

REGIONAL TRANSPORTATION COMMISSION

Regional Traffic Guidelines
September 2021



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STANDARD PAVEMENT MARKINGS

This guideline is intended to provide regional uniformity in the placement of pavement markings. It is intended to be an aid in the preparation of pavement marking plans for projects within Washoe County. Manual of Uniform Traffic Control Devices (MUTCD), latest edition, requirements should be followed in all cases.

Lane Markings

Center Lines:

4" broken yellow line, 10' long with a 30' space.

4" solid double yellow line.

4" solid yellow line around raised center medians – 1' off edge of oil.

Edge Lines:

6" solid white line should be used to separate bike lanes from vehicle travel lanes.

8" solid white edge line to separate bike lane from a right turn lane.

4" solid white line should be used on the right side of the bike lane if no curb exists, to delineate a bike lane or on road segments that do not have bike lanes (Shoulder line).

Lane Lines:

4" broken white line, 10' long with a 30' space.

6" or 8" solid white line.

4" solid double white line.

Dotted Lines:

8" or dotted yellow or white line 2' long with a 4' space for same line width of line extension of lane lines.

Bike Lane:

6" dotted white line 2' long with a 4' space for crossing traffic lane.

6" solid white line should be used to separate bike lanes from vehicle travel lanes.

5' minimum or 6' maximum width unless otherwise approved by maintaining agency this dimension does not include gutter width.

Channelization Lines:

8" solid white line. (Turn pockets)

Lane Drop Markings:

8" dotted white line 3' long with 9' gap.

Auxiliary Pavement Markings

Crosswalks:

Layout per NDOT Standard Detail ST- 7 District 2 & 3.

Stop Bars:

24"- solid white line placed 4' minimum or match existing in advance of a crosswalk at controlled intersections.

City of Reno: 12" solid white line for non-signalized intersections.

Yield Lines:

Isosceles triangles (shark's tooth) per MUTCD Section 3B.16, 20' – 50' (based on maintaining agency and site conditions) in advance of a crosswalk at multi-lane uncontrolled intersections or multi-lane mid-block crossings and prior to dotted line at roundabout entry. The following guidelines should be used for dimensions of the isosceles triangles:

- 1) 12"x18" triangles will be reserved for multi-use paths
- 2) 24"x36" triangles are used for roadways.

Place R1-5 sign on multi-lane roadway and W11-2 with downward arrow plaque (W16-7P) on single lane roadway.

Arrows and "ONLY":

8' high white turn lane arrows and two way left turn lanes (TWLTL). Layout per NDOT Standard Detail ST-6.

"ONLY" marking for use on a trap lane and alternate with arrow pavement markings

Transverse Markings:

Diagonal (45 degrees) white or yellow lines at 10' center to center.

Speed Limit:

"15 MPH" shall not be used in conjunction with School Reduced Speed Limit signage, or at other locations where 15 MPH speed limit is not in effect at all times.

School:

"SCHOOL" shall be used in conjunction with S1-1 School signs, when used to establish a school zone. "SCHOOL" shall not be used at other locations, including but not limited to in conjunction with School Reduced Speed Limit signage.

Bicycle Markings

Check with maintaining agency regarding use of bike lane markings including Sharrow markings.

6' high white bike rider symbol and directional arrow per 2009 MUTCD Fig. 9C-3 NDOT Standard Detail ST-4 placed 65' on the far side of major intersections and spaced 1300' apart in addition to conflict areas. Place a bike lane sign (R7-9) near the bike rider symbol. If needed to accommodate parking, use the (R3-17) sign with an appropriate supplemental sign (see figure 9C-5, 2009 MUTCD) near bike rider symbol.

Sharrow markings could be used on roadway segments with speeds less than 35mph on bike routes with no bike lanes. Signage should be R4-11 "Bikes may use full lane".

Roundabout Markings

See MUTCD current edition

REGIONAL TRAFFIC SIGNAL EQUIPMENT

General

Contact maintaining agency for equipment specifications. New Traffic signal activation shall occur at an off-peak time that minimizes impacts to the traveling public, based on engineering judgement and in consideration of agency staff availability.

Intersection and Midblock Safety Lighting

Where possible separate luminaires shall be provided to supply positive lighting for crosswalk areas use NDOT Detail TS-27. Additional lighting may be required for midblock crossings and other conflict areas (raised island delineation, changes in operations, accel/decel lanes, etc).

City of Sparks LED lighting specifications:

Shall be LED only and placed such that it provides a minimum of 2.0 FC of average illuminance at the sidewalk. All LED style lighting fixtures shall meet the following minimum criteria regardless of manufacturer:

1. The housing shall be all metal with the exception of the lens.
2. The housing shall be silver in color except where heat dissipation components are involved.
3. There shall be a minimum 10 year warranty.
4. The unit shall provide a Type IV Medium optical spread utilizing a minimum of 80 LED units.
5. Each complete and assembled fixture shall require no more than 190 System Watts.
6. The fixture shall be capable of utilizing Universal 120-277V Line Power.
7. The fixture shall have Corrected Color Temperature (CCT) of 4000K.
8. The fixture shall not exceed 700 mA Drive Current.
9. The fixture shall be Illuminating Engineering Society of North America (IESNA) LM-79-08 compliant.
10. The unit shall be constructed in such a manner that it can be mounted to a standard 2" ID horizontal pipe with +/- 5 degree adjustment with no specially constructed mounts or wire splicing methods.
11. No optional shorting cap receptacle allowed.

City of Reno LED lighting specifications:

Luminaire fixtures shall be Cree STR-LWY3MHT08EULSV700 or approved equal

Photocell shall be mounted at the metered service.

Signal Heads

All traffic signal heads shall be dull black in finish, outfitted with louvered back plate with a 2" retro-reflective border, tunnel visors with a ¾ slot, open to the bottom. Plumbizer for mast arm mounts shall be located between the red and yellow signal indication unless noted differently on the plans.

Light Emitting Diodes (LED)

Tinted (City of Sparks indicate no green tinted lenses) XL or XOD. All pedestrian signal indications shall be pedestrian countdown signals that conform with ITE PTCSI -2 requirements, EPACT 2005 compliant and fully MUTCD compliant.

Video Detection & Cameras

Contact maintaining agency for video detection system manufacturer.

Loop Detection

Contact maintaining agency regarding use of preformed loops under PCC or AC pavement.

Emergency Vehicle Detection

Contact maintaining agency.

Prior to acceptance, all preemption equipment shall be field tested in accordance to the manufacture's recommendations.

Signal Poles

Utilize all State of Nevada standard poles including Type 1A, 1B, 7, 28, 30, 30A, 30B, 35, 35A & 35B. All standard poles over 10'0" shall be equipped with three (3) hand holes, one (1) at the base of the pole and one (1) opposite the mast arm on back of pole, and a 27" hand hole terminal compartment on the back side of the pole, with the top of the hole six feet from ground level, placed 180 degrees (180°) from the mast arm. Pedestrian Push Buttons (PPB) shall be placed so as not to conflict with the terminal compartment. PPB shall not

be placed on terminal compartment cover. Signal poles shall be installed in accordance with all State of Nevada specifications and standard plans.

Controller

Contact maintaining agency for controller manufacturer.

Cabinets

The complete controller cabinet shall be delivered to the maintaining agency for testing and burn-in by the supplier no later than two (2) weeks prior to turning on the signal.

Pull Boxes

Use State of Nevada no.3½, no.5, no.7, no.9 pull boxes and ITS vaults within roadway. Utilize a ground-able fully traffic rated (HS 20) pull box with bolt down (steel cover) unless indicated otherwise. Pull boxes which will contain fiber optic cable shall have an extension to allow for additional cable slack (100') coil. Pull box lids shall be label accordingly. Examples include: "Electrical", "Fiber Optic", "Traffic Signal" – NDOT to send a list.

Pedestrian Push Button

PROWAG compliant units, contact maintaining agency for specific model.

Metered Service Cabinet

Metered service cabinets with battery backup shall be separate from the controller cabinet and placed to minimize possibility of accidental knock-down.

Battery Backup

The system shall be a 24-volt or 48-volt system and bear a 508 UL label. The system shall supply a minimum uninterrupted continuous service for a minimum two hours with a minimum 6.5 hours of flash. BBS for signal indications only, no safety lighting.

Interconnect (fiber optic) Cable

Utilize single mode or multi-mode fiber optic cable unless otherwise directed by maintaining agency. Contact maintain agency for details

Other Interconnect Options

Contact maintaining agency to use other options such as radio or cell modems.

Conduit

Signal conduit shall be a minimum of 3" ID, other conduit (detector lead-in, interconnect, etc) shall be a minimum 3" ID. Utilize "Schedule 40" (PVC) for all underground runs. Utilize rigid metal for exposed conduit to 18" below grade. Rigid metal conduit shall be used under driveway sections, railroad and riser sections. All conduits shall have a single locate wire coated or detectable

mule tape. Check National Electric Code (NEC) for maximum number of wires/cables in conduit.

Internally Illuminated Street Name Signs (IISNS)

All signs shall be single-faced with case-sensitive lettering and rigid mounted directly onto mast arm utilizing an approved method. Contact maintaining agency for "CITY" logo which shall be located on the left side of the sign face with appropriate block numbers, arrows, etc., for all signs. Logo shall not exceed height of upper-case lettering. Signs shall be a 120 volt system.

Conductor/Cable

Utilize IMSA rated color-coated cables and conductors. Each NDOT Type 28, 30, 30A, 30B 35, 35A & 35B signal poles shall be fed, at a minimum, by a single 25 conductor, No. 14 cable. Each Pedestrian Push Button shall be fed by a single 5 conductor, No. 14 cable for each push button installed. NDOT Type 1A and 1B poles shall be fed, at a minimum, by a single 15 conductor, No. 14 cable.

Controller Cabinet

Contact maintaining agency for detailed equipment specifications.

<https://cityofsparks.us/resources/resource/traffic-eng/>

<https://www.reno.gov/government/departments/public-works/forms-publications>

TRAFFIC SIGNAL ACTIVATION PROCEDURE

Traffic signal activations shall occur at an off-peak time that minimizes impacts to the traveling public, based on engineering judgement and in consideration of agency staff availability.

Place Changeable Message Signs (CMS) a minimum of 5 days in advance of signal activation. When using a single message, put the same message on the second panel to provide emphasis.

The CMS should read:

SIGNAL
ACTIVE
APRIL 5 or THURS (or 10:00 AM)

(The day of the activation, the message can be revised to identify the time the signal will be turned on.)

Determine if law enforcement is needed to control traffic and contact 3 days prior to activation.

Contracting Agency should contact the following (as appropriate) 2 days in advance of signal activation:

	Phone
NHP	688-2500
Washoe County Sheriff	328-3001
Reno Police	334-2175
Sparks Police	353-2428
Truckee Meadows Fire Protection District	328-3650
NDOT PIO	888-7000
NDOT DISTRICT II	834-8300

24 hours in advance of activation, the Contractor and Maintaining agency should test the signal operation, including advanced flashers when present.

The following personnel shall be present at activation:

Contractor
Signal technicians from maintaining agency
Project Manager for construction contract
Local Traffic Engineer
Traffic signal design engineer
Manufacturers' representatives

Unless otherwise directed by the Engineer, traffic signals shall start following MUTCD requirements.

TRAFFIC SIGNAL DESIGN REVIEW GUIDELINES

Base Plan

Traffic signal design plans should include as a minimum the following design elements:

Utilities, underground and overhead, with a note stating "utilities are shown for information only and shall be field verified by the contractor prior to any work by notifying the call before you dig service"

Nearest transformer for power source (check with NV Energy to make sure it can be used). New power source will require a Design Initiation Agreement (DIA) with NVE. Begin DIA at least three months ahead of advertisement.

Right of way

All intersection approaches for 300 feet, particularly for non-tangent approaches

Curb & gutter, ramp, sidewalk, driveway locations

Note unusual vision obstructions: buildings, trees, bushes, etc.

Bus stops, loading zones or on-street parking

Existing lane layouts, pavement markings

Pole locations outside 10-year right-of-way, if feasible

Overhead utilities - may require lateral shift of poles, or no street light

Conduit runs with note "runs are shown for intent, actual locations shall be as direct as possible".

Controller cabinet

Location shall not block the view of entire intersection, signals, signs etc.

Cabinet or open cabinet door does not completely block sidewalk with door facing away from intersection.

Locate on corner near to power source, if possible.

Concrete pad in front of cabinet.

Metered service with battery backup separate from controller cabinet, placed to minimize knock-down.

Wiring/cabling

Pullboxes (#5) every 300 feet (advance loops, interconnect), #9 at cabinet, #7 for all other signal cable, #3½ OK for other locations. Interconnect pullboxes shall be spaced every 600' along a street to facilitate pulling fiber in longer runs.

Pullboxes shall be fully traffic rated with bolt down metal lids with "TRAFFIC" or "INTERCONNECT" stamped or embossed on lids.

Metal lids must be grounded.

Modified pullbox bottom shall be minimum 2' deep with 6" of clear space between cabling/wires and pullbox lid.

Cable/ Conduit

Conduit/ cable schedule should indicate number and size of conduit by run from pull box to pull box or pull box to pole. 3" minimum ID for all conduit containing traffic signal cable. In any case the % fill of any conduit shall not exceed 26%. Each run shall include number of signal cables and how many conductors for each cable.

A spare conduit shall be provided with traceable pull tape installed and sealed with appropriate material at both ends.

Call out interconnect, lighting, ground wire, and video cable as needed. Conduit shall have bell ends.

Detection

Loops – show typical loop placement relative to striping. Include utilities to verify there is no conflict.

Video (**IF ALLOWED**) – maintaining agency will specify manufacturer if video detection is allowed.

Spacing of advanced loop should comply with Detector Handbook.

Controller

Contact maintaining agency for manufacturer.

Signal displays

12" LEDs for all vehicular faces

Slotted back plates with retro-reflective border on all signal heads.

Tunnel visor with $\frac{3}{4}$ opening (limits nests & ice/snow buildup).

Heads shall be placed per MUTCD requirements.

Pedestrian pushbuttons are indicated by associated phase.

Pedestrian signal head identify phase and quadrant location of mount, typically opposite from mast arm.

Signing

Do not use "LEFT TURN ON GREEN ARROW ONLY" signs (R10-5 & similar)

Use "LEFT TURN YIELD ON (circular green)" for PPLT (R10-12), unless flashing yellow arrow is used.

City of Sparks – install (Yield on Flashing Yellow) for Flashing Yellow Arrow (FYA) adjacent to left turn head.

Internally illuminated signs (IISNS)

Single sided IISNS mounted directly to mast arm (not hanging from bracket).

Green panels with white lettering abbreviated street suffix, such as Blvd, St. shall comply with MUTCD. New installations use "City" logo on left side (Sparks and Reno). Logo shall not exceed height of upper-case lettering. Use block numbering where available.

Interconnect

Interconnect shall be provided when traffic signals are 60 seconds or less travel time apart.

Miscellaneous

Battery backup system (BBS) required for new traffic signals and shall be placed in metered service cabinet, not controller cabinet.

Retrofit BBS can be controller cabinet mounted.

Emergency flash shall be all-red.

Emergency preemption (1 for each approaching leg unless geometry requires more).

Phase diagram should be included depicting signal operation.

All design shall conform to the requirements of the RTC, City of Reno, City of Sparks, Washoe County or Nevada Department of Transportation as applicable.

Geometric design shall conform to AASHTO's "A Policy on Geometric Design of Highways and Streets", latest edition.

Roadway design hourly volumes shall be based upon 20 year traffic projections obtained from the RTC Planning department or from the jurisdictional agency.

Design vehicle shall be WB-67 unless otherwise designated by the jurisdictional agency.

Roadway transitions shall be based on the design speed in accordance with AASHTO and MUTCD design standards.

Within NODT right-of-way reference NDOT Access Management System and Standards, Section 4.4.1.3

See Table E-2 Access Management Standards in the 2040 Regional Transportation Plan for intersection and driveway spacing standards.

TRAFFIC SIGNAL TIMING

Please Note: Traffic signal timing within Washoe County is designed and developed by internal staff at the RTC, City of Reno, City of Sparks and Washoe County.

REFERENCES

Manual on Uniform Traffic Control Devices, 2009

Traffic Control Devices Handbook, 2nd Edition

State of Nevada 2020 Standard Plans for Road and Bridge Construction 2020

Guide for the Development of Bicycle Facilities, AASHTO, 2012

Guide for the Planning, Design and Operation of Pedestrian Facilities, AASHTO, 2004