

APPENDIX A

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TABLE A1 – STANDARDS OF STREET DESIGN

Street Type	Alley	Local	Collector	Thoroughfare
Average Daily Traffic (ADT)	100	250	3000 Major 1000 Minor	8000 Major 4000 Minor
Longitudinal Grade Min Max: level/rolling hilly (stop/yield) at intersection (thru movement) at intersection Within 100' of an intersection	1%	1%	1%	See Thoroughfare Plan
	10 %	10 %	8 %	
	10 %	10 %	10 %	
	5 %	2 %	2 %	
	5 %	5 %	5 %	
Min Horizontal Centerline Curve Radius		150'	230'	
Min Tangent between Reverse Curves		50'	100'	
Street Intersection Radius⁽⁶⁾	20'	30'	30'	
Design Speed Min Max	15 mph	25 mph	25 mph	
	15 mph	35 mph	35 mph	
Design Vehicle Residential Non-Residential	Alley	Local	Collector	Thoroughfare
	SU-30	SU-30	Bus-45 & SU-30	WB-62
	SU-30	SU-30	WB-62 or WB-40	WB-62
Separation⁽¹⁾⁽²⁾⁽³⁾ driveway - driveway driveway - intersection driveway - residential prop. line driveway - non-residential prop. line intersection - intersection	40'	40'	120'	400'
	25'	60'	120'	250'
	5'	5'	5'	5'
	10'	10'	10'	10'
	N/A	200'	200'	600'-1000'
Pavement Schedule⁽⁴⁾⁽⁵⁾ surface course (S9.5C) intermediate course (I19.0C) base course (residential) base course (non-residential)	Alley	Local	Collector	Thoroughfare
	2"	2-1" Lifts	2-1" Lifts	See NCDOT Roadway Design Standards
	0"	2.5"	2.5"	
	8" ABC or 4" B25.0C			
N/A 10" ABC or 5" B25.0C				
Max Cul-de-sac Lengths Zoning	R4, R8	AG, R1, R2	CD, LI, HI	MU, O-I, C-1, GC, PD
	800'	1000'	1500'	500'
	R18, CC			
	300'			
Dead-End Fire Apparatus Access Roads Length Width Vertical clearance Maximum grade Turnaround required	0-150'	150'-500'	500'-750'	750'+
	20'	20'	26'	Special Approval Required
	13.5'	13.5'	13.5'	
	10 %	10 %	10 %	
	None	60' "Y" 96' ø Cul-De-Sac 120' Hammerhead (Temporary)		

- Notes:
1. Single-family dwellings and duplex dwellings on individual lots shall be exempt from the minimum separation between driveways as shown in the table above. However, such driveways shall maintain a minimum of 5' of side clearance from residential property lines and 10' for all others.
 2. City streets: proposed streets which intersect opposite sides of another street (either existing or proposed) shall be laid out to intersect directly opposite each other. Intersections which cannot be aligned shall be separated by a minimum length of **200'** between survey centerlines.
 3. For state-maintained streets, reference the NCDOT Policy on Street and Driveway Access to North Carolina Highways.
 4. Non-residential street pavement design shall be evaluated on a case-by-case basis.
 5. Prior to substituting B25.0C, approval shall be obtained from the Director of Engineering.
 6. Radius measured from edge of pavement.

TABLE A2 – STOPPING SIGHT DISTANCE

MINIMUM STOPPING SIGHT DISTANCE (ft)							
Vehicle Speed (mph)	UPGRADES			FLAT	DOWNGRADES		
	9 %	6 %	3 %	0 %	-3 %	-6 %	-9 %
25	140	145	150	155	160	165	175
30	180	185	200	200	205	215	230
35	225	230	240	250	260	275	290
40	270	280	290	305	315	335	355
45	320	330	345	360	380	400	430
50	375	390	405	425	450	475	510

TABLE A3 – DESIGN INTERSECTION SIGHT DISTANCE, LEFT TURN FROM STOP

Design Speed (mph)	Stopping Sight Distance (ft)	Intersection Sight Distance for Passenger Cars	
		Calculated (ft)	Design (ft)
15	80	165.4	170
20	110	220.5	225
25	155	275.6	280
30	200	330.8	335
35	250	385.9	390
40	305	441.0	445
45	360	496.1	500
50	425	551.3	555

TABLE A4 – GREENWAY MINIMUM STOPPING SIGHT DISTANCE

A	English Units - Minimum Length of Crest Vertical Curve (L) Based on Stopping Sight Distance														
	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300
2												30	70	110	150
3								20	60	110	140	180	220	260	300
4						15	55	95	135	175	215	256	300	348	400
5					20	60	100	140	180	222	269	320	376	436	500
6				10	50	90	130	171	216	267	323	384	451	523	600
7				31	71	111	152	199	252	311	376	448	526	610	700
8			8	48	88	128	174	228	288	356	430	512	601	697	800
9			20	60	100	144	196	256	324	400	484	576	676	784	900
10			30	70	111	160	218	284	360	444	539	640	751	871	1000
11			38	78	122	176	240	313	396	489	592	704	826	958	1100
12		5	45	85	133	192	261	341	432	533	645	768	901	1045	1200

1. When $S > L = 2S - 900/A$ Shaded area represents $S = L$
2. When $S < L = AS^2/900$
 L = Minimum Length of Vertical Curve (ft)
 A = Algebraic Grade Difference (%)
 S = Stopping Sight Distance (ft)
 Height of Cyclist's Eye = 4.5'
 Height of Object = 0'
 Minimum Length of Vertical Curve = 3'

Source: AASHTO, Guide for the Development of Bicycle Facilities

TABLE A5 – SANITARY SEWER PIPE SIZING & MATERIAL

Material	Pipe Diameter (in)
Solid wall ASTM D3034, SDR 35, Cell Classification 12454	4 - 15
Profile wall ASTM F794 Stiffness PS46	18 - 48
Ductile Iron Pipe (DIP) Class 50	All Sizes

TABLE A6 – WATER DISTRIBUTION PIPE SIZING & MATERIAL

Material	Pipe Diameter (in)
PVC SDR 13.5	2 - 4
PVC C900	6 - 12
Ductile Iron Pipe (DIP) Class 350	3 - 12
Ductile Iron Pipe (DIP) Class 250	16 +

TABLE A7 – MANDREL DIMENSIONS

Pipe Type	Pipe Diameter	Minimum Inside Diameter	Inside Diameter with 5% Deflection
Dual Wall	15"	14.85	14.11
	18"	17.93	17.03
	24"	23.90	22.71
	30"	29.89	28.30
Triple Wall	30"	29.62	28.14
	36"	35.40	33.63
	42"	41.31	39.24
	48"	47.31	44.94
	60"	59.30	56.34

TABLE A8 – MAXIMUM COVER FOR POLYPROPYLENE PIPE

Diameter	Class 1	Class 2			Class 3		Class 4
	Compacted	95%	90%	85%	95%	90%	95%
12"	39	27	20	9	21	12	11
15"	42	29	21	10	22	12	11
18"	36	25	18	9	19	12	11
24"	31	22	16	7	16	11	10
30"	33	23	17	9	17	11	10
36"	32	22	16	7	16	11	10
42"	32	22	15	7	16	11	10
48"	31	21	15	6	15	10	9
60"	34	23	16	6	16	11	10

TABLE A9 CASING PIPE SIZES

Pipe Diameter	HIGHWAY		RAILROAD	
	Casing O.D.	Min. Wall Thickness	Casing O.D.	Min. Wall Thickness
6"	12.75"	0.188"	12.75"	0.250"
8"	18"	0.250"	18"	0.312"
12"	24"	0.250"	24"	0.406"
16"	30"	0.312"	30"	0.500"
24"	36"	0.375"	36"	0.5625"

TABLE A10 – AIR TEST TABLE

Length of Line (ft)	4	6	8	10	12	15	18	21	24
25	0:04	0:10	0:18	0:28	0:40	1:02	1:29	2:01	2:38
50	0:09	0:20	0:35	0:55	1:19	2:04	2:58	4:03	5:17
75	0:13	0:30	0:53	1:23	1:59	3:06	4:27	6:04	7:55
100	0:18	0:40	1:10	1:50	2:38	4:08	5:56	8:05	10:34
125	0:22	0:50	1:28	2:18	3:18	5:09	7:26	9:55	11:20
150	0:26	0:59	1:46	2:45	3:58	6:11	8:30	9:55	11:20
175	0:31	1:09	2:03	3:13	4:37	7:05	8:30	9:55	11:20
200	0:35	1:19	2:21	3:40	5:17	7:05	8:30	9:55	11:20
225	0:40	1:29	2:38	4:08	5:40	7:05	8:30	10:25	13:36
250	0:44	1:39	2:56	4:35	5:40	7:05	8:31	11:35	15:07
275	0:48	1:49	3:14	4:43	5:40	7:05	9:21	12:44	16:38
300	0:53	1:59	3:31	4:43	5:40	7:05	10:12	13:53	18:09
350	1:02	2:19	3:47	4:43	5:40	8:16	11:54	16:12	21:10
400	1:10	2:38	3:47	4:43	6:03	9:27	13:36	18:31	24:12
450	1:19	2:50	3:47	4:43	6:48	10:38	15:19	20:50	27:13
500	1:28	2:50	3:47	5:15	7:34	11:49	17:01	23:09	30:14

Note: If the length of sewer to be tested is submerged or partially submerged in groundwater, the test pressure shall be increased as required to overcome the actual static pressure exerted by the groundwater. If a test pressure greater than 8 psi results, air testing shall not be used and exfiltration testing will be required.

TABLE A11 – UTILITY EASEMENT WIDTH CHART

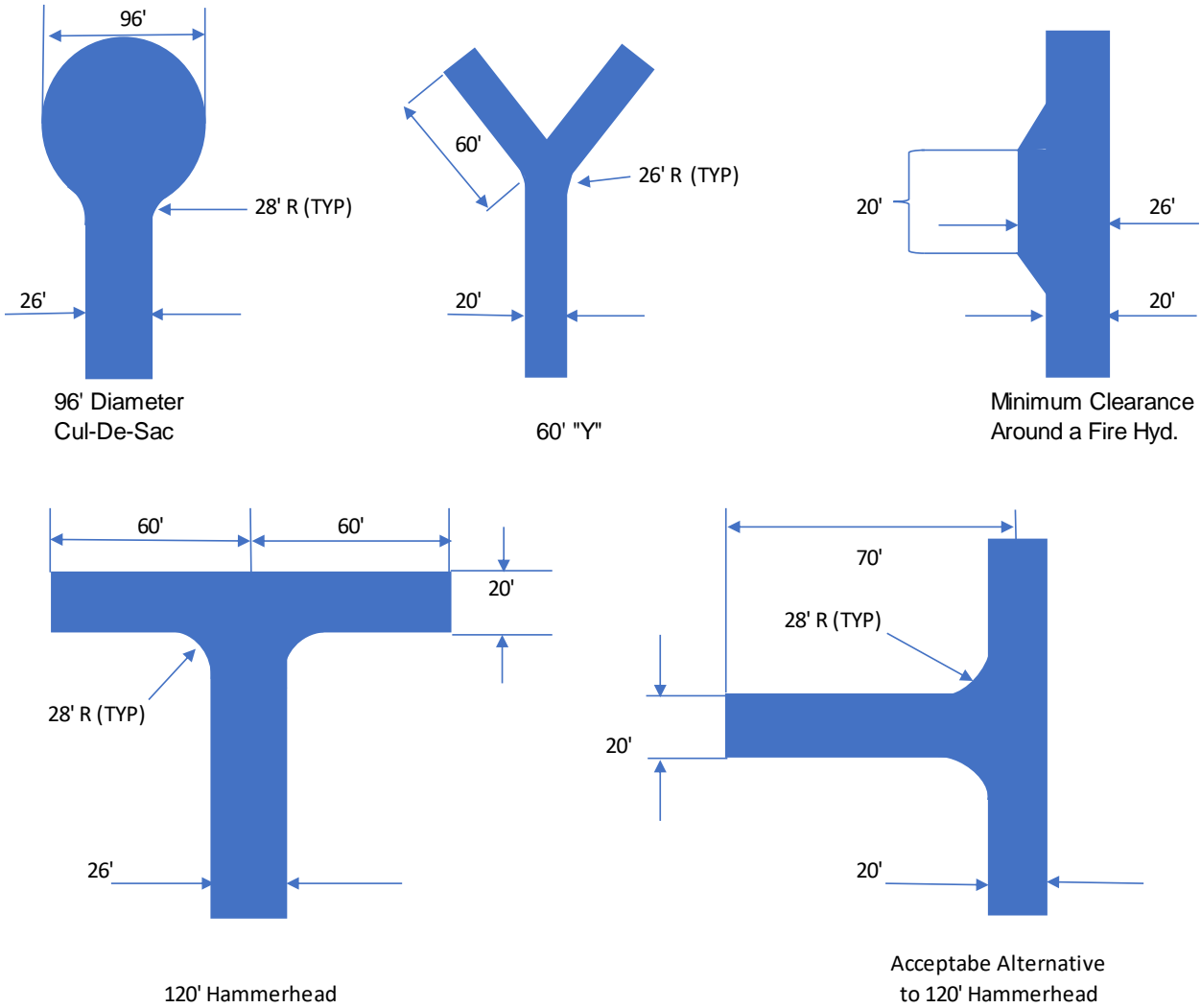
SEWER MAIN PIPE								
Diameter (in)	Diameter (ft)	Min. Bottom Width (ft)	Max. depth to bottom of pipe @ Esmt Width (ft)					
			20'	25'	30'	35'	40'	45'
8	0.67	2.67	8.67	11.17	13.67	16.17	18.67	21.17
12	1.00	3.00	8.50	11.00	13.50	16.00	18.50	21.00
16	1.33	3.33	8.33	10.83	13.33	15.83	18.33	20.83
24	2.00	4.00	8.00	10.50	13.00	15.50	18.00	20.50

* - Depth beyond those shown on this chart shall require additional easement width to the nearest 5' increment.

STORM PIPE									
Pipe Inner Diameter (in)	Wall Thickness (in)	Pipe Outer Diameter (ft)	Min. Bottom Width (ft)	Max. depth to bottom of pipe @ Esmt Width (ft.)					
				20'	25'	30'	35'	40'	50'
15	2.25	1.63	3.63	8.19	10.69	13.19	15.69	18.19	20.91
18	2.50	1.92	3.92	8.04	10.54	13.04	15.54	18.04	20.98
24	3.00	2.50	4.50	7.75	10.25	12.75	15.25	17.75	21.13
30	3.50	3.08	5.08	7.46	9.96	12.46	14.96	17.46	21.27
36	4.00	3.67	5.67	7.17	9.67	12.17	14.67	17.17	21.42
42	4.50	4.25	6.25	6.88	9.38	11.88	14.38	16.88	21.56
48	5.00	4.83	6.83	6.58	9.08	11.58	14.08	16.58	21.71
54	6.25	5.54	7.54	6.23	8.73	11.23	13.73	16.23	21.89
60	6.75	6.13	8.13	5.94	8.44	10.94	13.44	15.94	22.03
66	7.25	6.71	8.71	5.65	8.15	10.65	13.15	15.65	22.18
72	7.00	7.17	9.17	5.42	7.92	10.42	12.92	15.42	22.29

* - Depth beyond those shown on this chart shall require additional easement width to the nearest 5' increment.

DIAGRAM A1 – DEAD-END FIRE APPARATUS ACCESS ROAD TURNAROUND



Notes:

1. Turnarounds to be contained within R/W.
2. Acceptable pavement schedule alternative is 6" ABC, Geotextile, 12" min compacted subgrade to be approved by the Director of Engineering.

DIAGRAM A2 – INTERSECTION GRADES

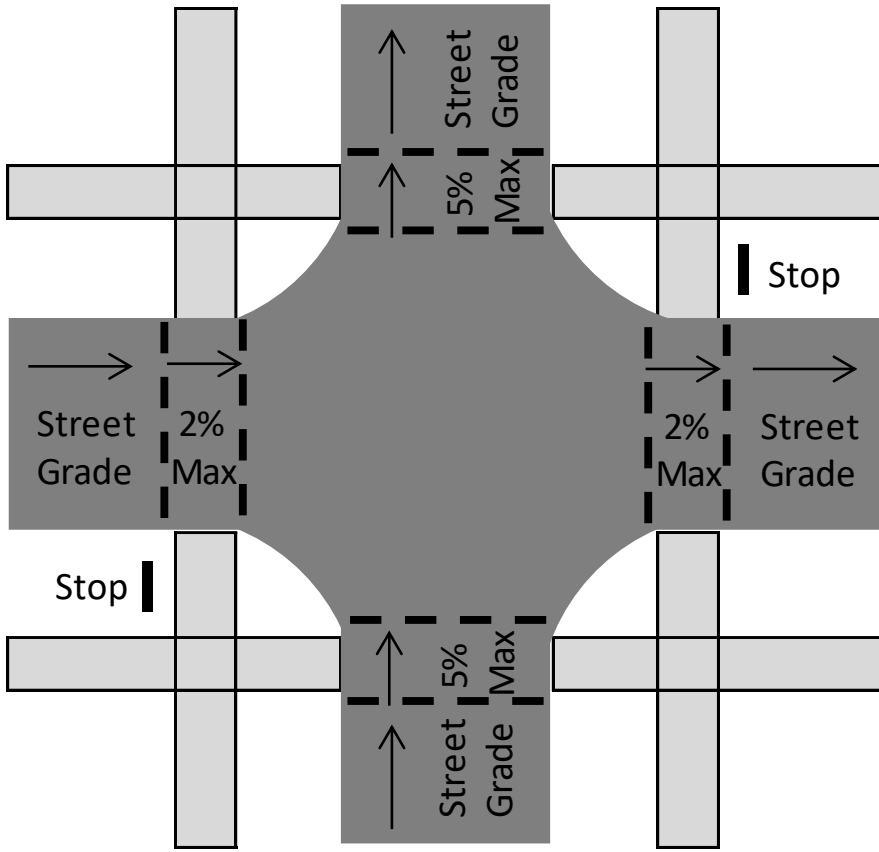
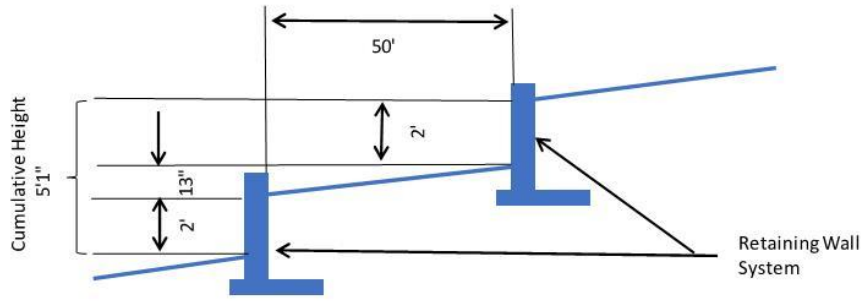
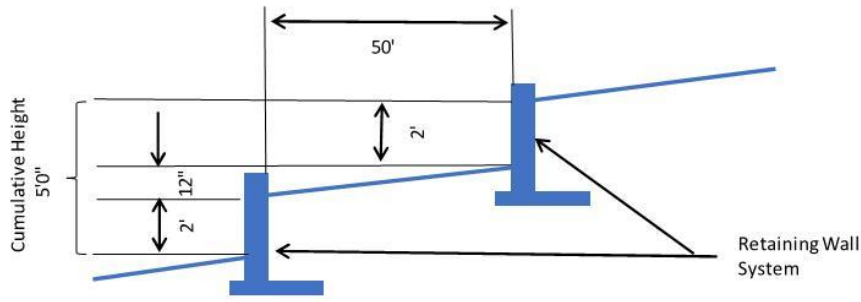


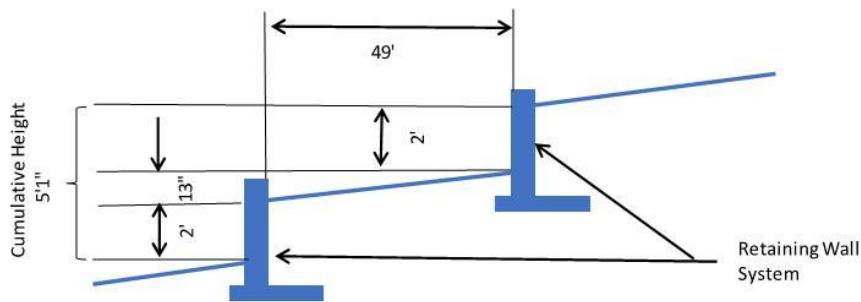
DIAGRAM A3 – RETAINING WALLS



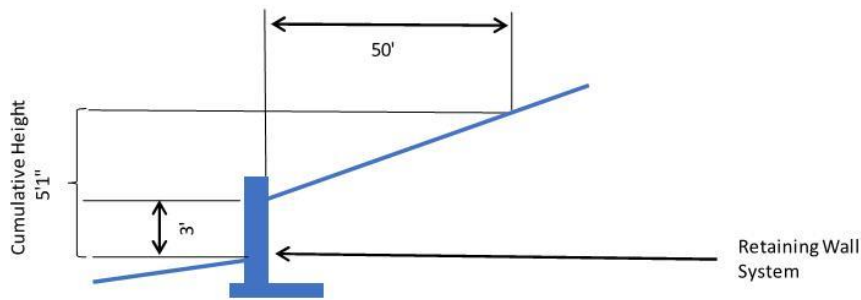
Example - A
Design Professional Required



Example - B
Design Professional Not Required



Example - C
Design Professional Required



Example - D
Design Professional Required

STORM DRAINAGE CONVEYANCE SYSTEM CERTIFICATION

As-Built Certification

I, _____, attest that this certification, for the _____ Project, has been reviewed by me and is accurate, complete and consistent with the information supplied in the plans, specifications, engineering calculations, and all other supporting documentation to the best of my knowledge. I further attest that to the best of my knowledge the Storm Drainage As-Built Plans have been prepared based on an accurate account of the stormwater piping and appurtenances installed during construction and any deviations from the approved construction plans shall not adversely impact the drainage system, discharge points, and/or adjacent properties analyzed during the approval process of the construction plans. Although other professionals may have developed certain portions of this submittal package, inclusion of these materials under my signature and seal signifies that I have reviewed this material and have judged it to be consistent with the proposed design.

SEAL:

(Date)

(Signature)

Engineer:
Firm:
Firm License #:
Address:

STORMWATER CONTROL MEASURE (SCM) CERTIFICATION

Licensed Professional Engineer to provide certification statement for each SCM

As-Built Certification

Project:

SCM # and Type:

I, _____, attest that this certification, has been reviewed by me and is accurate, complete and consistent with the information supplied in the plans specifications, engineering calculations, and all other supporting documentation to the best of my knowledge. I further attest that to the best of my knowledge the As-Built Plans have been prepared based on an accurate account of the SCM and appurtenances installed during construction and any deviations from the approved construction plans were analyzed and verified to not adversely impact the performance of the SCM during the approval process of the construction plans. Although other professionals may have developed certain portions of this submittal package, inclusion of these materials under my signature and seal signifies that I have reviewed this material, conducted a physical site visit, verified all applicable vegetative plantings have been installed, and have judged it to be consistent with the approved design.

SEAL:

(Date)

(Signature)

Engineer:

Firm:

Firm License #:

Address:

Provide sufficient photographs of each SCM design component as part of the certification.

RETAINING WALL CERTIFICATION

As-Built Certification

I, _____, attest that this certification, for the _____ Project, has been reviewed by me and is accurate, complete and consistent with the information supplied in the plans, specifications, engineering calculations, and all other supporting documentation to the best of my knowledge. I further attest that to the best of my knowledge the As-Built Plans have been prepared based on an accurate account of the retaining wall system and appurtenances installed during construction and any deviations from the approved construction plans were analyzed and verified to not adversely impact the performance of the wall system analyzed during the approval process of the construction plans. Although other professionals may have developed certain portions of this submittal package, inclusion of these materials under my signature and seal signifies that I have reviewed this material and have judged it to be consistent with the proposed design.

SEAL:

(Date)

(Signature)

Engineer:

Firm:

Firm License #:

Address:

BRIDGE CERTIFICATION

As-Built Certification

I, _____, attest that this certification, for the _____ Project, has been reviewed by me and is accurate, complete and consistent with the information supplied in the plans, specifications, engineering calculations, and all other supporting documentation to the best of my knowledge. I further attest that to the best of my knowledge the As-Built Plans have been prepared based on an accurate account of the bridge and appurtenances installed during construction and any deviations from the approved construction plans were analyzed and verified to not adversely impact the performance of the bridge analyzed during the approval process of the construction plans. Although other professionals may have developed certain portions of this submittal package, inclusion of these materials under my signature and seal signifies that I have reviewed this material and have judged it to be consistent with the proposed design.

SEAL:

(Date)

(Signature)

Engineer:

Firm:

Firm License #:

Address:

CERTIFICATION OF EMBANKMENTS

As-Built Certification

I, _____, attest that this certification, for the _____ Project, has been reviewed by me and is accurate, complete, and consistent with the information supplied in the plans, specifications, and all other supporting documentation to the best of my knowledge. I further attest that to the best of my knowledge the As-Built Plans have been prepared based on an accurate account of the embankment fill elevation, compaction, slope, and slope protection materials installed during construction and any deviations from the approved construction plans were analyzed and verified to not adversely impact the performance of the embankment during the approval process of the construction plans. Although other professionals may have developed certain portions of this submittal package, inclusion of these materials under my signature and seal signifies that I have reviewed this material and have judged it to be consistent with the proposed design.

SEAL:

(Date)

(Signature)

Engineer:

Firm:

Firm License #:

Address:

EROSION CONTROL PERMIT APPLICATION

Applicant Contact Information

Name: _____

Phone: _____

Project Information

Type of Construction: (Residential/Commercial): _____

Address: _____

Parcel & Lot #: _____

Disturbed Area (ac): _____

Date of land disturbing activity: _____

Applicant agrees to the following items:

1. Call One-Call before digging 811 or 1-800-351-1111 and allow 3 business days before digging.
2. Install and maintain in proper working order, erosion control measures as needed to prevent sedimentation from leaving the construction site.
3. Remove any sediment and or aggregate discharged onto streets immediately.

Applicant Signature

Date

RESIDENTIAL INSPECTION REQUIREMENTS

There are five (5) inspections required by the City of Kannapolis Engineering Department. These inspections must be completed **before** the Certificate of Occupancy will be issued. Inspections are scheduled through your Citizen Access account and will be performed the next business day, from 8:00am to 5:00pm. No specific inspection time will be provided. There is a \$50.00 reinspection fee for each failed inspection:

1. Driveway Pipe Review:

- This inspection will be after the pipe is in place but not covered
- Verify the correct type of the pipe and installation

2. Driveway Review:

- This inspection should be requested after all forms for Driveway are in place.
- All soft areas in the subgrade have been repaired.
- Before any concrete is poured.
- Driveway should meet all LDSM requirements

3. Sidewalk Review

- This inspection should be requested after all forms for Sidewalk are in place.
- All soft areas in the subgrade have been repaired.
- Before any concrete is poured.
- Sidewalk should meet all LDSM requirements

4. Drainage Review

- This inspection should be requested after fine grading has been completed.
- Lot is graded in general conformity with the plans.
- Lot grading does not negatively impact adjacent properties.
- Existing infrastructure is not impacted by the development.

5. Water and Sewer Review

- This inspection should be requested after sod or seed/straw has been placed.
- Sewer lateral has cast iron cap with stainless steel band and be set to grade.
- Water meter box and irrigation box (if applicable) set to grade.
- No damage to the boxes or clean out.
- Boxes are clear of mud and debris.

ENGINEERING INSPECTION PERMIT APPLICATION

Applicant Contact Information

Name: _____

Phone: _____ Email: _____

Project Information

Address: _____ PIN: _____

Contractor Name: _____

Applicant agrees to the following items:

1. For driveway pipe, driveway, sidewalk, grading, and water/sewer inspections, the Citizen Access email account that will be used to schedule the inspections is:

Email: _____

This Citizen Access email account will be linked to the KN-INSP record and will be used by the applicant to schedule the inspections.

2. Construct and maintain driveway(s) in absolute conformance with the current "Policy on Street and Driveway Access" as adopted by the City of Kannapolis [Land Development Standards Manual](#)
3. Provide proper signs, traffic control and other warning devices for the protection of traffic in conformance with the current "Manual on Uniform Traffic Control Devices for Streets and Highways" MUTCD
4. Contact the City of Kannapolis to determine the required size of RCP/HP pipe that must be installed 704-920-4221.
5. This permit allows one inspection for each of the five (5) required inspections. **For each failed inspection, there will be a \$50.00 reinspection fee that must be paid through Citizen Access before the reinspection can be performed.**
6. By signing below, I here indemnify and save harmless the City of Kannapolis from all damages and claims for damage that may arise by reason of this construction.

APPLICANT SIGNATURE

DATE



**Right-of-Way Extension/Service
Permit Application**

Provide the following information for the construction of facilities in the right-of-way:

Owner/Operator of Proposed Line: _____

Contact Representative & Position: _____

Address: _____

Phone: _____ Email: _____

Contractor of Proposed Line: _____

Address: _____

Phone: _____ Email: _____

Representative & Position: _____

Sub-Contractor of Proposed Line: _____

Address: _____

Phone: _____ Email: _____

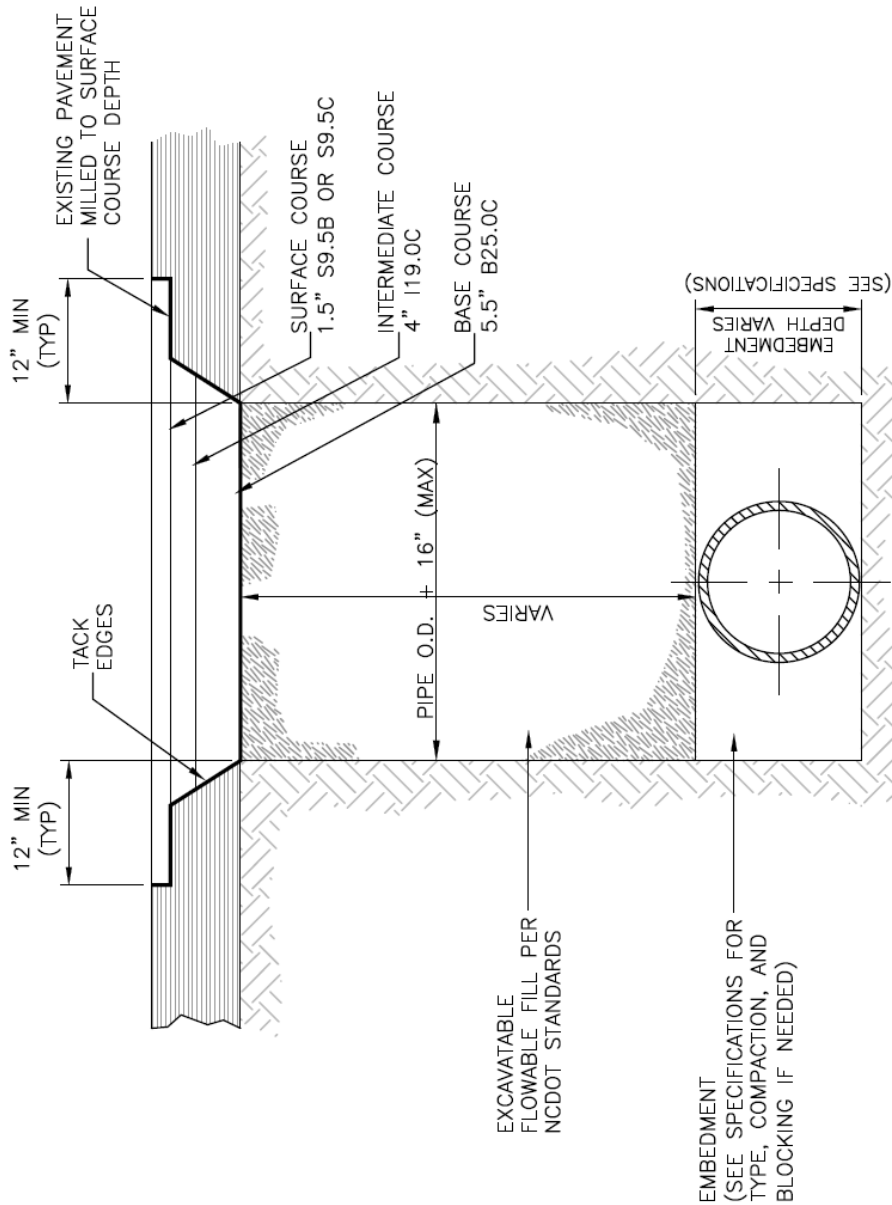
Representative & Position: _____

List Additional Sub-Contractors and Their Information on Back of Page.

List All Road Rights-of-Way (City and NCDOT) and/or City Easements Where Installation/Construction is Proposed:

Type of Utility/Extension Service: _____

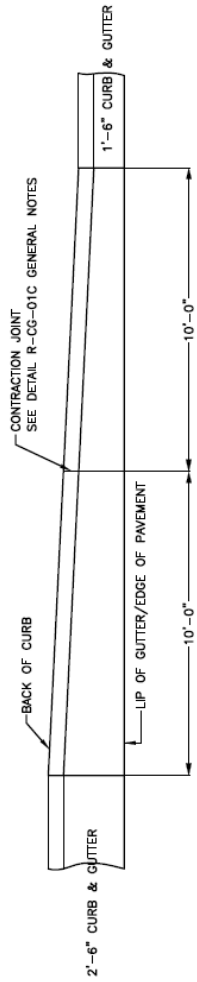
Diameters	Materials	Length of Pipe



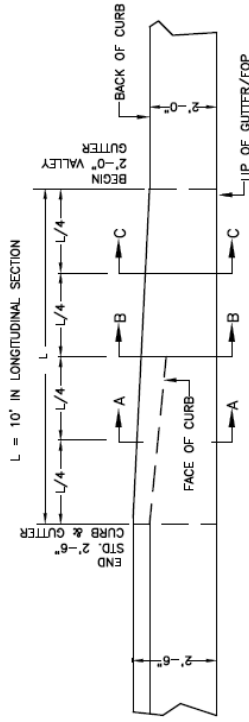
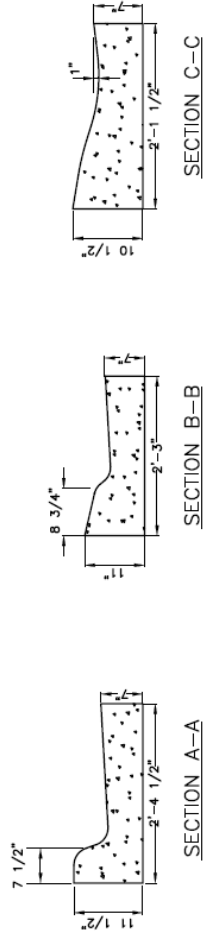
NOT TO SCALE

UTILITY CUT PAVEMENT REPAIR DETAIL





PLAN VIEW
CURB TRANSITION
2'-6" CURB & GUTTER TO 1'-6" CURB & GUTTER



PLAN VIEW
CURB TRANSITION
2'-6" CURB & GUTTER TO 2'-0" VALLEY GUTTER

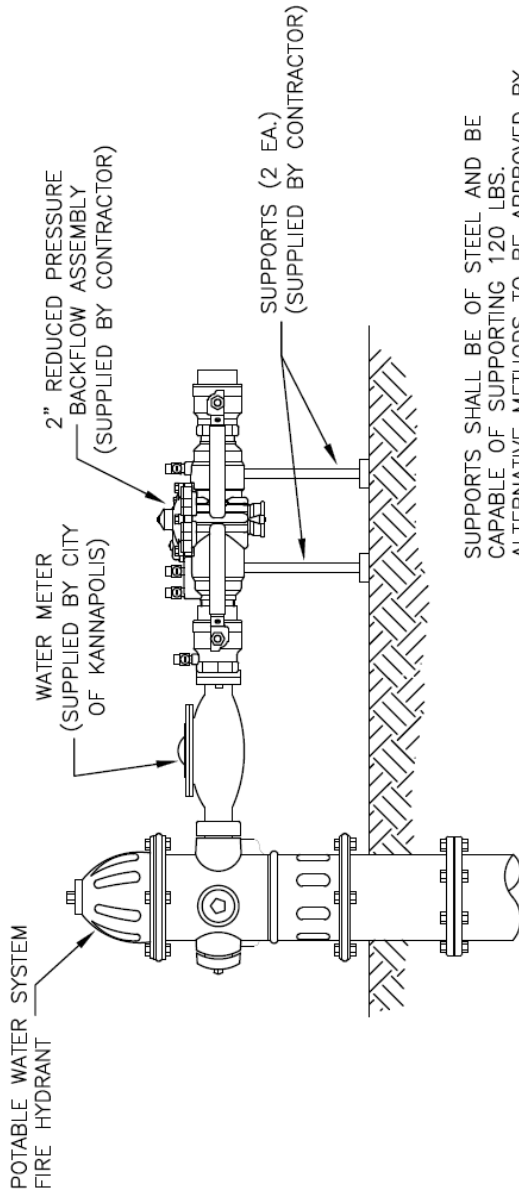
NOT TO SCALE



CURB TRANSITIONS

JANUARY 2025

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SUPPORTS SHALL BE OF STEEL AND BE CAPABLE OF SUPPORTING 120 LBS. ALTERNATIVE METHODS TO BE APPROVED BY CITY OF KANNAPOLIS BACKFLOW ADMINISTRATOR.

NOTES:

1. THE CONTRACTOR MUST INSTALL A REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY (RP) IMMEDIATELY AFTER THE HYDRANT METER IS SET.
2. BACKFLOW ASSEMBLIES MUST BE TESTED BY A CERTIFIED TESTER PRIOR TO USE.
3. PRIOR TO USE AN INSPECTION BY THE CITY IS REQUIRED FOR ALL HYDRANT METER BACKFLOW PREVENTION ASSEMBLIES.
4. EACH TIME THE HYDRANT METER BACKFLOW PREVENTION ASSEMBLY IS RELOCATED IT MUST BE TESTED.
5. THE CONTRACTOR WILL BE BILLED TO REPLACE AND INSTALL ANY PARTS NOT RETURNED WITH HYDRANT METER.
6. HYDRANT, BACKFLOW ASSEMBLY, AND METER SHALL BE ADEQUATELY INSULATED TO PREVENT FREEZING.
7. HYDRANT WRENCH ONLY, NO PIPE WRENCH ALLOWED
8. SEE CITY OF KANNAPOLIS LAND DEVELOPMENT STANDARDS MANUAL APPENDIX B FOR LIST OF APPROVED PRODUCTS.

NOT TO SCALE

**REDUCED PRESSURE PRINCIPLE
BACKFLOW PREVENTION ASSEMBLY FOR
HYDRANT METERS**

