

## CHAPTER 12 – UTILITY LOCATIONS AND ROADWAY APPURTENANCES

### 12.1 PLANS REQUIRED

Any utility or other facility constructed in Town ROW shall have construction plans submitted and approved in accordance with requirements of Chapter 3 of these standards. No construction permit shall be issued for construction of new utilities or extension of existing utilities (except service taps or lateral to individual properties) without prior review and approval of the construction plans by the Town of Bennett. Permits are required in all cases.

#### Exceptions:

1. Minor maintenance projects may be exempt from submitting formal construction plans. In such cases however, graphic exhibit must accompany the permit application. Utility companies may be exempt from the requirement of a professional engineer's signature and stamp on the construction plans if the project is of a nature that would not warrant design by a registered professional engineer.
2. To avoid delays and redesigns on large projects and in areas where future road improvements are expected, plan and profile sheets may be requested. A pre-design meeting must be held with the Town Engineer or the Director of Public Works to discuss the requirements of the plan submittal. The Town will assist the utility company in determining what future roadway profiles and improvements are expected to minimize future utility relocations. Requirements for submitting plan and profile sheets may be waived upon written request of the utility company. This exception does not apply to water and sewer line projects.

12.1.1 If formal plans are required, the Town will notify the applicant of such within 5 business days after the pre-design meeting.

12.1.2 The applicant's completed facility shall be in conformance with the drawings or graphic exhibit referred to above, unless a deviation has been requested and approved by the Town of Bennett.

12.1.3 When the proposed facility involves pressure pipe lines, the following additional data is required:

- A. Design pressure of pipe.
- B. Normal operating pressure.
- C. Maximum operating pressure.
- D. Nominal composition of material in pipeline.

This information is for reference only.

## 12.2 DESIGN STANDARDS

- 12.2.1 All work in connection with the facility authorized by the permit shall be done in a neat and workman like manner to the satisfaction of the Town Engineer or the Public Works Director. The details of construction of the same shall conform to the requirements in effect at the time of permit issuance.
- 12.2.2 All utilities including water, sanitary sewer and storm sewer shall be stubbed out to the ROW at all locations that are planned for future tie-ins. Other reasonable stub-outs may be requested by the Town based on sound judgment and knowledge of adjacent development.
- 12.2.3 All manhole lids, utility access covers and range box access covers shall be depressed 3/8 inch to 5/8 inch below the adjacent finished street surface.
- 12.2.4 At least three 4 inch (min.) Schedule 80 PVC sleeve shall be installed by the Developer across all streets at all intersections and at 400 foot intervals (max.) along streets at the time of initial construction to facilitate unforeseen future utility crossings. Sleeves shall be installed and capped at a minimum depth of 42 inches to the top of the pipe from the top of curb. Sleeve location and termination shall be determined on a case-by-case basis.

## 12.3 LOCATIONS

### 12.3.1 Water

Water mains shall be located on the North and East sides of streets. Provide minimum 10 feet horizontal separation from sanitary sewer. Fire hydrants will be located 3 feet minimum from back of curb, 1 foot minimum from back of attached walk, or 10 foot minimum from edge of pavement if no curb is present.

### 12.3.2 Sanitary Sewer

Sanitary sewer shall be located on the South and West sides of streets.

### 12.3.3 Storm Sewer

Storm sewer shall be located on the street centerline or 3 feet either side of centerline for adequate utility separation. Other locations may be considered if given written approval by the Town Engineer the Public Works Director.

#### 12.3.4 Natural Gas

Gas mains shall be located either within the ROW or in an adjacent easement on the South and West sides of the street or 3 feet either side of centerline adequate utility separation. For utility companies that wish to run double mains (a main on each side of the street), the requirement of North and East/South and West may be waived by the Public Works Department. The Public Works Department generally recommends double mains.

#### 12.3.5 Power and Telephone

Generally, power and telephone lines shall be located in the North and East sides of the street either within the ROW or in an adjacent easement. For utility companies that wish to run double mains (a main on each side of the street), the requirement of North and East/South and west may be waived by the Public Works Department, or as directed by the National Electrical Safety Code.

#### 12.3.6 Cable TV

Cable TV lines shall be located in the North and East sides of the street either within the ROW or in an adjacent easement. For utility companies that wish to run double mains (a main on each side of the street), the requirement of North and East/South and West may be waived by the Public Works Department.

#### 12.3.7 Additional Structures

Poles, signs and any other above-ground streetscape (except regulatory signs) shall be generally located within 5 feet of the ROW line or 10 feet from the travel lane, whichever is most restrictive. Light poles may be placed a minimum of 2 feet behind a vertical curb line, or 2 feet behind the sidewalk for attached sidewalk conditions with prior written approval by the Town. Poles placed within Town ROW may be required to be breakaway pursuant to latest revision of CDOT Roadway Design Manual/Guide. Specifications for ALL poles within Town ROW must be accepted by the Public Works Department prior to the permit application for installation.

CAUTION: Trees or large shrubs shall not be planted over buried utilities, within the sight distance triangle at intersections or accesses. In no case shall landscaping over 30 inches above the adjacent flowline be allowed to encroach into the sight-distance triangle.

### 12.4 SIGNING AND STRIPING PLANS

12.4.1 Because the Town will maintain the traffic control devices on public ROW, all traffic control devices shall be fabricated and installed in accordance with the Town's Standards. The Town's signage and striping details in this document shall be included in all sets of construction plans.

Permanent signage and striping shall be complete and in place before any new roadway is opened to the public. These standards are to be used in conjunction with other applicable Town of Bennett Standards.

Traffic signal installation and equipment shall conform to the Colorado Department of Transportation Standards and Specification. The manual on Uniform Traffic Control Devices Signal Warrants shall be met for signal installation.

All subdivisions, road improvement projects, and/or commercial developments must submit a separate signage and striping plan in accordance with the following criteria:

#### **12.4.1.1 Submittal**

Separate signage and striping plans are to consist of an overall area map noting all specific use areas, such as schools, parks, recreation centers, library, commercial industrial, etc. The pages following the area map are to be broken down into road segments, for notation of signage and striping details.

#### **12.4.2 The Signing Plan Should:**

12.4.2.1 Show the general longitudinal location of each sign (horizontal offset and station);

12.4.2.2 Specify the sign legend and sign type (from MUTCD).

12.4.2.3 Specify the sign size.

12.4.2.4 Provide a "typical detail" of installation dimensions (height, distance from curb, etc.).

12.4.2.5 Detail post and base dimensions and installation plan (showing sleeves, depth below surface, and materials used). Breakaway posts shall be specified.

#### **12.4.3 The Striping Plan must show:**

12.4.3.1 Color

12.4.3.2 Lane width

12.4.3.3 Striping/skip

12.4.3.4 Typical treatments for acceleration/deceleration lanes. Turning lanes and crosswalks.

**12.4.4** The following notes shall be on all signage and striping plans:

- A. All traffic control devices shall conform to the MUTCD, the "Colorado Supplemental MUTCD" and the Town of Bennett "Road Design and Construction Standards Manual". Further specifications and illustrations are located in the Colorado Department of Transportation "M and S Standards".
- B. A field inspection of location and installation of all signs shall be performed by the Town. All discrepancies identified during the field inspection must be corrected before the two-year warranty period will begin.
- C. The Contractor installing signs is responsible for locating and protecting all underground utilities.
- D. Type III lighted barricades shall be set at ends of roadways, separating finished and unfinished construction areas.
- E. Special care shall be taken in sign location to ensure an unobstructed view of each sign.

## **12.5 SIGNING**

### **12.5.1 Posts and Boots**

- 12.5.1.1** Signs shall be mounted on 2.25" x 2.25" square galvanized steel tubing, all four sides punched with 3/8" holes at 1 inch centers. Posts must be of appropriate length to pass the MUTCD specifications for the location, must conform to CDOT specification Section 614, and must meet the Federal breakaway standards. Installation boots are to be 2 1/4" x 3' 4" punch tubing, driven down flush to within 1 inch of ground level.
- 12.5.1.2** Sign boots are to be driven a minimum of 3 feet into the ground and longer boots may be required because of soil composition and compaction.
- 12.5.1.3** Post caps and crosses shall have 5" x 1/4" slots for plates.

### **12.5.2 Street Name Signs**

- 12.5.2.1** Street names and 100-block (where applicable) designations should be obtained from the Public Works Department.

- 12.5.2.2** 6 inch plates, up to 30 inches long, may be used at all minor intersections, minimum 2 plates per street sign assembly. 9 inch plates shall be used at all major intersections. All 9 inch by 36 inch and 6 inch by 30 inch plates will be installed, 2 for each road, minimum 4 plates per street sign assembly and shall be installed with end bolts on all plates. In the instance where a street changes names, such name changes should be designated on the street name assembly by using directional arrows and will require 2 additional plates.
- 12.5.2.3** Street name assembly should be located at the point of curvature of the corner radius and should be placed according to the following, as measured from the edge of the sign. When the street name assembly is combined with regulatory signs, sign placement for the regulatory sign shall govern. A reference of sign placement is provided in Chapter 4 and the Regulatory Sign Detail.
- 12.5.2.4** Backing Plates. Aluminum blanks of .080 gauge is standard, except for signs larger than 36 inch by 36 inch, which shall be 0.100 or 0.125 gauge aluminum.
- 12.5.2.5** All street signs will be high intensity white on reflectorized green. Lettering shall be Series C.

## 12.6 STRIPING

### 12.6.1 Pavement marking Standards

Unless otherwise directed by the Town Engineer or the Director of Public Works, pavement markings are to be traced as per the approved striping plan or retraced in the position and locations as existing in the field at the time of the Notice to Proceed. Unless otherwise directed by the Town Engineer or the Director of Public Works, lines shall not be carried through intersections. Standards for application concerning line configurations and color designations shall be as promulgated in the MUTCD, unless otherwise specifically authorized by the Town Engineer or the Director of Public Works.

Yellow skip (dashed) lines shall be 4 inches in width; white skip lines shall be 4 inches in width. Where existing markings are no longer visible, the measurement of the line to skip shall maintain a uniform spacing of 10 foot line and 30 foot skip. Solid yellow lines shall

be 4 inches in width; solid white edge lines shall be 4 inches in width. Solid white lane lines shall be 8 inches in width. Solid white bike lane lines shall be 6 inches in width. Solid yellow median lines for bike lanes shall be 6 inches in width.

All lines shall be 14-16 mil (.35 - .41mm) thickness.

### 12.6.2 Quality of Lines

All markings shall have clean, sharp-lined edges and clean beginnings and cutoffs. Line widths shall not vary more than 1/2 inch from the required line width. Line thickness shall be within the specified thickness range. Line color shall conform to FHWA requirements for standard highway colors.

When used with paint, glass beads shall be embedded in the paint and distributed uniformly throughout the line and shall provide retroreflectivity for the entire width and length of the line. When used with epoxy, glass beads shall be applied into the epoxy pavement marking by means of a pressurized bead applicator and distributed uniformly throughout the line and shall provide retroreflectivity for the entire width and length of the line.

All lines shall present a clean worker-like appearance and present motorists with clear meaning.

### 12.6.3 Condition of Pavement Surface and Weather Conditions

Under no circumstances shall markings be laid upon pavement surfaces which have not been cleaned or are not in a condition to retain such markings. The Contractor shall be responsible for providing all necessary pavement surface preparation to ensure that markings are applied only to clean, debris-free pavement. As a minimum, surface

preparation shall include a compressed air treatment at all times. When recommended by the marking material manufacturer, a high-pressure water blast integrated into the gun carriage shall be used to clean the pavement surface prior to epoxy application. The water blast shall be followed by a high-pressure air blast to remove all residual water, leaving only a damp surface.

Pavement markings shall not be applied unless the roadway surface is sufficiently dry and free of the threat of rain prior to drying. The pavement shall be 50 degrees and rising, and the air temperature shall be 50 degrees and rising, prior to starting or continuing pavement marking operations. Operations shall also be suspended if other conditions develop which affect the ability of the pavement to retain the markings, as determined by the Town Engineer or the Director of Public Works.

Painting shall not be done under windy conditions. Windswept lines will not be accepted. Lines will be considered windswept if paint is scattered outside the specified line width and/or less than 50 percent of the line is covered with glass beads.

#### 12.6.4 Inspection of Pavement Markings

All work will be inspected by the Town Engineer or the Director of Public Works for conformance to these Specifications. Lines will be checked for proper location, proper width (including checking for windswept lines), thickness, color and retroreflectivity. Inspections will be made on a regular basis at time intervals as determined by the Town Engineer or the Director of Public Works.

### 12.7 LIGHTING

- 12.7.1 It shall be the responsibility of the Developer of new or upgraded street improvements to install street lighting fixtures and the associated power sources to adequately light the public improvements. Street lighting installed in accordance with this policy and acceptable to IREA shall be a condition of acceptance of public improvements by the Town.

Street lighting shall be installed with underground electric service on all "newly developed" dedicated public streets in the Town.

- 12.7.2 The purpose of street light installations shall be to illuminate the public traveled ways to a level that promotes for the safe passage of public traffic whether it be vehicle or pedestrian.
- 12.7.3 This Chapter only refers to lighting on public streets and ROW. The Consultant Engineer shall design all street lighting as follows:

#### 12.7.3.1 Local Street and Minor Collectors

The minimum lumens is 7,000 at 100 watt capacity. The maximum horizontal spacing within residential subdivisions should be about every 300 feet on alternating sides of the street.

#### 12.7.3.2 Arterials, Major Collectors and Commercial

The minimum specification is 9,500 lumens at 100 or 150 watt capacity. The maximum horizontal spacing is 150 to 200 feet on alternating sides.

- 12.7.4 The positioning of light standards at intersection streets is as follows:

- Arterial/Arterial 4 lights, one on each corner.
- Collector/Arterial 4 lights, one on each corner.
- Collector/Collector 2 lights, one on opposite corners.
- Local/Collector 2 lights, one on opposite corners.
- Local/Local 1 light on one corner.



- 12.7.5 Distance behind back of walk for local streets is to be a minimum of 12 inches but must be within easements or ROW on local residential streets. For collectors and arterials, the light must be offset a minimum of 24 inches from the curb face and yet leave at least 36 inches of clear space between the light pole and back of walk.
- 12.7.6 All lighting in residential areas shall be installed to minimize light shining on or negatively effecting the neighboring residents.
- 12.7.7 The Developer is responsible for coordinating all aspects of design and installation with IREA.
- 12.7.8 All existing and proposed street lighting shall be shown on the street plan and profile sheets.

## 12.8 GENERAL TRAFFIC SIGNAL DESIGN REQUIREMENTS

This Chapter describes general signal design requirements for use in the Town of Bennett.

The Owner/Developer is required to provide separate 24"x36" drawings of all traffic signal installation as an integral part of the Construction Plan Set and its requirements.

The signal design plan shall include all existing ROW, easements, structures, utilities and signal improvements including traffic control boxes, pull boxes, signal poles, signage, striping and loops.

### 12.8.1 Signal Head Placement and Sizes

- A. For all installations, signal head placement including far left and far right pole-mounted signal heads and sizes shall conform to latest MUTCD or CDOT design standard.
- B. Pedestrian signal heads should be provided for all marked crosswalks. Where pedestrian signal heads are provided, corresponding pedestrian push buttons shall be provided if normal vehicle phasing and timing do not guarantee sufficient pedestrian crossing time.

### 12.8.2 Pole and Cabinet Placement

All signal poles, pedestals and cabinets shall be placed a minimum of 3 feet from face of traffic signal item to face of curb where curbing is present, with a desirable separation of 5 feet. The traffic control cabinet shall be placed in a location such that guarantees adequate visibility of intersection and approaching traffic from all directions. The same separations apply from face of traffic signal item to outside edge of shoulder where pavement and shoulder exist with no curbing. Where only pavement exists without shoulder and curbing, a minimum of 5 feet from face of traffic signal item to edge of pavement shall be maintained, with a desirable separation of 7 feet or as defined by latest MUTCD or CDOT design standard.

### 12.8.3 Signal Conduit

A. All conduit shall be Schedule 80 PVC. All electrical shall be separated from traffic signal conduit.

### 12.8.4 Luminaries

Unless otherwise indicated, the Developer shall provide a luminaire extension and luminaire wiring. The final power hook-up and the actual luminaire shall be provided by the utility company.

### 12.8.5 Vehicle Detectors

A. On all approaches with free-flow speeds of 40-45 MPH and greater, consideration should be given to providing advance detection for dilemma zone protection. Site-specific conditions such as grades or sight distance obstructions may also justify use of advance detection. The potential need for advance detection in these cases should be reviewed with the Town Engineer or the Director of Public Works.

### 12.8.6 Signal Power

A. In general, circuit breakers and power disconnect should be located internal to service meter assemblies and signal controller cabinets and should not be readily accessible to the public. A qualified signal installation and maintenance Contractor will be responsible for inspecting service installations and certifying acceptability to the utility company for hook-up.

### 12.8.7 Traffic Pre-Emption System

A. All traffic control signalization systems shall include an approved traffic pre-emption device controlled remotely by Fire and Rescue/Police units.

- B. Any upgrade or directional addition to an existing traffic signal, shall include the installation of a traffic pre-emption system.

**12.8.8 Guarantee**

The Developer shall include all warrants and/or guarantees with respect to materials, parts, workmanship and performance of the product to be supplied. The minimum guarantee period for the product shall be 2 years from the date of final acceptance of the contract. The Developer shall attach a statement that all material to be supplied is either in exact accordance with the specifications or shall list in detail any and all deviations therefrom. The supplying of equipment that is not in accord with the specification and on which the Developer has indicated no exception, shall be cause for rejection of the equipment and correction of the non-specification items entirely at the Developer's expense.

**12.9 PLANTSCAPING**

Refer to Town's Landscaping Guidelines for Plantscaping requirements.