item 630.04)**.

Extrusheet signs are fabricated of aluminum sheet and extrusions, joined by spot welding and assembled by bolts **(SCD TC-51.11)**. As an alternative, panels extruded in a single operation may be used **(SCD TC-51.12)**. Extruded panels and spot welded panels shall not be used in the same sign. There is to be no appreciable deviation from flatness on the face of an assembled sign.

Overlay signs are of aluminum sheet of the thickness specified and used to cover the legend of extrusheet signs. Signs with overlays should be checked for any loose rivets holding the overlay sign.

All signs are to be reflectorized by being covered with the appropriate grade of sheeting. The sheeting is to be of the correct color, firmly attached and free of tears, wrinkles, blisters or blemishes.

Sign legend is to be in accordance with the plans, certified shop drawings and the **OMUTCD**.

The type of copy on extrusheet signs is to be as shown on the certified shop drawings. Available types of copy are listed in ***Table 297-6***.

All signs are to be identified on the reverse side by decals as described in ***Section 250-7.4.***

Extrusheet signs are also to be identified by information in a detachable form on the back **(see CMS Item 630.04)**.

250-7.2 Sign Storage

Signs are to be suitably protected and identified for shipment and storage. Extrusheet signs are to be kept rigid by backbracing or crating and the sign face covered with protective material. The backbracing is to extend sufficiently below the sign lower edge to keep the sign off the ground.

Extrusheet signs and any flatsheet signs with Type G (high intensity) sheeting are to be stored in a vertical position.

Signs must be stored in such a manner that the packaging paper or cardboard material does not get wet. If the packaging material or slip sheeting should become wet, the paper should be removed immediately from contact with sign faces to prevent damage to reflective sheeting on the faces.

In the case of signs furnished by **ODOT** for erection by the contractor, the contractor is to be responsible for the storage and care of the signs after their transfer **(CMS Item 630.08)**.

250-7.3 Sign Copy

Table 297-6 provides information about the sign copy used, type, material used, design features, etc.

250-7.4 Sign Identification Decals

All signs are to be identified on the reverse side by decals of Type F white reflective sheeting **(CMS Item 730.18)** with silk screened numerals. Information is to be coded by punched-out numerals before decal application and is to include: sheeting manufacturer and year of sign fabrication. At the time of erection, month and year of erection shall be scratched out by the contractor. This procedure is described in **CMS Item 630.04**, which also contains an illustration of the decal. Decals for overlay signs may be on the front surface.

The following codes shall be used on the decals to identify the manufacturer of the sheeting.

0 - **Avery Dennison**
1 - **Minnesota Mining and Manufacturing Company (3-M)**
2 - **Sakai Trading-New York, Inc.**
3 - **Nippon Carbide Industries (USA)**
4 - **Morgan Adhesives Company**
5 - **American Decal and Manufacturing Company**
6 - **Stimsonite Corporation**
7 - **Reflexite North America**

250-7.5 Sign Erection

250-7.5.1 General

This section provides information on erection of the signs. Assembly and erection of various types of overhead sign supports are addressed in ***Sections 250-4 and 250-5*** and ground-mounted supports are addressed in ***Section 250-6***.

250-7.5.2 Ground-Mounted Flatsheet Signs

When erecting ground-mounted flatsheet signs the following provisions apply:

1. Typical vertical and lateral clearances of ground-mounted flatsheet signs are shown on **SCD TC-42.20**.

2. Flatsheet signs are fastened to posts by 5/16 inch (8 millimeters) hex head steel bolts with a 3/8 inch (10 millimeters) hex ID x 1 1/4 inch (32 millimeters) OD wide washer under the bolt head and using a lockwasher and hex nut. For U-channel posts, at each bolt a bearing plate behind the sign is used to reinforce the sign, as indicated on **SCD TC-41.20**. The hardware and bearing plates are furnished with the signs.

3. Posts supporting groupings of flatsheet signs in multiple arrangements will require the use of sign backing assemblies made up of bolted together short sections of posts. Sign backing assemblies are furnished with the signs unless separately itemized.

4. Flatsheet signs mounted so as to be read by motorists using bridges are to be erected on special steel posts in accordance with **SCD TC-41.40**.

5. Street Name signs are to be erected on square supports in accordance with **SCD TC-41.40**.

250-7.5.3 Ground-Mounted Guide Signs

When erecting ground-mounted Guide Signs the following provisions apply:

1. Typical vertical and lateral clearances of ground-mounted Guide Signs are shown on **SCD TC-42.10**.

2. Mounting clips and other attachment hardware is to conform with **SCD TC-51.11**.

3. Supplemental panels erected under ground-mounted Guide Signs mounted on non-breakaway beams are to be fastened directly to the beams. The panel is to be separated from the Guide Sign by 1 inch (25 millimeters) to conform with **SCD TC-42.10**. When the panel is too short to reach between the beams, the panel may be fastened to the Guide Sign by sign backing assemblies.

4. Supplemental panels erected under ground-mounted Guide Signs mounted on breakaway beams are to be fastened to the Guide Sign by sign backing assemblies. The panel is to be separated from the Guide Sign by the width of the fuse plate plus 1 inch (25 millimeters).

5. Exit Panels erected above Guide Signs are to be attached by sign backing assemblies furnished with the Exit Panel.

6. The signs should be checked after erection to verify that the beams extend to the top of

the signs and that the signs are horizontal and the clearances satisfactory.

250-7.5.4 Overhead Signs

When erecting overhead signs the following provisions apply:

1. The clearance above the roadway for the bottom of overhead signs is to be a minimum of 17 feet (5.2 meters), or as shown on the plans.

2. Overhead signs are to be vertical or horizontal regardless of the sag of supporting messenger wire, mast arm rise, chord camber or overpass slope.

3. Signs erected on span wire supports are to be attached in accordance with **SCD TC-17.10**.

4. Signs erected on single arm supports **(SCD TC-16.20)** are to be installed so their bottom edge is at the same elevation. Sufficient adjustment for this purpose is provided by the two pair of slotted holes in the sign brackets for the attachment of the arm clamps. The clamps are to be tightened sufficiently to prevent sign rotation about the arm.

5. Signs mounted on semi-overhead supports **(SCD TC-9.10)** are to be erected so that their edge clearance from the curb line is at least 2 feet (0.6 meter).

6. Extrusheet signs over 8 feet (2.4 meters) in height may be delivered in two pieces for assembly in the field **(CMS Item 630.04)**.

7. Guide Signs erected on supports with two arms are to be centered vertically.

8. Mounting clips and other attachment hardware is to conform with **SCD TC-51.11**.

9. Signs mounted on center-mount supports **(SCD TC-9.30)** may be mounted laterally on the support in an eccentric position when required by the plans. However, a minimum of 2 feet (0.6 meter) of sign length is to remain to one side or the other of the vertical member centerline.

10. Overlay signs erected in the field over existing Guide Signs are to be attached by blind rivets at spacings as required in **CMS Item 630.04**.

11. Flatsheet signs used in connection with signals supported by span wire are fastened to the messenger wire by special attachments in accordance with **SCD TC-41.41**.

12. Flatsheet signs used in connection with signals supported in a swinging condition on mast arm supports are fastened to the arm by a special attachment in accordance with **SCD TC-41.41**.

13. Exit Panels erected above Guide Signs are to be attached by sign backing assemblies furnished with the Exit Panel.

250-7.6 Sign Inspection

After sign erection, the contractor is to inspect all signs under both day and night conditions. Any necessary adjustments in lateral position or orientation to correct visibility deficiencies are to be made to the satisfaction of the project engineer **(CMS Item 630.13)**.

Overhead Guide Signs should typically be centered over the lane(s) to which they apply. Down arrows on the signs should normally be centered over the proper lane as viewed by the motorist.

The maximum displacement of a down arrow from the center of a lane should not be more than 2 feet (0.6 meter).

Overhead Guide Signs situated on curved roadways and incorporating down arrows may have the arrow(s) adjusted within the sign and/or the entire sign moved laterally so the arrows when seen from a typical viewing distance on the curve will appear to be over the proper lane(s).

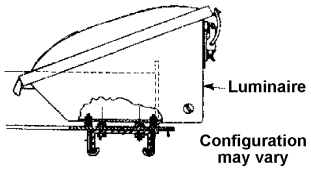
Night conditions inspection is to assure that each sign has visible and uniform reflectivity. Any signs not having proper reflectivity should be noted and cleaned or replaced by the contractor.

250-8 Sign Lighting

250-8.1 General

Guidelines and design information on sign lighting are addressed in **Sections 212 and 240-7**. This section provides additional information about what to look for when installing sign lighting.

1. Check certified shop drawings, catalog cuts, etc. for luminaires, ballasts, switches and enclosures.



2. Luminaires for mercury vapor sign lighting are to comply with **CMS Item 731.01** and are to consist of a housing containing a reflector, lamp socket, wiring and a door containing a glass lens or refractor, meeting the following requirements:The housing is to be adequately reinforced cast aluminum with a natural finish or painted gray.

   a. The reflector is to be highly reflective aluminum.

   b. The lamp socket is to be a porcelain shrouded mogul screw with lamp grips and a large center spring providing firm contact with a lamp base.

   c. The door is to be an aluminum frame either cast with a natural finish or a formed extrusion with an anodized finish. The door is to be hinged securely to the housing and provided with a spring loaded latch. Hinges are to be stainless steel and designed so that unintentional door separation is impossible. Latches are to be stainless steel and are not to require tools for opening.

   d. A flexible readily removable gasket is to be attached to the housing or door so a waterproof seal is formed when the door is closed and the gasket compressed. The glass lens is to be mounted within the door and sealed with elastic cement or a gasket. The glass lens is to be borosilicate or equivalent, able to withstand hail or the thermal shock of freezing rain.

   e. Drainage weepholes are to be provided in the housing or door depending upon the luminaire's bottom or top position on a sign.

3. Mercury vapor lamp sizes are to be as specified. Ballast type is to match the specified lamp wattage. Lamp watts and **ANSI** code are shown in ***Table 297-11*** from **SCD TC-31.21**.

4. Sign lighting is to be controlled by a disconnect switch within an enclosure. The switch is to be a two-pole minimum, single throw, fused safety disconnect type rated at 600 volts and 30 amperes **(CMS Item 631.06)**. The fuse size is to be as specified. A solid neutral bar is to be provided.

5. The enclosure is to be weatherproof and lockable, complying with **NEMA** standard Type 4 ICS 1-110.15. Enclosure size is to be as specified **(See SCD TC-32.10)**.

6. Each enclosure is to be furnished with at least one padlock. Padlocks are to have a corrosion resistant body and a corrosion proof steel shackle. All padlocks for a project are to be keyed alike from an appropriate master key number obtained by the contractor from the maintaining agency.

7. Sign service to the enclosure is to be according to the plans. Service wiring cable size is to be as specified, single conductor rated at 600 volts and not less than Number 4 **AWG (CMS Item 631.04)**. Sign service underground from a pull box to a foundation mounted support, or to a support mounted on a concrete median barrier, is shown on **SCD TC-32.10**. Sign service from a direct drop is shown on **SCD TC-32.11**.

8. Sign wiring from the disconnect to the luminaires is to be the size specified, single conductor rated at 600 volts and not less than Number 10 **AWG (CMS Item 631.05)**. The wiring is to be fully protected within enclosures, support interiors, junction boxes, rigid or flexible conduit and luminaire housings. Wiring is to be continuous from the disconnect switch to a junction box mounted on the sign support or overpass structure. The junction box is to permit disconnection of wiring when a sign and its lighting equipment is removed as a unit. A junction box is to be installed for each sign. Wiring is to be continuous from the junction box to the first luminaire on a sign and continuous between additional luminaires on the sign.

9. Luminaire ballast is to be located within the luminaire (integral) or in a weatherproof housing attached to or beside the luminaire (contiguous). Wiring to the ballast is to be continuous with permitted disconnection at the sign support junction box ***(see paragraph 8)***.

10. The wiring routing for wired signs is to be as shown on **SCD TC-31.21**.

11. Luminaire supports complying with **SCD TC-31.21** are specified for new installations. Support arms are of welded tubular design incorporating an attachment flange and a luminaire support plate. The arms are bolted to a continuous rectangular galvanized steel tube forming the lower portion of the sign's glare shield. The face of the rectangular tube is to be covered with non-reflective sheeting complying with **CMS Item 730.20** so as to match the color of the glare shield sheeting. Support arms are not to be mounted upside down or in any other manner than that permitted by the **SCD**.

12. Luminaires are to be adjusted to a proper aiming angle according to the manufacturer's instructions and inspected at night to determine if they are providing uniform illumination to the sign face.

250-8.2 Sign Lighting Inspection and Testing

1. In accordance with **CMS Item 631.11**, sign lighting and electrical signs are to meet the requirements of the following tests as required by **CMS Item 625.19** and performed by the contractor:

   a. Ground rod resistance to ground ***(see Section 450-11.2)***.

b. Cable insulation (megger) test ***(see Section 450-11.5)***.

c. Ten-day performance test ***(see Section 450-11.7)***.

During the ten-day performance test, failure of lamps, ballasts and transformers may be corrected by replacement of the faulty component but will not require restart of the entire test period.

2. The contractor should perform a circuit test on all sign lighting cable and wire conductors to determine if there are any short circuits, cross circuits or other improper connections. Circuit testing may be done in accordance with ***Section 450-11.4*** .

3. The test results are to be reported to the project engineer in the test information required by **CMS Item 625.19**. The test results should be documented.

4. During the ten-day performance test, a night inspection is to be performed by the contractor and final adjustments made to sign lateral positions and the aiming angle of luminaires to the satisfaction of the project engineer **(CMS Item 631.11)**. The adjustments are to eliminate excessive brightness and glare and to obtain optimum sign face reflected brightness, uniformity of illumination, visibility and legibility.

5. Following successful completion of a ten-day performance test and after there has been a partial or final acceptance of the project, the contractor should turn over to the project engineer all manuals, diagrams, instructions, guarantees and related material. The project engineer should transfer the material to the maintaining agency. For **ODOT**-maintained signs, the material should be given to the appropriate **ODOT District Office**.

6. After the project has been accepted by **ODOT**, the project engineer should immediately notify the maintaining agency that as of a certain exact time and date, the agency is responsible for the maintenance.

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260 MAINTENANCE / OPERATIONS

260-1 General

Signing is an essential part of the traffic control system on our highways. The consequence of poor maintenance practices are a reduction in safety to road users and an unnecessarily large exposure to liability claims. **District Roadway Services** personnel and sign maintenance contractors are required to repair, replace and install signs as needed. ***Section 260-5*** describes **ODOT's** systematic sign replacement project.

260-2 Responsibilities

In general, the **Districts** shall do the work necessary to maintain the signing on the state highway system and the **Office of Traffic Engineering (OTE)** shall:

1. Staff and maintain a central **Sign Shop**.

2. Assist **Districts** in maintaining reasonable stock levels of materials and hardware required for new installations and maintenance through the management of annual term contracts and spot purchase contracts.

3. Assist the **Districts**, through procedure manuals, training programs, inspections and other methods, in providing quality maintenance of traffic control features used on the state highway system.

260-3 Maintenance on Interstate Routes Within Municipalities

ODOT SOP OPS-111, Maintenance of Interstate Highways through Cities and Villages, addresses maintenance of highway signs and sign supports on Interstate routes within the boundaries of **Cities** and **Villages**.

260-4 Maintenance on Non-Interstate State Highways Within Municipalities

260-4.1 General

ORC Sections 5511.01 and 5511.02 contain provisions pertaining to **ODOT's** responsibility for the maintenance of signs on highways on the state highway system within municipal corporations. **ORC Section 5511.01** contains the following statement: "The director may erect state highway route markers and other such signs directing traffic as he thinks proper upon those portions of the state highway system lying within municipal corporations, and the consent of such municipal corporations to such erection and marking shall not be necessary." **Section 5511.02** contains the following: "The director of transportation may lay out, establish, acquire, open, construct, improve, maintain, regulate, vacate, or abandon 'limited access highways' or 'freeways' in the same manner in which the director may lay out, establish, acquire, open, construct, improve, maintain, regulate, vacate, or abandon highways."

Section 204-3 addresses maintenance of highway signs and sign supports on business routes and ***Section 221-3*** addresses the inspection and maintenance of overhead sign supports. Also, ***Sections 205-2 and 209-2*** address **ODOT's** involvement with traffic generator signs located within a municipality.

260-4.2 Limits and Responsibilities in Cities and Villages

Arrangements other than those described herein are permissible provided they are agreed upon in writing and are acceptable to all involved parties and **ODOT's** responsibility does not exceed the parameters set forth herein.

1. **ODOT** will bear the cost and:

   a. Furnish, install, maintain and repair all Route Markers and signs containing route shields on conventional highways (roadways that are not expressways or freeways), and on the mainline and interchange ramps of freeways and expressways;

   b. Furnish, install, maintain and repair all freeway and expressway entrance ramp approach signs located within **ODOT** right-of-way on intersecting highways and streets not on the state highway system, as prescribed in the **OMUTCD**;

   c. Furnish all trailblazing signs considered necessary, as agreed upon by **ODOT** and municipal officials, to provide additional directional guidance to the conventional highway, freeway or expressway; and

   d. Furnish, install, maintain and repair all sign supports containing one or more signs that are maintained by **ODOT**, except for supports which have a primary purpose other than for displaying signs, such as, but not limited to, utility, signal and lighting poles.

2. The **City** or **Village** shall:

   a. Furnish, install, maintain and repair all destination signs and other signs not maintained by **ODOT** on conventional highways, and on the mainline and interchange ramps of freeways and expressways;

   b. Furnish, install, maintain and repair all signs not maintained by **ODOT** on intersecting highways and streets not on the state highway system;

   c. Install, maintain and repair all trailblazing signs considered necessary as agreed upon ***(see item 1(c) above)***;

   d. Furnish, install, maintain and repair all sign supports not containing any signs maintained by **ODOT**;

   e. Furnish and install all necessary modifications required to assure structural integrity of sign supports maintained by **ODOT** when increasing loading on the supports due to the upgrading or addition of **City** or **Village** maintained signs (written approval shall be obtained from **ODOT** prior to making any modifications to **ODOT**-maintained sign supports);

   f. Furnish, install, maintain and repair all sign lighting on **ODOT** and **City** or **Village**-maintained signs; and

   g. Provide electrical energy for the operation of sign lighting on **ODOT** and **City** or **Village**-maintained signs, except where power to **ODOT**-maintained signs is supplied through highway lighting circuits.

260-4.3 Additional Services for Villages

For **Villages** which have requested additional services from **ODOT** under the provisions of **ORC Section 5521.01**, and have on file with **ODOT** an executed **M&R 689** ***(see Form 1396-1)***, the following shall also apply:

1. **ODOT** will, in addition to the limits specified in this section, bear the cost and furnish, install, maintain and repair all:

    a. Regulatory and Warning Signs within the right-of-way of conventional highways and on the mainline and interchange ramps of freeways and expressways;

    b. STOP and YIELD signs on intersecting highways and streets at the intersection with the state highway; and

    c. School Signs with Beacons and related appurtenances located within the state highway right-of-way.

2. Signs previously installed by the **Village** will be maintained and repaired only when justified, designed and installed in conformance with the **OMUTCD** and the **ORC**. For example, non-warranted STOP signs will not be maintained.

260-5 Systematic Sign Replacement Program

Highway signs utilize reflective sheeting materials containing optical elements designed to return a large portion of incident light back towards the source. At night, this property, known as retroreflectivity, redirects incident light from a vehicle's headlights back toward the vehicle's occupants. This allows highway signs to remain visible after dark.

The retroreflective properties of highway signs degrade over time, due primarily to exposure to ultraviolet light and environmental contaminants. The purpose of this standard is to establish a statewide uniform practice for the systematic replacement of permanent traffic control signs on **ODOT**-maintained highways to assure adequate visibility.

All new permanent traffic control signs are required to be reflectorized with Type G sheeting ***(see Section 220-6)***. It is expected that signs fabricated with Type G sheeting will have a sign service life of fifteen years, whereas signs fabricated with Type F sheeting would only have a sign service life of seven years. Sign service life is the period of time that a sign has an adequate appearance, proper color retention and contrast, and sufficient retroreflectivity to effectively convey its message both day and night.

There are currently no established required minimum maintained sign reflectivity levels; however, **FHWA** is proposing to issue minimum maintained sign reflectivity levels in the future. To avoid the **Districts** having a requirement to periodically measure sign reflectivity to determine replacement needs, this standard establishes a procedure for the systematic replacement of signs based on expected sign service life.

1. **District** responsibilities:

a. Each **District** shall develop and implement a program to provide for the systematic replacement of permanent traffic control signs on a fifteen year cycle. This should be done on a route by route basis, with signs on the entire length of a route within a **District** or **County**, or on a segment of a route within a **District** or **County**, scheduled for replacement on a fifteen year cycle.

b. The **District** should make preparations well in advance to provide sufficient time to assure signs are replaced within the recommended time interval. Sign replacements may be by contract or force account, or a combination of the two.

c. All signs on a route or route segment should be replaced at the same time. Signs that have been installed within two years of the scheduled replacement may remain in place. Type G signs that are removed that have sufficient remaining service life may be returned to **District** stocks to be used in maintenance activities (e.g., knockdown replacements).

d. The **District** may elect to delay sign replacements on a route segment for up to two years to allow the sign replacement to be combined with other scheduled work for that section of highway, provided the **District** verifies that the signs have sufficient retroreflectivity to effectively convey their message both day and night, and are at or above minimum reflectivity levels once established by **FHWA**.

e. The **District** should develop a program to upgrade all existing Type F signs with Type G signs over a seven year period coinciding with the seven year sign service life of Type F sheeting. Type F signs may remain in the field until they have reached the end of their sign service life.

2. The **Office of Traffic Engineering (OTE)** will periodically measure sign reflectivity on random samples of Type G signs to verify that the signs provide adequate levels of reflectivity, and to verify that the signs provide levels of reflectivity that are at or above minimum levels, once established by **FHWA**, for the expected sign service life of fifteen years.

260-6 Maintenance of STOP Signs at County and Township Road Intersections

260-6.1 General

ORC Section 4511.65 requires the local authorities to install STOP signs at the intersections of roads under their jurisdiction with State Routes. However, **ODOT** has a general duty to maintain state routes pursuant to **ORC 5501.01(C), 5501.31 and 5511.01**. Since the vast majority of these STOP signs, even though they face the cross or side road, are on **ODOT** right-of-way, **ODOT** has traditionally accepted the responsibility for them.

The **Districts** should include these STOP signs in their systematic sign replacement program efforts ***(see Section 260-5)***.

If officials from a **County** or **Township** encounter a STOP sign at the intersection of a road under their jurisdiction with a state highway that they believe needs to be replaced, this should be brought to the attention of the appropriate **ODOT District**. If the **District** agrees that a particular sign needs to be replaced, the **District** should proceed to schedule the work. If the **District** does not agree that a particular sign needs to be replaced, then the **County** or **Township** may, at their discretion, replace the sign at the **County** or **Township's** expense.

260-6.2 Limits of Maintenance and Responsibilities

Arrangements other than those described herein are permissible provided they are agreed upon in writing and are acceptable to all involved parties and **ODOT's** responsibility does not exceed the parameters set forth herein.

ODOT will bear the cost and:

1. Furnish, install, maintain and repair all STOP signs at the intersection of **County** and **Township** roads with rural state highways. No distinction will be made as to whether or not the STOP sign is actually located within the limits of **ODOT's** right-of-way.

2. Furnish, install, maintain and repair all sign supports used with a STOP sign at the intersection of **County** and **Township** roads with rural state highways.

The **County** or **Township** shall furnish and install all STOP signs and supports at the intersection of **County** or **Township** roads with rural state highways that they believe are in need of replacement, but which the appropriate **ODOT District** does not agree need to be replaced.

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295 REFERENCE RESOURCES

295-1 General

Various reference resources that may be useful have been noted in ***Sections 193, 194 and 195***.

The following documents are hereby incorporated into the **TEM** by reference.

295-2 Sign Design Manual

The **Sign Design Manual (SDM)** is intended to provide standard sign designs for the standard flatsheet signs depicted in the **OMUTCD** and the **TEM**.

The content covered includes element sizes, horizontal and vertical arrangements, spacing rules and charts which will simplify procedures and thus minimize time and effort in the design and layout of Guide Signs. The spacing criteria and element sizes contained in **Appendix B of the SDM** are based on criteria established by **FHWA** in combination with criteria from sign legend manufacturers. Guide Sign design information for an Alternate Guide Sign Design Method is provided in **Appendix C of the SDM**.

At this time, this is physically a separate publication. However, with publication of this **TEM** the **SDM** is to be considered part of this Manual, i.e., ***Section 295-2***. Cross-referencing is provided as appropriate within the text of this Manual to related additional detail information currently in the **SDM**.

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296 FORMS INDEX

296-1 Business Route Resolution for a County

Form 296-1 is a sample **Resolution** which can by used in establishing a Business Route for a **County** ***(see Section 204-3)***.

296-2 Business Route Resolution for a Municipality

Form 296-2 is a sample **Resolution** for establishing a Business Route within a municipality ***(see Section 204-3)***.

296-3 HAR Installation and Maintenance Agreement

Form 296-3 is a sample **HAR Agreement** as described in ***Section 206-5***.

296-4 Overhead Sign Support Inspection

Form 296-4 is a sample form that can be used for inspection of overhead sign supports ***(Section 221-3)***.

296-5 Sign Ordering Form

Form 296-5 is a copy of the form used for ordering signs and signing materials ***(Section 220-8.2)***.

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Form 296-1. Request for Business Route Signs on a County Road

Resolution Number _____

Requesting the Ohio Department of Transportation to Erect Business Route Signs on a County Road

WHEREAS, state route _____ has been relocated so as to bypass the Corporation of _____, and,

WHEREAS, the ownership of the old and previously marked section of state route _____ from _____ to _____ except that part of the previously marked road which lies inside the Corporation of _____ as shown in the attached map, has been transferred from the Ohio Department of Transportation to the County of _____, and,

WHEREAS, the _____ County Commissioners believe that it is in the best interest of the citizens of _____ County and the public in general that motorists be provided with appropriate direction to and from the business district of the Corporation of _____,

NOW, THEREFORE, be it resolved by the Commissioners of the County of _____, State of Ohio, that

SECTION 1: The Ohio Department of Transportation be requested, and consent is hereby given, to erect appropriate signs at appropriate places and intervals designating route _____ as previously described, as a business route.

SECTION 2: The County of _____ shall be responsible for the future replacement and maintenance of the business route signs, and the pavement, berms, traffic signals and all parts of said road, and furthermore, the County agrees to maintain all traffic control devices in accordance with the standards as set forth in the Ohio Manual of Uniform Traffic Control Devices (OMUTCD). It is also understood that all traffic control devices on the above section of road and any of its parts will be subject to inspection by ODOT personnel and failure of the County to maintain the marking system in accordance with the OMUTCD shall be cause for ODOT to rescind approval of the business route and order the removal of the business route signs.

SECTION 3: The County of _____ recognizes its responsibility for the section of road described above and it understands and agrees that the posting of this section of road as a business route will not remove the responsibility of any part of it from _____ County. Specifically, the County will in no manner be relieved or discharged from any claim or claims of any nature arising from, or growing out of, the maintenance of said section of road and the County shall save the State of Ohio harmless from any and all such claims.

SECTION 4: This resolution shall be in full force and effect from and after its passage, legal publication and earliest period allowed by law.

Passed this _____ day of _____, _____.

Commissioners	Voting
_____	_____
_____	_____
_____	_____

ATTEST:

_____
Clerk of the Board

Form 296-2. Request for Business Route Signs within a Corporation

Resolution Number _____

Requesting the Ohio Department of Transportation to Erect Business Route Signs within a Corporation

WHEREAS, state route _____ has been relocated so as to bypass the Corporation of _____, and,

WHEREAS, the streets as described below, which were previously marked as a section of this state route:
_____
_____
_____
have been abandoned by the Ohio Department of Transportation as a part of the state highway system, and

WHEREAS, it is believed that it is in the best interest of the citizens of the Corporation of _____ and the public in general that motorists be provided with appropriate direction to and from the business district of the Corporation of _____,

NOW, THEREFORE, be it resolved by _____ _____, State of Ohio, that

SECTION 1: The Ohio Department of Transportation be requested, and consent is hereby given, to erect appropriate signs at appropriate places and intervals designating route _____ as previously described, as a business route.

SECTION 2: The Corporation of _____ shall be responsible for the future replacement and maintenance of the business route signs, and the pavement, berms, traffic signals and all parts of said road, and furthermore, the Corporation agrees to maintain all traffic control devices in accordance with the standards as set forth in the Ohio Manual of Uniform Traffic Control Devices (OMUTCD). It is also understood that all traffic control devices on the above section of road and any of its parts will be subject to inspection by ODOT personnel and failure of the Corporation to maintain the marking system in accordance with the OMUTCD shall be cause for ODOT to rescind approval of the business route and order the removal of the business route signs.

SECTION 3: The Corporation of _____ recognizes its responsibility for the streets described above and it understands and agrees that the posting of this section of road as a business route will not remove the responsibility of any part of it from the Corporation of _____. Specifically, the Corporation will in no manner be relieved or discharged from any claim or claims of any nature arising from, or growing out of, the maintenance of said streets and the Corporation shall save the State of Ohio harmless from any and all such claims.

SECTION 4: This resolution shall be in full force and effect from and after its passage, legal publication and earliest period allowed by law.

Passed this _____ day of _____, _____.

Corporation of _____	Voting
_____	_____
_____	_____
_____	_____

ATTEST:

_____
Clerk of the Board

Form 296-3. HAR Installation and Maintenance Agreement

AGREEMENT NO. ____

This Agreement is made and entered into by and between the Ohio Department of Transportation ("ODOT") and the _____, hereafter referred to as the "owner."

In consideration of the mutual covenants, promises and warranties set forth herein, ODOT and the owner agree as follows:

SECTION 1: DEFINITIONS

The following words and items shall have the following meanings:

1.1 **AGREEMENT**: This Agreement, which is herein identified as Agreement No. ____.

1.2 **APPLICATION**: The written request by the owner.

1.3 **DIRECTOR**: The Director of ODOT.

1.4 **ODOT STANDARD OPERATING PROCEDURE PH-P-403**: Standard Operating Procedure PH-P-403 titled "Permits to Use or Occupy Highway Rights-of-Way" dated April 30, 1991.

1.5 **PERMIT**: An Occupancy Permit issued to owner by ODOT.

1.6 **PROCEDURES**: The procedures in ODOT Traffic Engineering Manual Section 206-5 titled "Highway Advisory Radio Signing."

1.7 **PROJECT**: The project of fabricating, erecting and maintaining Highway Advisory Radio signs in accordance with the procedures.

1.8 **HIGHWAY ADVISORY RADIO SYSTEM**: A specific information radio transmission system.

1.9 **OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES**: A manual titled "Ohio Manual of Uniform Traffic Control Devices for Streets and Highways" published by ODOT's Division of Highway Operations, Office of Traffic Engineering.

SECTION 2: PURPOSE OF AGREEMENT

2.1 The purpose of this Agreement is to set forth the covenants, rights, duties, obligations and warranties of the parties with respect to the installation, maintenance, and operation of a Highway Advisory Radio System and the installation and maintenance of associated sign(s) located on Route ____, at or about exit number _____, at mile marker ____, in _____ County.

SECTION 3: SCOPE OF THE PROJECT

3.1 The owner, entirely at its own expense, shall design, construct, and maintain a Highway Advisory Radio System and associated signs as described in this Agreement and in the following documents hereby incorporated by reference:

1. The application.
2. The procedures.
3. ODOT Standard Operating Procedure PH-P-403.
4. Ohio Manual of Uniform Traffic Control Devices.
5. ODOT Standard Construction Drawings.
6. ODOT Construction and Material Specifications.
7. ODOT Traffic Engineering Manual Section 206-5.
8. Approved construction plans for installation of signs.

3.2 The resolution of any conflict among these documents shall be made by the Director upon written request of the owner.

SECTION 4: PROJECT RESTRICTIONS

4.1 The owner agrees to operate a Highway Advisory Radio System transmitter and associated signs in the following manner.

a. Only traffic advisory or directional messages shall be broadcast over the radio station.
b. No message of a commercial or promotional nature may be broadcast at any time.
c. Messages concerning disruptions of normal traffic flow or road conditions due to highway construction or maintenance activities shall be broadcast when requested by the Ohio Department of Transportation.
d. The Highway Advisory Radio System shall be operated at all times in accordance with applicable Federal Communications Commission Rules and Regulations.
e. The Highway Advisory Radio System shall be operated on a permanent year-round basis 24 hours a day unless otherwise approved by the Director.
f. The location(s) of the broadcast reception zone(s), as described in this Agreement, shall not be altered subsequent to placement of the signs referred to herein.
g. The owner shall immediately notify the Ohio Department of Transportation of any event or condition which may significantly affect its ability to perform in accordance with the provisions of this Agreement.

SECTION 5: PERIOD OF PERFORMANCE

5.1 The term of this Agreement shall commence upon the execution thereof by the Director.

5.2 This Agreement shall terminate when one of the following events occurs:

a. The owner no longer operates the Highway Advisory Radio System; or
b. ODOT'S operational needs require removal of all Highway Advisory Radio System signs and/or equipment from the Right of Way;
c. At the discretion of the Director.

5.3 In the event that paragraphs 5.2b or 5.2c occur, ODOT shall provide the owner with reasonable written notice of termination sufficient to allow the owner to find an alternate site, if any.

SECTION 6: PERFORMANCE BOND AND PAYMENT BOND REQUIREMENTS:

6.1 The owner hereby agrees to post a performance bond prior to commencement of the Project and subject to ODOT's approval in an amount equal to the greater of twenty-five percent of the estimated cost of the initial Project construction cost or Five Thousand Dollars ($5,000), conditioned upon the owner's promise to perform in accordance with SECTION 8, Removal and Restoration, of this Agreement.

6.2 The owner further agrees to post a payment bond prior to the commencement of the Project and subject to ODOT's approval in an amount equal to the greater of one hundred percent of the initial project construction cost or Twenty-Five Thousand Dollars ($25,000.00) for the payment of any contractor or subcontractor for labor performed or materials furnished in connection with the Project.

6.3 If the owner or its contractor or subcontractor does not commence work within the time required, or does not carry the same forward with responsible progress, or is improperly performing the work, or has abandoned or fails to prosecute the work in an acceptable manner or fails or refuses to complete this Agreement, ODOT shall so notify the owner in writing and the owner and its contractors shall immediately cease work on the Project. ODOT shall forthwith give written notice, by certified mail, to the sureties on the bonds of the owner's contractor of such action. If, within ten days after the receipt of such notice, such sureties notify ODOT in writing of their intention to enter upon and complete the work covered by such contract, the sureties shall be permitted to do so. The sureties shall commence work within thirty days after receipt of permission from ODOT.

6.4 In the event said sureties do not undertake their legal and contractual obligations, ODOT may take any action it deems suitable in order to complete the Project or terminate the Project in accordance with Section ___, Default and Termination.

6.5 The owner shall include the terms found in 6.1 through 6.4 above in any and all contracts it enters into with contractors or subcontractors who actually perform work on the Project and shall provide ODOT with a copy of any such contract(s) and/or subcontract(s).

SECTION 7: PERMIT REQUIREMENTS

7.1 Except in emergencies, the owner shall obtain a Permit prior to each occasion that the owner intends to perform any scheduled installation, maintenance, repair and/or removal operations within the State highway right-of-way at or near the location of the Highway Advisory Radio signs described in this Agreement.

7.2 An emergency is defined as: _____

SECTION 8: MAINTENANCE OF HIGHWAY ADVISORY RADIO SIGNS

8.1 The owner shall provide maintenance of the Highway Advisory Radio signs at no cost to ODOT and in accordance with the specifications and standards defined by ODOT. This will include relocating or removing any Highway Advisory Radio signs which ODOT deems it necessary for any reason to relocate or remove.

8.2 If, in the opinion of ODOT, the Highway Advisory Radio System or associated signs malfunction, cease to function or cause damage or any threat of damage to State property or if the Highway Advisory Radio signs become, in the opinion of ODOT, unsightly, badly faded or in a state of dilapidation, the owner shall, at its own cost, immediately repair any damage or remove any threat of damage, cure any malfunction or make any needed repairs after written notice from ODOT.

8.3 If the owner fails to remedy the defects as noted by ODOT and ODOT repairs, or causes to be repaired, any Highway Advisory Radio sign, the owner shall reimburse ODOT for all expenses incurred as a result of the owner's failure to provide a remedy in accordance with this Section.

8.4 ODOT reserves the right to claim and recover by process of law such sums or otherwise receive satisfaction as may be sufficient to correct any and all errors or make good any and all defects in the performance, workmanship and/or materials involved pursuant to this Agreement.

SECTION 9: REMOVAL AND RESTORATION

9.1 The owner hereby agrees that it shall assume the entire cost of removing signs, sign supports, and foundations for Highway Advisory Radio signs and SHALL restore the area upon termination of this Agreement.

SECTION 10: RELEASE AND INDEMNIFICATION

10.1 The owner covenants and agrees to indemnify and hold ODOT, the State, and its agents harmless against any loss, claim, cause of action, damages, liability (including without limitation, strict absolute liability in tort or by statute imposed), charge, cost or expense (including, without limitation, counsel fees to the extent permitted by law) caused by the owner's negligent, willful, or wanton actions or inactions, including such actions or the failures to act of any contractors or subcontractors or other employee hired by owner in connection with this Agreement.

10.2 No claim, cause of action or request of any kind shall be made by the owner against ODOT or the State for any compensation for damage to the Highway Advisory Radio System and related signs resulting from the performance of ODOT highway maintenance or construction activities.

10.3 In no event shall the owner or any of its employees, agents, contractors or subcontractors, be considered agents or employees of ODOT or the State. The owner agrees that none of its employees, agents, contractors or subcontractors will hold themselves out as, or claim to be, agents, officers or employees of ODOT or the State and will not, by reason of any relationship with ODOT or the State make any claim, demand or application to or for any right or privilege applicable to an agent, officer or employee of ODOT or the State including, but not limited to, rights and privileges concerning workmen's compensation benefits, social security coverage or retirement membership, credit or any other terms, conditions, or privileges of employment.

10.4 The obligation of the owner to indemnify and hold ODOT and the State harmless shall not be limited or reduced in any way by reason of any insurance coverage or lack thereof.

SECTION 11: COMPLIANCE WITH FEDERAL, STATE AND LOCAL REQUIREMENTS

11.1 The owner shall fully comply with all federal, State and local laws, rules, executive orders, and other legal requirements as they apply to the performance of this Agreement.

SECTION 12: NO ADDITIONAL WAIVER IMPLIED

12.1 If any term, provision or condition contained in this Agreement is breached by either the owner or ODOT and thereafter such breach is waived by the other party, such waiver shall be limited to the particular breach so waived and shall not be deemed to waive any other breach hereunder.

12.2 No remedy herein conferred upon or reserved by ODOT is intended to be exclusive of any other available remedy, but each and every such remedy shall be cumulative and shall be in addition to every other remedy given under this Agreement or now or hereafter existing at law or in equity.

12.3 No delay or omission to exercise any right or option accruing to ODOT upon any default by the owner shall impair any such right or option or shall be construed to be a waiver thereof, but any such right or option may be exercised from time to time as often as may be deemed expedient by ODOT.

SECTION 13: DEFAULT AND TERMINATION

13.1 If the owner or its Contractor or Subcontractor does not commence work within the time required, or does not carry the same forward with responsible programs, or is improperly performing the work, or has abandoned or fails to prosecute the work in an acceptable manner, or fails to maintain signing in an acceptable manner, or fails or refuses to complete this Agreement, the Director may terminate this Agreement upon giving the owner 10 days written notice.

13.2 Neglect or failure of the owner to comply with any of the terms, provisions or conditions of this Agreement or failure of any representations made to ODOT in connection with this Agreement by the owner to be true may be an event of default, provided that if by reason of force majeure the owner is unable in whole or in part to carry out its covenants contained herein, the owner shall not be deemed in default during the continuance of such inability.

13.3 The term “force majeure” as used herein shall mean, without limitation: Acts of God, strikes, lockouts or other industrial disturbances; acts of public enemies, order of any kind of government of the United States or of the State or any of their political subdivisions or any of their departments, agencies, or officials, or any civil or military authority; epidemics; landslides; lightning; earthquake; fire; hurricanes; storms; floods; washouts; droughts; restraint of government and people; civil disturbances; explosions; partial or entire failure of utilities; or any other cause not reasonably in the control of the owner. The owner shall, however, remedy with all reasonable effort each cause preventing it from carrying out its covenants contained herein.

13.4 If notified by ODOT in writing that it is in violation of any of the terms, conditions, or provisions of this Agreement, and a default has occurred, the owner shall have thirty (30) days from the date of such notification to remedy the default or, if the remedy will take in excess of thirty (30) days to complete, the owner shall have thirty (30) days to satisfactorily commence a remedy of the causes preventing its compliance and curing the default situation. Expiration of the thirty days and failure by the owner to remedy, or to satisfactorily commence the remedy of, the default whether payment of funds has been fully or partially made, shall result in ODOT, at its discretion, declining to make any further payments to the owner, or termination of this Agreement by ODOT. If this Agreement is terminated, the owner shall repay to ODOT all of the federal funds disbursed to it under this Agreement pursuant to Article XVII of this Agreement.

13.5 The owner, upon receiving a notice of termination from ODOT for default, shall cease work on the terminated activities covered under this Agreement. If so requested by ODOT, the owner shall assign to ODOT all its rights, title, and interest to any contracts it has with any Consultants or Contractors. Otherwise, the owner shall terminate all Contracts and other Agreements it has entered into relating to such covered activities, take all necessary and appropriate steps to limit disbursements and minimize any remaining costs. At the request of ODOT, the owner may be required to furnish a report describing the status of Project activities as of the date of its receipt of notice of termination, including results accomplished and other matters as ODOT may require.

13.6 No remedy herein conferred upon or reserved by ODOT is intended to be exclusive of any other available remedy, but each and every such remedy shall be cumulative and shall be in addition to every other remedy given under this Agreement or now or hereafter existing at law or in equity. No delay or omission to exercise any right or option accruing to ODOT upon any default by the owner shall impair any such right or option or shall be construed to be a waiver thereof, but any such right or option may be exercised from time to time and as often as may be deemed expedient by ODOT.

SECTION 14: SETTLEMENT OF THIRD PARTY AGREEMENT DISPUTES OR BREACHES

14.1 The owner shall avail itself of all legal and equitable remedies under any third party contract which relates to the Project and shall notify ODOT of any current or prospective litigation pertaining to any such third party contract.

SECTION 15: CHANGE IN CONDITIONS OF LAW AFFECTING PERFORMANCE

15.1 The owner shall immediately notify ODOT of any other event, which may significantly affect its ability to perform in accordance with the provisions of this Agreement.

SECTION 16: SEVERABILITY

16.1 If any provision of this Agreement is held to be invalid or unenforceable by a Court of competent jurisdiction, such holding shall not affect the validity or enforceability of the remainder of this Agreement. All provisions of this Agreement shall be deemed severable.

SECTION 17: SUCCESSORS IN INTEREST

17.1 All the obligations incurred by the owner under this Agreement shall pass to and be binding upon any successors, heirs, contractors, subcontractors and assigns of the owner and such successors, heirs, assigns, contractors, subcontractors shall be bound to the terms, conditions, restrictions, specifications and covenants of this Agreement.

17.2 The owner shall not assign, transfer, convey or subcontract, in whole or in part, or otherwise dispose of this Agreement without the express prior written consent of ODOT, and such written consent shall not release the owner from any of the obligations of this Agreement.

SECTION 18: EXCLUSIVE AGREEMENT

18.1 This Agreement, when fully executed by the parties, constitutes the entire Agreement between the parties and shall supersede all other communications, representations or agreements, either oral or written, with respect to the subject matter in this Agreement unless a modification to this Agreement is executed in writing by the parties.

SECTION 19: CAPTION

19.1 The section captions in this Agreement, are used for the convenience of reference only and in no way define, limit or describe the scope or intent of this Agreement or any part hereof and shall not be considered in any construction hereof.

SECTION 20: DRUG-FREE WORK PLACE

20.1 The owner agrees to comply with all applicable State and federal law regarding a drug-free work place. The owner shall make a good faith effort to ensure that its employees will not purchase, transfer, use, or possess illegal drugs, or abuse prescription drugs in any way.

SECTION 21: EQUAL EMPLOYMENT OPPORTUNITY

21.1 In carrying out this Agreement, the owner shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, ancestry, age, or disability as that term is defined in the Americans with Disabilities Act. The owner shall ensure that applicants are hired and that employees are treated during employment without regard to their race, religion, color, sec, national origin, ancestry, age, or disability. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training including apprenticeship.

21.2 The owner agrees to post in conspicuous places available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause, and in all solicitations or advertisements for employees placed by it, state that all qualified applicants shall receive consideration for employment without regard to race, religion, color, sex, national origin, ancestry, age, or disability. The owner shall incorporate this nondiscrimination requirement within all of its Contracts for any of the work on the Project (other than Subcontracts for standard commercial supplies or raw materials) and shall require all of its Contractors to incorporate such requirements in all Subcontracts

for any part of such Project work.

21.3 The owner agrees to ensure that minority business enterprises, as such are defined in 49 CFR Part 23, will have the maximum opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with federal funds provided in conjunction with this Agreement.

SECTION 22: GOVERNING LAWS

22.1 This Agreement and any claims arising out of this Agreement shall be governed by the laws of the State of Ohio. Any provision of this Agreement prohibited by the law of Ohio shall be deemed void and of no effect. Any litigation arising out of or relating in any way to this Agreement or the performance thereunder shall be brought only in the courts of Ohio, and the owner hereby irrevocably consents to such jurisdiction. To the extent that ODOT is a party to any litigation arising out of or relating in any way to this Agreement or the performance thereunder, such an action shall be brought only in a court of competent jurisdiction in Franklin County, Ohio.

SECTION 23: NOTICE

23.1 Notice under this Agreement shall be directed as follows:

IF TO THE OWNER	IF TO ODOT:
_____	_____
_____	_____
_____	_____

SECTION 24: ASSIGNMENT

24.1 Neither this Agreement nor any rights, duties, or obligations described herein shall be assigned by either party hereto without the prior express written consent of the other party.

SECTION 25: SIGNATURES

25.1 Any person executing this Contract in a representative capacity hereby warrants that he/she has been duly authorized by his/her principal to execute this Contract on such principal's behalf.

IN WITNESS HEREOF, the parties hereto have executed this Agreement by their duly authorized officers on the day, month and year set forth below.

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

BY: _____
[typed Director's Name] ,
Director

DATE: _____

_____
(OWNER)

BY: _____

Print Name: _____

Title: _____

DATE: _____

Form 296-4. Overhead Sign Support Inspection

Support Information

Support Identifier: _____ Date: _____

Route: _____ Direction: _____

C - R - S: _____ Mile Marker: _____

Design No.: _____ Bridge Mtd Foundation? ____Yes ____No

Support Type: ____Cantilever ____Box Truss ____Bridge Mtd ____Skewed Bridge Mtd

____Span Wire ____Monotube ____Butterfly ____Semi-Overhead

____Other: _____

Foundation

____Concrete Condition ____Soil Condition ____Anchor Bolts/Nuts

Comments: _____

_____

End Frame/Pole

____Structural Members ____Structural Connections

____Damage? ____Yes ____No ____Pitting? ____Yes ____No

____Surface Rust: ____Minimal ____Moderate ____Severe

Comments: _____

_____

Cantilever/Span

____Structural Members ____Structural Connections

____Sign Attachments ____Attachments to End Frame/Pole

____Damage? ____Yes ____No ____Pitting? ____Yes ____No

____Surface Rust: ____Minimal ____Moderate ____Severe

Comments: _____

_____

Structural Components of Sign Lighting

Type: ____Fluorescent ____Mercury Vapor TC-31.21 (New Design)

____Mercury Vapor TC-31.20 (Old Design) ____Repair Brkt? ____Yes ____No

Comments: _____

_____

Inspected by: _____ **Date:** _____

Form 296-5. Sign Order Form

SIGN SHOP ORDER

OHIO DEPARTMENT OF TRANSPORTATION - OFFICE OF TRAFFIC ENGINEERING

DISTRICT REQUEST NUMBER:	[Enter Request Number Here]						RUSH	Date Needed	[Enter Date Needed]		
Material Type:		Flatsheet		Plywood		Extrusheet		Overlay		Decal	
Order Type:		Material Only		Special		CONFIRMING		ODNR		WAREHOUSE	
Make separate orders for: Flatsheet - Plywood - Extrusheet - Overlay - Material Only - Decal - Special - Confirming - ODNR - Warehouse											

EMS Number	Sign Code	Sign Width	Sign Height	Sq Ft Per Sign	Total Sq Ft	#	Legend/Description	Qty Order	Unit Cost	Total Cost
				0.00	0.00	1				$0.00
				0.00	0.00	2				$0.00
				0.00	0.00	3				$0.00
				0.00	0.00	4				$0.00
				0.00	0.00	5				$0.00
				0.00	0.00	6				$0.00
				0.00	0.00	7				$0.00
				TOTAL	0.00					

Delivery By:		Sign Shop		District - When Ready, Call: [For District Pickup Call:]	Order Total $0.00
Prepared By: [Order Prepared By:]			Date: [Order Date]	Return To: [Return Completed Order To]	
District: [District]			Supplemental Sign Design Sheet(s) Attached - Enter Number of sheets Attached:		
CO Review By:		Date:	ODNR - Approved By:		Date:
Approved By:		Date:	Order Filled By:		Date:
Shipment Received By:					Date:

297 TABLES INDEX

297-1 Sizes for Lane-Use Control Signs

As noted in ***Section 201-10***, ***Table 297-1*** provides a listing of the various Lane-Use Control Signs with their sizes. ***Figure 298-22*** also provides a visual representation of these signs.

297-2 Lake Erie Circle Tour Routes

Section 204-4 describes signing provided for the Lake Erie Circle Tour Routes. ***Table 297-2*** lists the routes involved.

297-3 Ramp Identification Code System

As noted in ***Section 210-2***, ***Table 297-3*** lists the codes used on the D10-H6 signs to identify interchange ramps.

297-4 Criteria for Signing for Traffic Generators on Freeways and Expressways

As noted in ***Section 209-2***, **Table 297-4** describes the criteria used when reviewing freeway and expressway signing requests for traffic generators.

297-5 Control City Destinations for Ohio's Interstate Highway System

As noted in ***Section 209-3***, ***Table 297-5*** lists the control cities used on **Ohio's** Interstate Routes for major destination references.

297-6 Sign Copy

As noted in ***Section 250-7.3***, ***Table 297-6*** provides information about the various kinds of sign copy.

297-7 Types of Overhead Sign Supports

As noted in ***Section 250-4.1***, ***Table 297-7*** provides a summary of information about the various types of overhead sign supports.

297-8a Weight of Overhead Supports - Truss

Table 297-8a provides information about the weight of truss sign supports ***(see Section 250-4.5)***.

297-8b Weight of Overhead Supports - Semi-Overhead & Center Mount

Table 297-8b provides information about the weight of semi-overhead and center-mount sign supports ***(see Section 250-4.5)***.

297-8c Weight of Overhead Supports - Butterfly

Table 297-8c provides information about the weight of butterfly sign supports ***(see Section 250-4.5)***.

297-8d Weight of Overhead Supports - Single Arm

Table 297-8d provides information about the weight of single arm overhead sign supports ***(see Section 250-4.5)***.

297-8e Weight of Overhead Supports - Cantilever

Table 297-8e provides information about the weight of cantilever sign supports ***(see Section 250-4.5)***.

297-8f Weight of Overhead Supports - Structure-Mounted

Table 297-8f provides information about the weight of overpass structure-mounted sign supports ***(see Section 250-4.5)***.

297-9 Bolt Size and Maximum Torque for Beam Supports

As noted in ***Section 250-6.5***, ***Table 297-9*** provides information about the bolt sizes and maximum torque allowed for beam type supports.

297-10 Bolt Tension

As noted in ***Section 250-4.6***, ***Table 297-10*** provides information from the **Society of Automotive Engineers Handbook** about the tensioning for bolts used with beam supports.

297-11 Sign Lighting Lamps and Ballast

As noted in ***Section 250-8.1***, ***Table 297-11*** provides information about types of lamps and ballasts used for sign lighting.

Table 297-1. Sizes of Lane-Use Control Signs

Code number	Size (Inches)	Size (Millimeters)
R3-5a	30x36, 36x42	750x900, 900x1050
R3-5L	30x36, 36x42	750x900, 900x1050
R3-5R	30x36, 36x42	750x900, 900x1050
R3-6L	30x36, 36x42	750x900, 900x1050
R3-H6a	30x36	750x900
R3-H6b	42x36	900x1050
R3-H6c	30x36	750x900
R3-6R	30x36, 36x42	750x900, 900x1050
R3-8	30x30	750x750
R3-8a	48x30	1200x750
R3-8b	48x30	1200x750
R3-H8ba	30x30, 36x36	750x750, 900x900
R3-H8bb	30x30, 36x36	750x750, 900x900
R3-H8bc	30x30	750x750
R3-H8bd	36x30	900x750
R3-H8be	36x30	900x750
R3-H8bf	36x30	900x750
R3-H8bg	30x30	750x750
R3-H8bh	36x30	900x750
R3-H8bj	36x30	900x750
R3-H8bk	36x30	900x750
R3-H8bm	36x30	900x750
R3-H8bn	36x30	900x750
R3-H8bp	36x30	900x750
R3-H8bq	42x30	1050x750
R3-H8bs	42x30	1050x750
R3-H8bt	42x30	1050x750
R3-H8bu	42x30	1050x750

Code number	Size (Inches)	Size (Millimeters)
R3-H8ca	48x30	1200x750
R3-H8cb	48x30	1200x750
R3-H8cc	48x30	1200x750
R3-H8cd	48x30	1200x750
R3-H8ce	48x30	1200x750
R3-H8cf	48x30	1200x750
R3-H8cg	48x30	1200x750
R3-H8ch	48x30	1200x750
R3-H8cj	48x30	1200x750
R3-H8ck	48x30	1200x750
R3-H8cm	48x30	1200x750
R3-H8cn	48x30	1200x750
R3-H8cp	48x30	1200x750
R3-H8cq	54x30	1350x750
R3-H8cs	54x30	1350x750
R3-H8ct	54x30	1350x750
R3-H8cu	54x30	1350x750
R3-H8da	54x30	1350x750
R3-H8db	54x30	1350x750
R3-H8dc	54x30	1350x750
R3-H8dd	54x30	1350x750
R3-H8de	54x30	1350x750
R3-H8df	54x30	1350x750
R3-H8dg	54x30	1350x750
R3-H8dh	54x30	1350x750
R3-H8ea	60x30	1650x750
R3-H8eb	60x30	1650x750

Table 297-2. Lake Erie Circle Tour Routes

Dist	County	Route	From	To	Distance	
					(miles)	(km)
2	LUC	I 75	Michigan State Line	I 280	3.49	5.615
2	LUC	I280	I 75	SR 2	4.02	6.468
2	LUC	SR 2	I 280	OTT Co. Line	12.96	20.853
2	OTT	SR 2	LUC Co. Line	SR 358	16.40	26.388
2	OTT	SR 358	SR 2	SR 163	0.92	1.480
2	OTT	SR 163	SR 358	SR 269	10.53	16.943
2	OTT	SR 269	SR 163	SR 269 spur	1.71	2.751
2	OTT	SR 269 spur	SR 269	SR 2	0.62	0.998
2	OTT	SR 2	SR 269 spur	ERI Co. Line	1.63	2.623
3	ERI	SR 2	OTT Co. Line	US 6	4.30	6.919
3	ERI	US 6	SR 2	LOR Co. Line	25.61	41.206
3	LOR	US 6	ERI Co. Line	CUY Co. Line	21.23	34.159
12	CUY	US 6	LOR Co. Line	SR 2	14.25	22.928
12	CUY	SR 2	US 6	I 90	3.25	5.229
12	CUY	I 90	SR 2	SR 283	5.11	8.222
12	CUY	SR 283	I 90	LAK Co. Line	7.40	11.907
12	LAK	SR 283	CUY Co. Line	SR 535	16.32	26.259
12	LAK	SR 535	SR 283	US 20	4.85	7.804
12	LAK	US 20	SR 535	ATB Co. Line	12.01	19.324
4	ATB	US 20	LAK Co. Line	SR 534	2.94	4.730
4	ATB	SR 534	US 20	SR 531	4.33	6.967
4	ATB	SR 531	SR 534	SR 7	22.72	36.556
4	ATB	SR 7	SR 531	US 20	1.22	1.963
4	ATB	US 20	SR 7	Pennsylvania State Line	2.08	3.347
				Total Distance	199.90	321.639

Table 297-3. Ramp Identification Code System

Letter Code	Mainline Direction of Travel	Ramp Type*	Ramp Usage
H	NB, EB	Diamond	Exit
J	NB, EB	Diamond	Entrance
K	NB, EB	Loop	Exit
L	NB, EB	Loop	Entrance
M	SB, WB	Diamond	Exit
P	SB, WB	Diamond	Entrance
Q	SB, WB	Loop	Exit
R	SB, WB	Loop	Entrance
T	NB, EB	Irregular	Exit
U	NB, EB	Irregular	Entrance
V	SB, WB	Irregular	Exit
X	SB, WB	Irregular	Entrance
Y	NB, EB		Collector - Distributor
Z	SB, WB		Collector - Distributor

* A loop ramp is defined as any ramp which replaces a left turn movement.

Mainline direction of travel refers to the straight line mileage system. NB and EB are the directions of increasing log miles.

The letters N, O, S and W are not used in ramp coding. The letters A, B, C, D, E, F, G and I are used to designate extra exit and entrance ramps in some interchange configurations.

Table 297-4. Signing for Traffic Generators on Freeways & Expressways

Type of Generator	Sign Type and Background Color	Criteria	Metropolitan Area over 100,000	Urbanized or Metropolitan Area under 100,000	Rural Area	Comments
Airport*, Ferry, Heliport, Bus Station, Train Station	E3-H1 green	Type	An airport* or ferry must be for public use and be shown on the Ohio Transportation Map. A heliport, bus station, or train station must have regularly scheduled departures and/or arrivals.			* Maximum distance from interchange may be extended to 15 miles for each category for commercial airports.
		Maximum distance from interchange	5 miles	7 miles	10 miles	
College, University, Post High School Educational Institute	E3-H1 green	Curriculum	Must be duly accredited and provide multiple associate, bachelors, masters, and/or doctorate degree programs of the traditional academic variety.			
		Maximum distance from interchange	5 miles	7 miles	10 miles	Distance requirement may be waived by the District Deputy Director.
Joint Vocational School	E3-H1 green	Annual adult enrollment	11,000	8,000	5,000	Total adult attendance for all courses in a year
		Maximum distance from interchange	1 mile	3 miles	5 miles	
Boarding School	E3-H1 green	Curriculum /residency	Must provide a traditional academic curriculum and have a substantial portion of their student enrollment comprised of individuals whose permanent residence is not considered to be local to the community in which the school is situated. This includes college preparatory schools and military academies.			
Major Military Installation	E3-H1 green	Number of employees or permanently assigned personnel	5,000	5,000	5,000	
		Maximum distance from interchange	3 miles	4 miles	5 miles	

Signing for Traffic Generators on Freeways & Expressways (continued)

Type of Generator	Sign Type and Background Color	Criteria	Metropolitan Area over 100,000	Urbanized or Metropolitan Area under 100,000	Rural Area	Comments
Amusement park, arena, auditorium, convention hall, dam, historical site, museum, stadium, zoo	E3-H2 brown	Annual attendance	200,000 plus 20,000 per mile of distance from interchange		100,000 plus 10,000 per mile of distance from interchange	
		Maximum distance from interchange	10 miles	10 miles	10 miles	
Recreation area	E3-H2 brown	Annual attendance	200,000 plus 20,000 per mile of distance from interchange		100,000 plus 10,000 per mile of distance from interchange	
		Maximum distance from interchange	10 miles	10 miles	15 miles	
Fairground, racetrack	E3-H2 brown	Annual attendance for permanent signs	200,000	200,000	200,000	
		Event attendance for temporary signs	20,000 plus 2,000 per mile of distance from interchange			
		Maximum distance from interchange	10 miles	10 miles	15 miles	
Law enforcement agency (state, county, muni. police)	D12-H16 blue	Maximum distance from interchange	1 mile	1 mile	2 miles	
Toll highway, toll bridge	E3-H1 green	Location	Direct access from exit and a part of the state highway system.			
Central (downtown) business district	E3-H1 green	Population	City of 300,000 or more population and no direct access to the downtown area.			

Table 297-5. Control City Destinations for Ohio's Interstate System

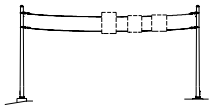
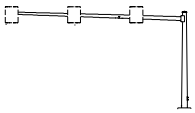
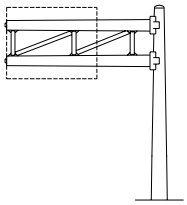
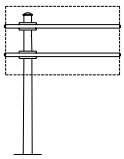
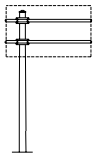
Interstate Route	Control City
I-70	Indianapolis - Dayton - Columbus - Wheeling
I-71	Louisville - Cincinnati - Columbus - Cleveland
I-74	Indianapolis - Cincinnati
I-75	Lexington - Cincinnati - Dayton - Toledo - Detroit
I-76	Akron - Youngstown - Pittsburgh
I-77 NB	Charleston - Marietta - Cleveland
I-77 SB	Cleveland - Akron - Canton - Marietta - Charleston
I-80	Chicago - Toledo -Youngstown - New York City
I-90	Chicago -Toledo - Cleveland - Erie

Table 297-6. Sign Copy

Demountable	Material	CopyFace	Design Features	Attachment
Embossed, with Reflector Units	Formed 0.040 inch (1 mm) Alum.Sheet, CMS Item 730.11	Baked Enamel, White	Colorless Plastic Reflectors, CMS Item 720.05	Aluminum Blind Rivets, CMS Item 730.17
Embossed, Black	Formed 0.040 inch (1 mm) Alum.Sheet, CMS Item 730.11	Baked Enamel, Black	No Holes for Reflectors	Aluminum Blind Rivets, CMS Item 730.17
Shield, Ohio or U.S.	Flat 0.063 inch (1.6 millimeters) Aluminum Sheet	Type G White Sheeting, CMS Item 730.19 Legend - Silk Screened, Black Paste CMS Item 730.22	—	Aluminum Blind Rivets, CMS Item 730.17
Shield, Interstate	Flat 0.063 inch (1.6 millimeters) Aluminum Sheet	Type G White Sheeting, CMS Item 730.19 Legend - Reverse Screened Red & Blue Transparent Paste, CMS Item 730.22	Border Frame and Numerals: Embossed with Reflector Units	Aluminum Blind Rivets, CMS Item 730.17

Direct Applied	Material	Attachment
Reflective Sheeting	Type F or G White Sheeting, CMS Item 730.18, or 730.19, unless otherwise indicated	By Adhesive Backing
Nonreflective Black Sheeting	Nonreflective Black Sheeting, CMS Item 730.20	By Adhesive Backing

Table 297-7. Types of Overhead Sign Supports

Support Type	Allowable Sign Area, Sq. Ft.	Span or Arm Length, Ft.	Configuration	Notes
TC-17.10 Span Wire	10 to 132	20 to 90		----------
TC-16.20 Single Arm	----------	Arm 23 to 45		----------
TC-12.30 Cantilever	Up to 300 (Depending on Arm Length)	Arm 16 to 30		Alternate Version - Made of Untapered Tubes.
TC-9.10 Semi-Overhead	Up to 150	----------		Sign may be eccentric to pole.
TC-9.30 Center Mount	Up to 250	_____		Sign may be eccentric to pole.

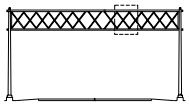
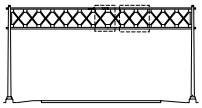
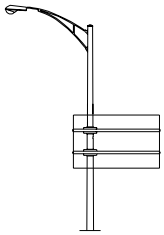
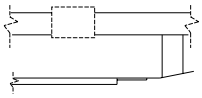
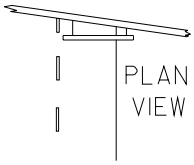
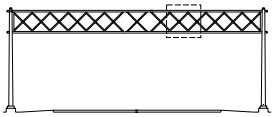
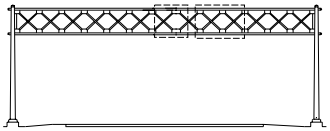
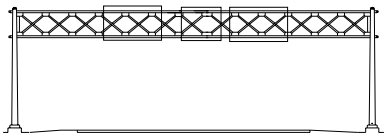
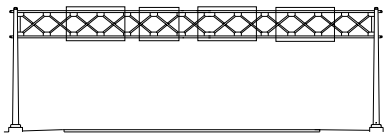
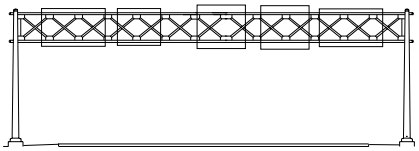
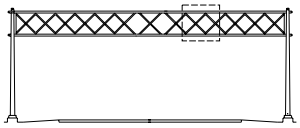
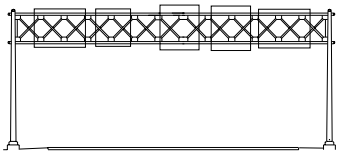
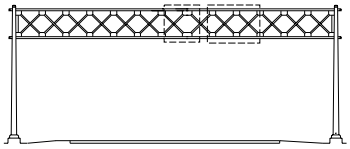
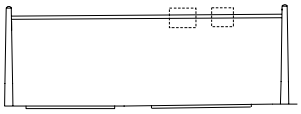
Support Type	Allowable Sign Area, Sq. Ft.	Span or Arm Length, Ft.	Configuration	Notes
TC-7.65 Aluminum Truss (Steel End Frames)	Design 6 Up to 600; Design 8 Up to 650	Design 6 40 to 65; Design 8 40 to 120		Design 6 ~ 3' sq. box Design 8 ~ 5' sq. box
TC-15.115 Steel Truss (Steel End Frames)	Up to 1150	40 to 150		5' square box
Combination Sign Support	According to Sign Support	According to Sign Support		May be used to add a highway lighting function to 16.20, 12.30, 9.10 and 9.30
TC-18.24 Structure Mounted	----------	----------		Flush Mounting. Aluminum Brackets
TC-18.26 Skewed Structure	----------	----------		Aluminum Structure

Table 297-8a. Weight of Overhead Supports - Truss

Sign Support Type		Span, Ft.	Wt./Ft.	Total Wt. of Truss, lbs.	Configuration
Truss – end frames weigh from 1400 to 1800 pounds each.					
7.2	Des. 1	70	15.4	1150	
	Des. 2	85	16.2	1375	
	Des. 3	105	21.4	2250	
7.3	Des. 1	55	16.8	925	
	Des. 2	80	21.3	1700	
	Des. 3	90	21.1	1900	
	Des. 4	105	21.4	2250	
7.4	Des. 1	75	21.3	1600	
	Des. 2	85	21.2	1800	
	Des. 3	90	32.5	2925	
	Des. 4	110	32.7	3600	
7.5	Des. 1	70	21.4	1500	
	Des. 2	80	21.3	1700	
	Des. 3	86	32.6	2800	
	Des. 4	110	32.7	3600	
7.6	Des. 1	65	21.5	1400	
	Des. 2	75	21.3	1600	
	Des. 3	80	31.1	2650	
	Des. 4	110	32.7	3600	

Sign Support Type		Span, Ft.	Wt./Ft.	Total Wt. of Truss, lbs.	Configuration
TC-7.65	Des. 6	55	21.8	1200	
	Des. 6	75	22.7	1700	
	Des. 8	75	29.0	2175	
	Des. 8	120	30.0	3600	

Steel Truss – end frames weigh from 1600 to 2000 pounds each.					
15.8		100	87.0	8700	
		140	87.2	12200	
TC-15.115		100	85	8500	
		140	84.3	11800	

Span Truss - each pole weighs 775 pounds.					
13.2	Des. 1	50		1275	
	Des. 2	60		1500	
	Des. 3	70		1800	
	Des. 4	80		2150	

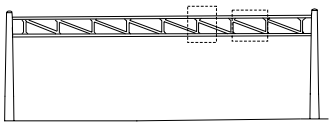
Flat Truss - each pole weighs 1550 pounds.					
14.5	Des. 1	50		2250	
	Des. 2	60		2700	
	Des. 3	70		3200	
	Des. 4	80		2600	
	Des. 5	90		4050	

Table 297-8b. Weight of Overhead Supports - Semi-Overhead & Center Mount

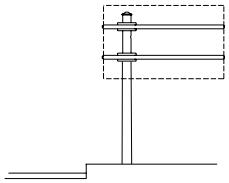
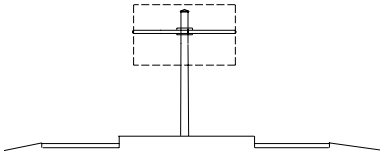
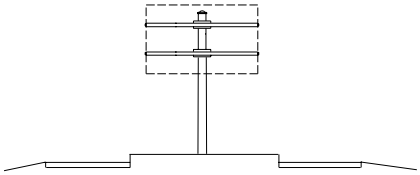
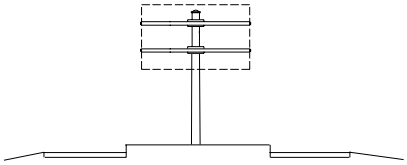
Sign Support Type		Total Wt. of Support, lbs.	Configuration
Semi-Overhead			
TC-9.10	Des. 1	650	
	Des. 2	900	
	Des. 3	1300	
Center Mount			
9.12	Des. 1	800	
	Des. 2	1100	
	Des. 3	1300	
9.24	Des. 1	1350	
	Des. 2	1550	
	Des. 3	1775	
	Des. 4	2300	
TC-9.30	Des. 1	975	
	Des. 2	1525	
	Des. 3	2350	
	Des. 4	4200	
	Des. 5	4500	

Table 297-8c. Weight of Overhead Supports - Butterfly

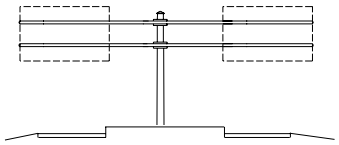
Sign Support Type		Total Wt. of One Set of Arms, lbs.	Total Wt. of Two Sets of Arms, lbs.	Configuration
10.48	Des. 1	1825	2150	
	Des. 2	1975	2500	
	Des. 3	2325	2800	
	Des. 4	2450	3000	
	Des. 5	3925	5000	
	Des. 6	3650	4400	
	Des. 7	4125	5400	
	Des. 8	5050	6700	
	Des. 9	5750	8000	

Table 297-8d. Weight of Overhead Supports - Single Arm

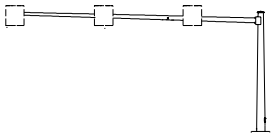
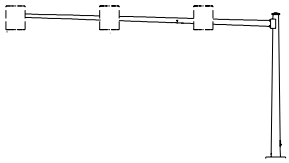
Sign Support Type		Arm Length, Ft.	Total Wt. of Support, lbs.	Configuration
16.10	Des. 1	38	2000	
	Des. 2	28	925	
	Des. 3	36	2350	
	Des. 4	42	2500	
	Des. 5	38	2050	
	Des. 6	28	1250	
	Des. 7	28	1800	
TC-16.20	Des. 1	23	800	
	Des. 2	31	1000	
	Des. 3	35	1200	
	Des. 4	43	1900	
	Des. 5	24	1150	
	Des. 6	27	1200	
	Des. 7	30	1250	
	Des. 8	33	1350	
	Des. 9	36	1800	
	Des. 10	39	2000	
	Des. 11	42	2050	
	Des. 12	45	2300	

Table 297-8e. Weight of Overhead Supports - Cantilever

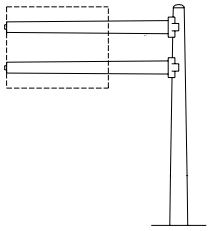
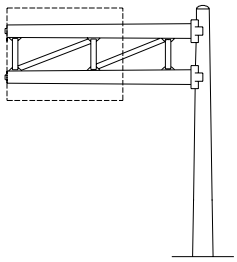
Sign Support Type		Total Wt. of Support, lbs.	Configuration
12.24	Des. 1	1300	
	Des. 2	1650	
	Des. 3	1750	
	Des. 4	2100	
	Des. 5	3300	
	Des. 6	3650	
	Des. 7	4000	
	Des. 8	5500	
12.30	Des. 1	1825	
	Des. 2	2450	
	Des. 3	2125	
	Des. 4	2875	
	Des. 5	3300	
	Des. 6	4000	
	Des. 7	4350	
	Des. 8	4650	
	Des. 9	5275	
	Des. 10	7000	
	Des. 11	6600	
	Des. 12	8400	

Table 297-8f. Weight of Overhead Supports - Structure Mounted

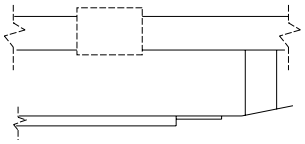
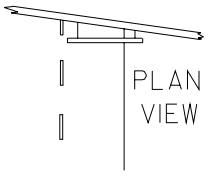
Sign Support Type		Total Wt. of Support, lbs.	Configuration
TC-18.24		Almost all the weight is involved in the sign; approximately 400 lbs. (181 kg) for a 10 x 10 foot (3.0 x 3.0 meters), including lights.	
TC-18.26	Des. 1	150	
	Des. 2	200	
	Des. 3	325	
	Des. 4	600	
	Des. 5	175	
	Des. 6	225	
	Des. 7	400	
	Des. 8	175	
	Des. 9	300	
	Des. 10	325	

Table 297-9. Bolt Size and Maximum Torque for Beams

Beam			Bolt Size	Maximum Torque
Type	Size			
	inches	mm	in (mm)	in-lb (N-m)
S4 x 7.7	4 x 2 5/8	102 x 67	1/2 (13)	200 (22.6)
W6 x 9	5 7/8 x 4	149 x 102	1/2 (13)	200 (22.6)
W10 x 12	9 7/8 x 4	244 x 102	3/4 (19)	750 (85)
W8 x 18	8 1/8 x 5 1/4	206 x 133	3/4 (19)	750 (85)
W10 x 22	10 1/8 x 5 3/4	257 x 146	1 (25)	1325 (150)
W12 x 30	12 3/8 x 6 1/2	314 x 165	1 (25)	1325 (150)

Table 297-10. Bolt Tension

Bolt Tension					
Bolt Size		80% Proof Load		Proof Load	
inches	(mm)	lbs.	(kg.)	lbs.	(kg.)
1/2	(13)	9,700	(4400)	12,100	(5490)
5/8	(16)	15,400	(6990)	19,200	(8710)
3/4	(19)	21,900	(9930)	28,400	(12,900)
7/8	(22)	31,400	(14,200)	39,300	(17,800)
1	(25)	41,200	(18,700)	51,500	(23,400)
1 1/8	(29)	45,200	(20,500)	56,500	(25,600)
1 1/4	(32)	57,400	(26,000)	71,700	(32,500)
1 3/8	(35)	68,400	(31,000)	85,500	(39,800)
1 1/2	(38)	83,100	(37,700)	104,000	(47,200)

Table 297-11. Sign Lighting Lamps and Ballast

Lamp Watts	ANSI Lamp Code	Ballast Type
100	H38HT - 100	CMRI-100-(a)
175	H39KB - 175	CMRI-175-(a)
250	H37KB - 250	CMRI-250-(a)

Where (a) = Operating Voltage

298 FIGURES INDEX

298-1 Signing for Median Crossovers

Figure 298-1 illustrates the recommended signing layout for a median crossover ***(see Section 201-2)***.

298-2 STOP Signs at Intersections

Figure 298-2 illustrates several variations for placement of STOP signs at intersections. See ***Section 201-3*** for further details.

298-3 Ramp Location Codes

Figure 298-3 is used to define the use of ramp location codes used for the extrusheet signs identification system ***(see Section 210-2)***. This coding system is based on the system established for recording accident data.

298-4a Regulatory and Warning Signs

Figure 298-4a is used to illustrate Regulatory and Warning Signs discussed in this Manual which are not shown in the **OMUTCD** ***(see Sections 201 and 202)***.

298-4b Regulatory and Warning Signs (Continued)

Figure 298-4b continues the illustrations of Regulatory and Warning Signs discussed in this Manual which are not shown in the **OMUTCD**.

298-5a Route Markers and Information Signs

Figure 298-5a is used to illustrate Route Markers and Information Signs discussed in this manual which are not shown in the **OMUTCD** ***(see Sections 204, 206 and 207)***.

298-5b Route Markers and Information Signs (Continued)

Figure 298-5b continues the illustrations of Route Markers and Information Signs discussed in this Manual which are not shown in the **OMUTCD**.

298-5c Route Markers and Information Signs (Continued)

Figure 298-5c continues the illustrations of Route Markers and Information Signs discussed in this Manual which are not shown in the **OMUTCD**.

298-5d Route Markers and Information Signs (Continued)

Figure 298-5d continues the illustrations of Route Markers and Information Signs discussed in this Manual which are not shown in the **OMUTCD**. This figure includes illustrations of sample Logo and TODS signs.

298-6a Rest Area and Miscellaneous Signs

Figure 298-6a is used to illustrate Rest Area Signs and miscellaneous others discussed in this manual which are not shown in the **OMUTCD** ***(see Section 208 and 210)***.

298-6b Rest Area and Miscellaneous Signs (Continued)

Figure 298-6b continues the illustrations of Rest Area Signs and miscellaneous others discussed in this Manual which are not shown in the **OMUTCD**.

298-7 Amish Buggy Signing for a Narrow Paved Shoulder

Figure 298-7 illustrates the situation described in ***Section 202-6*** regarding signing for a narrow shoulder on a route used by Amish buggies.

298-8 Placement of Overhead Exit Gore Sign - Span Type

Figure 298-8 is used as an illustration of placement of overhead exit gore signs of the span type.

298-9 Placement of Overhead Cantilever Type Sign

Figure 298-9 is used as an illustration of placement of cantilever signs ***(see Section 240-4.3)***.

298-10 Placement of Overhead Diverging Gore Sign - Cantilever Type

Figure 298-10 is used as an illustration of placement of overhead diverging gore signs of the Cantilever type.

298-11 Sight Distance Requirements for Overhead Guide Signs

Figure 298-11 is used illustrate sight distance requirements for overhead signs.

298-12 Design Chart for TC-12.30 Sign Supports

Figure 298-12 is used in designing **TC-12.30** sign supports ***(see Section 240-4.3)***.

298-13 Design Chart for Overhead Sign Support Trusses

Figure 298-13 is used in designing sign supports trusses ***(see Section 240-4.5)***.

298-14 Design Chart for Single Post Installations

Figure 298-14 is used in designing single post installations.

298-15 Design Chart for Two Post Installations

Figure 298-15 is used in designing two post installations.

298-16 Design Chart for Two Beam Installations

Figure 298-16 is used in designing two beam installations.

298-17 Design Chart for Three Beam Installations

Figure 298-17 is used in designing three beam installations.

298-18 Design Chart for TC-17.10 Sign Supports

Figure 298-18 is used in designing **TC-17.10** sign supports ***(see Section 240-4.5)***.

298-19 Two and Three Beam Installation Details

Figure 298-19 is used to define dimensions of the signs used in designing the supports ***(see Section 240-4.3)***.

298-20 TC-16.20 Overhead Sign Support

Figure 298-20 is used to illustrate design details needed and provide a sample table for use in a plan.

298-21 TC-17.10 Span Wire Sign Support

Figure 298-21 is used to illustrate design details needed and provide a sample table for use in a plan ***(see Section 240-4.5)***.

298-22 Lane-Use Control Signs Index

Figure 298-22 illustrates various Lane-Use Control signs not shown in the **OMUTCD**, and provides code number and size information ***(see Section 201-10)***.

298-23 Mounting a Sign Support on Concrete Barrier

Figure 298-23 illustrates a sign support developed to mount signs on concrete barrier.

298-24 Staking Sign Locations

Figure 298-24 is an illustration supporting the discussion in ***Section 250-3.1*** about staking.

298-25 Foundation Excavations

Figure 298-25 is an illustration of a foundation excavation, as described in ***Section 250-3.2***.

298-26 Solid Wood Posts

Figure 298-26 presents design details for solid wood posts used as sign supports, as described in ***Section 221-5***.

298-27 Sample Calculations for Solid Wood Posts

Figure 298-27 illustrates design calculations for solid wood posts used as sign supports ***(Section 221-5)***.

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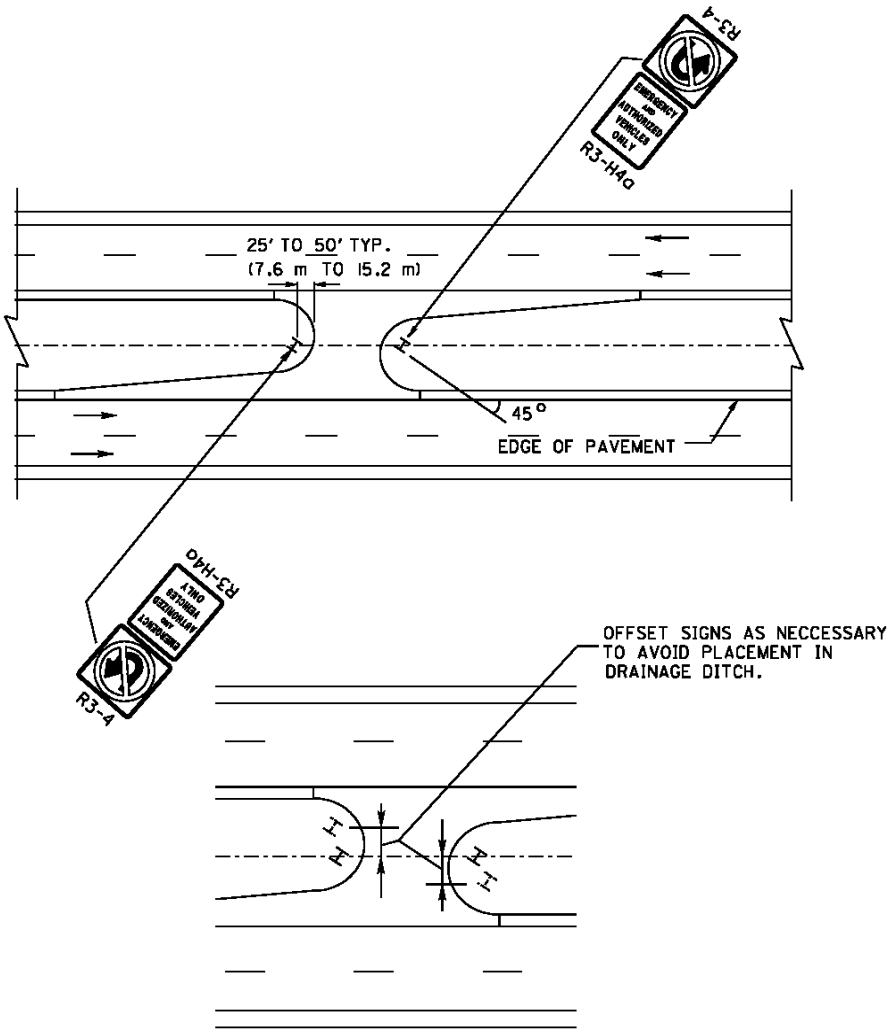
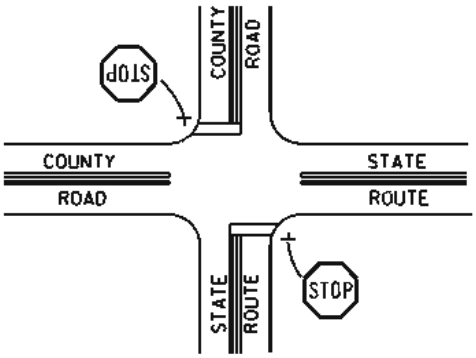
Figure 298-1. Signing for Median Crossovers

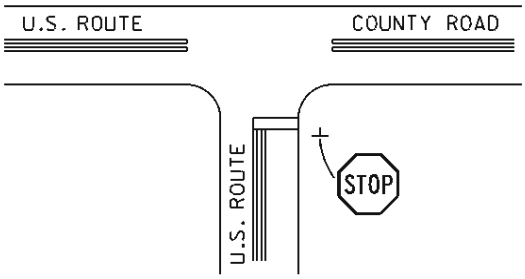


ALTERNATE SIGN PLACEMENT DETAIL

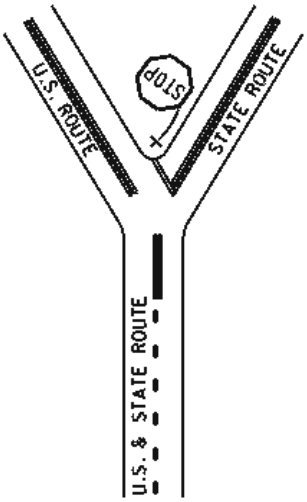
Figure 298-2. STOP Signs at Intersections



(A)



(B)



(C)

Figure 298-3. Ramp Location Codes

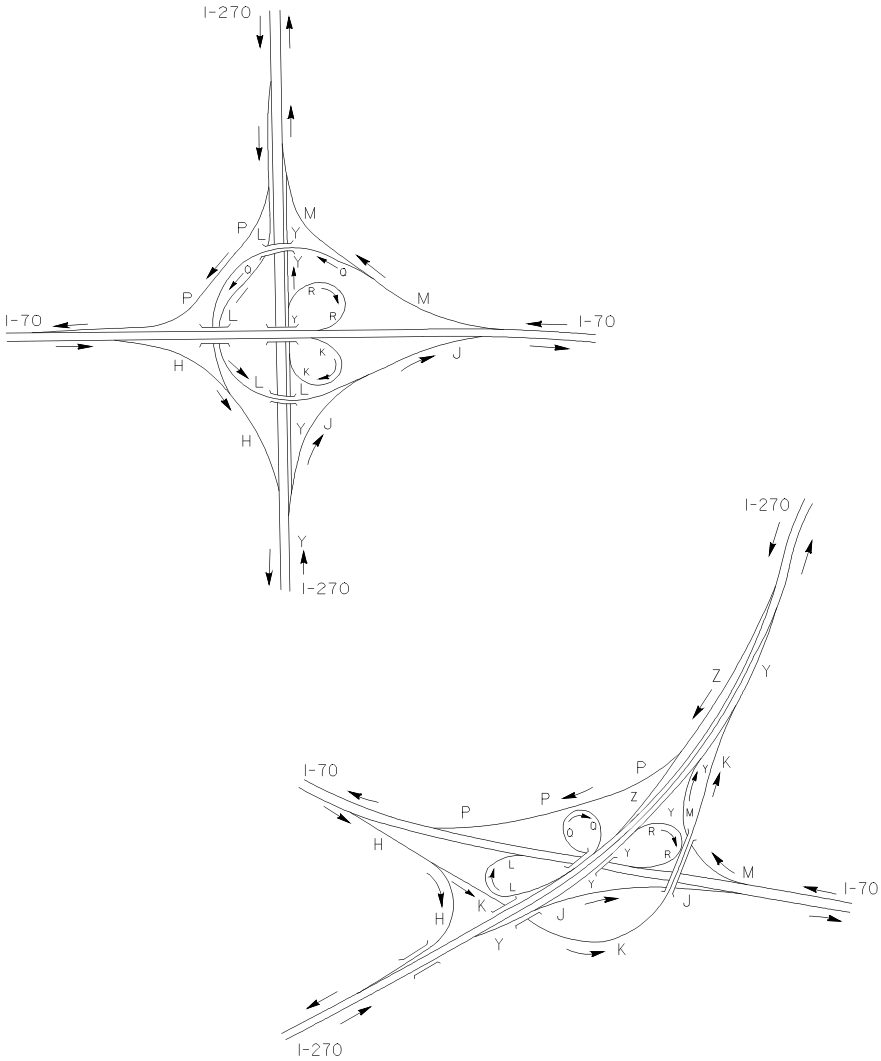


Figure 298-4a. Regulatory and Warning Signs

R7-H8b
(Sec. 201-6)

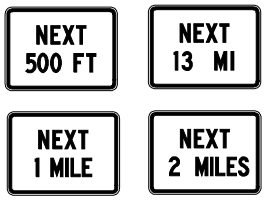
R16-H1
(Sec. 201-5)

R16-H2
(Sec. 201-5)

R16-H4
(Sec. 201-7)

R16-H5
(Sec. 201-7)

R16-H13
(Sec. 201-7)



R16-H14
(Sec. 201-7)

R16-H15
(Sec. 201-8)

W5-H6p
(Sec. 202-6)

W11- H14a
(Sec. 202-6)

Figure 298-4b. Regulatory and Warning Signs (Continued)

W13-H7
(Sec. 202-4)

W13-H8
(Sec. 202-4)

Figure 298-5a. Route Markers and Information Signs

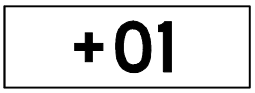
D5-H15
(Sec. 208-1)

D6-H4
(Sec. 206-8)

D6-H5
(Sec. 206-8)

D7-H6
(Sec. 206-12)

D10-H4
(Sec. 206-15)



D10-H4a
(Sec. 206-15)

D10-H6
(Sec. 210-2)

D10-H7
(Sec. 210-2)

D11-H2
(Sec. 204-3)

D11-H3
(Sec. 204-3)

D12-H2
(Sec. 206-6)

D12-H6
(Sec. 206-5)

Figure 298-5b. Route Markers and Information Signs (Continued)

D12-H7
(Sec. 206-5)

D12-H8
(Sec. 206-5)

D12-H9
(Sec. 206-5)

D12-H10
(Sec. 206-13)

D12-H11
(Sec. 207-7)

D12-H12
(Sec. 207-7)

D12-H13
(Sec. 208-6)

D12-H14
(Sec. 206-7)

D12-H15
(Sec. 206-9)

E8-H2
(Sec. 206-3)

E8-H5
(Sec. 206-8)

I-H2d
(Sec. 206-4)

I-H2e
(Sec. 206-3)

Figure 298-5c. Route Markers and Information Signs (Continued)

I-H15
(Sec.206-11)

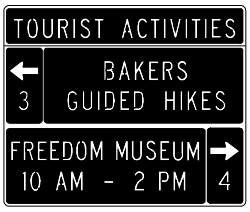
M8-H1
(Sec. 204-4)

M8-H2
(Sec. 204-4)

M8-H3
(Sec. 204-2)

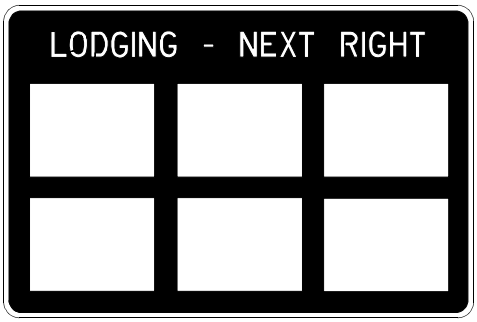
M8-H3p
(Sec. 204-2)

Figure 298-5d. Route Markers and Information Signs (Continued)
(TODS and LOGO Signs)



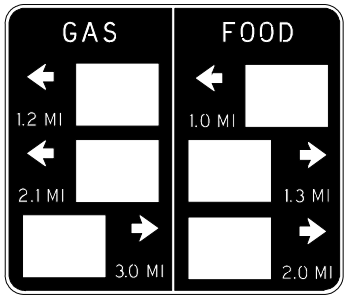
Tourist Oriented Directional Signing (TODS)
(Other variations possible)
(Section 207-3)

Specific Service Signing (LOGO)



E9-H1

(Other variations possible)
(Sec. 207-2)



E9-H17

(Other variations possible)
(Sec. 207-2)

Figure 298-6a. Rest Area and Miscellaneous Signs

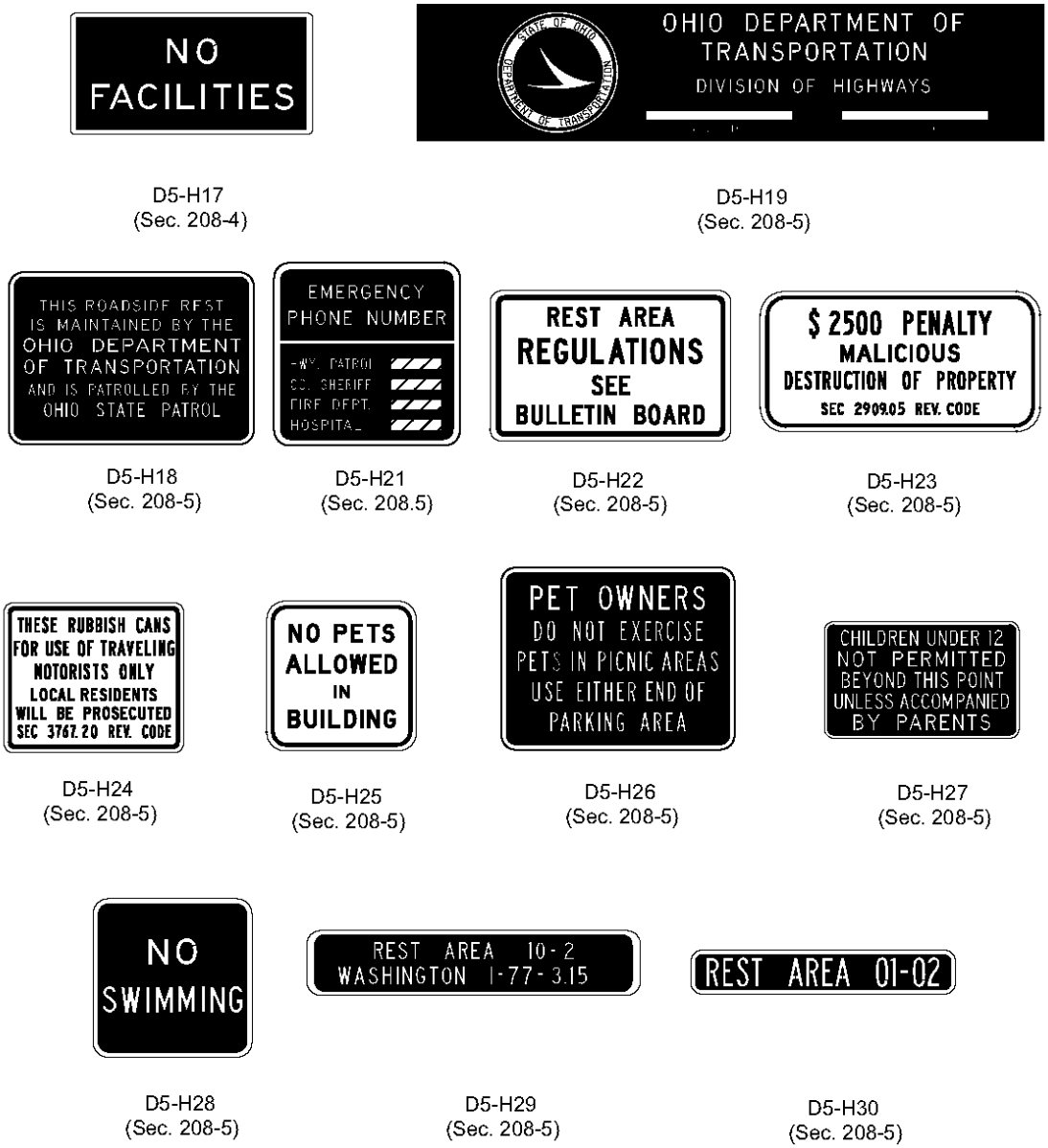


Figure 298-6b. Rest Area and Miscellaneous Signs (Continued)

D5-H31
(Sec. 208-5)

D5-H32
(Sec. 208-5)

D5-H33
(Sec. 208-5)

D5-H34
(Sec. 208-5)

D5-H35
(Sec. 208-5)

D5-H37
(Sec. 208-5)

D5-H38
(Sec. 208-5)

D5-H39
(Sec. 208-5)

D5-H40
(Sec. 208-5)

D5-H41
(Sec. 208-5)

D5-H42
(Sec. 208-5)

D5-H43
(Sec. 208-5)

D5-H44
(Sec. 208-5)

D5-H45
(Sec. 208-5)

D5-H46
(Sec. 208-5)

D5-H47
(Sec. 208-5)

Figure 298-7. Amish Buggy Signing for a Narrow Paved Shoulder

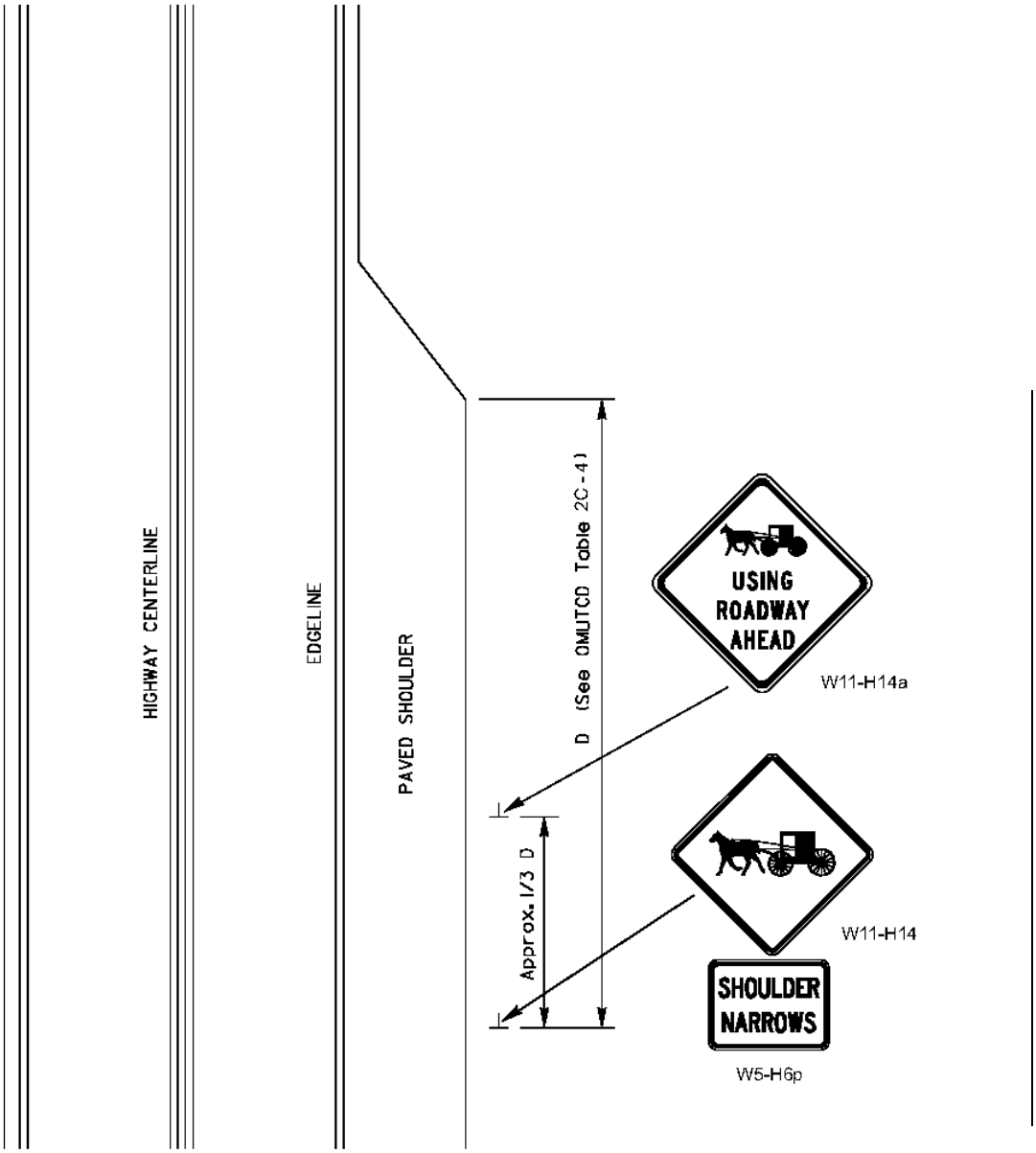


Figure 298-8. Placement of Overhead Exit Gore Sign - Span Type

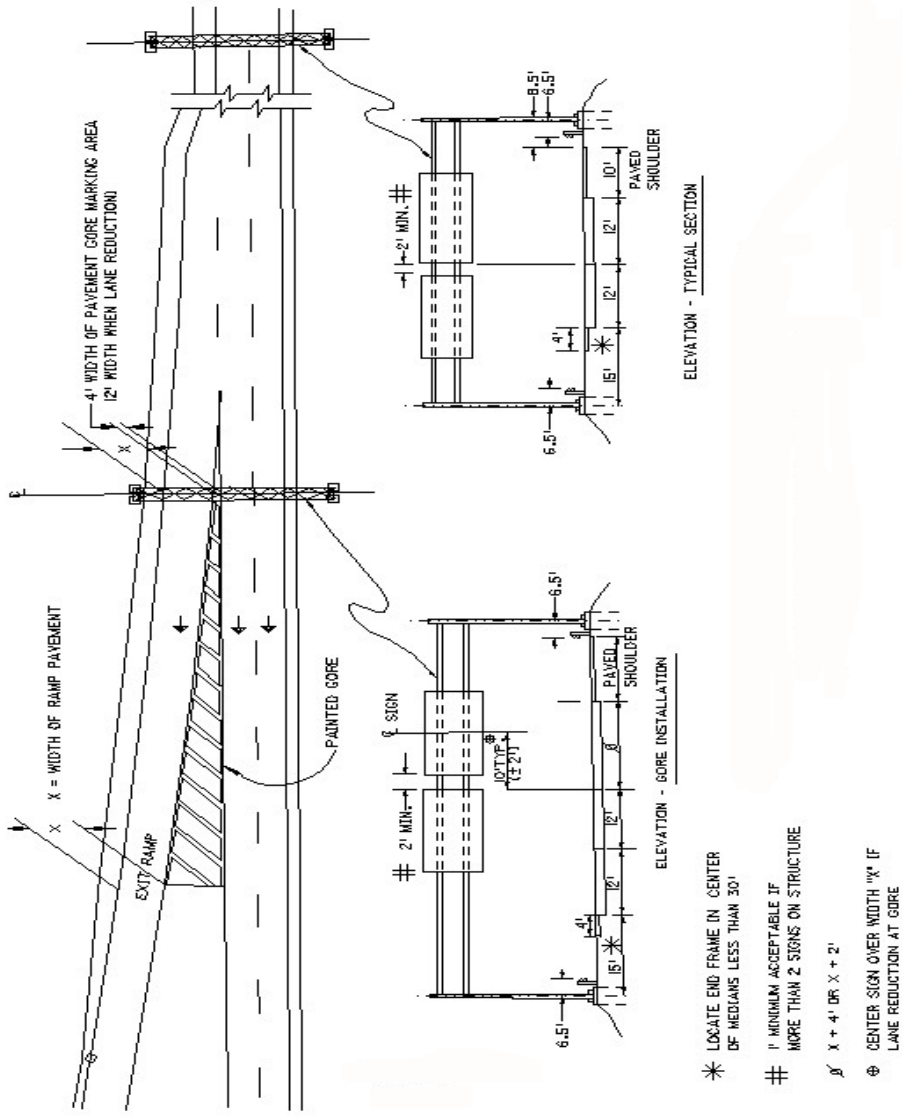


Figure 298-9. Placement of Overhead Cantilever Type Sign

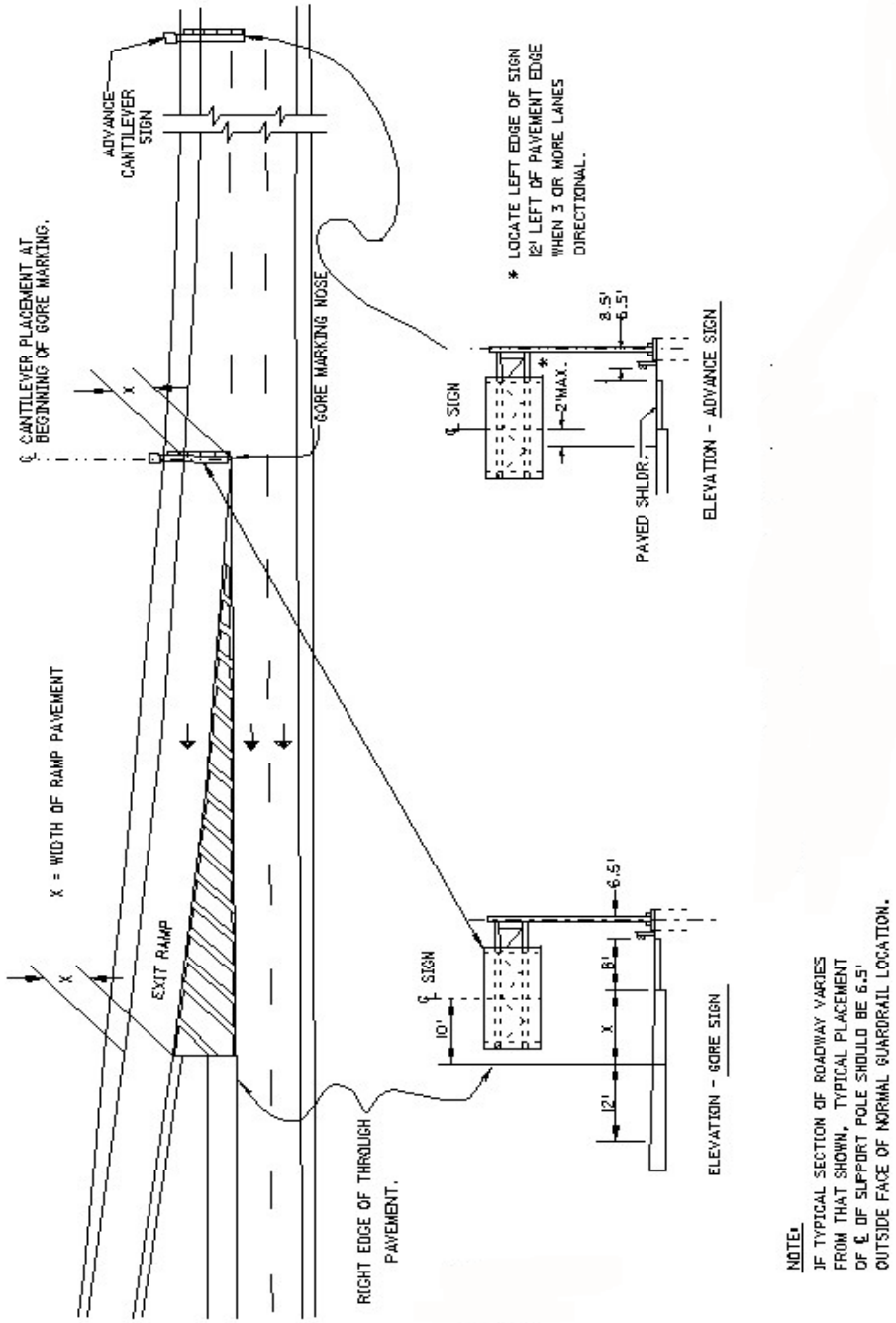


Figure 298-10. Placement of Overhead Diverging Gore Sign - Cantilever Type

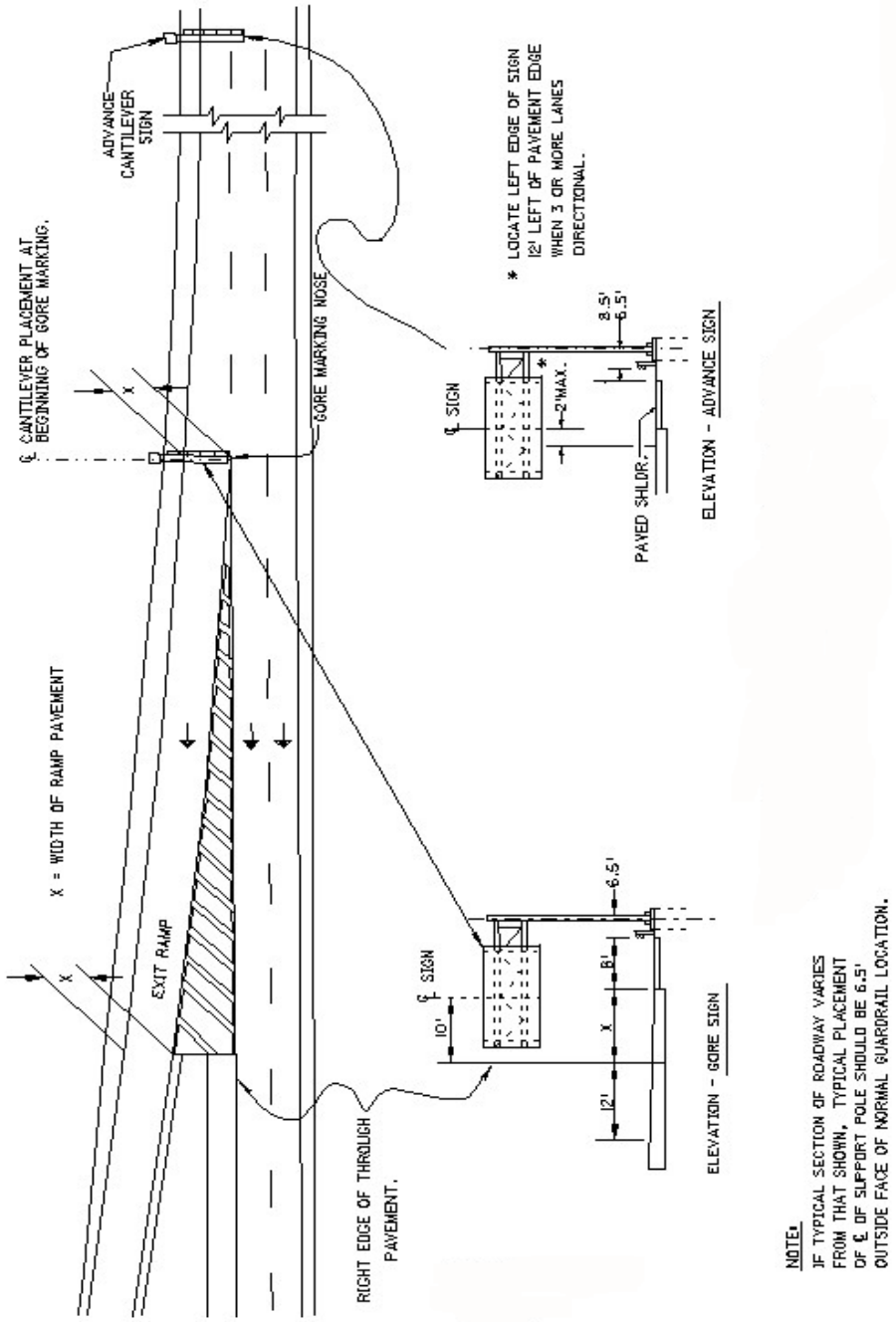


Figure 298-11. Sight Distance Requirements for Overhead Guide Signs (Mainline and Ramps)

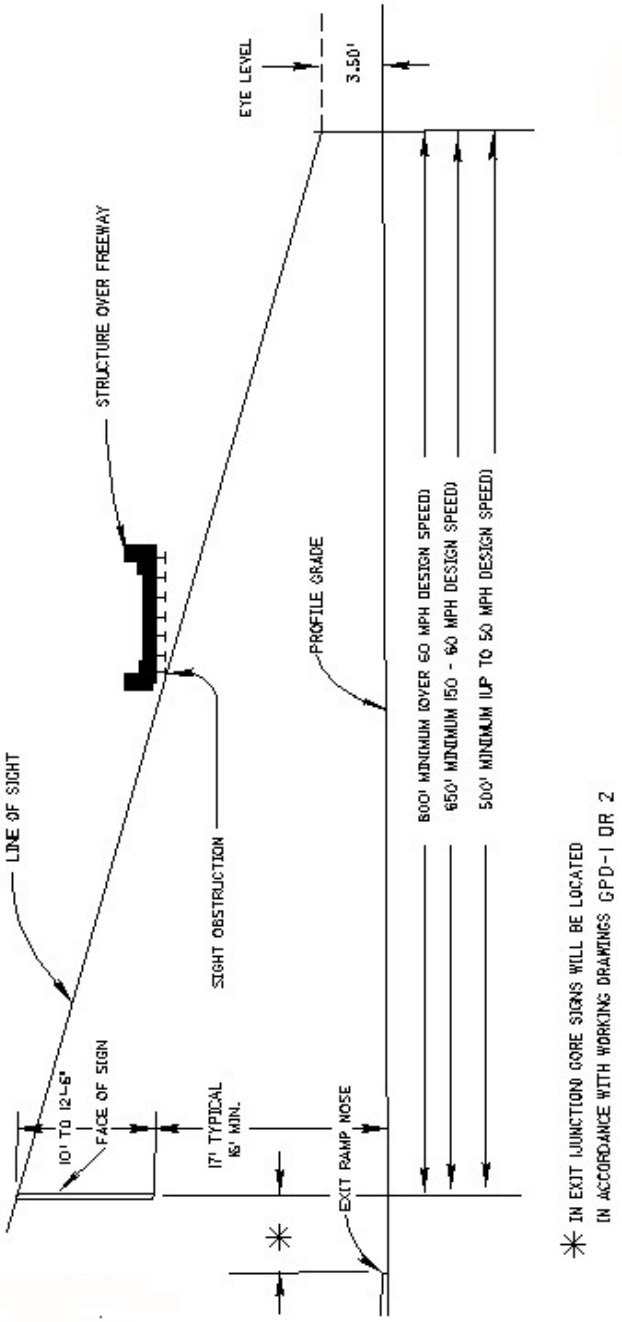


Figure 298-12. Design Chart for TC-12.30 Sign Supports

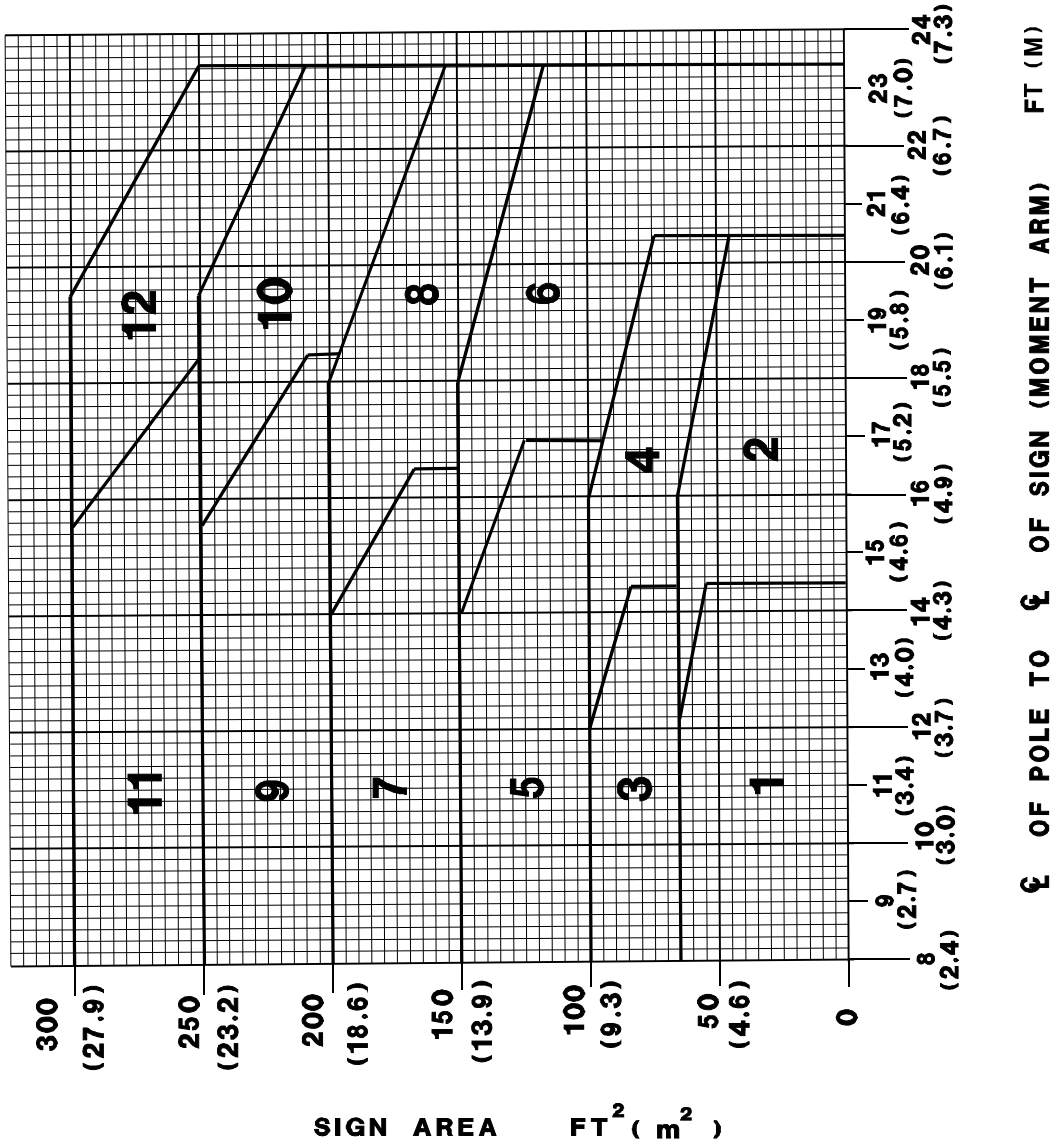


Figure 298-13. Design Chart for Overhead Sign Support Trusses

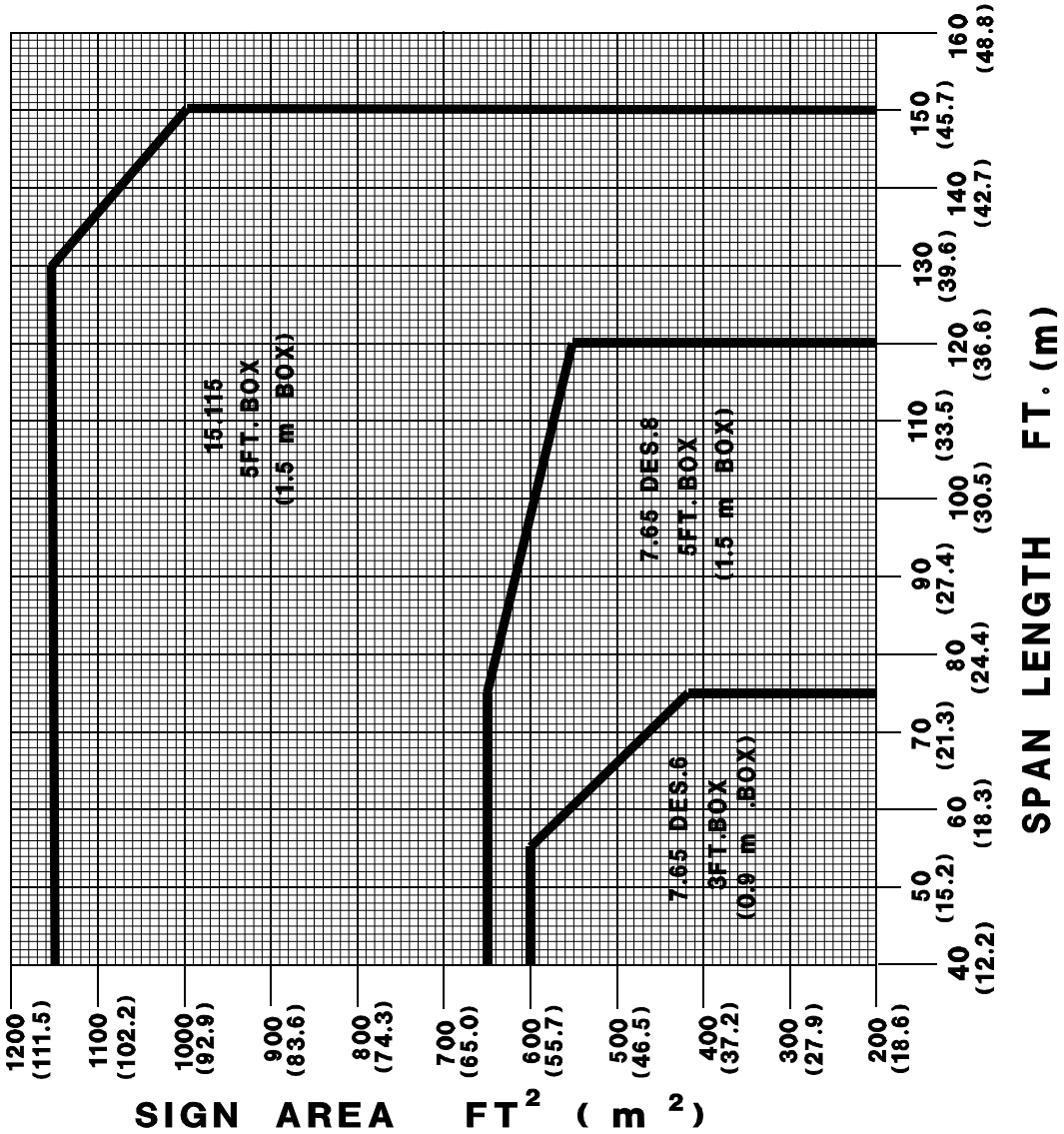


Figure 298-14. Design Chart for Single Post Installations

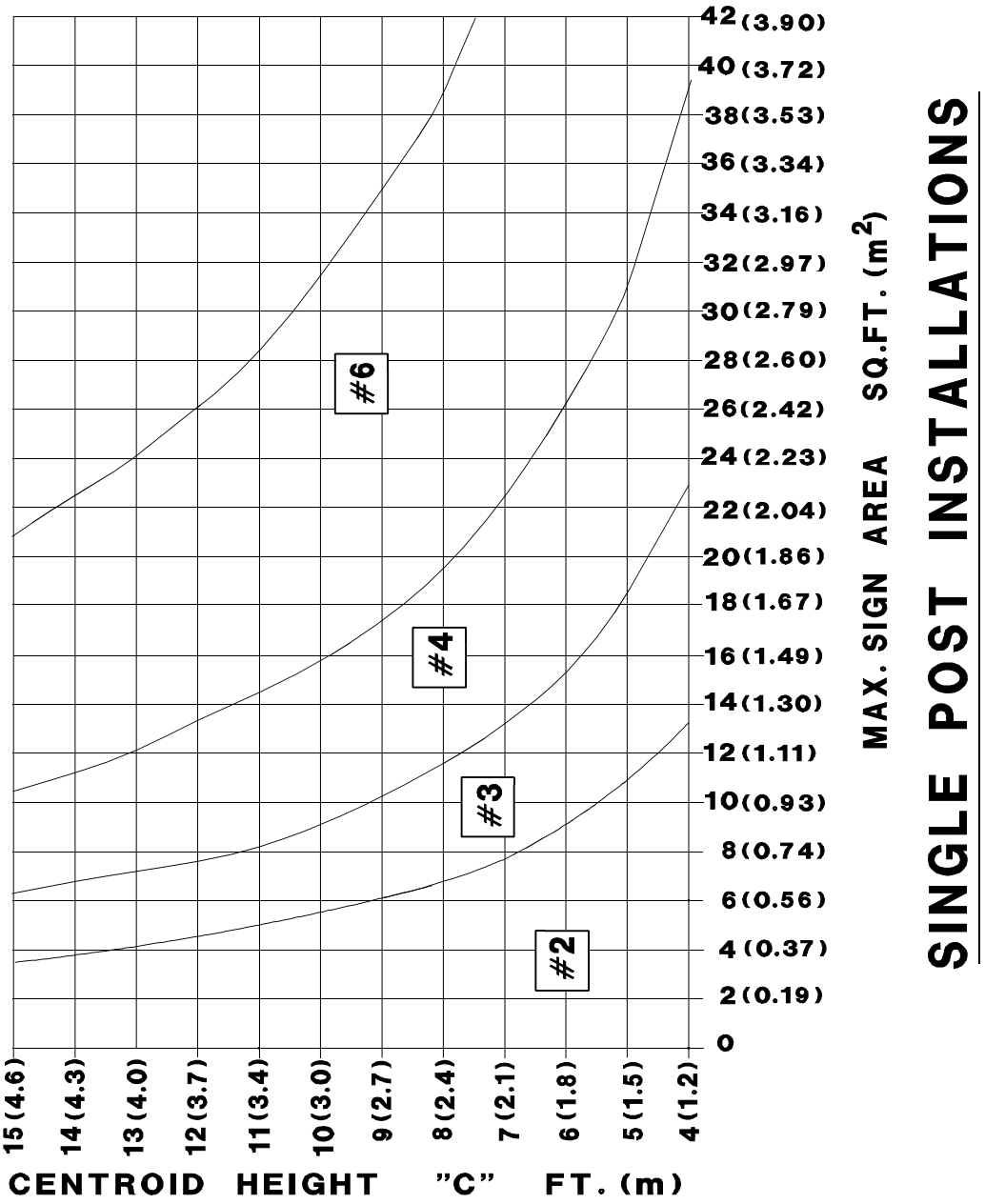


Figure 298-15. Design Chart for Two Post Installations

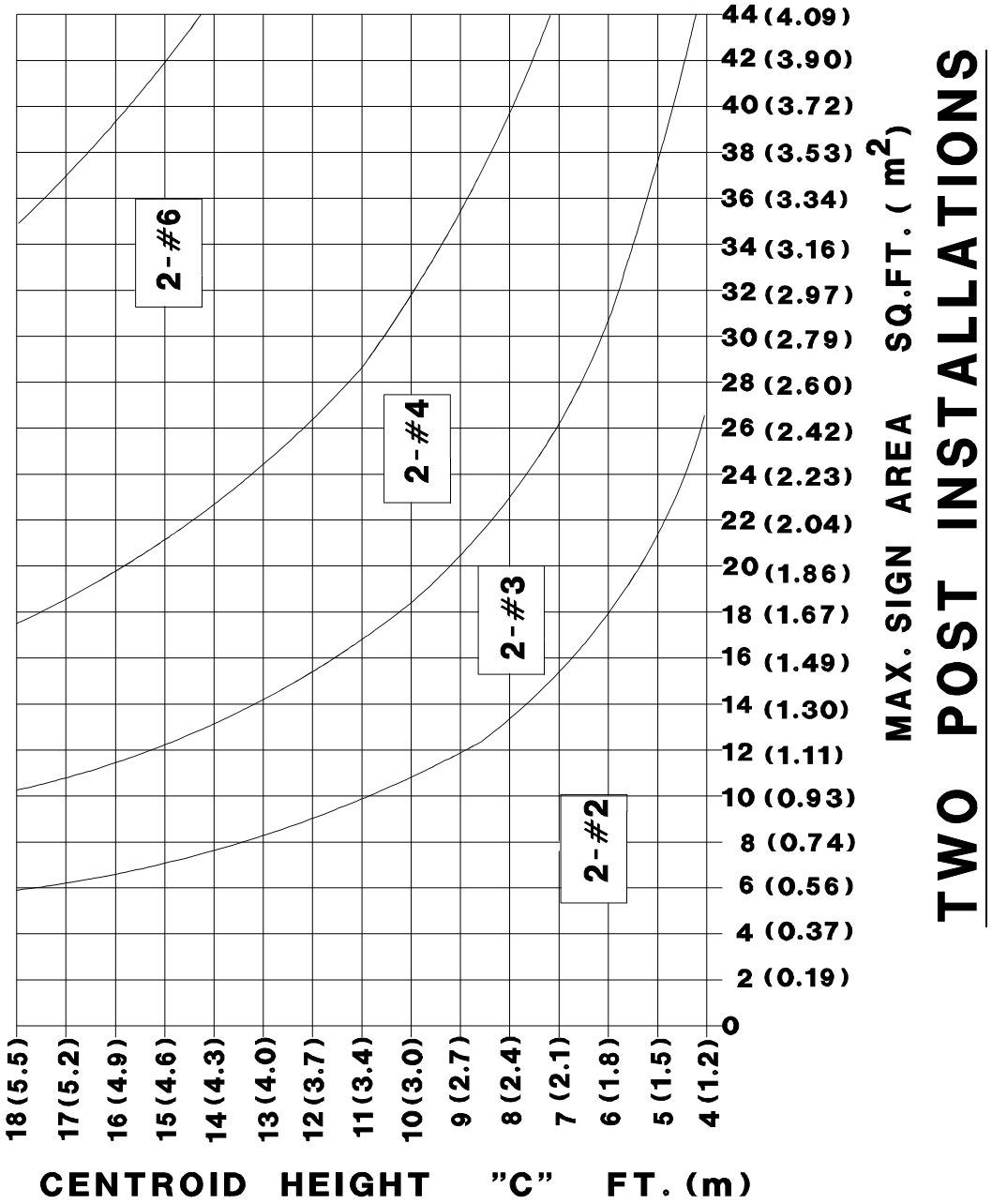


Figure 298-16. Design Chart for Two Beam Installations

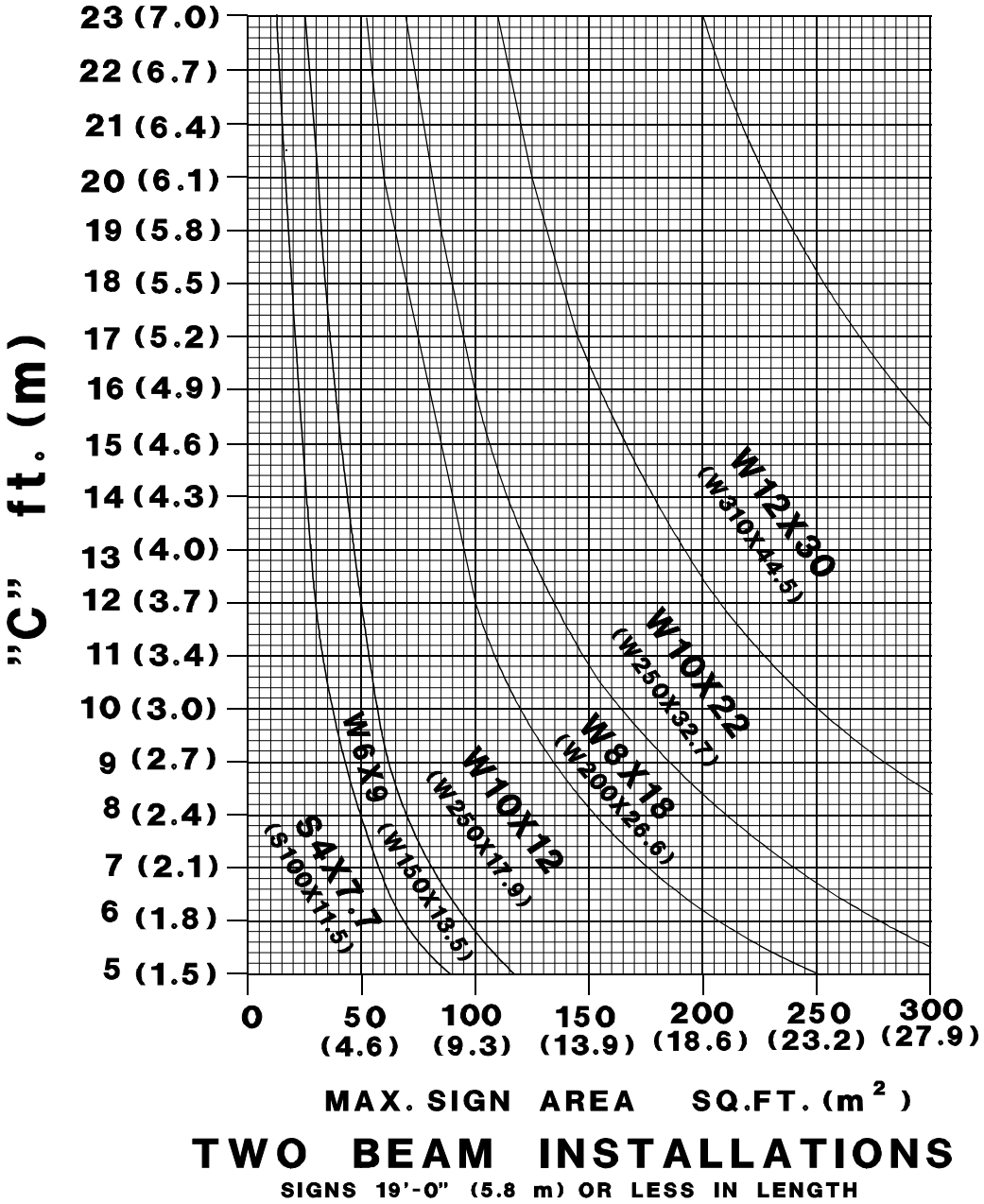


Figure 298-17. Design Chart for Three Beam Installations

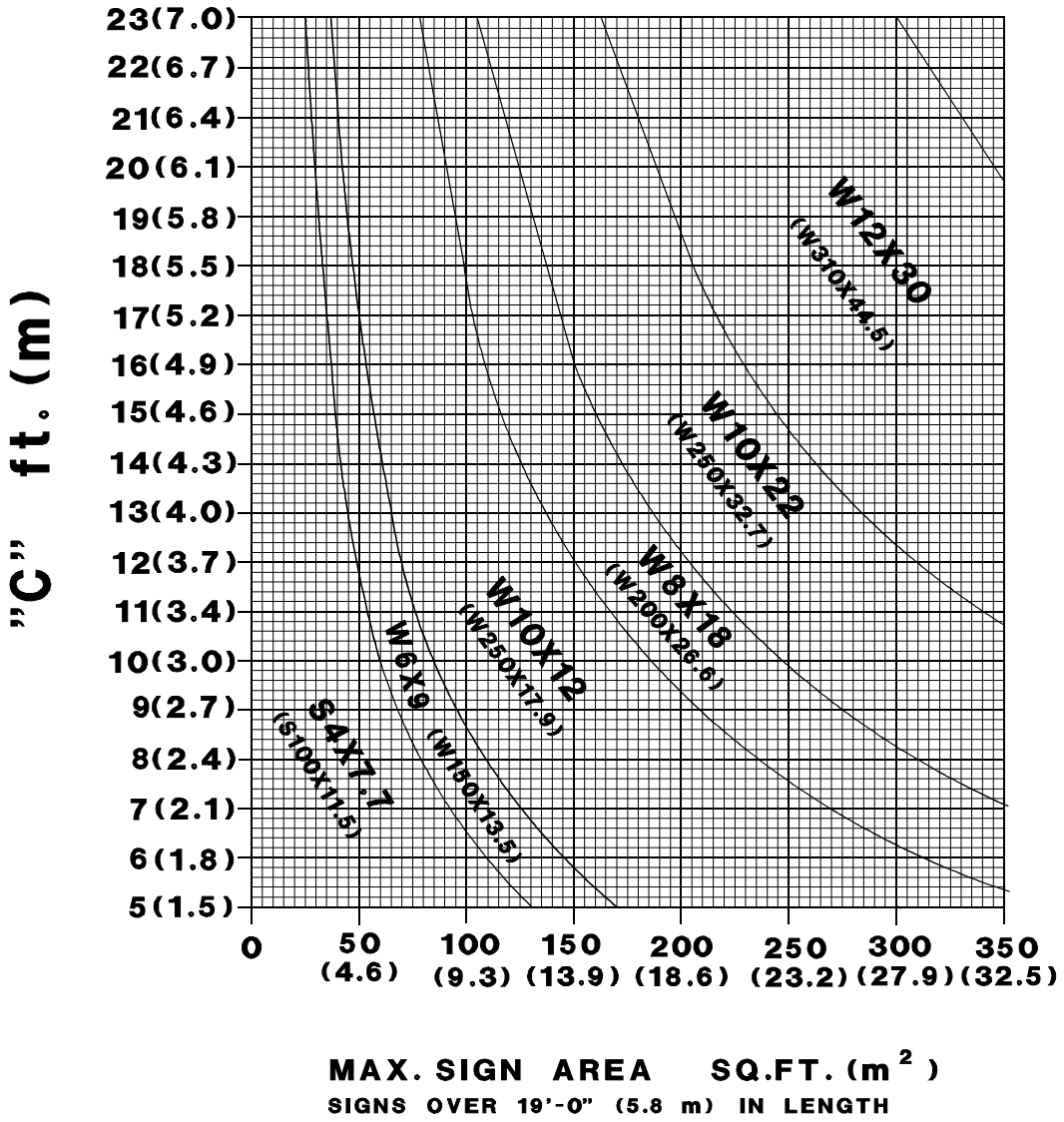


Figure 298-18. Design Chart for TC-17.10 Sign Supports

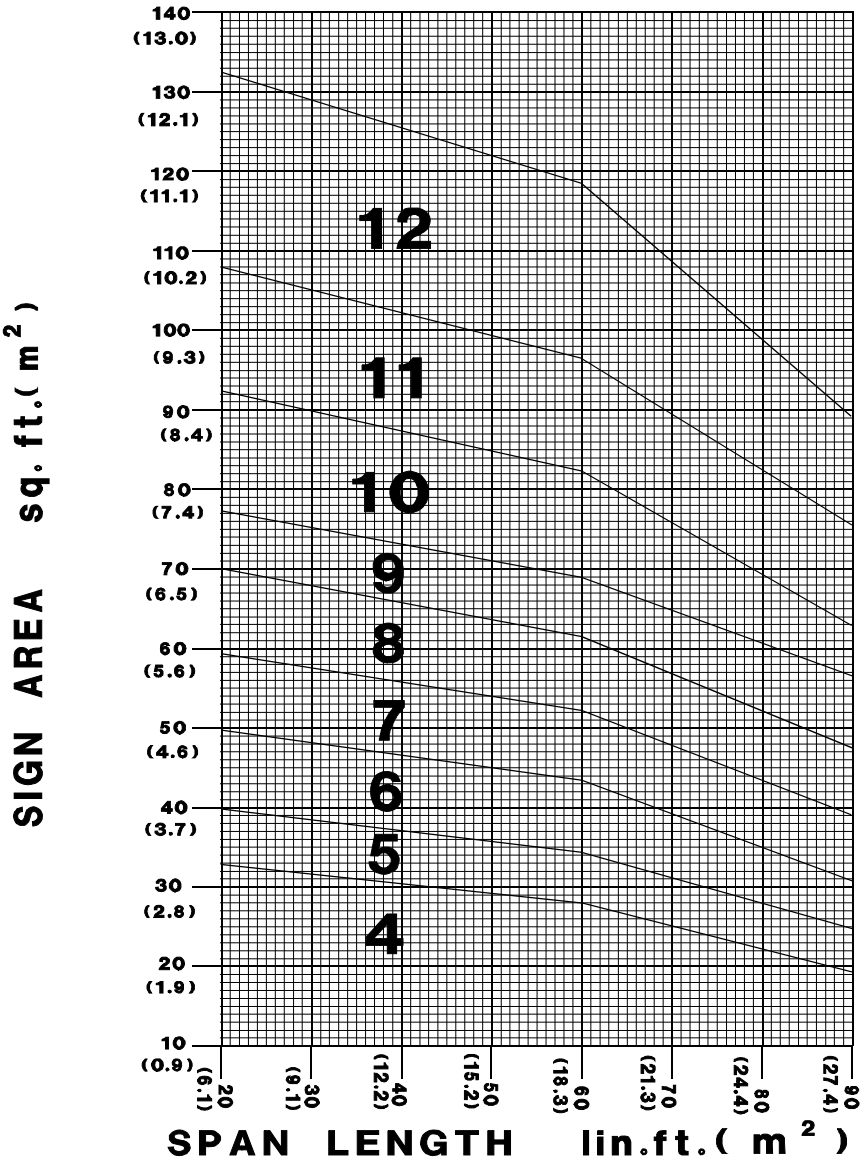
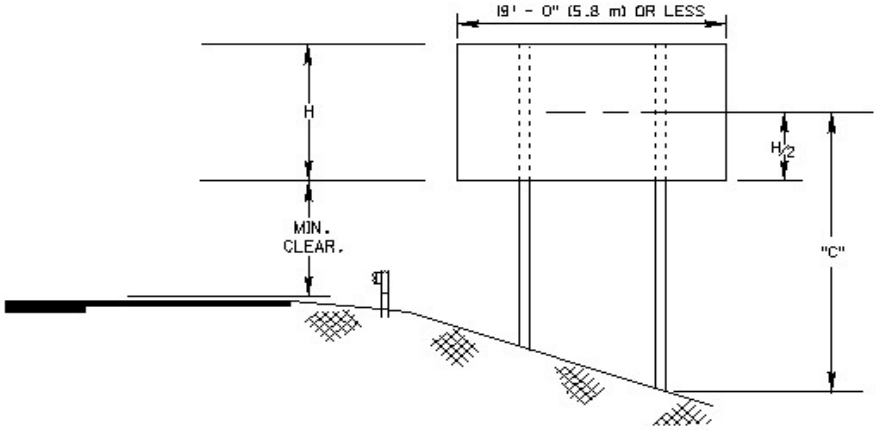
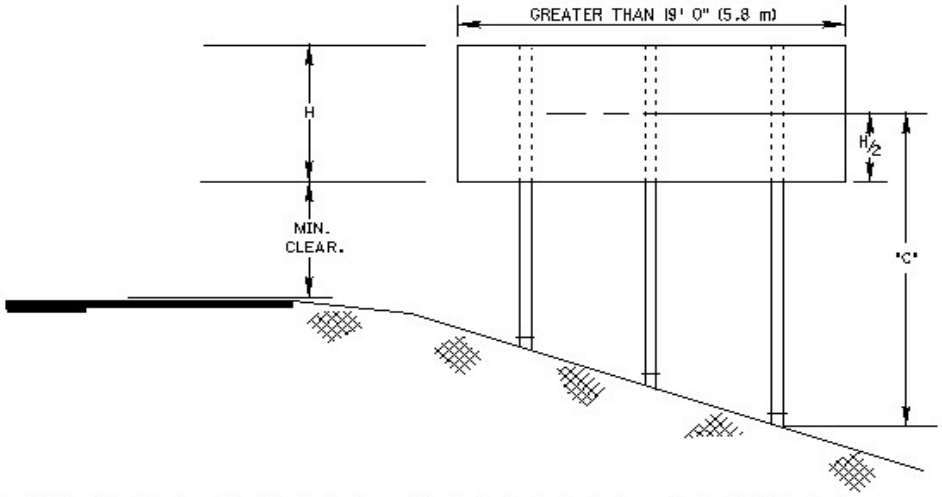


Figure 298-19. Two and Three Beam Installation Details

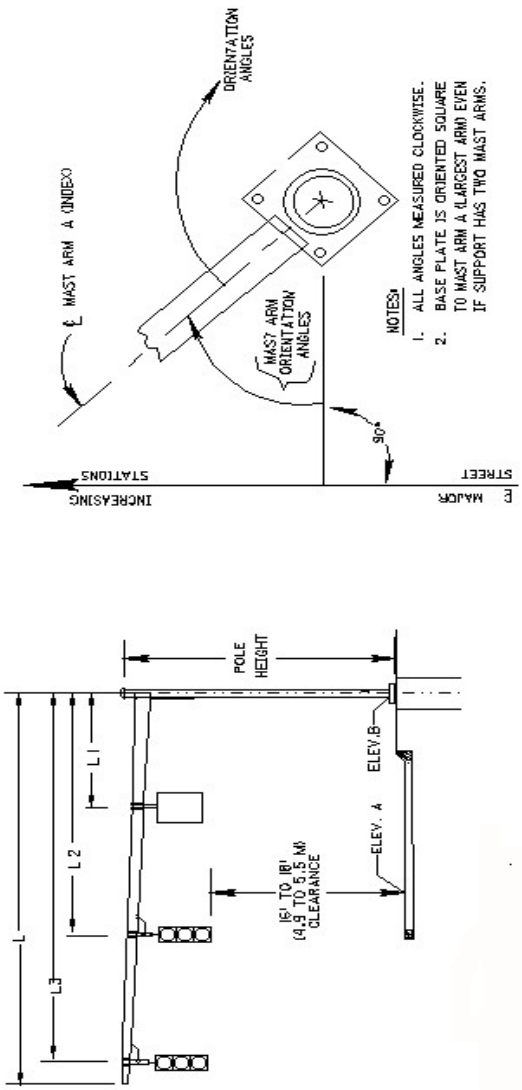


TWO BEAM INSTALLATION



THREE BEAM INSTALLATION

Figure 298-20. TC-16.20 Overhead Sign Support

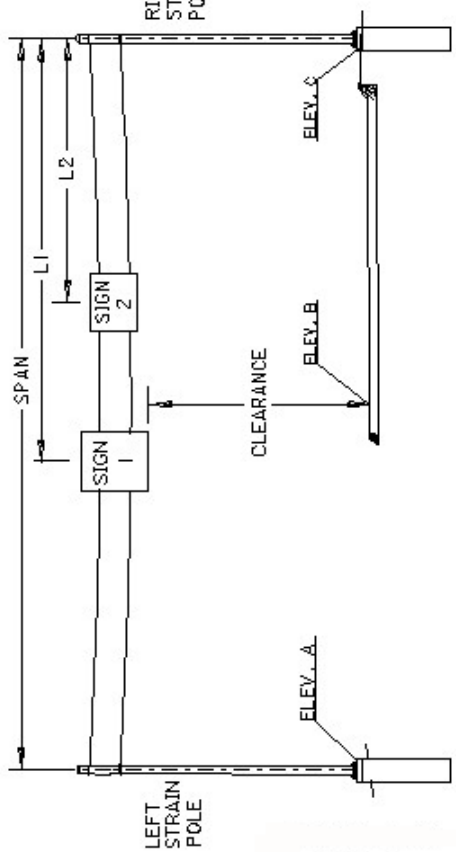


| SUPPORT NO. | | |

Figure 298-21. TC-17.10 Span Wire Sign Support

NOTES:

1. ALL SIGN SUPPORTS ARE VIEWED IN DIRECTION OF INCREASING STATIONS.
2. SEE TC-81.10 AND TC-21.20 FOR POLE AND FOUNDATION DETAILS.
3. THE HANDHOLE SHALL BE LOCATED ON THE SIDE OF THE POLE FARTHEST FROM THE ROADWAY.
4. A CAPPED 2" (51 mm) BLIND HALF COUPLING SHALL BE LOCATED 12" (0.3 m) FROM THE TOP OF POLE FACING TOWARDS THE ROADWAY.
5. ALL FOUNDATIONS SHALL CONTAIN ONE 2" (51 mm) CAPPED CONDUIT ELL FOR FUTURE USE. IT SHALL BE LOCATED PERPENDICULAR TO THE ROADWAY CENTERLINE ON THE SIDE OF THE FOUNDATION FARTHEST FROM THE ROADWAY.



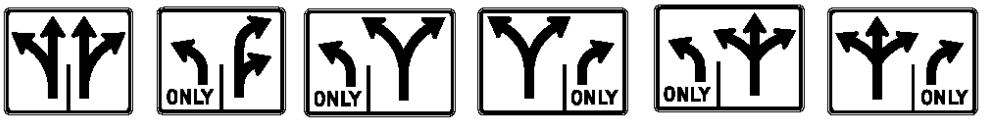
| SPAN WIRE SIGN SUPPORT TYPE TC - 17.10 | | |

Figure 298-22. Lane-Use Control Signs Index

R3-5a 30x36 36x42 | R3-5L 30x36 36x42 | R3-5R 30x36 36x42 | R3-6L 30x36 36x42 | R3-H6a 30x36 | R3-H6b 42x36 | R3-6R 30x36 36x42

R3-8 30x30 | R3-8a 48x30 | R3-8b 48x30 | R3-H8ba 30x30 36x36 | R3-H8bb 30x30 36x36 | R3-H8bc 30x30 | R3-H8bd 36x30

R3-H8be 36x30 | R3-H8bf 36x30 | R3-H8bg 30x30 | R3-H8bh 36x30 | R3-H8bj 36x30 | R3-H8bk 36x30 | R3-H8bm 36x30



R3-H8bn 36x30 | R3-H8bp 36x30 | R3-H8bq 42x30 | R3-H8bs 42x30 | R3-H8bt 42x30 | R3-H8bu 42x30

Figure 298-22 (continued). Lane-Use Control Signs Index

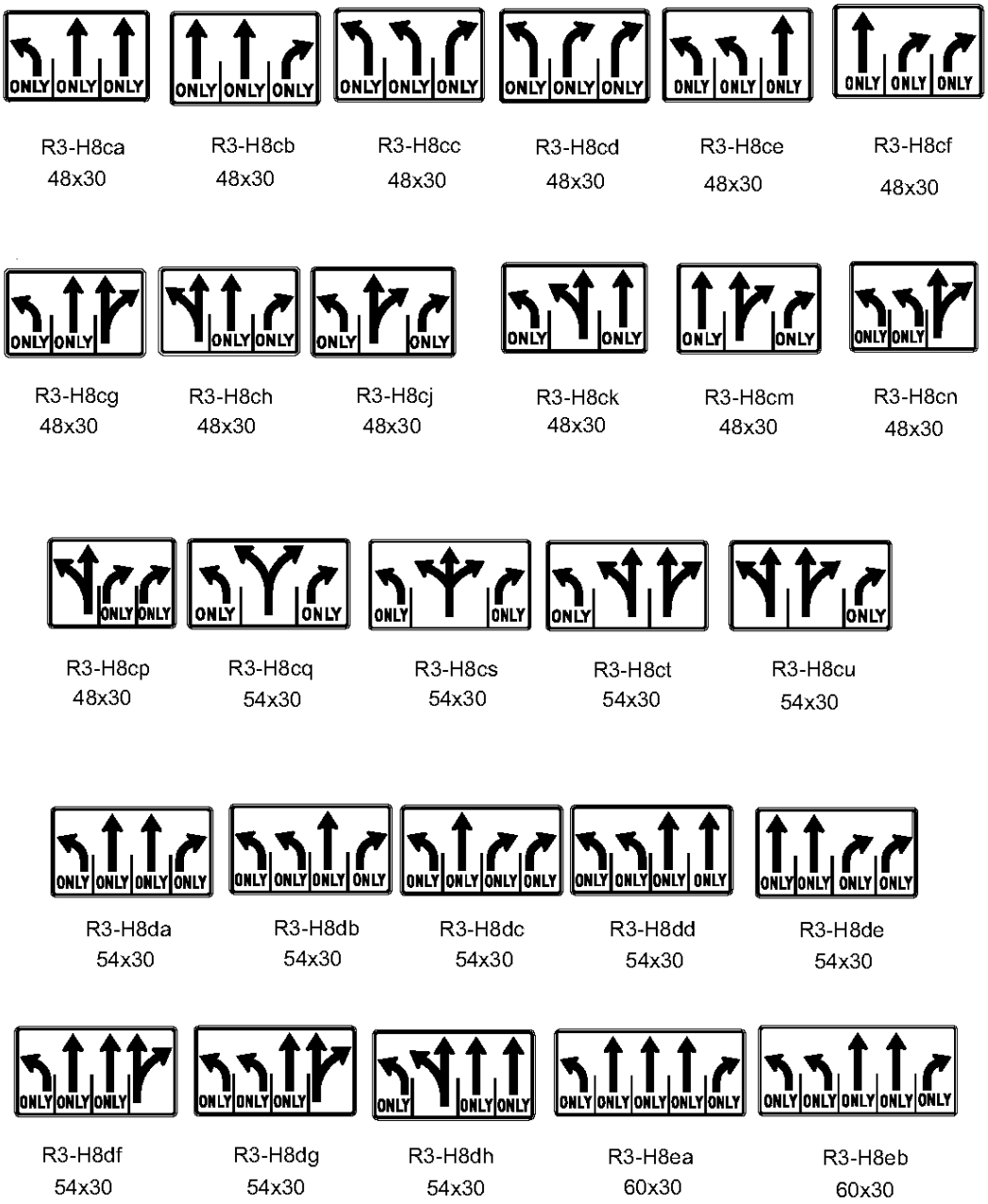


Figure 298-23. Mounting a Sign Support on Concrete Barrier

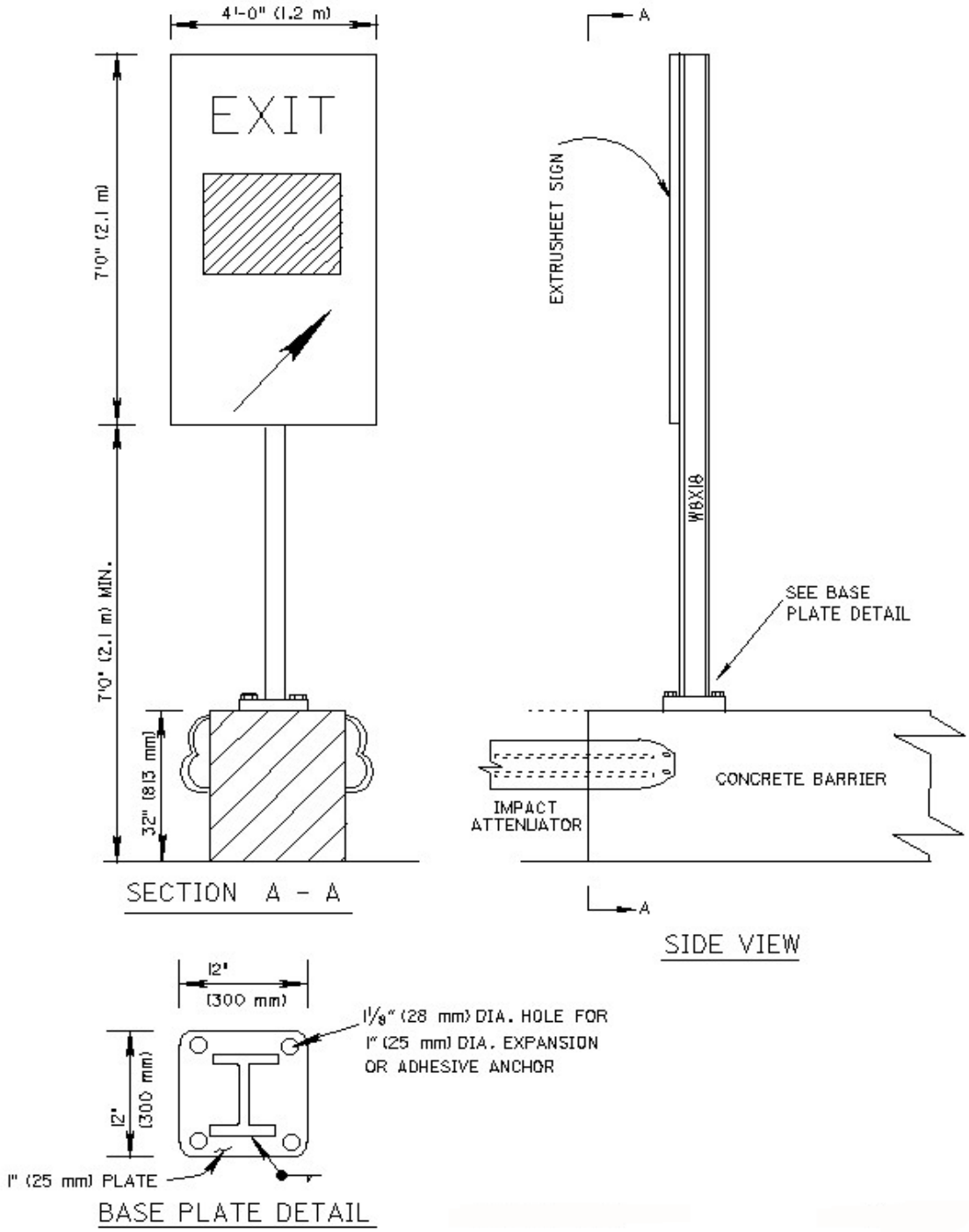
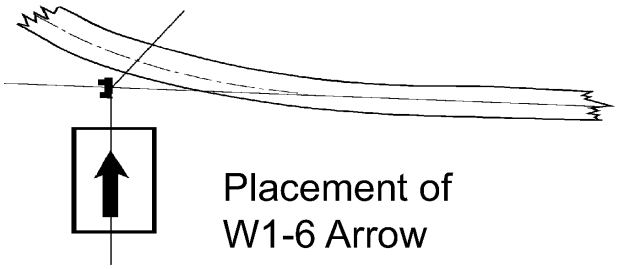


Figure 298-24. Staking Sign Locations



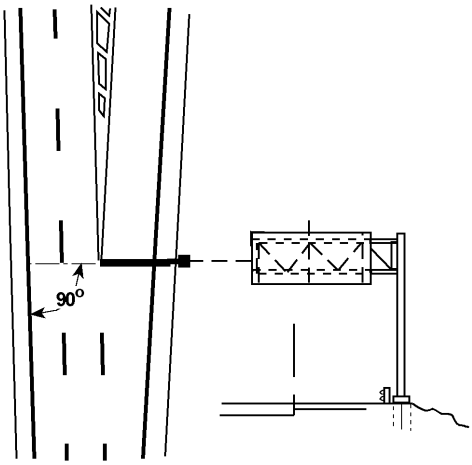
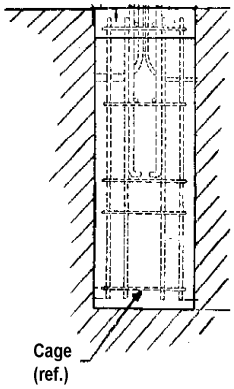


Figure 298-25. Foundation Excavations



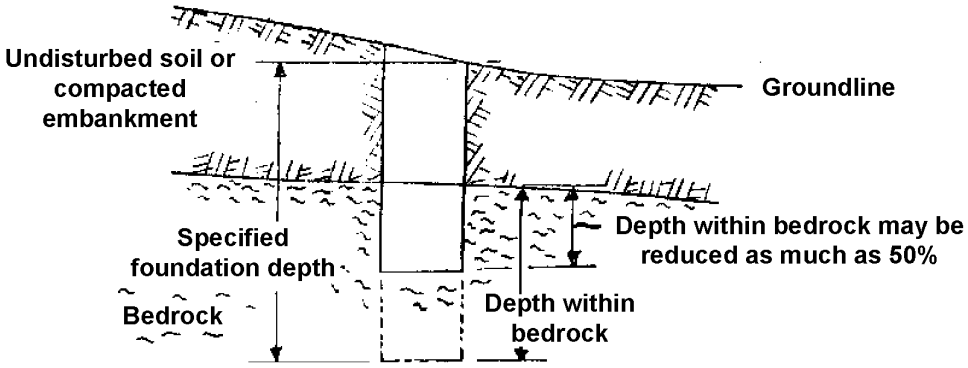
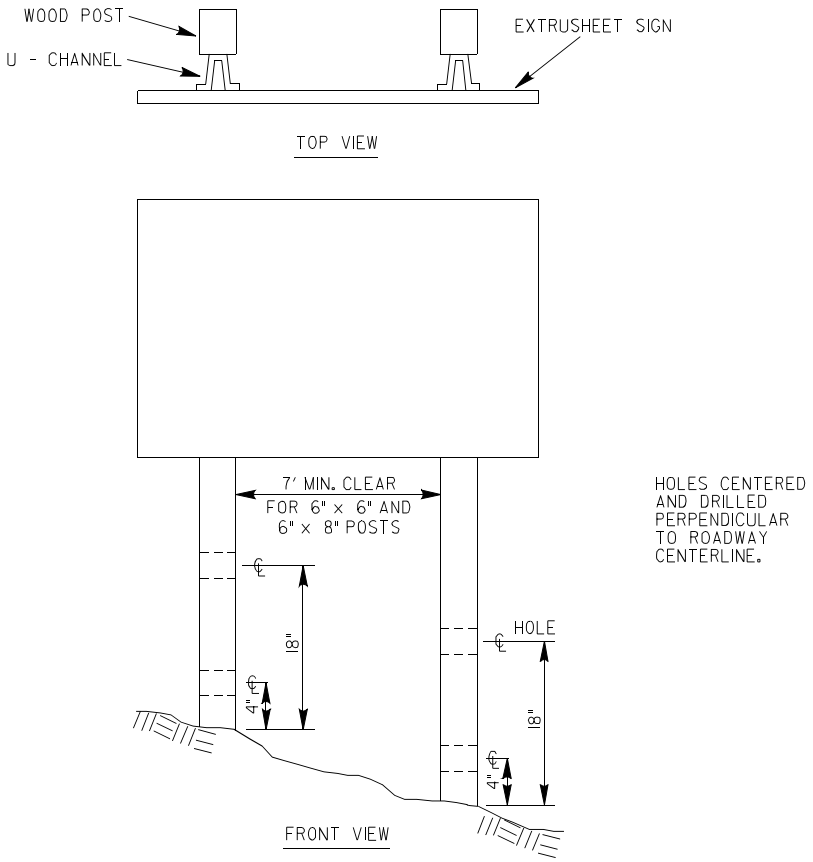


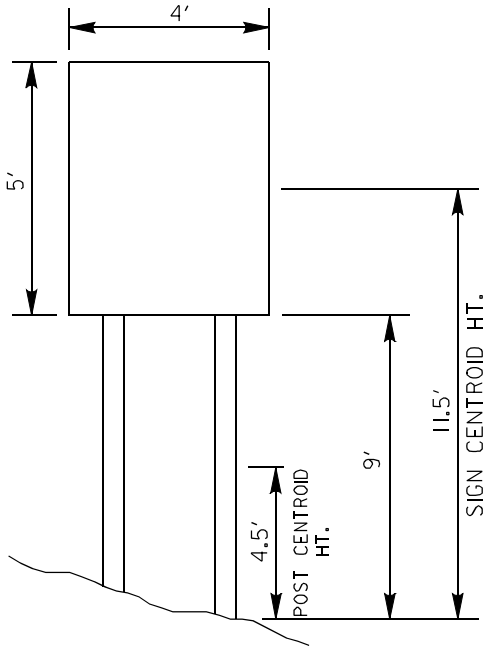
Figure 298-26. Solid Wood Posts



RECOMMENDED WIND PRESSURE TO USE IN SIZE CALCULATIONS:
WIND PRESSURE ON SIGN = 15 LB/FT^2
WIND PRESSURE ON EXPOSED POST = 18 LB/FT^2

NOMINAL POST SIZE	HOLE DIAMETER	NUMBER OF POSTS PERMITTED IN 7' PATH IN EXPOSED LOCATIONS	MINIMUM RECOMMENDED EMBEDMENT DEPTH	MAXIMUM RECOMMENDED ALLOWABLE MOMENT PER POST
4"x4"	NONE	2	3.5 FT	1050 FT-LB
4"x6"	1-1/2"	2	4 FT	2540 FT-LB
6"x6"	2"	1	4.5 FT	3880 FT-LB
6"x8"	3"	1	5 FT	6580 FT-LB

Figure 298-27. Sample Calculations for Solid Wood Posts



SIGN AREA = 5 FT. × 4 FT. = 20 FT.^{2}

SIGN CENTROID HT. = 9 FT. + $\frac{5 \text{ FT.}}{2}$ = 11.5 FT.

USE POST WIDTH = 3.5" (NOMINAL 4")

EXPOSED POST AREA = 9 FT. × $\left(\frac{3.5}{12}\right)$ FT. × 2 POSTS = 5.25 FT.^{2}

POST CENTROID HT. = $\frac{9 \text{ FT.}}{2}$ = 4.5 FT.

WIND PRESSURE ON SIGN = 15 LB/FT.^{2}

WIND PRESSURE ON EXP. POST = 18 LB/FT.^{2}

MOMENT = (20 FT^2)(15 LB/FT^2)(11.5 FT.) + (5.25 FT^2)(18 LB/FT^2)(4.5 FT.)

= 3450 + 425 FT-LB

= 3875 FT-LB

MAXIMUM ALLOWABLE MOMENT:

FOR TWO 4" × 4" POSTS = (1050 FT-LB)(2 POSTS) = 2100 FT-LB

FOR TWO 4" × 6" POSTS = (2540 FT-LB)(2 POSTS) = 5080 FT-LB

USE 4" × 6" POSTS

Intentionally blank.