



DATE: April 19, 2022

CASE: TA-03-22 Text Amendment (Articles 2 and 3 of the TSM)

PREPARED BY: Kevin Ashley, AICP –Deputy Planning Director

BACKGROUND

As the Commission will recall the Technical Standards Manual (TSM) is part of the Concord Development Ordinance (CDO) which contains engineering specifications and technical requirements which are more complex than traditional land use regulations. The TSM includes technical requirements for transportation (including the recently adopted section for traffic impact analysis) , stormwater, water, wastewater, electric and landscaping.

The City's Transportation and Engineering Departments have been working to revise Article 2 (Streets and Pedestrian Paths) and Article 3 (Driveways) to clarify procedures and to reflect accepted engineering practice. Some new requirements have been added to the articles, but the changes are generally clarifications. The changes are detailed in the executive summary that is included in the staff report materials. Also included is a redline which has deleted language shown as a strike-through and new language as a highlight.

Devin Huston, Deputy Transportation Director will be attending and can answer any specific questions. Staff will conduct a thorough presentation of all of the changes.

The amendment is in approval form and at the Commission's concurrence, it may be referred to Council for public hearing.



DATE: April 6, 2022

CASE: Executive Summary for Technical Standards Manual (TSM)
Articles 2 and 3

PREPARED BY: Devin Huston, Deputy Transportation Director

BACKGROUND

This memorandum is intended to serve as a general summary to describe the proposed revisions to the Concord Technical Standards Manual (TSM) which are supplementary to the Concord Development Ordinance (CDO). The reader should consult the proposed Ordinance and the proposed strike-through Articles II and III of the TSM (and related appendices) for more specific details.

Article II of the TSM sets forth minimum requirements for Streets and Pedestrian Paths and Article III addresses Driveways. These changes are a culmination of revisions that have been drafted based upon historical administration of requirements and developer feedback.

Revisions to the TSM generally involve clarifications of existing practice and not new requirements, but there are some changes and those are noted below. Revisions are based upon accepted engineering practice and design standards. Additionally, all technical standard drawings are proposed to be removed from the individual articles and moved to a Manual of Standard details.

ARTICLE II STREETS AND PEDESTRIAN PATHS

Functional classifications: The amendment clarifies the way proposed streets are classified. In the current version, typical Average Daily Traffic (ADT) thresholds were given as a predominant factor. Historically, layout and location have also been used as determinants regardless of the ADT, in accordance with accepted professional practice. While ADT will still potentially play a role in a proposed street classification, this change removes those ADT thresholds to help avoid confusion.

Rolling terrain: Under the proposed change, the documentation required for staff to consider a request to permit design of streets under the rolling terrain standards in lieu of the default level terrain standards is defined. The current regulations require a request to be made, but do not specify the procedure and submission requirements for consideration. This change is necessary now as the relative scarcity of land means that steeper slopes are being proposed for development.

Design speeds: This change eliminates a specified engineering design speed for freeways/expressways and reduces the design speed from 40 to 30 mph for local streets.

Right-of-way widths: Adjustments are proposed to modernize minimum r/w widths to coincide with current minimum utility and infrastructure requirements. These adjustments include some right-of-way increases and some reductions, which are a result of narrower minimum travel lanes in street cross-sections.

Construction materials: Language is proposed to specify subgrade and shoulder requirements for new streets, and to clarify inspection procedures. This section also serves to detail the developer's responsibilities in new construction of streets.

Cul-de-sacs: New language has been added to prohibit hammer head turnarounds.

Sight triangles: This section is rewritten to clarify the differences in the classifications of sight triangles. The requirements are not new and this change is proposed for clarity.

Street acceptance: A new section relative to accepting new public streets is proposed to replace the current section 15.0. This section sets forth minimum criteria for acceptance and specifies the procedures for both newly constructed streets and existing private streets that are proposed for dedication and acceptance for maintenance.

Cluster mailbox requirements: Per Postal Service policy, new neighborhoods are required to provide numerous mailboxes in common areas as opposed to one mailbox on each individual lot. The City has been administering the cluster mailbox requirements for several years since their adoption by USPS, and this section merely codifies those requirements.

Intersection Site Distance: These requirements in Section 7.6 are based upon accepted engineering practice on highway design (AASHTO) and have historically been utilized by staff.

Roundabout review language: The CDO allows the use of roundabouts or traffic circles as traffic calming measures and this section states that their review is on a case-by-case basis, which has historically been the policy for these features.

Traffic Island size: This section has been slightly revised to clarify the depth of the island relative to stem length (distance from the intersection) and to state that any island within an NCDOT right-of-way requires their approval. These items are reflections of current policy, which have been in effect for some time.

Sidewalk language: This proposed revision clarifies when sidewalks are required in the subdivision and development process. The change also specifies the location within the street section and details the easement process in the event

that the sidewalk cannot be placed within the right-of-way. This section clarifies administration of the sidewalk requirements as they have been historically interpreted.

Curb inlet language – Language added to clarify Roll-over frame and grate inlets are not permitted. These have historically not been allowed for use in drainage designs.

ARTICLE III DRIVEWAYS

Applicability: Section 2.0 of the TSM specifies that all access points and driveways that connect to a public street are subject to the provisions of Article III. This section is proposed to be amended to clarify that land that is internal to an existing neighborhood may be subject to Article III if the development is considered a neighborhood expansion. The determination is made on a case-by-case basis and is intended to prohibit the circumvention of the driveway permit requirements and associated street improvements.

Driveway Permits and NCDOT Coordination: Section 3.0 has been substantially expanded to clarify the applicability of the permit process particularly as it relates to coordination with NCDOT and connections to State maintained streets and roads. These revisions merely restate the historical administration of the driveway permit process, simplify the language, and do not introduce any new regulations.

Driveway Standards: Section 4.0 has been amended to reduce the minimum width of a single family attached (townhome) driveway from 12 feet to 10 feet. This change is proposed in coordination with the CDO changes for townhomes, which are underway.

Driveway Separation: Section 5.0 has been rewritten to clarify how driveway separation, particularly stem length, is calculated. Stem length is the distance from the street right-of-way or private street to the first point of conflict. Stem lengths are intended to provide enough distance for vehicles to safely exit the intersecting street without abruptly encountering an obstacle minimizing traffic backups and potential collisions on the street. Appropriate driveway separation provides a driver with an obstacle free line of sight to identify oncoming vehicles, pedestrians, and bicyclists while exiting their driveway. This section includes minor changes to the driveway separation requirements on local streets (based on land use) to provide slightly more distance for nonresidential and multifamily and less distance for single family. The minimum stem lengths have been amended to reduce the requirements on major thoroughfares and minor collectors, which are important in order to foster redevelopment and infill.

STANDARD DETAILS

Standard details in Article II and III are proposed to be replaced with new drawings that reflect the proposed changes, and moved to a Manual of Standard Details for quick reference by designers.

SUMMARY

In summary, the proposed TSM changes will serve to modernize both Article II and III, ensuring that they are compliant with historical administration, are consistent with the provisions of the CDO and reflect accepted engineering and design practice.

City of Concord Technical Standards Manual

Article II Streets & Pedestrian Paths



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Article II

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~~0 c.CBU units or combination of 32 or less mail receptacles may be located along a _____ street, other than a thoroughfare, provided a separate pull-off area is provided and _____ all of the following are met:~~

1.0 Purpose

The purpose of this Article is to protect the safety of the traveling public in the City and to create a quality street network that will not require pre-mature maintenance. All public streets inside the municipal limits of the City must be constructed in conformance with City standards and specifications. If any conflicts arise between a City and North Carolina State Highway Commission standard, the more restrictive standard will apply.

- 1.1. The Director of Transportation, in consultation with other City departments and state agencies, may allow modifications to the design criteria. Modifications to the design criteria:
 - a. Must be based on sound engineering principles and practices,
 - b. Must not create an unsafe or hazardous situation,
 - c. Must be equivalent to the efficiency, functionality, durability, structural integrity, and long-term maintenance of the minimum criteria in this Article.
 - d. Classifications must be in conformance with the current City of Concord Transportation Plan.
- 1.2. The Director of Transportation is authorized to require studies or other pertinent information to help support or justify the modification.

2.0 Basic Design Considerations

Streets must be designed to accommodate the volume and type of traffic they are intended to serve and the geometry of the landscape on which they will be located.

A selection of standard details is provided in the City of Concord Manual of Standard Details to be used in conjunction with this Article. In the event of a conflict between the standard details and the provisions of this Article, the strictest standard will apply

~~2.1. **Traffic Volumes.** The Average Daily Traffic (ADT) volume is a measurement of the users' demand for a street. ADT is defined as the total volume during a given time period (in whole days), greater than 1 day and less than 1 year, divided by the number of days in that time period. The current ADT volume for a street can be readily determined when continuous traffic counts are available. When only periodic counts are taken, the ADT volume can be estimated by adjusting the periodic counts according to such factors as the season, month, or day of the week. If the ADT of a street is unknown, traffic count studies may be required to determine the design volume.~~

2.2. **Traffic Volumes.** The Average Daily Traffic (ADT) volume is a measurement of the users' demand for a street. ADT is defined as the total volume during a given time period (in whole days), greater than 1 day and less than 1 year, divided by the number of days in that time period. The current ADT volume for a street can be readily determined when continuous traffic counts are available. When only periodic counts are taken, the ADT volume can be estimated by adjusting the periodic counts according to such factors as the

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~~season, month, or day of the week. If the ADT of a street is unknown, traffic count studies may be required to determine the design volume.~~

~~2.1.2.3. **Functional Classifications.** Individual streets do not serve travel independently of one another. Most vehicular travel involves movement through a network of streets. Therefore, the functional classification of a street must be determined before design criteria can be established for any proposed improvement. Functional classifications are based on the nature of the services streets are intended to provide, combined with the proposed layout and location of new streets. Known or estimated Average Daily Traffic (ADT) may be used to determine whether a street needs a higher classification than that based solely on function, and the average daily traffic (ADT) typically served. Table 2-1 identifies some general characteristics of each street classification along with the ADT volume thresholds for classification of new streets. To verify the functional classification of existing streets in the City’s transportation service area, please refer to the City’s Transportation Plan. For the purposes of the City’s ordinances and these technical standards, the highest classification for the same street between that of the City or the NCDOT shall be used to determine the appropriate standards which apply. *Functional classifications for proposed streets must be approved by the Director of Transportation prior to the final design of roadway layouts and preliminary plats.*~~

~~2.2. **Functional Classifications.** Individual streets do not serve travel independently of one another. Most vehicular travel involves movement through a network of streets. Therefore, the functional classification of a street must be determined before design criteria can be established for any proposed improvement. Functional classifications are based on the nature of the services streets are intended to provide and the minimum average daily traffic (ADT) typically served. Table 2-1 identifies each area street classification. To verify the functional classification of existing streets in City’s transportation service area, please refer to the City’s Transportation Plan. *Functional classifications for proposed streets must be approved by the Director of Transportation prior to the design of roadway layouts and preliminary plats.*~~

Table 2-1: Functional Classifications.

Classification	Function
Freeway or Expressway	Serves substantial statewide or interstate travel and exists solely to serve vehicular traffic; does not serve pedestrian and bicycle traffic
Major Thoroughfare (Includes Boulevard)	Provides for expeditious movement of high volumes of traffic within and through urban areas

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Minor Thoroughfare	Collects traffic from local streets and collectors and carries it to the major thoroughfare system; supplements the major thoroughfare system by facilitating minor thru traffic movements; and sometimes serves adjacent property
Major Collector	Serves intra-county travel corridors and traffic generators and provides access to the thoroughfare system
Minor Collector	Provides service to small local communities and traffic generators and provides access to the major collector system
Local Street	Provides access to adjacent property over relatively short distances
Alley	Provides access to adjacent property, typically to the rear of the structures located on the property served, and usually serves as a route for utilities, garbage collection, and garage access in residential areas

~~*Classification of Minor Collectors and lower will be based on the proposed street network layouts.~~

2.3.2.4. Service Classifications. Major collectors, minor collectors, local streets, and alleys may also be categorized as residential or non-residential.

Residential Streets. Residential streets serve residential property. In general, 50% or more of the properties fronting a residential street are zoned for residential purposes.

~~a. *Non-Residential Streets.* When less than 50% of the street frontage is adjacent to residential property, the street is considered a non-residential street.~~

2.4.2.5. Terrain Classifications. Two terrain classifications are applicable to the Concord area. These classifications affect street design criteria. All streets should be designed in accordance with the level terrain classification unless the necessary supporting data is presented and approved by the Director of Transportation for each street section designed using rolling terrain classification. The term “slope” in this subsection includes the rise and fall of the existing topography measured both parallel and perpendicular to the centerline of the proposed street.

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- a. *Level.* Slopes in a level terrain range from 0% to 8%. In level terrain, horizontal and vertical street sight distances are generally long or can be designed to be so without construction difficulties ~~or major expense.~~
- b. *Rolling.* Slopes in a rolling terrain range from 8.1% to 15%. Natural slopes consistently rise above and fall below the street grade line, and occasional steep slopes offer some restriction to normal highway horizontal and vertical alignment.

Rolling Terrain Classification Request

1. Memo with reasoning for request that indicates the section of the proposed classification by the range of stations for each street included in the request.
2. Plan view showing the horizontal alignment with appropriate stationing, existing topography, and other pertinent plan view elements.
3. Profile view showing existing and proposed vertical alignment with the grades appropriately labeled and stationing corresponding with the plan view.

~~b. —~~

2.5.2.6. Design Speeds. Designers should use the highest design speed that is practical to attain the best possible degree of safety, mobility, and efficiency. The design speed of a city street should be ~~a minimum of~~ five (5) miles per hour (mph) above the anticipated posted speed. Geometric design features should be consistent with the selected design speed. ~~Minimum d~~Design speeds for each functional classification are provided in Table 2-2.

Table 2-2: ~~Minimum~~ Design Speeds.

Classification	Minimum Design Speed (mph)	
	Level Terrain	Rolling Terrain
Freeway or Expressway	70*	*65
Major Thoroughfare	60	55
Minor Thoroughfare	50	45
Major Collector	50	50
Minor Collector	40	40
Local Street	40 <u>30</u>	40 <u>30</u>
Alley	20	15

*Reference NCDOT Guidelines

~~0 e.CBU units or combination of 32 or less mail receptacles may be located along a _____ street, other than a thoroughfare, provided a separate pull-off area is provided and _____ all of the following are met:~~

3.0 Cross-Section Standards

3.1 Widths.

- a. *Rights-of-Way*. Right-of-way widths are based on the street ~~type~~classification. Rights-of-way must be at least as wide as the minimum widths provided in ~~Table 3-1~~the table below. Rights-of-way must be platted and dedicated in the location and at the width shown on the approved plans.

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~~and~~
~~all of the following are met:~~

Table 3-1: Minimum Right-of-Way Widths.

Classification		Minimum Right-of-Way Width (feet)
Major Thoroughfare	All	100-120
Minor Thoroughfare	All	80-100
	Residential	6065
Minor Collector	Non-Residential	8071
	Residential	60656063
Local Street	All	50
Alley*	All	20
Cul-de-Sac	Non-Residential	80 67.570-foot radius
	Residential	60 60-foot radius

*Alleys may be either R/W or Access Easement. Alleys will not be accepted by the City of Concord for maintenance.

- b. *Pavement.* Pavement widths are based on the street classifications and locations. Fire, or other City codes may dictate different widths, the minimum width that satisfies all standards will apply. The width from the edge of pavement perpendicularly to the edge of pavement must be asat least as wide as the minimum widths provided in Table 3-2 below:

Table 3-2: Minimum Pavement Widths.

Classification		Minimum Pavement Width (feet)
Major Thoroughfare	All	24 for each of two divided sections
Minor Thoroughfare	All	24 for each of two divided sections or 36' non-divided
	Residential	3424
Minor Collector	Non-Residential	3630
	Residential with On-Street Parallel Parking	34
	Residential without On-Street Parking	2422
Local Street	All	2420
Alley	All	16
Cul-de-Sac	Non-Residential	4648-foot radius
	Residential	38.5-foot radius

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3.2. Materials. All work and materials shall conform to the latest edition of the NCDOT Standard Specifications for Roads and Structures unless otherwise specified. The following material standards and thicknesses represent the minimum acceptable standards of the City. Pavement designs must consider existing soil types and geotechnical conditions. The Engineering Department will review pavement designs. Failure to meet the following requirements may result in the delay or prevention of street acceptance by the City of Concord or NCDOT.

3.2. All applicable compaction, soils, concrete, or other required tests will be performed at no cost to the City and by an inspector sufficiently certified to perform such tests. Results from all applicable tests, all pavement and concrete mix designs, and all other material specifications shall be provided to the City inspector. The developer shall maintain their own records of all tests and inspections throughout the construction period. These records shall, at a minimum and as applicable, include information such as dates inspections are requested and performed, inspector's name, results of inspections, re-inspections, dates and results of tests, and other applicable information as may be necessary.

a. Subgrade. Shape the roadway to conform to the lines, grades and typical sections shown on the plans. Strip all existing vegetation from the ground surface wherever shaping of the roadway is to be done. Use all suitable surplus material in the construction of the roadway or stockpile for use in shoulder construction. Dispose of surplus material in excess of that needed for roadway or shoulder construction as waste. Remove all unsuitable material, boulders and all vegetative matter and replace with suitable material. Obtain suitable material, when not available from the shaping or fine grading operation, from roadway excavation or borrow sources.

1. Preparation of Subgrade. Shape the subgrade to the lines, grades and typical sections shown on the plans.
2. Compaction of Subgrade. Compact all material to a depth of 8 inches below the finished surface of the subgrade to a density equal to at least 100% of that obtained by compacting a sample of the material in accordance with AASHTO T 99 as modified by NCDOT. These modified testing procedures can be found in the NCDOT Conventional Density Operator's Manual. Provide private lab soil compaction reports to the inspector for random subgrade tests every 200 LF, 3 minimum per street, and 2 per cul-de-sac, or as directed by the inspector. Proof Rolls may be required in addition to density tests as directed by the City inspector.
3. New densities may be required if it has been more than 7 days since the densities were performed or there has been a rain event greater than ½".
4. Contractor should perform a self-proofroll and repair deficiencies before calling for an inspection.

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5. Subgrade should be neat, clean, trimmed, and rolled down.
6. After all above items have been completed, then a subgrade proofroll can be scheduled and performed with the inspector.
7. Base Course must be placed within 7 days or before any ½” or greater rain event or another proofroll may be required.

a.b. Base Course. Prior to the placement of the base course the subgrade shall be sufficiently compacted, inspected and accepted by the City inspector. The material for the base course of the street must be crusher-run stone with aggregates ranging from one and one-half (1½) inch diameter particles to dust and must meet the standards of the NCDOT's latest edition NC DOT of Standard Specifications for Roads and Structures. The City inspector shall be given a (24) ~~twenty-four hour~~ twenty-four-hour notification to inspect the base course prior to the application of the intermediate course. All deficiency repairs are to be monitored by a City inspector and accepted prior to application of the intermediate course.

1. The material should consist of tough durable aggregate, containing sufficient fines to ensure a well-bonded and uniform base after compaction.
2. The aggregate must be free from an excess of flat, elongated, soft disintegrated pieces, and should not contain clay, silt, vegetative, or other objectionable matter.
3. The mixing and shaping of the base course material must be performed with a power-driven motor grader, equipped with a blade not less than ten (10) feet long, and equal to or equivalent to a full-size full-size motor grader with 125 horsepower or greater.
- 3.4. All edges and manholes are to be trimmed to the proper depth. Remove any loose stone. All manhole covers shall be adjusted to final pavement grade and slope.
5. The base shall be compacted to 100% of the maximum density obtainable with the Modified Proctor Test (AASHTO-T180) by rolling with ring or temping roller or and with pneumatic tired roller with a minimum weight of ten tons. When completed, the base course must be smooth, hard, dense, unyielding and well bonded. The procedures for the Modified AASHTO-T180 test can be found in the NCDOT Conventional Density Operator's Manual. Provide private lab stone base compaction reports to the inspector.
6. New densities may be required if it has been more than 7 days since the densities were performed or there has been a rain event greater than ½”.
7. Contractor shall perform a self-proofroll and repair deficiencies before calling for an inspection.
8. After all above items have been completed then a proofroll can be scheduled and

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~~and~~
~~all of the following are met:~~

performed with the inspector.

9. Intermediate Course must be placed within 7 days or before any ½” or greater rain event or another proofroll may be required.

4.c. **Prime Coat.** If application of the intermediate course is not completed within seven (7) days following stone base approval, a prime coat shall be applied. The material for the prime coat must be consistent with NCDOT Standard Specifications for Roads and Structures.

d. **Intermediate Course.** The material for the binder/intermediate course of the street must be consistent with NC-DOT’s Superpave Manual Standard Specifications for Roads and Structures. Asphalt plants providing the material for the binder/intermediate course must be certified by NC-DOT. The City inspector shall be given a (24) twenty-four hour/twenty-four-hour notification to inspect the intermediate course prior to the application of the first lift of the surface course. All deficiency repairs are to be monitored by a City inspector and accepted prior to application of the first lift of the surface course.

1. Compaction must meet NCDOT requirements. The contractor shall perform quality control on asphalt by performing random density tests every 200 LF, 3 minimum per street, and 2 in each cul-de-sac, or as directed by inspector. Superpave mixes are to be compacted 90.0% of the maximum specific gravity. Provide results to inspector the following day.

b.—

e. **Surface Course.** The material for the surface course of the street must be consistent with NC-DOT’s Superpave Manual Standard Specifications for Roads and Structures. Asphalt plants providing the material for the surface course must be certified by NC DOT. The City inspector shall be given a (72) seventy-two hour/seventy-two-hour notification to inspect the initial surface course lift prior to the application of the final lift. All deficiency repairs are to be monitored by a City inspector and accepted prior to the application of the final lift of asphalt surface course.

1. The surface lift should be installed in 2 separate lifts a minimum of 1” thick for Local Streets, and 1.5” thick for higher classifications. The first lift should be applied directly/immediately following the application, inspection, and acceptance of the intermediate course, and the second lift is to be installed after all other requirements for City acceptance have been met. All known base failures shall be repaired prior to the application of the final lift of asphalt surface course.

2. Compaction must meet NCDOT requirements. The contractor shall perform quality control on asphalt by performing random density tests every 200 LF, 3 minimum

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~~0 e.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:~~

per street, and 2 in each cul-de-sac, or as directed by inspector. Superpave mixes are to be compacted 90.0% of the maximum specific gravity. Provide results to inspector the following day.

Table 3-3: Base, Intermediate, and Surface Courses

Classification		Base Course	Intermediate Course	Surface Course
Major Thoroughfare	All	*	*	*
Minor Thoroughfare	All	*	*	*
Major Collector	Non-Residential	*	*	*
	Residential	10" CABC or 5" B-25.0C	2.25" I-19.0C	3.0" S 9.5B
Minor Collector	Non-Residential	*	*	*
	Residential	10" CABC or 5" B-25.0C	2.25" I-19.0C	3.0" S 9.5B
Local Street	Non-Residential	*	*	*
	Residential	8" CABC or 4" B-25.0C	2.25" I-19.0C	2.5" S 9.5B
Alley	All	8"CABC		1.5" S 9.5B

* Pavement sections must be designed on a case by case basis with the residential specifications being the minimum requirements.

f. **Tack Coat.** The material for tack coats must be consistent with NCDOT Standard Specifications for Roads and Structures. Asphalt plants providing the material for tack coats must be certified by NC-DOT.

e. **Tack coats** must be applied between each layer of asphalt to be placed.

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~~0 c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:~~

~~Table 3-3: Base, Intermediate, and Surface Courses~~

Classification		Base Course	Intermediate Course	Surface Course
Major Thoroughfare	All	*	*	*
Minor Thoroughfare	All	*	*	*
Major Collector	Non-Residential	*	*	*
	Residential	10" CABC or 5" B-25.0X	2.25" I-19.0X	23.0" SF 9.5X
Minor Collector	Non-Residential	*	*	*
	Residential	10" CABC or 5" B-25.0X	2.25" I-19.0X	23.0" SF 9.5X
Local Street	Non-Residential	*	*	*
	Residential	8" CABC or 4" B-25.0X	2.25" I-19.0X	12.5" SF 9.5X
Alley	All	8" CABC		1.5" SF 9.5X

~~* Pavement cross sections must be designed on a case-by-case basis.~~

~~d.g. Street Shoulder.~~ Fill embankments must be formed of suitable materials placed in successive layers of not more than six (6) inches in depth for the full width of the cross section, including the width of the slope area. **All materials for fill embankments must be consistent with NCDOT Standard Specifications for Roads and Structures.**

1. No stumps, trees, brush, rubbish or other unsuitable materials or substances shall be placed in the embankments within any right-of-way or easement.
2. Each successive six-inch layer shall be thoroughly compacted by a sheepsfoot **tamping** roller, ten-ton, ~~three-wheel~~ power roller, pneumatic-tired roller or other method approved by the Director of Engineering. Embankments over and around all pipes and culverts shall be of select material, placed and thoroughly tamped and compacted as directed by the Director of Engineering or ~~their~~ **his/her** representative. **Any soft spots or pumping areas must be removed and replaced in the manner stated above until satisfactory compaction is achieved.**

h. Concrete. ALL concrete used for streets, curb and gutter, sidewalks and ~~drainage structures multi-use paths, etc.~~ shall have a minimum compressive strength of 3600 PSI at 28 days. This requirement shall be provided regardless of any lesser compressive strength specified in the NCDOT Standard Specifications for Roads and Structures.

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~~0 c.CBU units or combination of 32 or less mail receptacles may be located~~
along a _____
~~street, other than a thoroughfare, provided a separate pull-off area is provided~~
and _____
~~all of the following are met:~~

The contractor shall prepare concrete test cylinders in accordance with section 1000 of the NCDOT Standard Specifications for Roads and Structures at the direction of the project inspector. All equipment and cylinder molds shall be furnished by the contractor. It shall be the responsibility of the contractor to protect the cylinders until such time as they are transported for testing. Testing for projects shall be performed by an independent testing lab sufficiently certified to perform such tests, at no cost to the City. The contractor shall provide equipment and perform tests on concrete for a maximum slump and air content as defined in Section 1000 of the NCDOT Standard Specifications for Roads and Structures. These tests shall be performed at a frequency established by the inspector. Materials failing to meet the specifications shall be removed by the contractor.

1. All concrete shall be cured with 100% Resin Base, white pigmented curing compound which meets ASTM Specifications C-309, Type 1, applied at a uniform rate of one (1) gallon to 400 square feet within 24 hours of placement of concrete.

i. *Backfill.* All backfill shall be non-plastic in nature, free from roots, vegetative matter, waste, construction material or other objectionable material. Said material shall be capable of being compacted by mechanical means and the material shall have no tendency to flow or behave in a plastic manner under the tamping blows or proof rolling.

1. Materials deemed by the inspector as unsuitable for backfill purposes shall be removed and replaced with select backfill material.

j. Concrete or asphalt shall not be placed until the air temperature measured at the location of the paving operation is at 35 degrees F and rising by 10:00 a.m. Concrete or paving operations should be suspended when the air temperature is 40 degrees F and descending. The contractor shall protect freshly placed concrete or asphalt in accordance with Sections 420 (Concrete Structures), 600 (Asphalt Bases And Pavements), and 700 (Concrete Pavements And Shoulders) of the NCDOT Standard Specifications for Roads and Structures when the air temperature is at or below 35 degrees F and the concrete has not obtained an age of 72 hours.

~~3. Any soft spots or pumping areas must be removed and replaced in the manner stated above until satisfactory compaction is achieved.~~

~~0 e.CBU units or combination of 32 or less mail receptacles may be located~~
along a ~~street, other than a thoroughfare, provided a separate pull-off area is provided~~
and ~~all of the following are met:~~

4.0 Cul-de-Sac Design Standards

4.0

4.1. ~~Where a turn-around is required on a public or private street, a properly dimensioned cul-de-sac should be provided. "Hammer-head" designs will not be permitted.~~

4.1.4.2. **Design Standard Exceptions.** Cul-de-sacs are subject to the same design guidelines as those given for the ~~appropriate local street~~ ~~et~~ classification, with the exception of the following design standards that are specific to cul-de-sacs.

a. *Service Limits.* A cul-de-sac can serve no more than twenty (20) residential units.

—*Lengths.* Cul-de-sacs must not exceed the lengths provided in Table 4-~~12~~. Length is measured from the center of the terminus to the centerline of the closest intersecting street providing access to the cul-de-sac.

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~~0-c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:~~

Zoning District	Maximum Length (feet)
AG	1,000
B-1	500
C-1	500
C-2	500
CC	300
CD	1,500
I-1	1,500
I-2	1,500
O-1	500
PUD	500
RC	300
RE/RL	1,000
RE	1,000
RM-1	800
RM-2	800
RU	300
RV	600

Zoning District	Maximum Length (feet)
AG	1,000
B-1	500
C-1	500
C-2	500
CC	300
CD	1,500
I-1	1,500
I-2	1,500
O-1	500
PUD	500
RC	300
RE	1,000

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~~0 c.CBU units or combination of 32 or less mail receptacles may be located along a _____ street, other than a thoroughfare, provided a separate pull-off area is provided and _____ all of the following are met:~~

RL	1,000
RM-1	800
RM-2	800
RU	300
RV	800/600

- b. Connectivity Provisions.** If the cul-de-sac is located along a corridor included in the City of Concord’s Transportation Plan or if the cul-de-sac is located along a corridor that will serve as a future thru street in accordance with a recorded subdivision plat or site plan, preliminary and final engineering plans must show a stub (extension of the street right-of-way) from the terminus of the cul-de-sac to the edge of the area being developed. **Prior to final plat** ~~T~~the stub must be duly signed in the field as to the potential for future extension.
- c. Termini.** The terminus of the cul-de-sac must be designed to allow vehicles to turn around and exit to the adjoining street.
1. *Radii.* The radius for the terminus (bulb or turnaround) must not be less than forty (40) feet to the face of curb as shown on the detail drawings.
 2. *Islands.* An island may be **located proposed or required** in the center of the terminus of the cul-de-sac. Islands- **will be reviewed on a case-by-case-basis** ~~must meet the design standards provided in Section 7.6.~~

~~0-c.CBU units or combination of 32 or less mail receptacles may be located along a _____ street, other than a thoroughfare, provided a separate pull-off area is provided and _____ all of the following are met:~~

5.0 Slope Standards

5.1. **Longitudinal Grade.** Longitudinal grades may range between one percent (1.0%) and twelve percent (12%). Table 5-1 identifies the maximum longitudinal grade for each functional classification.

Table 5-1: Maximum Longitudinal Grades.

Classification	Conditions (Terrain or Proximity to Intersection)	Maximum Grade
Freeway or Expressway		*
Major Thoroughfare		*
Minor Thoroughfare		*
Major Collector	Level Terrain	6%
	Rolling Terrain	9%
	Intersection in \leq 100 feet	3%
Minor Collector	Level Terrain	6%
	Rolling Terrain	9%
	Intersection in \leq 100 feet	5%
Local Street	Level Terrain	9%
	Rolling Terrain	12%
	Intersection in \leq 100 feet	5%
Alley	Level Terrain	9%
	Rolling Terrain	12%
	Intersection in \leq 100 feet	5%

* Consult the latest edition of AASHTO's *The Policy on Geometric Design of Highways and Streets*.

5.2. Transverse Grade.

- a. *Street Surface.* Transverse grades on the street surface must have a one-fourth ~~_____~~ ($\frac{1}{4}$) inch rise to one (1) foot run slope. Superelevation rates, minimum runoff lengths, and methods of distribution should be designed in accordance with AASHTO guidelines.

~~0-c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:~~

Table 5-2: Maximum Superelevation Transverse Slope for Minimum Centerline Radius.

Classification	Maximum Superelevation Transverse Slope (feet/foot)	
	Level Terrain	Rolling Terrain
Freeway or Expressway	*	*
Major Thoroughfare	*	*
Minor Thoroughfare	*	*
Major Collector	0.04	0.04
Minor Collector	0.04	0.04
Local Street	normal crown	normal crown
Alley	N/A	N/A

* Consult the latest edition of AASHTO's *The Policy on Geometric Design of Highways and Streets*.

b. Street Shoulder.

1. *Minimum width.* The minimum shoulder width shall be 6 feet wide measured from the edge of pavement. The transverse grade for street shoulders shall be ¼" per foot.
 - *Fill/Cut Slopes.* The maximum transverse grade for ~~fill street shoulders slopes~~ is a one (1) foot rise to ~~threewe (23)~~ foot run ~~slope.~~, and one (1) foot rise to two (2) foot run for cut slopes.

6.0 Curve Standards

- 6.1. **Horizontal Centerline Curve Radius.** Table 6-1 provides the minimum horizontal centerline curve radii for each functional classification.

Table 6-1: Minimum Horizontal Centerline Curve Radii.

Classification	Minimum Horizontal Centerline Curve Radii (feet)	
	Level Terrain	Rolling Terrain
Freeway or Expressway	*	*
Major Thoroughfare	*	*
Minor Thoroughfare	*	*
Major Collector	310	230
Minor Collector	310	230
Local Street	230	150
Alley	90	90

* Consult the latest edition of AASHTO's *The Policy on Geometric Design of Highways and Streets*.

0 e.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:

6.2. **Tangent Between Reverse Curves.** Table 6-2 provides the minimum tangent between reverse curves for each functional classification.

Table 6-2: Minimum Tangent Between Reverse Curves.

Classification	Minimum Tangent Between Reverse Curves (feet)
Freeway or Expressway	*
Major Thoroughfare	*
Minor Thoroughfare	*
Major Collector	200
Minor Collector	200
Local Street	100
Alley	0

* Consult the latest edition of AASHTO's *The Policy on Geometric Design of Highways and Streets*.

6.3. **Vertical Centerline Curves.** Table 6-3 provides the minimum Rates of Vertical Curvature (K) for each functional and terrain classification.

6.2.

~~Table 6-2: Minimum Tangent Between Reverse Curves.~~

Classification	Minimum Tangent Between Reverse Curves (feet)
Freeway or Expressway	*
Major Thoroughfare	*
Minor Thoroughfare	*
Major Collector	200
Minor Collector	200
Local Street	100
Alley	0

~~* Consult the latest edition of AASHTO's *The Policy on Geometric Design of Highways and Streets*.~~

~~0 e.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:~~

Table 6-3: Rate of Vertical Curvature (K)**.

Classification		Level Terrain	Rolling Terrain
Freeway or Expressway	Crest	*	*
	Sag	*	*
	Stop	*	*
Major Thoroughfare	Crest	*	*
	Sag	*	*
	Stop	*	*
Minor Thoroughfare	Crest	*	*
	Sag	*	*
	Stop	*	*
Major Collector	Crest	45	30
	Sag	45	30
	Stop	20	14
Minor Collector	Crest	45	30
	Sag	45	30
	Stop	20	14
Local Street	Crest	30	20
	Sag	30	20
	Stop	14	9
Alley	Crest	30	20
	Sag	30	20
	Stop	14	9

* Consult the latest edition of AASHTO's *The Policy on Geometric Design of Highways and Streets*.

** $K = (\text{Length of the Vertical Curve in Feet}) \div (\text{Percent Algebraic Difference in the Grades Before and After the Vertical})$

7.0 Intersection Standards

- 7.1. **Angles of Intersection.** When practical, streets must intersect at an angle of ninety (90) degrees. The centerlines of the intersecting streets should remain straight for a minimum of fifty (50) feet from the ~~point of intersection of the two streets~~ **edge of travel way of the intersecting street.** In no case should the angle of intersection be less than seventy (70) degrees.
- 7.2. **Corners.**
- a. *Quantity.* Intersections shall not have more than four (4) corners.

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~~0 e.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:~~

- b. *Right-of-Way.* Property lines at intersections must be established so that the distance from the edge of pavement at the street turnout to the property line is at least as great as the distance from the edge of pavement to the property line along the intersecting streets.
 1. This property line can be established as a radius or as a sight triangle.
 2. Minimum and maximum street right-of-way curve radii are provided in Table 7-1.

Table 7-1: Minimum and Maximum Right-of-Way Curve Radii at Intersections.

Zoning District	Minimum Radii (feet)	Maximum Radii (feet)
AG	30	N/A
B-1	30	45
C-1	30	N/A
C-2	30	N/A
CC	30	45
CD	30	N/A
I-1	30	N/A
I-2	30	N/A
O-I	30	45
PUD	30	45
RC	30	45
RE	30	N/A
RL	30	N/A
RM-1	30	N/A
RM-2	30	N/A
RU	30	N/A
RV	30	45

7.3. Backs-of-Curb. Curbs must be rounded at the corners of intersections to facilitate the movement of traffic. The minimum corner radii for backs-of-curb at street intersections are provided in Table 7-2.

~~0-c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:~~

Table 7-2: Minimum Corner Radii for Backs-of-Curb at Intersections.

Classification	Minimum Corner Radii (feet)
Freeway or Expressway	*
Major Thoroughfare	*
Minor Thoroughfare	*
Major Collector	30
Minor Collector	30
Local Street	30
Alley	20

* Consult the N.C. Department of Transportation Division of Highways' Transportation Plan.

7.3.7.4. Distances between Intersections. -Proposed streets that intersect opposite sides of the same street (either existing or proposed) should be designed to intersect directly opposite one another as shown in Figure 7-1a.

a. Minimum lengths for Local Streets and Minor Collectors.

1. A minimum length of 200 feet between street-centerlines must separate proposed streets that cannot be aligned to create a shared intersection as shown in Figure 7-1b.
2. A minimum length of 400 feet between centerlines must separate streets with opposing left-hand turns as shown in Figure 7-1c.

b. Minimum lengths for higher street classifications. Minimum lengths for higher street classifications must be reviewed and approved by the Director of Transportation, but in no case can the distance be less than 400 feet.

a.

- ~~1. A minimum length of 200 feet between street centerlines must separate proposed streets that cannot be aligned to create a shared intersection as shown in Figure 7-1b.~~
- ~~2.1. A minimum length of 400 feet between centerlines must separate streets with opposing left hand turns as shown in Figure 7-1c.~~

b. ~~Minimum lengths for higher street classifications. Minimum lengths for higher street classifications must be reviewed and approved by the Director of Transportation, but in no case can the distance be less than 400 feet.~~

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0-c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:

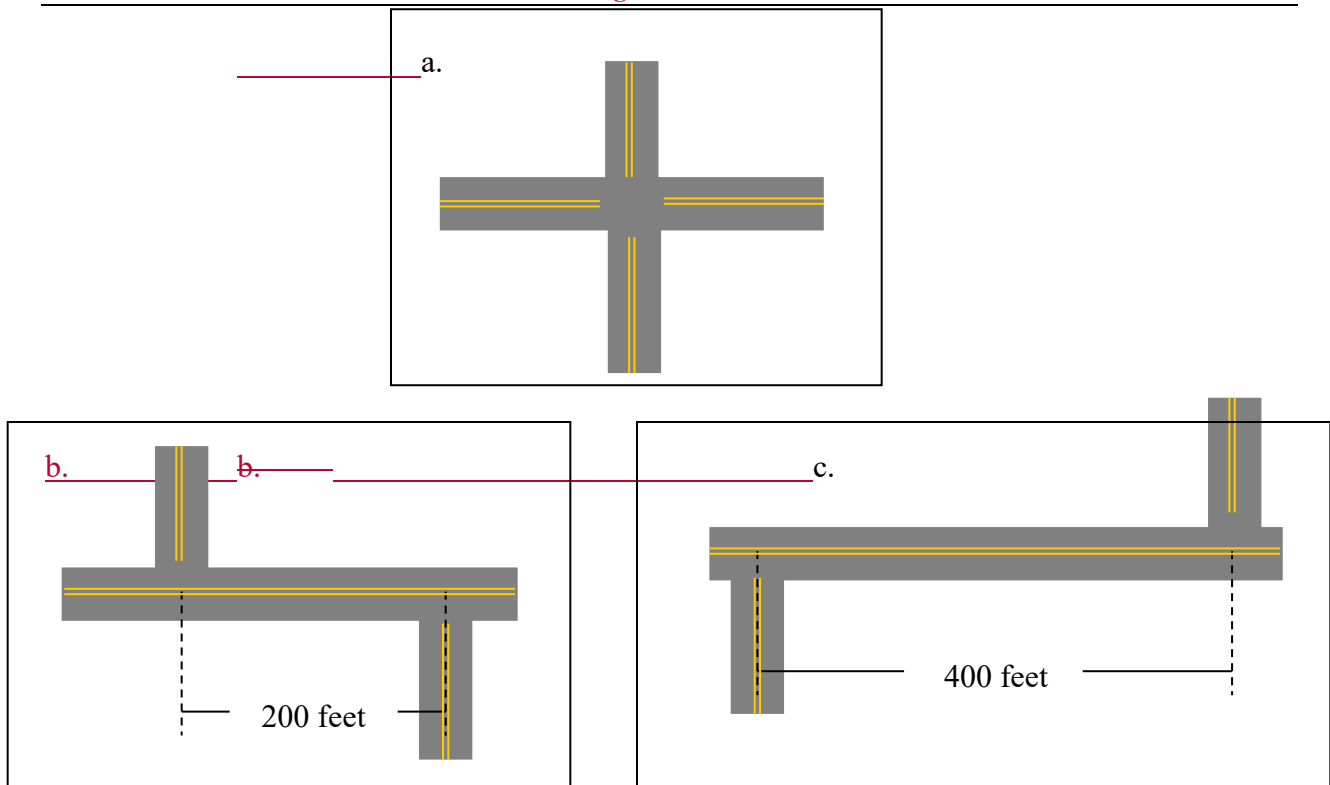


Figure 7-1: Two Streets Intersecting the Same Street.

7.5. Sight Triangle Easements. Sight triangle easements are required in every zoning district of the City except for the CC District. Sight triangle easements must be shown on all plans and recorded on a final plat. NCDOT may have separate and/or additional requirements regarding Sight Triangles, the strictest standard that satisfies all requirements will apply. Dimensions given in this section are the minimums, evaluation of sight distance may require larger sight triangle easements.

A. Type 1

a. Type 1 sight triangles must be maintained on property located at intersections of:

1. Two streets of any classification
2. A street and a railroad
3. A street and a non-residential driveway

b. Size and Measurement - A sample illustration is provided in Figure 7-2.

1. The lengths of the Type 1 sight triangle legs are based on the widths of the intersecting rights-of-way of the where the intersection occurs.

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~~0-c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:~~

**Table 7-3: Sight Triangle Leg Length along a Right-of-Way
Measured from the Point of Intersection**

Right-of-Way Width* (feet)	Length (F or G) (feet)
≤50	25
60	30
70	35
80	40
90	45
>100	50
*Or pavement width where no R/W exists.	

2. Type 1 Sight triangles are measured from the following three points as shown on Figure 7-2:

- a. Point 1. The point of intersection of two right-of-way lines or driveway pavement edge.
- b. Point 2. The point along right-of-way one (1) a distance from Point 1 as determined by the width of right-of-way one (1) in accordance with Table 7-3, and
- c. Point 3. The point along right-of-way two (2) a distance from Point 1 as determined by the width of right-of-way two (2) in accordance with Table 7-3.

B. Type 2

1a. In addition to Type 1 sight triangles, Type 2 sight triangles must be maintained on property located at intersections of:

- 1. Any street with a street classified as a collector or higher.
- 2. Any non-residential driveway with a street classified as a collector or higher.

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0-c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:

2b. Size and Measurement - A sample illustration is provided in Figure 7-2.

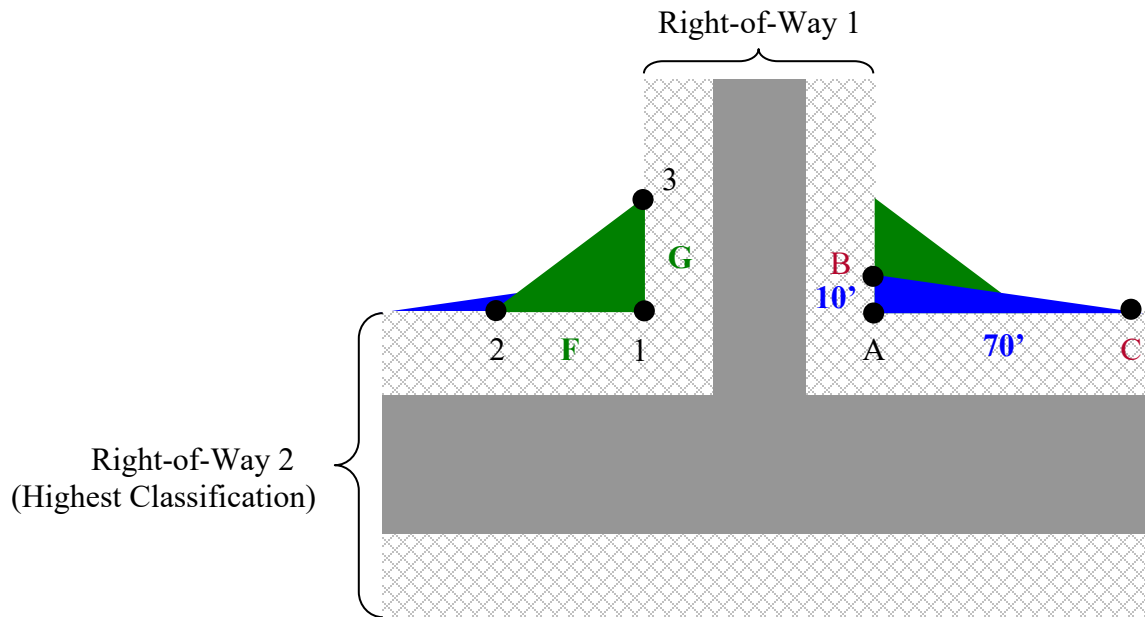
1. Type 2 Sight triangles are measured from the following three points as shown on Figure 7-2:

a. *Point A.* The point of intersection of two right-of-way lines or R/W and driveway pavement edge.;

b. *Point B.* The point along right-of-way one (1) a distance of 10 feet from Point A, and

c. *Point C.* The point along right-of-way two (2) a distance of 70 feet from Point A.

Figure 7-2: Type 1 & 2 Sight Triangle Sample Illustration



C. Type 3

a. Type 3 Sight Triangles must be maintained on property located at intersections of:

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0-c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:

a1. Residential driveways and streets

b. Size and Measurement - A sample illustration is provided in Figure 7-3.

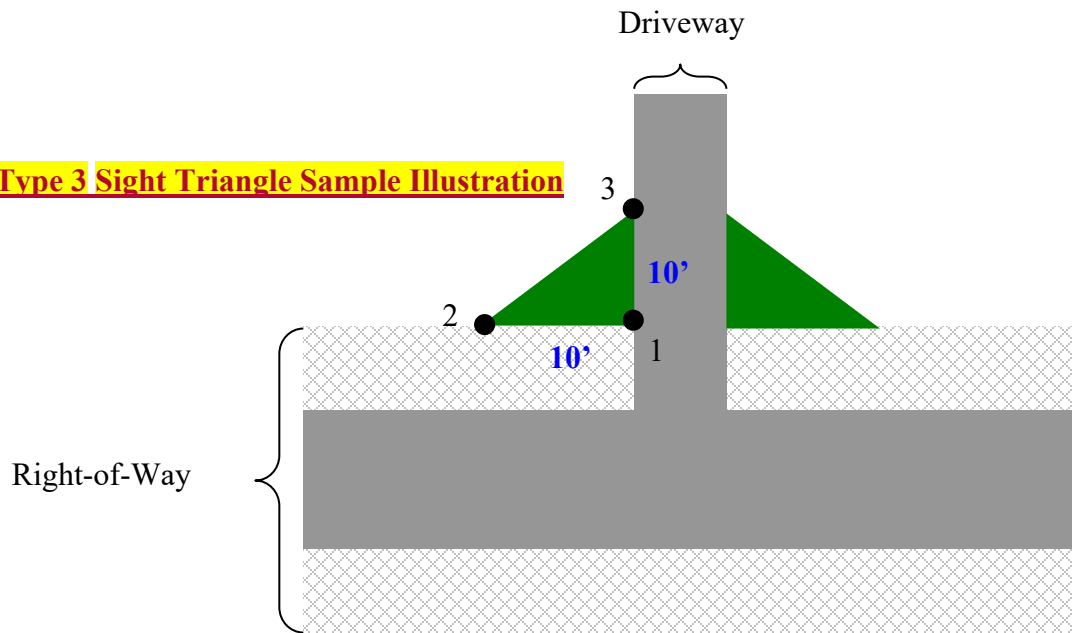
1. -Sight triangles are measured from the following three points:

1a. — Point 1. The point of intersection of the street right-of-way line and the edge of the driveway pavement,

2b. Point 2. The point along the street right-of-way a distance of ten (10) feet from Point 1, and

3c. Point 3. The point along the edge of the driveway pavement a distance of ten (10) feet from Point 1

Figure 7-3: Type 3 Sight Triangle Sample Illustration



~~0-c.CBU units or combination of 32 or less mail receptacles may be located~~
along a _____
~~street, other than a thoroughfare, provided a separate pull-off area is provided~~
and _____
~~all of the following are met:~~

D. Objects Not Allowed within Sight Triangles. Objects within sight triangles must be restricted to give the users of the street or driveway an unobstructed view of oncoming vehicles and pedestrians. No structures, berms, vegetation, or other visual obstruction with a height equal to or greater than two (2) feet above the street surface elevation is allowed within the sight triangle, except those listed in the following subsection. The dimensions given represent the dimensions of the Sight Triangle Easements as measured at the R/W.

E. Objects Allowed within Sight Triangles. The following objects are allowed within sight triangles:

1. Public utility poles.
2. Official warning signs or signals.
3. Supporting members or appurtenances to permanent buildings lawfully existing prior to April 11, 1996.
4. Other signs that meet all of the following criteria:
 - a. Conform to the City's sign ordinance, and
 - b. Are mounted at a height equal to or greater than ten (10) feet above the street surface, and
 - c. Have supports that do not obscure the view of oncoming vehicles and pedestrians.

~~Supporting members or appurtenances to permanent buildings lawfully existing prior to April 11, 1996.~~

~~7.4. **Sight Triangle Easements.** Sight triangle easements are required in every zoning district of the City except for the CC District. Sight triangle easements must be shown on all plans and recorded on a final plat.~~

~~a. *Locations.* Sight triangles must be maintained on property located at the intersection of:~~

- ~~1. Two streets of any classification,~~
- ~~2. A street and a railroad, and~~
- ~~3. A street and a driveway.~~

~~b. *Size and Measurement.* A sample illustration is provided in Figure 7-2.~~

~~c. *Intersections of Two Streets or Streets and Railroads.* The lengths of the legs of a site triangle are based on the widths of the intersecting rights-of-way and the functional classification of the streets where the intersection occurs.~~

~~d. *Sight Triangle Measurements.* Based on Width of Right of Way. Sight triangles are measured from the following three points:~~

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~~0 e.CBU units or combination of 32 or less mail receptacles may be located along a _____ street, other than a thoroughfare, provided a separate pull-off area is provided and _____ all of the following are met:~~

- ~~1. *Point 1.* The point of intersection of two right-of-way lines,~~
- ~~2. *Point 2.* The point along right-of-way one a distance from Point 1 as determined by the width of right-of-way one in accordance with Table 7-3, and~~
- ~~3. *Point 3.* The point along right-of-way two a distance from Point 1 as determined by the width of right-of-way two in accordance with Table 7-3.~~

Table 7-3: Sight Triangle Leg Length along a Right-of-Way Measured from the Point of Intersection

Right-of-Way Width (feet)	Length (feet)
50	25
60	30
70	35
80	40
90	45
≥100	50

~~e. **Functional Classification.** Additional site triangle easements are needed at the intersection of two streets if at least one of the streets has the following functional classification:~~

- ~~1. **freeway or expressway;**~~
- ~~2. **major thoroughfare;**~~
- ~~3. **minor thoroughfare, major collector; or**~~
- ~~4. **minor collector.**~~

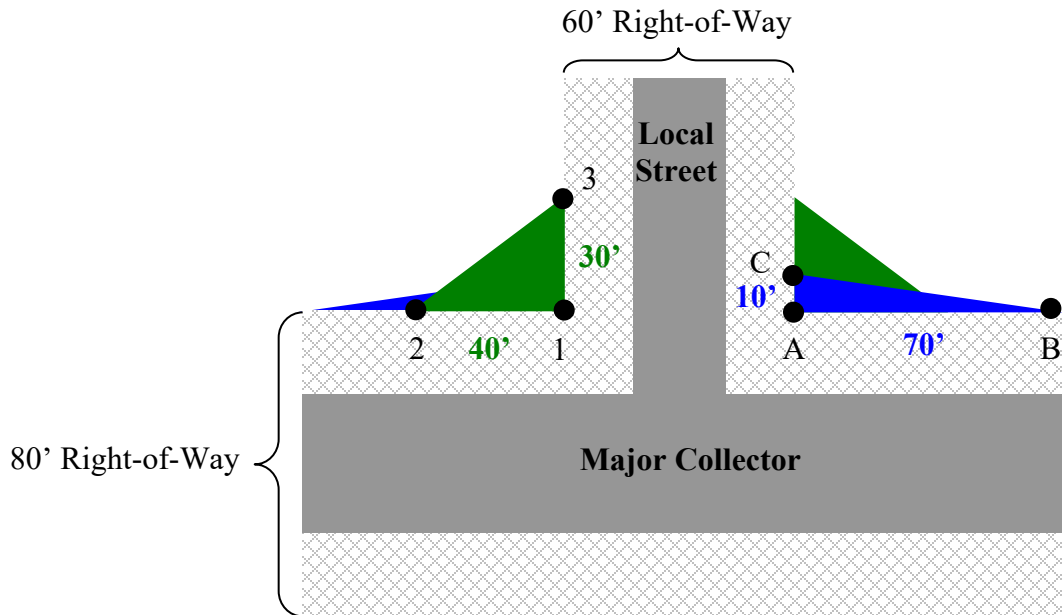
~~f. **Measuring.** Site triangles are measured from the following three points:~~

- ~~1. **Point A.** The point of intersection of the two street right-of-way lines,~~
- ~~2. **Point B.** The point along the right-of-way of the street with the highest functional classification (highest ADT) a distance of 70 feet from Point 1, and~~
- ~~3. **Point C.** The point along right-of-way of the intersecting street a distance of 10 feet from Point 1.~~

Figure 7-2: Sight Triangle Sample Illustration

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~~0-c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:~~



~~g. Intersections of Streets and Residential Driveways. Sight triangles are measured from the following three points:~~

- ~~1. Point 1. The point of intersection of the street right-of-way line and the edge of the driveway pavement,~~
- ~~2. Point 2. The point along the street right-of-way a distance of ten (10) feet from Point 1, and~~
- ~~3. Point 3. The point along the edge of the driveway pavement a distance of ten (10) feet from Point 1.~~

~~h. Intersections of Streets and Non-Residential Driveways. Site triangle requirements are addressed during the driveway permitting process.~~

~~i. Objects Not Allowed within Sight Triangles. Objects within sight triangles must be restricted to give the users of the street or driveway an unobstructed view of oncoming vehicles and pedestrians. No structures, berms, vegetation, or other visual obstruction with a height equal to or greater than two (2) feet above the street surface elevation is allowed within the sight triangle, except those listed in the following subsection:~~

~~j. Objects Allowed within Sight Triangles. The following objects are allowed within sight triangles:~~

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~~0 c.CBU units or combination of 32 or less mail receptacles may be located along a _____ street, other than a thoroughfare, provided a separate pull-off area is provided and _____ all of the following are met:~~

- ~~1. Public utility poles,~~
- ~~2. Official warning signs or signals,~~
- ~~3. Other signs that meet all of the following criteria:~~
 - ~~(a) Conform to the City's sign ordinance, and~~
 - ~~(b) Are mounted at a height equal to or greater than ten (10) feet above the street surface, and~~
 - ~~(c) Have supports that do not obscure the view of oncoming vehicles and pedestrians.~~
- ~~4. Supporting members or appurtenances to permanent buildings lawfully existing prior to April 11, 1996.~~

~~7.6. Roundabouts/Traffic Circles. Roundabout/traffic circle designs must be reviewed and approved by the Director of Transportation based on current engineering standards. Sight Distance. Sight distance shall be measured at a height of 3.5' above the ground with a minimum of 1' vertical separation between the highest obstruction at ground level and the sight line, and 5' between the sight line and the bottom of tree canopies, or objects above the surface. Table 7-6 gives the sight distance for stop controlled intersections. Minimum Sight Distance should be provided as outlined in Article VIII, Appendix E of the TSM intersections.~~

Table 7-6

Design Speed (mph)	Minimum Intersection Sight Distance (ISD)*		
	Passenger Cars (ft.)	Single Unit Trucks (ft.)	Combination Trucks (ft.)
	Left / Right	Left / Right	Left / Right
20	225 / 195	279 / 250	337 / 310
25	280 / 240	348 / 315	422 / 385
30	335 / 290	418 / 375	506 / 465
35	390 / 335	488 / 440	590 / 540
40	445 / 385	557 / 500	675 / 620
45	500 / 430	627 / 565	759 / 695
50	555 / 480	697 / 625	843 / 770
55	610 / 530	766 / 685	927 / 850

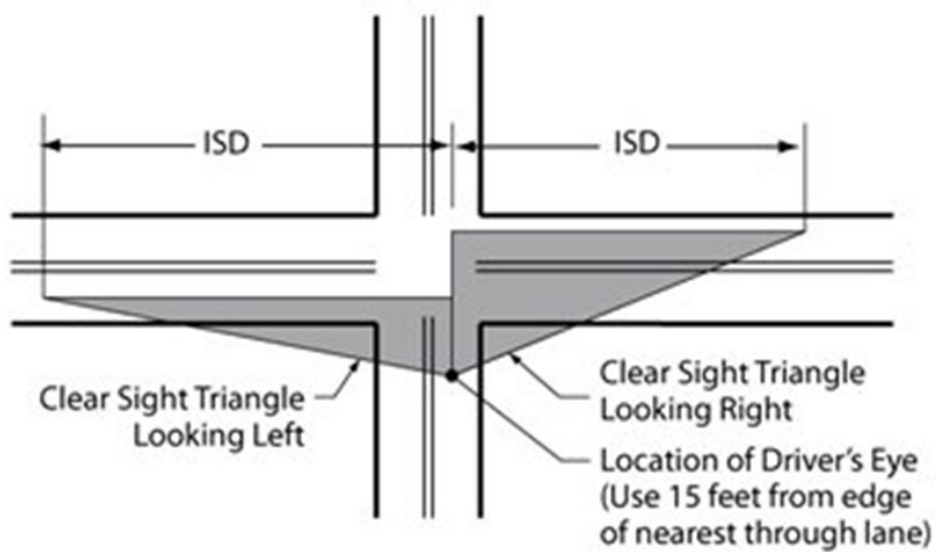
*Values are based on case B1 and B2 from AASHTO Policy on Geometric Design of Highways and Streets with base condition of two-lane highway with no median and grades <=3%. For conditions outside of the base conditions appropriate adjustments should be made in accordance with AASHTO

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~~0-c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:~~

Policy.

Figure 7-6



7.7. **Roundabouts/Traffic Circles.** Roundabouts may be required at certain intersections within developments proposing a new network of public streets to provide traffic calming and help create a safe environment for drivers and pedestrians. Locations of Roundabouts will be determined by the Planning and Transportation Departments. Designs must be reviewed and approved by the Director of Transportation or their his/her representative.

7.5. —

~~0-c.CBU units or combination of 32 or less mail receptacles may be located~~
along a ~~street, other than a thoroughfare, provided a separate pull-off area is provided~~
and ~~all of the following are met:~~

8.0 Median and Island Standards

- 8.1. *Where Required.* Entrance roads shall include a median in conformance with the City’s development ordinances, except that the Director of Transportation may waive this requirement if the Director determines that such a median is not ~~practical~~ **practical**, or such installation would create a hazard.
- 8.2. *Size.* Islands **must be a minimum of 75 square feet** and **entrance** medians must be a minimum **of one half the required stem length of the intersecting street(s) of 75 square feet in size** and at ~~least~~ **minimum of 4 feet wide. Lengths of non-entrance medians are to be approved by the Transportation Director.** Where median widths are specified, a median of not less than the designated width must be provided.
- 8.3. *Contents.* Structures, permanent materials or plantings within the island **or median** should not obscure the visibility of cars entering a cross street for a distance of 20 feet back from the curb face of the cross street, unless a larger setback is needed due to inadequate sight distance created by horizontal or vertical curve alignment. Islands **and medians must** ~~should~~ be landscaped at a density equivalent to a Class “A” buffer as set forth in the Landscaping Standards of in the City’s development ordinances.
- 8.4. *Specifications.* The nose of the median must be at least 6 feet from edge of **the** perpendicular thru lane. Standard **2’-6”** curb **and guttering should be used unless 1’-6” is approved** ~~must be used~~. A minimum 14-foot ~~travelway~~ **travel way** must be provided on each side of the median/island. **Medians and islands which encroach into NCDOT R/W must be approved by NCDOT.**

9.0 Drainage Standards

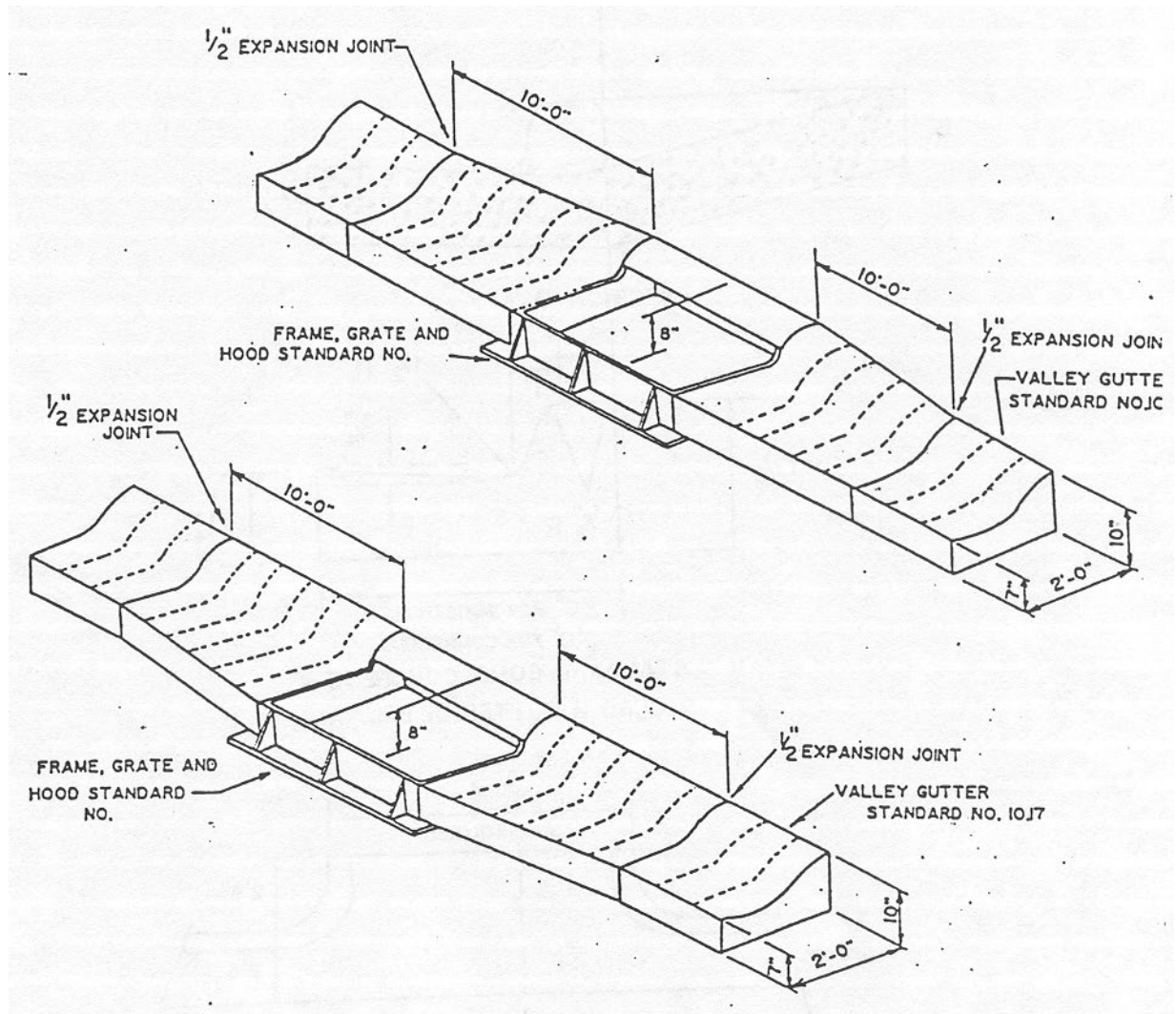
–A drainage system must be provided that adequately facilitates the movement of stormwater off and under streets. This drainage system may include curbs and gutters, catch basins, stormwater pipes, and graded channels. Each component of the drainage system should be designed by a registered professional engineer and installed in accordance to City construction specifications and standards. Please refer to Article 1 Section 3 of these Technical Standards.

9.1. Curbs and Gutters.

- a. *Required Locations.* Concrete curbs and gutters must be included on all new streets, ~~on and~~ all existing streets **which the property to be subdivided or developed fronts, and on all streets** that provide access to a new development or subdivision, except those listed in the following subsection.
- b. *Exemptions.* Concrete curbs and gutters are not required along the following streets:
1. Interstate highways,

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0-c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:



2. Numbered State highways with topography that does not allow for reasonable or practical installation, and
 3. Numbered State highways where the N.C. Department of Transportation ~~has not determined the ultimate right-of-way width~~ stipulates no curb and gutter should be installed.
- c. Specifications.

Figure 9-1: Curb and Gutter Detail.

1. Curbs and gutters must be built in accordance with City of Concord Standards and NCDOT Standards. ~~NCDOT Standard 846.01 for Standard 2'-6" curb and gutter~~ is to be used on all ~~major and minor collector streets~~ streets. Valley curb is allowed

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~~0 c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:~~

~~only~~ on local streets and alleys.

~~2. All excess concrete on the front edge (lip) of gutter shall be removed when curb and gutter is poured with a machine.~~

~~1.3. All curb and gutter shall be backfilled with soil approved by the inspector within 48 hours after construction to prevent erosion.~~

9.2. **Catch Basins.**

a. *Required Locations.* Catch basins shall be located:

1. ~~Aas~~ outlined in Article 1 ~~Section 3~~ of these Technical Standards, and
2. On both sides of the street at low points.

b. *Specifications.*

1. Catch basin frames and grates must be in accordance with NCDOT Standards. Improvised grates will not be acceptable.
2. Catch basin frames must be cast with the following statement: "Dump No Waste Drains to Stream" or a comparable statement as approved by the Director of ~~Environmental Services~~ ~~Engineering~~.
3. Catch basins must be built in accordance with NCDOT Standards.
- ~~4.~~ ~~Catch basins~~ walls must be built straight with inside joints struck smooth. Precast catch basins may be acceptable with the approval of the Director of Engineering.
- ~~4.5. Roll-over frame and grate inlets are not permitted within driveways.~~

9.3. **Pipes.**

a. *Stormwater.*

1. *Required Locations.* Stormwater pipes should be placed at all low points in the street grade to transmit storm water transversely across the street. Additionally, stormwater pipes should be parallel ~~to~~ the street, but not under the street, ~~when necessary to~~ ~~unless~~ transmitting stormwater from one catch basin to another ~~on the opposite side of the street.~~
2. *Size.* The minimum pipe diameter shall be fifteen (15) inches, regardless of the size of the drainage area.
3. *Depth.* The minimum cover for all pipe shall be two (2) feet, ~~or as otherwise approved for Class IV and V RCP in accordance with NCDOT Standards.~~
4. *Material.* All pipe must be concrete conforming to the ~~N.C.~~-DOT Standard

~~0-c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:~~

~~Specifications of Road and Structures. For special conditions, alternative pipe materials recommended by the manufacturer for the type of installation involved, and involved and approved by the Director of Engineering will be considered. Any concrete pipe laid between the concrete curbs shall be reinforced.~~

- ~~b. Construction. All pipe must be laid with the bell or groove upgrade and joint entirely interlocking.~~
- ~~c. Groundwater. Subdrainage must be provided where the groundwater table is within two (2) feet of the subgrade. Subdrainage design must be approved by the Director of Engineering.~~
- ~~d. Graded Channels. Ditches proposed within the street rights-of-way will need to be approved on a case to case basis. Ditches should be a minimum of thirty-six (36) inches deep and two (2) feet in width. Ditches, swales, or other drainage features shall not be designed or allowed to discharge concentrate water flow onto or across sidewalks.~~

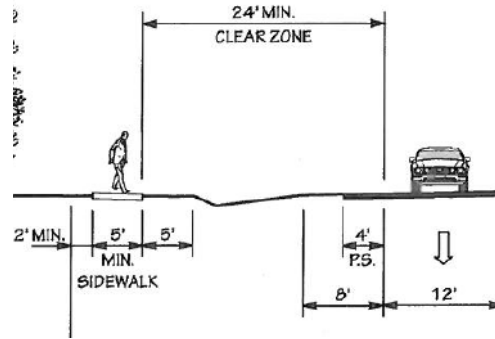
10.0 Sidewalk Standards

10.1. Locations. Sidewalks should be provided for the safe movement of pedestrians, separate from the movement of vehicular traffic, through residential, commercial, and industrial areas, as well as public places. Sidewalks must be constructed along both sides of all new streets in a subdivision, ~~and~~ along any street ~~that~~ which the property to be subdivided fronts and any street which provides access to the subdivision. ~~Multi-Family and Non-Residential developments shall provide sidewalk along the frontage of existing streets regardless of whether the site property is being subdivided.~~ Sidewalks ~~may~~will not be required along interstate highways (not designed for curb and gutter). Where identified in adopted City plans, Multi-Use paths will replace sidewalk where required.

- a. Except in unusual circumstances, sidewalk must be located a minimum of (8) eight feet from the back of the curb or at the back of the right-of-way. A recorded public sidewalk easement is required for all sidewalk located outside the public right-of-way, the width shall be equal to the distance from the right-of-way line to the back of the sidewalk plus a minimum of two feet or to the face of building, whichever is less. The sidewalk easement must be recorded with the Cabarrus County Register of Deeds prior to issuance of a certificate of occupancy for the corresponding building(s).
- b. Along NCDOT highways where curb and gutter is not recommended or approved by NCDOT, the minimum clear zone for sidewalks and multi-use paths is 24' as measured from the edge of the closest parallel travel lane subject to approval by NCDOT.

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~~10.1.~~

10.2. **Specifications.** Sidewalks must:

- a. Have a minimum five (5) foot width;
- b. Be constructed of not less than three thousand **six hundred (3,0600)** pound-per-square-foot **inch** concrete;
- c. Be a minimum of four (4) inches thick when adjacent to standard 30" curb and gutter, the sidewalk must be six (6) inches thick when **placed** adjacent to valley curb and gutter **and no planting strip is present;**
- ~~e.~~ **d. Be a minimum of six (6) inches thick at driveway crossings**
- ~~d.~~ **e. Be constructed on a ~~n adequately compacted and~~ properly graded base **with subgrade compacted to 95% of the maximum density obtainable with the Standard Proctor Test,****
- ~~e.~~ **f. Have a lateral slope of one-quarter (1/4) inch per foot toward the street,**
- ~~f.~~ **g. Be steel-~~trowelled~~ **troweled** and light broom finished and cured properly,**
- ~~g.~~ **h. ~~Have~~ tooled joints at intervals of not more than five (5) feet and expansion joints at intervals of not more than forty (40) feet,**
- ~~h.~~ **~~Be separated from the back of curb by a six-foot planting strip, and~~**
- ~~i.~~ **Meet all current Americans with Disabilities Act (ADA) standards, ~~and,~~**
- ~~j.~~ **Meet NCDOT specifications for concrete sidewalks, ~~stricter of any sapecification applies;~~**
- ~~i.~~ **k. Be designed and located so as to prevent transmission of drainage water from swales, ditches or other graded channels across the surface.**

10.3. **Transitions to Street Grade.** Access ramps must meet current **ADA and** NC-DOT standards and be constructed with materials that are approved by the Director of Transportation. **Truncated dome mats at all access ramps shall be red in color.**

~~0 c.CBU units or combination of 32 or less mail receptacles may be located along a _____ street, other than a thoroughfare, provided a separate pull-off area is provided and _____ all of the following are met:~~

11.0 Curb and Gutter, and Sidewalk Exemptions

Applicability. Refer to Article 10 of the UDO.

12.0 Guardrails

12.1. Applicability.

- a. Guardrails must be provided in all areas required in accordance with the NC-DOT Roadway Design Manual.
- ~~b. Additionally, guardrails must be provided along all areas, regardless of the design speed, where an eight foot or greater drop in elevation exists between the edge of pavement and the area extending 40 feet beyond the edge of pavement, unless:~~
 - ~~1. Greater than or equal to 13 feet of flat, unobstructed area exists beyond the edge of pavement, and~~
 - ~~2. A 3:1 or flatter unobstructed slope exists beyond the flat area, and~~
 - ~~3. At least 8 feet of flat, unobstructed area exists beyond the toe of the slope.~~

13.0 Street and Subdivision Naming Standards

13.1. Uniqueness.

- a. Proposed street and subdivision names must not duplicate nor too closely approximate phonetically the name of any street within Cabarrus County.
- b. Where proposed streets are extensions of existing streets, the existing street names shall be used except where a new name can reasonably be used to facilitate proper house numbering or to avoid further street name duplication.

13.2. Labels.

In addition to names to identify new streets, the following labels must be included:

- a. A street oriented in a general north-south direction must be labeled a “Street;”
- b. A street oriented in a general east-west direction must be labeled an “Avenue;”
- c. A street that changes direction may be labeled a “Drive,” “Lane,” or “Road;”
- d. A street that forms a loop where both ends intersect with the same street may be labeled a “Circle;” and

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- ~~e.~~ A cul-de-sac or street terminating in a similar dead-end must be labeled a “Place” if oriented in a north-south direction and a “Court” if oriented in an east-west direction.

~~e.—~~

14.0 Sign Standards

~~14.1. Standard Signs.~~ In all subdivisions that include public streets, except as provided below, standard street signs should be installed by the City of Concord. The developer must reimburse the City for the full cost of the installation. ~~Costs associated with signs requiring reinstallation due to damage or removal prior to City acceptance of the streets are the responsibility of the developer. The performance of installation, maintenance, and replacement of signs on public streets after the streets have been accepted by the City are the responsibility of the City.~~ **Signage Plan.** A separate signage plan should be included with the site plan showing the locations of all signs (stop, speed limit, street blades, no-parking, etc.). Signs should be indicated as standard or decorative.

~~14.1.14.2. Standard Signs.~~ In all subdivisions that include public streets, except as provided below, standard street signs should be installed by the City of Concord. The developer must reimburse the City for the full cost of the installation. Costs associated with signs requiring reinstallation due to damage or removal prior to City acceptance of the streets are the responsibility of the developer. The performance of installation, maintenance, and replacement of signs on public streets after the streets have been accepted by the City are the responsibility of the City.

~~14.2.14.3. Decorative Custom Signs Treatments.~~ [Encroachment process.] In subdivisions with architectural standards, restrictive covenants, and a property owner's association, ~~decorative custom street sign treatments s may shall may~~ be installed by the developer with all costs of installation, maintenance, and replacement paid by the developer. ~~Sign panels themselves shall be procured from the City of Concord for installation on the custom sign treatments. An encroachment agreement for the custom sign treatments must be completed prior to the installation approval of a site plan containing decorative signage.;~~

a. Specifications.

~~14.3. Decorative Custom street signs treatments~~ must comply with the Manual on Uniform Traffic Control Devices (MUTCD) published by the U.S. Department of Transportation and City of Concord standards, ~~may be installed only after written approval by the City Director of Transportation.~~ Submission requirements for consideration of ~~custom street decorative~~ signs treatments shall include detailed color drawings, plans and specifications of the proposed street signs, signage plan showing locations, and a written statement describing funding for installation, maintenance, and replacement.

~~0 c.CBU units or combination of 32 or less mail receptacles may be located along a _____ street, other than a thoroughfare, provided a separate pull-off area is provided and _____ all of the following are met:~~

~~14.4. b. Replacement.~~

- ~~1. Regulatory and Warning Signs.~~ Replacement of lost or damaged regulatory or warning signs, as defined by the ~~Uniform Manual~~ MUTCD, must be accomplished ~~immediately~~ within mandated time periods by the City using standard street signs until the developer or property owner's association installs replacement ~~custom decorative street sign treatments~~. If the developer or property owner's association fails to install replacement ~~custom street decorative signs treatments~~ for regulatory and warning signs within ninety (90) days, the replacement by the City shall be considered permanent and the full cost must be paid by the developer or property owner's association.
- ~~2. Guide Signs.~~ Replacement of lost or damaged guide signs, as defined by the MUTCD, on decorative sign treatments must be accomplished by the developer or property owner's association within ninety (90) days or the City shall install standard street signs with full costs paid by the developer or property owner's association.

~~14.5. _____~~

~~2. Guide Signs.~~ Replacement of lost or damaged guide signs, as defined by the Uniform Manual MUTCD, on decorative sign treatments must be accomplished by the developer or property owner's association within ninety (90) days or the City must install standard street signs with full costs paid by the developer or property owner's association.

~~14.6. _____~~

~~:~~

15.0 Public Street Acceptance

The City of Concord may consider the acceptance of streets/roads for maintenance upon written request. The City reserves the right to refuse acceptance of maintenance of streets which are not built to the standards outlined in the Technical Standards Manual or, upon inspection, are found to require redesign or extensive repair work to bring the street(s) up to current standards. Alleys will not be accepted by the City for maintenance.

15.1 A street must meet the following minimum requirements to be considered for public maintenance:

- a. Must be within City of Concord City limits,
- b. Shall be contiguous to streets currently maintained by the City or NCDOT. Streets which do not directly connect to an existing public street maintained by the City or NCDOT will not be accepted.

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- ~~c. Must meet current standards as outlined in the City of Concord Technical Standards.~~
- ~~d. Must be platted with at least minimum Right-of-Way (R/W) required for the designated classification.~~
- ~~e. The Owner(s)/Applicant(s) must not otherwise be in default of any other obligation to the City of Concord.~~

15.2 Newly Constructed Streets Platted for City Maintenance

To initiate the acceptance procedure for newly constructed streets platted for City maintenance, the following information shall be submitted to the City Engineer:

- a. An Application for Street Maintenance Acceptance (Appendix A). The street(s) shall not have had the final surface lift of asphalt laid for more than 12 months.
- b. One (1) PE Certification for Subdivisions and Streets (Appendix B), including applicable reports and inspection data.
- c. One (1) Pavement Core Results Report. The report will include a cover letter, table of contents, project scope, data collection methodology, description of project limits, a map at a legible scale of the project limits containing street names, lengths, cross sections, and the location of the pavement core samples. The report will also include a core results table with street name, applicable City of Concord Technical Standards Manual Typical Section, core result material and thickness (in inches), and a statement of whether or not the core result meets the current minimum design standard per the applicable typical section. Pavement core samples shall be taken at 500' intervals (minimum of 1 core per street block), and no more than 4.0' from the centerline of the road. This report must be signed, dated, and stamped by a North Carolina registered professional engineer. The City may acquire its own pavement core samples as a quality control
- d. Copies of all soils, compaction, concrete, and other applicable inspection data and records for all streets included in the acceptance request.
- e. Upon receipt of the request, the City will perform an inspection of the subject street(s), and a review of all submitted materials. The City shall notify the owning entity of all construction deficiencies required to be corrected. Upon satisfactory inspection and/or completion of corrective measures, re-inspection, and final approval by the City Engineer, the street acceptance request will be presented to City Council for approval.
- f. All additional requirements of Section 5.7.8 thru 5.7.10 of the City of Concord Development Ordinance apply to street acceptance.

15.3 Existing Private Streets

To initiate the acceptance procedure for existing private streets for City maintenance the following information shall be submitted to the City Engineer by the Applicant(s):

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~~0-c.CBU units or combination of 32 or less mail receptacles may be located~~
along a _____
~~street, other than a thoroughfare, provided a separate pull-off area is provided~~
and _____
~~all of the following are met:~~

- a. Private Street Maintenance Acceptance Petition (Appendix C), representing a minimum of 75% of the linear frontage of property owners (one per parcel) within the request area in favor of the request.
- b. One (1) map of the area with the subject streets identified.
- c. Copies of plats for all parcels with frontage along the subject street.
- d. Encroachment request information sheet for all non-city utilities.
- e. Upon receipt of the petition, the City Engineer or their representative will perform an inspection of the subject street(s), and review all submitted materials. The City shall notify the Applicant(s) of all deficiencies required to be corrected, and the Right-of-Way (R/W) that will be required to be dedicated for the subject street(s).
- f. Once the Applicant(s) receives notification of deficiencies and R/W requirements they should inform the City Engineer within one-hundred and twenty (120) days if they wish to continue the acceptance request.
- g. If the Applicant(s) wish to continue the request they will be responsible for correcting any identified deficiencies using a licensed contractor where applicable and ensuring the street(s) and related infrastructure meet current standards as outlined in the Technical Standards Manual (TSM). Where necessary, designs for the required work shall be prepared by a licensed professional engineer.
- h. If R/W is required for acceptance, the Applicant(s) will be responsible for having a Plat(s) prepared by a licensed professional land surveyor showing dedication of the required R/W. The Plat(s) should be accompanied by appropriate documentation from 100% of the landowners where the proposed R/W encroaches upon their property. The City of Concord will not provide compensation for any property dedicated as R/W as part of a voluntary request for acceptance of a private street for City maintenance.
- i. Upon satisfactory inspection and/or completion of corrective measures, re-inspection, approval of R/W dedication Plat(s), and final approval by the City Engineer, the street acceptance request will be presented to City Council for approval.

15.4 Dedication of Public Streets on a Final Plat

- a. When a *street* is dedicated in connection with a *subdivision*, the approval of a *final plat* shall not be deemed to constitute or effect the acceptance by the City of Concord of any *street* shown on the *final plat*. All streets proposed for public dedication are subject to acceptance for maintenance in accordance with Section 15 of this Article.

15.5 City Council Street Acceptance

Street acceptance requests must be approved by City Council during a regular council meeting. It is the applicant's responsibility to ensure the City Engineer has all documentation necessary for the request to be placed on the Council Agenda. No requests

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~~_____ for street acceptance will be considered during the June council meeting.~~

~~15.0~~**16.0 Unopened, Dedicated Street Standards**

Streets for which right-of-way has been dedicated by subdivision plat or deed to the North Carolina Department of Transportation or the City of Concord and recorded with the Cabarrus County Register of Deeds, but have never been constructed ~~or accepted for public maintenance,~~ will not be constructed or maintained by the City until the following conditions have been met:

~~15.1.16.1. _____ Rights-of-way sufficiently wide for the street and utilities, as determined by the Director of Engineering, have been dedicated, and surveyed if necessary, sufficiently wide for the street and utilities, as determined by the Director of Engineering.~~

~~15.2.16.2. _____ Right-of-way has been cleared and graded to meet City standards for slope and drainage.~~

~~15.3.16.3. _____ Roadway shall be constructed or improved to the standards set forth in this Article of the Technical Standards Manual, with a surface of crusher-run stone to a depth of not less than eight (8) inches, two and a quarter (2.25) inches of intermediate course, and two (2) inches of surface course. Width of roadway shall be not less than eighteen (18) feet.~~

~~15.4.16.4. _____ The Director of Engineering or their/his/her authorized representative has inspected all work.~~

~~16.5. _____ The Director of Engineering or their/his/her authorized representative has issued a certificate of completion for the required improvements.~~

~~15.5. _____ City Council has approved the acceptance of the street(s) for public maintenance and the warranty period has passed.~~

~~16.0~~ **Alley Standard**

~~_____ For developments utilizing alleys in their design, the following standard shall be used. Alleys are private streets which will not be accepted by and the City does not accept for maintenance.~~

~~0-c.CBU units or combination of 32 or less mail receptacles may be located along a _____ street, other than a thoroughfare, provided a separate pull-off area is provided and _____ all of the following are met:~~

17.0 Cluster Mailbox Unit Requirement Standards

It is the responsibility of the Applicant to ensure that the appropriate method of mail delivery and locations are coordinated and approved with local USPS representatives for all proposed developments.

17.1 Site Plan Approval

A site plan will be required for review prior to approval of Cluster Mailbox Units (CBUs) associated with any subdivision or development application. If for any reason after approval of a site plan the location and other details pertaining to CBUs is altered, a revised site plan will be required to be submitted for review and compliance to all pertinent technical standards.

17.2 18.1—Arrangement

~~a. _____ a. _____ The location of CBU(s) is preferred to shall be located outside the public right-of-way _____ and located in a centralized common area(s) of the development. Sufficient parking should be provided to serve the location(s).~~

~~b. CBUs or combinations with 16 or less mail receptacles may be located along a local residential street outside of the R/W, provided all the following are met:~~

- ~~1. Posted speed limit on street is 25 mph or less.~~
- ~~2. Sidewalk must be located on the same side of the street as the CBU.~~
- ~~3. Access to the mailbox by users must be from the non-street side of the CBU.~~
- ~~4. The structure is located so that no conflicts with utilities, above or underground, exist.~~
- ~~5. At least one dedicated accessible parking space, on or off-street, is provided.~~

~~_____ CBUs or combinations of 32 or less mail receptacles may be located along a local or residential collector street provided all of the following are met:~~

~~a.c.~~

- ~~1. _____ 1. _____ Posted speed limit on the street is 35 mph or less.~~
- ~~2. _____ 2. _____ Sidewalk must be located on the same side of street as the CBU.~~
- ~~3. _____ 3. _____ Access to the mailbox by users must be from the non-street side of the CBU.~~
- ~~4. The structure(s) is located so that no conflicts with utilities, above or underground, exist.~~

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~~0-c.CBU units or combination of 32 or less mail receptacles may be located along a _____ street, other than a thoroughfare, provided a separate pull-off area is provided and _____ all of the following are met:~~

- ~~5. _____ 4. AA separatededicated on or off street pull-off or parallel parking area is provided with an appropriate _____ amount of parking spaces.~~
- ~~d. CBUs or combinations of 33 or more mail receptacles require a separate lot with street type driveway access containing an appropriate number of dedicated parking spots.~~
- ~~e. CBUs or combinations of any number for non-residential or multi-family developments and/or subdivisions require a separate lot with street type driveway access containing an appropriate number of dedicated parking spots.~~

17.3 Location

All cluster mailbox units and associated on-street parking must be erected:

- a. No closer than 100 feet measured from the curb-line of intersecting streets.
- b. Away from any location whereby reason of the position of, shape or color, it may interfere with or obstruct the view of, or be confused with any authorized traffic sign, signal or device.
- c. So as not to obstruct sight distance along the roadway and at intersecting streets, driveways, greenways, or trail facilities.
- d. No closer than 10 feet away from a residential driveway serving a detached, semi-attached, or townhome dwelling.
- e. In common areas or near property lines rather than directly in front of a residence.
- f. Outside of public or private utility easements, public or private storm drainage easements, and at least 10 feet away from water meters and cleanouts.
- g. No closer than 500 feet, measured along the street, from another CBU.

17.4 Signs & Markings

In areas where parking is provided for CBU(s), permissible parking signs shall be installed on both ends of the defined parking area and designated specifically for mail parking. Signs R7-21a, shall be used that states "MAIL PARKING, 15 MINUTE LIMIT." Reserved accessible spaces shall be clearly marked with an international accessibility symbol marked on the pavement and signs R7-8 and R7-8a installed. All pavement markings and signs shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).

17.5 Lighting

Suitable and sufficient lighting to illuminate the CBU and associated parking areas (where applicable) should be provided for all CBU locations.

17.6 Maintenance

- a. The City does not have any responsibility for mail delivery; therefore, the city does not

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~~0-c.CBU units or combination of 32 or less mail receptacles may be located along a _____ street, other than a thoroughfare, provided a separate pull-off area is provided and _____ all of the following are met:~~

~~own or maintain CBUs.~~

~~b. The City will not be responsible for clearing snow and accumulations from the sidewalk, designated parking areas (if applicable), and pad around the CBU. In addition, the area around the CBUs is to be kept clean from trash and debris and clear from any obstacles that could impede mail delivery or retrieval.~~

~~c. These responsibilities must be provided by mailbox users or a legally responsible organization (i.e. homeowner's association, other legally recognized association, etc.) as acceptable to the Administrator. Documents to assure private responsibility of maintenance and repair by a homeowner's association or other legally recognized entity shall be approved as to form by the City Attorney.~~

17.7 Signs on CBUs

~~Signage affixed to CBUs located along streets is prohibited.~~

17.8 Construction of CBUs

~~Materials and specifications for the installation of CBUs and concrete pads are to be in accordance with USPS requirements and their approved manufacturer list.~~

17.9 CBU Parking Requirements

~~_____~~

~~a. CBUs, or combinations of CBUs, require designated parking spots per Table 17-1.~~

~~_____~~

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~~0-c.CBU units or combination of 32 or less mail receptacles may be located along a street, other than a thoroughfare, provided a separate pull-off area is provided and all of the following are met:~~

Table 187-1: CBU Parking Requirements:

CBU -Parking Requirements		
Number of Mail Receptacles	Accessible Parking Spaces*ets	Regular Parking Spacesets
0-16	-1	1
17-3248	1	-1
33-48	1	1
49-64	1	2
65-80	1	3
81-96	1	4
97-112	1	5
>112	**	**

*Where only 1 accessible space is provided, it must be van accessible.

**Requirements to be determined on a case by case basis.

18.0 ReferencesReferences

The following are publications, documents, models, etc. that were used as guidance or direct reference for developing this Article. -They are provided for citation and further review by the user of the contents of this article. Later editions and/or revisions of these references may be created in the future and shall be considered part of the standards in this manual where applicable.

North Carolina department of Transportation Standard Specifications for Roads and Structures, latest edition January 2018.

North Carolina Department of Transportation, Roadway Standards Drawings, -2018.

City of Concord Technical Standards Manual, Article 1, Stormwater.

American Association of State Highway and Transportation Officials, A Policy on Geometric Design of Highways and Streets, 7th edition.

North Carolina Department of Transportation, Roadway Design Manual, 2021.

North Carolina Department of Environment and Natural Resources, Erosion and Sediment Control Planning and Design Manual, 2013.

NCDENR, Storm Water Best Management Practices, 2020.

Federal Highway Administration, Manual on Uniform Traffic Control Devices (MUTCD), -2009.

City of Concord Technical Standards Manual

Article III

~~Driveways~~ Driveways & Street Connections



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1.0 Purpose

The safety and efficiency of streets are impacted by the amount and type of interference experienced by the vehicles traveling on it. The purpose of this Article is to minimize interference with traffic flow and accidents and promote the best overall utilization of the street by controlling vehicles entering, leaving, and crossing the street at intersections and driveways. The City recognizes the right of abutting property owners to access their property from the street; however, the rights of other users of the street to travel with relative safety and freedom from interference must also be considered. ~~These standards have been established:~~

The requirements contained within this article will serve as the rules and regulations to permit connections to public streets per Article IV, Section 50-121 of the City Code of Ordinances and have been established:

- 1.1. To provide maximum safety and protection to the public through the regulation of vehicles entering and exiting public streets, and
- 1.2. To provide uniform standards for the design, location, operation, and construction of driveways and street connections throughout the City, and
- 1.3. To provide owners of abutting property with the maximum service feasible, consistent with the safe and efficient use of City streets.

2.0 Applicability

2.1. This article includes the standards for all access points and driveways planned to connect to a ~~publicly maintained~~publicly maintained street within the corporate limits and extraterritorial jurisdiction of the City of Concord. Standard details are provided in the Concord Manual of Standard Details to be used in conjunction with this article. In the event of a conflict between the standard details and the provisions in this Article, the stricter standards will apply. These provisions apply to that portion of the private driveway from the point where it connects to the edge of the public right-of-way.

~~2.2. These provisions apply to that portion of the private driveway from the point where it connects to the edge of the public right-of-way.~~

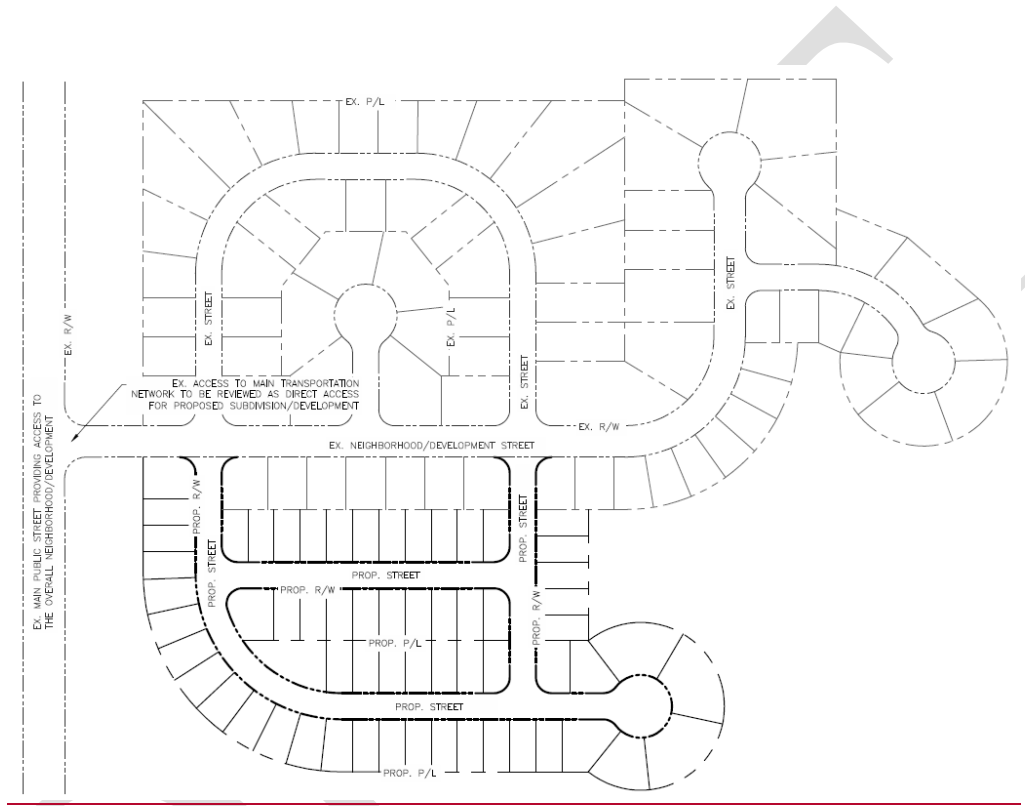
~~2.3.2.2.~~Standards for private driveways on private property are included in Article 10 of the Development Ordinance.

2.3. Existing driveway approaches or street connections may not be relocated, altered, or reconstructed without a permit approving the relocation, alteration, or reconstruction; such driveway approaches are subject to the provisions of this article.

2.4. Where proposed accesses connect to an existing public or private neighborhood/development street network with no more than two (2) non-gated entrances/outlets, the proposed development may be

considered an expansion of the existing neighborhood/development and the existing entrances may be considered direct access entrances serving the proposed development and may be subject to current standards as they would apply to the proposed development. See figure 2.4-1 for an example.

Figure 2.4-1: Existing Development Expansion Example



2.4.

2.5. Changes in property use, property ownership or traffic volumes that will affect existing driveway approaches are subject to the provisions of this article.

- a. Where NCDOT stipulates a new/revised driveway permit is required if access is taken on a state-maintained street.

3.0 Driveway Permits

3.1. A driveway permit must be received prior to the creation of any access point subject to this article.

3.2. A new driveway permit will be required for non-residential change of use development plans if they meet any of the following criteria:

a. A new driveway permit will be required for non-residential change of use development plans if they meet any of the following criteria. Current driveway is in disrepair and does not meet City minimum design

b. When a change of use results in an additional 20 daily trips per day above the existing use.

c. In cases where the existing driveway does not meet ADA accessibility requirements.

d. When there are significant changes to the on-site parking layout and circulation pattern.

3.1.

3.3. If not completed as part of a previous application process, an approved Traffic Impact Analysis (TIA) and subsequent Transportation Mitigation Agreement (TMA) is required prior to the approval of Driveway Permits for all proposed non-residential and mixed-use developments, all multi-family and single-family attached residential developments, and all other residential developments with 6 or more total dwelling units. Refer to the Technical Standards Manual (TSM), Article VIII, Traffic Impact Analysis, for TIA requirements.

3.2.3.4. The application process and requirements for issuance of this permit are provided in Article 6.

3.5. The North Carolina Department of Transportation (NCDOT) is required to review all connections to state system streets, ~~unless —This includes both driveway and street connections, with the exception of single family residential drives, which are~~ exempt from state review requirements. The Applicant is responsible for ensuring all NCDOT Driveway Permit materials are submitted to NCDOT as applicable. The City will not accept nor handle money associated with any NCDOT fees.

3.6. All connections to City maintained streets which will potentially add traffic or otherwise impact an existing City to State system connection will be reviewed by NCDOT to determine the potential for, and extent of improvements to State facilities to ensure the overall transportation infrastructure is adequate to serve proposed developments.

3.3.3.7. When determined that improvements are needed on NCDOT maintained streets and a NCDOT driveway permit is not required for the proposed access(s), an encroachment agreement between the Applicant and the NCDOT will be required for any work to be done within NCDOT right-of-way in accordance with NCDOT guidelines.

3.4.3.8. State system streets are those streets within the city for which the state retains the ultimate responsibility. The more restrictive driveway standards (NCDOT or City of Concord) apply.

3.5.3.9. Driveway permits on state system streets, within the municipal limits of Concord, must also be submitted to the City for ~~the~~ initial review.

3.6.3.10. ~~Upon the City's approval, the site plans and NCDOT driveway permit forms will be forwarded to NCDOT for their approval.~~ When a NCDOT Driveway Permit or Encroachment Agreement is required, concurrent review is allowed however, the City cannot approve a development Site Plan until such time as final approval of the NCDOT Driveway Permit Encroachment Agreement application and plans approved by NCDOT are provided.

3.11. The maximum number of driveways allowed for any parcel prior to the subdivision of property is three.

3.7.3.12. Approval of a City Driveway Permit is contingent on the determination by the City and/or NCDOT that the overall existing transportation infrastructure, or planned improvements, is adequate to serve proposed accesses.

4.0 Driveway Approach Standards

4.1. Widths.

- a. All driveway approach widths are measured at the street right-of-way line and the width of any driveway shall not increase within the right-of-way except at properly designated radii and curb returns.
- b. The width from the edge of pavement perpendicularly to the edge of pavement must be greater than the minimum widths and smaller than the maximum widths provided below:

Table 4-1: Minimum and Maximum Access Widths.

Driveway Types	Driveway Width (feet)		Flare/Radius (feet)	
	Minimum	Maximum	Minimum	Maximum
Residential Single Family (Detached)	12	20	1	3
Residential Single Family (Attached)	<u>10</u>	<u>20</u>	<u>1</u>	<u>3</u>
Residential Multi-Family	24	36	5	10
Commercial/Industrial Two-Way	24	36	10	30
Commercial/Industrial One-Way	15	20	10	30
Private Street Entrance	24	48	10*	30*
Street Type Driveway	24	36	10*	30*

* Radius only.

- c. Ramp type driveway approaches may use either a standard drop curb opening or curb radius from the street curb to the inside sidewalk line. If a curb radius is used, the top elevation of the curb radius must be held level with the elevation of the street curb, and the driveway approach must be raised to meet the elevation of the ~~curbline~~ curb line at the inside sidewalk line.

4.2. Location.

- a. The driveway approach must be installed to the right-of-way line, ~~or~~ at least ten feet from the edge of the street and/or back-of-curb, or at least 5' from the edge of sidewalk furthest from the edge of the street. The greatest distance will apply.

- b. No portion of a driveway may be located within a sight triangle.

- 4.2.c. Driveways accessing Major or Minor Thoroughfares, Boulevards, or Major Collectors must provide on-site turnaround to prevent backing into the street from the driveway.

4.3. Materials.

- a. Types.

1. *Portland Cement Concrete.* All driveway approaches must be Portland cement concrete (30600 psi min.) apron sections ("ramp" type), unless specifically listed in the asphaltic concrete section.

2. *Asphaltic Concrete.* Asphalt paving is not allowed on any driveway apron connecting to a public street with granite curbing or concrete curb and gutter. Asphalt may be allowed if the pavement design is approved by the Director of Transportation and only for the following situations:

- (a) Street type driveway entrances, which may be required for public or private developments that have parking spaces for two hundred (200) or more vehicles;
- (b) Driveways connecting to unpaved public streets;
- (c) Driveways connecting to stone surface public streets; or
- (d) Driveways connecting to public streets constructed of asphalt ribbon pavement.

5.0 Driveway Separation

- 5.1 **Minimum Driveway Separation.** Driveways must be spaced as outlined in Table 5-1, ~~provided all other requirements of this article are met. Single family and duplex developments on individual lots of record are exempt from the spacing standards;~~

however, driveways associated with these uses cannot be located within sight triangles and driveways, for corner lots, driveways should be located as far as possible from the intersection.

Table 5-1: Minimum Driveway Separations

Functional Classification	Separation between Driveways ¹	Separation between Driveway and Public Street ²
Major Thoroughfare	400 feet	250 feet
Minor Thoroughfare	400 feet	250 feet
Major Collector	120 feet	120 feet
Minor Collector ³	50 feet	60 feet
Non-Residential & Multi-Family	50 feet	60 feet
Single-Family Detached	30 feet	30 feet
Local Street (Inc. Alleys)	40 feet	60 feet
Non-Residential & Multi-Family	50 feet	60 feet
Single-Family Detached	30 feet	30 feet
Single-Family Attached	15 feet	30 feet

¹ Distance is measured from closest edge to closest edge.

² Distance is measured from closest edge of the driveway the closest parallel edge of the street right-of-way. Minimum stem lengths apply to all entrances to proposed developments from intersecting streets, the greatest distance will apply. Minimum separation between Driveways and Streets should be equal to the number shown in the table, the minimum distance required to ensure no portion of a driveway falls within a sight triangle, or the minimum stem length required along entrances to proposed developments. The greatest distance will apply.

5.2 Stem Lengths. The stem length shall be measured from the parallel edge of right-of-way of the intersecting street to the first point of conflict, such as parking areas or intersections. Where no right-of-way is dedicated along a private street, the stem length shall be measured from the closest edge of the intersecting street. Stem lengths for non-residential and multi-family driveways shall be established by raised curb and gutter or other acceptable physical barrier to prevent vehicles from entering and exiting the driveway within the required length. Minimum stem lengths are listed in Table 5-2.

a. Residential Stem Lengths. Minimum stem lengths for single-family residential developments will be required along all proposed entrances to the proposed development from intersecting streets.

b. Non-Residential Stem Lengths. Minimum stem lengths for non-residential and multi-family uses will be required along all streets. The stem length shall be measured from the perpendicular travel lane to the first point of conflict, such as parking areas or intersections. Minimum stem lengths are listed in Table 5-2.

c. **Gated Driveways.** In order to ensure that no part of any vehicle using a driveway remains in or overhangs the R/W, sidewalk, or street while waiting on the gate to operate, proposed gates for all detached and attached residential driveways shall be located a minimum of 24 feet from the R/W, and proposed gates for all non-residential and multi-family driveways shall be located a minimum distance per the stem lengths shown in Table 5-2, or further if design vehicle is longer than the minimum stem length.

Table 5-2: Minimum Stem Lengths.

Functional Classification	Minimum Stem Length (feet)
Major Thoroughfare	125 feet
Minor Thoroughfare	100 feet
Major Collector	75 feet
Minor Collector	75 feet
Non-Residential & Multi-Family	70 feet
Single-Family Residential	60 feet
Local Street (Inc. Alleys)	50 feet

5.1.5.3. **Side Clearance.** All driveway approaches must have a minimum side clearance from property line as specified in Table 5-3. Additional side clearance may be needed to accommodate required turn lanes, deceleration lanes and/or tapers.

Table 5-3: Minimum Side Clearance.

Land Use	Minimum Side Clearance
Single-Family Residential Uses	5 feet
All Other Uses	10 feet

5.2.5.4. **Shared Access Points.** Landowners of adjacent property, may, by written mutual agreement, construct a joint driveway to service both properties provided that all other requirements of this article are met apart from the side clearance restriction along the property line where the access is located. Minimum separation of shared accesses shall follow Table 5-1 with the exception that the minimum separation for shared access points for Single-Family Attached from adjacent driveways shall be 30 feet. A shared access is treated as a single driveway for the purposes of allowed widths.

5.3.5.5. **Corner Clearance.** All driveway approaches must have a minimum clearance ~~of sixty (60) feet~~ from the edge of parallel public rights-of-way (street intersections) to the nearest edge of the driveway approach as indicated by the minimum separations and/or stem lengths shown in Tables 5-1 and 5-2.

5.4.5.6. **Corner Lots.** Driveways associated with corner lots should be located on the street with

the lower street functional classification (i.e., the lowest traffic volume).

6.0 Median and Island Standards for Driveways

6.1. **Applicability.** Medians and islands may only be allowed in street-type driveways. Medians and islands are not permitted for ramp-type driveways.

6.2. **Location.** Raised medians and islands must be constructed on private property outside of the public right-of-way, unless required as an approved access management device.

6.3. **Size.**

1. The minimum width of the island (excluding the nose) as measured nearest the public right-of-way must be four (4) feet or six (6) feet for a planted median.
2. The minimum length must be fifty (50) feet.
3. For street type driveways with a median or island, the combined width of pavement of the separated driveway segments shall not exceed forty-eight (48) feet.
4. High volume street-type driveways with medians will be reviewed and approved on a case by case basis.

5. Minimum travel width on either side of medians and islands is 14'.

4. —

7.0 Alignment and Grades

~~7.1. **Side Clearance.** All driveway approaches must have a minimum side clearance as specified in Table 7-1. Additional side clearance may be needed to accommodate required turn lanes, deceleration lanes and/or tapers.~~

~~Table 7-1: Minimum Side Clearance.~~

Land Use	Minimum Side Clearance
Single-Family Residential Uses	5 feet
All Other Uses	10 feet

~~Corner Clearance.~~ All driveway approaches must have a minimum clearance ~~of sixty~~

~~(60) feet from the edge of parallel public rights-of-way (street intersections) to the nearest edge of the driveway approach, as measured along the edge of the perpendicular public right-of-way as indicated by the minimum separations and/or stem lengths shown in Tables 5-1 and 5-2. This requirement is not applicable to a residential subdivision with a lot width less than 85'.~~

~~7.2.~~

~~**Corner Lots.** Driveways associated with corner lots should be located on the street with the lower street functional classification (i.e., the lowest traffic volume).~~

~~7.3.~~ 7.1 – 7.3 moved to 5.3 – 5.5

~~7.4.7.1.~~ **Sidewalk Crossings.** Driveway approaches must cross the sidewalk area at the existing or proposed sidewalk grade. The sidewalk must be constructed separately from the driveway apron. Sidewalk should be a minimum of 6" thick at driveway crossings.

~~7.2.~~ **Angle.** The driveway angle (the angle between the driveway centerline and the ~~curbline~~ curb line) must be ninety (90) degrees, unless engineering considerations dictate otherwise, as and approved by the Director of Transportation.

~~7.5.~~

~~7.6.7.3.~~ **Directional Restrictions.**

- a. Where special pedestrian or vehicular hazards may be encountered, driveway approaches may be restricted to one-way operation.
- b. Such driveways shall be clearly signed and marked as one-way driveways using pavement arrows and directional signs.
- c. Failure to erect and maintain such signs or the failure to use these driveways in accordance with the signing and marking shall be considered a violation of this article.

~~7.7.7.4.~~ **Near Traffic and Utility Structures.**

- a. No driveway approach shall be permitted to encompass any municipal facility, including but not limited to:
 1. traffic signal standards elements,
 2. catch basins,
 3. fire hydrants,
 4. crosswalks,
 - 3.5. curb ramps,
 6. loading zones,
 - 4.7. utility poles,

- 5.8. fire alarm supports,
- 6.9. meter boxes, and/or
- 7.10. sewer cleanouts.

b. The driveway approach must be located a minimum of 3 feet from any such facilities.

~~7.8. Shared Access Points. Landowners of adjacent property, may, by written mutual agreement, construct a joint driveway to service both properties provided that all other requirements of this article are met with the exception of a part from the side clearance restriction along the property line where the shared access is located. Minimum separation of shared access points shall follow Table 5-1 with the exception that the minimum separation for shared access points for Single-Family Attached shall be 30 feet. Moved to 5.4~~

8.0 Turn Lanes

8.1 Dedication and construction of turn lanes may be needed to serve one or more entrances into a development. Turn lanes must be provided for conditional uses, special uses, driveway permits, or subdivision approvals for developments proposing direct or indirect (i.e. adding accesses to existing dead end or limited access neighborhood/development street networks) adjacent access to two-lane public streets with average daily traffic (ADT) exceeding four thousand (4000) vehicles per day, or four-lane or larger public streets with ADT exceeding ten thousand (8,000) vehicles per day, if any one of the following conditions are also present:

8.1. a. Fifty (50) or more off-street parking spaces are required;

8.2. b. More than (100) trips during the peak hours of 7:00 a.m. and 9:00 a.m., 11:00 a.m. and 1:00 p.m., and 4:00 p.m. and 6:00 p.m. are generated. Data shall be based on the latest edition of the Institute of Transportation Engineers Manual titled "Trip Generation" and based upon the highest land use permitted by the zoning classification considering any restrictions imposed by any conditional use permit, special use permit, or other legally enforceable restriction;

8.3. c. More than twenty-five (25) truck (more than 13,000 G.V.W.) trips per day through a single driveway are expected;

8.4. d. Special safety or traffic conditions exist due to limited sight distance and/or posted speeds in excess of thirty-five (35) miles per hour along the adjacent public street; or

8.5. e. At least fifty (50) attached or detached residential dwelling units are served by the

access point.

8.2 In addition to the criteria listed above, Tables C-1 and C-2 in Appendix C, Article VIII of the TSM, offers further guidance to warrant the installation of dedicated left or right turn lanes on streets throughout Concord.

8.3 NCDOT publishes a chart (pg. 80) in the NCDOT Policy On Street and Driveway Access that recommends storage lengths for left and right turn lanes based on the number of turns versus the opposing volume of traffic. This chart should be used as a basis for determining the storage length required for turn lanes into a site. The chart is included in Appendix C, Article VIII of the TSM. The typical minimum length is 100' for tapers, and 100' for storage. Storage and taper lengths less than 100' will be reviewed on a case-by-case basis.

8.4 Turn lanes should be designed per NCDOT recommendations. Two charts (pages 78 and 79) outlining NCDOT recommended treatments for turn lanes, included in the NCDOT Driveway Permit Manual, are provided in Appendix C, Article VIII of the TSM for general reference.

Note: Dual right- or left-turn lanes should be considered when the turning volume exceeds 300 vehicles per hour.

8.5 Where turn lanes are determined to be needed based on the above criteria, they will be considered necessary improvements for the transportation infrastructure to be considered adequate to safely and efficiently serve proposed accesses.

9.0 One-Way Access Point Standards

9.0

9.1. Signage.

a. Location.

1. At a minimum, one double-faced sign must be located on private property at least ten feet from the back of the curb to the right of each driveway approach.
2. Additional signs may be placed on the opposite side of the approach.
3. The sign should not be blocked from view by vegetation or other obstacles.

b. Size.

1. The area of the sign cannot be less than three square feet or more than six square feet.
2. Business logos may be used but shall not exceed one-third of the sign area.

c. *Content.* Only the words “Enter” and “Exit” or “In” and “Out” with the appropriate arrow shall be used.

d. *Lettering Standards.*

1. Uppercase letters must be at least six inches tall; however, eight-inch letters are preferred;
 2. Lowercase letters must be at least four inches tall; however, six-inch letters are preferred;
 3. The first letter of each word must be uppercase; and
 4. Letters must be black or white on a reflectorized or illuminated background of contrasting color.
- e. *Arrow Standards.*
1. Arrow dimensions must be at least six inches long with a shaft width of at least two inches.
 2. The head of the arrow must be at least twice as wide as the shaft.
 3. Arrows must be comprised of thermoplastic material.
- f. *Pavement Arrows.*
1. *Location.* A sufficient number of pavement arrows designating the appropriate direction of traffic must be installed in the driveway approach and driveway so that they are clearly visible to oncoming traffic.
 2. *Size.* Pavement arrows must be a minimum of eight feet in length and shall conform in size and proportion to the standards set forth in the Manual on Uniform Traffic Control Devices.

10.0 Roadside Drainage

A well-functioning roadside drainage system is important to maintaining the structural integrity of the street and providing a safe driving surface during storm events.

- 10.1. **Drainage System.** Roadside drainage is accomplished using ditches, driveway pipes, curb and gutter, or some combination of both systems.
- 10.2. **Modifications** to existing drainage systems must be evaluated and approved by the City prior to construction, and are reviewed and permitted as a part of the site plan or subdivision construction plan approval process.
- 10.3. **Piping Existing Ditches**
- a. The design and cost for piping existing roadside ditches is the responsibility of the property owner unless it is included as part of a neighborhood capital improvement project funded by the City of Concord.
 - b. Piping ditches will only be allowed if the following criteria are achieved:
 1. The hydraulic capacity of the existing ditch system will not be reduced or diminished.
 2. The culvert pipe shall be of size adequate to carry the anticipated flow in the ditch

as determined by the City of Concord and shall not be smaller than 15-inches inside diameter.

3. The flow from and to adjacent properties will not be inhibited.
4. All pipe materials and installation meet City of Concord and NCDOT standards. No pipe with broken joints or other defects is allowed.
5. A swale must be maintained over the pipe to prohibit sheet flow of water from the property onto the road surface, and adequate inlet grates are included in the design and installation. In no case shall the construction cause water to flow across the pavement, or to pond on the shoulders or in the ditch, or result in erosion within the right-of-way.
6. A minimum cover of 8-inches must be maintained over the top of the pipe. If vehicular traffic will cross the pipe, a minimum cover of 24-inches must be maintained, or Class IV reinforced concrete pipe must be utilized.
7. Pipe installation must be inspected by the City prior to back-filling the pipe and inlet boxes.
8. All grates and frames shall meet NCDOT standards for traffic bearing, and must be pre-approved by the City of Concord.
9. Drainage collected by ditches, gutters, or pipes on private property shall not be discharged into the road drainage system unless expressly approved by the City of Concord. The applicant may be required to submit a drainage study to the City justifying the drainage system proposed and the pipe or sewer sizes to be used. Natural drainage laws and practices must be observed.

10.4. Pipe Construction Options

- a. All commercial or industrial sites are responsible for the design, construction and cost associated with all drainage improvements in accordance with these regulations.
- b. All residents have two options for construction of the ditch pipe, once a permit has been issued:
 1. The City will contract with a licensed contractor following payment of all estimated costs associated with the project to the City by the owner. The project will then be completed based upon the Contractor's schedule.
 2. The resident will hire a licensed contractor who will complete the project according to the submitted plans. The contractor will be responsible to schedule inspection by the City prior to placing any backfill into the excavation, so that all pipe joints, bedding, and inlet construction can be inspected.
- c. Failure to obtain the proper permit and/or inspection may result in the pipe being removed at the owner's expense.

10.5. Acceptable Piping Materials

- a. All pipe located within the street right-of-way must be reinforced concrete pipe or other acceptable material approved on a case-by-case basis, high density polyethylene

~~plastic pipe, double-walled corrugated pipe with a smooth interior, meeting ASHTO M294 Type S (smooth interior—corrugated exterior) that has been approved by the NCDOT for use in secondary and subdivision road systems.~~

- ~~b. No corrugated metal pipe is allowed.~~
- ~~e. Approved HDPE pipe includes the following, but documentation on other manufactures will be reviewed for consideration:~~
 - ~~1. Advanced Drainage System (ADS) N-12 HDPE pipe~~
 - ~~2. Hancor Hi-Q HDPE pipe~~

10.6. Acceptable Grates and Frames

- a. All grates and frames must be cast iron and must meet City of Concord and NCDOT standards.
- b. Each casting shall be permanently imprinted with the image of a fish and the following statement: “Dump No Waste! Drains to Streams.”
- b.c. Roll-over grates are not acceptable within driveways.**

11.0 Inspections

11.0

- 11.1 Once the permit is duly issued, the supervisor on the driveway construction site shall keep the permit available for on-the-job inspection by authorized personnel of the city.
- 11.2 The applicant shall request an inspection by ~~the Director of Transportation~~ **a city inspector** 24 hours in advance of any concrete pouring. The Director of Transportation or ~~his/her~~ authorized representative shall have the authority to require the immediate stoppage of work not performed under the requirements of this article.
- 11.3 In the event of failure to comply with the provisions of this article or the term of the permit or in the case of faulty workmanship or materials, **the permit may be revoked and the property owner will be required to remove or correct** ~~the city may remove~~ the non-complying driveway at the property owner’s expense.

12.0 Street and Utility Repairs

- 12.1. Operations requiring the cutting and removal of roadway and sidewalk surfaces, or operations interfering with the normal flow of vehicular or pedestrian traffic shall be subject to the guidelines set forth in Part VI of the Manual of Uniform Traffic Control Devices.
- 12.2. Prior to cutting of the street, sidewalk or curb and gutter, a street cut permit is required to be obtained from the Director of Transportation or their designee. No street cut permits will be issued for streets that have been resurfaced within the last two years, unless there is an emergency situation or other physical constraints and approved by the Director of Transportation.

- 12.3. Cost of replacing the asphalt, concrete or other materials and other related costs such as street cleaning, sidewalk cleaning, etc. as a result of the above described work will be paid by the permit holder.
- 12.4. A copy of the permit must be kept at the job location.
- 12.5. Street cuts and sidewalks should be completely repaired in an expedient manner.
 - a. Cuts must be filled with stable material (asphalt, concrete or approved equal) to within 1 ½ inches of finished grade within 3 days of initial work.
 - b. Finished roadway surfaces, sidewalks and curbs must be restored within 30 days of initial work.
- 12.6. If circumstances justify, the Director of Transportation may grant an extension of these time requirements.

13.0 Use and Protection of Property

13.1. Rights-or-Way.

- a. Rights-of-way of streets may not be used for private or commercial purposes without an approved encroachment agreement. ~~approved by City Council.~~
- b. The area to which the driveway provides access shall be sufficiently large to store any vehicles using the driveway completely off the right-of-way and must be of sufficient size to allow the necessary function to be carried out completely on private property. This includes vehicle queues from drive-through and curb side services.

13.2. Raised Curbing.

- a. Except for driveway approaches to single family residences, a six (6) inch raised curb shall be constructed a minimum distance of three (3) feet behind the street right-of-way line in the vicinity of:
 1. street corners,
 2. sidewalk safety zones,
 3. entrance driveways and other points.
- b. Construction of curbing should be completed in such a manner as to:
 1. prevent vehicles from crossing sidewalks other than by means of a driveway as herein prescribed,
 2. prevent vehicular overhang on the right-of-way and
 3. provide for proper drainage and control of water on private property.

13.3. Parking areas and loading areas.

- a. Parking and loading areas shall be constructed, marked, signed, and properly curbed

so that all movements to park and un-park, and load and unload will take place back of or within property lines.

- b. In the central business area, the Director of Transportation is hereby granted the authority to waive requirements set forth in this subsection after all engineering investigation and provided the following conditions are present:
 1. The area is within the parking exempt area of the city;
 2. The waiver requested arises from peculiar physical conditions not ordinarily existing in other areas of the city;
 3. Due to the nature or operation of the business on the applicant's property the requirements of the above causes unnecessary hardship;
 4. The waiver requested is not against the public interest, safety, convenience, and general welfare; and
 5. The granting of the waiver will not adversely affect the rights of adjacent property owners.
- 13.4. Except as may be provided for under the Concord City Code, Part II, Chapter 580, ~~Traffic and Vehicles~~ **Streets, Sidewalks, and Other Public Places**, no part of the right-of-way or the area between the curb or edge of pavement and the property line shall be used to place private signs, fences, wall post lights, or any other item. All such items shall be placed on private property in such a manner as not to interfere with vehicular or pedestrian traffic or visibility.

14.0 Protecting the public from injury

- 14.1. Whenever any person or firm shall do or undertake any of the items set forth in this article it shall be the duty of such person(s) to protect from harm and damage all persons or vehicles which may be using any street, sidewalk, right-of-way or other public area where such work is in progress.
- 14.2. All persons or firms shall erect and maintain suitable barricades, signs, lights, flares and other appropriate warning devices at the proper locations where such work is in progress in accordance with the current policy and regulations for street construction and maintenance operations within the City of Concord, as established by the Director of Streets and Traffic Engineering and in accordance with the Manual on Uniform Traffic Control Devices.
- 14.3. Permits for driveway construction can only be issued to persons who are properly licensed and bonded to work within the street or highway right-of-way.
- 14.4. The city's intent is to further increase safety and decrease congestion along specified major thoroughfares. In order to accomplish these objectives, certain goals have been identified. These goals are:
 - a. To prohibit driveways within a certain distance of intersecting streets unless alternate

access is not available,

- b. To decrease the number of driveways along major thoroughfares, and
- c. To increase the distance between adjacent driveways along major thoroughfares.

16.0 ~~15.0~~ Non-Residential and Multi-family Development

156.1 Parking Aisle and Space Dimensions

Minimum dimensions of standard parking spaces (other than compact car spaces and handicap spaces) and maneuvering area shall be as set forth in 10.3-1 below.

~~(a) Handicapped Spaces~~

- a. ~~Handicapped~~ **Accessible** parking spaces shall be a minimum of 13 feet by 18 feet for a single non-van space (8 feet in width in addition to a 5 foot access aisle); a minimum of 16 feet by 18 feet for a single van space (~~8~~ **eight** feet in width in addition to an ~~8~~ **eight** foot access aisle, **or 11 feet in width in addition to a 5 foot access aisle**); or 24 feet by 18 feet for a double van space, or a non-van and van double space (~~8~~ **eight** feet in width for each space with an eight foot access aisle between spaces). **Accessible** ~~P~~ parking spaces ~~for handicapped or disabled persons~~ shall comply with the N.C. Accessibility Code ~~(do we have this to insert)~~.

~~(b) Compact Car Spaces~~

- b. **Compact Car Spaces are only permitted in** ~~This section shall apply only to~~ parking facilities providing 100 spaces or more. Not more than 20 percent of the off-street parking spaces required by this Section shall be designed as compact car parking spaces. Each compact car parking space shall be a minimum of eight feet wide and 16 feet long. Compact car parking spaces shall be clearly marked or posted for "Compact Cars Only." All other provisions of this Article relating to off-street parking requirements shall be met.

Parking Area Dimensional Standards

For standard-size vehicles

A	B	C	D	E	F	G
45°	9.0'	18.0'	12.0' ONE-WAY	8.0'	51.0'	2.0' / 4.0'
60°	9.0'	18.0'	18.0' ONE-WAY	8.0'	58.0'	2.0' / 4.0'
90°	9.0'	18.0'	24.0' TWO-WAY	8.0'	60.0'	2.0' / 4.0'

For compact-size vehicles (see Sect. 8.3.2.2)

A	B	C	D	E	F	G
45°	8.0'	16.0'	N/A	8.0'	N/A	1.5' / 3.0'
60°	8.0'	16.0'	N/A	8.0'	N/A	1.5' / 3.0'
90°	8.0'	16.0'	N/A	8.0'	N/A	1.5' / 3.0'

Note: Parallel parking spaces shall be 9' by 26' with a 20' two-way access, or a 12' one-way access.

Key (also see Figure 10.1-1):

- A. Parking Angle
- B. Stall Width
- C. Stall Depth
- D. Aisle Width
- E. Planting Island Width (minimum width shown, refer to Article 7 for minimum area)
- F. Parking Bay Width
- G. Bumper Overhang (front / rear)

DRAFT

16.2 Overhang Protection

Wheel or bumper guards or curbing shall be provided, located and arranged so that no part of any parked vehicle will extend beyond the boundaries of the parking space and into a pedestrian crossing area.

Except where a wall is constructed, a minimum six inch high vertical concrete curb (or individual bumper guard) shall be constructed or installed so that no part of a vehicle extends beyond the property line.

16.3 Striping Required

Off-street parking areas, as required by this Ordinance, shall be striped in accordance with the dimensions as set forth in ~~this § 10.3.~~ **Standard DRV-121, and shall be 4" white paint.**

16.4 Sight Triangles

~~Sight Triangles for intersections of driveways and public streets shall be regulated in accordance with Article 10 and the City's Technical Standards Manual.~~

Location of Driveway(s):

**CITY OF CONCORD
STREET AND DRIVEWAY ACCESS PERMIT**

STAFF USE ONLY:

Property Street Address _____

Driveway #1: Exact Distance _____ N S E W
From the Intersection of _____ and _____ heading toward _____

Driveway #2: Exact Distance _____ N S E W
From the Intersection of _____ and _____ heading toward _____

Driveway #3: Exact Distance _____ N S E W
From the Intersection of _____ and _____ heading toward _____

Permit Number _____

Street File _____

Approval Date _____

Property Use: Commercial Industrial Residential/ Subdivision Other

Current Property Zoning: _____

Overlay District (if applicable): _____

Type of Existing Street Infrastructure: Curb & Gutter Shoulder Section Existing Surface: Concrete Asphalt

Access Agreement

I, the undersigned property owner and/or agent, request access and permission to construct driveway(s) or street(s) on public right-of-way at the above location.

I agree to construct and maintain driveway(s) or street entrance(s) in absolute conformance with the City of Concord "Standard for Access to Public Streets" as adopted by the City of Concord City Council.

I agree that no sign or objects will be placed on or over the public right-of-way.

I agree that the driveway(s) or street(s) will be constructed as shown on the sketch on (the reverse side) (the attached plans).

I agree that the driveway(s) or street(s) as used in this agreement include any approach tapers, storage lanes or speed change lanes as deemed necessary.

I agree that in any future improvements to the roadway become necessary, the portion of driveway(s) or street(s) located on public right-of-way will be considered the property of the City of Concord, and will not be entitled to reimbursement or have any claim for present expenditures for driveway or street construction.

I agree that this permit becomes void if construction of driveway(s) or street(s) is not constructed within the time specified by the City of Concord "Standard for Access to Public Streets".

If a commercial access permit is applied for. I agree to pay a \$50 inspection fee. Make Check payable to the City of Concord. The inspection fee will be reimbursed if application is denied.

I agree to construct and maintain the driveway(s) or street(s) in a safe manner so as to not interfere with or endanger the public travel.

I agree I am responsible for all utility locations, signing, and maintaining the work area from vehicular or pedestrian hazards until the work is repaired and complete by either the grantee or by the City of Concord. The appropriate signage and barricades shall be used according to the latest version of the Manual on Uniform Traffic Control Devices (MUTCD) and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the City of Concord Department of Transportation.

The owner and/or agents, upon submission of this application, hereby indemnifies and holds harmless the City of Concord, its officers and agents from any and all liability resulting from all work performed pursuant to this permit by the owner or contractor on the public right-of-way.

I agree the costs of making any improvements or other related costs such as sidewalk replacement, curb repair / replacement, sidewalk and street cleaning, etc., as a result of the above-described work will be paid by the grantee.

I agree that the City of Concord will assume no responsibility for any damages that may be caused to such facility, within the highway right-of-way, in carrying out its construction.

I AGREE TO NOTIFY THE CITY OF CONCORD ENGINEERING DEPARTMENT PRIOR TO WORK BEGINNING AND UPON COMPLETION.

THIS PERMIT SHALL BE CONSIDERED OFFICIAL AND MUST BE KEPT AT THE WORK LOCATION AND BE AVAILABE FOR INSPECTION BY CITY OFFICIALS.

IF APPROVED, THIS PERMIT WILL BE GRANTED TO THE PROPERTY OWNER. ANY CHANGE IN PROPERTY OWNERSHIP WILL REQUIRE A NEW OR REVISED DRIVEWAY ACCESS PERMIT. RESULTS MAY INCLUDE CHANGES TO OR CLOSURES OF EXISTING DRIVEWAYS.

	Driveway Width	Radius/Flare	Pipe Size*	Pipe Length*	Pipe Type*
1					
2					
3					

Applicant to contact City of Concord Environmental Services to determine driveway pipe size, material, etc. at (704) 920-5372. (if necessary).

Property Owner

Witness

Name: _____

Name: _____

Signature: _____

Signature: _____

Address: _____

Address: _____

_____ Phone #: _____

_____ Phone #: _____

Applicant (if different than owner)

Witness

Name: _____

Name: _____

Signature: _____

Signature: _____

Address: _____

Address: _____

_____ Phone #: _____

_____ Phone #: _____

Approvals By City

Approved By:

Transportation

Signature

Title

Date

Engineering

Signature

Title

Date

Processed By:

Signature

Title

Date

Comments:

Sketch Plan (If no plans are attached, use this sheet. If plans are attached, please only include sheets that show driveway(s) and/or street(s))

Please attach Proposed Plans or sketch driveway(s) or streets(s) below.

Drawing must show:

- Location of driveways; both proposed and all adjacent existing driveways
- Details of Work, including pipes
- Existing buildings, walls, etc.
- Proposed building, walls, etc.
- Roadway features (including %grades and required roadway improvements if applicable)

Indicate North



City of Concord

Technical Standards Manual

Article II

Streets and Pedestrian Paths

Appendix B

PE Certification for Subdivisions and Streets



PE Certification for Subdivisions and Streets

Subdivision: _____ Phase / Map: _____

Street(s): _____	Length: _____
_____	Length: _____
_____	Length: _____
_____	Length: _____
_____	Length: _____
_____	Length: _____
_____	Length: _____
_____	Length: _____

A final inspection of the streets, and complete storm drainage system for the above referenced subdivision has been performed by _____. I have reviewed the inspection data and have determined that all public infrastructure has been constructed in accordance with the design drawings approved by Cabarrus County and the City of Concord on _____ and all subsequent revisions. My observations and testing indicate the subgrade, base, and pavement have been constructed in accordance with the guidelines established by the City of Concord, as verified by the attached test results.

_____	_____	_____
Signature	Print Name	Date

NC PE #

Seal

Received by City of Concord: _____
(initials)

Date: _____

PE Certification for Subdivisions and Streets – Checklist

TYPICAL SECTION

- _____ - Roadway has been constructed in the center of the right of way.
- _____ - Normal crown and/or superelevation have been properly established.
- _____ - Curb & gutter and/or ditches have been constructed properly with no standing water.
- _____ - Backfill of all curb & gutter / sidewalk properly placed and compacted.
- _____ - All slopes have been properly graded.
- _____ - Street Trees have been installed in accordance with approved plan.

ROADWAY CONSTRUCTION

- _____ - Subgrade density tested at minimum of every 200 LF, minimum of 3 tests per street, and 2 tests in each cul-de-sac. First 8” of subgrade compacted to at least 100% of that obtained by compacting a sample of the material in accordance with AASHTO T 99 as modified by NCDOT indicated for each test as shown in attached soil compaction reports.
- _____ - Subgrade has been proof rolled over the entire section. (pass/fail data & remarks included)
- _____ - Stone depth verified at 1 location per station (data included). Minimum design depth must be achieved over the entire roadway section.
- _____ - Stone density tested at minimum of every 200 LF, minimum of 3 tests per street, and 2 tests in each cul-de-sac. Stone base compacted to at least 100% of maximum density obtainable with the Modified Proctor Test (AASHTO-T180) indicated for each test as shown in attached stone compaction reports.
- _____ - Stone base has been proof rolled over the entire section. (Pass/fail data & remarks included)
- _____ - Prime Coat applied when/where needed.
- _____ - Asphalt course(s) was inspected for failures and appropriate repairs made prior to placement of each successive course.
- _____ - Tack Coats were applied between each layer of asphalt.

PAVEMENT PLACEMENT

- _____ - Asphalt placement temperatures & mix designs verified.
- _____ - Each asphalt course was tested for density at a minimum of 90% of the maximum specific gravity per attached results reports.
- _____ - Pavement Core Results Report (attached) indicates the core results meet the current minimum design standards per the City of Concord Technical Standards. Core samples shall be taken at 500’ intervals (minimum of 1 core per street block), and no more than 4.0’ feet from the centerline of the street.

DRAINAGE

- _____ - All materials are approved for use. (NCDOT stamp, etc.)
- _____ - All grates/frames/hoods are free of damage and of domestic origin.
- _____ - Masonry drainage structures have been properly constructed – steps installed, inverts poured, pipes cut and grouted, backfill compacted, and free of debris.
- _____ - All pipe inlets, outlets, and channels are properly stabilized and free of erosion.
- _____ - Pipes have been installed with proper cover and slope.
- _____ - Pipe sizes are correct. (per plans)

TRAFFIC CONTROL

- _____ - All traffic control signs are installed in locations per approved plans and are free of damage.
- _____ - All signs comply with MUTCD requirements.
- _____ - Encroachment agreement has been approved for all signs with decorative treatments.

Signature

NC PE #

Print Name

Seal

City of Concord

Technical Standards Manual

Article II

Streets and Pedestrian Paths

Appendix A

**Application for New Street
Maintenance Acceptance**



City of Concord

Technical Standards Manual

Article II

Streets and Pedestrian Paths

Appendix C

Private Street Maintenance

Acceptance Petition



Private Street Maintenance Acceptance Petition

I _____, being a property owner along the identified street segment(s), agree to be the main contact to the City in regards to this Petition.

There are a total of _____ properties along the street segment(s) listed on the Private Street Maintenance Acceptance Form. There are _____ valid signatures on the petition form, which represent _____ % of the properties along the identified street segment(s).

I certify, to the best of my knowledge, the signatures on the petition form are those of the property owners of record, that they are valid, and that only one signature per property has been considered in the above percentage.

Number of petition sheets attached: _____

Print Name

Address

Phone Number

Email Address

Date: _____

Signature of Applicant

Private Street Maintenance Acceptance Petition

We the undersigned, petition the City of Concord to accept the below identified street segment(s) for City maintenance.

STREET **FROM** **TO** _____

Support from 75% of the property owners (one per property) along each street segment is required for the street acceptance request to move forward in the approval process.

<p>By signing below I certify that I support the request for the above street segment(s) to be accepted into the City’s public street network, and that I have read and understand Section 15, Article II of the City’s Technical Standards Manual in regards to Public Street Acceptance.</p>		
<p>PROPERTY OWNER PRINTED NAME & SIGNATURE</p>	<p>ADDRESS</p>	<p>TELEPHONE #</p>

This sheet may be duplicated as needed.



CITY OF CONCORD
MANUAL OF STANDARD DETAILS

MARCH 2022

DRV - DRIVEWAY STANDARDS	
<i>Standard</i>	<i>Title</i>
DRV-100	GENERAL DRIVEWAY (DW) NOTES & DIMENSIONS
DRV-101 (2 SHEETS)	GENERAL DRIVEWAY LOCATION DIMENSIONS
DRV-102	DROP CURB RAMP TYPE DW (PLANT STRIP & 2'-6" C&G)
DRV-103	RADIUS CURB RAMP TYPE DW (PLANT STRIP & 2'-6" C&G)
DRV-104	RES. RAMP TYPE DW (BOC 2'-6" C&G)
DRV-105	STREET TYPE DW (2'-6" C&G)
DRV-106	RES. RAMP TYPE VALLEY CURB
DRV-107	RAMP TYPE DW RIBBON PAVEMENT
DRV-108	CONC. CURB & GUTTER DRIVEWAY CUT
DRV-120	ACCESSIBLE PARKING AND SIGNAGE STANDARDS
DRV-121	STANDARD PARKING DIMENSIONS

MI - MISCELLANEOUS INFRASTRUCTURE STANDARDS	
<i>Standard</i>	<i>Title</i>
MI-101	CONC. CURB & GUTTER DETAILS
MI-102	CURB TRANSITION (2-6 TO 2)
MI-103	CURB TRANS. 2-6 TO 1-6
MI-104	CONC. SWLKS
MI-105	SWLK TRANS.
MI-106	CONCRETE MULTI-USE PATH
MI-107	ASPHALT MULTI-USE-PATH
MI-109	TYP. INTERSECTION CURB RAMP LAYOUT AND NOTES
MI-110	TRUNCATED DOMES
MI-111	PERP. CR 2-6 C&G
MI-112	PERP. CR 2-0 VALLEY C&G
MI-113	DIRECTIONAL CURB RAMP SMALL/MED RADIUS
MI-114	DIRECTIONAL CURB RAMP LARGE RADIUS
MI-115	DIRECTIONAL CURB RAMP W/VALLEY CURB
MI-116	PED REFUGE MEDIAN (1'-6" CURB)
MI-117	PED REFUGE MEDIAN (MONOLITHIC CONC.)

STR - STREETS STANDARDS	
<i>Standard</i>	<i>Title</i>
STR-101	LOCAL RESIDENTIAL (RES.) STREET
STR-102	RES. COLLECTOR STREET
STR-103	RES. COLLECTOR STREET WITH BICYCLE LANES
STR-104	RES. COLLECTOR WITH PARALLEL PARKING
STR-105	RES. COLLECTOR WITH 45 DEG. REVERSE ANGLE PARKING
STR-106	NON-RES. COLLECTOR
STR-107	NON-RES. COLLECTOR WITH BICYCLE LANES
STR-108	NON-RES. COLLECTOR DIVIDED
STR-109	NON-RES. COLLECTOR 45 DEG. ANGLE PARKING
STR-110	NON-RES. COLLECTOR PARALLEL PARKING
STR-111	RES. CUL-DE-SAC LESS THAN 150'
STR-112	RES. CUL-DE-SAC GREATER THAN 150' (ENCROACHMENT)
STR-113	NON-RES. AND MIXED USE CUL-DE-SAC
STR-114	RES. ALLEY
STR-116	TRANSITION BETWEEN STREET CLASSIFICATIONS
STR-118	CATCH BASIN IN VALLEY CURB
STR-119	CULVERT CROSSING
STR-120	ON-STREET PARALLEL PARKING
STR-121	ACCESSIBLE ONSTREET PARALLEL PARKING
STR-122	ON-STREET REVERSE ANGLE PARKING

MISC - MICELLANEOUS STANDARDS	
<i>Standard</i>	<i>Title</i>
MISC-201	CURB AND GUTTER REMOVAL / REPLACEMENT
MISC-202	UTILITY CUT REPLACEMENT DETAIL
MISC-203 (2 SHEETS)	END OF ROAD BARRICADE
MISC-204	END OF ROAD MARKER
MISC-205	END OF STREET FUTURE DEV. SIGN
MISC-206 (2 SHEETS)	SAFETY RAIL & WARRANTS

NOT TO SCALE



CONCORD MANUAL OF STANDARD DETAILS
TABLE OF CONTENTS

MINIMUM DRIVEWAY SEPARATION		
	CORRESPONDING DIST. FROM DETAIL SHEETS	
	D	C
FUNCTIONAL CLASSIFICATION (STREET A)	SEPARATION BETWEEN DRIVEWAYS ¹ (FEET)	SEPARATION BETWEEN DRIVEWAY & STREET ² (FEET)
Major Thoroughfare		
Non-Res. & Multi-Family	400	250
Single-Family Detached	150	250
Minor Thoroughfare		
Non-Res. & Multi-Family	400	250
Single-Family Detached	150	250
Major Collector		
Non-Res. & Multi-Family	120	120
Single-Family Detached	120	120
Minor Collector		
Non-Res. & Multi-Family	50	60
Single-Family Detached	30	30
Local Street (Inc. Alleys)		
Non-Res. & Multi-Family	50	60
Single-Family Detached	30	30
Single-Family Attached	10	30

¹ Distance is measured from the closest edge to the closest edge.

² Distance is measured from closest edge of the driveway to the closest parallel edge of the street right-of-way. Minimum separation between Driveways and Streets should be equal to the number shown in the table, the minimum distance required to ensure no portion of a driveway falls within a sight triangle, or the minimum stem length required along entrances to proposed developments. The greatest distance will apply.

SIDE CLEARANCE	
LAND USE	S MINIMUM SIDE CLEARANCE
Single-Family Residential Uses	5 Feet
All Other Uses	10 Feet

MINIMUM STEM LENGTHS	
CLASSIFICATION OF PERPENDICULAR STREET	L - MINIMUM STEM LENGTH (FEET)
MAJOR THROUGHFARE	125
MINOR THROUGHFARE	100
MAJOR COLLECTOR	75
MINOR COLLECTOR	
Non-Residential & Multi-Family	70
Single Family Residential	60
LOCAL STREET (INC. ALLEYS)	50

MINIMUM AND MAXIMUM ACCESS WIDTHS				
DRIVEWAY TYPES	W - DRIVEWAY WIDTH (FEET)		F - FLARE / R-RADIUS (FEET)	
	MIN.	MAX.	MIN.	MAX.
Res. Single-Family (Detached)	12	20	1	3
Res. Multi-Family	24	36	5	10
Comm./Industrial (two-way)	24	36	10	30
Comm./Industrial (one-way)	15	20	10	30
Private Street Entrance	24	48	10*	30*
Street Type Driveway	24	36	10*	30*

*Radius only

DRIVEWAY NOTES:

1. ALL CONNECTIONS TO STATE MAINTAINED STREETS MUST BE APPROVED BY NCDOT UNLESS EXEMPT.
2. WHERE NCDOT AND CITY STANDARDS DIFFER, THE STRICTEST STANDARDS MEETING THE MINIMUM REQUIREMENTS OF BOTH WILL APPLY.
3. THE DRIVEWAY APPROACH MUST BE INSTALLED TO THE RIGHT-OF-WAY LINE, AT LEAST 10 FEET FROM THE EDGE OF THE STREET AND/OR BACK OF CURB, OR AT LEAST 5' FROM THE EDGE OF SIDEWALK FURTHEST FROM THE EDGE OF THE STREET. THE GREATEST DISTANCE WILL APPLY.
4. DRIVEWAYS ACCESSING MAJOR OR MINOR THOROUGHFARES OR BOULEVARDS MUST PROVIDE ON-SITE TURNAROUND.
5. DRIVEWAYS ASSOCIATED WITH CORNER LOTS SHOULD BE LOCATED ON THE STREET WITH THE LOWER FUNCTIONAL CLASSIFICATION.
6. REFER TO SECTION 7.5 IN ARTICLE II OF THE TECHNICAL STANDARDS MANUAL (TSM) FOR SIGHT TRIANGLE REQUIREMENTS.
7. REFER TO ARTICLE III OF THE TSM FOR MORE STANDARDS PERTAINING TO DRIVEWAYS.

NOT TO SCALE



GENERAL DRIVEWAY NOTES &
DIMENSIONS

3-2022

DRV-100

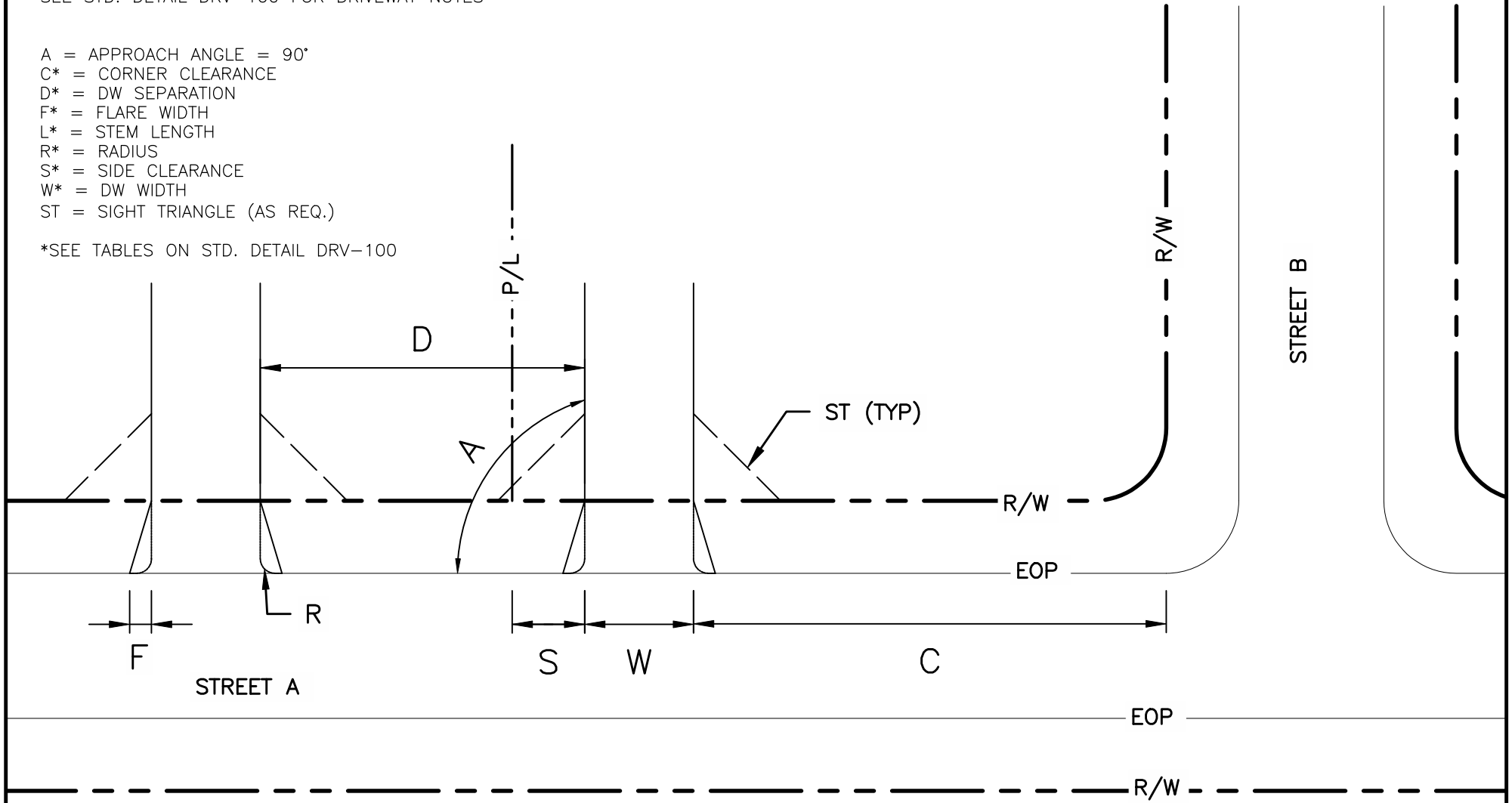
SHEET 1 OF 1

NOTES:

SEE STD. DETAIL DRV-100 FOR DRIVEWAY NOTES

- A = APPROACH ANGLE = 90°
- C* = CORNER CLEARANCE
- D* = DW SEPARATION
- F* = FLARE WIDTH
- L* = STEM LENGTH
- R* = RADIUS
- S* = SIDE CLEARANCE
- W* = DW WIDTH
- ST = SIGHT TRIANGLE (AS REQ.)

*SEE TABLES ON STD. DETAIL DRV-100



NOT TO SCALE

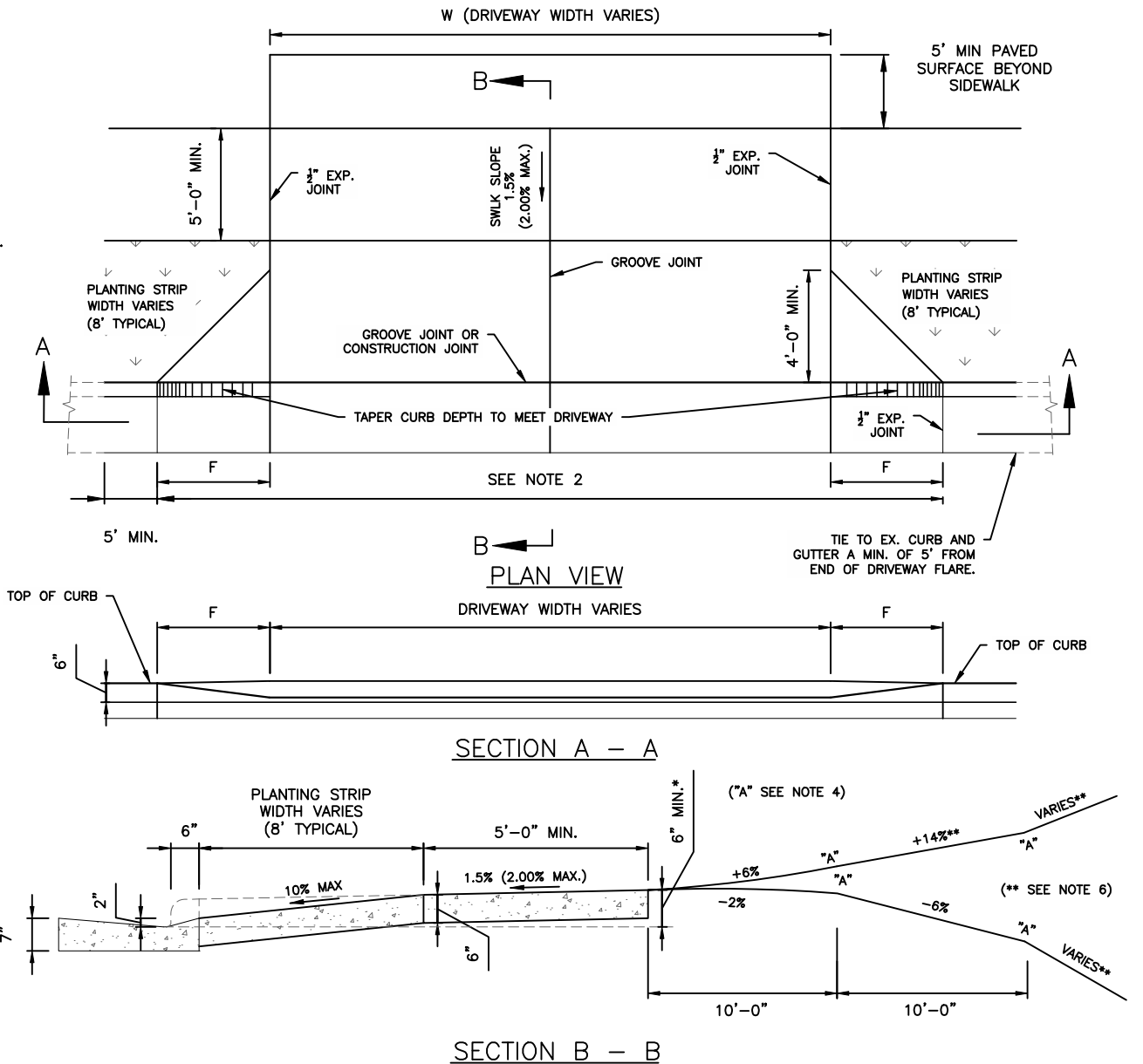


GENERAL DRIVEWAY LOCATION DIMENSIONS

3-2022
DRV-101
SHEET 2 OF 2

NOTES:

1. ALL CONCRETE TO BE 3600 P.S.I.
2. ALL CURB OR CURB AND GUTTER AND SIDEWALKS ARE TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED. SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT.
3. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
4. "A" – BREAKOVER SHALL BE 8% OR LESS (A = ALGEBRAIC DIFFERENCE).
5. PRIOR APPROVAL IS REQUIRED ON GRADES EXCEEDING WHAT ARE SHOWN.
6. ** – PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. JOINT MATERIAL SHOULD BE PLACED FLUSH WITH CONCRETE.
8. * – THE DRIVEWAY MUST RISE 6" FROM THE GUTTER LINE TO PREVENT RUNOFF FROM ENTERING DRIVEWAY.
9. REFER TO TSM AND STD. DRV-100 AND DRV-101 FOR ASSOCIATED DIMENSIONS AND LOCATION INFORMATION.



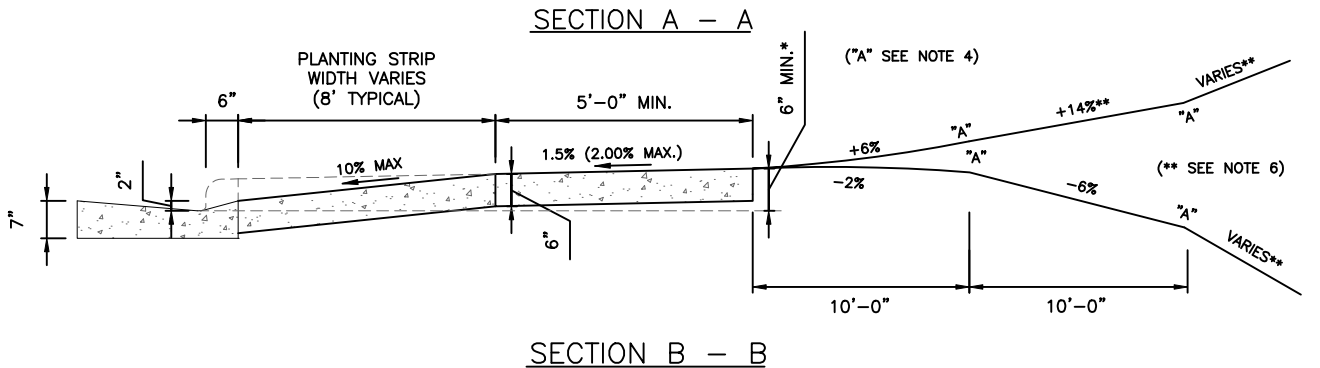
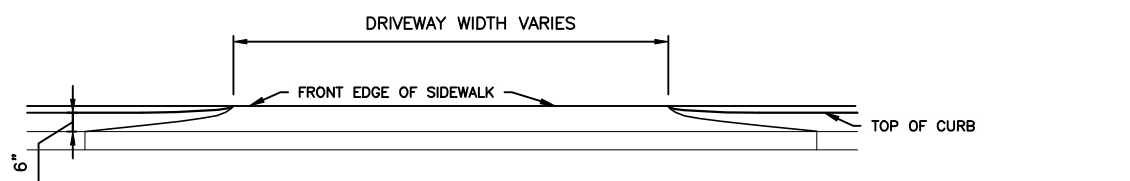
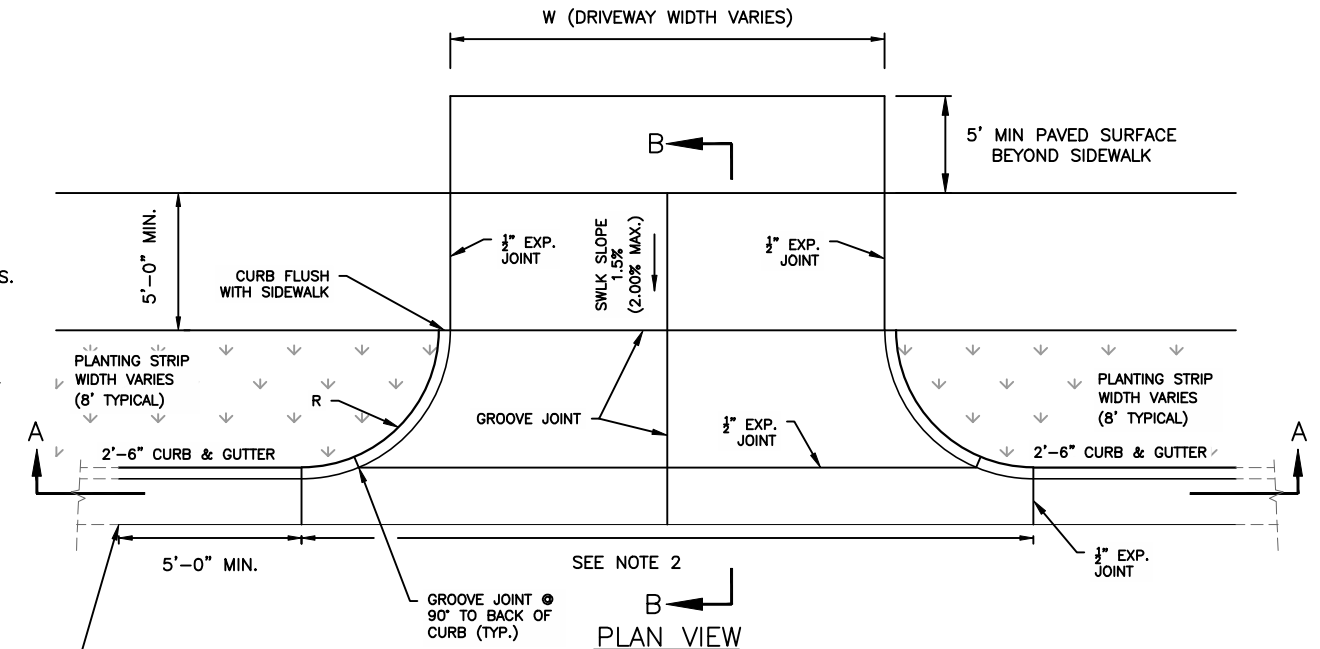
DROP CURB RAMP TYPE DRIVEWAY
PLANTING STRIP & 2'-6" CURB AND GUTTER

3-2022
DRV-102
SHEET 1 OF 1

NOTES:

1. ALL CONCRETE TO BE 3600 P.S.I.
2. ALL CURB OR CURB AND GUTTER AND SIDEWALKS ARE TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED. SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT.
3. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
4. "A" - BREAKOVER SHALL BE 8% OR LESS (A = ALGEBRAIC DIFFERENCE).
5. PRIOR APPROVAL IS REQUIRED ON GRADES EXCEEDING WHAT ARE SHOWN.
6. ** - PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. JOINT MATERIAL SHOULD BE PLACED FLUSH WITH CONCRETE.
8. * - THE DRIVEWAY MUST RISE 6" FROM THE GUTTER LINE TO PREVENT RUNOFF FROM ENTERING DRIVEWAY.
9. REFER TO TSM AND STD. DRV-100 AND DRV-101 FOR ASSOCIATED DIMENSIONS AND LOCATION INFORMATION.

TIE TO EX. CURB AND GUTTER A MIN. OF 5' FROM END OF DRIVEWAY FLARE.



NOT TO SCALE

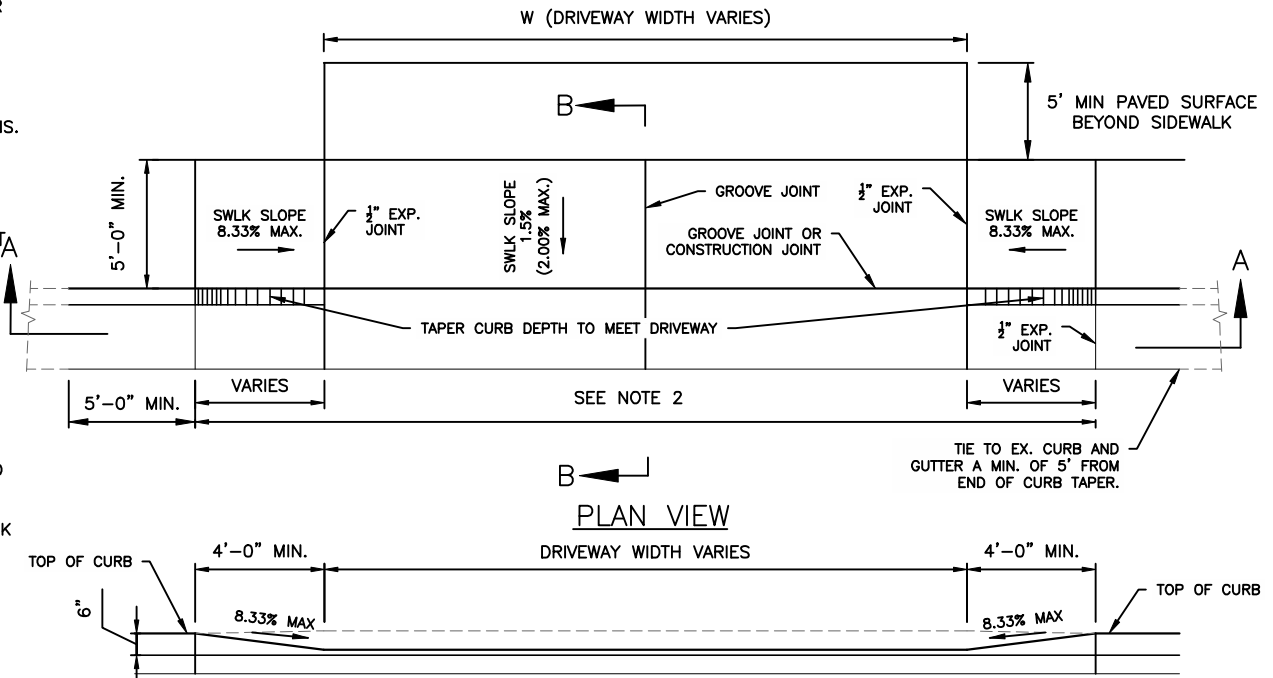


RADIUS CURB RAMP TYPE DRIVEWAY
PLANTING STRIP & 2'-6" CURB AND GUTTER

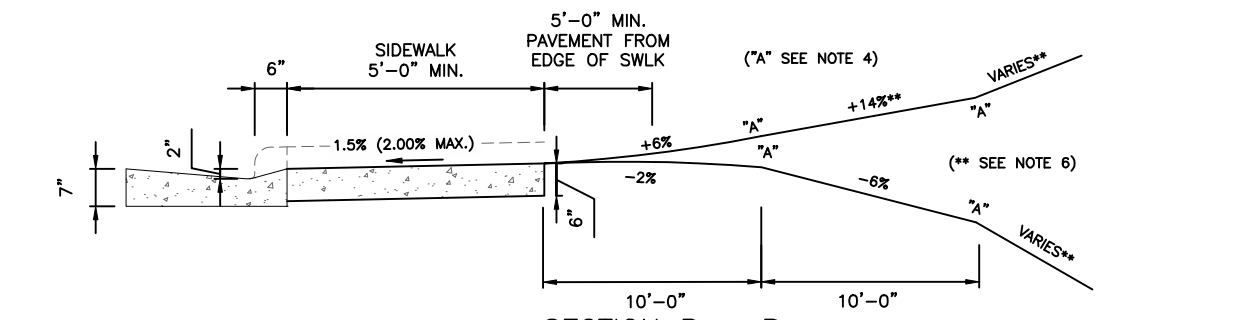
3-2022
DRV-103
SHEET 1 OF 1

NOTES:

1. ALL CONCRETE TO BE 3600 P.S.I.
2. ALL CURB OR CURB AND GUTTER AND SIDEWALKS ARE TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED. SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT.
3. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
4. "A" – BREAKOVER SHALL BE 8% OR LESS (A = ALGEBRAIC DIFFERENCE).
5. PRIOR APPROVAL IS REQUIRED ON GRADES EXCEEDING WHAT ARE SHOWN.
6. ** – PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. JOINT MATERIAL SHOULD BE PLACED FLUSH WITH CONCRETE.
8. * – THE DRIVEWAY MUST RISE 6" FROM THE GUTTER LINE TO PREVENT RUNOFF FROM ENTERING DRIVEWAY.
9. REFER TO TSM AND STD. DRV-100 AND DRV-101 FOR ASSOCIATED DIMENSIONS AND LOCATION INFORMATION.
10. PRIOR APPROVAL IS REQUIRED BEFORE LOCATING SIDEWALK AT BACK OF CURB.



SECTION A – A



SECTION B – B

NOT TO SCALE



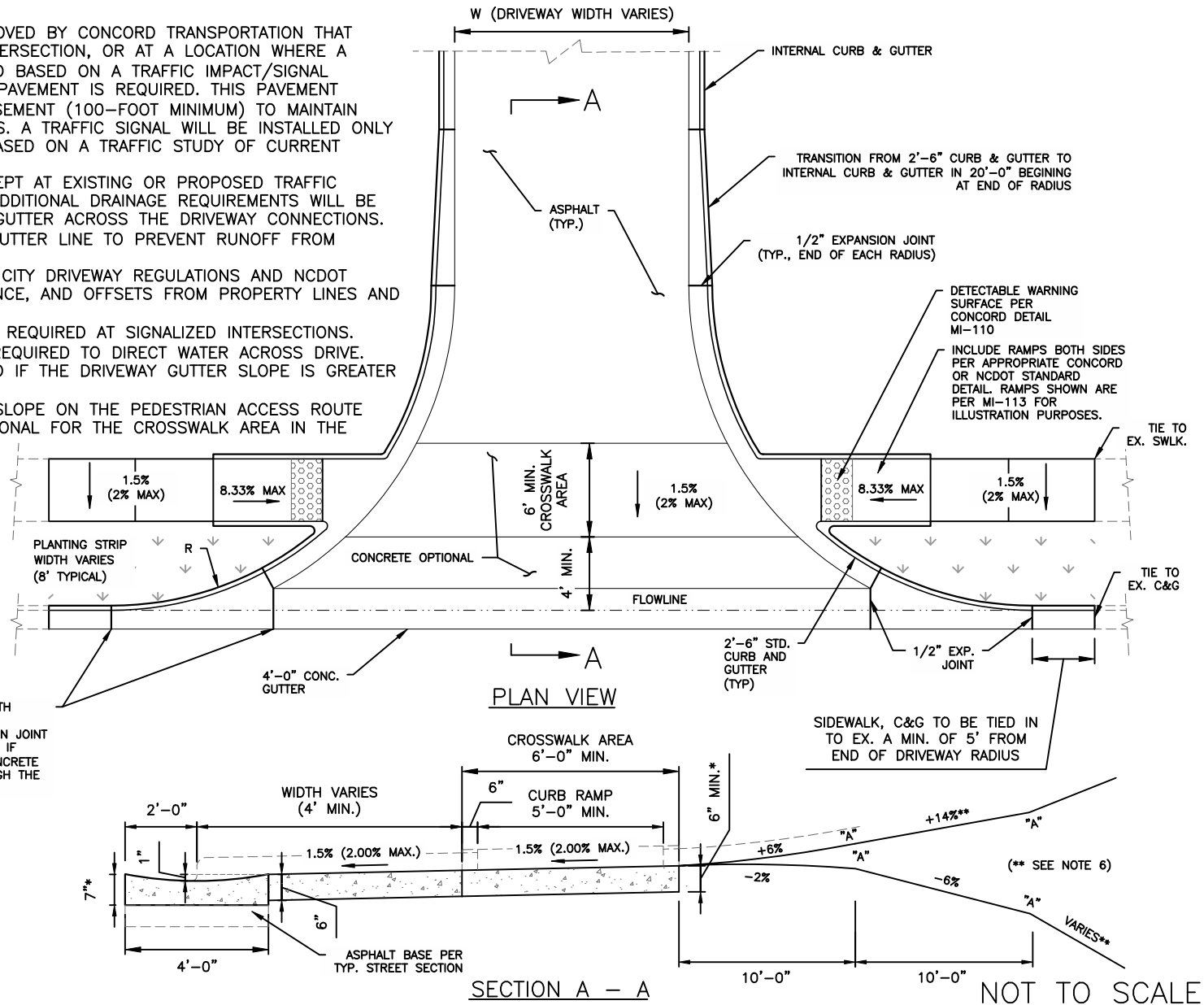
RESIDENTIAL RAMP TYPE DRIVEWAY
ADJACENT TO 2'-6" CURB AND GUTTER

3-2022
DRV-104
SHEET 1 OF 1

NOTES:

1. WHERE A STREET TYPE DRIVEWAY IS APPROVED BY CONCORD TRANSPORTATION THAT CONNECTS TO AN EXISTING SIGNALIZED INTERSECTION, OR AT A LOCATION WHERE A TRAFFIC SIGNAL INSTALLATION IS PROPOSED BASED ON A TRAFFIC IMPACT/SIGNAL WARRANT STUDY, A FULL DEPTH ASPHALT PAVEMENT IS REQUIRED. THIS PAVEMENT DESIGN IS REQUIRED IN THE DRIVEWAY EASEMENT (100-FOOT MINIMUM) TO MAINTAIN DETECTOR LOOPS AND PAVEMENT MARKINGS. A TRAFFIC SIGNAL WILL BE INSTALLED ONLY IF IT IS DETERMINED TO BE NECESSARY BASED ON A TRAFFIC STUDY OF CURRENT CONDITIONS.
2. A CONCRETE GUTTER IS TO BE USED EXCEPT AT EXISTING OR PROPOSED TRAFFIC SIGNAL LOCATIONS. AT THESE LOCATIONS ADDITIONAL DRAINAGE REQUIREMENTS WILL BE NECESSARY TO ELIMINATE THE NEED FOR GUTTER ACROSS THE DRIVEWAY CONNECTIONS.
3. THE DRIVEWAY MUST RISE 6" FROM THE GUTTER LINE TO PREVENT RUNOFF FROM ENTERING DRIVEWAY.
4. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE, AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
5. TWO (2) CURB RAMPS PER CURB RETURN REQUIRED AT SIGNALIZED INTERSECTIONS.
6. FOUR (4) FOOT GUTTER AND WINGS ARE REQUIRED TO DIRECT WATER ACROSS DRIVE. GUTTER AND WINGS MAY NOT BE REQUIRED IF THE DRIVEWAY GUTTER SLOPE IS GREATER THAN 2%.
7. MAINTAIN UP TO 1.5% (MAX. 2%) CROSS-SLOPE ON THE PEDESTRIAN ACCESS ROUTE BETWEEN CURB RAMPS. CONCRETE IS OPTIONAL FOR THE CROSSWALK AREA IN THE DRIVEWAY.
8. WHERE DRIVEWAY CONNECTS TO AN NCDOT MAINTAINED STREET, NCDOT APPROVED CURB RAMPS SHOULD BE USED.
9. THE CROSSWALK AREA SHOULD BE GRADED TO ADA STANDARDS WHETHER OR NOT A STRIPED CROSSWALK IS INSTALLED. THE INCLUSION OF A STRIPED CROSSWALK WILL BE ON A CASE BY CASE BASIS.
10. REFER TO STD. DRV-100 & DRV 101 FOR ASSOCIATED DIMENSIONS AND LOCATION INFORMATION

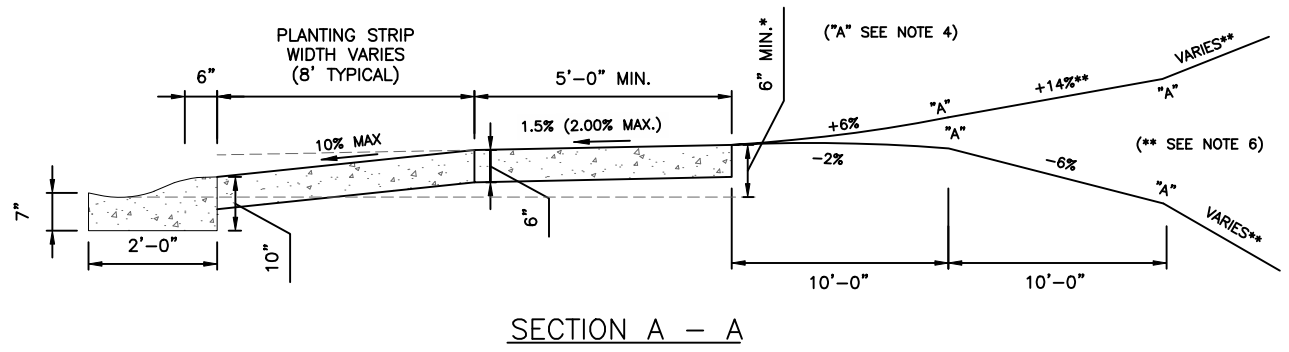
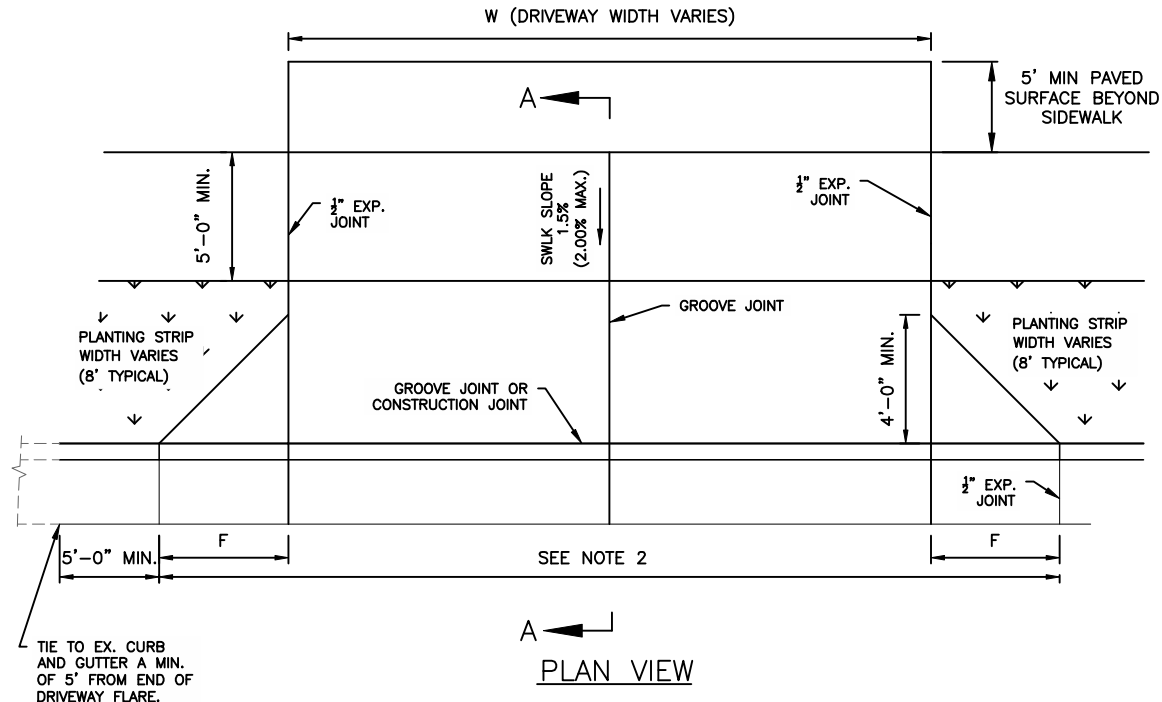
* - TRANSITION CONCRETE DEPTH FROM 7" AT LIP TO 10" AT 4' CONCRETE GUTTER CONSTRUCTION JOINT IF NO ASPHALT BASE IS USED. IF ASPHALT BASE IS USED, 7" CONCRETE DEPTH CAN BE CARRIED THROUGH THE 4' CONCRETE GUTTER.



STREET TYPE DRIVEWAY
2'-6" STD. CURB AND GUTTER

NOTES:

1. ALL CONCRETE TO BE 3600 P.S.I.
2. ALL CURB OR CURB AND GUTTER AND SIDEWALKS ARE TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED. SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT.
3. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
4. "A" – BREAKOVER SHALL BE 8% OR LESS (A = ALGEBRAIC DIFFERENCE).
5. PRIOR APPROVAL IS REQUIRED ON GRADES EXCEEDING WHAT ARE SHOWN.
6. ** – PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. JOINT MATERIAL SHOULD BE PLACED FLUSH WITH CONCRETE.
8. * – THE DRIVEWAY MUST RISE 6" FROM THE GUTTER LINE TO PREVENT RUNOFF FROM ENTERING DRIVEWAY.
9. REFER TO TSM AND STD. DRV-100 AND DRV-101 FOR ASSOCIATED DIMENSIONS AND LOCATION INFORMATION



NOT TO SCALE

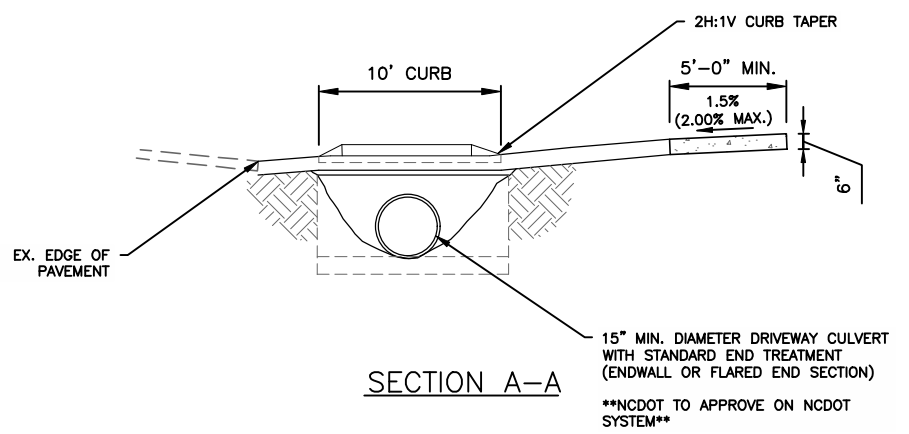
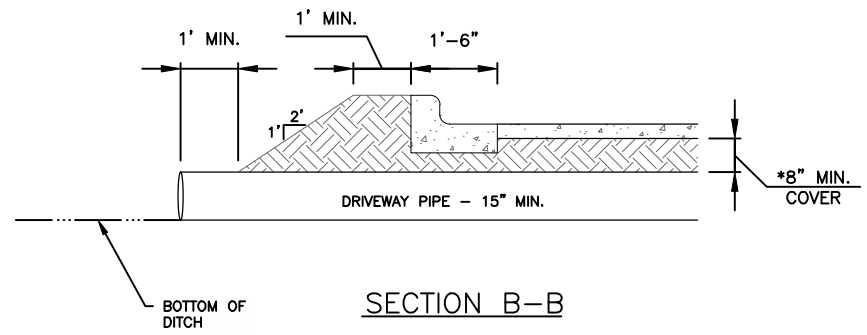
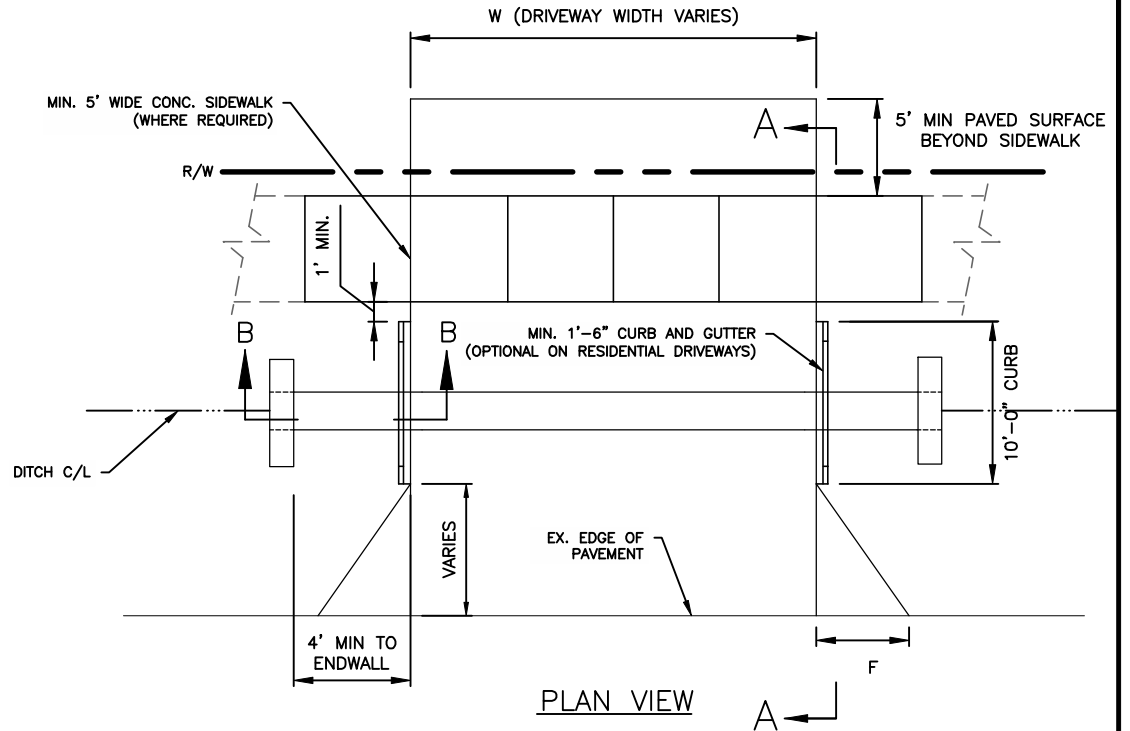


RESIDENTIAL RAMP TYPE DRIVEWAY
2'-0" VALLEY CURB AND GUTTER

3-2022
DRV-106
SHEET 1 OF 1

NOTES:

1. ALL CONCRETE TO BE 3600 P.S.I.
2. ALL CURB OR CURB AND GUTTER AND SIDEWALKS ARE TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED. SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT.
3. ALL DRIVEWAYS MUST MEET THE CURRENT CITY DRIVEWAY REGULATIONS AND NCDOT REQUIREMENTS FOR SPACING, SIGHT DISTANCE AND OFFSETS FROM PROPERTY LINES AND INTERSECTIONS.
4. "A" - BREAKOVER SHALL BE 8% OR LESS (A = ALGEBRAIC DIFFERENCE).
5. PRIOR APPROVAL IS REQUIRED ON GRADES EXCEEDING WHAT ARE SHOWN.
6. ** - PER NC IFC SECTION D103.2, FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 10 PERCENT IN GRADE.
7. JOINT MATERIAL SHOULD BE PLACED FLUSH WITH CONCRETE.
8. TO BE USED ON ROADS WITHOUT CURB AND GUTTER WHERE CURB AND GUTTER IS NOT BEING INSTALLED (MUST MEET BOTH CRITERIA).
9. REFER TO TSM AND STD. DRV-100 AND DRV-101 FOR ASSOCIATED DIMENSIONS AND LOCATION INFORMATION.
10. * MINIMUM COVER IS 8" WHEN CLASS IV RCP IS USED. WHERE A DIFFERENT MATERIAL IS APPROVED THE MINIMUM COVER WILL BE DETERMINED ON A CASE BY CASE BASIS.
11. THE PIPE SHALL BE A MINIMUM DIAMETER OF 15" REINFORCED CONCRETE A LARGER PIPE SIZE MAY BE REQUIRED WHERE DETERMINED BY A PROFESSIONAL ENGINEER.
12. THE MINIMUM LENGTH OF THE PIPE IS 20', OR THE LENGTH NEEDED TO EXTEND ONE (1) FOOT BEYOND THE TOE OF A 2:1 SLOPE. SEE SECTION B-B.



NOT TO SCALE

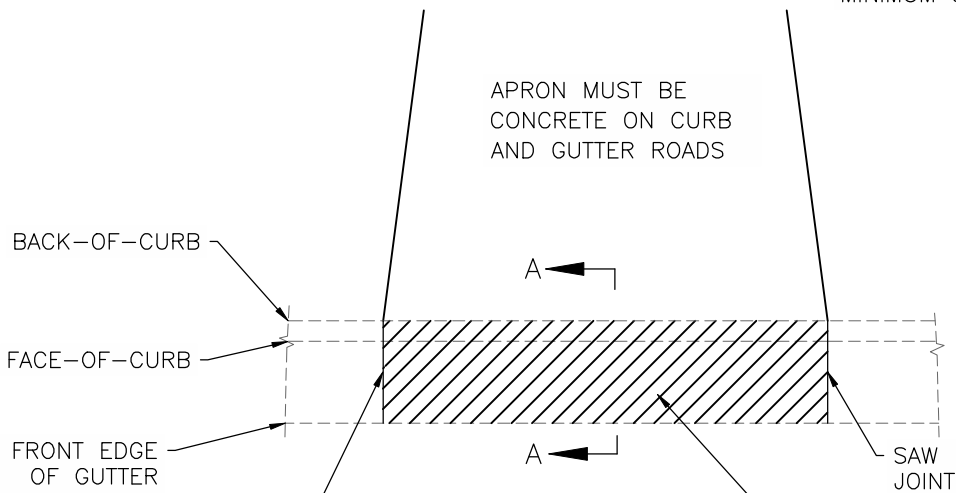


RAMP TYPE DRIVEWAY
RIBBON PAVEMENT

3-2022
DRV-107
SHEET 1 OF 1

*CONCRETE SHALL BE A MINIMUM OF 6" THICK IN THE RIGHT-OF WAY, MINIMUM 3600 PSI.

APRON MUST BE CONCRETE ON CURB AND GUTTER ROADS

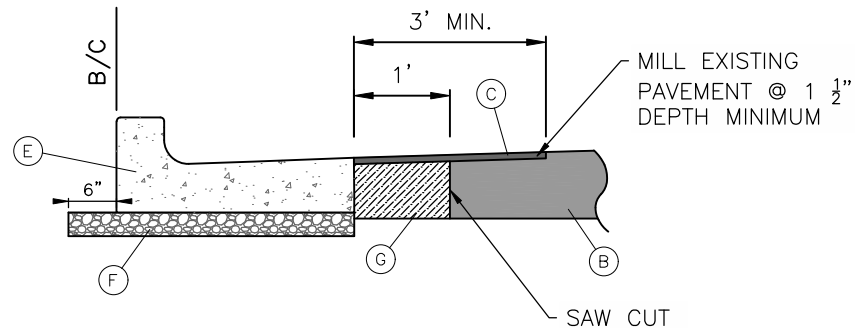


PLAN VIEW

CONCRETE CURB & GUTTER TO BE REMOVED COMPLETELY

NOTES

1. ANY DAMAGED CURB & GUTTER SHALL BE COMPLETELY REMOVED AND REPLACED WITH NEW CONCRETE.
2. ON STREETS WITH A CUL-DE-SAC, THE SAW CUT SHALL BE PERPENDICULAR TO THE FACE OF THE CURB & GUTTER.
3. NO SECTION OF EXISTING CURB & GUTTER WHICH WILL BE LESS THAN 5' SHALL REMAIN. LIMITS OF REMOVAL AND REPLACEMENT SHOULD BE ADJUSTED APPROPRIATELY.



SECTION A - A

KEY

- (B) EXISTING PAVEMENT STRUCTURE
- (C) MIN. 1 1/2" S 9.5B SURFACE COURSE
- (E) 2'-6" STANDARD CURB AND GUTTER SHOWN, APPROPRIATE CURB & GUTTER TO BE DETERMINED BASED ON STREET CLASSIFICATION
- (F) 6" COMPACTED AGGREGATE OR 4" B-25.0C BASE COURSE
- (G) MIN. 8" I-19.0C

NOT TO SCALE

ACCESSIBLE PARKING REQUIREMENTS

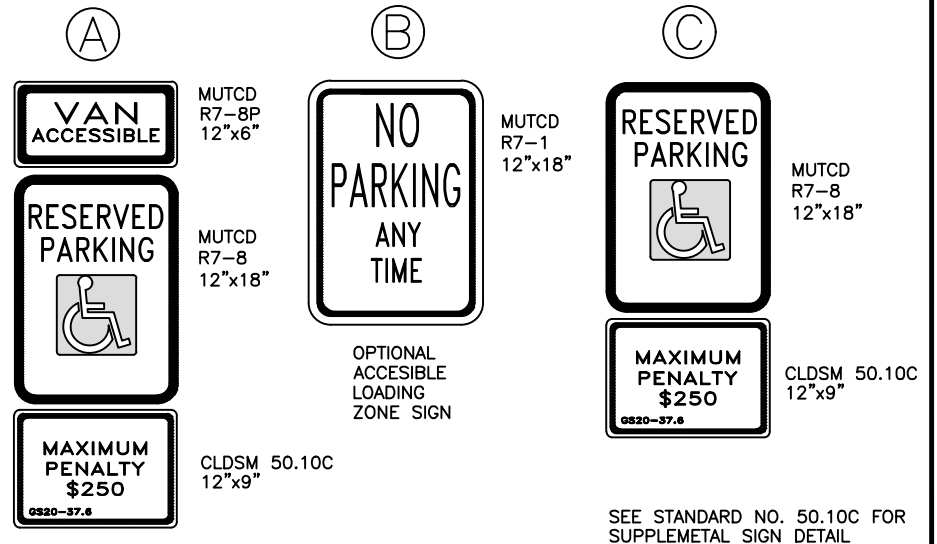
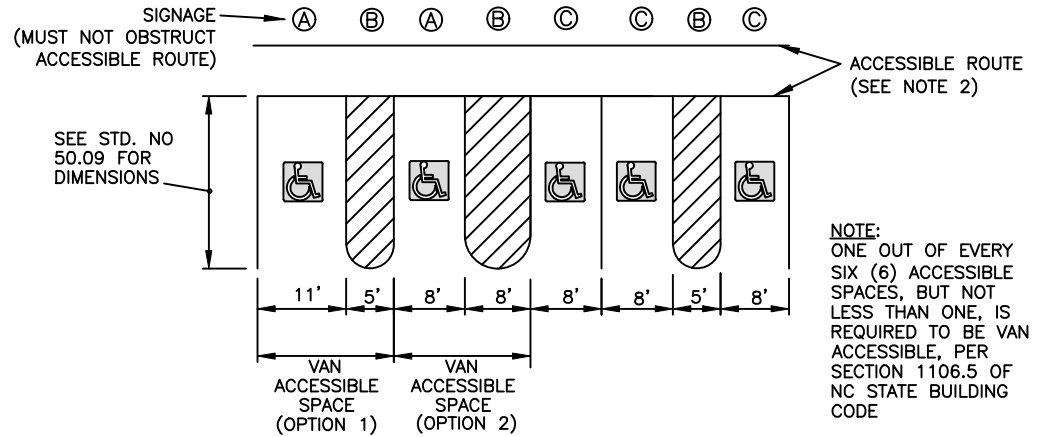
TOTAL PARKING SPACES PROVIDED	MINIMUM NUMBER OF ACCESSIBLE SPACES REQUIRED	MINIMUM NUMBER OF ACCESSIBLE SPACES REQUIRED TO BE VAN ACCESSIBLE
1 TO 25	1	1
26 TO 50	2	1
51 TO 75	3	1
76 TO 100	4	1
101 TO 150	5	1
151 TO 200	6	1
201 TO 300	7	2
301 TO 400	8	2
401 TO 500	9	2
501 TO 1000	2% OF TOTAL	1 IN EVERY 6 ACCESSIBLE SPACES
1001 AND OVER	20 PLUS 1 FOR EACH 100 OVER 1000	1 IN EVERY 6 ACCESSIBLE SPACES

REFERENCE: SECTION 1106 OF NC BUILDING CODE

NOTES:

- ALL ACCESSIBLE SIGNS (R7-8P, R7-8, R7-1, AND 50.10C) SHALL BE MOUNTED AT 7 FEET FROM GRADE TO BOTTOM EDGE OF SIGN FACE (PER MUTCD). MOUNTING HEIGHT CAN BE REDUCED TO 5 FEET IF PLACED IN AN AREA BETWEEN SIDEWALK AND BUILDING FACE IN WHICH PEDESTRIANS ARE NOT EXPECTED TO USE.
- IF ACCESSIBLE ROUTE IS A RAISED SIDEWALK AREA, THEN RAMPS ARE REQUIRED AT LOADING ZONE AREA. MAINTAIN MIN. 4' WIDE CONTINUOUS PASSAGE.
- VERTICAL CLEARANCE FOR VANS MUST BE GREATER THAN 98-INCHES.
- THIS DETAIL IS TO PROVIDE GENERAL GUIDANCE FOR PARKING LAYOUT AND DESIGN; REFER TO MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) U.S. DEPARTMENT OF TRANSPORTATION AND NORTH CAROLINA DEPARTMENT OF TRANSPORTATION SUPPLEMENT AND NC BUILDING CODE FOR ADDITIONAL INFORMATION.

PARKING SPACE PAVEMENT MARKINGS



NOT TO SCALE

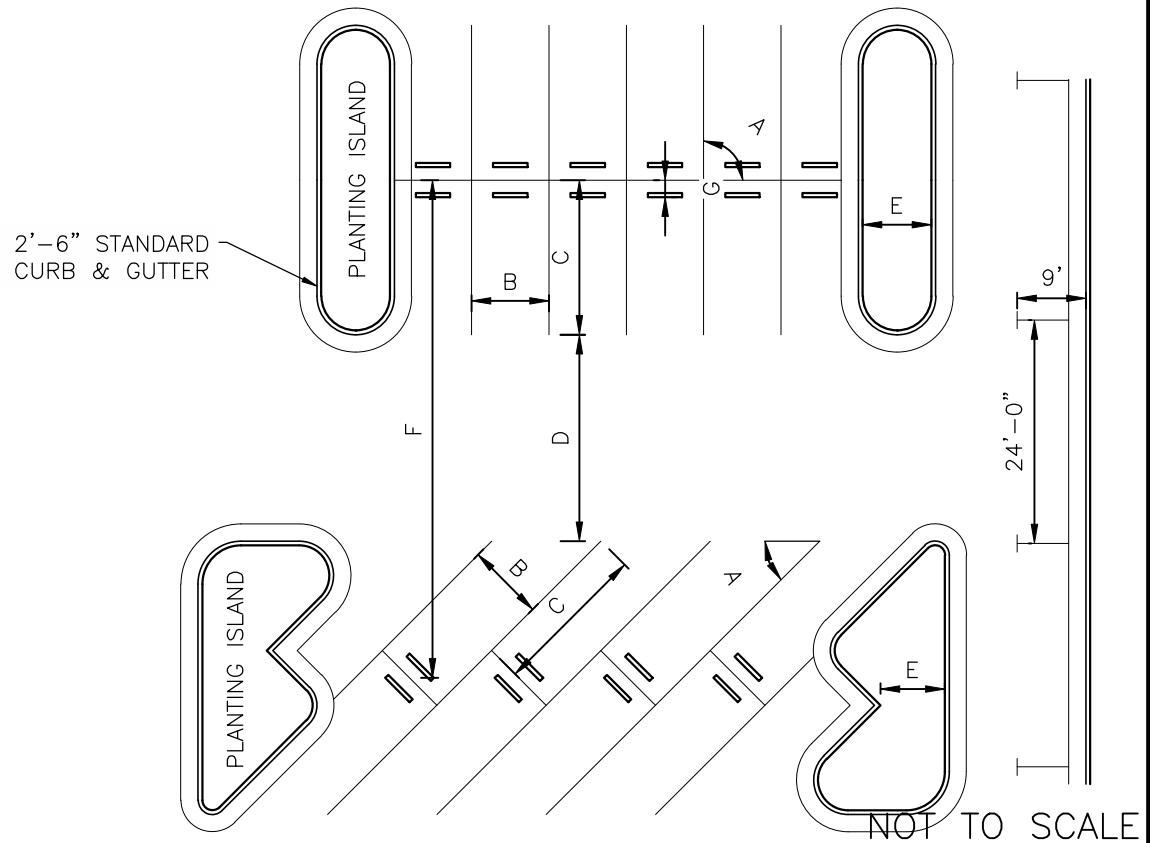
STANDARD SIZE SPACES						
A	B	C	D	E	F	G
45°	9.0'	18.0'	12.0' ONE-WAY	8.0'	51.0'	2.0'/4.0'
60°	9.0'	18.0'	18.0' ONE-WAY	8.0'	58.0'	2.0'/4.0'
90°	9.0'	18.0'	24.0' TWO-WAY	8.0'	60.0'	2.0'/4.0'
COMPACT SPACES						
A	B	C	D	E	F	G
45°	8.0'	16.0'	N/A	8.0'	N/A	1.5'/3.0'
60°	8.0'	16.0'	N/A	8.0'	N/A	1.5'/3.0'
90°	8.0'	16.0'	N/A </td <td>8.0'</td> <td>N/A</td> <td>1.5'/3.0'</td>	8.0'	N/A	1.5'/3.0'

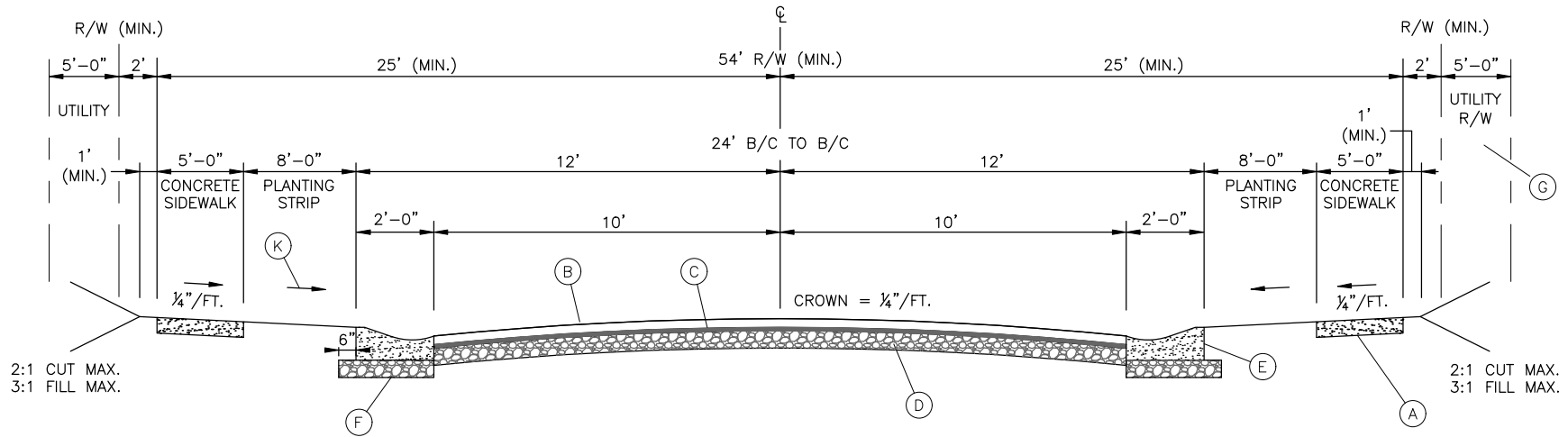
NOTES:

1. PARALLEL PARKING SPACES SHALL BE 9' BY 24' WITH A 20' TWO-WAY ACCESS, OR A 12' ONE-WAY ACCESS.
2. REFER TO STANDARD DRV-120 FOR ADA PARKING AND SIGNAGE STANDARDS.

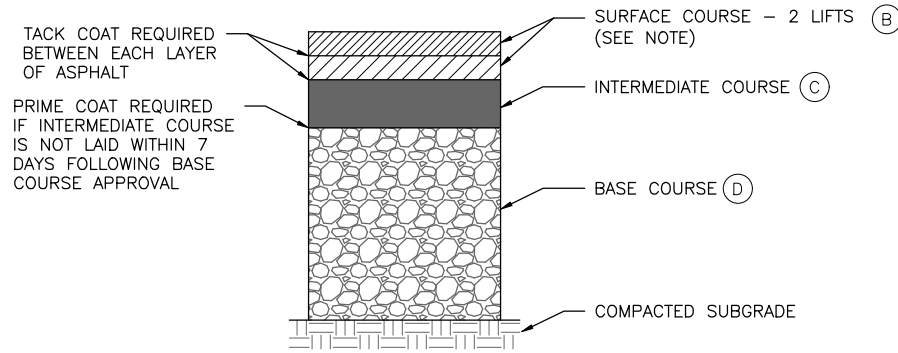
KEY:

- A. PARKING ANGLE
- B. STALL WIDTH
- C. STALL DEPTH
- D. AISLE WIDTH
- E. PLANTING ISLAND WIDTH (MIN. WIDTH SHOWN, REFER TO ARTICLE 7 FOR MIN. AREA.)
- F. PARKING BAY WIDTH
- G. BUMPER OVERHANG (FRONT/REAR)





TYPICAL CROSS SECTION



NOTE:
 SURFACE COURSE TO BE INSTALLED IN TWO (2) SEPARATE LIFTS A MINIMUM OF 1" THICK. THE FIRST LIFT MUST BE INSTALLED DIRECTLY AFTER INTERMEDIATE COURSE HAS BEEN INSTALLED AND ACCEPTED. THE FINAL LIFT SHOULD BE INSTALLED AFTER ALL OTHER REQUIREMENTS FOR ACCEPTANCE HAVE BEEN MET.

TYPICAL PAVEMENT SECTION

KEY

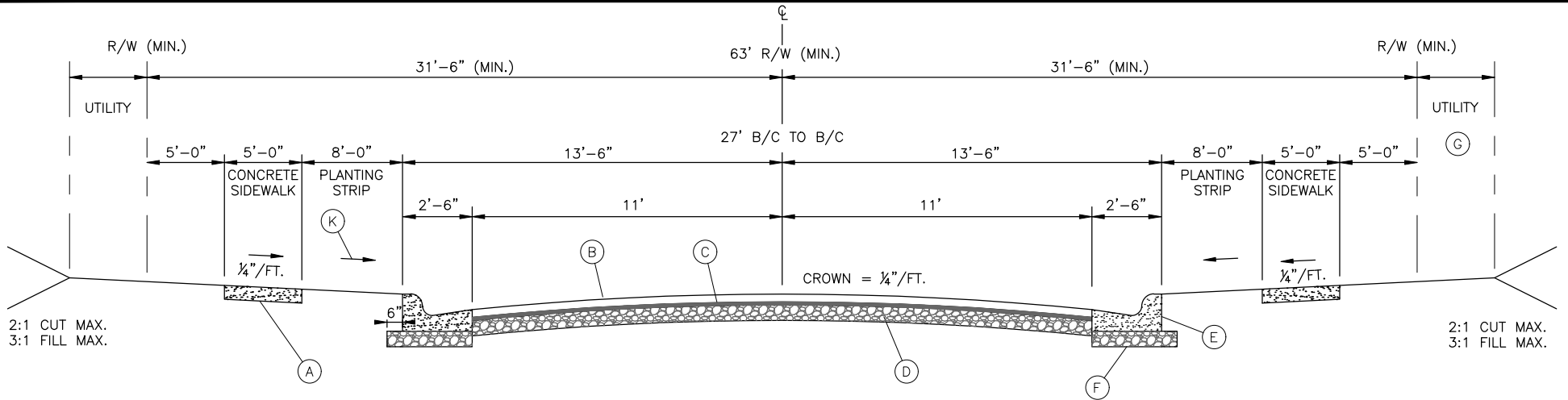
- (A) 4" SIDEWALK*
*DRIVEWAY APRON AND SIDEWALK AT DRIVEWAY CROSSINGS SHOULD BE 6" THICK
- (B) 2 1/2" S9.5B SURFACE COURSE
- (C) 2.25" I-19.0C INTERMEDIATE COURSE
- (D) 8" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (E) 2'-0" VALLEY GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- (K) PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES.

NOT TO SCALE

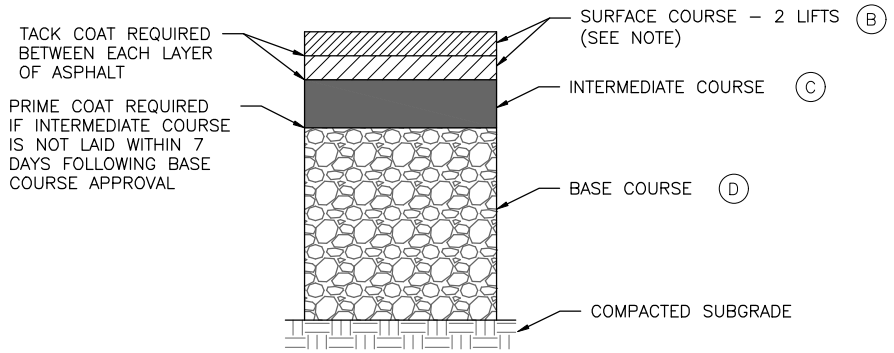


LOCAL RESIDENTIAL STREET

3-2022
STR-101
SHEET 1 OF 1



TYPICAL CROSS SECTION



NOTE:
 SURFACE COURSE TO BE INSTALLED IN TWO (2) SEPARATE LIFTS A MINIMUM OF 1.5" THICK. THE FIRST LIFT MUST BE INSTALLED DIRECTLY AFTER INTERMEDIATE COURSE HAS BEEN INSTALLED AND ACCEPTED. THE FINAL LIFT SHOULD BE INSTALLED AFTER ALL OTHER REQUIREMENTS FOR ACCEPTANCE HAVE BEEN MET.

TYPICAL PAVEMENT SECTION

KEY

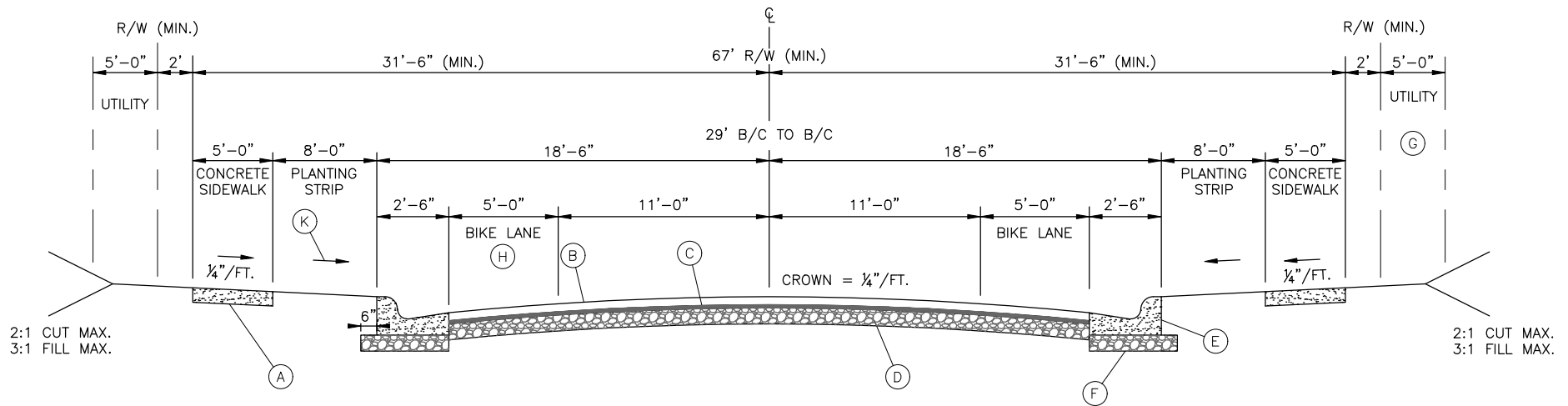
- (A) 4" SIDEWALK
- *DRIVEWAY APRON AND SIDEWALK AT DRIVEWAY CROSSINGS SHOULD BE 6" THICK
- (B) 3" S9.5B SURFACE COURSE
- (C) 2.25" I-19.0C INTERMEDIATE COURSE
- (D) 10" COMPACTED AGGREGATE BASE COURSE OR 5" B-25.0C
- (E) 2'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- (K) PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES.

NOT TO SCALE

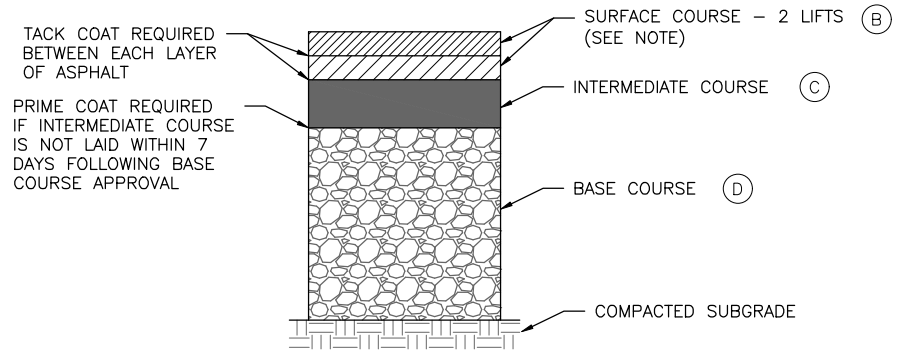


RESIDENTIAL COLLECTOR STREET

3-2022
 STR-102
 SHEET 1 OF 1



TYPICAL CROSS SECTION



TACK COAT REQUIRED BETWEEN EACH LAYER OF ASPHALT

PRIME COAT REQUIRED IF INTERMEDIATE COURSE IS NOT LAID WITHIN 7 DAYS FOLLOWING BASE COURSE APPROVAL

NOTE:
SURFACE COURSE TO BE INSTALLED IN TWO (2) SEPARATE LIFTS A MINIMUM OF 1.5" THICK. THE FIRST LIFT MUST BE INSTALLED DIRECTLY AFTER INTERMEDIATE COURSE HAS BEEN INSTALLED AND ACCEPTED. THE FINAL LIFT SHOULD BE INSTALLED AFTER ALL OTHER REQUIREMENTS FOR ACCEPTANCE HAVE BEEN MET.

TYPICAL PAVEMENT SECTION

KEY

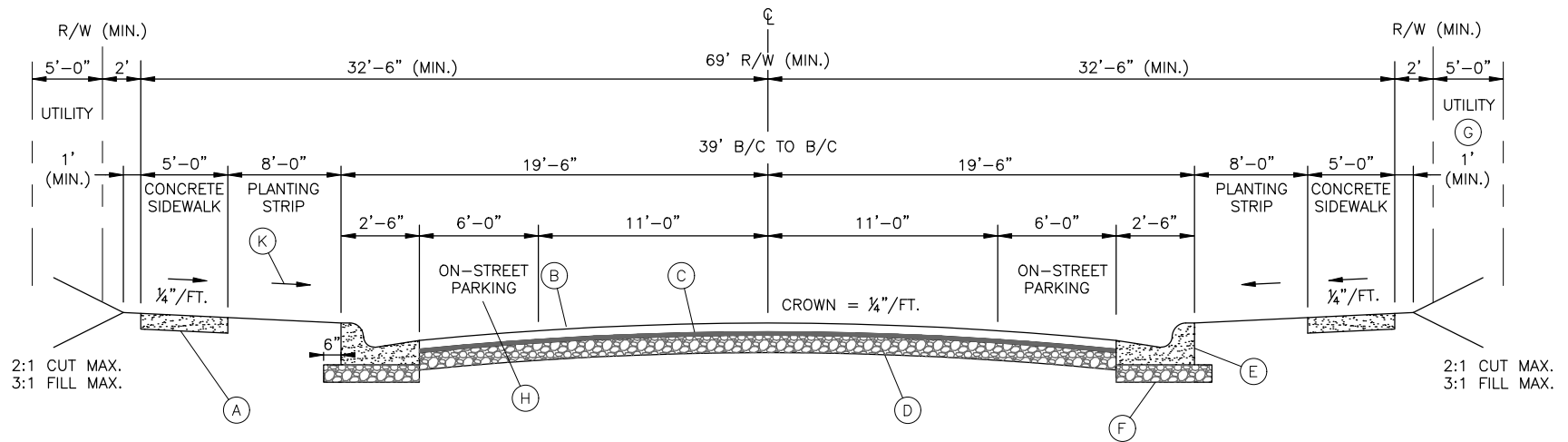
- (A) 4" SIDEWALK
- *DRIVEWAY APRON AND SIDEWALK AT DRIVEWAY CROSSINGS SHOULD BE 6" THICK
- (B) 3" S9.5B SURFACE COURSE
- (C) 2.25" I-19.0C INTERMEDIATE COURSE
- (D) 10" COMPACTED AGGREGATE BASE COURSE OR 5" B-25.0C
- (E) 2'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- (H) TEMPORARY STRIPING FOR BIKE LANE SHOULD BE INSTALLED ONCE INITIAL SURFACE LIFT IS APPLIED, PERMANENT STRIPING SHOULD BE INSTALLED AFTER FINAL SURFACE LIFT IS APPLIED
- (K) PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES.

NOT TO SCALE

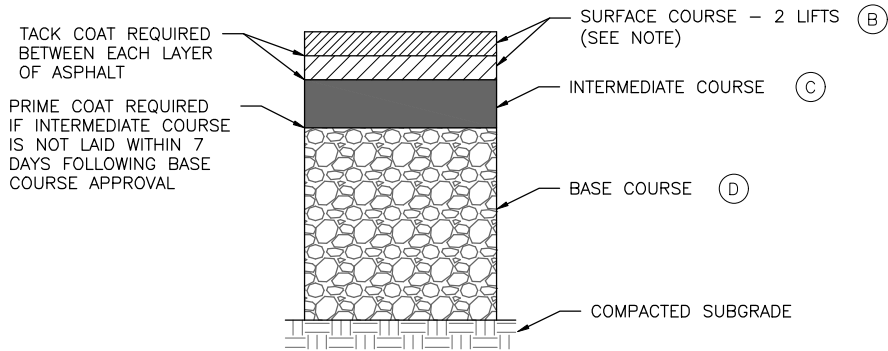


RESIDENTIAL COLLECTOR STREET
WITH BICYCLE LANES

3-2022
STR-103
SHEET 1 OF 1



TYPICAL CROSS SECTION



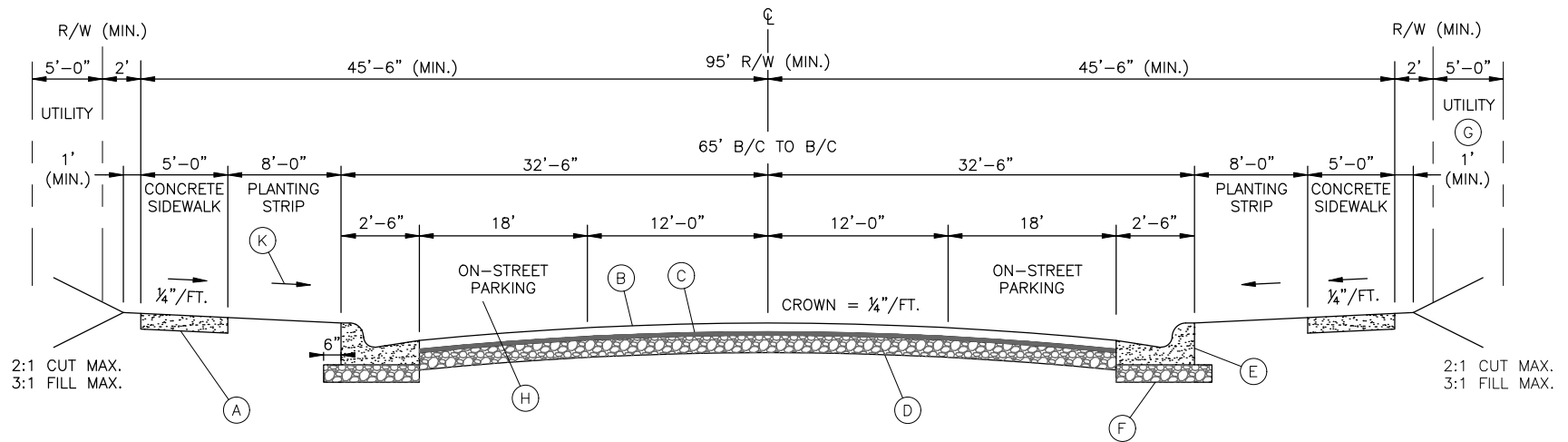
NOTE:
 SURFACE COURSE TO BE INSTALLED IN TWO
 (2) SEPARATE LIFTS A MINIMUM OF 1.5"
 THICK. THE FIRST LIFT MUST BE INSTALLED
 DIRECTLY AFTER INTERMEDIATE COURSE HAS
 BEEN INSTALLED AND ACCEPTED. THE FINAL
 LIFT SHOULD BE INSTALLED AFTER ALL
 OTHER REQUIREMENTS FOR ACCEPTANCE
 HAVE BEEN MET.

TYPICAL PAVEMENT SECTION

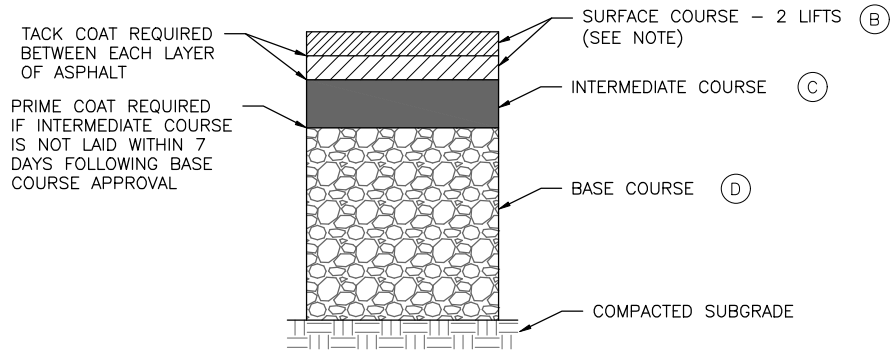
KEY

- (A) 4" SIDEWALK
 *DRIVEWAY APRON AND SIDEWALK AT DRIVEWAY CROSSINGS SHOULD BE 6" THICK
- (B) 3" S9.5B SURFACE COURSE
- (C) 2.25" I-19.0C INTERMEDIATE COURSE
- (D) 10" COMPACTED AGGREGATE BASE COURSE OR 5" B-25.0C
- (E) 2'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- (H) TEMPORARY STRIPING FOR PARKING SHOULD BE INSTALLED ONCE INITIAL SURFACE LIFT IS APPLIED, PERMANENT STRIPING SHOULD BE INSTALLED AFTER FINAL SURFACE LIFT IS APPLIED
- (K) PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES.

NOT TO SCALE



TYPICAL CROSS SECTION



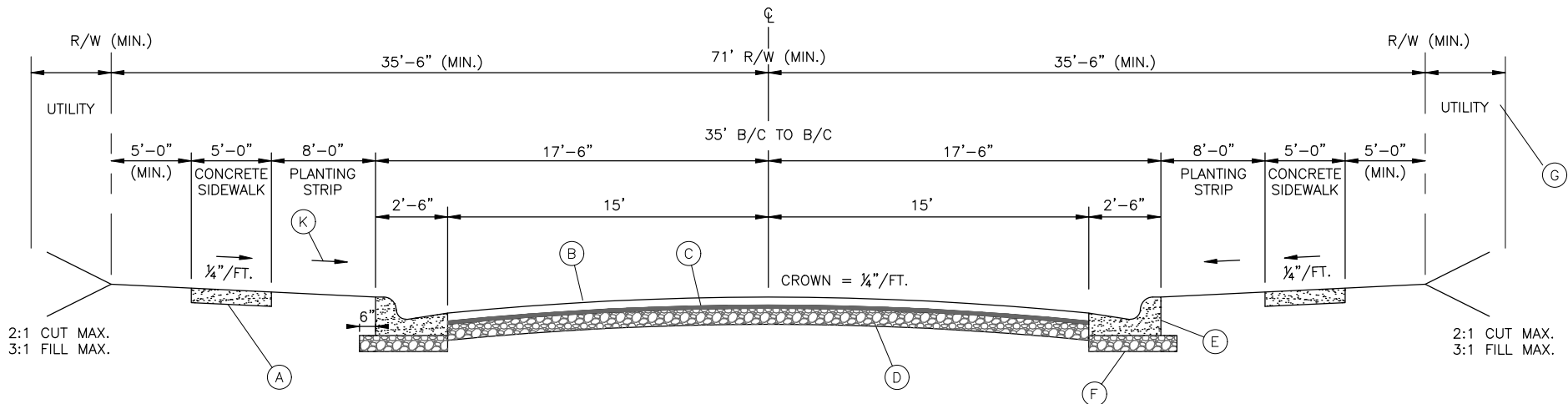
NOTE:
SURFACE COURSE TO BE INSTALLED IN TWO (2) SEPARATE LIFTS A MINIMUM OF 1.5" THICK. THE FIRST LIFT MUST BE INSTALLED DIRECTLY AFTER INTERMEDIATE COURSE HAS BEEN INSTALLED AND ACCEPTED. THE FINAL LIFT SHOULD BE INSTALLED AFTER ALL OTHER REQUIREMENTS FOR ACCEPTANCE HAVE BEEN MET.

TYPICAL PAVEMENT SECTION

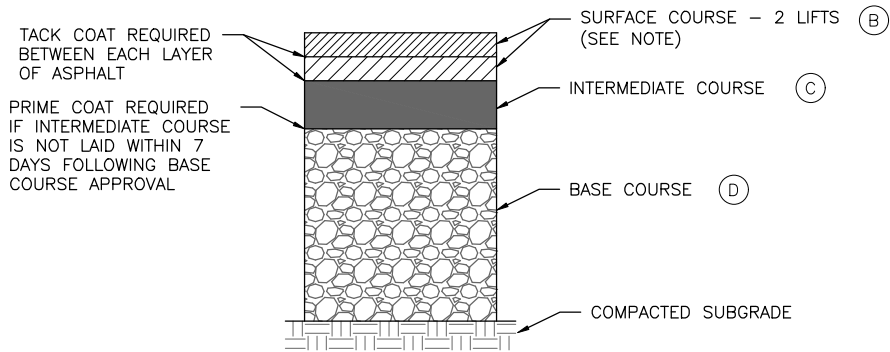
KEY

- (A) 4" SIDEWALK
- *DRIVEWAY APRON AND SIDEWALK AT DRIVEWAY CROSSINGS SHOULD BE 6" THICK
- (B) 3" S9.5B SURFACE COURSE
- (C) 2.25" I-19.0C INTERMEDIATE COURSE
- (D) 10" COMPACTED AGGREGATE BASE COURSE OR 5" B-25.0C
- (E) 2'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- (H) TEMPORARY STRIPING FOR PARKING SHOULD BE INSTALLED ONCE INITIAL SURFACE LIFT IS APPLIED, PERMANENT STRIPING SHOULD BE INSTALLED AFTER FINAL SURFACE LIFT IS APPLIED
- (K) PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES.

NOT TO SCALE



TYPICAL CROSS SECTION



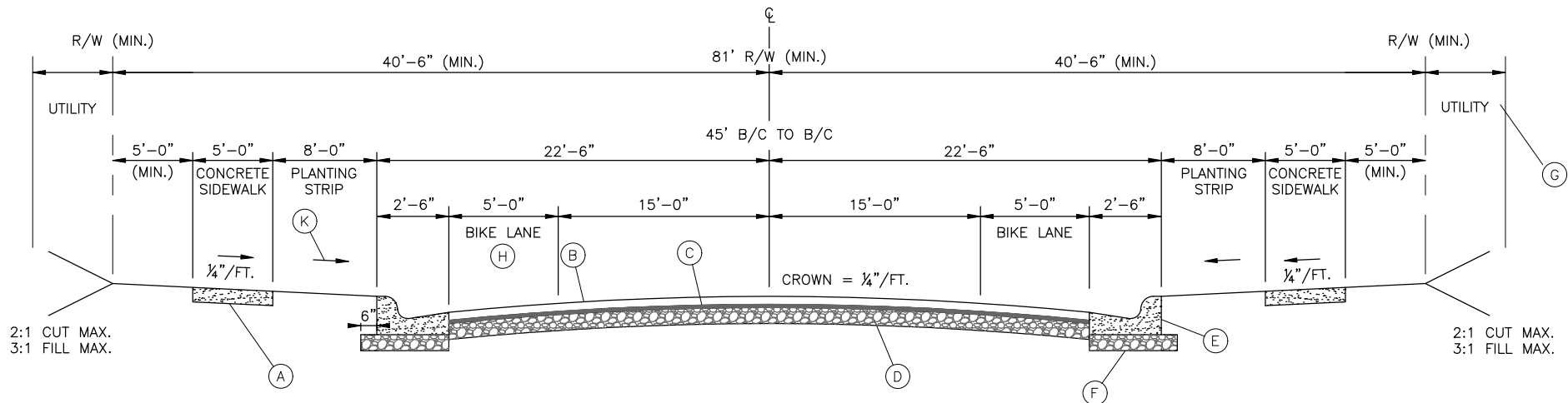
NOTE:
 SURFACE COURSE TO BE INSTALLED IN TWO (2) SEPARATE LIFTS A MINIMUM OF 1.5" THICK. THE FIRST LIFT MUST BE INSTALLED DIRECTLY AFTER INTERMEDIATE COURSE HAS BEEN INSTALLED AND ACCEPTED. THE FINAL LIFT SHOULD BE INSTALLED AFTER ALL OTHER REQUIREMENTS FOR ACCEPTANCE HAVE BEEN MET.

TYPICAL PAVEMENT SECTION

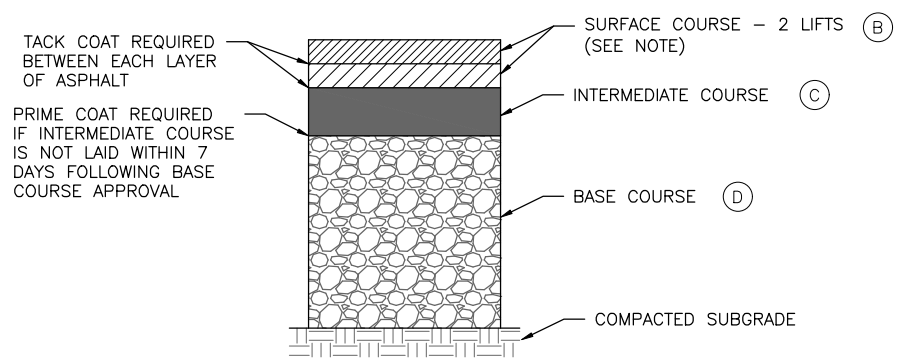
KEY

- (A) 4" SIDEWALK
- *DRIVEWAY APRON AND SIDEWALK AT DRIVEWAY CROSSINGS SHOULD BE 6" THICK
- (B) PER APPROVED PAVEMENT DESIGN (3" S9.5B SURFACE COURSE MIN.)
- (C) PER APPROVED PAVEMENT DESIGN (2.25" I-19.0C INTERMEDIATE COURSE MIN.)
- (D) PER APPROVED PAVEMENT DESIGN (10" COMPACTED AGGREGATE BASE COURSE OR 5" B-25.0C MIN.)
- (E) 2'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- (K) PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES

NOT TO SCALE



TYPICAL CROSS SECTION



NOTE:
 SURFACE COURSE TO BE INSTALLED IN TWO (2) SEPARATE LIFTS A MINIMUM OF 1.5" THICK. THE FIRST LIFT MUST BE INSTALLED DIRECTLY AFTER INTERMEDIATE COURSE HAS BEEN INSTALLED AND ACCEPTED. THE FINAL LIFT SHOULD BE INSTALLED AFTER ALL OTHER REQUIREMENTS FOR ACCEPTANCE HAVE BEEN MET.

TYPICAL PAVEMENT SECTION

KEY

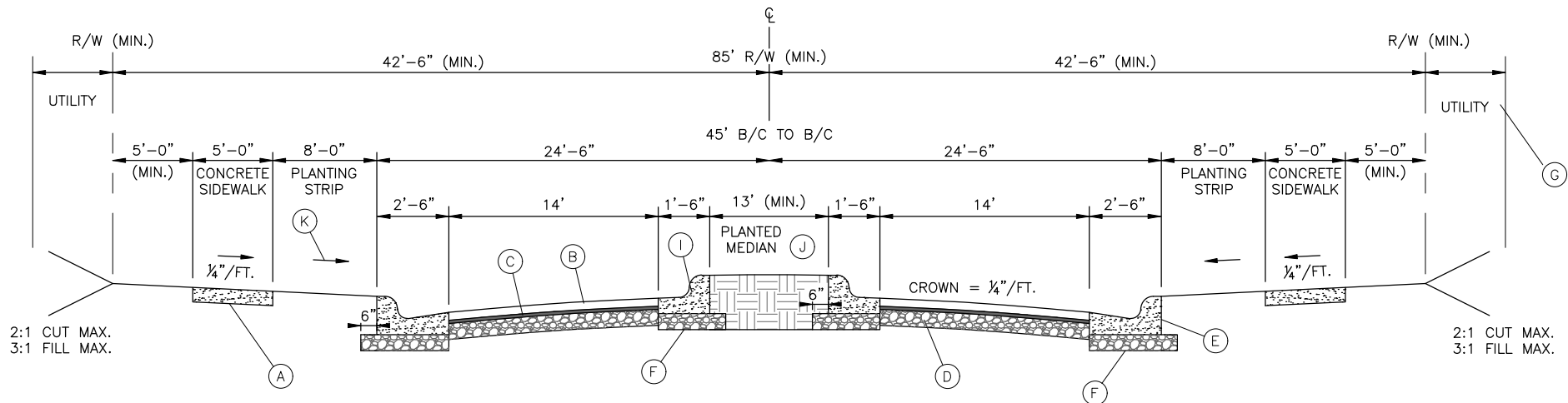
- (A) 4" SIDEWALK
- *DRIVEWAY APRON AND SIDEWALK AT DRIVEWAY CROSSINGS SHOULD BE 6" THICK
- (B) PER APPROVED PAVEMENT DESIGN (3" S9.5B SURFACE COURSE MIN.)
- (C) PER APPROVED PAVEMENT DESIGN (2.25" 1-19.0C INTERMEDIATE COURSE MIN.)
- (D) PER APPROVED PAVEMENT DESIGN (10" COMPACTED AGGREGATE BASE COURSE OR 5" B-25.0C MIN.)
- (E) 2'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- (H) TEMPORARY STRIPING SHOULD BE INSTALLED ONCE INITIAL SURFACE LIFT IS APPLIED, PERMANENT STRIPING SHOULD BE INSTALLED AFTER FINAL SURFACE LIFT IS APPLIED
- (K) PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES

NOT TO SCALE



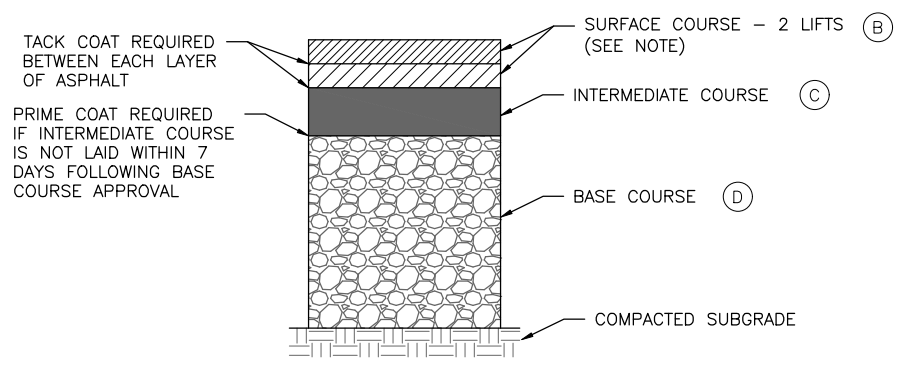
NON-RESIDENTIAL COLLECTOR STREET WITH BICYCLE LANES

3-2022
 STR-107
 SHEET 1 OF 1



TYPICAL CROSS SECTION

KEY



NOTE:
 SURFACE COURSE TO BE INSTALLED IN TWO (2) SEPARATE LIFTS A MINIMUM OF 1.5" THICK. THE FIRST LIFT MUST BE INSTALLED DIRECTLY AFTER INTERMEDIATE COURSE HAS BEEN INSTALLED AND ACCEPTED. THE FINAL LIFT SHOULD BE INSTALLED AFTER ALL OTHER REQUIREMENTS FOR ACCEPTANCE HAVE BEEN MET.

TYPICAL PAVEMENT SECTION

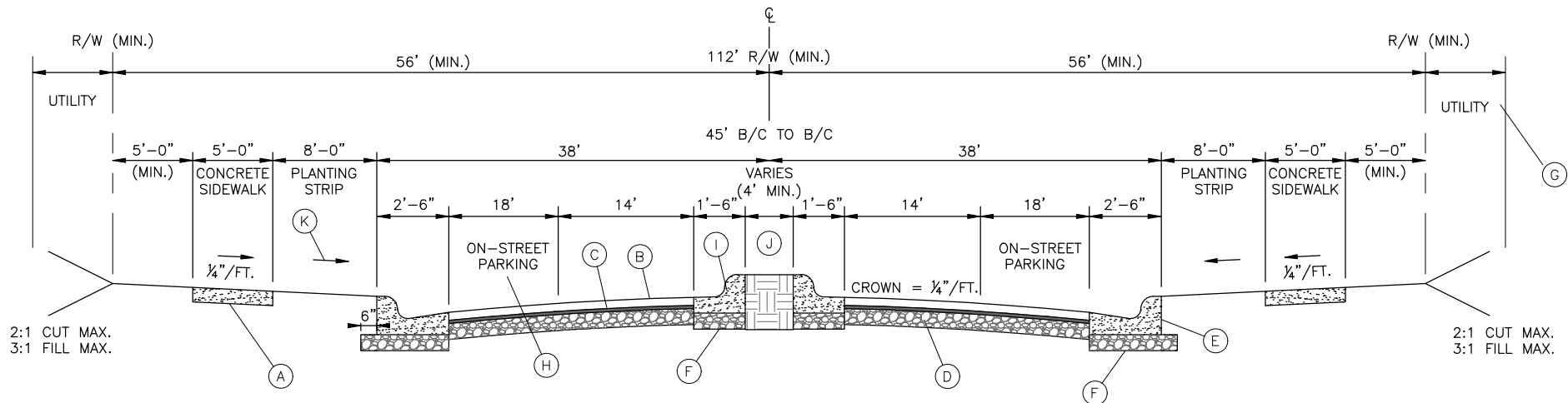
- (A) 4" SIDEWALK
- (B) PER APPROVED PAVEMENT DESIGN (3" S9.5B SURFACE COURSE MIN.)
- (C) PER APPROVED PAVEMENT DESIGN (2.25" I-19.0C INTERMEDIATE COURSE MIN.)
- (D) PER APPROVED PAVEMENT DESIGN (10" COMPACTED AGGREGATE BASE COURSE OR 5" B-25.0C MIN.)
- (E) 2'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- (H) TEMPORARY STRIPING SHOULD BE INSTALLED ONCE INITIAL SURFACE LIFT IS APPLIED, PERMANENT STRIPING SHOULD BE INSTALLED AFTER FINAL SURFACE LIFT IS APPLIED
- (I) 1'-6" STANDARD CURB AND GUTTER
- (J) PLANTED MEDIAN, WIDTH VARIES BASED ON PROPOSED PLANTINGS. LANDSCAPING TO BE MAINTAINED BY PROPERTY OWNER'S ASSOCIATION WITH EXECUTED ENCROACHMENT AGREEMENT WITH CITY
- (K) PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES

NOT TO SCALE



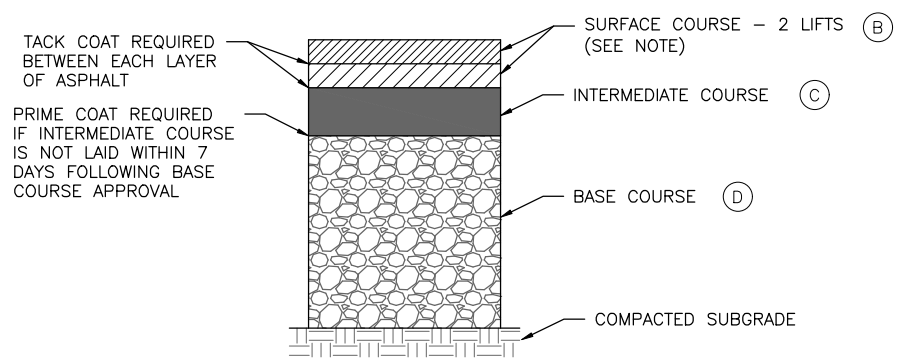
NON-RESIDENTIAL COLLECTOR STREET
 DIVIDED WITH PLANTED MEDIAN

3-2022
STR-108
SHEET 1 OF 1



TYPICAL CROSS SECTION

KEY



NOTE:
SURFACE COURSE TO BE INSTALLED IN TWO (2) SEPARATE LIFTS A MINIMUM OF 1.5" THICK. THE FIRST LIFT MUST BE INSTALLED DIRECTLY AFTER INTERMEDIATE COURSE HAS BEEN INSTALLED AND ACCEPTED. THE FINAL LIFT SHOULD BE INSTALLED AFTER ALL OTHER REQUIREMENTS FOR ACCEPTANCE HAVE BEEN MET.

TYPICAL PAVEMENT SECTION

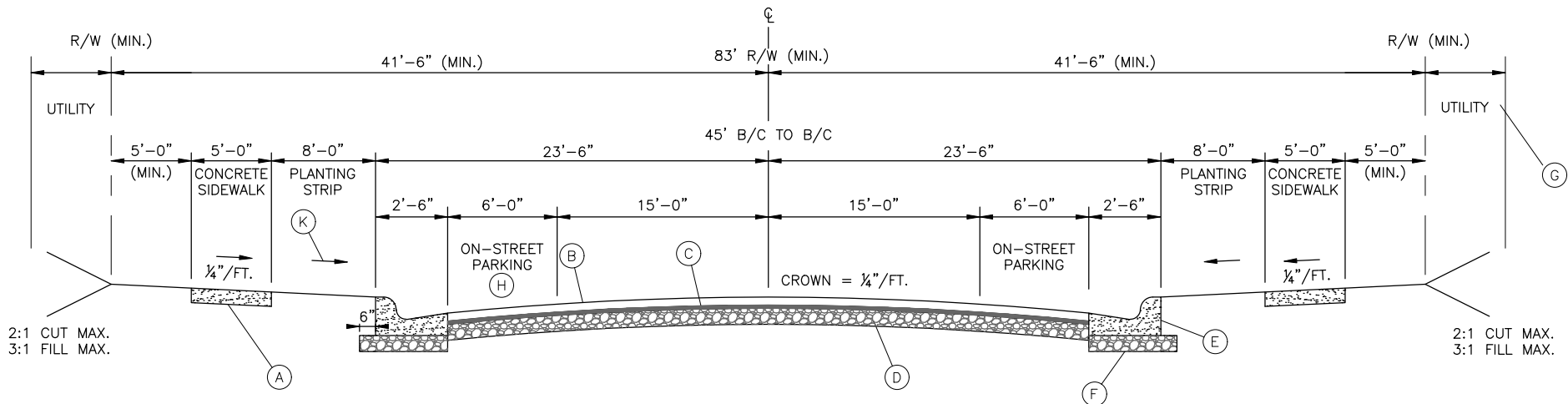
- (A) 4" SIDEWALK
- *DRIVEWAY APRON AND SIDEWALK AT DRIVEWAY CROSSINGS SHOULD BE 6" THICK
- (B) PER APPROVED PAVEMENT DESIGN (3" S9.5B SURFACE COURSE MIN.)
- (C) PER APPROVED PAVEMENT DESIGN (2.25" I-19.0C INTERMEDIATE COURSE MIN.)
- (D) PER APPROVED PAVEMENT DESIGN (10" COMPACTED AGGREGATE BASE COURSE OR 5" B-25.0C MIN.)
- (E) 2'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- (H) TEMPORARY STRIPING SHOULD BE INSTALLED ONCE INITIAL SURFACE LIFT IS APPLIED, PERMANENT STRIPING SHOULD BE INSTALLED AFTER FINAL SURFACE LIFT IS APPLIED
- (I) 1'-6" STANDARD CURB AND GUTTER
- (J) PLANTED MEDIAN, WIDTH VARIES BASED ON PROPOSED PLANTINGS. LANDSCAPING TO BE MAINTAINED BY PROPERTY OWNER'S ASSOCIATION WITH EXECUTED ENCROACHMENT AGREEMENT WITH CITY
- (K) PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES

NOT TO SCALE

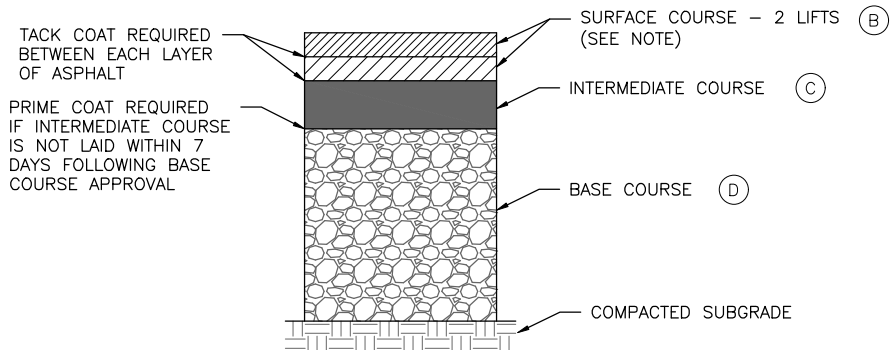


NON-RESIDENTIAL COLLECTOR STREET WITH 45° REVERSE ANGLE PARKING

3-2022
STR-109
SHEET 1 OF 1



TYPICAL CROSS SECTION



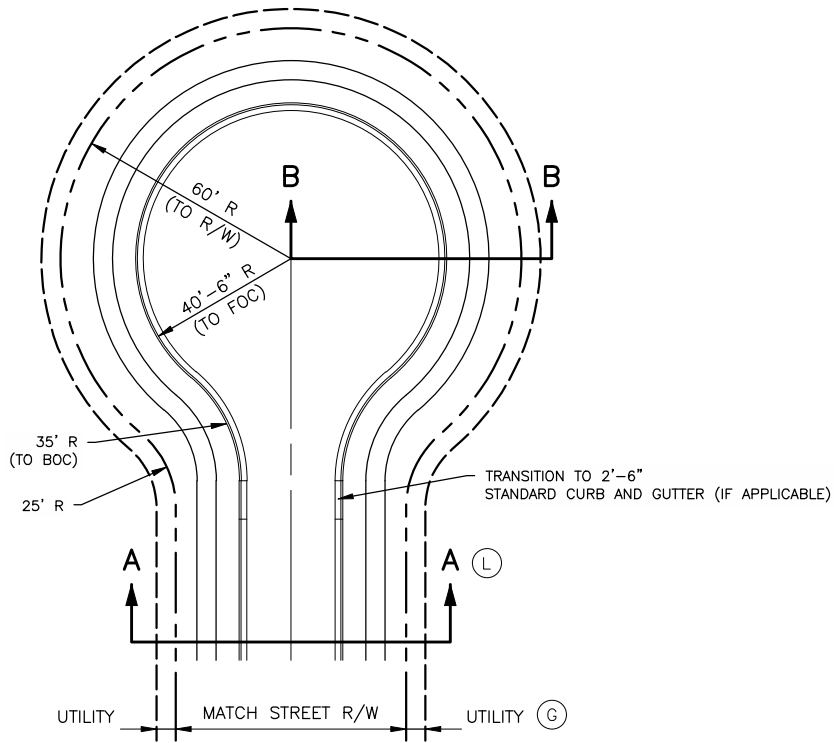
NOTE:
 SURFACE COURSE TO BE INSTALLED IN TWO (2) SEPARATE LIFTS A MINIMUM OF 1.5" THICK. THE FIRST LIFT MUST BE INSTALLED DIRECTLY AFTER INTERMEDIATE COURSE HAS BEEN INSTALLED AND ACCEPTED. THE FINAL LIFT SHOULD BE INSTALLED AFTER ALL OTHER REQUIREMENTS FOR ACCEPTANCE HAVE BEEN MET.

TYPICAL PAVEMENT SECTION

KEY

- (A) 4" SIDEWALK
- *DRIVEWAY APRON AND SIDEWALK AT DRIVEWAY CROSSINGS SHOULD BE 6" THICK
- (B) PER APPROVED PAVEMENT DESIGN (3" S9.5B SURFACE COURSE MIN.)
- (C) PER APPROVED PAVEMENT DESIGN (2.25" I-19.0C INTERMEDIATE COURSE MIN.)
- (D) PER APPROVED PAVEMENT DESIGN (10" COMPACTED AGGREGATE BASE COURSE OR 5" B-25.0C MIN.)
- (E) 2'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- (H) TEMPORARY STRIPING SHOULD BE INSTALLED ONCE INITIAL SURFACE LIFT IS APPLIED, PERMANENT STRIPING SHOULD BE INSTALLED AFTER FINAL SURFACE LIFT IS APPLIED
- (K) PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES.

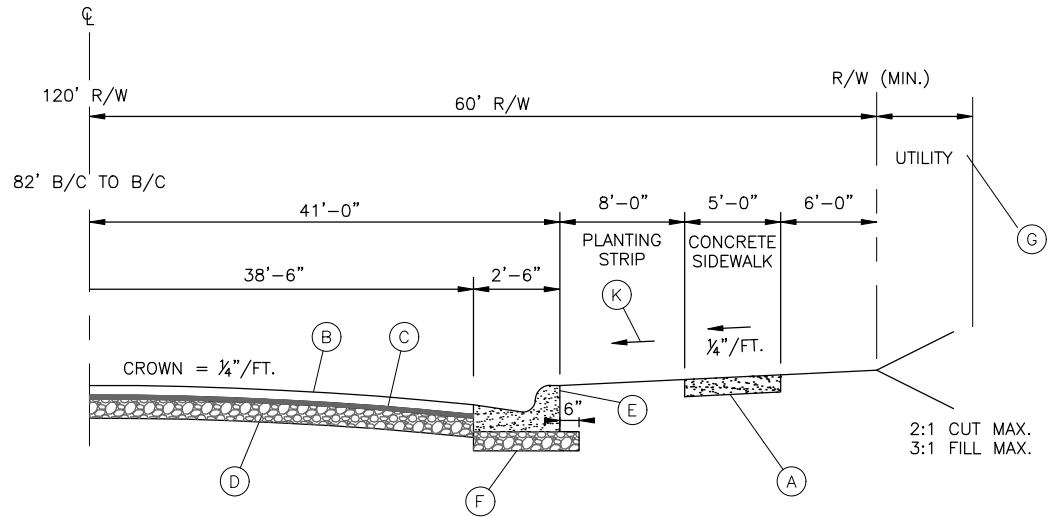
NOT TO SCALE



PLAN

NOTES

1. THIS DETAIL ONLY APPLIES TO RESIDENTIAL CUL-DE-SACS WITH A LENGTH LESS THAN 150' FROM THE CENTERLINE OF THE INTERSECTING STREET PROVIDING ACCESS TO THE CENTER TERMINUS OF THE CUL-DE-SAC.

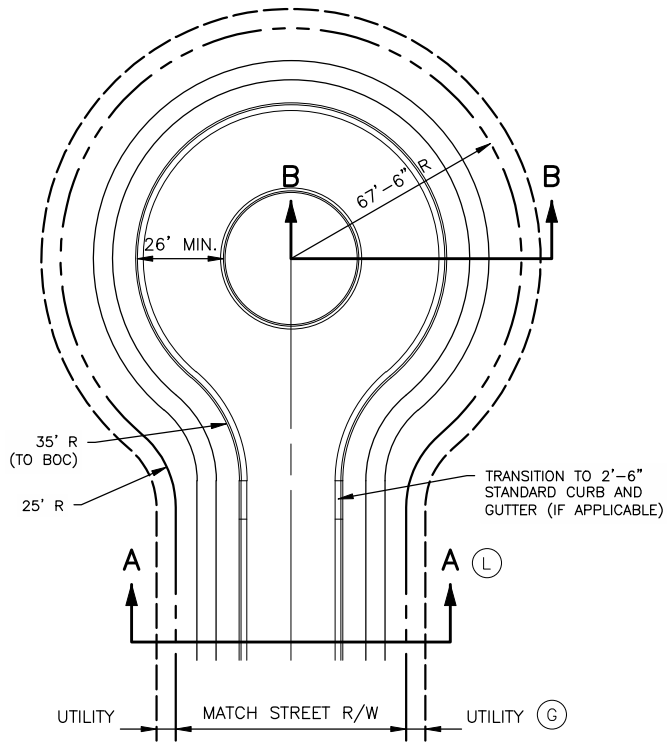


SECTION B - B

KEY

- (A) 4" SIDEWALK
- *DRIVEWAY APRON AND SIDEWALK AT DRIVEWAY CROSSINGS SHOULD BE 6" THICK
- (B) TO MATCH TYPICAL SECTION OF ADJOINING STREET
- (C) TO MATCH TYPICAL SECTION OF ADJOINING STREET
- (D) TO MATCH TYPICAL SECTION OF ADJOINING STREET
- (E) 2'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES
- (K)
- (L) SECTION A-A TO MATCH ADJOINING STREET CROSS SECTION

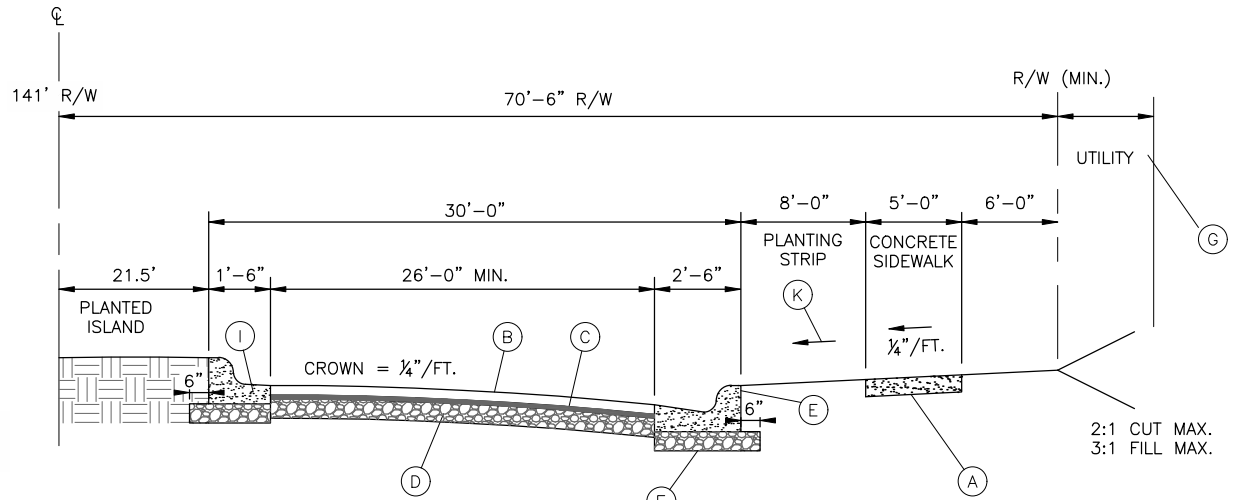
NOT TO SCALE



PLAN

NOTES

1. THIS DETAIL APPLIES TO RESIDENTIAL CUL-DE-SACS WITH A LENGTH GREATER THAN 150' FROM THE CENTERLINE OF THE INTERSECTING STREET PROVIDING ACCESS TO THE CENTER TERMINUS OF THE CUL-DE-SAC.
2. PLANTINGS IN ISLAND SHOULD BE GRASS/SHRUBS WITH A MAXIMUM MATURE HEIGHT OF 3'. TREES WITH WITH A CANOPY OF 8' OR HIGHER ABOVE THE STREET SURFACE MAY BE ALLOWED AS APPROVED BY THE CITY ARBORIST.
3. LANDSCAPING AND PLANTINGS WITHIN THE ISLAND SHALL BE MAINTAINED BY THE DEVELOPER, HOMEOWNER'S ASSOCIATION OR OTHER LEGAL ENTITY THROUGH AN ENCROACHMENT AGREEMENT WITH THE CITY OF CONCORD.

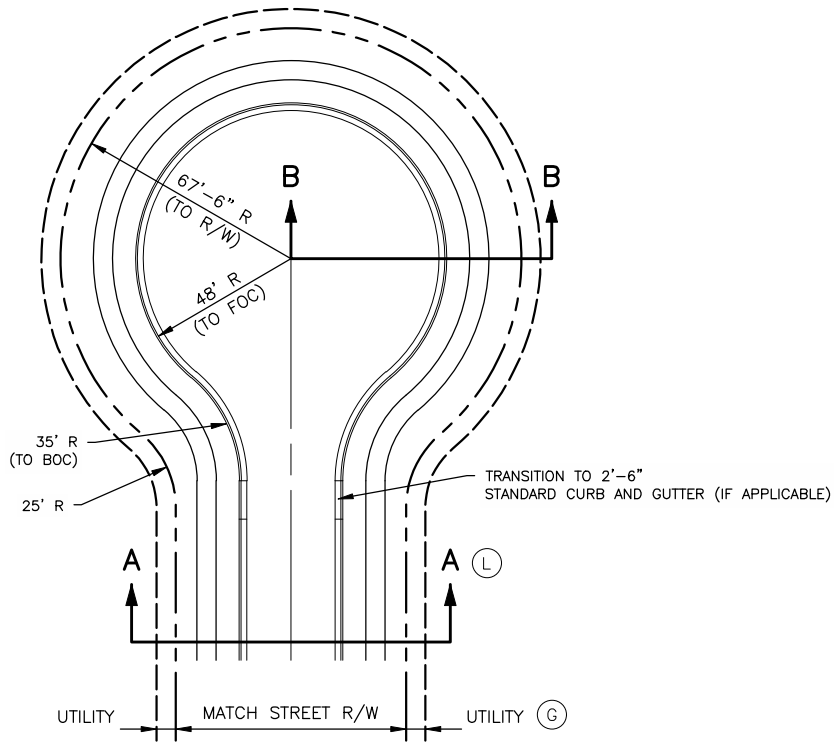


SECTION B - B

KEY

- (A) 4" SIDEWALK
- *DRIVEWAY APRON AND SIDEWALK AT DRIVEWAY CROSSINGS SHOULD BE 6" THICK
- (B) TO MATCH TYPICAL SECTION OF ADJOINING STREET
- (C) TO MATCH TYPICAL SECTION OF ADJOINING STREET
- (D) TO MATCH TYPICAL SECTION OF ADJOINING STREET
- (E) 2'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- (I) 1'-6" STANDARD CURB AND GUTTER
- (K) PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES
- (L) SECTION A-A TO MATCH ADJOINING STREET CROSS SECTION

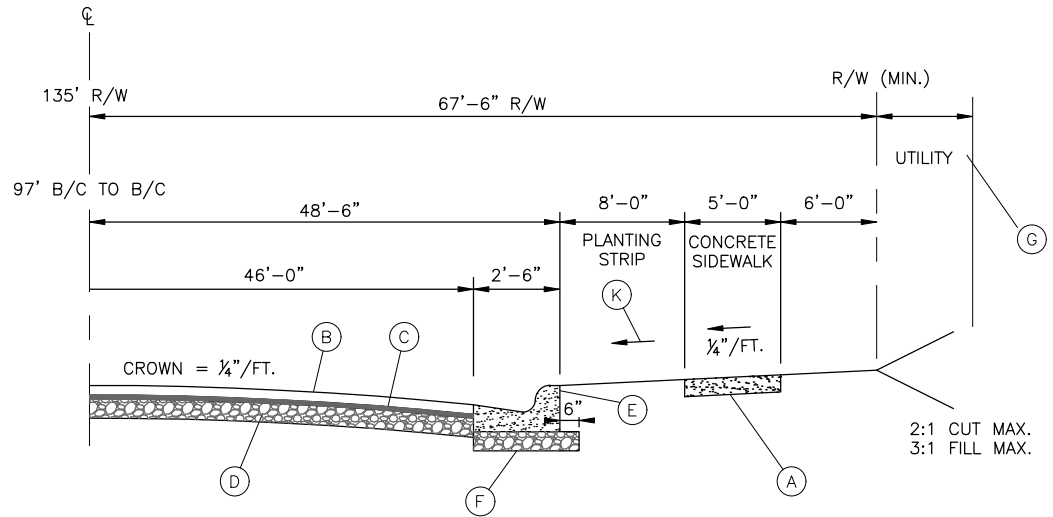
NOT TO SCALE



PLAN

NOTES

1. THIS DETAIL APPLIES TO ALL NON-RESIDENTIAL AND MIXED USE CUL-DE-SACS OF ALL LENGTHS.



SECTION B - B

KEY

- (A) 4" SIDEWALK
- *DRIVEWAY APRON AND SIDEWALK AT DRIVEWAY CROSSINGS SHOULD BE 6" THICK
- (B) TO MATCH TYPICAL SECTION OF ADJOINING STREET
- (C) TO MATCH TYPICAL SECTION OF ADJOINING STREET
- (D) TO MATCH TYPICAL SECTION OF ADJOINING STREET
- (E) 2'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- PLANTING STRIP ADJACENT TO SIDEWALK SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES
- (K)
- (L) SECTION A-A TO MATCH ADJOINING STREET CROSS SECTION

NOT TO SCALE

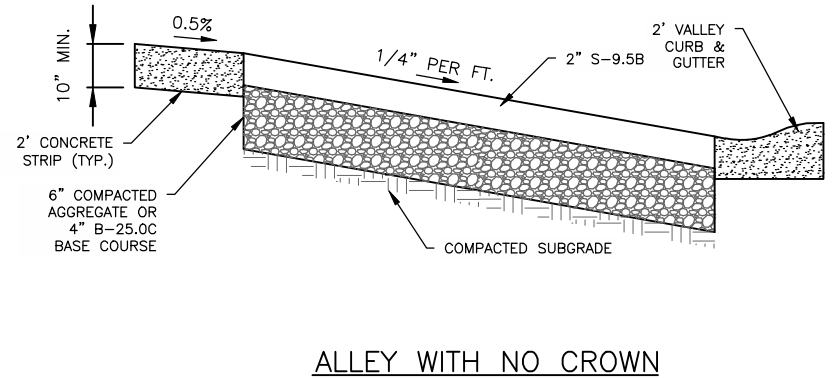
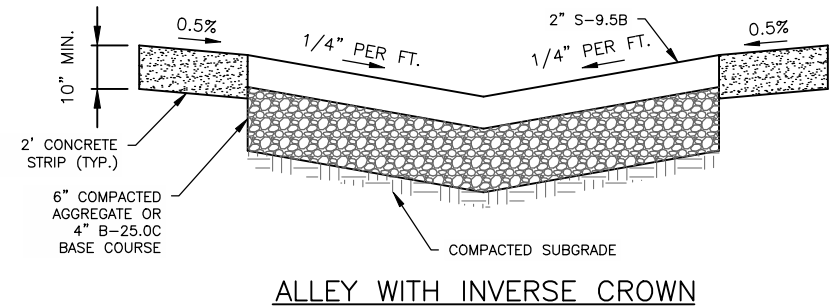
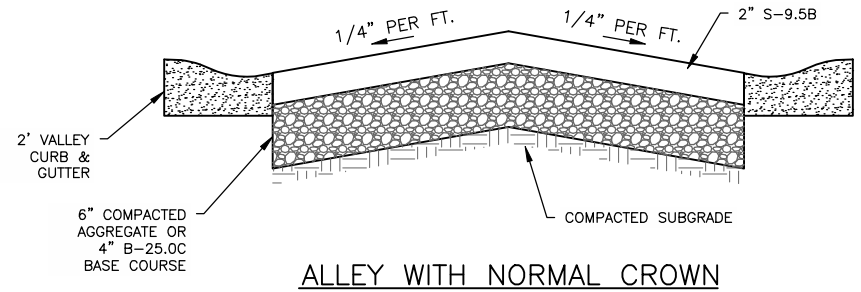
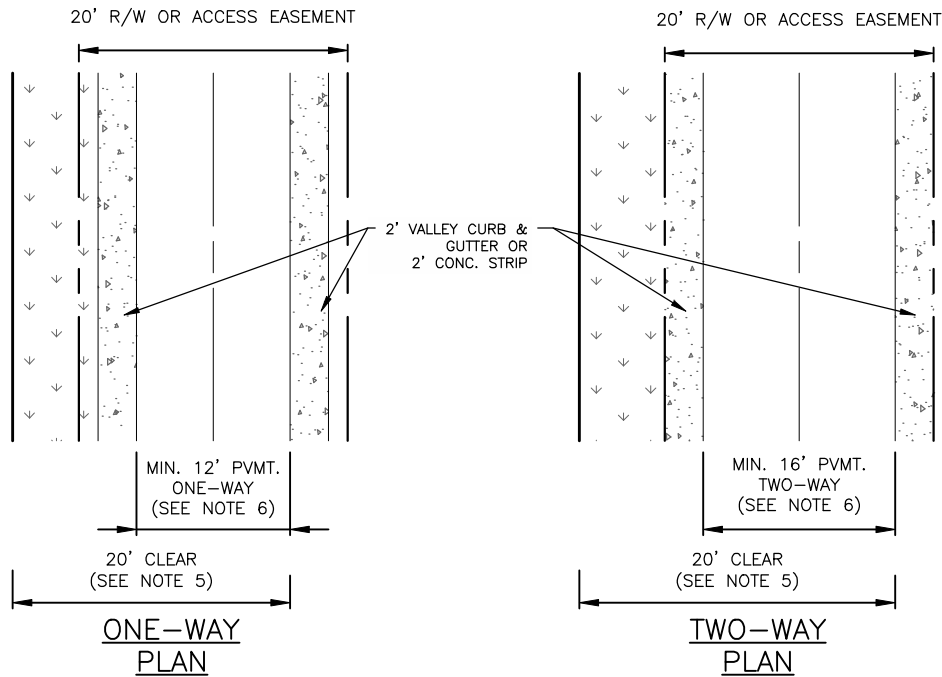


NON-RESIDENTIAL & MIXED USE CUL-DE-SAC
ALL LENGTHS

3-2022
STR-113
SHEET 1 OF 1

NOTES:

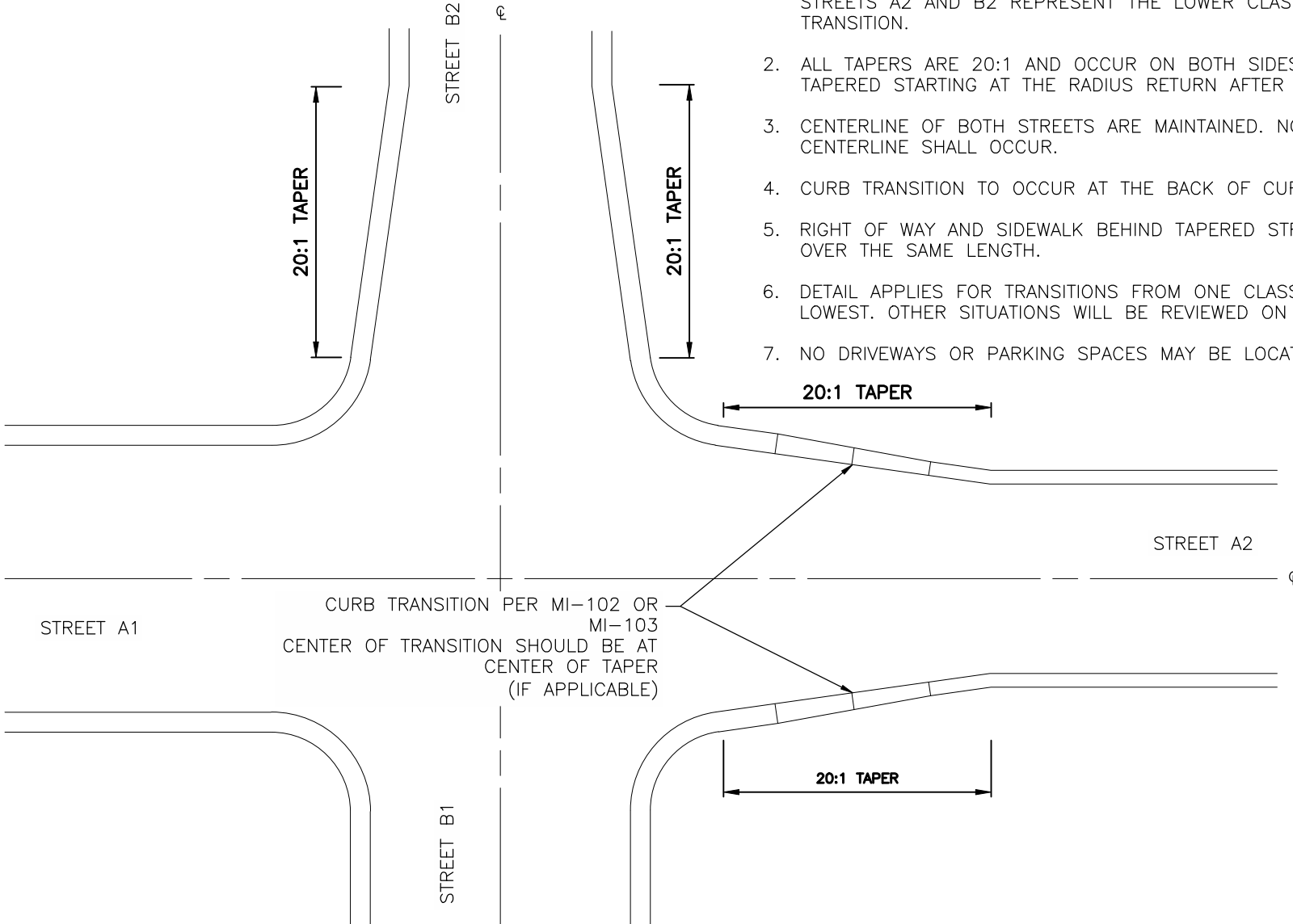
1. SUBGRADE SHALL BE COMPACTED TO PUBLIC STREET STANDARDS.
2. STORM DRAINAGE (NOT SHOWN) SHALL BE PROVIDED AS NECESSARY.
3. ALLEYS SHALL BE CONSIDERED PRIVATE EASEMENTS AND WILL NOT BE ACCEPTED FOR MAINTENANCE BY THE CITY OF CONCORD.
4. DRIVEWAYS SHALL BE A MINIMUM OF 10' WIDE AND SEPARATED BY AT LEAST 6 FEET, OR GREATER IF REQUIRED BY PLANNING (LOT SIZE) REQUIREMENTS AND/OR N.C. BUILDING CODE.
5. DETAIL APPLIES TO SINGLE- OR DOUBLE-LOADED ALLEYS. FOR SINGLE-LOADED ALLEYS, THERE SHALL BE A 20-FOOT CLEAR ZONE FREE OF CUT SLOPES, OBSTRUCTIONS, HEDGES, ETC. FROM THE LOADED SIDE EDGE OF PAVEMENT.
6. MINIMUM 20' WIDE PAVEMENT REQUIRED IF ALLEY IS TO BE CONSIDERED A "FIRE APPARATUS ACCESS ROAD" PER NC FIRE CODE. FIRE CODE MAY REQUIRE OTHER DIMENSIONAL AND PAVEMENT SECTION CHANGES TO ACCOMMODATE MINIMUM REQUIREMENTS.



NOT TO SCALE

GENERAL NOTES:

1. STREETS A1 AND B1 REPRESENT THE HIGHER CLASSIFICATION WHILE STREETS A2 AND B2 REPRESENT THE LOWER CLASSIFICATION AFTER THE TRANSITION.
2. ALL TAPERS ARE 20:1 AND OCCUR ON BOTH SIDES OF THE ROAD TO BE TAPERED STARTING AT THE RADIUS RETURN AFTER THE INTERSECTION.
3. CENTERLINE OF BOTH STREETS ARE MAINTAINED. NO SHIFTING OF THE CENTERLINE SHALL OCCUR.
4. CURB TRANSITION TO OCCUR AT THE BACK OF CURB WHERE APPLICABLE.
5. RIGHT OF WAY AND SIDEWALK BEHIND TAPERED STREET SECTION TO TAPER OVER THE SAME LENGTH.
6. DETAIL APPLIES FOR TRANSITIONS FROM ONE CLASSIFICATION TO THE NEXT LOWEST. OTHER SITUATIONS WILL BE REVIEWED ON A CASE BY CASE BASIS.
7. NO DRIVEWAYS OR PARKING SPACES MAY BE LOCATED WITHIN THE TAPER.



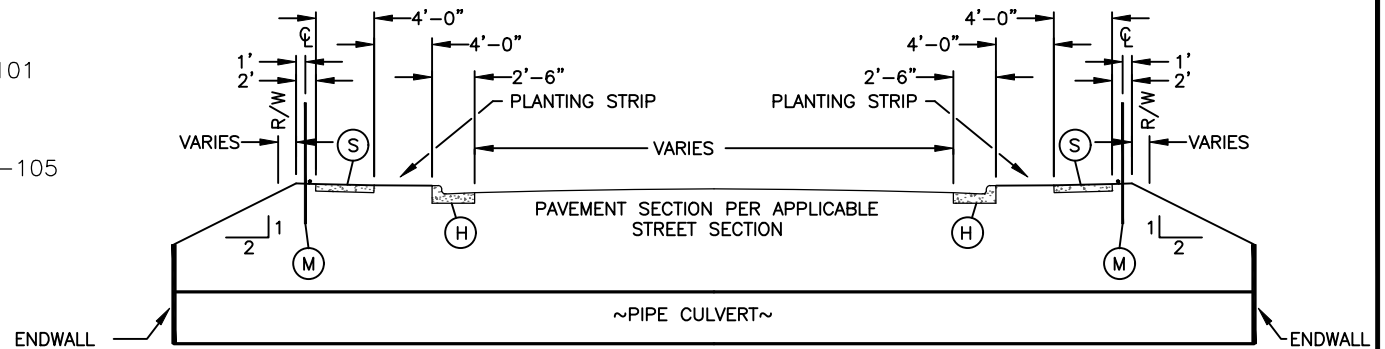
NOT TO SCALE



TRANSITION BETWEEN STREET CLASSIFICATIONS

3-2022
STR-116
SHEET 1 OF 1

- (H) 2'-6" CURB AND GUTTER, STD. MI-101
- (M) SAFETY RAIL, STD. MISC-206
- (S) 4'-0" SIDEWALK, STD. MI-104 & MI-105
- (H1) 2'-0" VALLEY GUTTER, STD. MI-101
- (H2) CURB TRANSITION 2'-6" CURB AND GUTTER TO 2'-0" VALLEY GUTTER, STD. MI-102



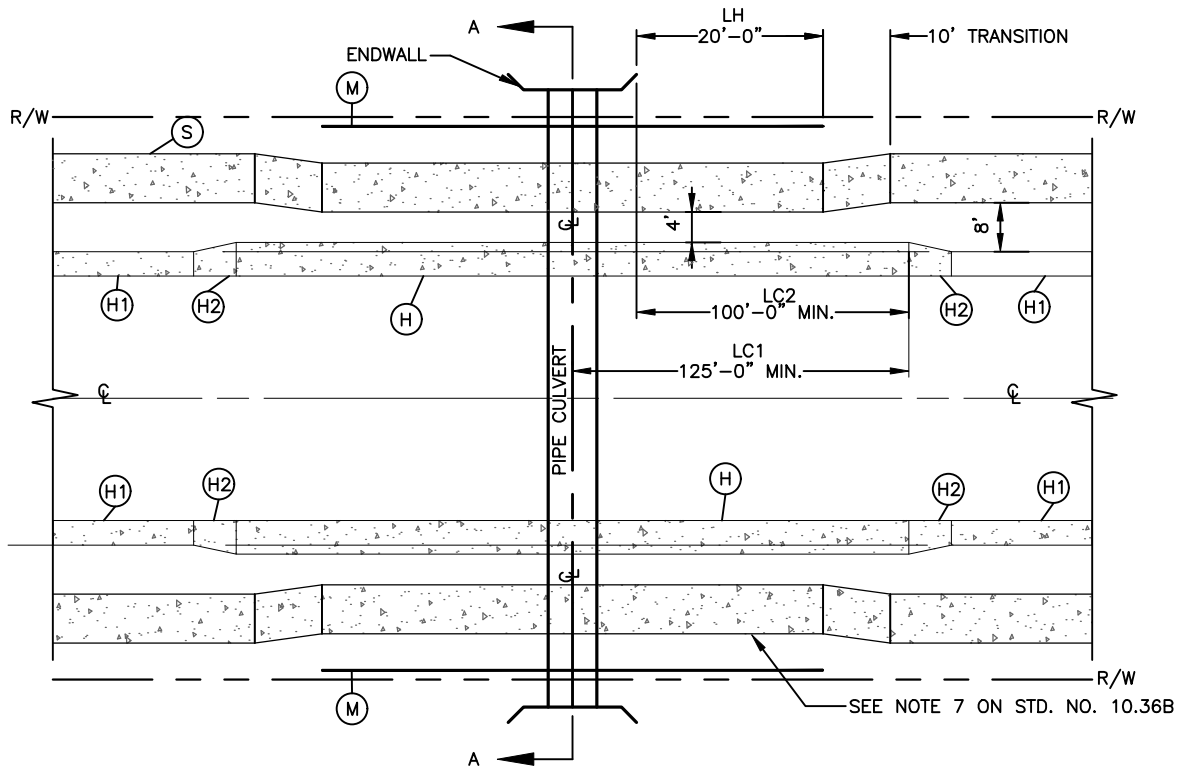
SECTION A - A

LH* = DISTANCE FROM END OF WINGWALL TO END OF SAFETY RAIL.

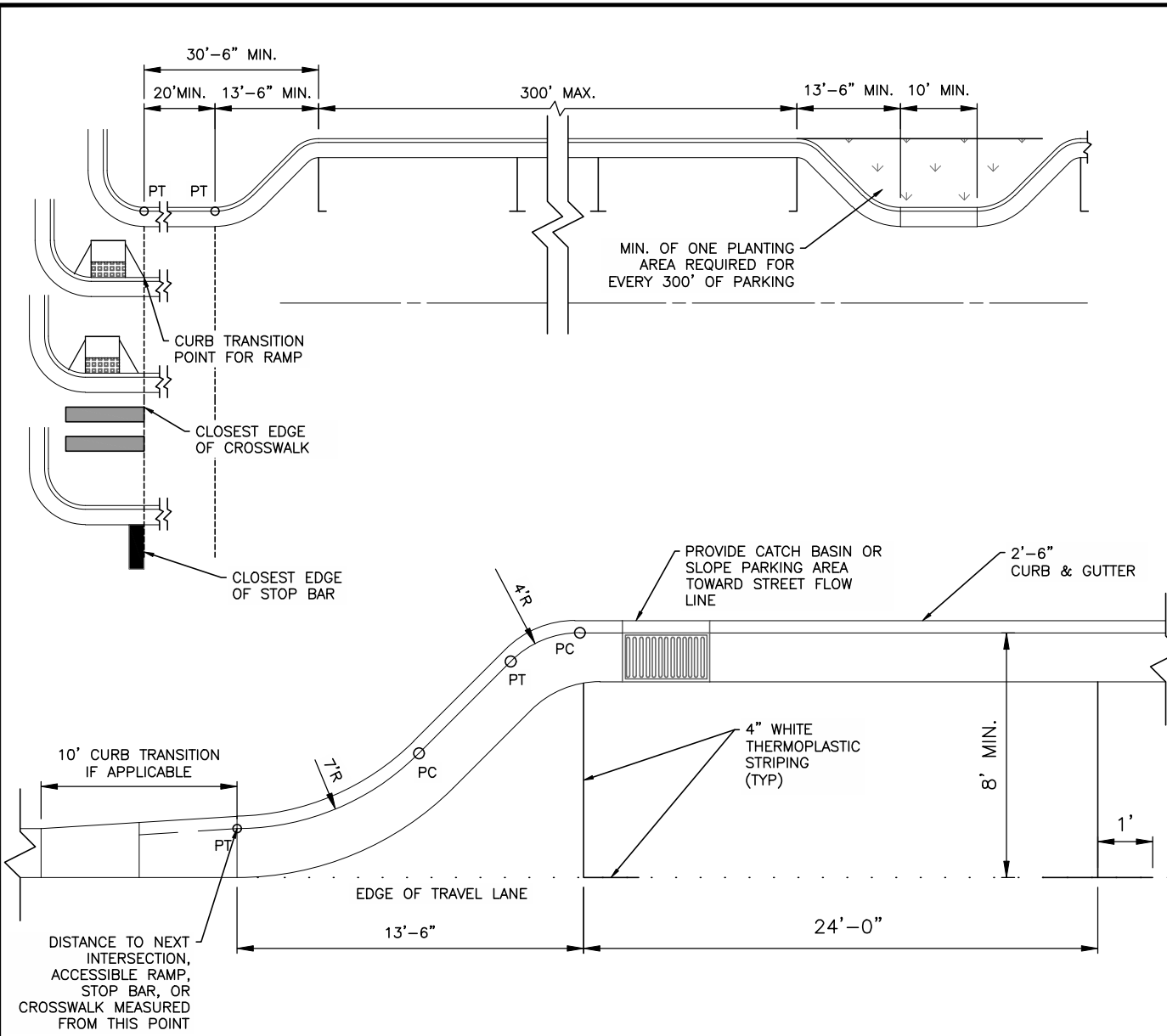
LC1 = DISTANCE FROM^CL OF CULVERT TO END OF 2'-6" CURB AND GUTTER.

LC2* = DISTANCE FROM END OF WINGWALL TO END OF 2'-6" CURB AND GUTTER.

*LH AND LC2 TO BE MEASURED FROM THE OUTSIDE OF THE NEAREST WALL OF THE CULVERT BARREL.



NOT TO SCALE



NOTES:

1. ACCESSIBLE SPACES AND ACCESS AISLES SHALL BE PROVIDED PER ADA GUIDELINES, AND PER STD. STR-121
2. ALL CONCRETE TO BE 3600 P.S.I.
3. PARKING SPACES SHALL BE GRADED TO PROPERLY DRAIN AND ENSURE WATER, SEDIMENT, DEBRIS ETC. DOES NOT COLLECT.
4. WHERE A BICYCLE LANE IS REQUIRED ADJACENT TO PARALLEL PARKING SPACES, THE MINIMUM WIDTH IS 6'.

NOT TO SCALE



ON-STREET PARALLEL PARKING

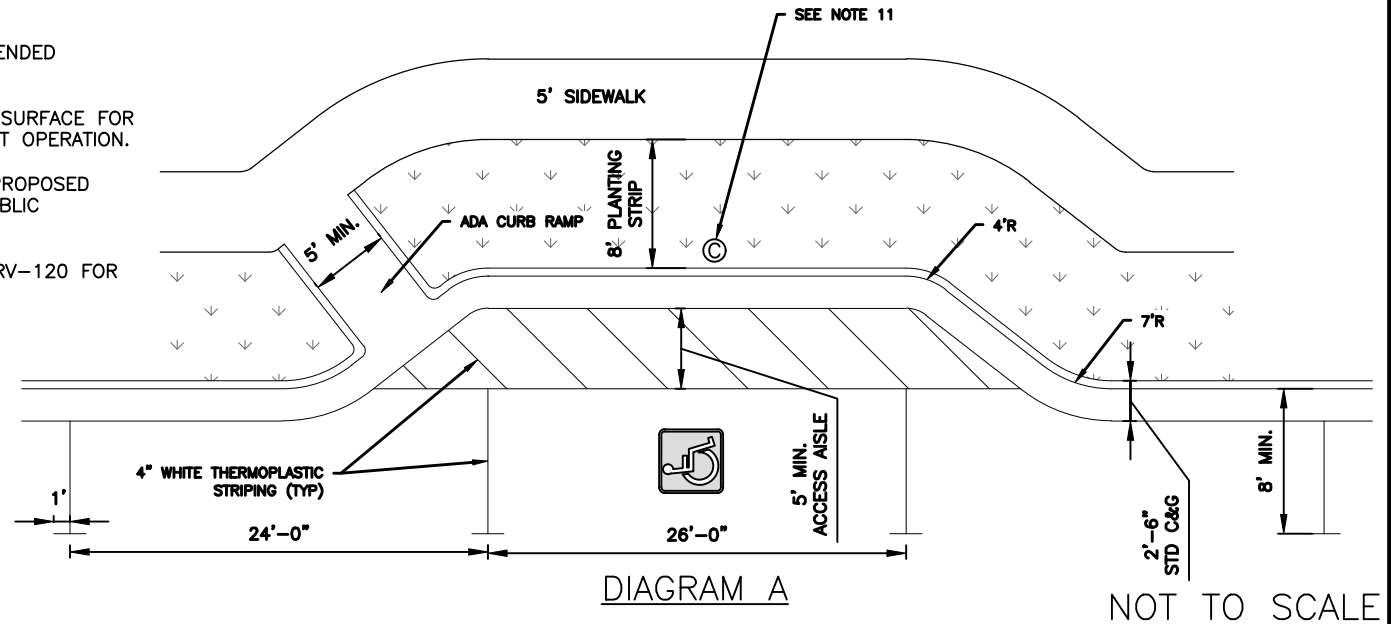
3-2022
STR-120
SHEET 1 OF 1

NOTES:

1. AN ACCESS AISLE SHALL BE PROVIDED AT STREET LEVEL FOR ON-STREET PARALLEL PARKING WITH 5' MIN. WIDTH AND SHALL EXTEND THE FULL LENGTH OF THE PARKING SPACE.
2. ACCESSIBLE SPACE AND ACCESS AISLE SHALL BE OBSTRUCTION-FREE.
3. ALL CONCRETE TO BE 3600 P.S.I.
4. GUTTER FLOW LINE SHALL BE MAINTAINED THROUGH THE ACCESS AISLE.
5. ACCESS AISLE, CURB RAMP, AND PARKING SPACE SHALL BE GRADED TO PROPERLY DRAIN AND TO ENSURE WATER, SEDIMENT, DEBRIS, ETC., DOES NOT COLLECT.
6. ACCESSIBLE PAVEMENT MARKING DETAIL PER MUTCD:
 - INSTALL INTERNATIONAL SYMBOL OF ACCESSIBILITY PARKING SPACE MARKINGS, INCLUDING WHITE SYMBOL WITH BLUE BACKGROUND AND WHITE BORDER. SYMBOL SHALL HAVE MIN. HEIGHT OF 28 INCHES AND MIN. WIDTH OF 24 INCHES (EXCLUSIVE OF BLUE BACKGROUND AND WHITE BORDER). STROKE WIDTH SHALL BE MIN. 3 INCHES.
 - WHITE PAVEMENT MARKINGS PLACED ON CONCRETE SHALL BE SHADOWED WITH BLACK BORDER.
 - TYPICAL SYMBOL LOCATION AND ORIENTATION PER "DIAGRAM A" BELOW
8. LOCATE IN MOST LEVEL AREA OF BLOCK (RECOMMENDED PRACTICE) TO MAXIMIZE USABILITY.
9. SPACE AND ACCESS AISLE SHOULD HAVE SMOOTH SURFACE FOR LIFT DEPLOYMENT. MINIMIZE CROSS SLOPE FOR LIFT OPERATION.
10. FOR MORE INFORMATION SEE SECTION R309 OF "PROPOSED GUIDELINES FOR PEDESTRIAN FACILITIES IN THE PUBLIC RIGHT-OF-WAY" (PROWAG).
11. USE APPROPRIATE SIGNAGE AS SHOWN ON STD. DRV-120 FOR ON-STREET PARKING.

ON-STREET PARKING SPACES REQUIRED	
TOTAL PARKING SPACES PROVIDED	MINIMUM NUMBER OF ACCESSIBLE SPACES REQUIRED
1 TO 25	1
26 TO 50	2
51 TO 75	3
76 TO 100	4
101 TO 150	5
151 TO 200	6
201 AND OVER	4% OF TOTAL

(BASED ON TABLE R214 OF PROWAG)



NOTES:

1. ACCESSIBLE SPACES AND ACCESS AISLES SHALL BE PROVIDED PER ADA GUIDELINES. VAN ACCESSIBLE SPACES SHALL HAVE AN ACCESS AISLE WITH A MINIMUM WIDTH OF 8' LOCATED ON THE PASSENGER SIDE. NON-VAN ACCESS AISLES SHALL BE A MINIMUM OF 5' IN WIDTH.
2. ACCESSIBLE SPACE AND ACCESS AISLE SHALL BE OBSTRUCTION-FREE.
3. APPROPRIATE CURB RAMPS TO BE LOCATED AT EACH ACCESS AISLE.
4. ALL CONCRETE TO BE 3600 P.S.I.
5. ACCESSIBLE PAVEMENT MARKING DETAIL:
 - INSTALL INTERNATIONAL SYMBOL OF ACCESSIBILITY PARKING SPACE MARKINGS, INCLUDING WHITE SYMBOL WITH BLUE BACKGROUND AND WHITE BORDER. SYMBOL SHALL HAVE MIN. HEIGHT OF 28 INCHES AND MIN. WIDTH OF 24 INCHES (EXCLUSIVE OF BLUE BACKGROUND AND WHITE BORDER). STROKE WIDTH SHALL BE MIN. 3 INCHES.
 - WHITE PAVEMENT MARKINGS PLACED ON CONCRETE SHALL BE SHADOWED WITH BLACK BORDER.
 - TYPICAL SYMBOL LOCATION AND ORIENTATION PER "DIAGRAM A" BELOW
8. USE APPROPRIATE SIGNS AS SHOWN ON STD. DRV-120 FOR ACCESSIBLE ON-STREET PARKING.

PREFERRED DIMENSIONS FOR REVERSE ANGLE PARKING				
ANGLE (A)	STALL LENGTH (L)	STALL WIDTH (W)	STALL DEPTH (H)	PARALLEL WIDTH (C)
30°	32'	19	16'	9.5'
45°	25.46'	13.44'	18'	9.5'
60°	21.36	10.97	18.5'	9.5'

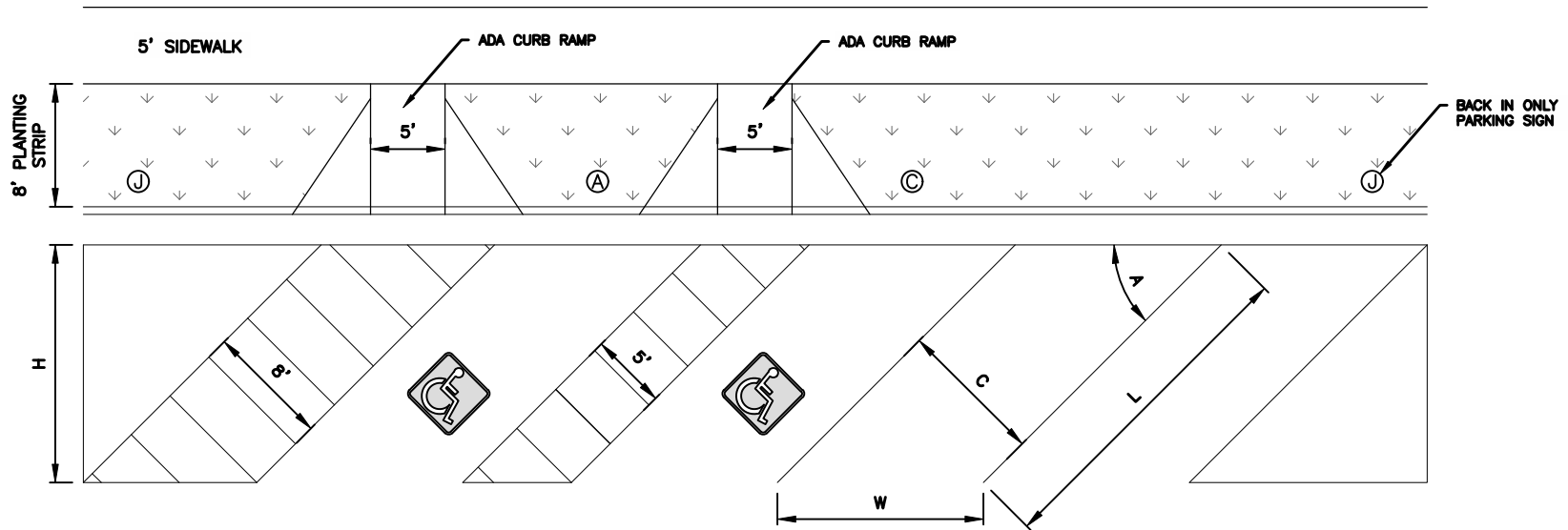
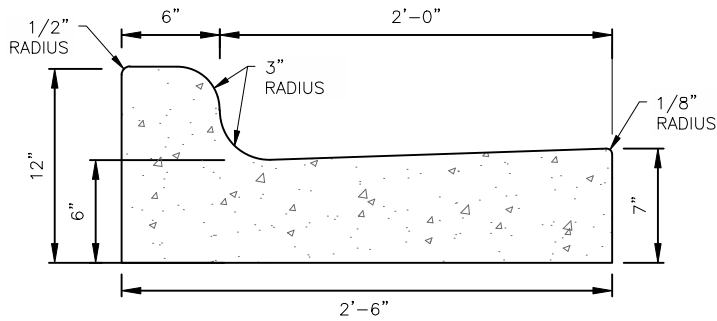
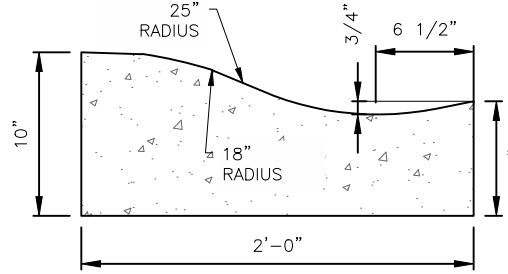


DIAGRAM A

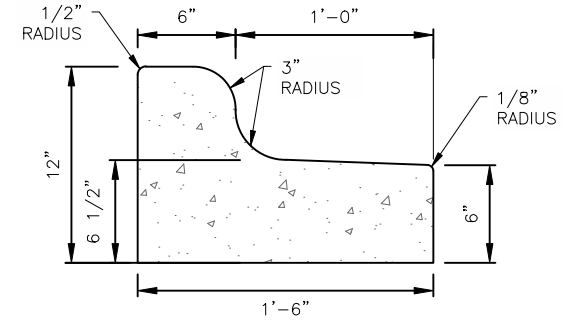
NOT TO SCALE



STANDARD 2'-6" CURB & GUTTER

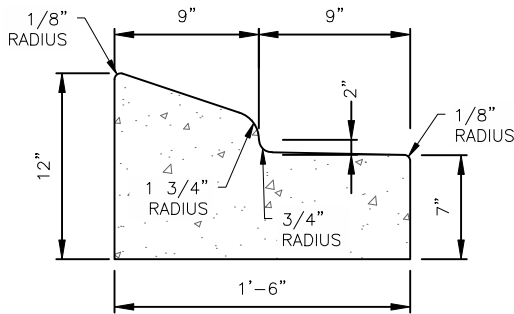


2'-0" VALLEY CURB & GUTTER



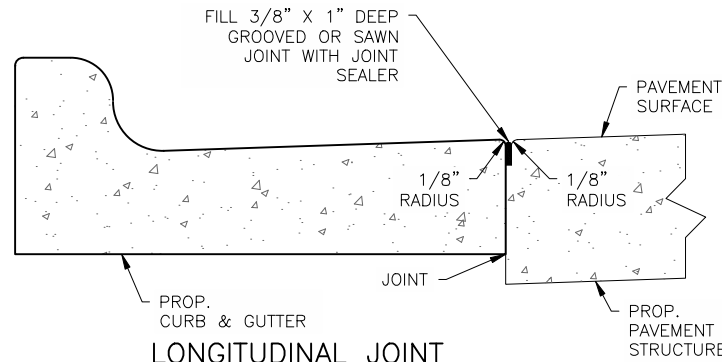
1'-6" MEDIAN CURB & GUTTER

TO BE USED IN MEDIANS WHEN LANES ARE SLOPED FROM ISLAND OR AS SPECIFIED BY THE APPROPRIATE CITY ENGINEERING DEPT.

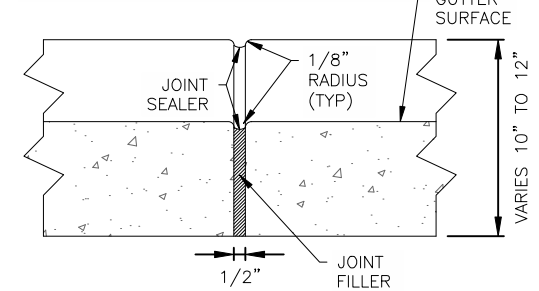


1'-6" MOUNTABLE CURB & GUTTER

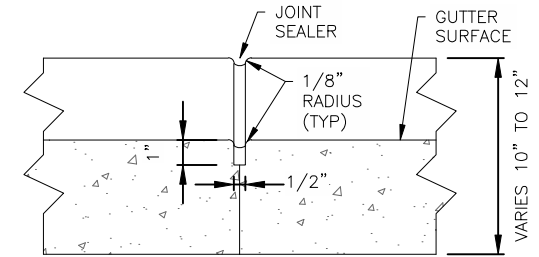
TO BE USED IN MEDIANS ONLY: WHEN SPECIFIED BY THE APPROPRIATE CITY DEPT.



LONGITUDINAL JOINT



TRANSVERSE EXPANSION JOINT



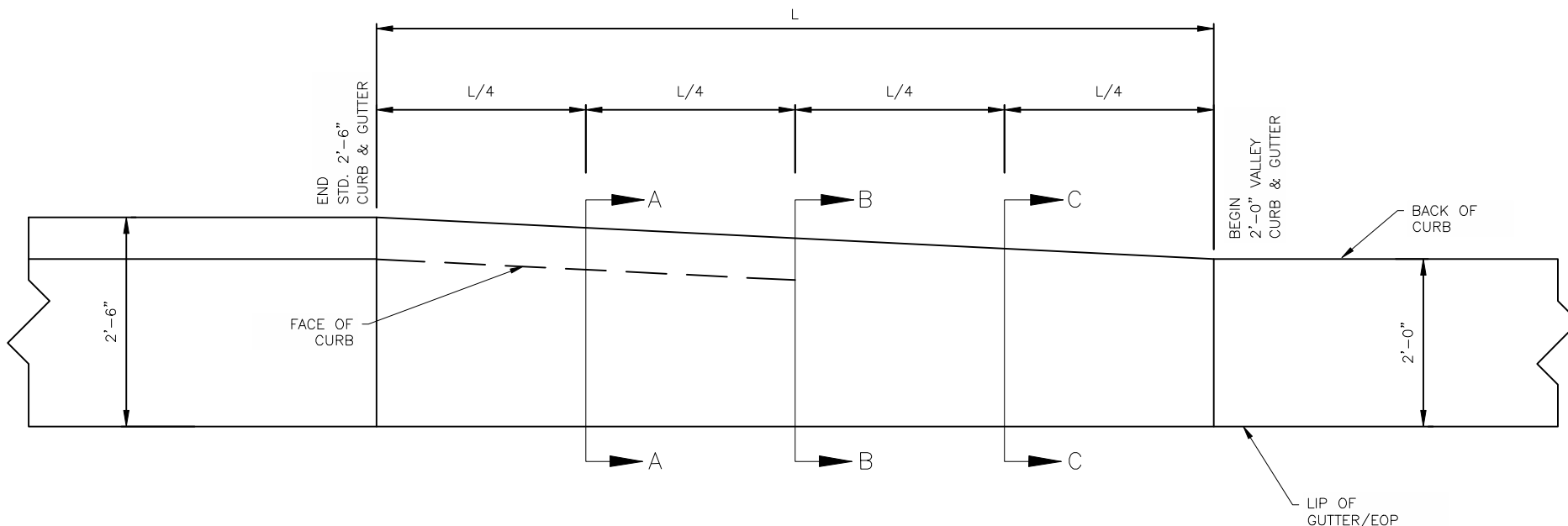
CONTRACTION JOINT

NOTES

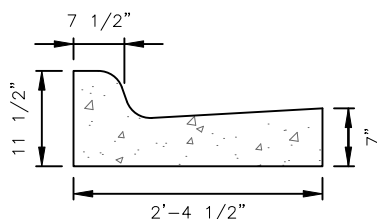
1. NCDOT STANDARD DETAIL 846.01 TO BE USED FOR VARIOUS CURB AND GUTTER SUPERELEVATION RATES.
2. PLACE CONTRACTION JOINTS AT 10' INTERVALS. JOINT SPACING MAY BE ALTERED BY CITY ENGINEER TO PREVENT UNCONTROLLED CRACKING.
3. FILL ALL CONSTRUCTION JOINTS WITH JOINT FILLER AND SEALER.
4. SPACE EXPANSION JOINTS AT 90' INTERVALS AND ADJACENT TO ALL RIGID OBJECTS. JOINTS SHALL MATCH LOCATION WITH JOINTS IN ABUTTING SIDEWALK.
5. CONCRETE COMPRESSIVE STRENGTH SHALL BE 3600 P.S.I. IN 28 DAYS.
6. TOP 6" OF SUBGRADE BENEATH CURB AND GUTTER SHALL BE COMPACTED TO 100% STANDARD PROCTOR DENSITY.

NOT TO SCALE

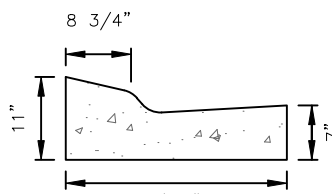
L = 10 FEET IN LONGITUDINAL SECTION



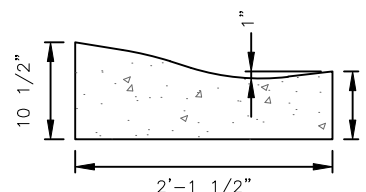
PLAN VIEW



SECTION A-A



SECTION B-B



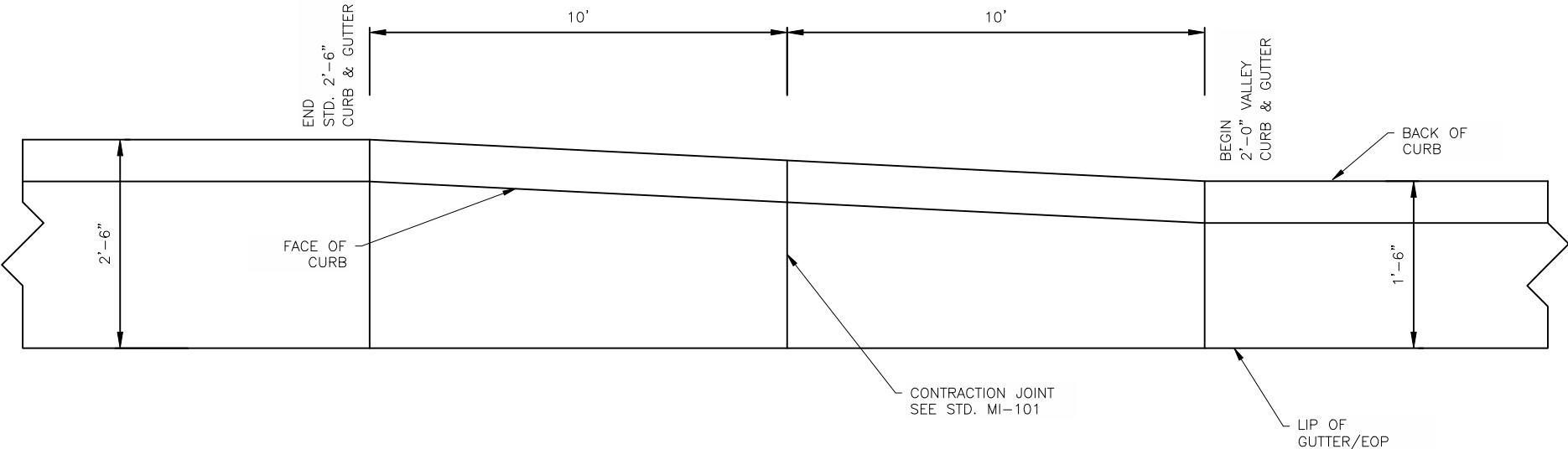
SECTION C-C

NOTES

1. TRANSITION SHALL NOT BE LOCATED WITHIN THE CURB RADIUS.
2. TRANSITION TO BE ALONG BACK OF CURB.

NOT TO SCALE

L = 10 FEET IN LONGITUDINAL SECTION



PLAN VIEW

NOTES

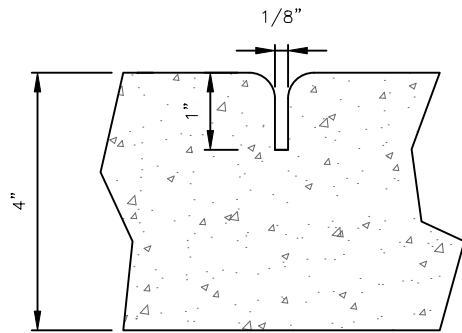
- 1. TRANSITION SHALL NOT BE LOCATED WITHIN THE CURB RADIUS.
- 2. TRANSITION TO BE ALONG BACK OF CURB.

NOT TO SCALE

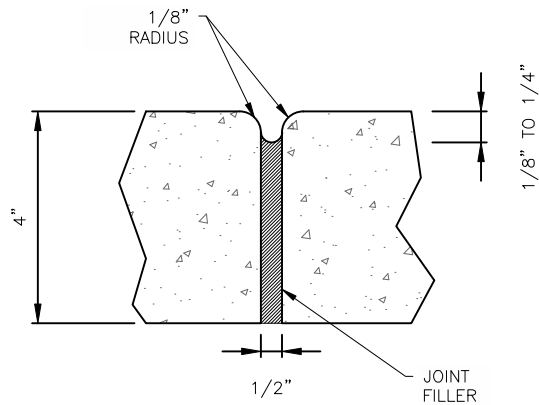


CURB TRANSITION
2'-6" STANDARD TO 1'-6" STANDARD

3-2022
MI-103
SHEET 1 OF 1



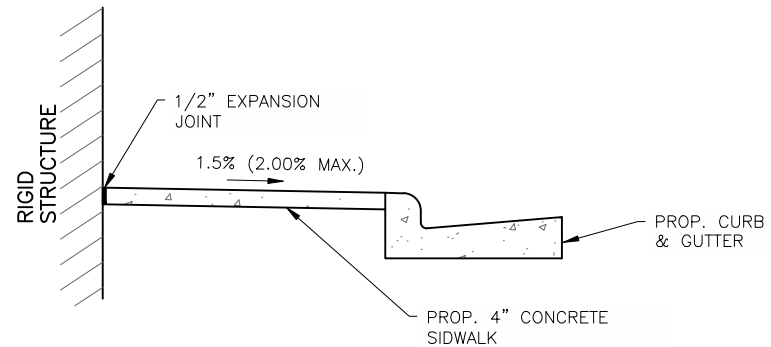
GROOVE JOINT IN SIDEWALK



TRANSVERSE EXPANSION
JOINT IN SIDEWALK

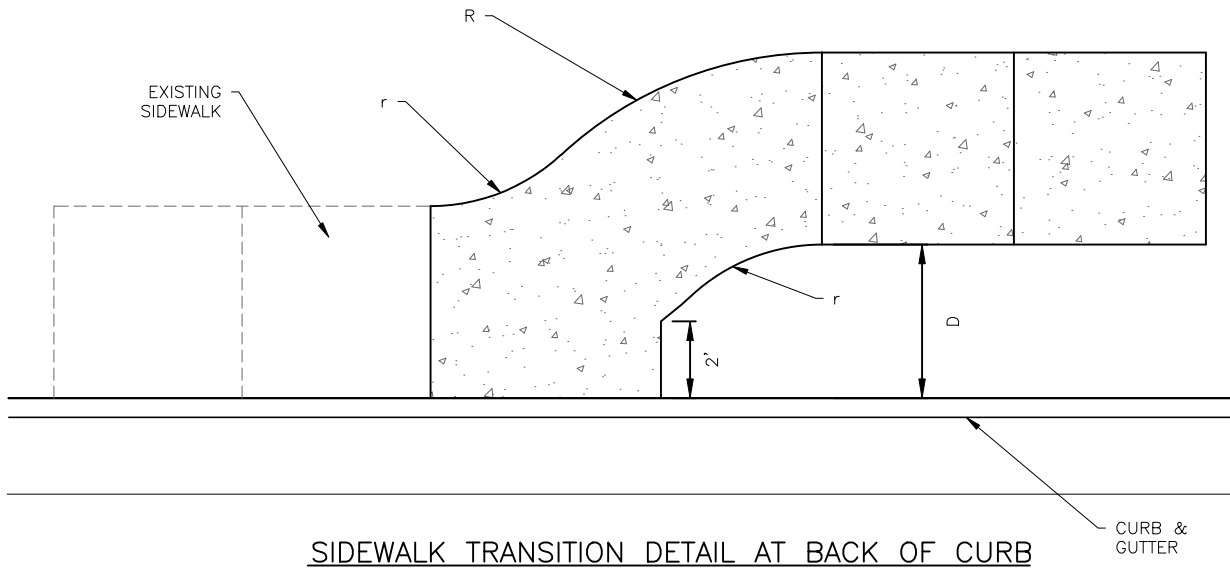
GENERAL NOTES:

1. A GROOVE JOINT 1" DEEP WITH 1/8" RADII SHALL BE REQUIRED IN THE CONCRETE SIDEWALK AT 5' INTERVALS. ONE 1/2" EXPANSION JOINT WILL BE REQUIRED AT INTERVALS OF NOT MORE THAN 45' AND MATCHING EXPANSION/CONSTRUCTION JOINT IN ADJACENT CURB. A SEALED 1/2" EXPANSION JOINT WILL BE REQUIRED WHERE THE SIDEWALK JOINS ANY RIGID STRUCTURE.
2. SIDEWALK AT DRIVEWAY CORSSINGS TO BE 6" THICK.
3. MINIMUM WIDTH OF SIDEWALK IS 5'
4. CONCRETE COMPRESSIVE STRENGTH SHALL BE 3600 PSI. IN 28 DAYS.
5. ZONING CONDITIONS MAY REQUIRE ADDITIONAL WIDTH SIDEWALKS WHICH SHALL SUPERSEDE THESE STANDARD DIMENSIONS SHOWN.
6. LIDS FOR JUNCTION BOXES AND UTILITY VAULTS SHALL BE NON-SKID AS SPECIFIED BY ENGINEER.
7. JOINT MATERIALS SHALL LIMIT SHRINK/SWELL SO POST CONSTRUCTION INSTALLATION RESULTS IN A MAXIMUM OF 1/4" FROM FLUSH.



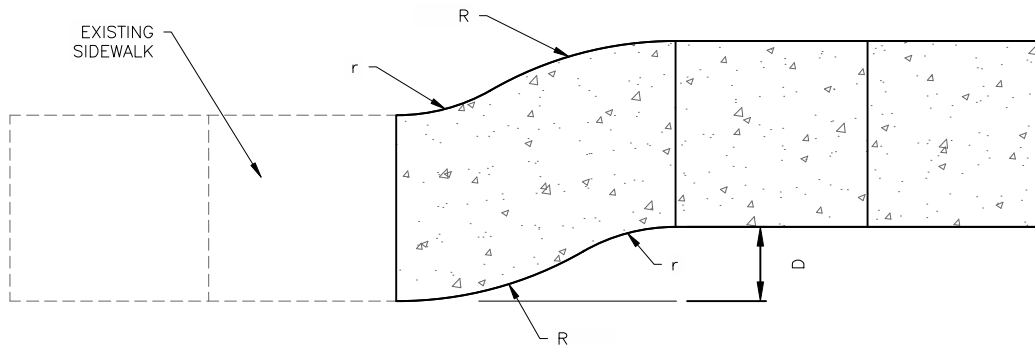
DETAILS SHOWING EXPANSION JOINTS
IN CONCRETE SIDEWALK

NOT TO SCALE



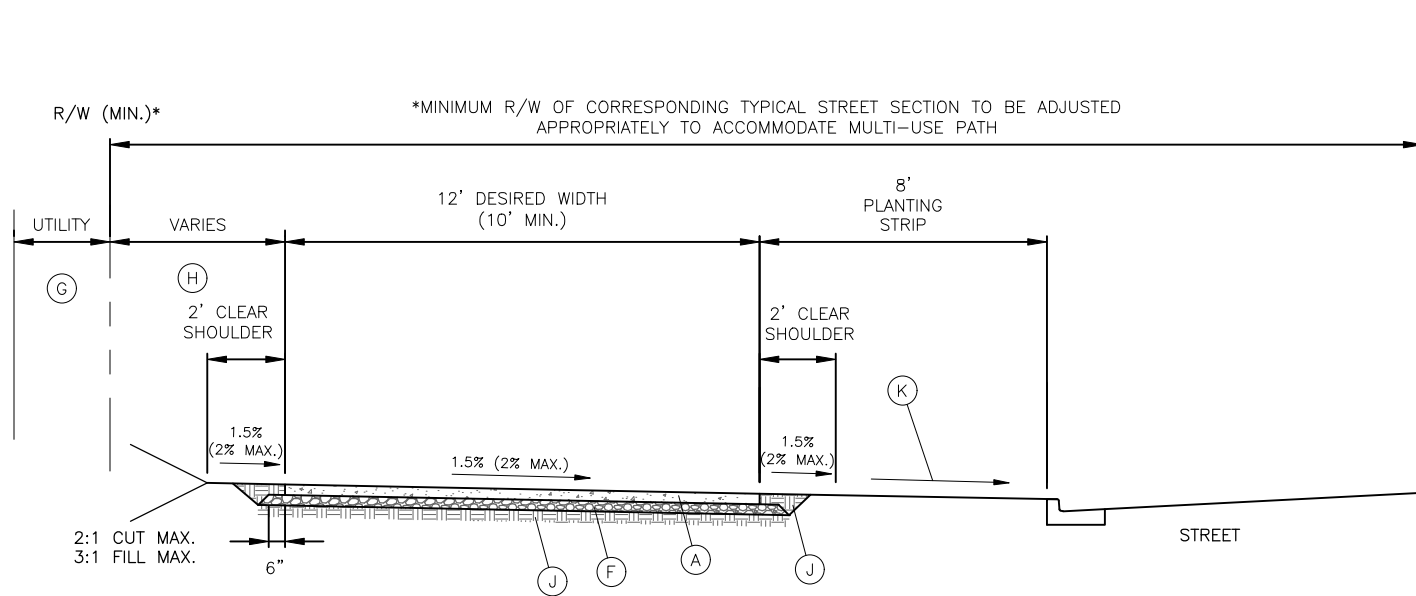
SIDEWALK TRANSITION DETAIL AT BACK OF CURB

KEY		
D	R	r
0'-2.9'	10'-0"	4'-0"
3'-7.9'	25'-0"	19'-0"
8'+	50'-0"	44'-0"



SIDEWALK TRANSITION DETAIL (PLANTING STRIP BOTH SIDES)

NOT TO SCALE



NOTES:

1. AT INTERSECTIONS WITH STREETS OR DRIVEWAYS, RAMP WIDTH MUST MATCH MULTI-USE PATH WIDTH.
2. ALL JOINTS MUST BE SEALED. SEAL MUST BE NON-SHRINKING AND FLUSH WITH FINISHED GRADE OF THE CONCRETE PATH.
3. ALL CONCRETE SHALL BE AT LEAST 3600 PSI COMPRESSIVE STRENGTH.
4. JOINTS MUST BE SAWCUT A MINIMUM OF 1/4 DEPTH OF CONCRETE DEPTH, BUT NO MORE THAN 1/2 OF CONCRETE DEPTH.
 - TRANSVERSE JOINTS MUST BE SAWCUT EVERY 6 FEET.
 - CONSTRUCTION JOINTS MUST BE EVERY 40 FEET.
5. NO ABOVE GROUND UTILITIES OR UTILITY SURFACE COVERS/PLATES/MANHOLES SHALL BE LOCATED WITHIN MULTI-USE-PATH AND SHALL BE A MINIMUM OF 2 FEET FROM THE EDGE OF THE PATH. RAISED MANHOLES SHALL BE LOCATED A MINIMUM OF 4' FROM EDGE OF PATH.
6. SIGN POSTS OR OTHER FIXED OBJECTS SHALL BE LOCATED A MINIMUM OF 2' FROM EDGE OF PATH.

KEY

- (A) 6" CONCRETE, 3600 PSI
- (F) 3" COMPACTED AGGREGATE BASE COURSE
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- (H) WIDTH TO BE DETERMINED BY TYPICAL SECTION OF STREET CLASSIFICATION
- (J) SUBGRADE COMPACTED TO A DENSITY NO LESS THAN 95%
- (K) PLANTING STRIP ADJACENT TO MULTI-USE PATH SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES.

NOT TO SCALE

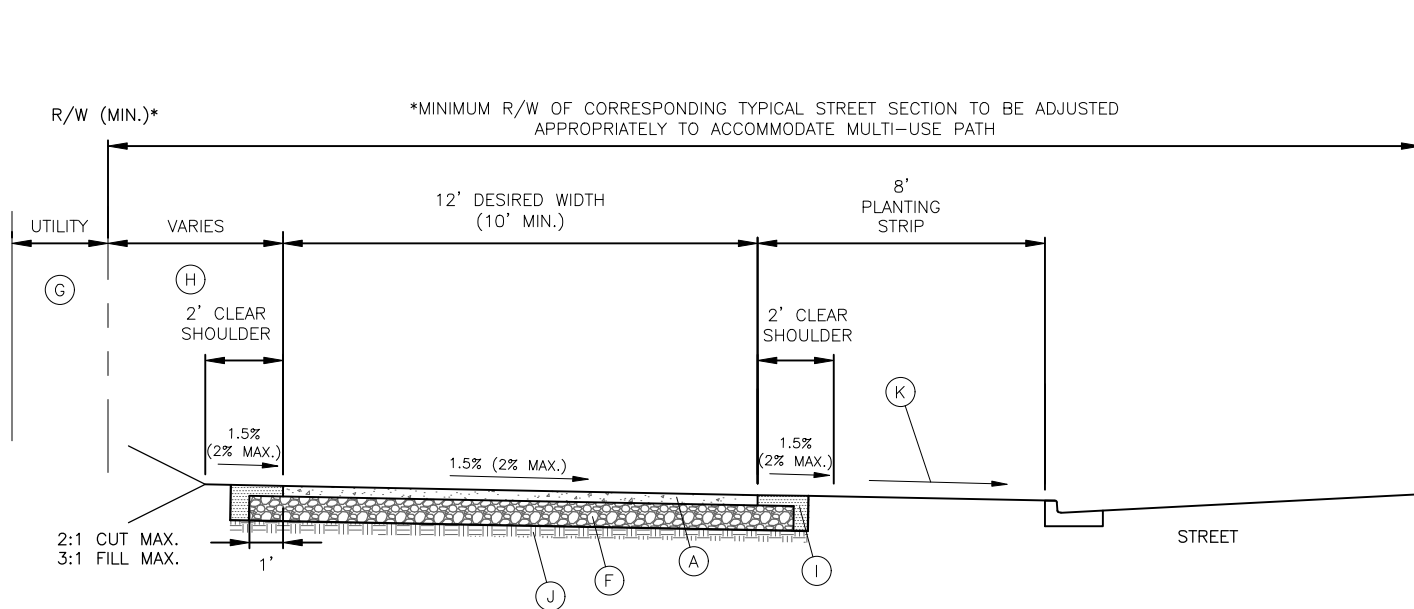
CONCRETE MULTI-USE PATH



3-2022

MI-106

SHEET 1 OF 1



NOTES:

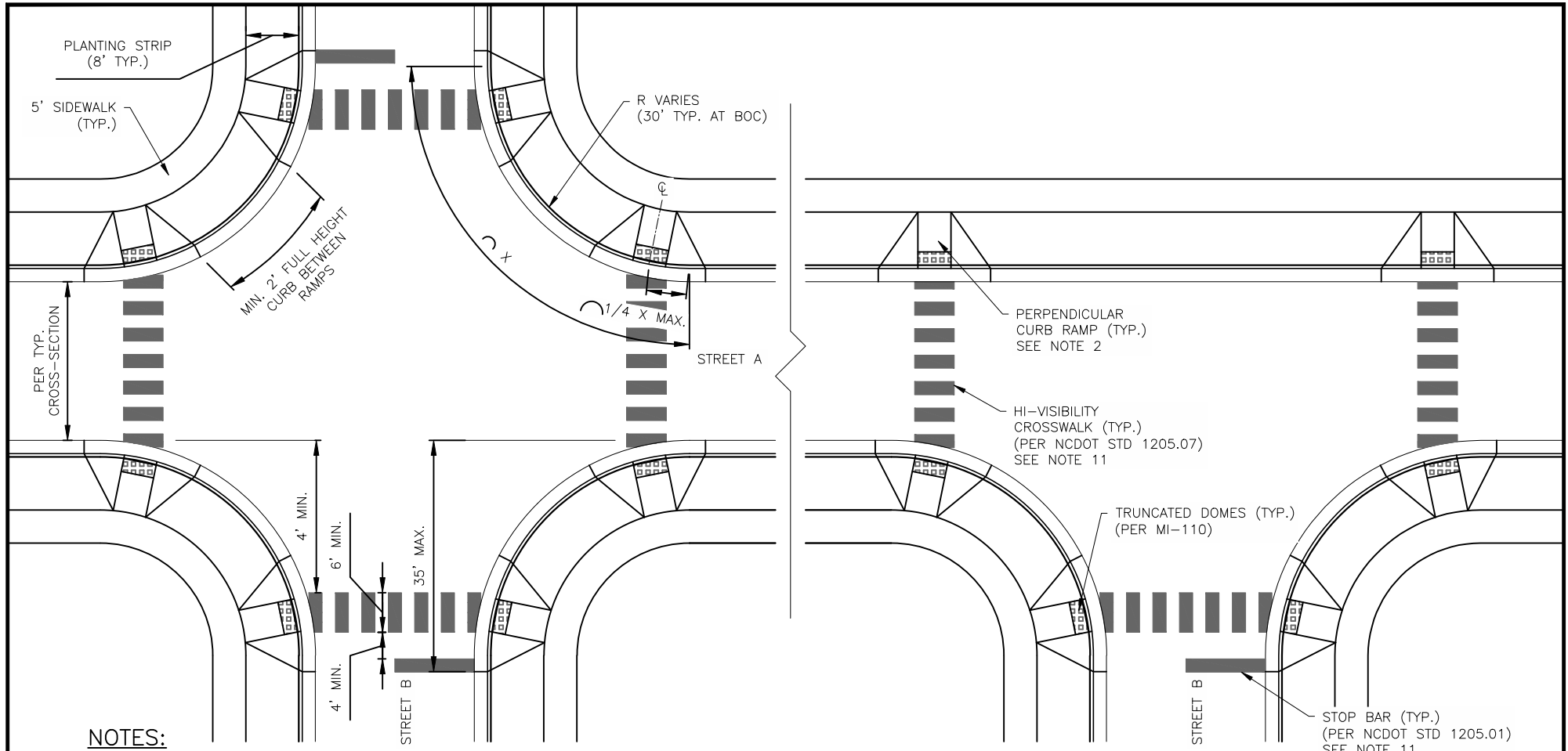
1. AT INTERSECTIONS WITH STREETS OR DRIVEWAYS, RAMP WIDTH MUST MATCH MULTI-USE PATH WIDTH.
2. NO ABOVE GROUND UTILITIES OR UTILITY SURFACE COVERS/PLATES/MANHOLES SHALL BE LOCATED WITHIN MULTI-USE-PATH AND SHALL BE A MINIMUM OF 2 FEET FROM THE EDGE OF THE PATH. RAISED MANHOLES SHALL BE LOCATED A MINIMUM OF 4' FROM EDGE OF PATH.
3. SIGN POSTS OR OTHER FIXED OBJECTS SHALL BE LOCATED A MINIMUM OF 2' FROM EDGE OF PATH.

KEY

- (A) 2" ASPHALT CONCRETE S9.5B
- (F) 6" COMPACTED AGGREGATE BASE COURSE UNDERLINED WITH GEOTEXTILE FABRIC (SEE TABLE)
- (G) ADDITIONAL UTILITY R/W OR EASEMENT TO BE DETERMINED BY APPLICABLE PARTIES
- (H) WIDTH TO BE DETERMINED BY TYPICAL SECTION OF STREET CLASSIFICATION
- (I) CLEAN BACKFILL
- (J) SUBGRADE COMPACTED TO A DENSITY OF 100%
- (K) PLANTING STRIP ADJACENT TO MULTI-USE PATH SHALL BE GRADED TO 1/4" PER FOOT (MIN.) TO 1-1/4" PER FOOT (MAX.). PRIOR APPROVAL REQUIRED FOR STEEPER GRADES.

GEOTEXTILE FABRIC SPECIFICATIONS		
	TYPICAL	TEST
TENSILE STRENGTH	200	ASTM D4632-86
ELONGATION AT Break, %	15	ASTM D4632
PUNCTURE STENGTH, LBS.	100	ASTM D0751
MULLEN BURST, PSI	400	ASTM D0751/3786
TRAPEZOID TEAR, LBS.	75	ASTM D4533

NOT TO SCALE



NOTES:

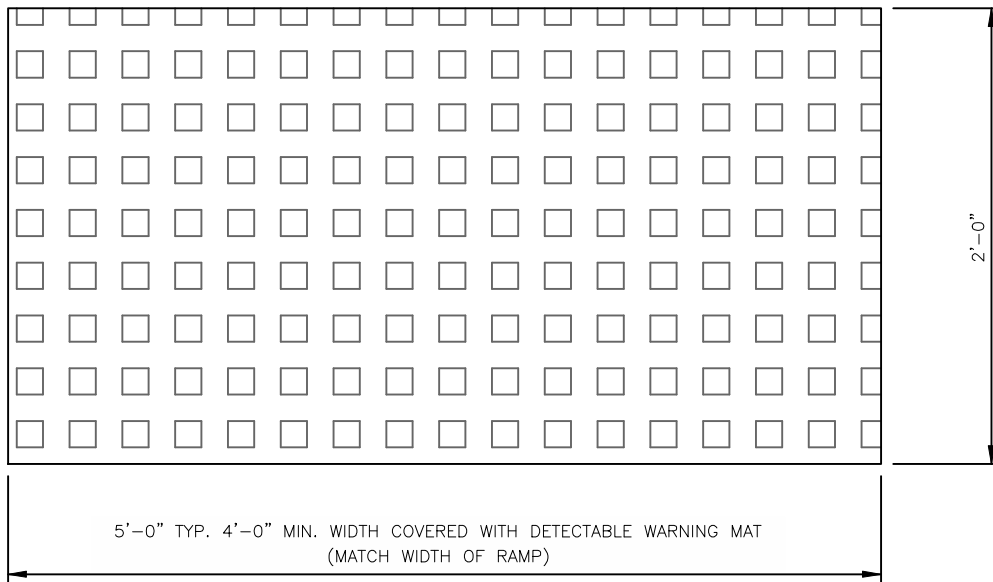
1. ALL RAMPS AND SIDEWALK SHALL MEET CURRENT ADA STANDARDS.
2. PERPENDICULAR CURB RAMPS PER DETAILS MI-111 AND MI-112 ARE STANDARD, OTHER TYPES WILL BE CONSIDERED ON A CASE BY CASE BASIS.
3. DUAL RAMPS AT EACH CORNER ARE STANDARD. SINGLE DIAGONAL RAMPS MAY BE CONSIDERED ONLY IN UNUSUAL CIRCUMSTANCES OR RETROFIT SITUATIONS AND MUST MEET ADA STANDARDS.
4. CURB RAMP AND CROSSWALK LOCATIONS AND TYPES AT INTERSECTIONS WITH NCDOT STREETS ARE SUBJECT TO REVIEW AND APPROVAL BY NCDOT.
5. FOR ALL RAMPS AT MARKED CROSSWALKS, THE RAMP OPENING (AT THE FULLY DEPRESSED CURB) SHALL BE LOCATED WITHIN THE PARALLEL BOUNDARIES OF CROSSWALK MARKINGS.
6. DRAINAGE STRUCTURES, MAST ARMS, LIGHT POLES AND OTHER OBSTRUCTIONS SHALL NOT BE PLACED IN LINE WITH RAMPS. LOCATION OF THE RAMP SHALL TAKE PRECEDENCE OVER LOCATION OF OBSTRUCTIONS EXCEPT WHERE EXISTING OBSTRUCTIONS ARE BEING UTILIZED IN THE NEW CONSTRUCTION.
7. NO UTILITY STRUCTURES MAY BE LOCATED WITHIN THE RAMP AREA.
8. NO PORTION OF A CURB RAMP MAY BE CONTAINED WITHIN A DRIVEWAY, NOR MAY A DRIVEWAY SERVE AS A CURB RAMP.
9. CATCH BASINS MUST BE PLACED APPROPRIATELY WITHOUT INTERFERING WITH THE CURB TRANSITIONS FOR RAMPS.
10. WING AND RAMP SURFACES SHALL BE FINISHED IN ACCORDANCE WITH THE LATEST EDITION OF NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
11. CROSSWALKS AND STOP BARS SHALL BE WHITE THERMOPLASTIC 120 MILS THICK. LOCATIONS WILL BE DETERMINED ON A CASE BY CASE BASIS DURING THE PLAN REVIEW PROCESS.
12. TERMINATE PARKING A MINIMUM OF 20' FROM A PEDESTRIAN CROSSING.

NOT TO SCALE

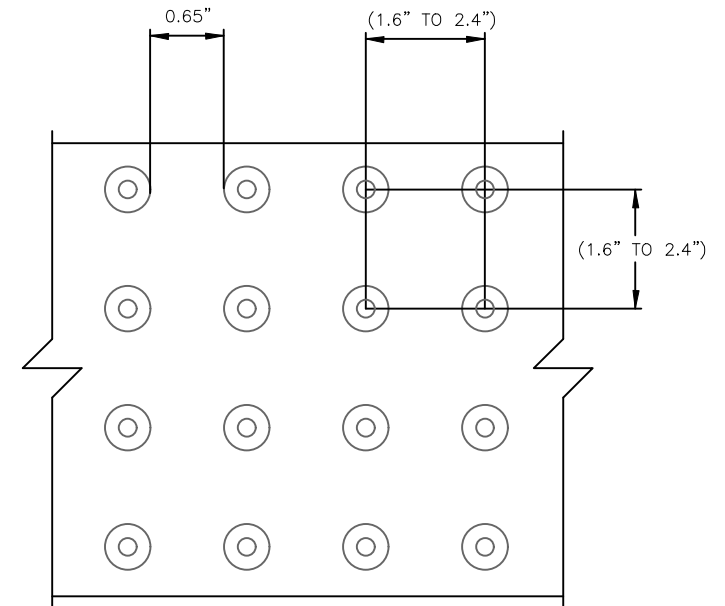


TYPICAL INTERSECTION CURB RAMP LAYOUT
AND NOTES

3-2022
MI-109
SHEET 1 OF 1



TRUNCATED DOME PLAN VIEW

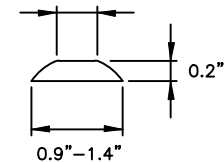


TRUNCATED DOME SPACING

NOTES:

1. ALL DETECTABLE WARNING DEVICES USED IN NEW CONSTRUCTION SHALL BE OF A RIGID PRECAST OR EMBEDDED PRODUCT APPROVED BY THE CITY ENGINEER. RETROFIT MATS WILL ONLY BE ALLOWED ON EXISTING RAMPS WITH PRIOR APPROVAL OF THE CITY ENGINEER FOR MATERIAL TYPE AND INSTALLATION (IE. RESURFACING).
2. RAMP AND DETECTABLE WARNING AREA SHALL BE A MINIMUM OF 4 FEET IN WIDTH, BUT NOT LESS THAN THE WIDTH OF SIDEWALK LEADING TO BACK OF RAMP.
3. DETECTABLE WARNING SURFACES SHALL EXTEND 2.0 FT MINIMUM IN THE DIRECTION OF PEDESTRIAN TRAVEL.
4. DETECTABLE WARNING AREA CAN BE PLACED SQUARE WHERE USED IN A CURB RADIUS.
5. THE ROWS OF TRUNCATED DOMES IN DETECTABLE WARNING SURFACES SHOULD BE ALIGNED PERPENDICULAR TO THE GRADE BREAK BETWEEN THE RAMP RUN AND THE STREET. WHERE DETECTABLE WARNING SURFACES ARE PROVIDED ON A SURFACE WITH A SLOPE THAT IS LESS THAN 5 PERCENT, DOME ORIENTATION IS LESS CRITICAL.
6. DETECTABLE WARNING AREA SHALL CONTRAST VISUALLY WITH ADJACENT GUTTER, STREET OR HIGHWAY, OR PEDESTRIAN ACCESS ROUTE SURFACE; RED COLOR SHALL BE USED.
7. MATS ARE TO BE RIGID WITH TURNED-DOWN EDGES EMBEDDED IN CONCRETE TO ELIMINATE TRIP HAZARD.
8. DIMENSIONS PER NCDOT 848.06

50%-65% OF BASE DIAMETER

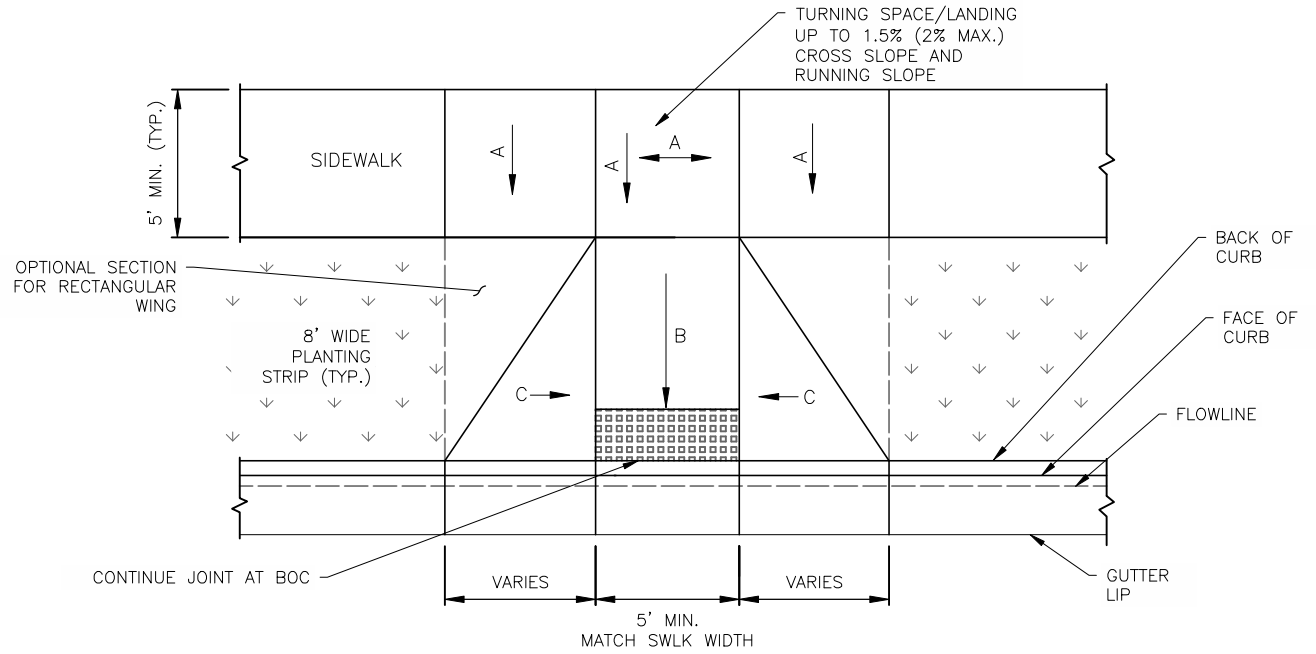


TRUNCATED DOME SECTION

NOT TO SCALE

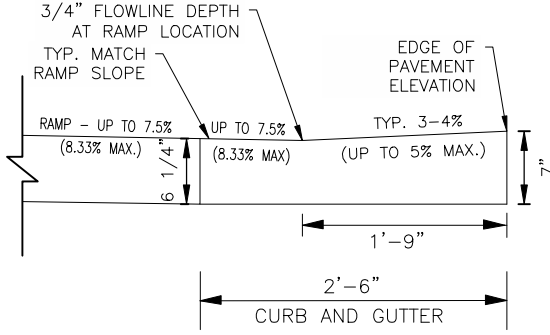
NOTES:

1. ALL CONCRETE SHALL BE A MINIMUM OF 3600 PSI.
2. ENSURE FLUSH CONDITIONS AT CURB RAMP TO GUTTER TRANSITION.
3. TYPICALLY, THE SIDEWALK RUNNING SLOPE SHALL NOT EXCEED THE GENERAL GRADE ESTABLISHED FOR THE ADJACENT STREET.
4. MAINTAIN POSITIVE DRAINAGE ALONG THE LIP OF GUTTER IN RAMP. IN FLAT AREAS, ADDITIONAL CATCH BASINS MAY BE REQUIRED ON THE SIDES OF THE RAMP TO MINIMIZE STANDING WATER AT THE RAMP LOCATION.
5. IF THE SLOPE FROM FLOWLINE TO BACK OF CURB AT RAMP IS LESS THAN 8.33%, THEN THE SLOPE FROM LIP TO FLOWLINE AT RAMP MAY EXCEED 5% AS LONG AS THE ALGEBRAIC DIFFERENCE BETWEEN THESE TWO SLOPES IS LESS THAN 13.33%.
6. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT TYPICALLY WALK ACROSS THE RAMP, THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE, OR THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED.

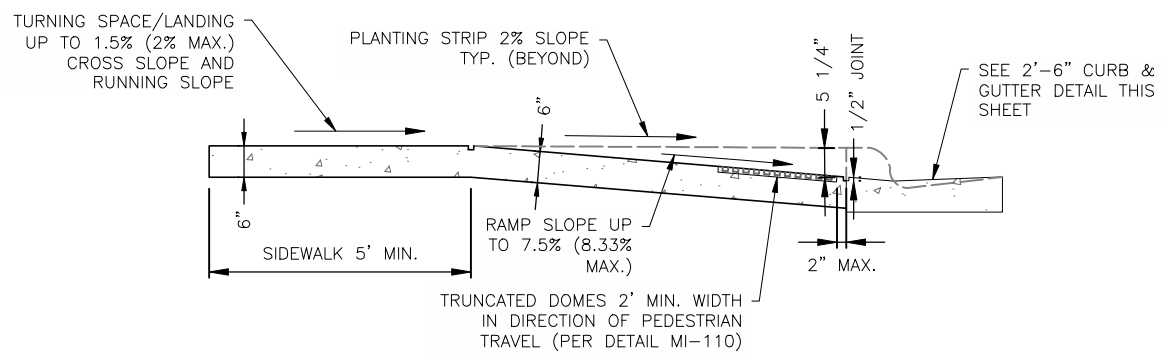


PLAN VIEW

SLOPE "A" = UP TO 1.5% (2.00% MAX)
SLOPE "B" = UP TO 7.5% (8.33% MAX)
SLOPE "C" = UP TO 10% MAX



2'-6" CURB AND GUTTER RAMP DETAIL
 MAXIMUM SLOPES FOR CURB AND GUTTER DEPRESSION AT RAMPS



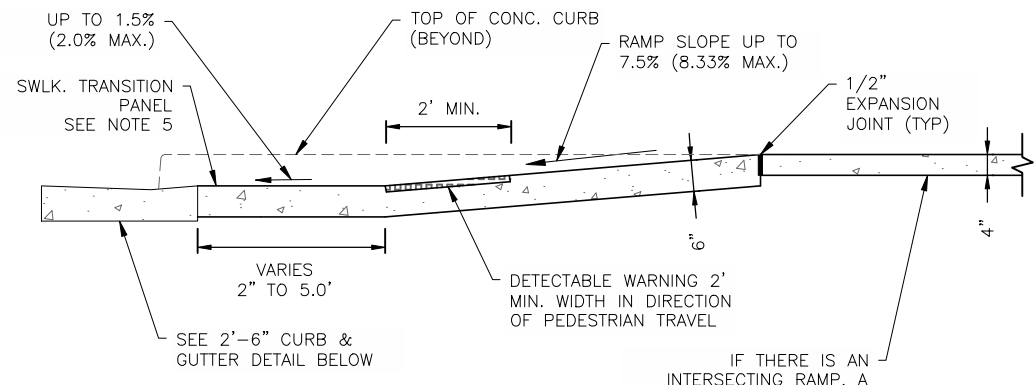
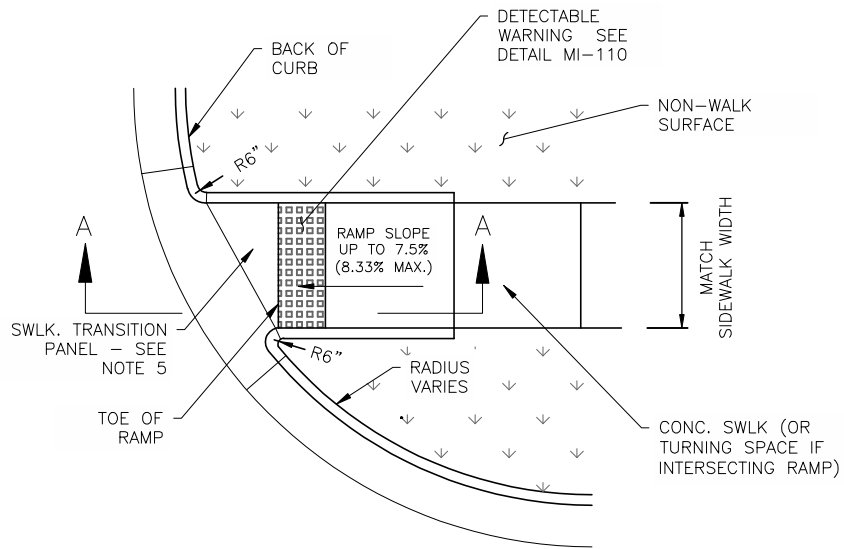
TYPICAL RAMP SECTION AT CENTERLINE

NOT TO SCALE

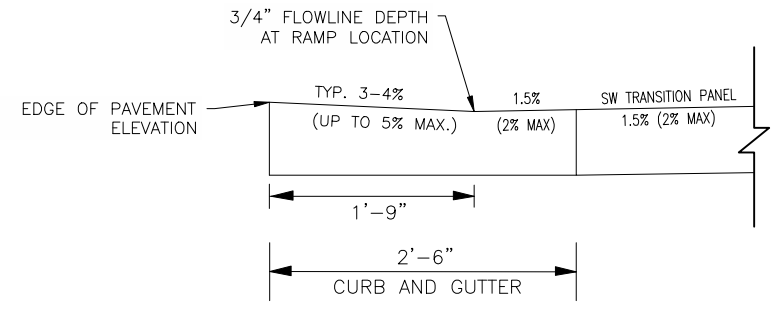
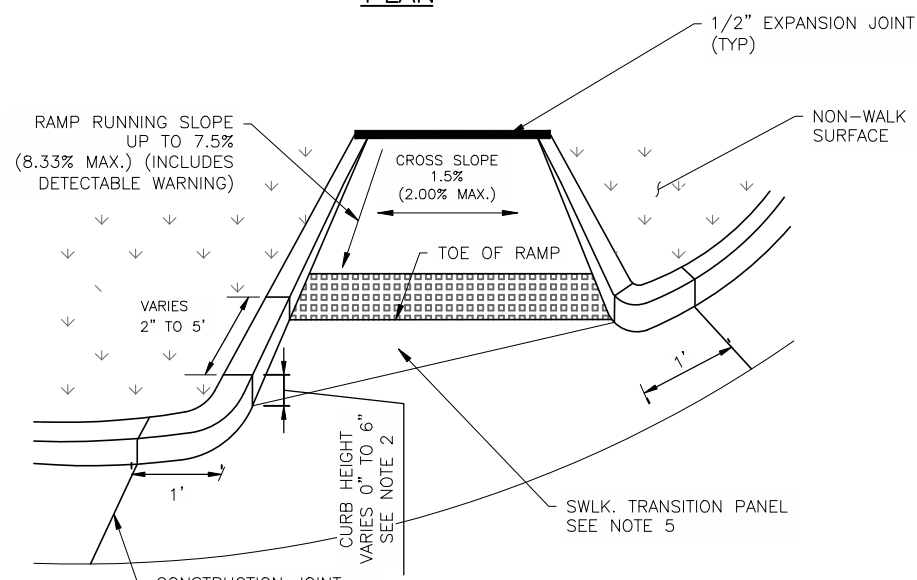


PERPENDICULAR CURB RAMP
 2'-6" CURB & GUTTER

3-2022
MI-111
SHEET 1 OF 1



IF THERE IS AN INTERSECTING RAMP, A TURNING SPACE/LANDING IS REQ. WITH UP TO 1.5% (2% MAX.) CROSS SLOPE AND RUNNING SLOPE



2'-6" CURB AND GUTTER DETAIL
 MAXIMUM SLOPES FOR CURB AND GUTTER DEPRESSION AT DIRECTIONAL RAMPS

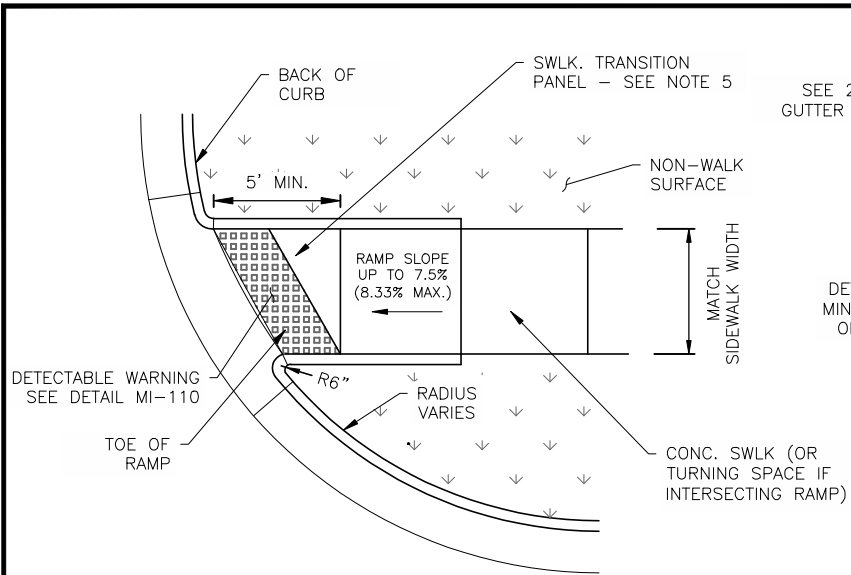
- NOTES:
- USE THIS DETAIL ONLY UNDER THE FOLLOWING CIRCUMSTANCES:
 - 5-FOOT SIDEWALKS WITH CURB RADII OF 35 FEET OR LESS
 - 6-FOOT SIDEWALKS WITH CURB RADII OF 30 FEET OR LESS
 - 8-FOOT SIDEWALKS WITH CURB RADII OF 25 FEET OR LESS
 - DIRECTIONAL RAMPS WITH RETURNED CURBS AS SHOWN MAY BE USED WHEN A PLANTING STRIP (NON-WALK SURFACE) IS PROVIDED. DO NOT USE THIS DETAIL IF THERE IS HARDSCAPE (WALKABLE SURFACE) INSTEAD OF A PLANTING STRIP. IF A WALKABLE SURFACE IS ADJACENT TO RAMP CONSTRUCT CONCRETE FLARES WITH SLOPES UP TO 10% MAX, INSTEAD OF RETURNED CURBS.
 - ALL CONCRETE SHALL BE AT LEAST 3600 PSI.
 - ENSURE FLUSH CONDITIONS AT RAMP TO GUTTER TRANSITION.
 - SIDEWALK TRANSITION PANEL: PREFERRED DESIGN IS 1.5% (2.0% MAX) IN ALL DIRECTIONS IN FRONT OF GRADE BREAK & DRAIN TO FLOW LINE. RUNNING SLOPE OF THIS AREA MUST NOT EXCEED 2%. CROSS-SLOPE MAY MATCH STREET GRADE AT BACK OF CURB WHEN STREET GRADE >2%. TRANSITION TO 1.5% (2.0% MAX) CROSS-SLOPE AT TOE OF RAMP.

THIS DETAIL IS NOT FOR USE ON NCDOT-MAINTAINED STREETS.

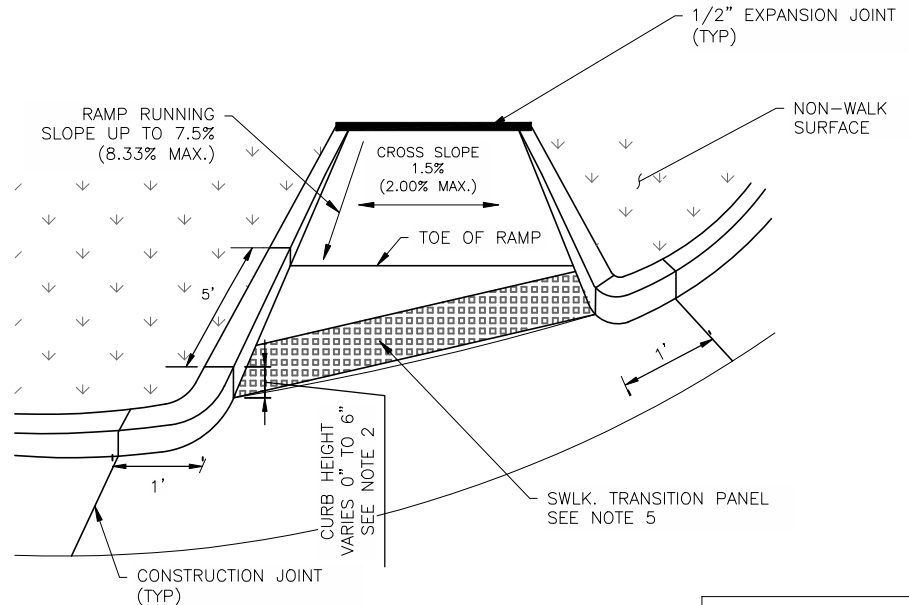
NOT TO SCALE



DIRECTIONAL CURB RAMP
 SMALL/MEDIUM CURB RADII

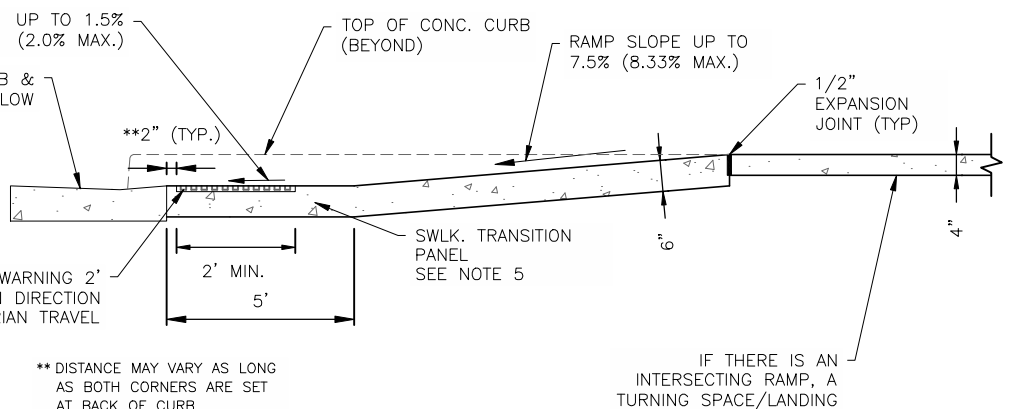


PLAN



PERSPECTIVE

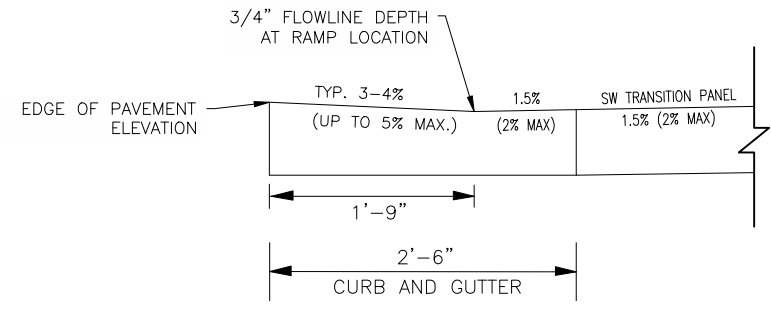
THIS DETAIL IS NOT FOR USE ON NCDOT-MAINTAINED STREETS.



SECTION A-A

**DISTANCE MAY VARY AS LONG AS BOTH CORNERS ARE SET AT BACK OF CURB

IF THERE IS AN INTERSECTING RAMP, A TURNING SPACE/LANDING IS REQ. WITH UP TO 1.5% (2% MAX.) CROSS SLOPE AND RUNNING SLOPE



2'-6" CURB AND GUTTER DETAIL

MAXIMUM SLOPES FOR CURB AND GUTTER DEPRESSION AT DIRECTIONAL RAMPS

NOTES:

- USE THIS DETAIL ONLY UNDER THE FOLLOWING CIRCUMSTANCES:
 - 5-FOOT SIDEWALKS WITH CURB RADII OF GREATER THAN 35 FEET
 - 6-FOOT SIDEWALKS WITH CURB RADII OF GREATER THAN 30 FEET
 - 8-FOOT SIDEWALKS WITH CURB RADII OF GREATER THAN 25 FEET
- DIRECTIONAL RAMPS WITH RETURNED CURBS AS SHOWN MAY BE USED WHEN A PLANTING STRIP (NON-WALK SURFACE) IS PROVIDED. DO NOT USE THIS DETAIL IF THERE IS HARDSCAPE (WALKABLE SURFACE) INSTEAD OF A PLANTING STRIP. IF A WALKABLE SURFACE IS ADJACENT TO RAMP CONSTRUCT CONCRETE FLARES WITH SLOPES UP TO 10% MAX, INSTEAD OF RETURNED CURBS.
- ALL CONCRETE SHALL BE AT LEAST 3600 PSI.
- ENSURE FLUSH CONDITIONS AT RAMP TO GUTTER TRANSITION.
- SIDEWALK TRANSITION PANEL: PREFERRED DESIGN IS 1.5% (2.0% MAX) IN ALL DIRECTIONS IN FRONT OF GRADE BREAK & DRAIN TO FLOW LINE. RUNNING SLOPE OF THIS AREA MUST NOT EXCEED 2%. CROSS-SLOPE MAY MATCH STREET GRADE AT BACK OF CURB WHEN STREET GRADE >2%. TRANSITION TO 1.5% (2.0% MAX) CROSS-SLOPE AT TOE OF RAMP.

NOT TO SCALE

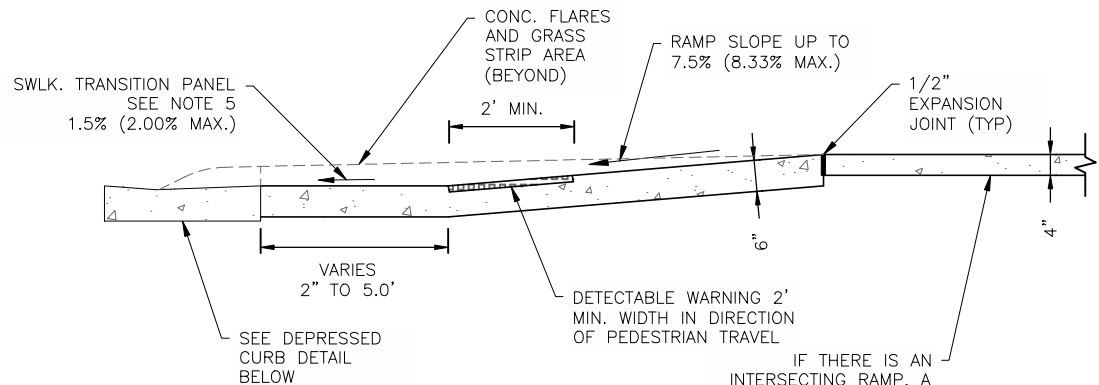
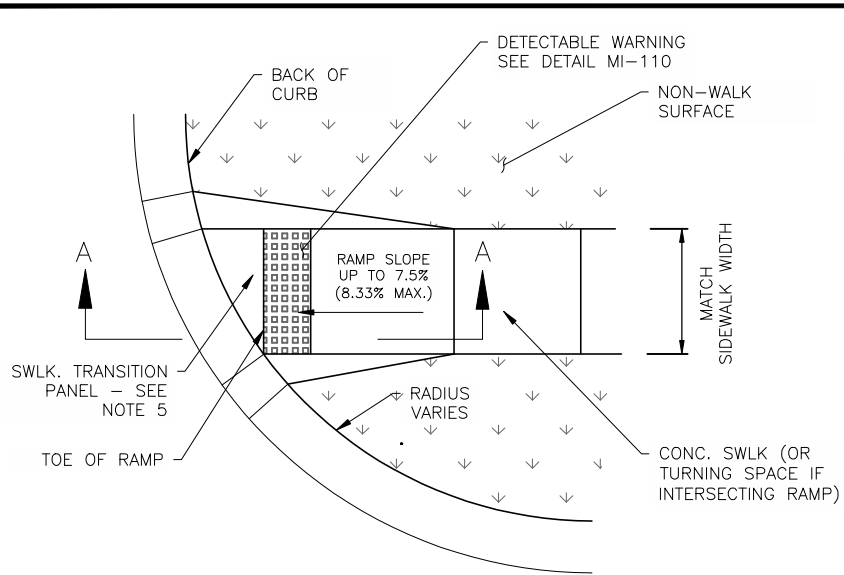


**DIRECTIONAL CURB RAMP
LARGE CURB RADIUS**

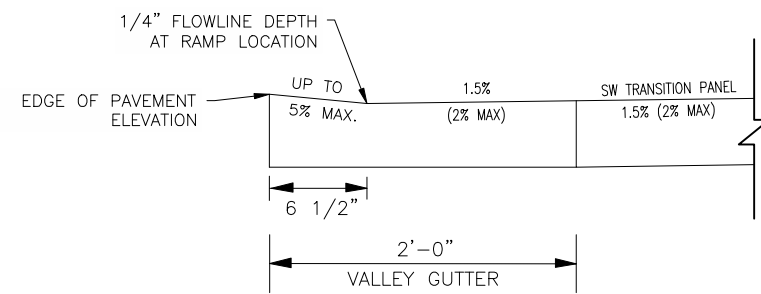
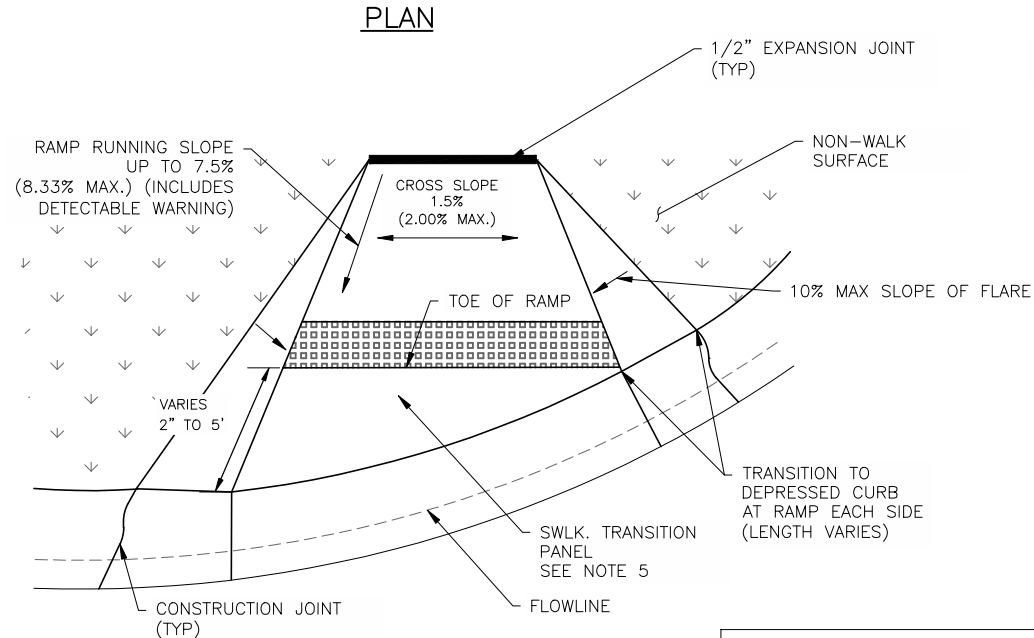
3-2022

MI-114

SHEET 1 OF 1



IF THERE IS AN INTERSECTING RAMP, A TURNING SPACE/LANDING IS REQ. WITH UP TO 1.5% (2% MAX.) CROSS SLOPE AND RUNNING SLOPE



2'-0" CURB AND GUTTER DETAIL
MAXIMUM SLOPES FOR CURB AND GUTTER DEPRESSION AT DIRECTIONAL RAMPS

- NOTES:**
- USE THIS DETAIL ONLY UNDER THE FOLLOWING CIRCUMSTANCES:
 - 5-FOOT SIDEWALKS WITH CURB RADII OF 35 FEET OR LESS
 - 6-FOOT SIDEWALKS WITH CURB RADII OF 30 FEET OR LESS
 - 8-FOOT SIDEWALKS WITH CURB RADII OF 25 FEET OR LESS
 - DIRECTIONAL RAMPS WITH RETURNED CURBS AS SHOWN MAY BE USED WHEN A PLANTING STRIP (NON-WALK SURFACE) IS PROVIDED. DO NOT USE THIS DETAIL IF THERE IS HARDSCAPE (WALKABLE SURFACE) INSTEAD OF A PLANTING STRIP. IF A WALKABLE SURFACE IS ADJACENT TO RAMP CONSTRUCT CONCRETE FLARES WITH SLOPES UP TO 10% MAX, INSTEAD OF RETURNED CURBS.
 - ALL CONCRETE SHALL BE AT LEAST 3600 PSI.
 - ENSURE FLUSH CONDITIONS AT RAMP TO GUTTER TRANSITION.
 - SIDEWALK TRANSITION PANEL: PREFERRED DESIGN IS 1.5% (2.0% MAX) IN ALL DIRECTIONS IN FRONT OF GRADE BREAK & DRAIN TO FLOW LINE. RUNNING SLOPE OF THIS AREA MUST NOT EXCEED 2%. CROSS-SLOPE MAY MATCH STREET GRADE AT BACK OF CURB WHEN STREET GRADE >2%. TRANSITION TO 1.5% (2.0% MAX) CROSS-SLOPE AT TOE OF RAMP.

THIS DETAIL IS NOT FOR USE ON NCDOT-MAINTAINED STREETS.

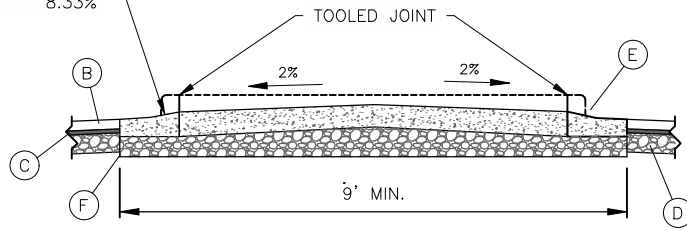
NOT TO SCALE



DIRECTIONAL CURB RAMP
 VALLEY CURB

3-2022
 MI-115
 SHEET 1 OF 1

SLOPE ON DEPRESSED CURB
AT DOMES CANNOT EXCEED
8.33%



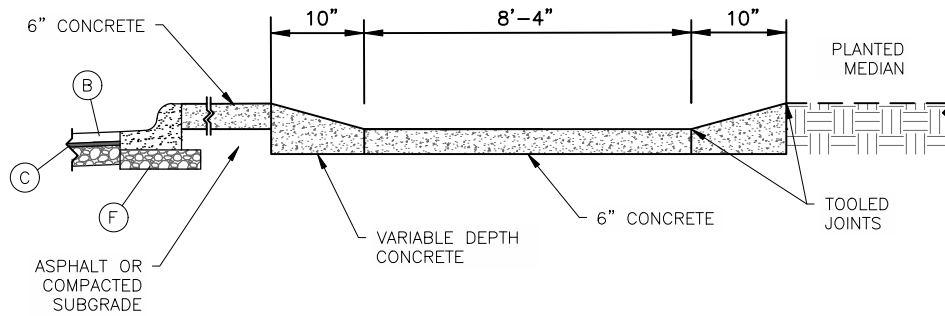
SECTION A-A

NOTES:

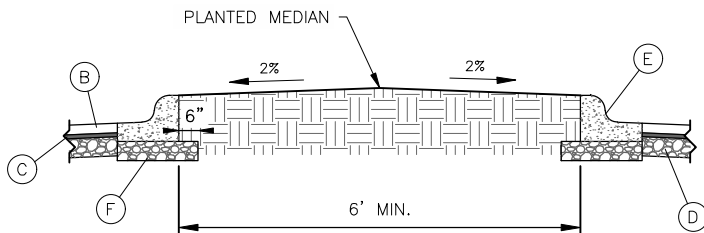
1. THIS DETAIL MAY BE USED ON NCDOT-MAINTAINED STREETS ONLY WITH APPROVAL FROM NCDOT.
2. ENSURE PEDESTRIAN PASS-THRU HAS ADEQUATE SLOPE DRAINAGE AND DOES NOT POND WATER.
3. THIS DETAIL MAY BE USED TO PROVIDE A PEDESTRIAN REFUGE PASS-THRU IN AN EXISTING MEDIAN WITH 1'-6" CURB & GUTTER.
4. FOR 1'-6" CURB AND GUTTER, USE CONCORD STANDARD MI-101 FOR CITY STREETS OR NCDOT 846.01 FOR NCDOT STREETS.
5. NCDOT REQUIRES 1' OFFSET FROM EDGE OF PAVEMENT ALONG CURBLINE TO LANE LINE.
6. ALL JOINTS IN THE ISLAND MUST BE SEALED PER APPROPRIATE STANDARD.
7. USE "QWICK KURB L104 REFLECTIVE YELLOW PADDLE" OR EQUIVALENT.
8. CONCORD STANDARD MISC-201 TO BE FOLLOWED IF MEDIAN IS BEING INSTALLED IN EXISTING PAVEMENT.

KEY

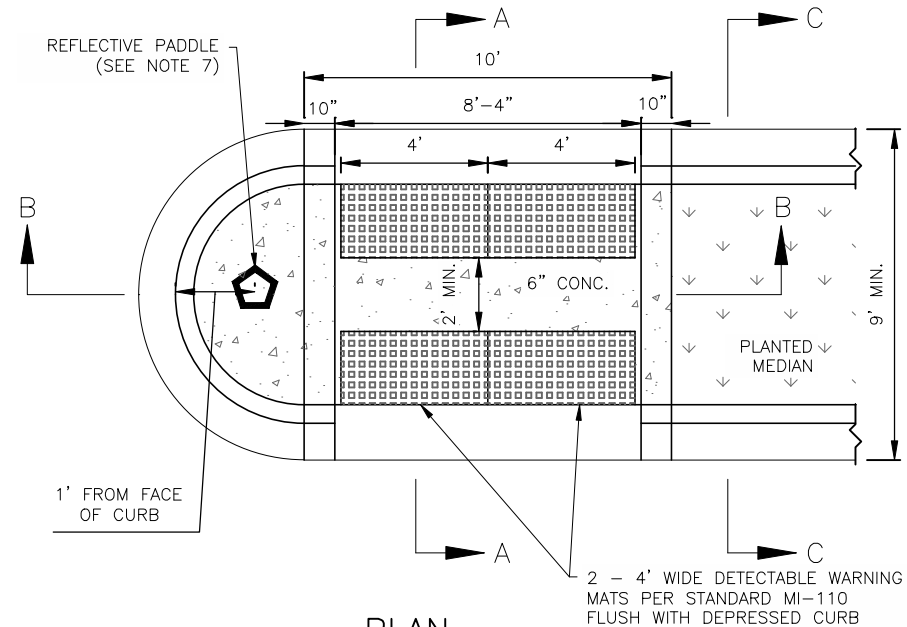
- (B) SURFACE COURSE PER APPROPRIATE TYPICAL CROSS SECTION STANDARD
- (C) INTERMEDIATE COURSE PER APPROPRIATE TYPICAL CROSS SECTION STANDARD
- (D) BASE COURSE PER APPROPRIATE TYPICAL CROSS SECTION STANDARD
- (E) 1'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE



SECTION B-B

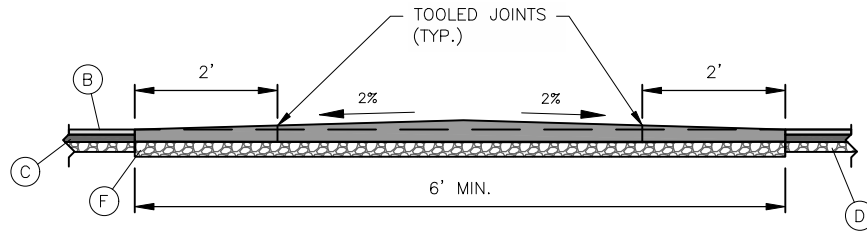


SECTION C-C

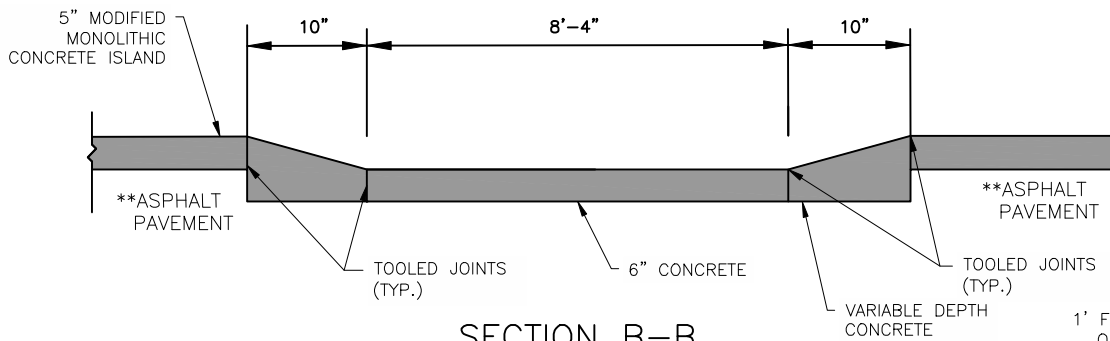


PLAN

NOT TO SCALE

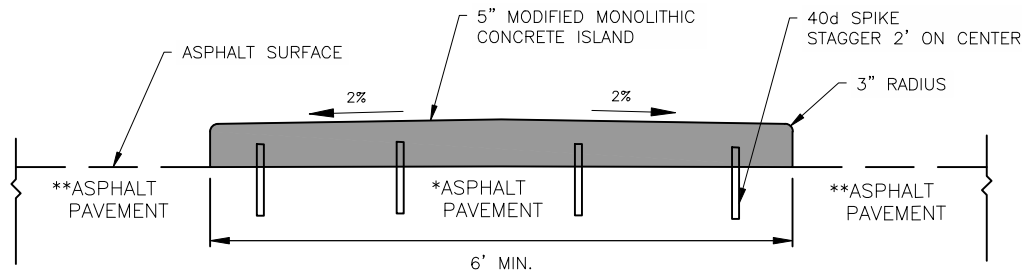


SECTION A-A



SECTION B-B

** ASPHALT PAVEMENT PER APPROPRIATE TYPICAL CROSS SECTION STANDARD



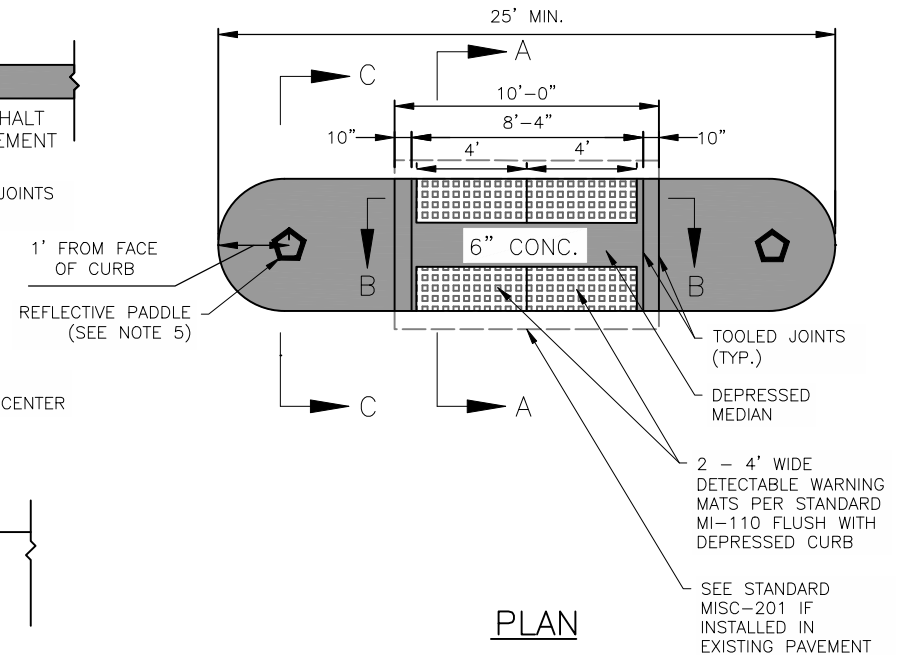
SECTION C-C

NOTES:

1. THIS DETAIL MAY BE USED ON NCDOT-MAINTAINED STREETS ONLY WITH APPROVAL FROM NCDOT.
2. ENSURE PEDESTRIAN PASS-THRU HAS ADEQUATE SLOPE DRAINAGE AND DOES NOT POND WATER.
3. NCDOT REQUIRES 1' OFFSET FROM EDGE OF PAVEMENT ALONG CURBLINE TO LANE LINE.
4. ALL JOINTS IN THE ISLAND MUST BE SEALED PER APPROPRIATE STANDARD.
5. USE "QWICK KURB L104 REFLECTIVE YELLOW PADDLE" OR EQUIVALENT.
6. CONCORD STANDARD MISC-201 TO BE FOLLOWED IF MEDIAN IS BEING INSTALLED IN EXISTING PAVEMENT.

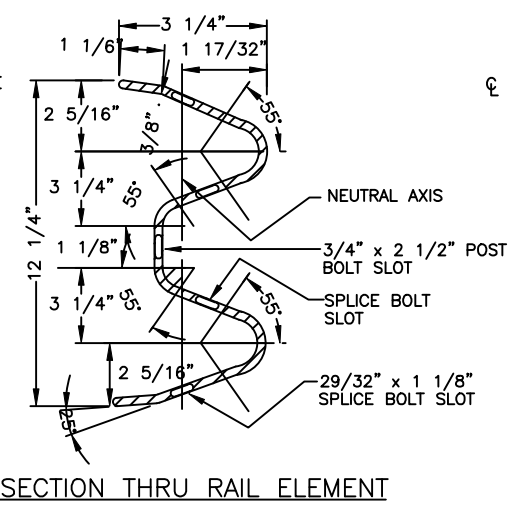
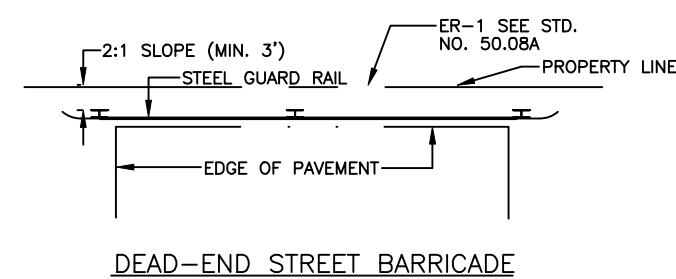
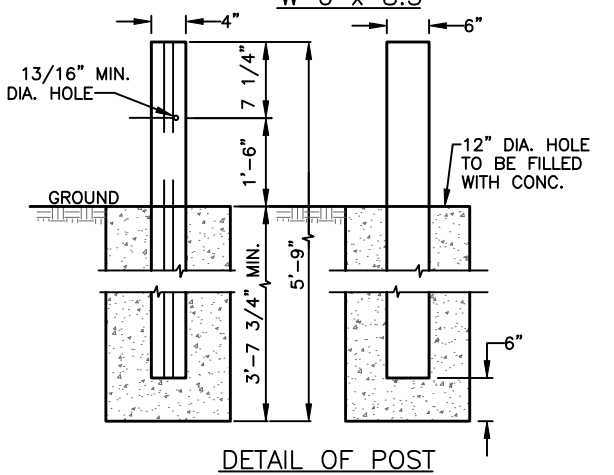
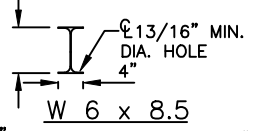
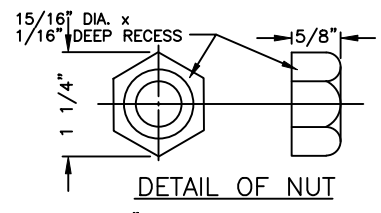
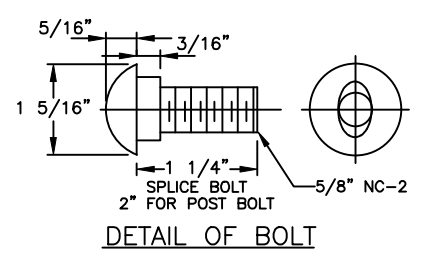
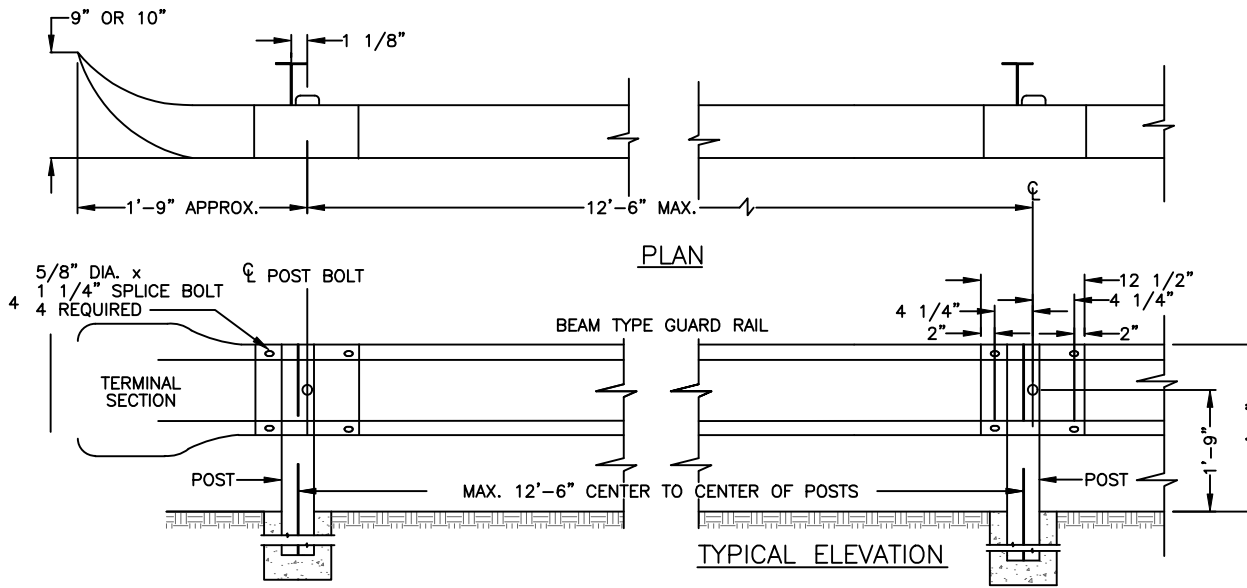
KEY

- (B) SURFACE COURSE PER APPROPRIATE TYPICAL CROSS SECTION STANDARD
- (C) INTERMEDIATE COURSE PER APPROPRIATE TYPICAL CROSS SECTION STANDARD
- (D) BASE COURSE PER APPROPRIATE TYPICAL CROSS SECTION STANDARD
- (E) 1'-6" STANDARD CURB AND GUTTER
- (F) 6" COMPACTED AGGREGATE BASE COURSE OR 4" B-25.0C BASE COURSE



PLAN

NOT TO SCALE



NOTE
 THIS DETAIL IS NOT A GUARDRAIL DETAIL. FOR
 ROADSIDE GUARDRAIL, SEE NCDOT STANDARD
 DRAWINGS 862.01-862.04.

NOT TO SCALE



END OF ROAD BARRICADE

3-2022
MISC-203
SHEET 1 OF 2

GENERAL NOTES:

1. STEEL BEAM TYPE GUARD RAILS SHALL BE INSTALLED AT THE END OF ALL DEAD-END STREETS, EXCEPT CUL-DE-SAC STREETS WHICH HAVE BEEN IMPROVED WITH A PERMANENT TURN-AROUND.
2. FOR STREETS 26' IN WIDTH THE GUARD RAIL SHALL CONSIST OF TWO(2) 12'-6" SECTIONS OR ONE(1) 25' SECTION, THREE (3) STEEL POSTS, AND TWO (2) TERMINAL SECTIONS. FOR STREETS GREATER THAN 25' IN WIDTH THE GUARD RAIL SHALL SPAN THE ENTIRE WIDTH OF THE STREET.
3. GUARD RAIL SHALL CONSIST OF RAIL ELEMENTS FABRICATED TO DEVELOP CONTINUOUS BEAM STRENGTH AND INSTALLED AS SHOWN.
4. MINIMUM THICKNESS OF GUARD RAIL SHALL BE 12 GAGE U.S. STANDARD. THE RAIL ELEMENT INCLUDING SPLICES, SHALL HAVE A MINIMUM ULTIMATE TENSILE STRENGTH OF 80,000 LBS. GUARD RAIL PARTS FURNISHED SHALL BE INTERCHANGEABLE WITH SIMILAR PARTS REGARDLESS OF THE SOURCE OF MANUFACTURER. THE HOLES FOR CONNECTING BOLTS SHALL BE PUNCHED OR DRILLED, BURNING WILL NOT BE PERMITTED.
5. THE GUARD, BOLTS, NUTS, STEEL POSTS. AND ALL OTHER METAL PARTS SHALL BE GALVANIZED TO CONFORM TO THE REQUIREMENTS FOR THE COATING CLASS, (2.50 OUNCES PER SQUARE FOOT) OF THE CURRENT SPECIFICATIONS FOR ZINC-COATED (GALVANIZED) IRON, AND STEEL SHEETS, COILS, AND CUT LENGTHS, IN ACCORDANCE WITH ASTM 123A.
6. IF THE AVERAGE SPELTER COATING AS DETERMINED FROM THE REQUIRED SAMPLES IS LESS THAN TWO (2) OUNCES OF SPELTER PER SQUARE FOOT, OR IF ANY ONE SPECIMEN HAS LESS THAN 1.8 ONCES OF SPELTER PER SQUARE FOOT OF DOUBLE EXPOSED SURFACE, THE LOT SAMPLED SHALL BE REJECTED, THE FINISHED SHEETS SHALL BE OF FIRST CLASS COMMERCIAL QUALITY, FREE FROM INJURIOUS DEFECTS, SUCH AS BLISTERS, FLUX, AND UNCOATED SPOTS.
7. THE GUARD RAIL SHALL BE INSPECTED TO DETERMINE THAT THE MATERIAL, DIMENSIONS, AND WORKMANSHIP ARE IN ACCORDANCE WITH THIS PLAN.
8. WHERE A DEAD-END STREET REQUIRES A BARRICADE, END OF ROADWAY MARKER SIGNS SHALL ALSO BE REQUIRED. (SEE STD. MISC-204).

NOT TO SCALE

END OF ROAD BARRICADE



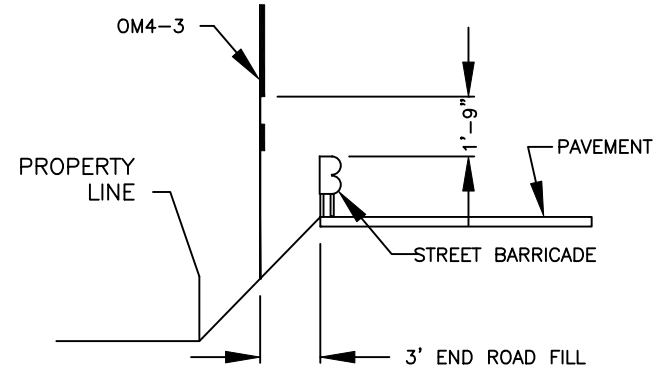
3-2022

MISC-203

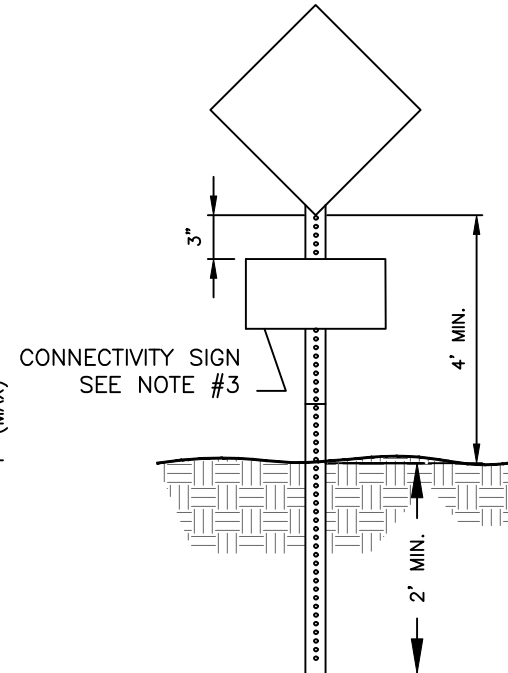
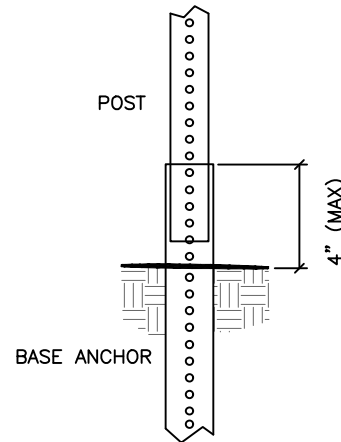
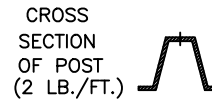
SHEET 2 OF 2

NOTES:

1. WHEN A DEAD-END OR STUBBED STREET REQUIRES A BARRICADE, END-OF-ROADWAY MARKER SIGNS (OM4-3, 24"x24", SOLID RED) SHALL BE PROVIDED.
2. SIGNS ARE TO BE PLACED BEHIND THE BARRICADE (SEE DETAIL MISC-203), EVENLY SPACED WITH ONE SIGN PLACED AT THE CENTERLINE LOCATION AND ADDITIONAL SIGNS AT 6' O.C. (MINIMUM OF 3 SIGNS, MAXIMUM OF 5 SIGNS).
3. WHEN BARRICADE IS USED ON A STREET STUB, THE SIGN AT THE CENTERLINE SHALL BE SUPPLEMENTED WITH A STREET CONNECTIVITY SIGN. SEE DETAIL MISC-205.
4. ALL SIGNS/MARKERS SHALL MEET OR EXCEED MUTCD STANDARDS FOR RETROREFLECTIVITY.



SIGN LOCATION DETAIL



NOT TO SCALE

END OF ROAD MARKER

3/4" OUTSIDE RADIUS (TYP.)

1/2" WIDE WHITE BORDER

1/4" INSIDE RADIUS (TYP.)

FUTURE DEVELOPMENT
WILL EXTEND
THIS STREET

GREEN BACKGROUND

WHITE TEXT (TYP.)

2" (TYP.)

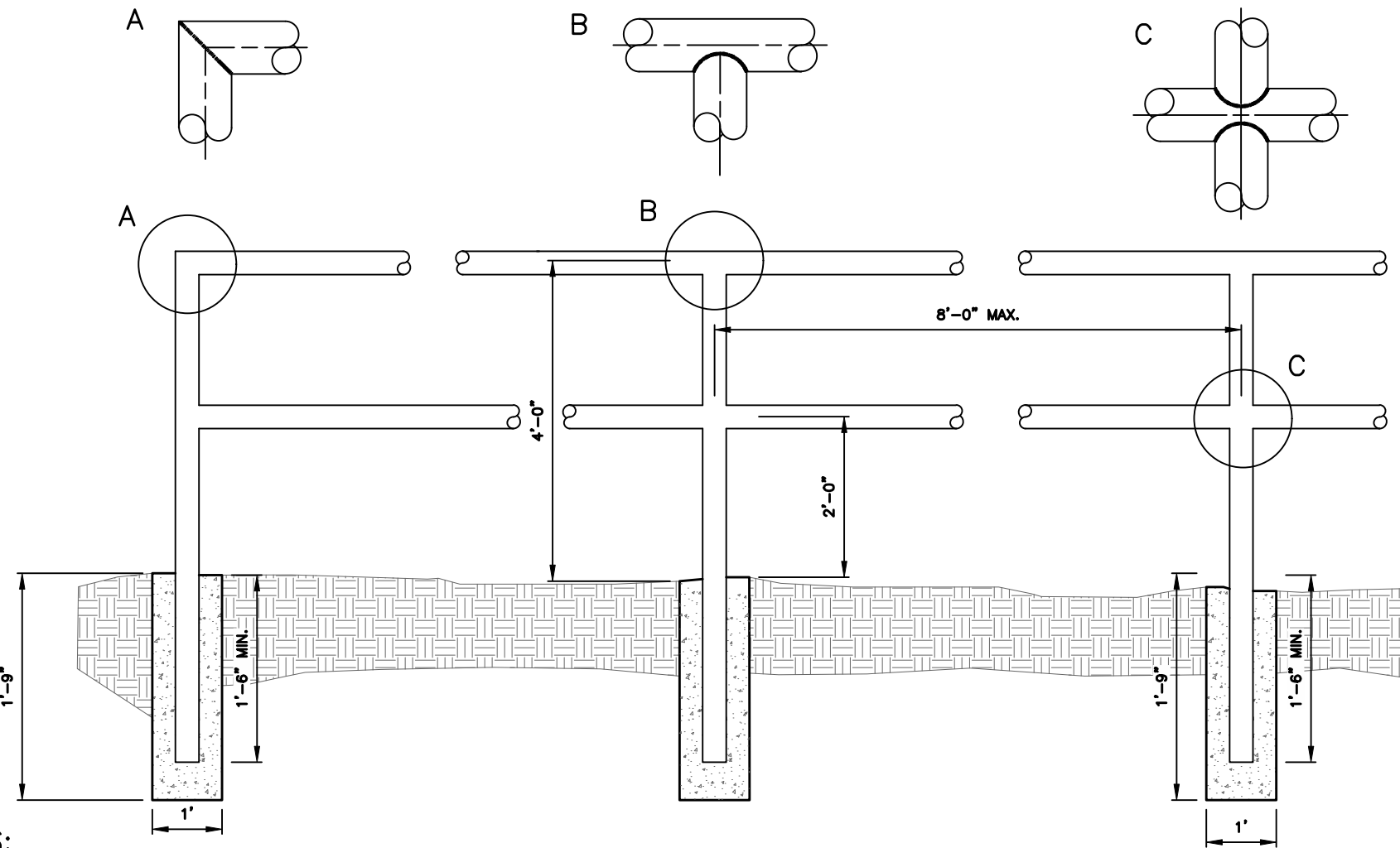
12"

24"

NOTES:

1. SIGN SHALL MEET OR EXCEED MUTCD STANDARDS FOR RETROREFLECTIVITY
2. SIGN MATERIAL SHALL BE 0.080" THICK ALUMINUM
3. ALL LETTERS SHALL BE SERIES B-2000 FROM THE 2004 STANDARD HIGHWAY SIGNS MANUAL (AND ANY REVISION THERETO) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION.

NOT TO SCALE



NOTES:

1. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
2. TYPE OF PIPE TO BE USED IS 1-5/8" MAX. O.D. BLACK IRON, LOW CARBON PIPE OR GALVANIZED.
3. ALL JOINTS TO HAVE A 1/2" FILLET WELD AT ALL JOINTS.
4. PAINT ASSEMBLY AFTER INSTALLATION WITH BLACK ALL WEATHER ENAMEL.
5. SEE STD. MISC-206 SHEET 1 FOR WARRANTS

NOT TO SCALE



SAFETY RAIL & WARRANTS

3-2022
MISC-206
SHEET 2 OF 2