# Town of Ranlo

RANLO

## Standard Specifications and Details

# Section 4
# Streets and Sidewalks

***Prepared by:***

Wooten

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***Hickory, NC 28601***
***License No. F-0115***

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## SECTION 4 – STREETS AND SIDEWALKS



RANLO

# SECTION 4

# STREETS AND SIDEWALKS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Work under this section includes, but is not limited to, the design and construction of all streets, curbing and sidewalks which shall become part of the Town of Ranlo's street system.

B. Unless otherwise provided herein, all materials and street construction methods shall conform to the applicable requirements contained in the "Standard Specification for Roads and Structures", latest edition, as published by the NCDOT.

### 1.02 DESIGN CRITERIA

A. General

Street design shall conform to the standards set forth in A Policy on Geometric Design of Highways and Streets as published by AASHTO, the Town's Subdivision Ordinance, Standard Specifications for Roads and Structures as published by the NCDOT, Roadway Design Manual as published by the NCDOT and the requirements outlined herein.

Streets shall be in accordance with the Town's Subdivision Ordinance and the Standard Details.

B. Pavement & Right-of-Way Widths

1. The Town may require additional widening and related work as deemed necessary to provide for the safety and quality of roadway for the traveling public. The widths shall not be less than the following taken from the Town's Subdivision Ordinance:

| | **Minimum Right-of-Way, Feet** |
|---|---|
| (i) Major Arterial Freeways | 90' |
| (ii) Collector | 60' |
| (iii) Local/Minor Residential | 50' |
| (iv) Commercial and Industrial | 60' |
| (v) Marginal Access | 50' |
| (vi) Alleys | 20' |
| (vii) Cul-de-sac (Turnarounds) | 100' |

2. Minimum width for streets shall be as follows:

| Road Type | w/Curb & Gutter (B/B) | wo/Curb & Gutter |
|---|---|---|
| (i) Major Arterial | 49’ | N/A |
| (ii) Collector | 37’ | N/A |
| (iii) Local/Minor Residential | 27’ | 22’ |
| (iv) Commercial and Industrial | 29’ | |
| (v) Marginal Access | 29’ | 24’ |
| (vi) Alleys | 20’ | 15’ |
| (vii) Cul-de-sac (Turnarounds) | 85’ | 80’ |

3. Cul-de-sac
    a. Permanent dead end streets are prohibited except when required by extreme topography, water or other natural features. When permitted, no dead end street shall be longer than 500 feet or provide access to more than 12 lots, unless prior written approval is obtained from the Town Manager. Measurement shall be from the point where the center line of the dead end street intersects with the center of a through street to the center of the turnaround of the cul-de-sac.
    b. Cul-de-sacs should not be used to avoid connection with an existing street or to avoid the extension of an important street.
4. Bridges
    a. Bridges shall be designed in accordance with NCDOT requirements and shall be subject to the approval of the Town.
5. Alleys
    a. The right-of-way width of an alley shall be 20 feet and the pavement width shall be 15 feet.
    b. Dead-end alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turnaround facilities at the dead-end as may be recommended by the Planning Board and approved by the Town Council.
    c. Minimum centerline radius shall be 35 feet.
    d. Property line radius at alley intersections shall be 15 feet.

C. Grades

1. Unless necessitated by exceptional topography and approved by the Town, street grades shall meet grades included within the Subdivision Ordinance and shall not exceed 12 percent, nor be less than 1/2 percent, on any street, unless specific conditions are met within the Subdivision Ordinance.
2. Grades approaching intersections shall not exceed 5 percent for a distance of not less than 100 feet from the right-of-way of such intersection unless otherwise approved prior by the Town in writing.
3. All changes in street grade shall be connected by vertical curves of at least 100 feet, or calculated by use of Standard Detail R-3.07.
4. Sharp alignment or grade changes shall be avoided.

D. Radii of Curvature

1. Where a street centerline deflection of more than five (5) degrees occurs, a curve shall be introduced with the minimum centerline radius as shown in Standard Detail R-4.07.
2. At intersections, all streets and commercial driveways shall be rounded with an edge of pavement or face of curb radii not less than the following:

   a. Thoroughfares 50 feet

   b. Collectors 40 feet

   c. Residential 30 feet

E. Tangents

1. A centerline tangent of not less than 100 feet shall be provided between reverse curves on all streets. Reverse curves on super-elevated streets shall have a sufficient centerline tangent to accommodate entry and exit run-out, but not less than 100 feet.

F. Sight Triangle

1. A sight triangle easement shall be provided at all intersections. No obstructions 30-inches higher than the elevation of the roadway's centerline intersection shall be allowed in the sight triangle.
2. Sight triangle easements shall not be less than 10 feet by 70 feet. The 10-foot dimension shall be the setback from the right-of-way of the major street, and the 70-foot dimension shall be measured along the right-of-way of the major street.
3. Sight triangle distances shall be increased by the Town if appropriate for traffic conditions and speed limits.
4. Sight triangle easements shall be shown on the final plat for the developed tract.

G. Pavement Design

1. The pavement design thickness shown in the Standard Details shall be considered as the minimum design requirements.
2. If soil conditions and/or projected traffic volumes warrants, the Town may require a pavement design in excess of the minimum requirements.
3. If the Design Engineer believes that a more economical pavement design may be provided without sacrificing the structural integrity or 15-year design life of the pavement, an alternate pavement design based on actual Soil Support Values as determined by California Bearing Ratio (CBR) or other acceptable method may be proposed. All design data, sealed by a Professional Engineer licensed by the State of North Carolina must be submitted to the Town for review and approval.

H. Curb and Gutter, Sidewalks

1. Curb and gutter, where required, shall be standard 30-inch combination curb and gutter unless otherwise approved by the Town.
2. Sidewalks shall be a minimum of 5 feet wide. The minimum thickness of a sidewalk shall be 4-inches except where the sidewalk crosses a driveway, in which case it shall be 6-inches thick. Sidewalks shall have a uniform slope perpendicular to the curb of not greater than 1/4-inch per foot toward the roadway. The utility strip between the sidewalk and the back of curb shall not slope less than 1/2-inch per foot or greater than 3/4-inch per foot toward the roadway.
3. All sidewalks and ramps shall meet the current Americans With Disabilities Act (ADA) requirements.

## 1.03 REFERENCES

A. The latest revision of the publications listed below form a part of this specification.

1. N.C. Department of Transportation – Specification for Roads and Structures
2. American Society for Testing and Materials (ASTM)
   a. C39 Test for Compressive Strength of Cylindrical Concrete Test Specimens
   b. C94 Ready Mixed Concrete
3. American Concrete Institute (ACI)

## 1.04 SUBMITTALS

A. Affidavit that all materials and proposed plans are in compliance with Town standards and ordinances. Any items not meeting the Town's requirements are deemed unapproved unless prior written approval has been obtained regardless of any past or future approvals unless specifically identified and prior written approval has been obtained.

B. Submit the following to the Town of Ranlo and obtain approval from the Town's Public Works Department prior to beginning work:

1. Affidavit of Compliance: Affidavit shall attest that supplied products conform to the referenced standard and this specification and that tests set forth in each applicable referenced publication have been performed and that test requirements have been met. Submit for the each of the following materials:
    a. Asphalt concrete
    b. Aggregate Base Course
    c. Concrete
    d. Structural Fabric
2. Test Reports:
    a. Concrete Tests: Report for 7-day and 28-day concrete compressive strengths.

## 1.05 QUALITY ASSURANCE

A. Contractors must be licensed by the N.C. Licensing Board for General Contractors and have a classification and a cost limitation appropriate for the work to be performed.

## 1.06 WARRANTY

A. Unless otherwise required, all materials and workmanship shall have a one-year warranty from the date of final acceptance by the Town. A warranty inspection will be made jointly by the Town and Contractor/Developer approximately eleven (11) months after acceptance to identify needed repairs. All labor, equipment and materials needed to make these repairs shall be the responsibility of the Contractor.

## 1.07 ACCEPTANCE OF STREETS FOR PUBLIC MAINTENANCE

A. The Town may add streets, which were not previously maintained by a public agency, to the Town's street system upon the recommendation of the Director of Public Works provided that the streets meets or exceed the following minimum standards:
    1. Right-of-way width meets or exceeds the requirements of Section1.02.B of these specifications. If the existing right-of-way does not meet the minimum standards, the adjacent property owners will be required to dedicate sufficient right-of-way to meet the standards at no cost to the Town.
    2. Minimum development along street:
        a. Commercial: Not less than a total of four (4) businesses fronting street and not less than two (2) businesses per one-tenth of a mile.
        b. Residential: Not less than a total of four (4) houses fronting street and not less than two (2) houses per one-tenth of a mile.
        c. Other Streets: Not less than a total of four (4) houses fronting street and not less than two (2) houses per one-tenth of a mile.
        d. Alleyways: Not less than a total of four (4) houses fronting alley and not less than two (2) houses per one-tenth of a mile.
    3. Businesses or houses on corner lots which also abut an existing publicly maintained street shall not be included in the calculations for development resources.

4. The Town may provide the stone base and asphalt pavement and/opr resurfacing at no cost to the property owners if the Town decides to upgrade said streets to the minimum construction standards of the Town.

B. Streets added to the Town's street system for maintenance under this section shall be deemed as accepted by the Town and officially added to the Town's street system by complying with the following procedures:

1. Request for acceptance of a street by the Town shall be submitted in writing to the Director of Public Works. This request can be submitted by a resident and/or property owner of said street.

2. Request for acceptance of street for maintenance shall be reviewed by the Director of Public Works and upon affirmative finding that street meets or exceeds criteria as listed in subsection (A) of this section, the Director of Public Works shall forward the request to the Town Manager. Upon agreement by the Town Manager, the request shall be forwarded to the Town Council with a recommendation for approval.

3. Recommendation for acceptance of street for maintenance shall be approved/ disapproved indicating street name, location and general description of street, as well as, the date of approval/disapproval shall be on file in the Town Clerk's office.

C. The Town may add streets, which were previously maintained by the North Carolina Department of Transportation (NCDOT), to the Town's street system for maintenance upon the recommendation of the Town Manager. Streets added to the Town's street system for maintenance under this section shall be deemed as accepted by the Town and officially added to the Town's street system by action of the Town Council and approval of the North Carolina Board of Transportation. The official date of acceptance of such street and/or streets shall be the date mutually agreed upon by the Town and NCDOT.

## PART 2 ALLOWABLE PRODUCTS AND MATERIALS

### 2.01 GENERAL

A. All materials used in the construction of new streets, curb and gutter and sidewalks shall be in accordance with the latest edition of the NCDOT's "Standard Specifications for Roads and Structures" and the requirements contained herein.

B. Materials and Mixes

1. Asphalt Concrete Base Course - Type B-25.0B: Conforming to materials and compositions required in NCDOT Section 610, Asphalt Concrete Plant Mix Pavements. If approved use by the Town as a base material, a minimum compacted thickness of 4-inches is required.

2. Tack Coat: Conforming to materials and compositions required in NCDOT Section 605, Asphalt Tack Coat

3. Asphalt Concrete Surface Course - Type SF9.5A: Conforming to materials and composition required in NCDOT Section 610, Asphalt Concrete Plant Mix Pavements. For higher traffic volumes, an alternate surface mixture such as S9.5B may be required by the Town. Minimum thickness of surface course shall be 2-inches.

4. Concrete for Curb and Gutter, and Sidewalks: Conforming to materials and composition required in NCDOT Section 846, Concrete Curb, Curb and Gutter, Concrete Gutter, Shoulder Berm Gutter, Concrete Expressway Gutter, Concrete Valley Gutter and Concrete Flumes, and Section 848, Concrete Sidewalks and Driveways and Wheelchair Ramps.
5. Base Course: Aggregate base course shall comply with requirements of NCDOT Section 520, Aggregate Base Course. If used as a base material, a minimum compacted thickness of 8-inches is required.
6. Structural Fabric: Provide structural fabric specifically designed and manufactured to stabilize soft soils under an aggregate base for roads and parking areas. Fabric shall provide a permeable layer, planar flow, and tensile reinforcement for retaining the soil matrix. Fabric shall be inert to commonly encountered chemicals, hydrocarbons, resistant to mildew, rot, and ultraviolet light exposure, and meet or exceed the following test standards:

| Test | ASTM |
|---|---|
| Fabric weight | D-1910 ..... 6 (oz / sq yd) |
| Grab tensile strength | D-1682 ..... 200 (lbs.) |
| Mullen burst strength | D-3786 ..... 320 (psi) |
| Puncture strength | D-751 ..... 80 (lbs.) |

## PART 3 EXECUTION / INSTALLATION

### 3.01 GENERAL

A. The construction of new streets, curb and gutter and sidewalks shall be in accordance with the latest edition of the NCDOT's "Standard Specifications for Roads and Structures" and the requirements contained herein.

B. Provide erosion control measures as required. Erosion control measures including seeding and mulching shall be designed, installed and maintained in accordance with the N.C. Department of Environment and Natural Resources, Land Quality Section's "Erosion and Sediment Control Planning and Design Manual". The Developer/Engineer is responsible for securing all required permits.

C. Protect existing structures, utilities and other features that are to remain.

D. Dispose of excavated material in such a manner that it will not obstruct the water flow, endanger existing improvements or work in progress or be detrimental to the completed work in any way.

E. Weather Limitations: Proceed with fill and backfill operations based on the following weather conditions:

1. Temperature must be above freezing.
2. In windy, hot or arid conditions with a high rate of evaporation, add moisture to the material to maintain the optimum moisture content.
3. Do not proceed in rain or on saturated subgrade.

F. Repair or undercut and backfill soils that become damaged by construction activity or unsuitable due to being left exposed to the weather.

G. Do not place material on surfaces that are muddy, frozen or contain frost.

H. Excavation carried below the design elevation shall be backfilled with select material and compacted to the satisfaction of the Town.

I. Remove and properly dispose of unsatisfactory and excess material from the site.

J. All streets shall be cleared and graded for the full width of the right-of-way. All stumps, roots and other objectionable material shall be completely removed from the cleared area.

K. All roadway subgrade and underground utilities must be inspected and approved by the Town prior to the placement of base course materials.

## 3.02 PREPARATION OF SUBGRADE

A. After installation of all utilities and prior to placement of curb and gutter, the entire subgrade shall be compacted to 95% of Standard Proctor density for a depth of 8-inches. The area shall be proof-rolled in the presence of the authorized or designated Town representative. Areas found to be loose, yielding or composed of unsuitable material, whether located in the subgrade or located deeper, shall be undercut, backfilled with suitable material and properly compacted. The use of a structural fabric to stabilize a soft subgrade may be allowed by the Town if it can be demonstrated that this method will provide adequate stability.

B. Subgrade compaction tests shall be performed by a qualified geotechnical firm, provided by the Contractor and approved by the Town.

C. Compaction tests shall be made for every 3,000 square feet of road bed. Additional tests may be required by the Town if there is uncertainty about the uniformity of the compaction.

D. Preparation and shaping of the subgrade shall be in accordance with NCDOT Section 500, Fine Grading Subgrade, Shoulders and Ditches.

## 3.03 AGGREGATE BASE COURSE

A. The stone base shall be constructed in accordance with the applicable paragraphs of NCDOT Section 520.

B. Compacted base shall be a minimum thickness of 8-inches.

C. Town may require a greater thickness on streets projected to have higher traffic volumes.

## 3.04 ASPHALT CONCRETE BASE COURSE

A. Spreading, compaction, and finishing shall comply with the requirements of NCDOT Section 610, Asphalt Concrete Plant Mix Pavements.

B. Compacted thickness shall be a minimum of 4-inches.

C. Town may require a greater thickness on streets projected to have higher traffic volumes.

## 3.05 ASPHALT CONCRETE SURFACE COURSE

A. Spreading, compaction, and finishing shall comply with the requirements of NCDOT Section 610 Asphalt Concrete Plant Mix Pavements.

B. Compacted thickness shall be a minimum of 2-inches.

C. Town may require a greater thickness on streets projected to have higher traffic volumes.

## 3.06 TACK COAT

A. Application rates, method of application and curing shall be in accordance with the requirements of NCDOT Section 605.

## 3.07 CONCRETE CURB AND GUTTER

A. Provide concrete curb and gutter where required by the Town. Curb and gutter shall be Standard 30-inch section unless otherwise approved by the Town.

B. Construct Curb and Gutter in accordance with NCDOT Section 846.

## 3.08 CONCRETE SIDEWALKS

A. Provide concrete sidewalks as required by the Town's Ordinances. Construction shall be in conformity with the materials, lines, grades, thickness, and typical section as indicated herein and in the Standard Details.

B. Construct sidewalks in accordance with NCDOT, Section 848, and the following specifications.

1. Space contraction joints equal to the width of the sidewalk and to a depth of at least 1/3 of the slab thickness.
2. Place a 1/2 inch wide expansion joint at all intersections and wherever walks abut structures and other walks.
3. Place additional expansion joints at each fifth contraction joint.
4. Walks shall receive a light broom finish.

## 3.09 "AS-CONSTRUCTED" DRAWINGS

A. General

1. Maintain on-site a full set of project drawings for purpose of recording as-constructed conditions.
2. Information should be legibly recorded as construction progresses.
3. Clearly and completely identify any field changes from the original drawings.
4. Actual, as-constructed elevations shall be obtained on all structures such as manholes, drainage structures, etc. Invert depths shall be recorded at each structure. All elevations shall be referenced to NAVD 88.
5. Show horizontal and vertical location of any existing underground utilities encountered during construction.
6. Submit document to the Town prior to final acceptance.

7. All new features shall be surveyed utilizing survey grade GPS equipment and digital file with all surveyed information shall be provided to the Town.
8. A digital CADD file shall be provided to the Town that contains all the features constructed with the updated as-built information along with survey data.
9. The Town shall have the right to employ an independent survey firm to verify the "As-Constructed" Drawings submitted by the Developer at the end of the project. If components or the drawings are determined to be incorrect, the Developer shall have all items corrected to obtain final approval by the Town. Developer will also be responsible for reimbursing the Town for all associated costs related to verification, review, and other costs arising from any corrections having to be made in order to provide correct plans and files to the Town.

**❖ End of Section ❖**

# Standard Detail Index

## SECTION 4 — STREETS AND SIDEWALKS

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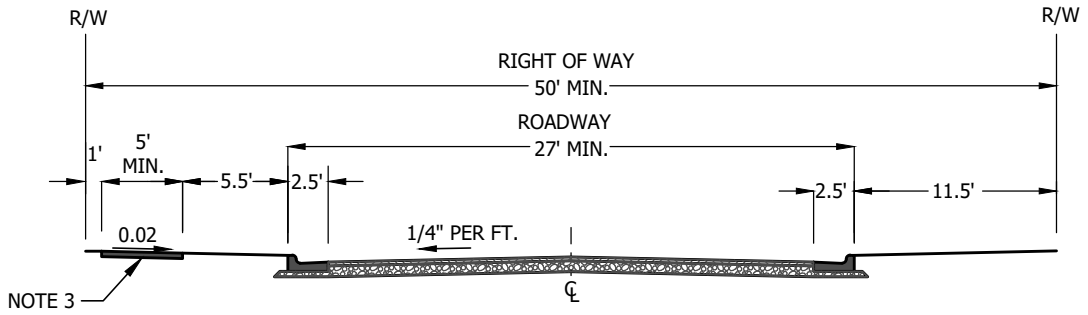
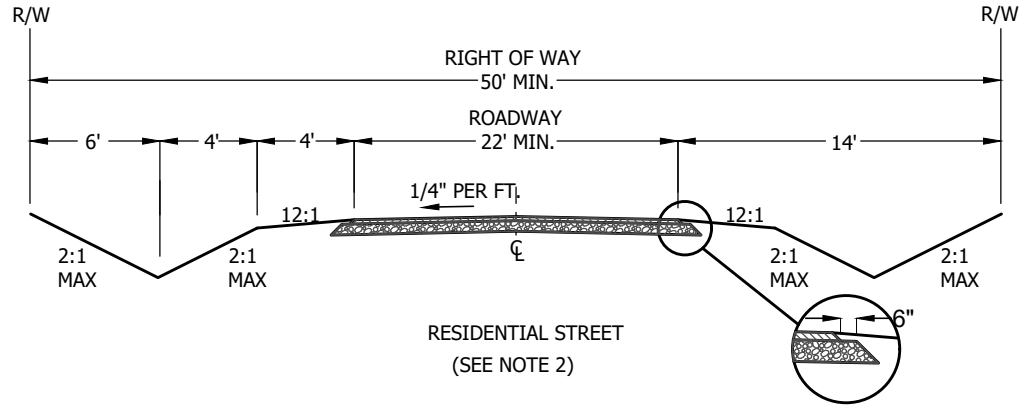
RANLO




RESIDENTIAL STREET

NOTES:

1) NORMAL CROWN OF ¼" PER FOOT SHALL BE USED UNLESS OTHERWISE DIRECTED BY THE THE TOWN.
2) NON-CURB AND GUTTER RESIDENTIAL STREETS MAY BE ALLOWED BY THE TOWN.
3) SIDEWALK MAY BE REQUIRED AS PER ZONING ORDINANCE.




RESIDENTIAL STREET
(SEE NOTE 2)

MINIMUM RESIDENTIAL PAVEMENT DESIGN

2" ASPHALT CONCRETE SURFACE COURSE (COMPACTED THICKNESS)
4" OF ASPHALT CONCRETE BASE COURSE
8" AGGREGATE BASE COURSE
ADDITIONAL THICKNESS MAY BE REQUIRED BY THE TOWN DEPENDING ON LOCAL SOIL CONDITIONS AND/OR PROJECTED TRAFFIC VOLUMES.

# TYPICAL STREET SECTION (RESIDENTIAL)

| DATE: | REVISIONS |
|---|---|
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| | |

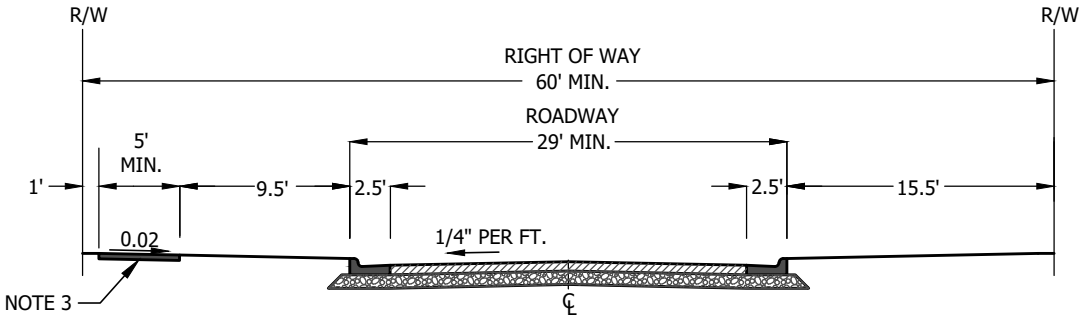
## STANDARD DETAIL

DATE: 03/01/22

SHEET 1 OF 1

STD. No. R-4.01

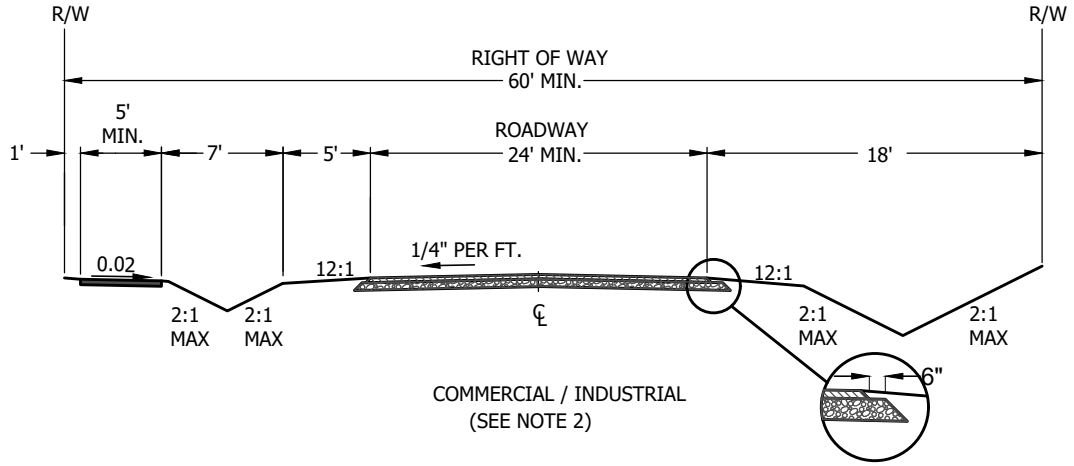
RANLO




COMMERCIAL / INDUSTRIAL

NOTES:

1) NORMAL CROWN OF ¼" PER FOOT SHALL BE USED UNLESS OTHERWISE DIRECTED BY THE TOWN.
2) NON-CURB AND GUTTER STREETS MAY BE ALLOWED BY THE TOWN.
3) SIDEWALK MAY BE REQUIRED AS PER ZONING ORDINANCE.




COMMERCIAL / INDUSTRIAL
(SEE NOTE 2)

MINIMUM PAVEMENT DESIGN

2" ASPHALT CONCRETE SURFACE COURSE (COMPACTED THICKNESS)
6" OF ASPHALT CONCRETE BASE COURSE MAY BE USED
12" AGGREGATE BASE COURSE
ADDITIONAL THICKNESS MAY BE REQUIRED BY THE TOWN DEPENDING ON LOCAL SOIL CONDITIONS AND/OR PROJECTED TRAFFIC VOLUMES.

# TYPICAL STREET SECTION (COMMERCIAL-INDUSTRIAL)

| DATE: | REVISIONS |
|---|---|
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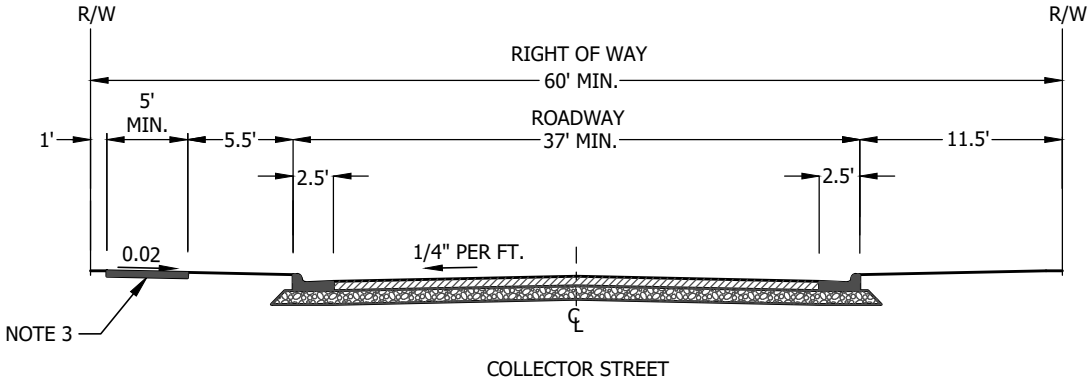
| | |

STANDARD DETAIL

DATE: 03/01/22
SHEET 1 OF 1
STD. No. R-4.02

RANLO




COLLECTOR STREET

NOTES:

1) NORMAL CROWN OF ¼" PER FOOT SHALL BE USED UNLESS OTHERWISE DIRECTED BY THE TOWN.
2) NON-CURB AND GUTTER STREETS MAY BE ALLOWED BY THE TOWN.
3) SIDEWALK MAY BE REQUIRED AS PER ZONING ORDINANCE.

MINIMUM PAVEMENT DESIGN

2" ASPHALT CONCRETE SURFACE COURSE (COMPACTED THICKNESS)
5" OF ASPHALT CONCRETE BASE COURSE
10" AGGREGATE BASE COURSE
ADDITIONAL THICKNESS MAY BE REQUIRED BY THE TOWN DEPENDING ON LOCAL SOIL CONDITIONS AND/OR PROJECTED TRAFFIC VOLUMES.

# TYPICAL STREET SECTION (COLLECTOR)

| DATE: | REVISIONS |
|---|---|
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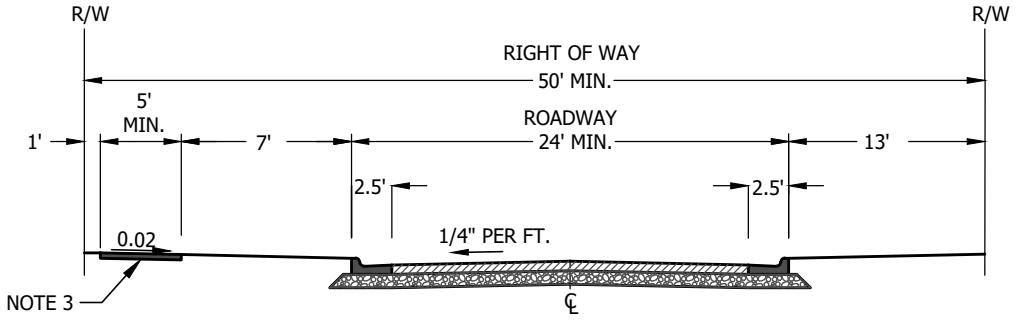
# STANDARD DETAIL

DATE: 03/01/22

SHEET 1 OF 1

STD. No. R-4.03

RANLO




MARGINAL ACCESS

NOTES:

1) NORMAL CROWN OF ¼" PER FOOT SHALL BE USED UNLESS OTHERWISE DIRECTED BY THE TOWN.
2) NON-CURB AND GUTTER STREETS MAY BE ALLOWED BY THE TOWN.
3) SIDEWALK MAY BE REQUIRED AS PER ZONING ORDINANCE.
4) ROADWAY MIN. 24' WHEN NO CURB AND GUTTER.

MINIMUM PAVEMENT DESIGN

2" ASPHALT CONCRETE SURFACE COURSE (COMPACTED THICKNESS)
5" OF ASPHALT CONCRETE BASE COURSE
10" AGGREGATE BASE COURSE
ADDITIONAL THICKNESS MAY BE REQUIRED BY THE TOWN DEPENDING ON LOCAL SOIL CONDITIONS AND/OR PROJECTED TRAFFIC VOLUMES.

# TYPICAL STREET SECTION (MARGINAL ACCESS)

| DATE: | REVISIONS |
|---|---|
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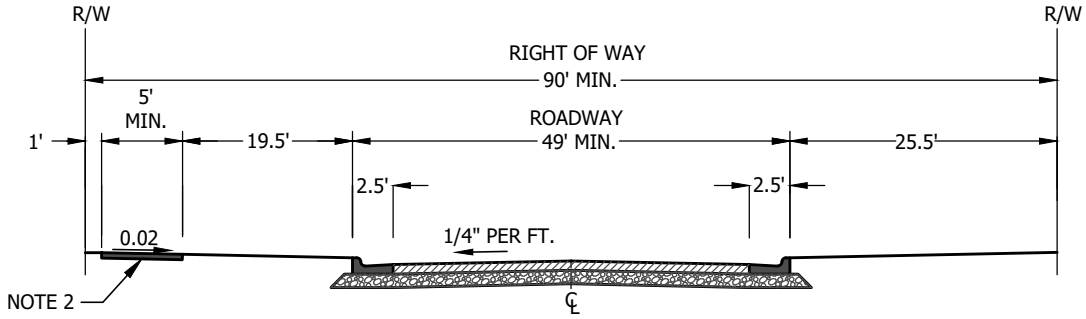
STANDARD DETAIL

DATE: 03/01/22

SHEET 1 OF 1

STD. No. R-4.04

RANLO




MAJOR ARTERIAL

NOTES:

1) NORMAL CROWN OF ¼" PER FOOT SHALL BE USED UNLESS OTHERWISE DIRECTED BY THE TOWN.

2) SIDEWALK MAY BE REQUIRED AS PER ZONING ORDINANCE.

MINIMUM PAVEMENT DESIGN

2" ASPHALT CONCRETE SURFACE COURSE (COMPACTED THICKNESS)
6" OF ASPHALT CONCRETE BASE COURSE
12" AGGREGATE BASE COURSE
ADDITIONAL THICKNESS MAY BE REQUIRED BY THE TOWN DEPENDING ON LOCAL SOIL CONDITIONS AND/OR PROJECTED TRAFFIC VOLUMES.

# TYPICAL STREET SECTION (MAJOR ARTERIAL)

| DATE: | REVISIONS |
|---|---|
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| | |

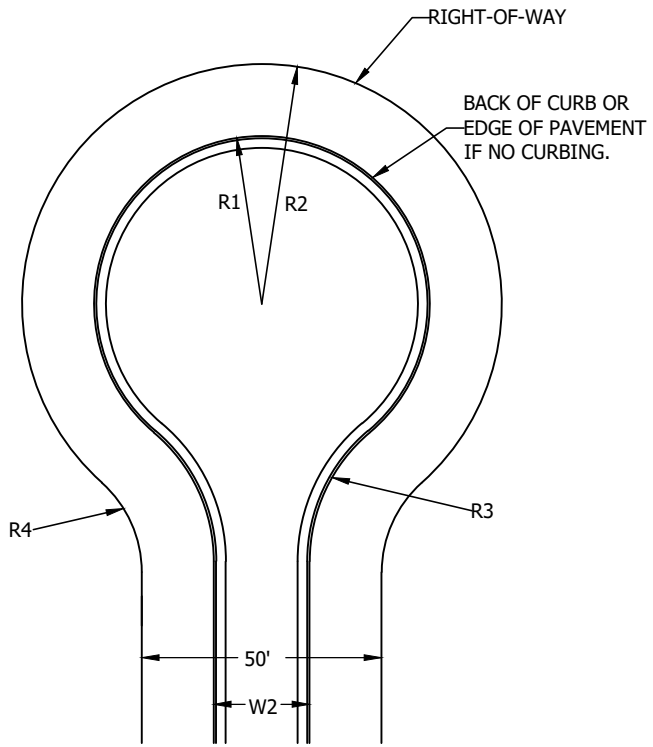
## STANDARD DETAIL

DATE: 03/01/22

SHEET 1 OF 1

STD. No. R-4.05

RANLO




NOTES:

1) NORMAL CROWN OF ¼" PER FOOT SHALL BE USED UNLESS OTHERWISE DIRECTED BY THE TOWN.
2) NON-CURB AND GUTTER RESIDENTIAL STREETS MAY BE ALLOWED BY THE TOWN.
3) SIDEWALK MAY BE REQUIRED AS PER ZONING ORDINANCE.
4) CENTER OF CUL-DE-SAC SHALL BE PAVED UNLESS OTHERWISE APPROVED BY THE TOWN.

MINIMUM RESIDENTIAL PAVEMENT DESIGN

2" ASPHALT CONCRETE SURFACE COURSE (COMPACTED THICKNESS)
4" OF ASPHALT CONCRETE BASE COURSE
8" AGGREGATE BASE COURSE
ADDITIONAL THICKNESS MAY BE REQUIRED BY THE TOWN DEPENDING ON LOCAL SOIL CONDITIONS AND/OR PROJECTED TRAFFIC VOLUMES.

| | R1 | R2 | R3 | R4 | W2 |
|---|---|---|---|---|---|
| CURB AND GUTTER SECTION | 42.5' | 50' | 40' | 25' | 27' |
| NON-CURB AND GUTTER SECTION | 40' | 50' | 40' | 25' | 27' |

# TYPICAL CUL-DE-SAC SECTION

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## STANDARD DETAIL

DATE: 03/01/22

SHEET 1 OF 1

STD. No. R-4.06

RANLO

| CLASSIFICATION | MAX. GRADE (%) | HORIZONTAL CURVE CONTROLS | | VERTICAL CURVE CONTROLS | |
|---|---|---|---|---|---|
| | | MAX. SUPER ELEVATION (%) | MIN. CL RADIUS (FT) | MIN. LENGTH CREST (FT) | MIN. LENGTH SAG (FT) |
| MAJOR ARTERIAL | 12 | 6 | 300 | 85A | 100A |
| COLLECTOR | 12 | 4 | 230 | 30A | 50A |
| RESIDENTIAL STREET | 12 | NC | 150 | 12A | 30A |

NOTES:

1) A = ALGEBRAIC DIFFERENCE IN GRADES.
2) NC = NORMAL CROWN - A PARABOLIC CROWN WITH AN AVERAGE CROSS SLOPE OF THE 1/4" PER FOOT MEASURED OUTWARD FROM THE CENTERLINE.
3) THIS TABLE OUTLINES MINIMUMS FOR ROADWAY DESIGN. SOUND ENGINEERING JUDGEMENT SHOULD BE EXERCISED WHEN USING MINIMUM DESIGN STANDARDS FOR ROADS.
4) ALTERNATE DESIGNS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION PUBLISHED BY AASHTO: A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS.
5) GRADES SHALL NOT EXCEED 5% WITHIN 100 FEET OF INTERSECTIONS UNLESS APPROVED BY THE TOWN.
6) MINIMUM GRADE SHALL BE 0.5% UNLESS APPROVED BY THE TOWN.

# MINIMUM STREET GEOMETRIC REQUIREMENTS

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STANDARD DETAIL

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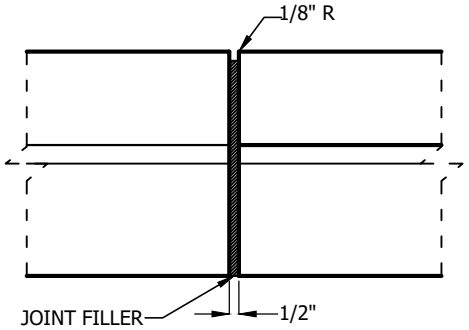
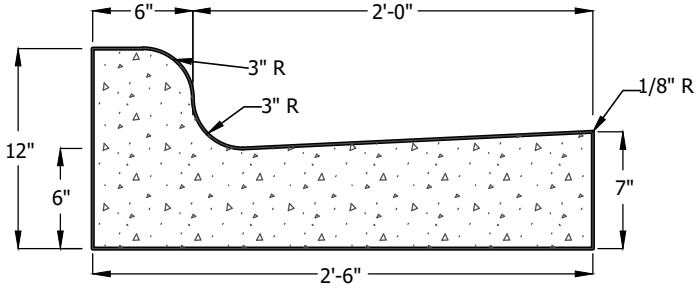
SHEET 1 OF 1

STD. No. R-4.07

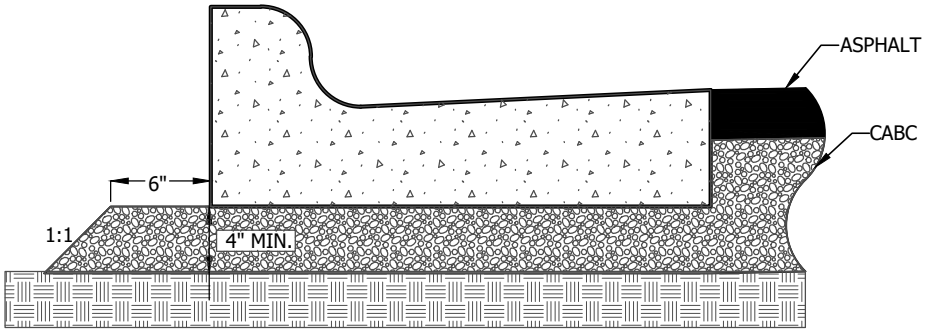
RANLO




FRONT ELEVATION




SECTION




NOTES:

1) CONCRETE SHALL BE 3,000 PSI.
2) CONTRACTION JOINTS SHALL BE SPACED AT 10' INTERVALS.
3) EXPANSION JOINTS SHALL BE SPACED AT 50' INTERVALS.
4) FINISH ALL CONCRETE WITH CURING COMPOUND.
5) SEAL ALL CONTRACTION AND EXPANSION JOINTS.
6) ALL WORK TO BE IN ACCORDANCE WITH SECTION 846 OF THE NCDOT STANDARD SPECIFICATIONS.

# CONCRETE CURB AND GUTTER

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STANDARD DETAIL

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SHEET 1 OF 1

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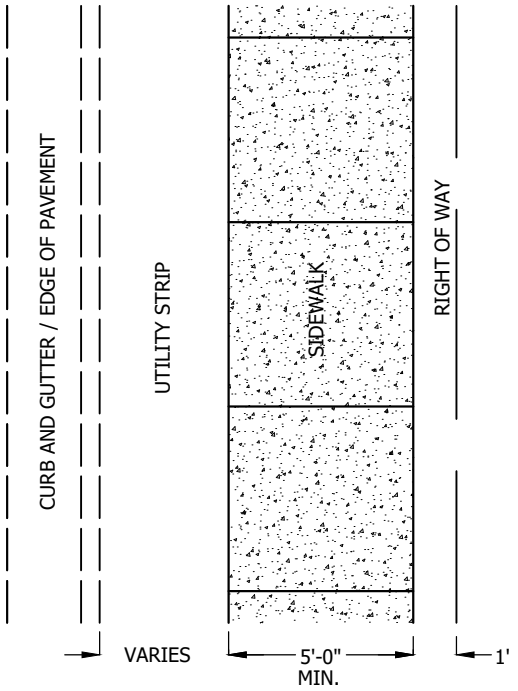
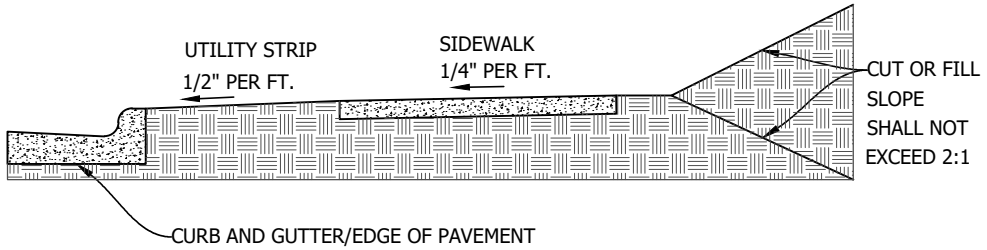
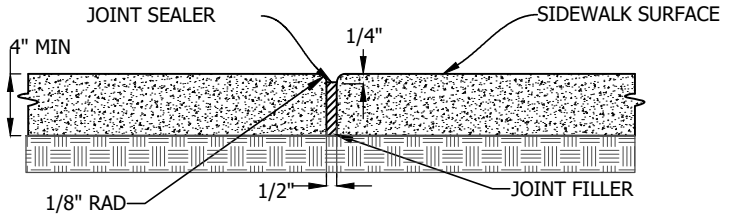
RANLO




PLAN




TYPICAL SECTION




TRANSVERSE EXPANSION JOINT

NOTES:

1) TRANSVERSE EXPANSION JOINTS SHALL BE PLACED AT EACH FIFTH CONTRACTION JOINT.
2) CONTRACTION JOINTS SHALL BE SPACED EQUAL TO THE WIDTH OF THE SIDEWALK.
3) ALL CONCRETE TO BE FINISHED WITH CURING COMPOUND.
4) SIDEWALK TO BE 6" THICK ACROSS DRIVEWAYS.
5) CONCRETE SHALL BE A MINIMUM OF 3,000 PSI.
6) ALL WORK TO BE IN ACCORDANCE WITH SECTION 846 OF THE NCDOT STANDARD SPECIFICATIONS.

# CONCRETE SIDEWALK

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## STANDARD DETAIL

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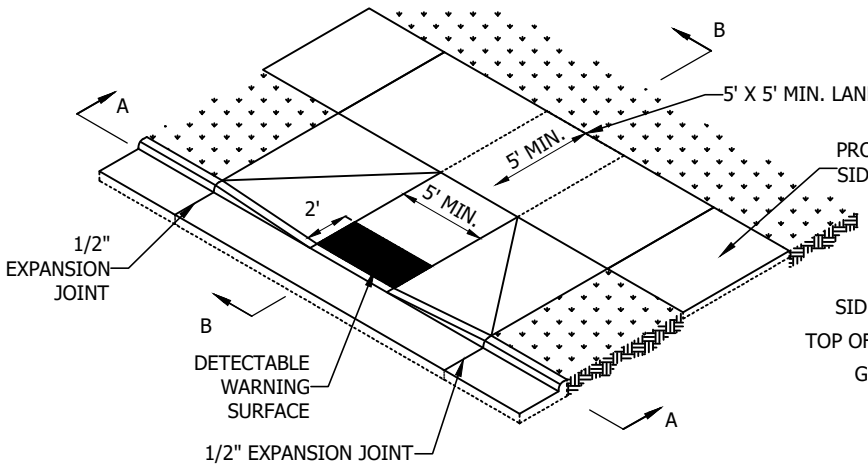
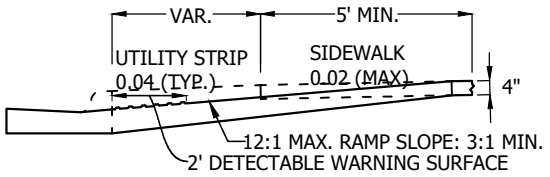
RANLO

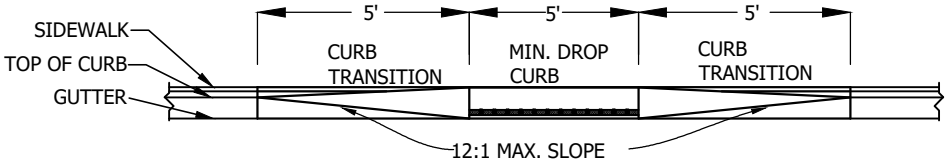
ISOMETRIC VIEW



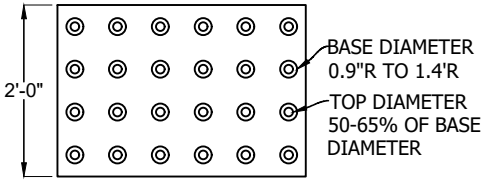

SECTION B-B

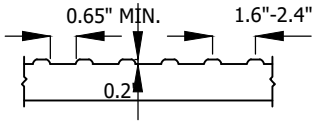



SECTION A-A

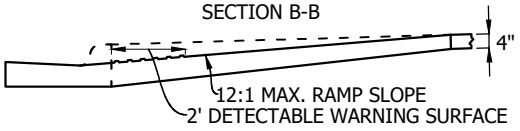



DETECTABLE WARNING DOMES

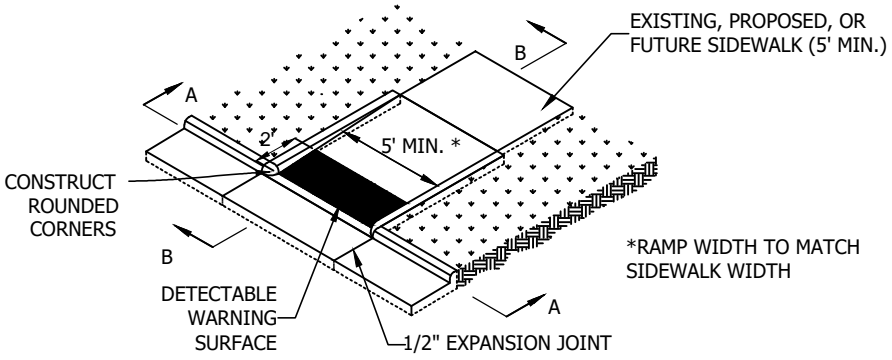



SECTION B-B

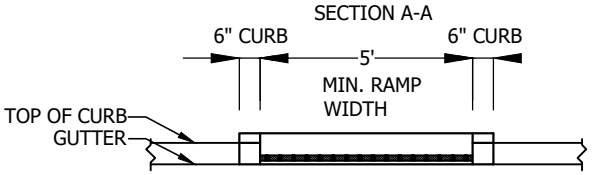



ISOMETRIC VIEW




*RAMP WIDTH TO MATCH SIDEWALK WIDTH

SECTION A-A




# CURB RAMP

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## STANDARD DETAIL

DATE: 03/01/22

SHEET 1 OF 2

STD. No. R-4.10.1

RANLO

NOTES:

1) RAMPS WITH FLARED SIDES WILL BE USED WHEN NEEDED FOR PEDESTRIAN CIRCULATION.
2) RAMPS WITH RETURNED CURB WILL BE USED WHEN FLARED SIDES ARE NOT NEEDED FOR PEDESTRIAN CIRCULATION.
3) DETECTABLE WARNING DOMES WILL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR.
4) DETECTABLE WARNING DOMES WILL CONTRAST VISIBILITY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT SEQUENCE.
5) CONSTRUCT THE RAMP SURFACE TO BE STABLE, FIRM AND SLIP RESISTANT.
6) COORDINATE THE CURB RAMP AND THE PEDESTRIAN CROSSWALK MARKINGS SO 5' X 5' CLEAR SPACE AT THE BASE OF THE CURB RAMP WILL FALL WITHIN THE PEDESTRIAN CROSSWALK LINES.
7) SET BACK DISTANCE FROM THE INSIDE CROSSWALK MARKING TO NEAREST EDGE OF TRAVEL LANE IS 4' MINIMUM.
8) TERMINATE PARKING A MINIMUM OF 20' BACK OF A PEDESTRIAN CROSSWALK.
9) CONSTRUCT CURB RAMPS A MINIMUM OF 5' WIDE.
10) CONSTRUCT THE RUNNING SLOPE OF THE RAMP 8.33% MAXIMUM.
11) ALLOWABLE CROSS SLOPE ON SIDEWALKS AND CURB RAMPS WILL BE 2% MAXIMUM.
12) CONSTRUCT THE SIDE FLARE SLOPE A MAXIMUM OF 10% MEASURED ALONG THE CURB LINE.
13) CONSTRUCT THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE BASE OF THE CURB RAMP A MAXIMUM OF 5% AND MAINTAIN A SMOOTH TRANSITION.
14) CONSTRUCT LANDINGS FOR SIDEWALK A MINIMUM OF 5' X 5' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.
15) CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP. THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE OR THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED.
16) PLACE 1/2" EXPANSION JOINT WHERE THE CONCRETE CURB RAMP JOINS THE CURB.

# CURB RAMP NOTES

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STANDARD DETAIL

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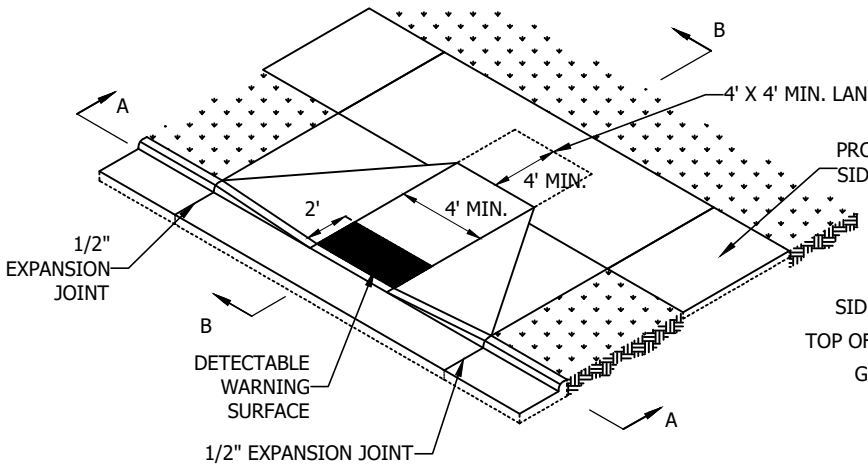
SHEET 2 OF 2

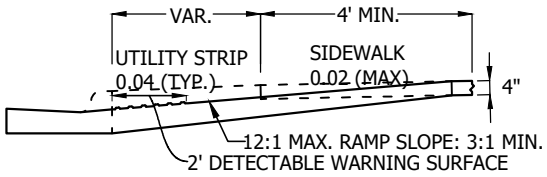
STD. No. R-4.10.2

RANLO

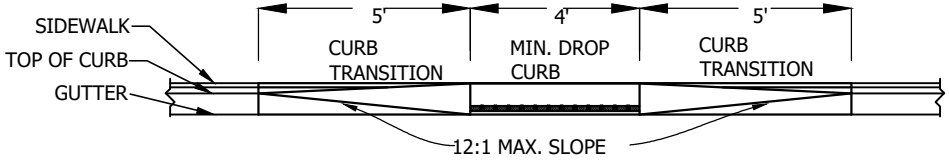
ISOMETRIC VIEW



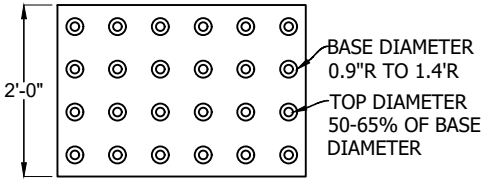

SECTION B-B

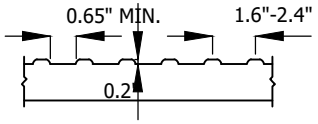



SECTION A-A

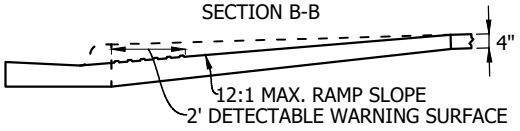



DETECTABLE WARNING DOMES

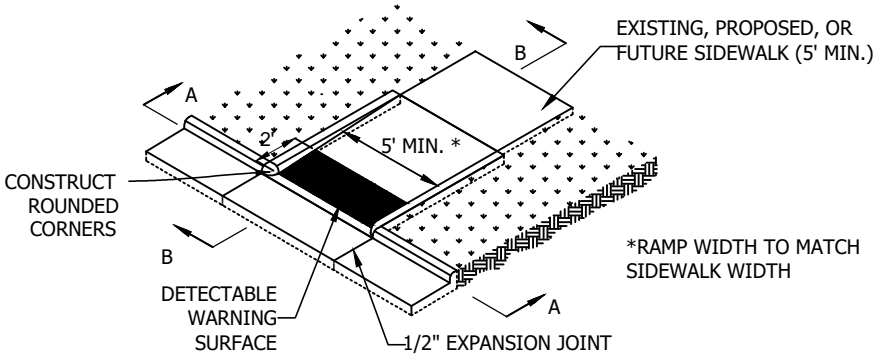



SECTION B-B

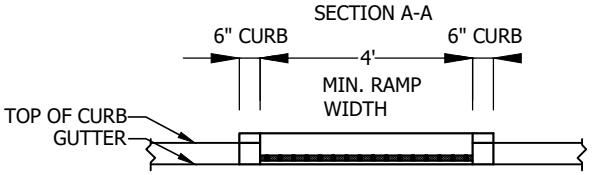



ISOMETRIC VIEW




*RAMP WIDTH TO MATCH SIDEWALK WIDTH

SECTION A-A




# CURB RAMP

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## STANDARD DETAIL

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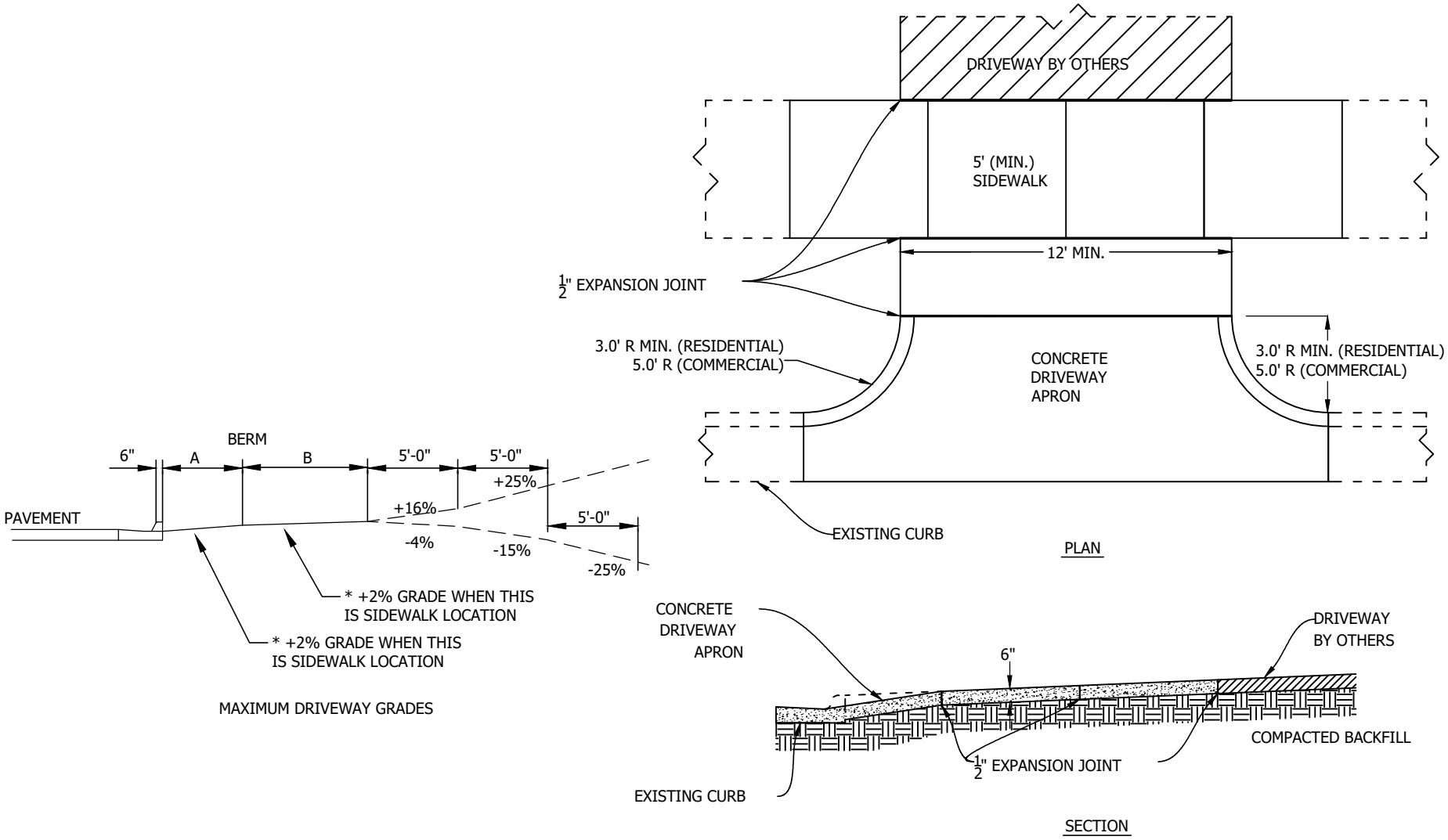
RANLO




# TYPICAL DRIVEWAY APRON (CURB AND GUTTER)

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## STANDARD DETAIL

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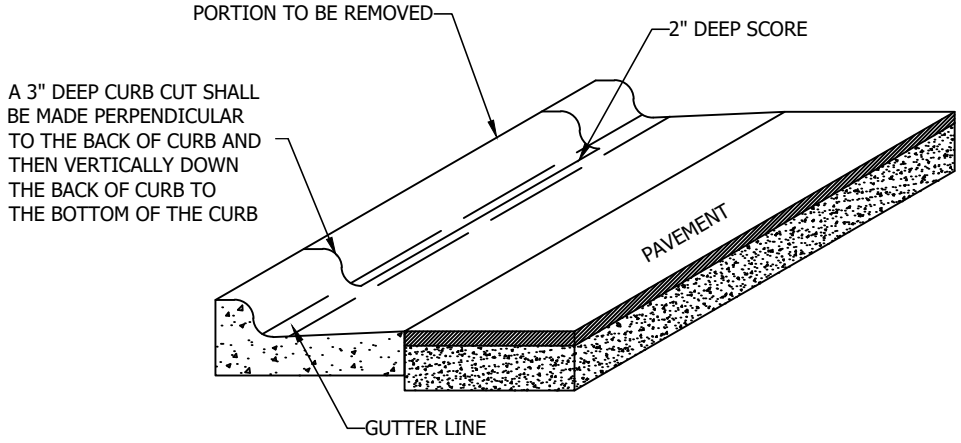
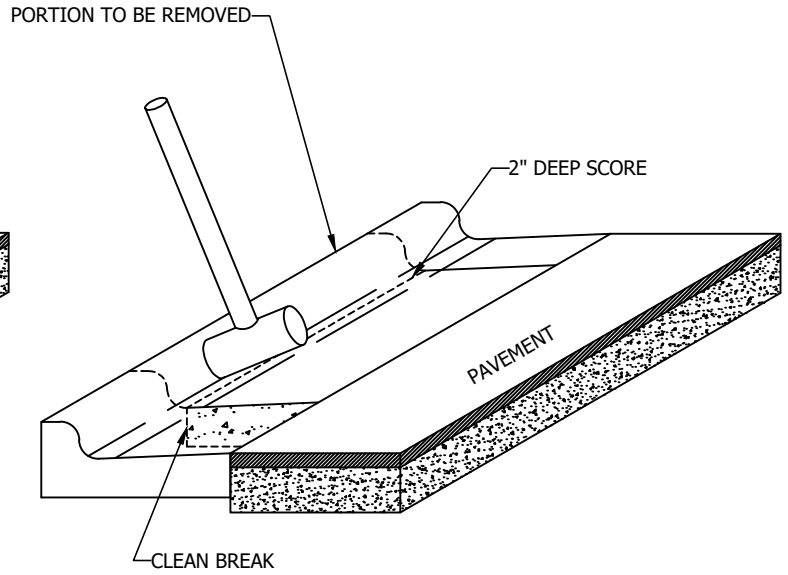
RANLO




NOTE:

1) IF PERPENDICULAR CURB CUT IS WITHIN 5' FROM A JOINT, THEN THE PARALLEL CUT SHALL BE MADE TO THAT JOINT.

# METHOD OF REMOVING EXISTING CURB

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STANDARD DETAIL

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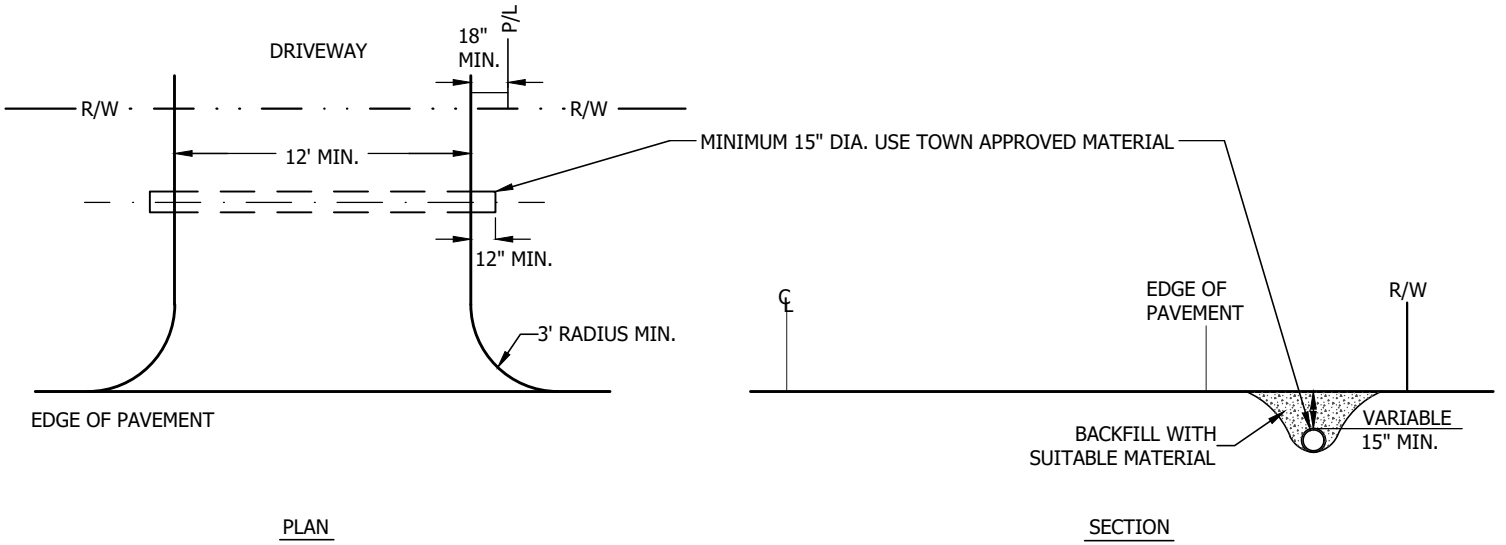
STD. No. R-4.12

RANLO

DRIVEWAY WIDTH MIN. 12'
MAX. 50' OR 1/3 LOT FRONTAGE
WHICHEVER IS SMALLER




PLAN

SECTION

PIPE SIZE AND GRADE TO BE APPROVED BY THE TOWN

# RESIDENTIAL DRIVEWAY APRON (NON-CURB AND GUTTER)

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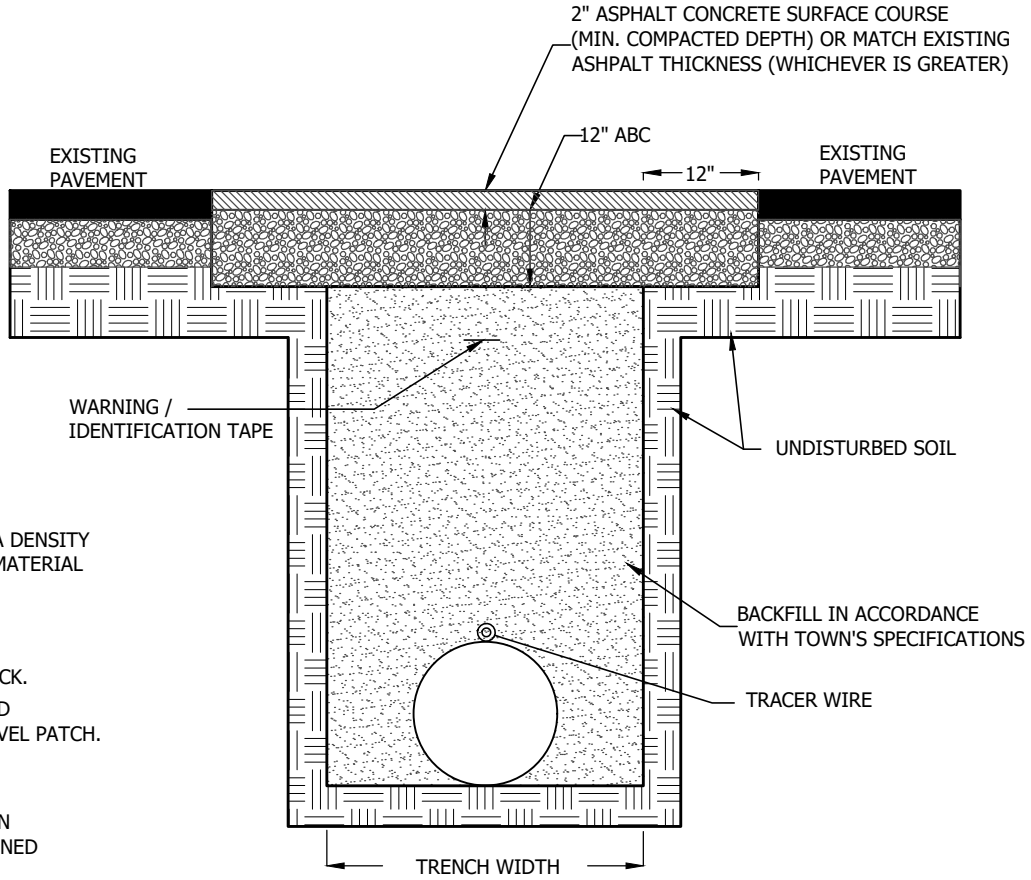
RANLO




NOTES:

1) THE PAVEMENT CUT SHALL BE DEFINED BY A STRAIGHT EDGE AND CUT WITH AN APPROPRIATE SAW CUT MACHINE.
2) THE TRENCH SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED IN ACCORDANCE WITH THE TOWN'S SPECIFICATIONS.
3) THE FINAL 1' OF FILL SHALL CONSIST OF ABC MATERIAL COMPACTED TO A DENSITY EQUAL TO 100% OF THAT OBTAINED BY COMPACTING A SAMPLE OF THE MATERIAL IN ACCORDANCE WITH AASHTO T-80 AS MODIFIED BY N.C.D.O.T.
4) THE ENTIRE THICKNESS/VERTICAL EDGE OF SAW CUT SHALL BE TACKED.
5) THE SAME DEPTH OF PAVEMENT MATERIAL WHICH EXISTS SHALL BE REINSTALLED, BUT IN NO CASE SHALL THE ASPHALT BE LESS THAN 3" THICK.
6) THE ASPHALT PAVEMENT MATERIAL SHALL BE INSTALLED AND COMPACTED THOROUGHLY WITH A SMOOTH DRUM ROLLER TO ACHIEVE A SMOOTH LEVEL PATCH.
7) ALL PAVEMENT CUTS SHALL BE REPAIRED WITHIN A MAXIMUM OF SEVEN (7) DAYS FROM THE DATE THE CUT WAS MADE.
8) IF CONDITIONS DO NOT PERMIT A PERMANENT REPAIR WITHIN THE GIVEN TIME LIMIT, PERMISSION TO MAKE A TEMPORARY REPAIR MUST BE OBTAINED FROM THE TOWN.

MIN: PIPE OUTSIDE DIAMETER +9" EACH SIDE

MAX: PIPE OUTSIDE DIAMETER +12" EACH SIDE

# TYPICAL PAVEMENT REPAIR

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# STANDARD DETAIL

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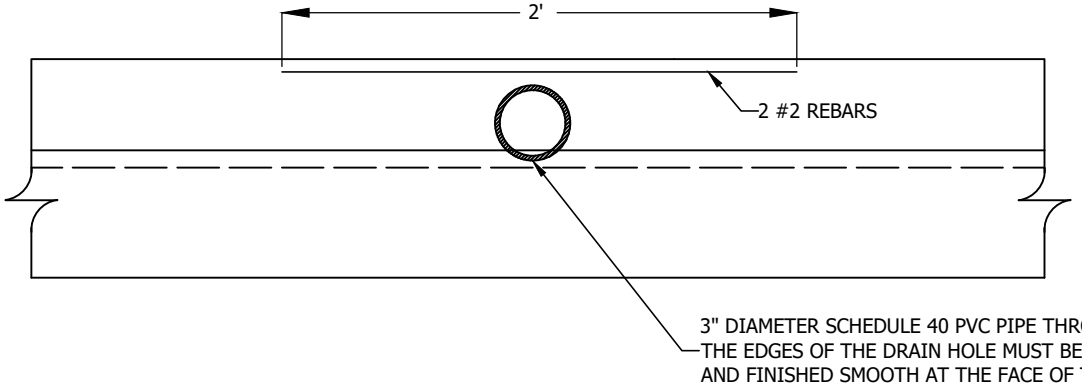
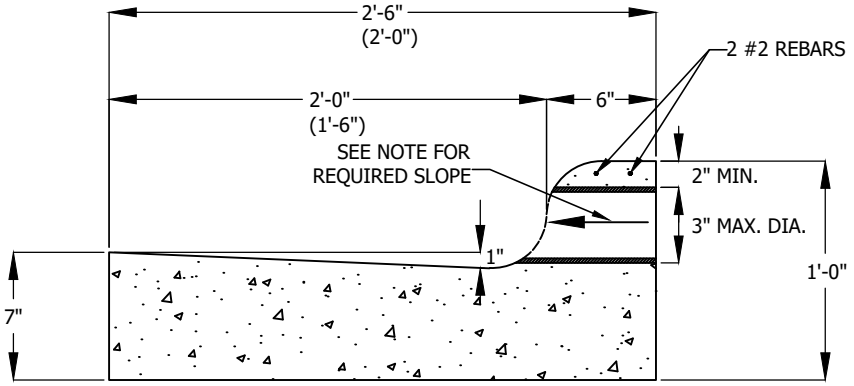
STD. No. R-4.14

RANLO




NOTES:

1) CURB DRAINS SHALL NOT BE CONSTRUCTED WITHIN 18" OF CONTRACTION OR EXPANSION JOINTS.
2) OPENING GRADE MAY VARY BETWEEN A MAXIMUM SLOPE OF 1/2" PER FOOT AND A MINIMUM OF 1/4" PER FOOT.
3) MORE THAN ONE HOLE MAY BE INSTALLED PROVIDED THE HOLES ARE LOCATED WITH 18" MINIMUM SPACING.
4) ALL CURB DRAIN INSTALLATIONS MUST RECEIVE PRIOR APPROVAL FROM THE TOWN.




# TYPICAL CURB DRAIN

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## STANDARD DETAIL

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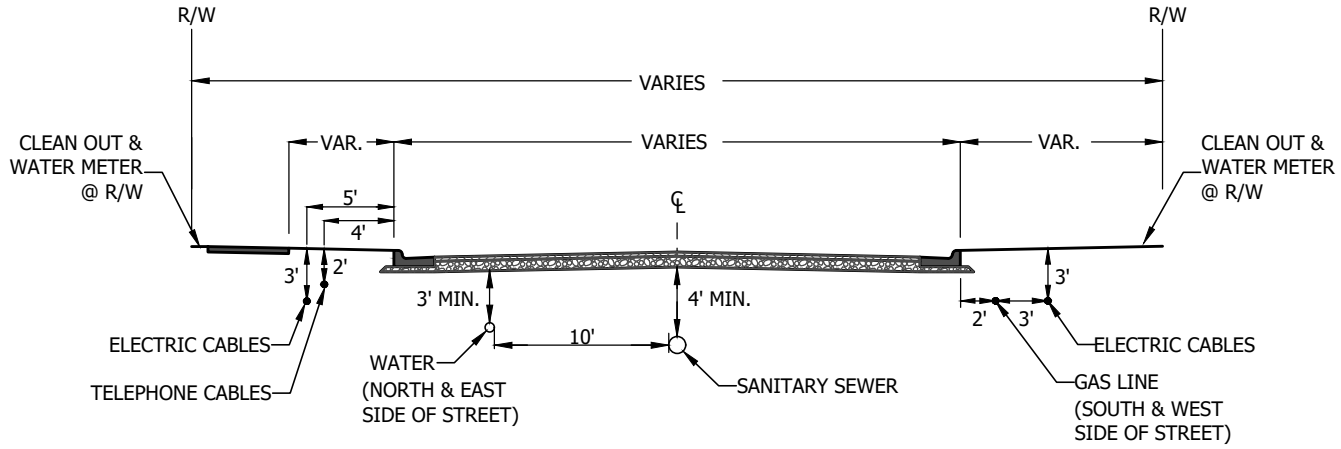
RANLO




NOTES:

1) ON NON-CURB AND GUTTER STREETS ADJUSTMENTS IN THE LOCATION OF NEW UTILITIES ARE TO BE MADE AS NEEDED TO INSURE THAT NONE ARE INSTALLED IN THE ℄ OF SIDE DITCHES.
2) COORDINATE LOCATION OF ALL UTILITIES WITH THE TOWN.
3) WHERE POSSIBLE , UTILITIES ARE TO BE LOCATED SUCH THAT THEY ARE NOT BENEATH THE PAVEMENT AND CURB & GUTTER.

# SUGGESTED UTILITY LOCATIONS

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## STANDARD DETAIL

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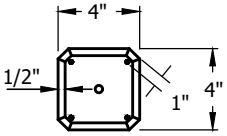
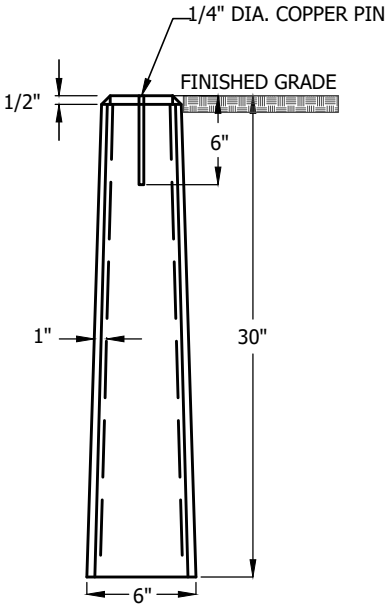
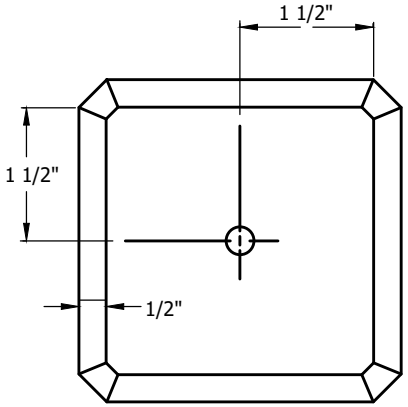
STD. No. R-4.16

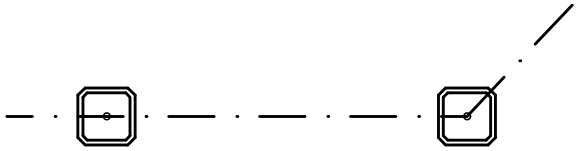
RANLO




3/8" DIA. STEEL REINFORCED BAR 2'-3" LONG TO BE PLACED IN EACH CORNER



THE RIGHT-OF-WAY MARKER SHALL BE SET THAT THE RIGHT-OF-WAY LINE PASSES THROUGH THE CENTER OF THE COPPER PIN. RIGHT-OF-WAY MARKERS SHALL BE INSTALLED ONLY BY A NC LICENSED SURVEYOR.

# STANDARD RIGHT-OF-WAY MARKER

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## STANDARD DETAIL

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RANLO