UP TO 250 ADT

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Appendix IV

Flexible Pavement Design Worksheet for New Subdivision Streets

This sheet is intended for use and submission in conjunction with VDOT's Subdivision Street Requirements

County	BOTETOURT	Date:	06 FEB.07
Subdivision	DALEVILLE TOWN CENTER		
Street Name	WATER LILY, FERN LANE, BERKELEY ST.		
Developer	FRALIN & WALDRON	Phone:	

- ADT — Projected traffic for the street segment considered, as defined in the Subdivision Street Requirements.
- CBR_D — Design CBR = Average of CBR_T x 2/3 and modified only as discussed in the Pavement Design Guide.
- CBR_T — CBR value of the subgrade sample, taken and tested as specified in the Pavement Design Guide
- DME — VDOT District Materials Engineer
- EPT — Equivalent projected traffic
- HCV — Number of Heavy Commercial Vehicles (e.g. trucks, buses, etc., with 2 or more axles and 6 or more tires).
- %HCV — Percentage of the total traffic volume composed of Heavy Commercial Vehicles.
- RF — Resiliency Factor = Relative value of the subgrade soil's ability to withstand repeated loading.
- SSV — Soil support value of subgrade (SSV = CBR_D x RF)
- D_P — Thickness index of proposed pavement design computed by the Conventional Pavement Design Method
- D_R — Thickness index required, based on Design ADT and SSV, determined by Appendix II.

Step 1: Determine Design ADT	
ADT	
%HCV = 100 x HCV x ADT) or 20 x HCV. Note: For %HCV ≤ 5%, use ADT	250 (Note: For %HCV>5%, EPT>ADT)
Design ADT (Use greater of ADT or EPT)	250

Step 2: Determine Design Values CBR, RF, and SSV			
Sample	DBR_T	Resiliency Factor Source	(RF) Value
#1		Table 1	1.50
#2		Appendix I	1.50
#3		DME approved RF	1.50
#		For preliminary designs, use the lowest RF value in the equation	
#			

CBR_D x RF = SSV: (4) x (1.5) = 6

Step 3: Pavement Design (Check appropriate box and show proposed pavement design below.)

O (A) Limited to Design ADT ≤ 400 - Show pavement material notations and thickness from Appendix IV Tables A and B.

O (B) Show pavement section as developed in the Pavement Design Guide. (See Appendix III for material notations and thickness equivalency values (a)). D_R = 9.4 from Appendix II

Description of Proposed Pavement Section	Material Notation	Thickness, h	a	(a x h)
Surface	SM-9.5A	1.50	2.15	3.22
Base	BM-25	2.00	2.15	4.30
Subbase	21-B	6.00	0.60	3.60

D_P must equal or exceed the value of D_R. D_P = Σ(a x h) = 11.12

11.12 > 9.4 OK

2,207 ADT

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Appendix IV

Flexible Pavement Design Worksheet for New Subdivision Streets

This sheet is intended for use and submission in conjunction with VDOT's Subdivision Street Requirements

County	BOTETOURT	Date:	06 FEB.07
Subdivision	DALEVILLE TOWN CENTER		
Street Name	BROAD ST AND SYCAMORE AVE		
Developer	FRALIN & WALDRON	Phone:	

- ADT — Projected traffic for the street segment considered, as defined in the Subdivision Street Requirements.
- CBR_D — Design CBR = Average of CBR_T x 2/3 and modified only as discussed in the Pavement Design Guide.
- CBR_T — CBR value of the subgrade sample, taken and tested as specified in the Pavement Design Guide
- DME — VDOT District Materials Engineer
- EPT — Equivalent projected traffic
- HCV — Number of Heavy Commercial Vehicles (e.g. trucks, buses, etc., with 2 or more axles and 6 or more tires).
- %HCV — Percentage of the total traffic volume composed of Heavy Commercial Vehicles.
- RF — Resiliency Factor = Relative value of the subgrade soil's ability to withstand repeated loading.
- SSV — Soil support value of subgrade (SSV = CBR_D x RF)
- D_P — Thickness index of proposed pavement design computed by the Conventional Pavement Design Method
- D_R — Thickness index required, based on Design ADT and SSV, determined by Appendix II.

Step 1: Determine Design ADT	
ADT	
%HCV = 100 x HCV x ADT) or 20 x HCV. Note: For %HCV ≤ 5%, use ADT	2,207 (Note: For %HCV>5%, EPT>ADT)
Design ADT (Use greater of ADT or EPT)	2,207

Step 2: Determine Design Values CBR, RF, and SSV			
Sample	DBR_T	Resiliency Factor Source	(RF) Value
#1		Table 1	1.50
#2		Appendix I	1.50
#3		DME approved RF	1.50
#		For preliminary designs, use the lowest RF value in the equation	
#			

CBR_D x RF = SSV: (4) x (1.50) = 6.0

Step 3: Pavement Design (Check appropriate box and show proposed pavement design below.)

O (A) Limited to Design ADT ≤ 400 - Show pavement material notations and thickness from Appendix IV Tables A and B.

O (B) Show pavement section as developed in the Pavement Design Guide. (See Appendix III for material notations and thickness equivalency values (a)). D_R = 16.80 from Appendix II

Description of Proposed Pavement Section	Material Notation	Thickness, h	a	(a x h)
Surface	SM-9.5A	2.0	2.25	4.50
Base	BM-25	3.50	2.25	7.87
Subbase	21-B	8.0	0.60	4.80

D_P must equal or exceed the value of D_R. D_P = Σ(a x h) = 17.17

17.17 > 16.80 OK

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WORST CASE = 8,470 VPD (TOWN BLVD)

Appendix IV

Flexible Pavement Design Worksheet for New Subdivision Streets

This sheet is intended for use and submission in conjunction with VDOT's Subdivision Street Requirements

County	BOTETOURT	Date:	06 FEB.07
Subdivision	DALEVILLE TOWN CENTER		
Street Name	TOWN BLVD.		
Developer	FRALIN & WALDRON	Phone:	

- ADT — Projected traffic for the street segment considered, as defined in the Subdivision Street Requirements.
- CBR_D — Design CBR = Average of CBR_T x 2/3 and modified only as discussed in the Pavement Design Guide.
- CBR_T — CBR value of the subgrade sample, taken and tested as specified in the Pavement Design Guide
- DME — VDOT District Materials Engineer
- EPT — Equivalent projected traffic
- HCV — Number of Heavy Commercial Vehicles (e.g. trucks, buses, etc., with 2 or more axles and 6 or more tires).
- %HCV — Percentage of the total traffic volume composed of Heavy Commercial Vehicles.
- RF — Resiliency Factor = Relative value of the subgrade soil's ability to withstand repeated loading.
- SSV — Soil support value of subgrade (SSV = CBR_D x RF)
- D_P — Thickness index of proposed pavement design computed by the Conventional Pavement Design Method
- D_R — Thickness index required, based on Design ADT and SSV, determined by Appendix II.

Step 1: Determine Design ADT	
ADT	8,470
%HCV = 100 x HCV x ADT) or 20 x HCV. Note: For %HCV ≤ 5%, use ADT ✓	(Note: For %HCV>5%, EPT>ADT)
Design ADT (Use greater of ADT or EPT)	8,470

Step 2: Determine Design Values CBR, RF, and SSV			
Sample	DBR_T	Resiliency Factor Source	(RF) Value
#1		Table 1	1.50
#2		Appendix I	1.50
#3		DME approved RF	1.50
#		For preliminary designs, use the lowest RF value in the equation	
#			

CBR_D x RF = SSV: (4) x (1.50) = 6

Step 3: Pavement Design (Check appropriate box and show proposed pavement design below.)

O (A) Limited to Design ADT ≤ 400 - Show pavement material notations and thickness from Appendix IV Tables A and B.

O (B) Show pavement section as developed in the Pavement Design Guide. (See Appendix III for material notations and thickness equivalency values (a)). D_R = 21 from Appendix II

Description of Proposed Pavement Section	Material Notation	Thickness, h	a	(a x h)
Surface	SM-9.5A	2.00	2.25	4.50
Base	BM-25	3.50	2.25	7.87
Subbase	CTA TYPE I MATERIAL	8.00	1.33	10.64

D_P must equal or exceed the value of D_R. D_P = Σ(a x h) = 23 (OK)

500 - 1500 ADT

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Appendix IV

Flexible Pavement Design Worksheet for New Subdivision Streets

This sheet is intended for use and submission in conjunction with VDOT's Subdivision Street Requirements

County	BOTETOURT	Date:	06 FEB.07
Subdivision	DALEVILLE TOWN CENTER		
Street Name	COLONY AVE, CHARTER AVENUE, VILLAGE DR.		
Developer	FRALIN & WALDRON	Phone:	

- ADT — Projected traffic for the street segment considered, as defined in the Subdivision Street Requirements.
- CBR_D — Design CBR = Average of CBR_T x 2/3 and modified only as discussed in the Pavement Design Guide.
- CBR_T — CBR value of the subgrade sample, taken and tested as specified in the Pavement Design Guide
- DME — VDOT District Materials Engineer
- EPT — Equivalent projected traffic
- HCV — Number of Heavy Commercial Vehicles (e.g. trucks, buses, etc., with 2 or more axles and 6 or more tires).
- %HCV — Percentage of the total traffic volume composed of Heavy Commercial Vehicles.
- RF — Resiliency Factor = Relative value of the subgrade soil's ability to withstand repeated loading.
- SSV — Soil support value of subgrade (SSV = CBR_D x RF)
- D_P — Thickness index of proposed pavement design computed by the Conventional Pavement Design Method
- D_R — Thickness index required, based on Design ADT and SSV, determined by Appendix II.

Step 1: Determine Design ADT	
ADT	
%HCV = 100 x HCV x ADT) or 20 x HCV. Note: For %HCV ≤ 5%, use ADT	1,500 (Note: For %HCV>5%, EPT>ADT)
Design ADT (Use greater of ADT or EPT)	1,500

Step 2: Determine Design Values CBR, RF, and SSV			
Sample	DBR_T	Resiliency Factor Source	(RF) Value
#1		Table 1	1.50
#2		Appendix I	1.50
#3		DME approved RF	1.50
#		For preliminary designs, use the lowest RF value in the equation	
#			

CBR_D x RF = SSV: (4) x (1.5) = 6.0

Step 3: Pavement Design (Check appropriate box and show proposed pavement design below.)

O (A) Limited to Design ADT ≤ 400 - Show pavement material notations and thickness from Appendix IV Tables A and B.

O (B) Show pavement section as developed in the Pavement Design Guide. (See Appendix III for material notations and thickness equivalency values (a)). D_R = 15.50 from Appendix II

Description of Proposed Pavement Section	Material Notation	Thickness, h	a	(a x h)
Surface	SM-9.5A	2	2.25	4.50
Base	BM-25	3	2.25	6.75
Subbase	21-B	8	0.60	4.80

D_P must equal or exceed the value of D_R. D_P = Σ(a x h) = 16.05

16.05 > 15.50 OK

4,235 ADT

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Appendix IV

Flexible Pavement Design Worksheet for New Subdivision Streets

This sheet is intended for use and submission in conjunction with VDOT's Subdivision Street Requirements

County	BOTETOURT	Date:	06 FEB.07
Subdivision	DALEVILLE TOWN CENTER		
Street Name	MARKET STREET		
Developer	FRALIN & WALDRON	Phone:	

- ADT — Projected traffic for the street segment considered, as defined in the Subdivision Street Requirements.
- CBR_D — Design CBR = Average of CBR_T x 2/3 and modified only as discussed in the Pavement Design Guide.
- CBR_T — CBR value of the subgrade sample, taken and tested as specified in the Pavement Design Guide
- DME — VDOT District Materials Engineer
- EPT — Equivalent projected traffic
- HCV — Number of Heavy Commercial Vehicles (e.g. trucks, buses, etc., with 2 or more axles and 6 or more tires).
- %HCV — Percentage of the total traffic volume composed of Heavy Commercial Vehicles.
- RF — Resiliency Factor = Relative value of the subgrade soil's ability to withstand repeated loading.
- SSV — Soil support value of subgrade (SSV = CBR_D x RF)
- D_P — Thickness index of proposed pavement design computed by the Conventional Pavement Design Method
- D_R — Thickness index required, based on Design ADT and SSV, determined by Appendix II.

Step 1: Determine Design ADT	
ADT	
%HCV = 100 x HCV x ADT) or 20 x HCV. Note: For %HCV ≤ 5%, use ADT	(Note: For %HCV>5%, EPT>ADT)
Design ADT (Use greater of ADT or EPT)	

Step 2: Determine Design Values CBR, RF, and SSV			
Sample	DBR_T	Resiliency Factor Source	(RF) Value
#1		Table 1	1.50
#2		Appendix I	1.50
#3		DME approved RF	1.50
#		For preliminary designs, use the lowest RF value in the equation	
#			

CBR_D x RF = SSV: (4) x (1.5) = 6

Step 3: Pavement Design (Check appropriate box and show proposed pavement design below.)

O (A) Limited to Design ADT ≤ 400 - Show pavement material notations and thickness from Appendix IV Tables A and B.

O (B) Show pavement section as developed in the Pavement Design Guide. (See Appendix III for material notations and thickness equivalency values (a)). D_R = 19.50 from Appendix II

Description of Proposed Pavement Section	Material Notation	Thickness, h	a	(a x h)
Surface	SM-9.5A	2	2.25	4.50
Base	BM-25	3.50	2.25	7.87
Subbase	CTA - TYPE I MATERIAL	6.00	1.33	7.98

D_P must equal or exceed the value of D_R. D_P = Σ(a x h) = 20.35

20.35 > 19.50 OK

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1. ALL PROPOSED STREETS TO BE PUBLIC.
2. ALL ALLEYS TO BE PRIVATE.
3. ALL PARKING LOTS TO BE PRIVATE, INCLUDING PARKING LOT WITH ANGLED PARKING SPACES.

WVWA NOTES

1. ALL CONSTRUCTION METHODS AND MATERIALS SHALL CONFORM TO THE LATEST WVWA DESIGN AND CONSTRUCTION STANDARDS.
2. THE CONTRACTOR OR DEVELOPER IS REQUIRED TO NOTIFY THE WESTERN VIRGINIA WATER AUTHORITY IN WRITING AT LEAST THREE (3) DAYS PRIOR TO ANY CONSTRUCTION. PLEASE CONTACT MARK SINK AT (540) 537-3460.
3. ALL WORK SHALL BE SUBJECT TO INSPECTION BY THE WESTERN VIRGINIA WATER AUTHORITY.
4. FIELD CORRECTIONS SHALL BE APPROVED BY THE WESTERN VIRGINIA WATER AUTHORITY PRIOR TO SUCH CONSTRUCTION.
5. THE CONTRACTOR SHALL MAINTAIN A MINIMUM OF 18" CLEARANCE VERTICALLY AND 2' MINIMUM HORIZONTALLY FROM OUTSIDE OF PIPE TO OUTSIDE OF PIPE AT ALL WATER, SANITARY SEWER CROSSINGS OF ANY OTHER UTILITIES. WHERE THIS CANNOT BE ACHIEVED ADDITIONAL MEASURES IN ACCORDANCE WITH WVWA STANDARDS SHALL BE ENFORCED.
6. IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE ALL EXISTING UTILITIES LOCATED AND POTHOLED TO VERIFY LOCATIONS. THIS PLAN REVIEW DOES NOT REMOVE THE CONTRACTOR'S RESPONSIBILITY TO RELOCATE ANY EXISTING CONFLICTS FOUND DURING CONSTRUCTION.
7. PLEASE PROVIDE RECORDED COPY OF ALL THAT APPLY: 20 FOOT PUBLIC WATER, 20 FOOT PUBLIC SEWER, OR 30 FOOT COMBINED PUBLIC WATER/SEWER EASEMENTS CENTERED OVER ALL PUBLIC WATER AND SEWER LINES PROPOSED OUTSIDE PUBLIC RIGHT-OF-WAY.
8. ALL DUCTILE IRON WATER PIPE (DIP) OF THE PUSH-ON JOINT OR MECHANICAL JOINT VARIETY, CONFORMING TO ANSI/AWWA C151, LATEST REVISION. FOR ALL PIPE TWELVE INCHES (12") IN DIAMETER OR SMALLER, THE MINIMUM PRESSURE CLASS (PC) SHALL BE 350, THE MINIMUM THICKNESS CLASS SHALL BE 50. WATER MAINS LARGER THAN TWELVE INCH (12") DIAMETER IN SIZE SHALL HAVE A WALL-THICKNESS AS DETERMINED BY THICKNESS DESIGN OF DUCTILE-IRON PIPE ANSI/AWWA C150.
9. ALL WATER CONNECTIONS TO EXISTING LINES SHALL BE COORDINATED WITH AND PERFORMED BY THE WESTERN VIRGINIA WATER AUTHORITY.
10. ALL WATER AND SANITARY SEWER FACILITIES ARE TO BE INSTALLED ACCORDING TO THE WESTERN VIRGINIA WATER AUTHORITY DESIGN AND CONSTRUCTION STANDARDS.
11. PROVIDE 5 DAYS' NOTICE TO THE WVWA FOR ANY ANTICIPATED WATER OUTAGE TO ALLOW THE WVWA TIME TO SCHEDULE AND NOTIFY AFFECTED CUSTOMERS. (540) 537-3460.
12. ALL SANITARY SEWER CONNECTIONS TO EXISTING LINES SHALL BE COORDINATED WITH AND PERFORMED BY THE WESTERN VIRGINIA WATER AUTHORITY.
13. SANITARY SEWER TAP TO EXISTING MANHOLES TO BE MADE BY CONTRACTOR. MANHOLE CONNECTION MUST BE CORED WITH A BOOT INSTALLED.

GENERAL UTILITY NOTES:

1. VERIFY LOCATION, SIZE, AND ELEVATION FOR ALL UTILITIES IN AREAS OF CONSTRUCTION PRIOR TO STARTING WORK. CONTACT ENGINEER IMMEDIATELY IF LOCATION, SIZE, OR ELEVATION IS DIFFERENT FROM THAT SHOWN ON PLAN. IF THERE APPEARS TO BE A CONFLICT, OR UPON DISCOVERY OF ANY UTILITY NOT SHOWN ON PLAN.
2. PROVIDE CONSTRUCTION METHODS AND MATERIALS IN ACCORDANCE WITH THE COMMONWEALTH OF VIRGINIA SEWAGE AND WATERWORKS REGULATIONS AND WESTERN VIRGINIA REGIONAL DESIGN AND CONSTRUCTION STANDARDS.
3. A MINIMUM OF THREE (3.0) FEET OF COVER IS REQUIRED OVER PROPOSED WATER AND SEWER LINES.
4. ALL EXISTING UTILITIES MAY NOT BE SHOWN IN EXACT LOCATION. THE CONTRACTOR SHALL COMPLY WITH THE STATE WATERWORKS REGULATIONS, SECTION 12.05.03, WHERE LINES CROSS.
5. ALL LINES SHALL BE STAKED PRIOR TO CONSTRUCTION.
6. REFER TO DETAIL SHEETS FOR BEDDING DETAILS. AFTER THE PIPE HAS BEEN PLACED IN THE TRENCH, THE TRENCH SHALL BE BACKFILLED WITH SELECT MATERIAL AND THOROUGHLY COMPACTED PER SPECIFICATIONS.
7. ALL WATER MAINS SHALL BE PROPERLY RESTRAINED WITH MECHANICALLY RESTRAINED JOINTS OR APPROVED ALTERNATIVE.
8. ALL WATER MAINS SHALL BE TESTED IN ACCORDANCE WITH WESTERN VIRGINIA REGIONAL DESIGN AND CONSTRUCTION STANDARDS. COORDINATE INSPECTIONS FOR TESTING WITH BOTETOURT COUNTY.
9. ALL WATER PIPE TO BE DUCTILE IRON PIPE, PRESSURE CLASS 350, MINIMUM IN ACCORDANCE WITH AWWA C151.
10. PROPOSED STORM DRAINS TO BE FLUSHED PRIOR TO REMOVING SEDIMENT TRAPPING MEASURES.

SANITARY SEWER NOTES

1. PIPE & FITTINGS: ALL SANITARY SEWER PIPE AND FITTINGS SHALL BE POLYVINYL CHLORIDE (PVC), SDR 35, AND SHALL CONFORM WITH ASTM D-3034.

2. INSTALLATION: THE SANITARY SEWER PIPE SHALL BE INSTALLED IN ACCORDANCE WITH THE PIPE MANUFACTURER'S RECOMMENDATIONS AND THESE SPECIFICATIONS. THE PIPE SHALL BE LAID IN TRUE STRAIGHT LINES WITH THE BELL ENDS UPSTREAM AND WITH THE INVERT OF THE PIPE BEING THE TRUE ELEVATION AND GRADE OF THE SYSTEM. THE PIPE SHALL BE VISUALLY INSPECTED FOR DEFECTS BEFORE LOWERING THE PIPE IN THE TRENCH. FIELD CUTTING OF THE PIPE SHALL BE DONE SO IN A NEAT AND WORKMANLIKE MANNER, SO AS TO LEAVE A SMOOTH END AT RIGHT ANGLES TO THE AXIS OF THE PIPE.

3. TRENCH EXCAVATION: TRENCHES SHALL BE EXCAVATED IN STRAIGHT LINES AND SHALL BE OF SUFFICIENT WIDTH TO PERMIT THE PROPER INSTALLATION OF BRACING, SHORING OR SHEETING. TRENCH WIDTH SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION. THE BOTTOM OF THE PIPE TRENCH SHALL BE EXCAVATED TO A MINIMUM COVER DEPTH OF FOUR (4) INCHES BELOW THE BOTTOM OF THE PIPE, TO PROVIDE FOR THE COMPACTED BEDDING MATERIAL.

4. BEDDING: BEDDING MATERIAL SHALL BE COARSE AGGREGATE SIZE NUMBER 57 AND SHALL CONFORM WITH VDOT SECTION 203 AND/OR ASTM C33. BEDDING MATERIAL SHALL BE PLACED AND COMPACTED IN FOUR (4) INCHES BELOW THE PIPE AND AS A MINIMUM UP TO 6" ABOVE THE TOP OF THE BELLS OF ALL PIPES. CARE SHALL BE TAKEN TO ENSURE THE BEDDING MATERIAL FULLY SUPPORTS THE SIDE AND BOTTOM OF THE PIPE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

5. BACKFILL: BACKFILL MATERIAL SHALL BE EITHER APPROVED EXCAVATED MATERIAL OR APPROVED SUITABLE MATERIAL FROM OTHER SOURCES THAT IS FREE OF ORGANIC MATERIAL, LOAM, DEBRIS, OR MINIMUM TWO (2) FEET ABOVE THE TOP OF PIPE SHALL BE FREE OF STONES LARGER THAN ONE (1) INCH AND SHALL BE PLACED IN SIX (6) INCH LAYERS AND COMPACTED WITH HAND TAMPERS. BACKFILL FROM THIS POINT TO TOP OF TRENCH SHALL BE FREE OF STONES LARGER THAN FOUR (4) INCHES AND SHALL BE PLACED IN LAYERS NOT TO EXCEED EIGHT (8) INCHES AND COMPACTED WITH MECHANICAL TAMPERS. BACKFILL BELOW UNPAVED AREAS SHALL BE COMPACTED TO 90%. BACKFILL BELOW PAVED AREAS SHALL BE COMPACTED TO 95%. BACKFILL COMPACTION TESTING SHALL BE IN ACCORDANCE WITH ASTM D-698.

6. TESTING OF SANITARY SEWER: TESTING FOR WATER TIGHTNESS SHALL BE MADE UTILIZING A LOW PRESSURE AIR TEST. THE TESTING EQUIPMENT, PROCEDURE AND RESULTS WILL ALL BE SUBJECT TO THE APPROVAL OF THE COUNTY ENGINEER. THE AIR TEST SHALL BE IN ACCORDANCE WITH ASTM F1417-92, CURRENT REVISION. THE CONTRACTOR SHALL DEFLECTION TEST THE ENTIRE LENGTH OF PIPE BY MEANS OF A GO-NO-GO MANDREL TO ASSURE THAT A 5.0% DEFLECTION HAS NOT BEEN EXCEEDED. MANDREL SHALL BE SIZED AT 5% LESS THAN ASTM DIMENSION FOR THE SEWER.
MANHOLE TESTING. MANHOLES SHALL BE TESTED AFTER ASSEMBLY AND PRIOR TO BACKFILLING IN ACCORDANCE WITH ASTM C1244. STUB-OUTS, MANHOLE BOOTS AND PIPE PLUGS SHALL BE SECURED TO PREVENT MOVEMENT WHILE THE VACUUM IS DRAWN. INSTALLATION AND OPERATION OF VACUUM EQUIPMENT AND INDICATING DEVICES SHALL BE IN ACCORDANCE WITH EQUIPMENT SPECIFICATIONS FOR WHICH PERFORMANCE INFORMATION HAS BEEN PROVIDED BY THE MANUFACTURER AND ACCEPTED BY THE ENGINEER. A MEASURED VACUUM OF TEN INCHES OF MERCURY SHALL BE ESTABLISHED IN THE MANHOLE. THE TIME FOR THE VACUUM DROP TO NINE INCHES OF MERCURY SHALL BE RECORDED. ACCEPTANCE STANDARDS FOR LEAKAGE SHALL BE ESTABLISHED FROM THE ELAPSED TIME. FOR A NEGATIVE PRESSURE CHANGE FROM TEN INCHES TO NINE INCHES OF MERCURY. THE MAXIMUM ALLOWABLE RATE FOR A FOUR-FOOT DIAMETER MANHOLE SHALL BE IN ACCORDANCE WITH THE FOLLOWING: 4' DIA. MANHOLE DEPTH 10' OR LESS = 60 SECONDS PER CHANGE OF ONE INCH OF MERCURY. 4' DIA. MANHOLE DEPTH GREATER THAN 10' BUT LESS THAN 15' = 75 SECONDS PER CHANGE OF ONE INCH OF MERCURY. 4' DIA. MANHOLE GREATER THAN 15' BUT LESS THAN 25' = 90 SECONDS PER CHANGE OF ONE INCH OF MERCURY. FOR MANHOLES FIVE FEET IN DIAMETER, ADD AN ADDITIONAL 15 SECONDS AND FOR MANHOLES SIX FEET IN DIAMETER, ADD AN ADDITIONAL 30 SECONDS TO THE TIME REQUIREMENTS FOR FOUR FOOT DIAMETER MANHOLES. IF THE MANHOLE FAILS THE TEST, NECESSARY REPAIRS SHALL BE MADE AND THE VACUUM TEST SHALL BE REPEATED UNTIL THE MANHOLE PASSES THE TEST. IF THE MANHOLE JOINT MASTIC IS COMPLETELY PULLED OUT DURING THE VACUUM TEST, THE MANHOLE SHALL BE DISASSEMBLED AND THE MASTIC REPLACED. THE ENGINEER SHALL OBSERVE THE MANHOLE TESTING. APPROPRIATE DOCUMENTATION SHALL BE INCLUDED IN THE FINAL DOCUMENTATION. MANHOLE TOLERANCES SHALL BE PLUS OR MINUS 0.1 FEET HORIZONTAL AND VERTICAL.

7. A MINIMUM COVER OF THREE (3.0) FEET IS REQUIRED OVER PROPOSED LINES UNLESS OTHERWISE INDICATED.

8. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND UNCOVERING ALL MANHOLES AFTER PAVING. MANHOLE TOPS SHALL BE ADJUSTED TO GRADE IF NECESSARY.

9. ALL SANITARY SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF THE WESTERN VIRGINIA REGIONAL DESIGN AND CONSTRUCTION STANDARDS.

BOTETOURT GENERAL E&S NOTES:

ES-1: UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATIONS VR 625-02-00 EROSION AND SEDIMENT CONTROL REGULATIONS.

ES-2: THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE ONSITE PRECONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION.

ES-3: ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING.

ES-4: A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN & NARRATIVE, AS WELL AS A COPY OF THE LAND DISTURBING PERMIT, SHALL BE MAINTAINED ON THE SITE AT ALL TIMES. THE EROSION AND SEDIMENT CONTROL ADMINISTRATOR WILL DELIVER THESE MATERIALS AT THE ONSITE PRECONSTRUCTION CONFERENCE.

ES-5: PRIOR TO COMMENCING LAND DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFF-SITE BORROW OR WASTE AREAS), THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN APPROVING AUTHORITY.

ES-6: THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.

ES-7: ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING THE LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.

ES-8: DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE.

ES-9: THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUNOFF-PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY. AN INSPECTION REPORT MUST BE FILED WITH THE BOTETOURT COUNTY EROSION AND SEDIMENT CONTROL ADMINISTRATOR ONCE EVERY TWO WEEKS, BEGINNING WITH COMMENCEMENT OF THE LAND DISTURBING ACTIVITY, AND WITHIN 48 HOURS OF ANY RUNOFF-PRODUCING RAINFALL EVENT. FAILURE TO SUBMIT A REPORT WILL BE GROUNDS FOR IMMEDIATE REVOCATION OF THE LAND DISTURBING PERMIT. REPORTS MUST BE POSTMARKED WITHIN 24 HOURS OF THE DEADLINE. A STANDARD INSPECTION REPORT FORM WILL BE SUPPLIED, WHICH SHOULD BE COPIED AS NECESSARY. THE PROVISION IN NO WAY WAIVES THE RIGHTS OF BOTETOURT COUNTY PERSONNEL TO CONDUCT SITE INSPECTIONS, NOR DOES IT DENY THE RIGHT OF THE PERMITTEE(S) TO ACCOMPANY THE INSPECTOR(S).

GENERAL WATER AND SEWER SPECIFICATIONS

1.1 QUALITY ASSURANCE

A. QUALIFICATIONS OF MANUFACTURERS – PRODUCTS USED IN THIS WORK SHALL BE PRODUCED BY MANUFACTURERS REGULARLY ENGAGED IN THE MANUFACTURE OF SIMILAR ITEMS AND WITH A HISTORY OF QUALITY PRODUCTION ACCEPTABLE TO THE PARTICIPATING UTILITY.

B. QUALIFICATIONS OF INSTALLERS – USE EXPERIENCED WORKERS TO ENSURE PROPER INSTALLATION OF THE PRODUCTS SPECIFIED HEREIN. IN THE ACCEPTANCE OR REJECTION OF INSTALLED WORK, NO ALLOWANCE SHALL BE MADE FOR THE LACK OF EXPERIENCE ON THE PART OF THE WORKERS.

C. MAIN LINE CONSTRUCTION CAN ONLY BE PERFORMED BY CLASS A CONTRACTORS LICENSED BY THE COMMONWEALTH OF VIRGINIA.

D. A PRECONSTRUCTION CONFERENCE SHALL BE HELD ON ALL WATER AND SEWER PROJECTS BY THE AT LEAST TWO DAYS PRIOR TO ANY CONSTRUCTION WORK BEING PERFORMED. THE CONTRACTOR SHALL HAVE A REPRESENTATIVE OF APPROPRIATE AUTHORITY AT THIS MEETING. PRIOR TO THE START OF CONSTRUCTION, CONTRACTOR MUST HAVE AN APPROVED SET OF CONSTRUCTION DOCUMENTS ON- SITE.

1.2 LINES AND GRADES

A. PIPES SHALL BE LAID TRUE TO THE LINES AND GRADES SHOWN ON THE DRAWINGS EXCEPT AS AUTHORIZED BY THE PARTICIPATING UTILITY. THE GRADE SHOWN ON THE PROFILE IS THE INVERT TO WHICH THE WORK MUST CONFORM. WORK NOT CONFORMING TO THE GRADE SHALL BE CORRECTED BY THE CONTRACTOR AT HIS OWN EXPENSE IN A MANNER ACCEPTABLE TO THE PARTICIPATING UTILITY.

B. LOCATIONS OF WATER AND SEWER LINES

1. THE LOCATIONS OF THE PROPOSED LINES ARE SHOWN ON THE DRAWINGS.
2. THE PARTICIPATING UTILITY RESERVES THE RIGHT TO MAKE CHANGES IN LINES AND GRADES OF PIPE LINES, AND IN LOCATIONS OF PIPES AND/OR APPURTENANCES WHEN SUCH CHANGES MAY BE NECESSARY OR ADVANTAGEOUS.
3. ANY DEVIATION IN LOCATION OR LINE GRADE OF SEWER, OR THE LOCATION OR ELEVATION OF A WATER LINE, STRUCTURE OR APPURTENANCE AS SHOWN ON THE CONTRACT DRAWINGS, WILL REQUIRE A REVISION OF THE DRAWINGS CLEARLY SHOWING THE PROPOSED DEVIATION, AND SHALL BE SUBMITTED TO THE PARTICIPATING UTILITY FOR REVIEW AND APPROVAL BEFORE ANY CHANGES ARE CONSTRUCTED. DESIGN ENGINEER OF RECORD MUST CONCUR IN ANY REVISION OF DRAWINGS. MINOR FIELD CHANGES MAY BE MADE WITH APPROVAL OF THE PARTICIPATING UTILITY'S CONSTRUCTION INSPECTOR.

1.3 SUBMITTALS

A. GENERAL – ALL SUBMITTALS SHALL BE MADE IN ACCORDANCE WITH SECTION 6.17 (SHOP DRAWINGS AND SAMPLES) OF THE STANDARD GENERAL CONDITIONS OF THE ENGINEERS JOINT CONTRACT DOCUMENT COMMITTEE (EJCDC), 2002 EDITION. CONTRACTOR SHALL FURNISH ENGINEERING DATA COVERING DESIGN AND INSTALLATION. SUBMITTAL SHALL BE MADE IN A TIMELY MANNER SO THAT THE PROJECT SCHEDULE CAN BE MET.

B. SHOP DRAWINGS – AS A MINIMUM, THE FOLLOWING SHOP DRAWING INFORMATION SHALL BE SUBMITTED TO THE PARTICIPATING UTILITY FOR REVIEW AND APPROVAL:

1. COMPLETE BILL OF MATERIALS TO BE PROVIDED FOR THE WORK DESCRIBED UNDER THIS SECTION.
2. MANUFACTURER'S CATALOG CUT SHEETS FOR ALL MATERIALS TO BE PROVIDED UNDER THIS SECTION.

1.2 RESPONSIBILITY FOR MATERIALS

A. MATERIAL FURNISHED BY CONTRACTOR – THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MATERIAL FURNISHED BY HIM, AND SHALL REPLACE AT HIS OWN EXPENSE ALL SUCH MATERIAL FOUND DEFECTIVE IN MANUFACTURE OR DAMAGED IN HANDLING AFTER DELIVERY BY THE MANUFACTURER. THIS SHALL INCLUDE THE FURNISHING OF ALL MATERIALS AND LABOR REQUIRED FOR THE REPLACEMENT OF INSTALLED MATERIAL DISCOVERED DEFECTIVE PRIOR TO THE FINAL ACCEPTANCE OF THE WORK.

B. MATERIAL FURNISHED BY PARTICIPATING UTILITY – THE CONTRACTOR'S RESPONSIBILITY FOR MATERIAL FURNISHED BY THE PARTICIPATING UTILITY SHALL BEGIN AT THE POINT OF DELIVERY TO CONTRACTOR. MATERIALS ALREADY ON THE SITE SHALL BECOME THE CONTRACTOR'S RESPONSIBILITY ON THE DATE OF THE AWARD OF THE CONTRACT. THE CONTRACTOR SHALL EXAMINE ALL MATERIAL FURNISHED BY THE PARTICIPATING UTILITY AT THE TIME AND PLACE OF DELIVERY TO HIM AND SHALL REJECT ALL DEFECTIVE MATERIAL. ANY MATERIAL FURNISHED BY THE PARTICIPATING UTILITY AND INSTALLED BY THE CONTRACTOR WITHOUT DISCOVERY OF SUCH DEFECTS WILL, IF FOUND DEFECTIVE PRIOR TO FINAL ACCEPTANCE OF THE WORK, BE REPLACED WITH SOUND MATERIAL BY THE PARTICIPATING UTILITY. THE CONTRACTOR, HOWEVER, SHALL, AT HIS OWN EXPENSE, FURNISH ALL SUPPLIES, LABOR AND FACILITIES NECESSARY TO REMOVE SAID DEFECTIVE MATERIAL AND INSTALL THE SOUND MATERIAL IN A MANNER SATISFACTORY TO THE PARTICIPATING UTILITY.

MARK	DATE	BY	DESCRIPTION

REVISIONS

DATE	1/24/07
PROJECT	03083
DESIGNED	RHW
DRAWN	MSMJ
CHECKED	RHW

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COMMONWEALTH OF VIRGINIA
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5/24/17
PROFESSIONAL ENGINEER

PROJECT FRALIN AND WALDRON DALEVILLE TOWN CENTER

DRAWING **MISCELLANEOUS NOTES**

SHEET

C-02