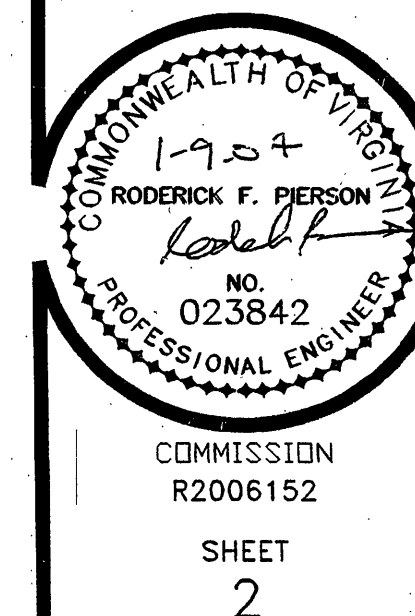


DATE: 01/09/07

REVISIONS  
△  
△  
△PIERSON  
ENGINEERING  
&  
SURVEYINGP.O. BOX 311  
1324 ROANOKE ROAD  
DALEVILLE, VA 24083(540) 966-3027 TEL  
(540) 966-5906 FAX  
e-mail: rpierson@bnet.comSEWER PLAN SHEET  
FOR  
L & L CONTRACTOR  
CITY OF ROANOKE, VIRGINIA

DETAIL SHEET



Pipe Diameter (in.)	Specified Time for Length (L) Shown (minutes)									
	100 R	150 R	200 R	250 R	300 R	350 R	400 R	450 R	500 R	600 R
4	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	5:40	5:40	5:40	5:40	5:40	5:40	5:40	5:40	5:40
8	7:34	7:34	7:34	7:34	7:34	7:34	7:34	7:34	7:34	7:34
10	9:28	9:28	9:28	9:28	9:28	9:28	9:28	9:28	9:28	9:28
12	11:20	11:20	11:20	11:20	11:20	11:20	11:20	11:20	11:20	11:20
14	14:10	14:10	14:10	14:10	14:10	14:10	14:10	14:10	14:10	14:10
16	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00
18	20:50	20:50	20:50	20:50	20:50	20:50	20:50	20:50	20:50	20:50
20	24:40	24:40	24:40	24:40	24:40	24:40	24:40	24:40	24:40	24:40
22	28:30	28:30	28:30	28:30	28:30	28:30	28:30	28:30	28:30	28:30
24	32:20	32:20	32:20	32:20	32:20	32:20	32:20	32:20	32:20	32:20
26	36:10	36:10	36:10	36:10	36:10	36:10	36:10	36:10	36:10	36:10
28	40:00	40:00	40:00	40:00	40:00	40:00	40:00	40:00	40:00	40:00
30	43:50	43:50	43:50	43:50	43:50	43:50	43:50	43:50	43:50	43:50
32	47:40	47:40	47:40	47:40	47:40	47:40	47:40	47:40	47:40	47:40
34	51:30	51:30	51:30	51:30	51:30	51:30	51:30	51:30	51:30	51:30
36	55:20	55:20	55:20	55:20	55:20	55:20	55:20	55:20	55:20	55:20

Notes:

1. Ductile iron pipe - test shall be in accordance with ASTM C924 and C898.
2. PVC and PE pipe - test shall be in accordance with ASTM F1417-92(2005).

## WESTERN VIRGINIA WATER AUTHORITY - CONSTRUCTION STANDARDS

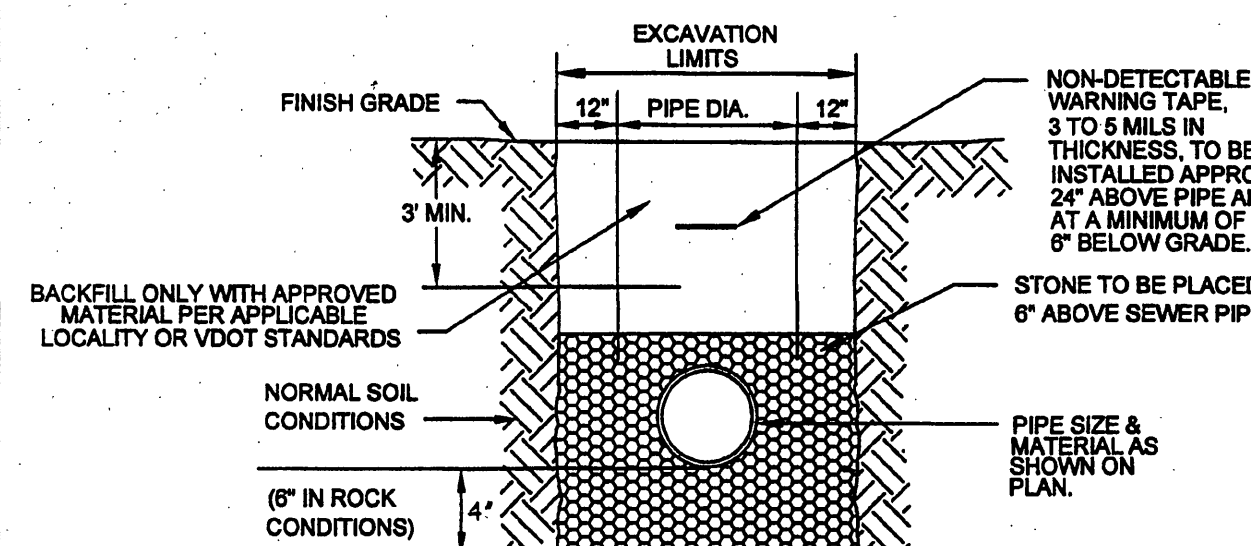
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07/01/04		
03/01/06		

MINIMUM SPECIFIED TIME  
REQUIRED FOR A 1.0 PSIG  
PRESSURE DROP FOR SIZE  
AND LENGTH OF PIPE  
INDICATED FOR Q=0.0015

S-27

## NOTES:

1. BEDDING, HAUNCHING AND INITIAL BACKFILL CONSTRUCTION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION.
2. ALL PVC PIPE SHALL BE BEDDED IN COMPACTED VDOT #57 OR #68 STONE.
3. IN AREAS NOT SUBJECTED TO VEHICULAR TRAFFIC, BEDDING STONE AND FILL SHALL BE PLACED IN 6" LIFTS FROM BOTTOM OF TRENCH TO 1" ABOVE THE PIPE AND THE REMAINING SHALL BE PLACED IN 10" LIFTS AND SHALL BE COMPACTED TO AT LEAST 90% OF MAXIMUM DENSITY AS DETERMINED BY ASTM D 698.
4. ALL SEWER LINE PIPE SHALL BE BEDDED IN COMPACTED GRANULAR MATERIAL. BEDDING REQUIREMENTS FOR DUCTILE SEWER LINE ARE DEPENDENT ON MANUFACTURER'S BEDDING CRITERIA.
5. ALL EXCAVATIONS SHALL COMPLY WITH OSHA TECHNICAL MANUAL, CHAPTER 2, TITLED "EXCAVATIONS: HAZARD RECOGNITION IN TRENCHING AND SHORING."

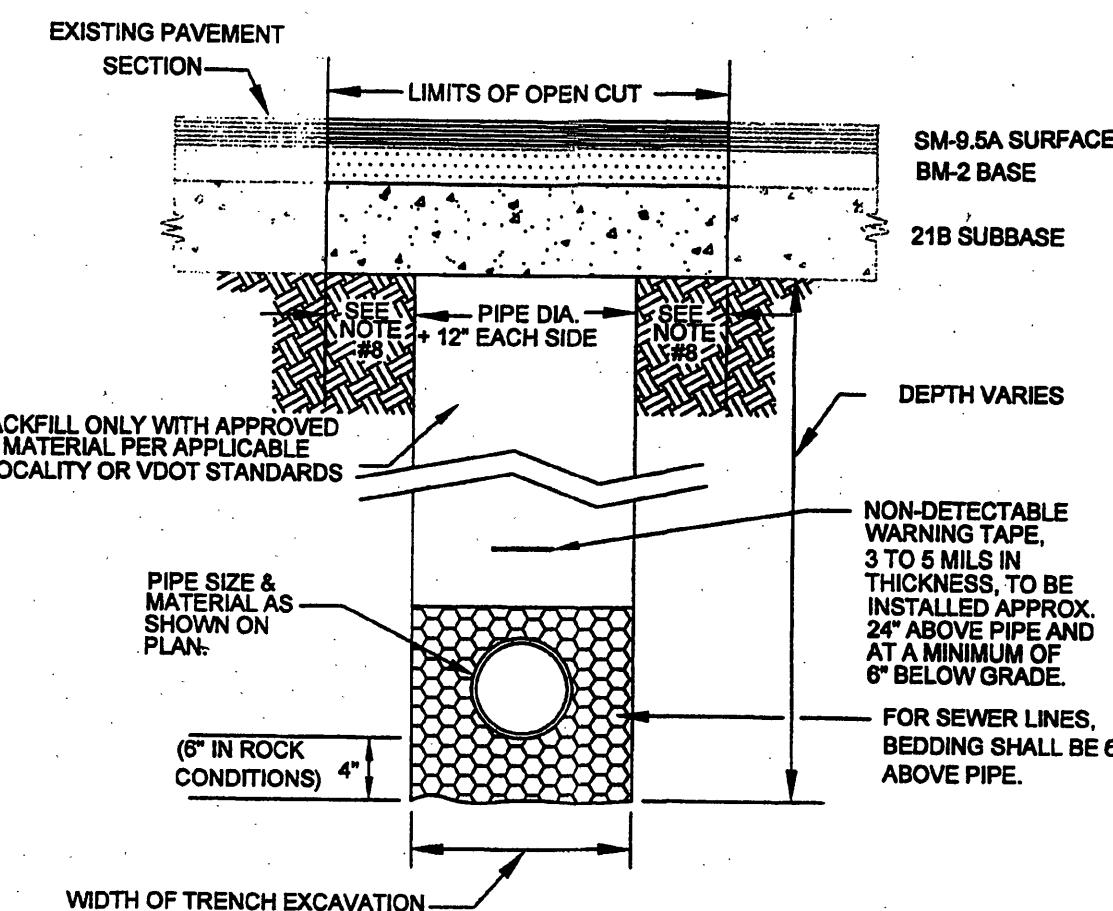


## WESTERN VIRGINIA WATER AUTHORITY - CONSTRUCTION STANDARDS

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BEDDING AND BACKFILL  
OUTSIDE OF PAVED AREAS

S-30



## NOTES:

1. BEDDING, HAUNCHING AND INITIAL BACKFILL CONSTRUCTION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION.
2. ALL PVC PIPE SHALL BE BEDDED IN COMPACTED VDOT #57 OR #68 STONE.
3. IN ROANOKE COUNTY, THE CONTRACTOR SHALL REPLACE THE OPEN CUT WITH A MINIMUM TOP COURSE OF 1.5" (MINIMUM) VDOT SM-9.5A, BASE COURSE OF 8" VDOT SM-25A, AND SUBBASE OF 10" VDOT 21B, OR AS REQUIRED BY VDOT. IN ROANOKE CITY, CONTRACTOR SHALL REPLACE PAVEMENT AS REQUIRED BY CITY OF ROANOKE RIGHT OF WAY EXCAVATION AND RESTORATION STANDARDS.
4. ALL CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE AS SPECIFIED BY VDOT OR APPLICABLE LOCALITY.
5. PRIOR TO CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR SECURING ALL REQUIRED PERMITS FROM VDOT AND/OR APPLICABLE LOCALITY.
6. IN AREAS SUBJECTED TO VEHICULAR TRAFFIC, BEDDING STONE AND FILL SHALL BE PLACED IN 6" LIFTS AND SHALL BE COMPACTED TO AT LEAST 90% OF MAXIMUM DENSITY AS DETERMINED BY ASTM D 698.
7. ALL SEWER LINE PIPE SHALL BE BEDDED IN COMPACTED GRANULAR MATERIAL. BEDDING REQUIREMENTS FOR DUCTILE SEWER LINE ARE DEPENDENT ON MANUFACTURER'S BEDDING CRITERIA.
8. BENCHOUT ON EACH SIDE OF PAVEMENT: CITY OF ROANOKE EQUALS 12". VDOT RIGHT-OF-WAY EQUALS 6".
9. ALL EXCAVATIONS SHALL COMPLY WITH OSHA TECHNICAL MANUAL, CHAPTER 2, TITLED "EXCAVATIONS: HAZARD RECOGNITION IN TRENCHING AND SHORING."

## WESTERN VIRGINIA WATER AUTHORITY - CONSTRUCTION STANDARDS

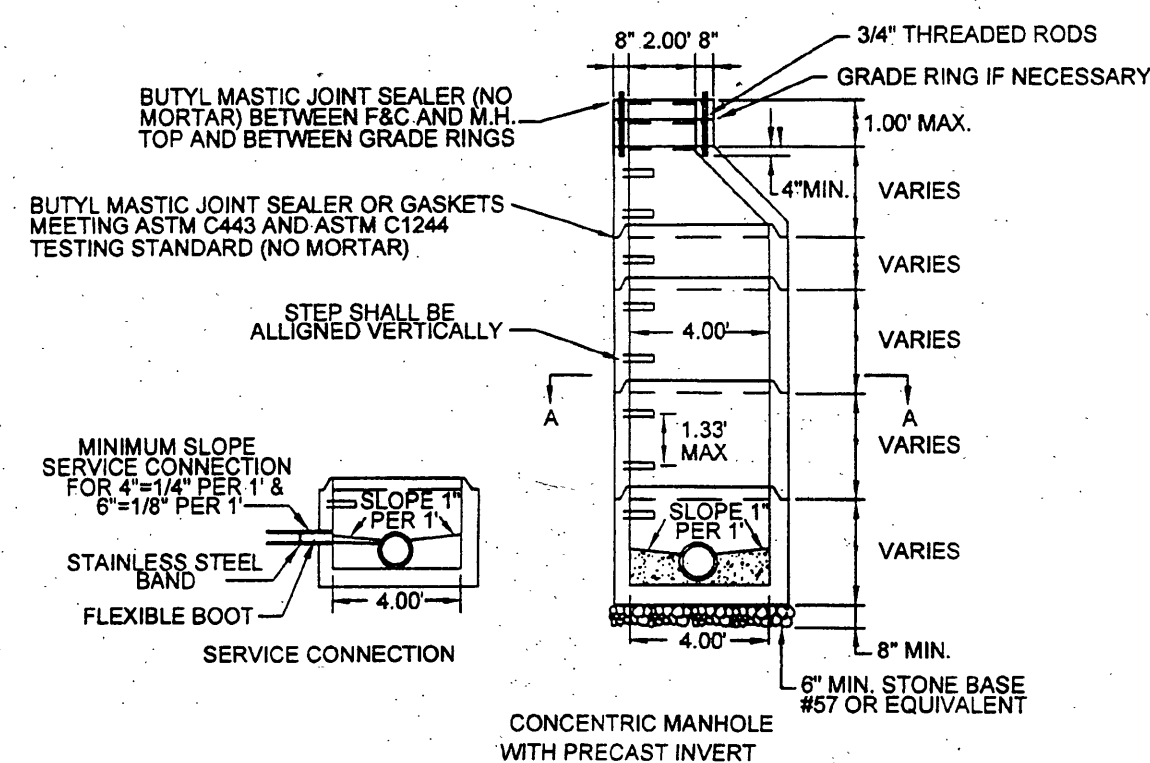
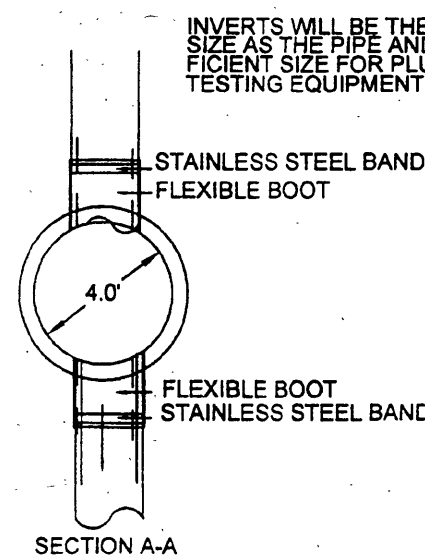
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BEDDING AND BACKFILL  
UNDER PAVEMENT AND RIGHT-OF-WAY

S-31

## NOTES:

1. ALL MANHOLE FRAMES AND COVERS SHALL BE EAST JORDAN IRON WORKS, INC. WATERTIGHT MANHOLE FRAME MODEL #10462, WATERTIGHT COVER MODEL #10406S AND BOLT-DOWN MANHOLE COVER MODEL #10406LS, OR APPROVED EQUAL BOLT-DOWN MODEL. TO BE USED IN AREAS SUBJECTED TO FLOODING OR AS DIRECTED BY THE AUTHORITY.
2. STEPS TO BE VERTICALLY ALIGNED.
3. THE FRAME AND COVER SHALL BE PROPERLY ALIGNED WITH THE 2' FOOT OPENING OF THE MANHOLE STRUCTURE AND BOLTED IN PLACE.
4. FLAT TOP MANHOLES MAY ONLY BE SUBSTITUTED WITH THE PERMISSION OF THE UTILITY DIRECTOR. WHEN USED, THE ECCENTRIC OPENING MUST LINE UP WITH THE STEPS.
5. SAMPLING MANHOLES IN TRAFFIC AREAS SHALL BE CONSTRUCTED AS PER MANHOLE DETAILS.
6. FLEXIBLE JOINT MANHOLE CONNECTION SHALL BE AS MANUFACTURED BY PRESS-SEAL GASKET CORPORATION OR EQUAL.
7. GROUT ANNUAL SPACE BETWEEN PIPE AND PRECAST MANHOLE ON INSIDE OF MANHOLE.



## WESTERN VIRGINIA WATER AUTHORITY - CONSTRUCTION STANDARDS

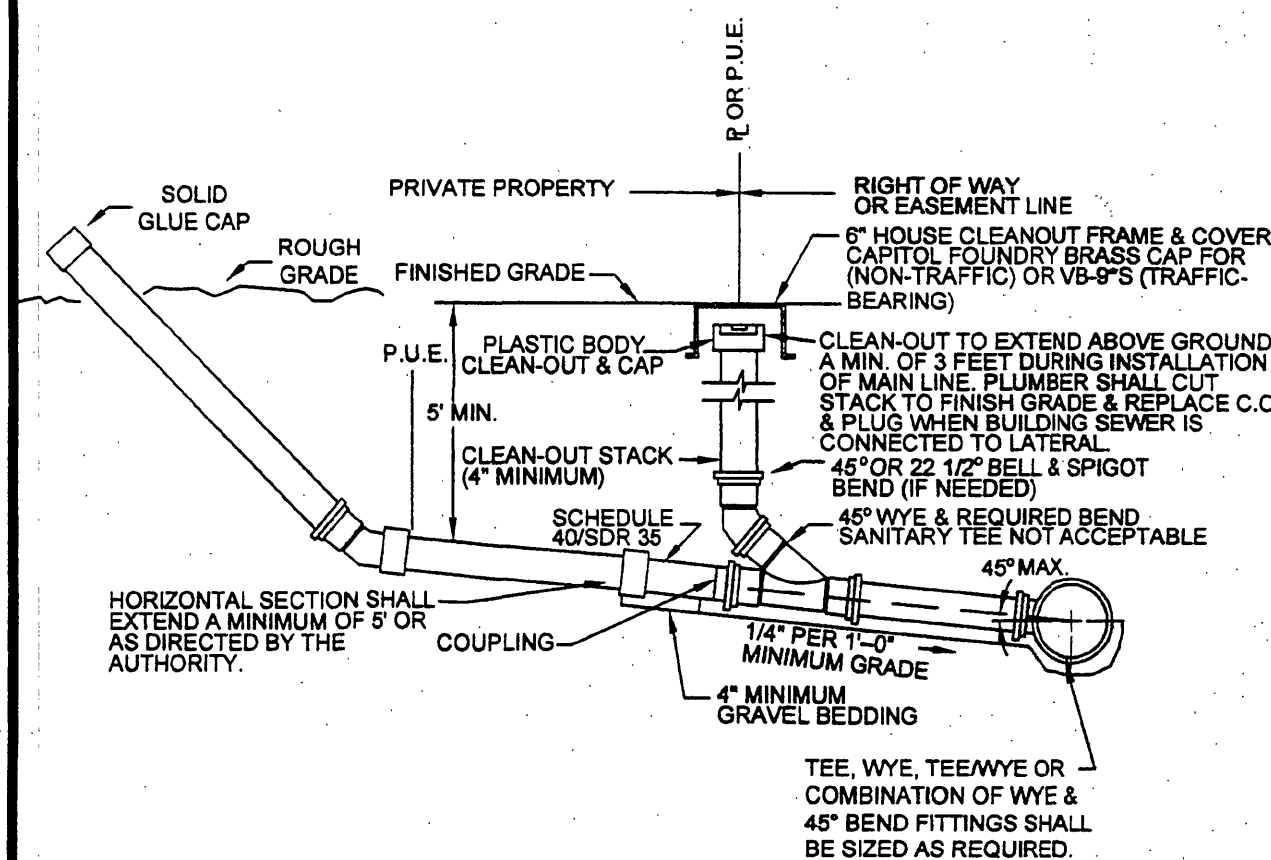
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4" STANDARD MANHOLE  
FOR PIPE 15"  
OR SMALLER

S-01

## GENERAL NOTES:

1. TRAFFIC BEARING BOX REQUIRED IN TRAFFIC AREAS.
2. ALL PIPE AND FITTINGS SHALL BE OF SIMILAR MATERIAL.
3. ALL PIPE SHALL BE OF SAME SIZE.
4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEANOUT STACK WYE. (EXCEPT AS NOTED)
5. ALL MAIN LINE TAPS ON ACTIVE MAINS WILL BE PERFORMED BY WESTERN VIRGINIA WATER AUTHORITY.
6. PIPING BEHIND CLEANOUT TO BE INSTALLED PER BOCA CODE.
7. MINIMUM LATERAL SIZE:  
4" FOR RESIDENTIAL SERVICE  
6" FOR NON-RESIDENTIAL SERVICE
8. MINIMUM COVER FOR ALL SEWER LATERALS SHALL BE THREE(3) FEET.
9. PROPERTY OWNER RESPONSIBLE FOR INSTALLING CLEANOUT ON PROPERTY LINE WHEN MAINTENANCE OCCURS, IN ACCORDANCE WITH THIS STANDARD.
10. FLOWLINE AT CLEANOUT WYE SHALL BE A MINIMUM OF THREE FEET (3') BELOW LOWEST SERVED FINISHED FLOOR.



## WESTERN VIRGINIA WATER AUTHORITY - CONSTRUCTION STANDARDS

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SANITARY SEWER LATERAL

S-08

EQUIVALENT PSI	HEIGHT OF GROUND WATER ABOVE PIPE INV. (FL)
0.43	1
0.87	2
1.30	3
1.73	4
2.17	5
2.60	6
3.03	7
3.47	8
3.90	9
4.34	10
4.77	11
4.98	11.5

For anything above 11.5 VF, allow maximum 5.0 PSI.

## NOTES:

1. Table based on 1.0 v.f. of water = 0.4335 PSI.
2. The appropriate PSI allowance for average vertical foot of ground water shall be added to the base starting pressure of 4.0 PSI, but in no CASE shall the resulting pressure be more than 5.0 PSI.
3. Interpolate for fractions of a foot of water.

## WESTERN VIRGINIA WATER AUTHORITY - CONSTRUCTION STANDARDS

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07/01/04		

AIR TESTING  
BACK PRESSURE  
EQUIVALENCY  
TABLE

S-26

Jay Light  
L & L Contractor  
5202 Hollyhock Road  
Roanoke, Va 24012  
Availability No. 06-308  
Tax Map# 7390713  
Nelms Lane