

General Requirements

City of Steubenville - Public Works

DESIGN CRITERIA & STANDARDS for DEVELOPMENT

within the CITY OF STEUBENVILLE, OHIO

STORM WATER MANAGEMENT

- Per City Codified Chapter 1341
- Sites Greater than One Acre - address requirements in full
- Sites between 0.5 and one acre - provide means to not increase net runoff and no storm water to flow off site through driveways
- Site less than 0.5 acre - no storm water management needed, however positive drainage design is encouraged / must provide positive drainage system if known drainage problems exist or result from the proposed development

- Use Soil Conservation Service TR-55 or Modified Rational Method
- Storm water shall not be discharged in a concentrated manner where a defined drainage ditch does not exist. Methods to spread out the discharge flow shall be employed in these instances.
- Use "Rainwater and Land Development" (ODNR) as resource / design guide.

SITE EROSION AND SEDIMENTATION CONTROL

- Per City Codified Chapter 1339
- No site size limitations, all sites must submit plan
- Use "Rainwater and Land Development" (ODNR) as resource / design guide.

DRIVEWAY STANDARDS

- See attached ODOT Specifications & Drawings
- Pavement: ODOT Item 451 Reinforced Concrete Pavement
or ODOT Item 452 Plain Concrete Pavement with
Poly Fibers per City Requirements
- Thickness: Minimum of 6 inches
- Joints: Per Portland Cement Association Standards and the following:
Contraction Joints to penetrate the concrete a minimum of 1/4 its thickness
Spacing: 2 times the thickness in feet (i.e. 6 inches x 2 = 12 feet)
Maximum: no joint spacing shall exceed 15 feet in any direction
The length of a jointed section shall not exceed 1.5 times the width.

MATERIAL STANDARDS

- Use ODOT Construction & Material Specifications, Latest Edition

CURB STANDARDS

- Conform to ODOT Item 609 and the following:
- City of Steubenville Concrete Specification with Poly Fibers
- City Curb Types are preferred (see drawing ST-263)
- See ODOT Drawing BP-5.1 - Type 2, 2-A, 2-B and 6 acceptable to match existing
- Roll curb is acceptable only when joining existing roll curb on both sides

SIDEWALK STANDARDS

- Conform to ODOT Item 608 and the following:
- City of Steubenville Concrete Specification with Poly Fibers
- Central Business District - Width (Minimum) - 7 feet
 Thickness (Minimum) - 4 inches
- Outside of CBD - Width (Minimum) - 5 feet
 Thickness (Minimum) - 4 inches
- All sidewalks shall have expansion joints every 20 feet and contraction joints (trowel formed or sawed) every 5 feet. All joints shall penetrate the concrete minimum of 1/4 its thickness.
 - Maximum joint spacing: 2 times the thickness in inches (i.e. 4 inches x 2 = 8 feet) - The length of a jointed section shall not exceed 1.5 times the width.
- Curb ramps with truncated domes shall be provided at all locations required by ADA regulations (see included ODOT Standards for design detail)

CATCH BASIN STANDARDS

- City Type A at raised curb locations
- City Type B at depressed curb locations
- Type 'V' grates are to be used unless otherwise specified on the plans
- Manhole Ring w/grate: Neenah #R-2435 & R-1762 ring
- Catch Basin Trap: Neenah #3701 or PVC Elbow
- Catch Basins shall be sumped a minimum of 24 inches below the outlet invert.

MANHOLE STANDARDS

- Conform to ODOT Item 604 and the following:
- See ODOT Drawings: MH-1.1 through MH-3.1
- Precast reinforced concrete construction with O-Ring seals
- use reinforced propylene plastic steps per ODOT 711.31
- Manhole Ring & Lid Outside Pavement: Neenah #R-1762 (use concealed pick hole and self sealing lid on sanitary sewer)
- Manhole Ring & Lid Inside Pavement: Neenah #R-1772-B (use concealed pick hole and self sealing lid on sanitary sewer)
- Exiting pipe crown shall be 0.10 feet lower than entering the pipe crown.
- Manholes are to be located outside ponding areas, swales, flood routing routes, etc. or otherwise protected to the 100 year recurrence interval storm.
- Drop pipes shall be used where entering pipes are 2 feet or more above the invert of the manhole.
- No more than one inside drop pipe will be permitted in a manhole.
- Manhole diameter shall be increased one size when inside drops pipes are used
- Manholes shall be required at the following locations:
 1. At changes of pipe size.
 2. At changes of pipe slope.
 3. At changes of pipe alignment.
 4. At changes of pipe material (Example: PVC to Vitrified Clay)
 5. At curve on sewers (PC or PT) 48" in diameter and larger.

6. At intermediate intervals not exceeding 300 feet on 8 inch through 27 inch and 500 feet on 30 inch and larger.
7. At the ends of sewer extensions where a service line is located between the manhole and the end of the sewer extension.
8. At the ends of sewer extensions 50 feet or more in length, regardless of service line connections.

STORM SEWERS

- Conform to ODOT Item 603 and the following:
- Diameter on Public easements & rights of way: 12 inches (min)
- Pipe material: Concrete pipe (ODOT 706.02) or HDPE pipe (ODOT 707.33) is required for pipe within public rights of way
- HDPE (ODOT 707.33) may be used elsewhere
- Bedding:
 - use limestone or gravel no. 57 stone from 6 inches below to 6 inches above pipe
 - no open hearth or BOF slags

SANITARY SEWERS

- Conform to ODOT Item 603 and the following:
- Diameter for mains: 8 inches minimum
- Diameter for service laterals: 6 inches minimum
- Pipe material: PVC - ConTech A-2000 or approved equal
- PVC (SDR 35) may be used for service laterals, but must be laid in bedding of 6 inches of sand below and above pipe
- Hydrostatic testing per ASTM C969
- Bedding: no open hearth or BOF slags

SANITARY SEWER DESIGN CRITERIA

- Design Planning Period - 50 years
- Population Densities
 - Residential - single family - 3.0 persons per household (minimum)
 - Multi-family - based on zoning (12 to 36 persons per acre)
 - Commercial / Institutional / Industrial - Case by case basis
- Average Sanitary Flow - A rate of 100 gallons per capita per day multiplied by the population density (actual and/or projected) of the area under consideration.
- Infiltration Rate - 1000 gallons per day per acre
- Peak Sanitary Flow - The Average Sanitary Flow multiplied by 3.0.
- Design Sanitary Flow - The sum of the Peak Sanitary Flow and the total infiltration up to the point in question.
- Hydraulic Sewer Design - Based on Manning Formula, using a roughness coefficient of 0.013 regardless of pipe material.
- Depth of Design Flow - Sewer size 12 inches or less - not to exceed 50% full
 - Sewer size greater than 12 inches - not to exceed 75% full
- Design Flow Velocity:
 - Minimum - Sufficient sewer slope to obtain mean velocities, when flowing full, of not less than 2.0 feet per second.

Maximum - Excessive velocities are to be avoided. When proposed design velocities excess 15 feet per second, Ohio EPA design requirements shall apply.
End of Sewer Runs - Sewers that will not require future extensions shall have adequate grade to provide sufficient cleaning velocity to compensate for reduced flows.

WATER LINE STANDARDS

- Conform to ODOT Item 638 and the following:
- Ductile iron pipe, Class 52 for all mains and laterals larger than 4 inches and not under pavement. Use Class 55 for all mains and laterals under pavement.
- Minimum size of mains - 8 inch
- All 12 inch or smaller valves shall be gate type (ccw open) - AWWA C509
- Larger than 12 inch valves shall be butterfly type (ccw open) - AWWA C504
- Service branches shall be copper (Type K) or ductile iron
- Hydrostatic tests per ODOT 638.09
- Disinfection per ODOT 638.10
- Bedding per City Drawings: no open hearth or BOF slags

FIRE HYDRANT STANDARDS

- CLOW - F2500 (4.5" or 5.25")
- Two hose nozzles (2.5") and one pumper nozzle (4.5")
- 6 inch line opening
- Conform to latest AWWA Standards
- All operating parts to be bronze
- Must use Pittsburgh Thread on all hydrants as follows:
 - 2.5" Hose nozzle - I.D = 2-1/2"
 - Threads - Basic Major Diameter = 3.096"
 - Minimum Root Diameter = 2.875"
 - Threads per inch = 6
 - Thread Form - Sharp Vee
 - 4.5" Steamer nozzle - I.D. = 4-7/16"
 - Threads - Basic Major Diameter = 5.468"
 - Minimum Root Diameter = 5.125"
 - Threads per inch = 4
 - Thread Form - National Form
- Pentagon operating nut (ccw open) and cap nuts (all pentagon nuts 1.75 inches from flat to point)
- barrel: breakaway & automatic draining type

Attachments:

- Chapter 1339 of City Codified Ordinances
- Chapter 1341 of City Codified Ordinances
- Jefferson County 24 Hour Rainfall Data
- Example of TR-55 Storm Calculations
- Excerpt from "Applied Hydrology" by Ven Te Chow, David R. Maidment and Larry W. Mays; McGraw-Hill, 1988 to explain "Modified Rational" Method
- Intensity Chart for Modified Rational Method
- Typical: Outlet Control using PVC Cap with Orifice
- Walk requirements
- Steubenville Fibrous Concrete Specification
- Steubenville Asphalt Plant Mix Specification
- Access Control / Drive Design
- Standard Details

Additional References

- ODOT Construction and Material Specifications, latest edition
- ODOT Standard Construction Drawings

CITY OF STEUBENVILLE STREET LIGHTING DESIGN STANDARDS

GENERAL

City street and parking lighting installations shall meet ODOT specifications with the following conditions:

PULLBOXES

Pullboxes are to be concrete type, 18 or 24 inch as needed

CONDUIT

1. Pole Foundations - conduit shall be heavy wall galvanized steel meeting ODOT 725.04
2. Pavement Crossings - lighting conduit shall be installed inside a minimum three (3) inch heavy wall galvanized steel carrier pipe meeting ODOT 725.04.
3. Driveway Crossings - same treatment as pavement crossings
4. Above Ground - all above ground conduit shall be heavy wall galvanized steel meeting ODOT 725.04

CONTROL CENTERS

Lighting control shall utilize a disconnect and photo cell (twist lock type) controlled contactor within a stainless steel NEMA weatherproof enclosure. The photo cell shall be mounted a minimum of fourteen (14) feet above the ground surface. The control center shall be furnished with a HAND-OFF-AUTO switch.

CONNECTOR KITS

At the pole base, each circuit shall be spliced with a fused Y-Connector kit using a maximum 10 amp fuse.

CONTRACTOR QUALIFICATIONS

Contractors performing any work on highway lighting within the City of Steubenville shall be pre-qualified with the Ohio Department of Transportation.

**CITY OF STEUBENVILLE
TRAFFIC SIGNAL DESIGN STANDARDS**

GENERAL

City traffic signal installations shall meet ODOT specifications with the following conditions:

SIGNALS

Polycarbonate material type with glass lenses and LED indications

Color: Vehicle ----- Body and Hoods molded in black
Door molded in yellow

 Pedestrian ----- All Black

Hoods: Vehicle ----- Use cutaway when ped signals are not used
 Use tunnel when ped signals are used

 Pedestrian ----- Tunnel or eggcrate

Indications: Pedestrian International Symbols: Hand/Man

LED Indications: Vehicle Red, Amber & Green by Dialight
 Pedestrian Hand/Man (full image) by Dialight

Approved Sources: Vehicle: Eagle Signal
 McCain Signals

 Pedestrian: McCain Signals (1 section)
 Eagle Signal (2 section)
 Indicator Controls (1 section)

DETECTOR LOOPS

Use preformed loops manufactured by "Never-Fail Loop Systems" (503/244-6345, FAX 503/288-0274) or approved equal. Install in saw slot back filled with material approved by loop manufacturer. Install loop four (4) inches, clear distance, below the finished pavement surface. Install loop in base or intermediate course.

POLES

ODOT galvanized mast arm type with rigid mounted signals and signs using "Astrobrac" mounting hardware
NOTE: The use of blind half-couplings welded to the poles for vehicle/pedestrian signal attachment are prohibited.

PULLBOXES

Pullboxes are to be concrete type, 18 or 24 inch as needed

CONTROLLER

Use ODOT - NEMA TS2-Type 1 specification with the following additions:

- Bare aluminum cabinet with police door
- Cabinet minimum size (outside dimensions in inches):
 - Two Phase Pole Mount: ----- 24W x 40H x 15D
 - Two Phase Base Mount: ----- 24W x 46H x 16D
 - Four Phase Base Mount: ----- 30W x 48H x 16D
 - Five or More Phases - Base Mount: ----- 44W x 52H x 24D
- Main door lock: Corbin Type keyed to #2
- Extended monitoring per 733.04 (3)(b)
- Manual control & pushbutton per 733.04 (10)
- Automatic/Manual transfer switch per 733.04 (11)(c)
- Detector test switches per 733.04 (11)(g)
- Time Base Coordination to be furnished per 733.08, but shall be internal to the controller unit
- Lightning Protection:
 - AC Power Line: Innovative Surge Protection, Inc. Model# HS-P-SP-120-30A-RJ
 - Loop Detectors: EDCO Model SRA-16C
 - Ped Push Buttons: EDCO Model SRA-63
 - Interconnect (120 VAC): EDCO Model SPA-60B
 - Interconnect (Low Voltage): EDCO Model SRA-64C

Approved Source: Econolite Model ASC-2S-2100

**CITY OF STEUBENVILLE
TRAFFIC SIGNAL DESIGN STANDARDS**

LOOP DETECTOR UNITS

All are to be Extend and Delay type with solid state output
Dual channel rack mount type units only
Approved Source: RENO A&E; Reno, NV

PEDESTRIAN PUSH BUTTONS

Ped Push Button signs shall be furnished (ODOT #R-73A, 9"x12") with the following legend:
"TO CROSS ____ * PUSH BUTTON WAIT FOR ____ ** SIGNAL"

- * Insert name of street to be crossed
- ** Insert GREEN if ped signals are not used
Insert WALK if ped signals are used

Color: Yellow

Approved Source: Eagle Signal Type EJ-4 or pre-approved equal

INTERCONNECT CABLE

Twisted Pair Cable

Twisted Pair Shielded (18 pair/19 AWG) meeting the following specification: IMSA Spec 40-2-1984 or REA Spec. PE-22, Type ALP

Interconnect to be installed between controller cabinets without splices.
For non-computer applications, terminate soldered pairs for each required function.

Fiber Optic Cable

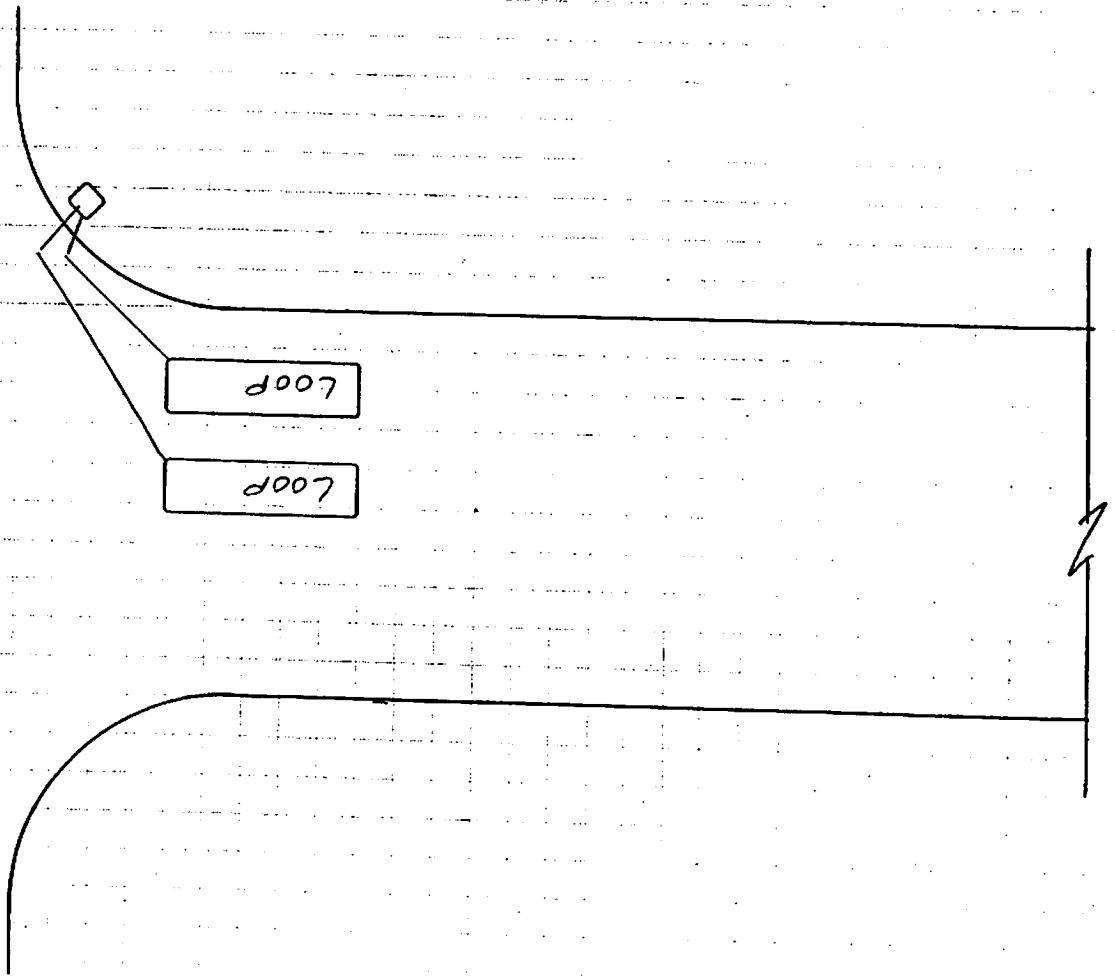
Shall meet the current requirements of the City of Steubenville
Installation shall be performed by personnel certified to install fiber optic cable (contact City for requirements)
Cable shall be installed between controller cabinets without splices

CONTRACTOR QUALIFICATIONS

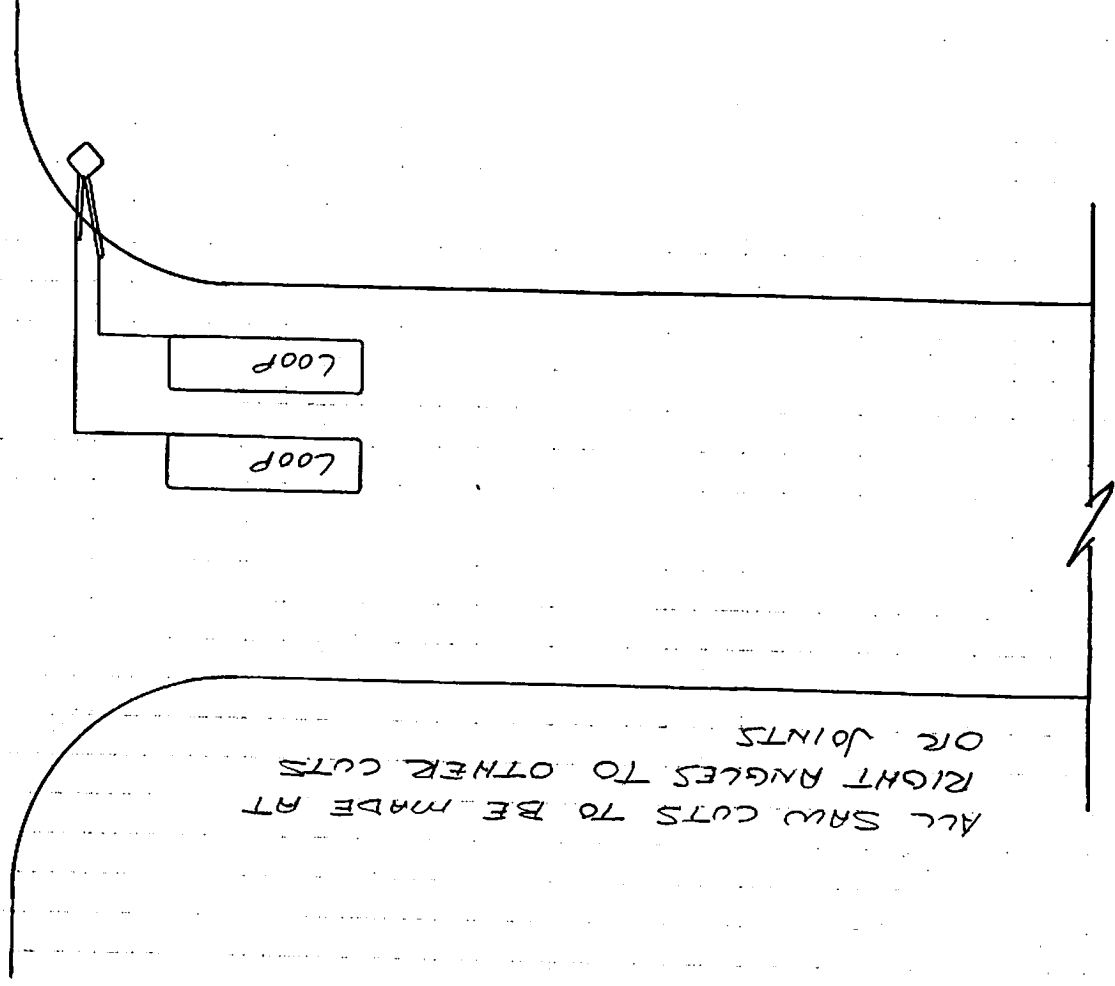
Contractors performing any work on traffic signals within the City of Steubenville shall meet the qualifications outlined in ODOT Supplement 1063.

LOOP INSTALLATION & ROUTING DETAILS

NOT ACCEPTABLE METHOD



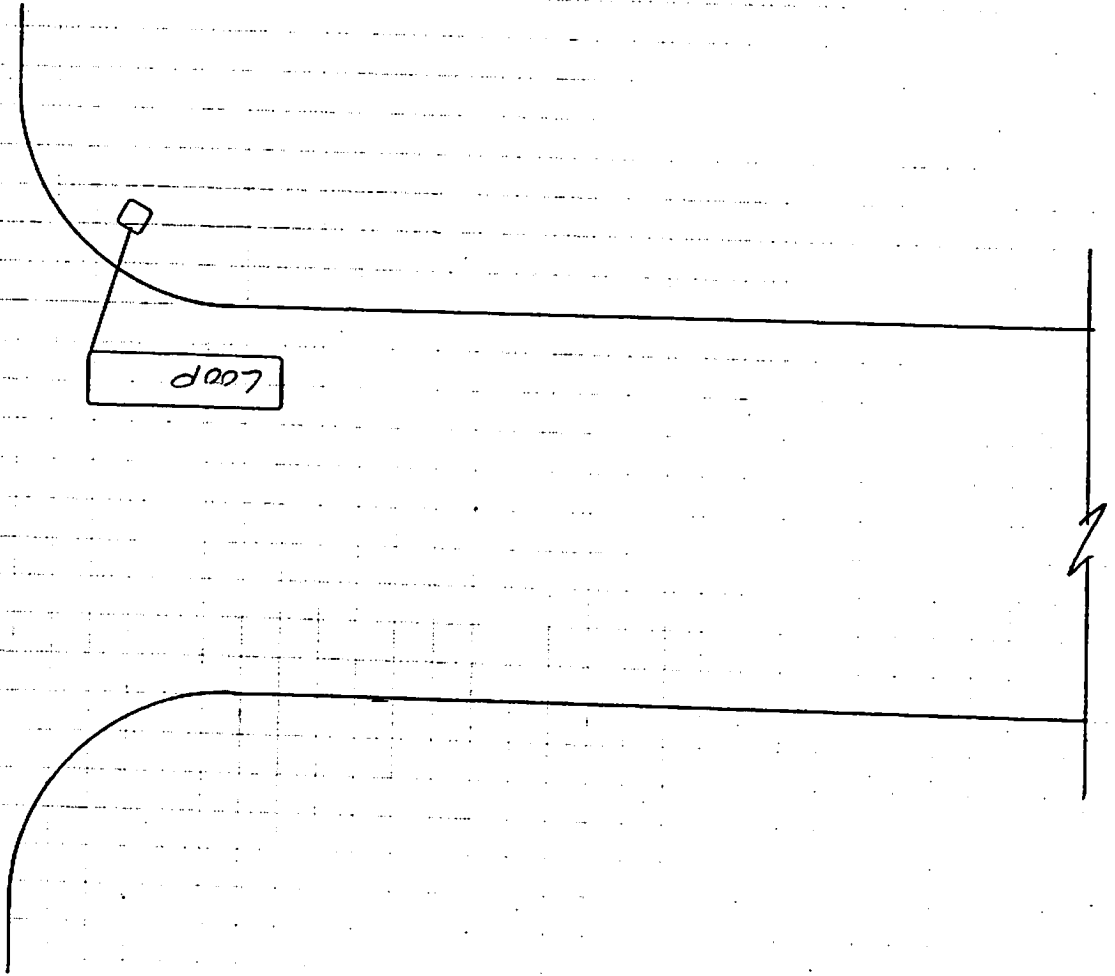
ACCEPTABLE METHOD



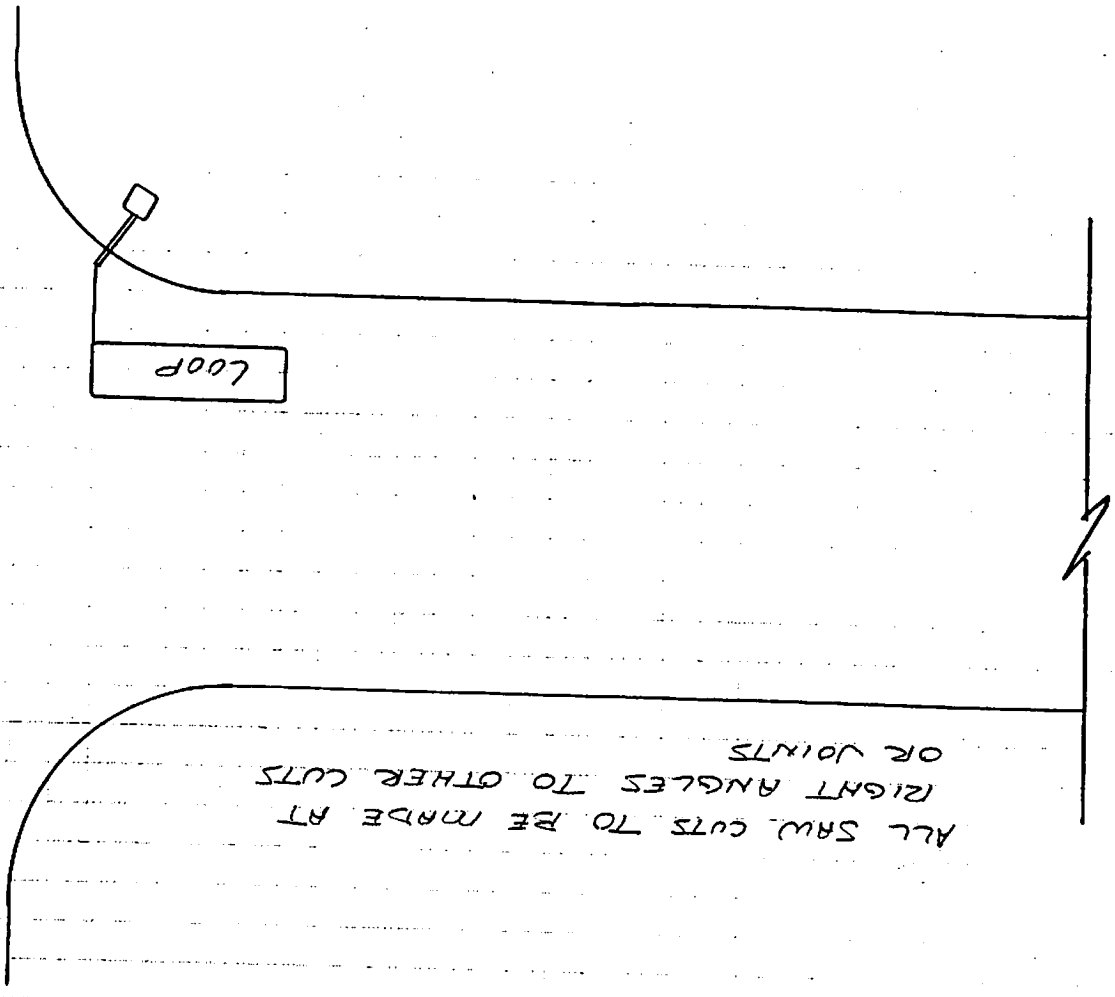
ALL SAW CUTS TO BE MADE AT
RIGHT ANGLES TO OTHER CUTS
OR JOINTS

LOOP INSTALLATION & ROUTING DETAILS

NOT ACCEPTABLE METHOD



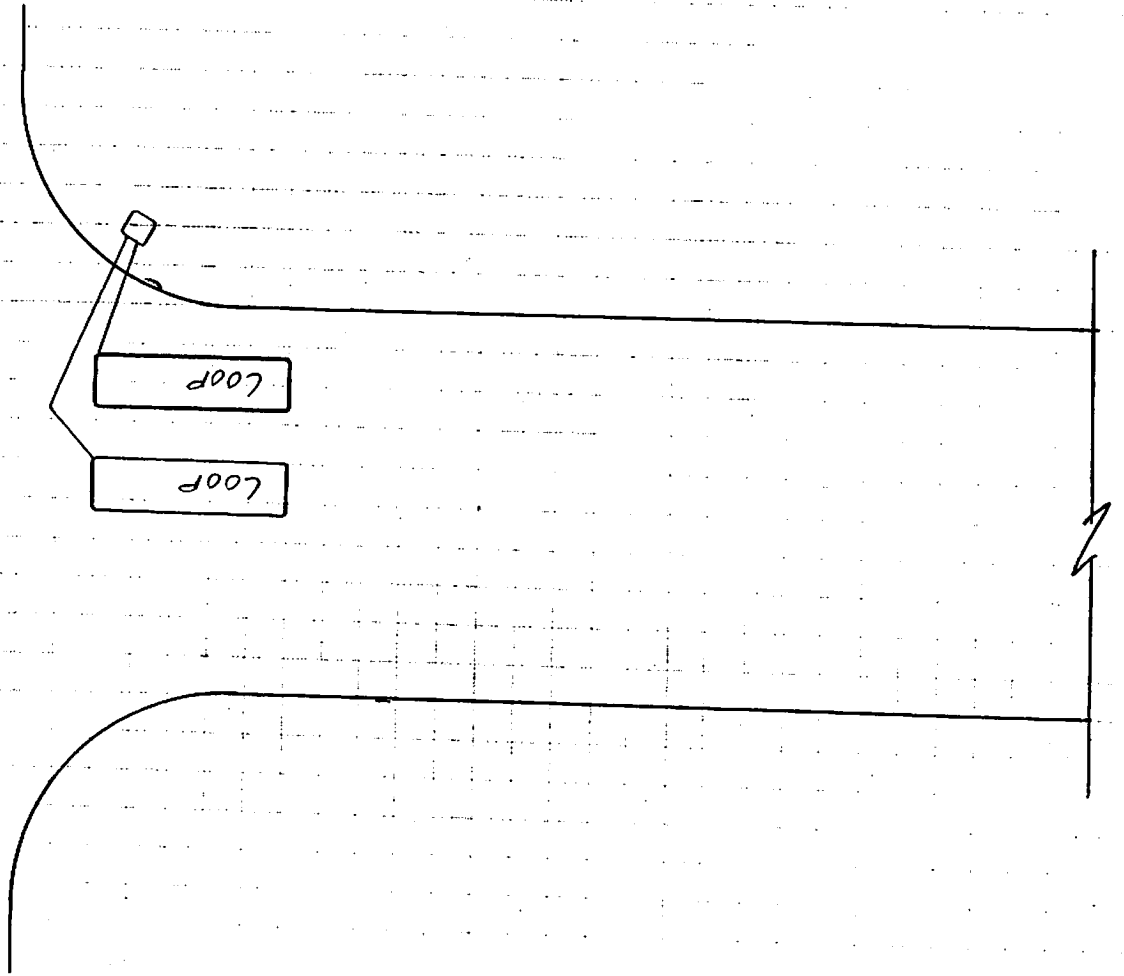
ACCEPTABLE METHOD



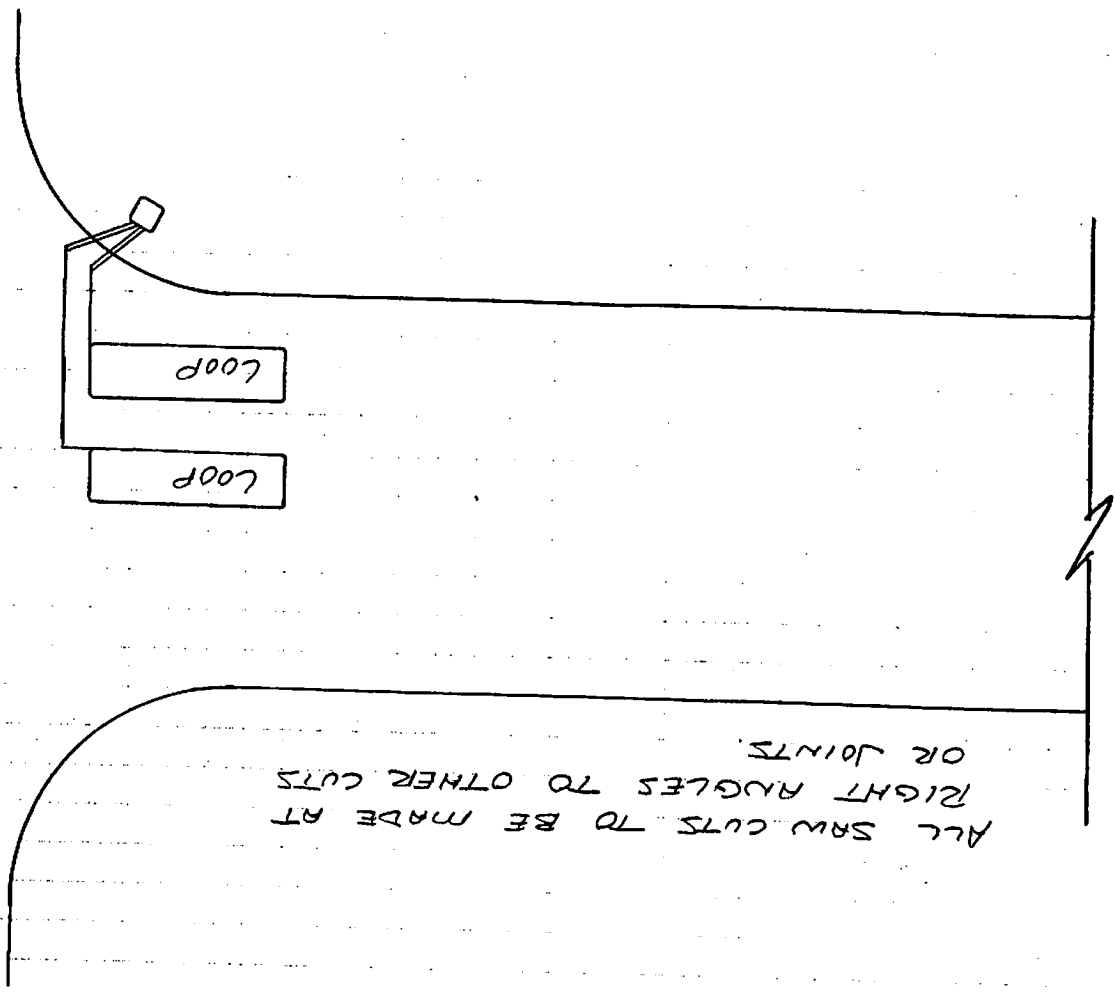
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LOOP INSTALLATION & ROUTING DETAILS

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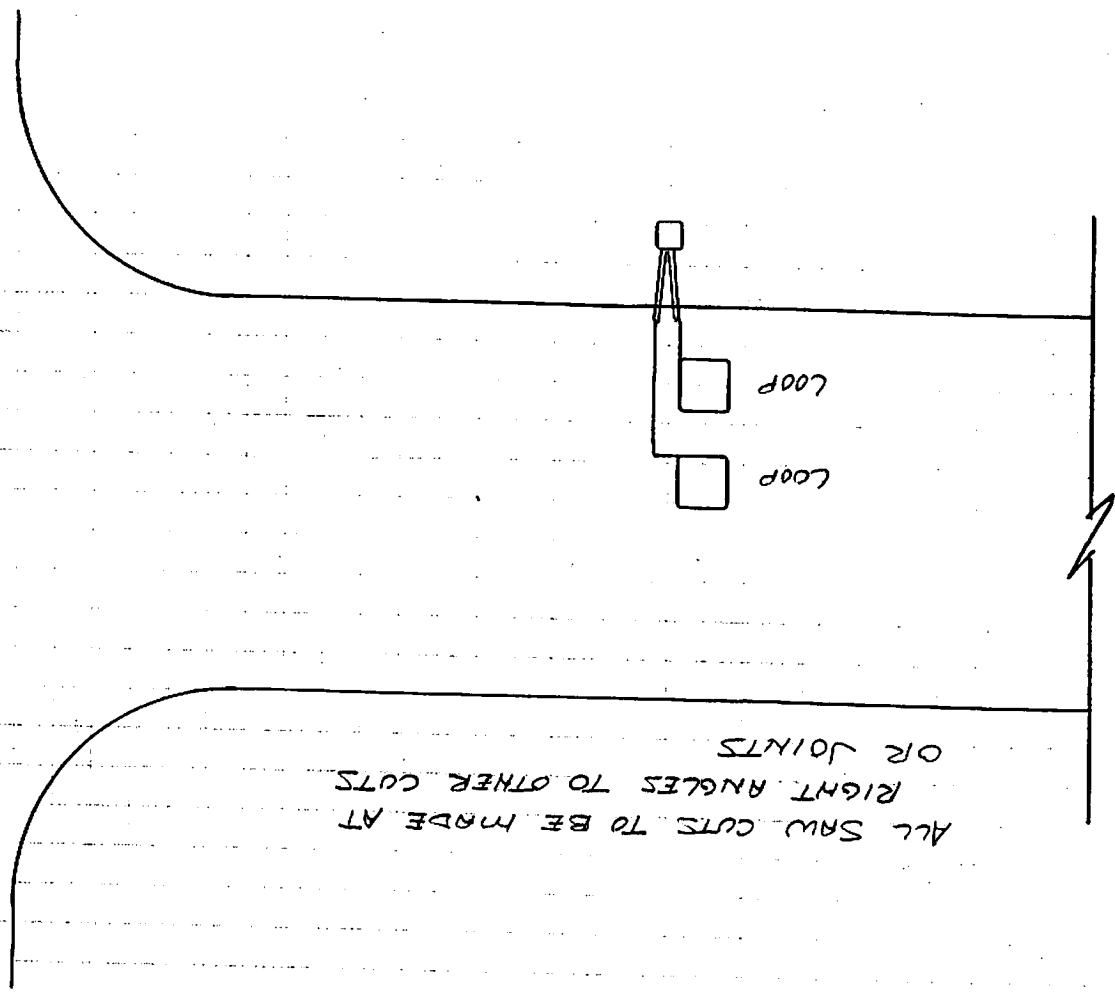
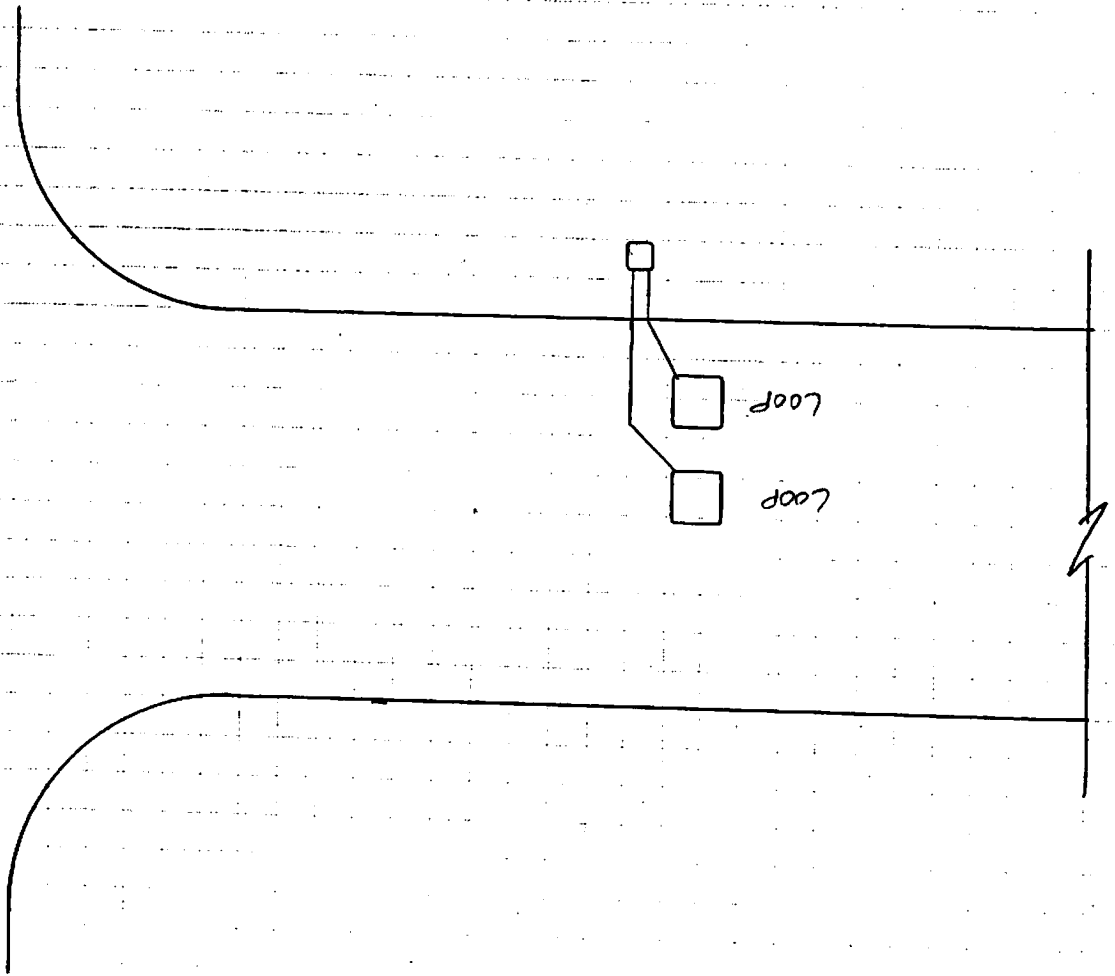
ACCEPTABLE METHOD



LOOP INSTALLATION & ROUTING DETAILS

NOT ACCEPTABLE METHOD

ACCEPTABLE METHOD



ALL SAW CUTS TO BE MADE AT
RIGHT ANGLES TO OTHER CUTS
OR JOINTS

City of Steubenville
Pavement Marking Design Standards - 1997

GENERAL

City pavement marking installations shall meet ODOT specifications with the following conditions:

MATERIAL TYPE

Thermoplastic pavement marking material shall be used on all arterial and major collector streets.

Chlorinated Rubber based paint shall be used on all other streets.

LINE SIZES

| | |
|------------------------|---------------------------------|
| Stop Line ----- | 24 inch, white |
| Channelizing Line ---- | 8 inch, white |
| Crosswalk Line ----- | 8 inch, white |
| Transverse Line ----- | 24 inch, color per OMUTCD * |
| Center Line ----- | 4 inch, yellow |
| Lane Line ----- | 4 inch, white |
| Edge Line ----- | 4 inch, color per OMUTCD * |
| Dotted Line ----- | 4 or 6 inch, color per OMUTCD * |

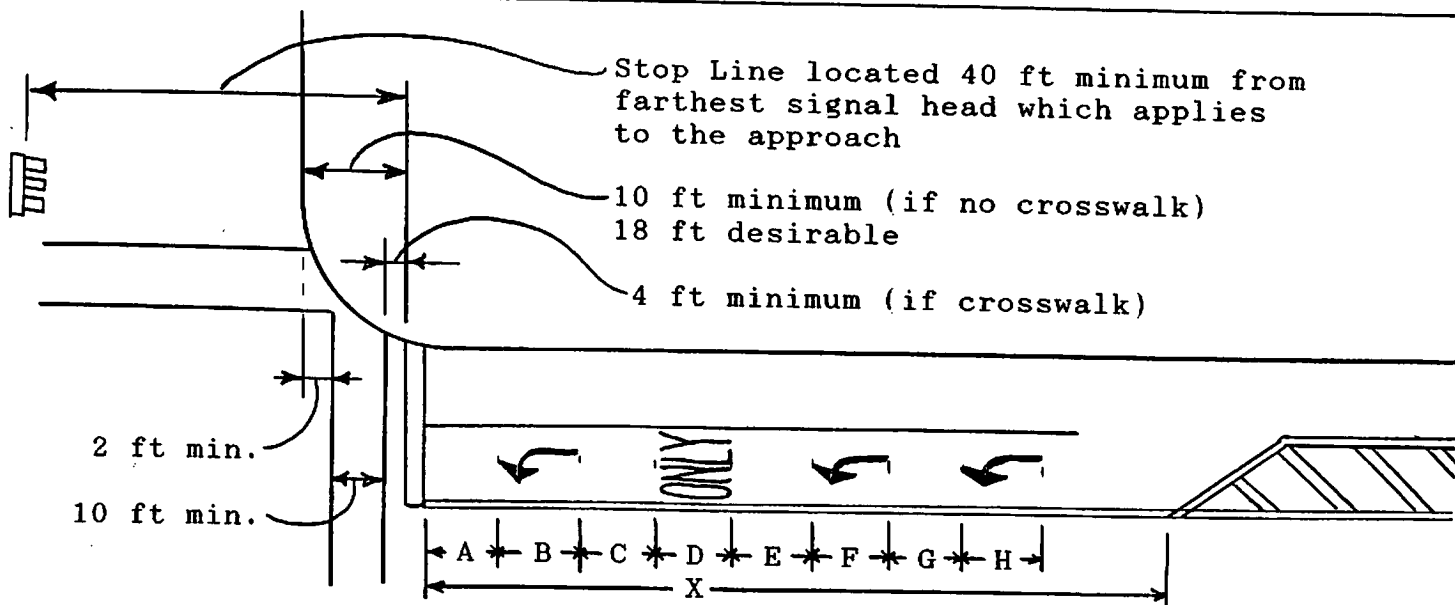
AUXILIARY MARKING LAYOUT

Use Steubenville Drawing ST-101.

* - OMUTCD: Ohio Manual of Uniform Traffic Control Devices

AUXILIARY PAVEMENT MARKING STANDARD
City of Steubenville

ST-101



| Length of Turn Lane -->>> | X | 20-35 | 36-55 | 56-80 | 81-120 | 121-160 | 161-200 | > 200 |
|---------------------------|---|------------|------------|------------|------------|-------------|-------------|------------|
| Stop Line to Arrow | A | 10 (10) | 10 (10) | 20 (20) | 30 (30) | 30 (30) | 30 (30) | 30 (30) |
| First Arrow | B | 8 (18) | 8 (18) | 8 (28) | 8 (38) | 8 (38) | 8 (38) | 8 (38) |
| Arrow to ONLY | C | | 10 (28) | 20 (48) | 30 (68) | 30 (68) | 30 (68) | 30 (68) |
| ONLY | D | NONE | 6 (34) | 6 (54) | 6 (74) | 6 (74) | 6 (74) | 6 (74) |
| ONLY to Arrow | E | | | | | 30 (104) | 30 (104) | SEE BELOW |
| Second Arrow | F | NONE | NONE | NONE | NONE | 8 (112) | 8 (112) | 8 |
| Arrow to Arrow | G | | | | | | 30 (142) | SEE BELOW |
| Third Arrow | H | NONE | NONE | NONE | NONE | NONE | 8 (150) | 8 |

FOR TURN LANES LONGER THAN 200, the Second and Third Arrows are spaced using the following formula:

$$E \ \& \ G = \frac{(X-140)}{2}$$