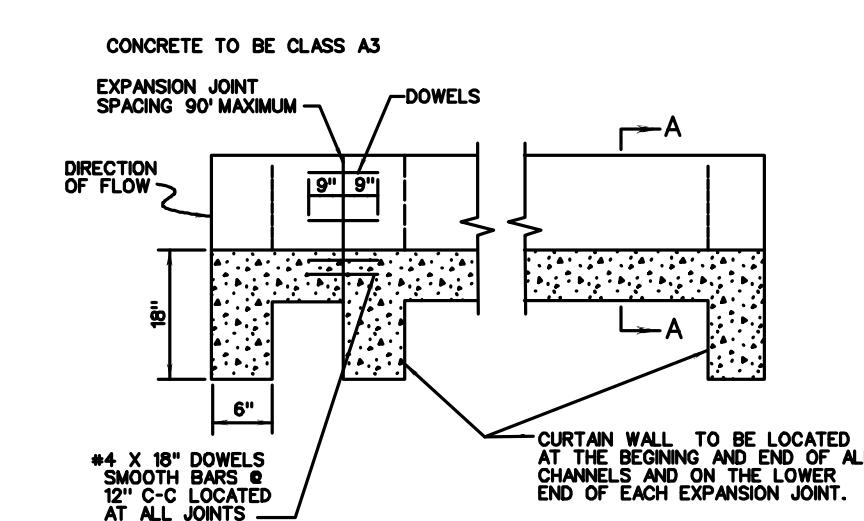


SECTION A-A



ELEVATION

CONCRETE DITCH DETAIL

NOT TO SCALE

INDICATES CHANNEL WHERE WIRE MESH REINFORCEMENT IS NOT REQUIRED.

CONC- THICK- NESS	D	W	SQUARE YARDS PER LIN. FT. OF PAVED CHANNEL									
			1'	2'	3'	4'	5'	6'	7'	8'	9'	10'
4"	1'	0.425	0.538	0.648	0.759	0.870	0.981	1.092	1.203	1.314	1.425	
4"	2'	0.849	0.851	0.962	1.073	1.184	1.295	1.406	1.517	1.629	1.740	
4"	3'	1.273	1.275	1.386	1.497	1.608	1.719	1.830	1.941	2.052	2.163	
4"	4'	1.688	1.478	1.590	1.702	1.813	1.924	2.035	2.146	2.257	2.368	
5"	1.682	1.794	1.905	2.016	2.127	2.238	2.349	2.460	2.571	2.682		
6"	1.91	2.108	2.219	2.330	2.441	2.552	2.663	2.774	2.886	2.997		
6"	2.265	2.738	2.848	2.958	3.070	3.181	3.292	3.403	3.514	3.625		
6"	2.940	3.051	3.162	3.273	3.384	3.495	3.606	3.717	3.828	3.939		
10'	3.254	3.365	3.476	3.587	3.698	3.809	3.920	4.032	4.143	4.254		
1/1 SIDE SLOPES												
4"	1'	0.312	0.623	1.034	0.845	1.056	1.067	1.178	1.290	1.401	1.512	
4"	2'	0.912	1.023	1.133	1.246	1.357	1.468	1.579	1.690	1.801	1.912	
4"	3'	1.513	1.424	1.535	1.646	1.757	1.869	1.980	2.091	2.202	2.313	
4"	4'	2.114	2.225	2.336	2.448	2.559	2.670	2.781	2.892	3.003	3.114	
6"	6"	2.815	2.626	2.737	2.848	2.959	3.070	3.181	3.293	3.404	3.515	
6"	7'	2.915	3.027	3.138	3.249	3.360	3.471	3.582	3.693	3.804	3.915	
6"	8'	3.317	3.428	3.539	3.649	3.760	3.871	3.982	4.093	4.204	4.315	
6"	9'	4.117	4.228	4.340	4.451	4.562	4.673	4.784	4.895	5.006	5.117	
2/1 SIDE SLOPES												
4"	1'	0.605	0.718	0.830	0.942	1.052	1.164	1.275	1.386	1.497	1.608	
4"	2'	1.602	1.715	1.824	1.935	2.046	2.157	2.268	2.380	2.491	2.602	
4"	3'	2.099	2.210	2.321	2.432	2.543	2.654	2.765	2.876	2.988	3.099	
6"	6"	2.598	2.707	2.818	2.928	3.040	3.151	3.262	3.373	3.484	3.595	
6"	7'	3.389	3.501	3.612	3.723	3.834	3.945	4.056	4.167	4.278	4.389	
6"	8'	4.086	4.197	4.308	4.420	4.531	4.642	4.753	4.864	4.975	5.086	
6"	9'	5.080	5.191	5.302	5.413	5.525	5.636	5.747	5.858	5.969	6.080	

NOTES:
DEPTH (D) AND WIDTH (W) TO BE AS SHOWN ON PLANS
WEEP HOLE WITH 12" X 12" PLASTIC HARDWARE CLOTH 1/4" MESH OR GALVANIZED STEEL
WEED CONTROL FABRIC NUMBER 4 MESH, HARDWARE CLOTH ANCHORED FIRMLY TO THE
BOTTOM OF THE CHANNEL.

*4" X 18" DOWELS, SMOOTH BARS & 12" C-C LOCATED AT ALL JOINTS.

SITE AND ZONING TABULATIONS

TAX MAP ID: 077.17-02-33.00, 077.17-02-34.00, 077.17-02-35.00, 077.17-02-36.00,
077.17-02-37.00, 077.17-02-38.00, 077.17-02-39.00, 077.17-02-40.00,
077.17-02-41.00, 077.17-02-42.00, 077.17-02-43.00, 077.17-02-44.00,
077.17-02-45.00, & 077.17-02-46.00

CURRENT ZONING: R-1 LOW DENSITY RESIDENTIAL
EXISTING USE: SINGLE FAMILY RESIDENTIAL
PROPOSED USE: UNCHANGED

GENERAL NOTES

- OWNER/DEVELOPER: ROANOKE COUNTY DEVELOPMENT SERVICES, BOX 29800 ROANOKE, VA 24018
- THE BOUNDARIES ARE THE DIRECT RESULT OF A FIELD SURVEY BY LUMSDEN ASSOCIATES, PC.
- TOPOGRAPHY DATA BASED ON A FIELD SURVEY BY LUMSDEN ASSOCIATES, PC. IN 2022.
- NO CURRENT TITLE REPORT HAS BEEN FURNISHED FOR THE SUBJECT PROPERTIES.
- NO PORTION OF THE SUBJECT PROPERTY IS LOCATED WITHIN THE LIMITS OF FLOOD HAZARD AREA. THIS OPINION IS BASED ON AN INSPECTION OF THE FLOOD INSURANCE RATE MAP #51161C0232G, DATED SEPTEMBER 28, 2007.
- NO CONSTRUCTION/FIELD REVISIONS ARE ALLOWED WITHOUT THE APPROVAL OF THE CONSULTING ENGINEER, ROANOKE COUNTY, AND/OR THE VIRGINIA DEPARTMENT OF TRANSPORTATION.
- ANY NEW ALIGNMENTS, CHANGES IN GRADES, ALTERNATE PIPE SIZES, MANHOLES, OR ESC MEASURES WILL REQUIRE A NEW SET OF PLANS STAMPED BY THE CONSULTING ENGINEER. PLAN SHEETS CAN BE 8.5 x 11 IF THE DRAWING IS LEGIBLE AND WITHIN THE LIMITS OF THE APPROVED PLANS.
- ANY TOPOGRAPHIC CHANGES FROM THE APPROVED PLANS MAY REQUIRE ADDITIONAL DRAINAGE STRUCTURES AND EASEMENTS AS DEEMED NECESSARY BY ROANOKE COUNTY.

CONSTRUCTION NOTES

- ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT COUNTY OF ROANOKE STANDARDS AND SPECIFICATIONS AND THE CURRENT EDITION OF VDOT ROAD AND BRIDGE STANDARDS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE OWNER AND THE ENGINEER OF ANY CHANGES OR CONDITIONS ATTACHED TO PERMITS OBTAINED FROM ANY AUTHORITY ISSUING PERMITS.
- THE CONTRACTOR SHALL VISIT THE SITE AND VERIFY EXISTING CONDITIONS PRIOR TO STARTING CONSTRUCTION.
- THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO STARTING CONSTRUCTION.
- SEE VDOT ROAD AND BRIDGE STANDARDS FOR STORM DRAIN DETAILS.
- THE CONTRACTOR AND OWNER SHALL PROVIDE A STORAGE CONTAINER FOR TEMPORARY STORAGE AND DISPOSAL OF LAND CLEARANCE DEBRIS AND BUILDING MATERIALS. ON-SITE BURIAL OF MATERIAL SHALL NOT BE PERMITTED.
- CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF ALL UNDERGROUND UTILITIES SHOWN ON THE PLANS IN AREAS OF CONSTRUCTION PRIOR TO STARTING WORK BY CONTRACTOR. USE THE CONTRACT SITE ENGINEER IMMEDIATELY IF LOCATION OR ELEVATION IS DIFFERENT FROM THAT SHOWN ON THE PLANS. IF THERE APPEARS TO BE A CONFLICT AND UPON DISCOVERY OF ANY UTILITY NOT SHOWN ON THIS PLAN, CALL "MISS UTILITY" OF CENTRAL VIRGINIA AT 1-800-552-7201.
- IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER TO CLEAN OUT ANY EXISTING STORM SEWER SYSTEM IN THE EVENT THEY BECOME SILENT OR BLOCKED IN ANY WAY DUE TO THE PROPOSED DEVELOPMENT.
- ROANOKE COUNTY DEVELOPMENT SERVICES SHALL COORDINATE REMOVAL AND RELOCATION OF SMALL LANDSCAPING PLANTS CONFLICTING WITH CONSTRUCTION WITH INDIVIDUAL PROPERTY OWNERS.
- ROANOKE COUNTY DEVELOPMENT SERVICES SHALL COORDINATE WITH SURVEYOR TO RESET PROPERTY MONUMENTATION LOST IN THE COURSE OF CONSTRUCTION.

GRADING NOTES

- AREAS TO BE GRADED SHALL BE CLEARED OF ALL VEGETATION, STRUCTURES, AND OTHER PHYSICAL FEATURES IN PREPARATION OF GRADING.
- TOPSOIL SHALL BE REMOVED FROM THE CLEARED AREA AND STOCKPILED FOR FUTURE USE.
- FILL MATERIAL SHALL BE FREE FROM ORGANIC MATTER AND ROCKS LARGER THAN 6 INCHES IN DIAMETER.
- FILL MATERIAL SHALL BE PLACED AND COMPAKTED IN EIGHT (8) INCH LOOSE LIFTS AND COMPACTED TO AT LEAST NINETY-FIVE (95) PERCENT OF THE MATERIAL'S MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698, STANDARD PROCTOR. MAINTAIN STRUCTURE AND ELEVATION OF FILL MATERIAL WITHIN THREE (3) PERCENT OF DESIGN ELEVATION. RECOMPACT AS REQUIRED.
- A QUALIFIED GEOTECHNICAL ENGINEER, LICENSED IN THE STATE OF VIRGINIA, SHOULD BE CONSULTED CONCERNING SOIL STABILITY, SLOPE STABILIZATION, SOIL COMPAKCTION, TESTING, AND OTHER SOIL CHARACTERISTICS. LUMSDEN ASSOCIATES ASSUMES NO RESPONSIBILITY OR LIABILITY RELATING TO FAILURES RESULTING FROM SAME.

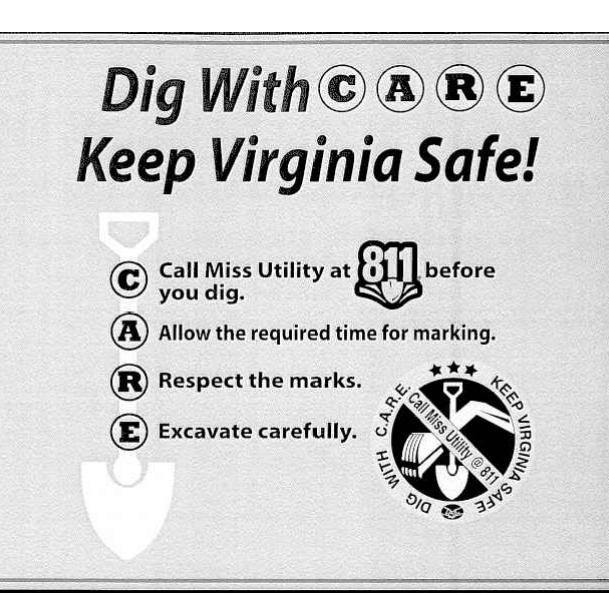
NOTES & DETAILS

ETON HILL STORM DRAINAGE IMPROVEMENTS

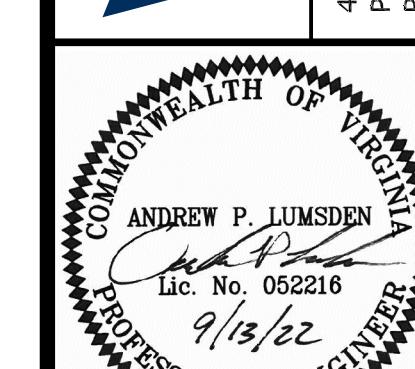
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ROANOKE COUNTY, VIRGINIA

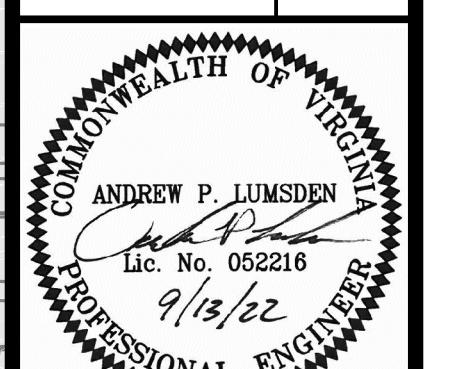
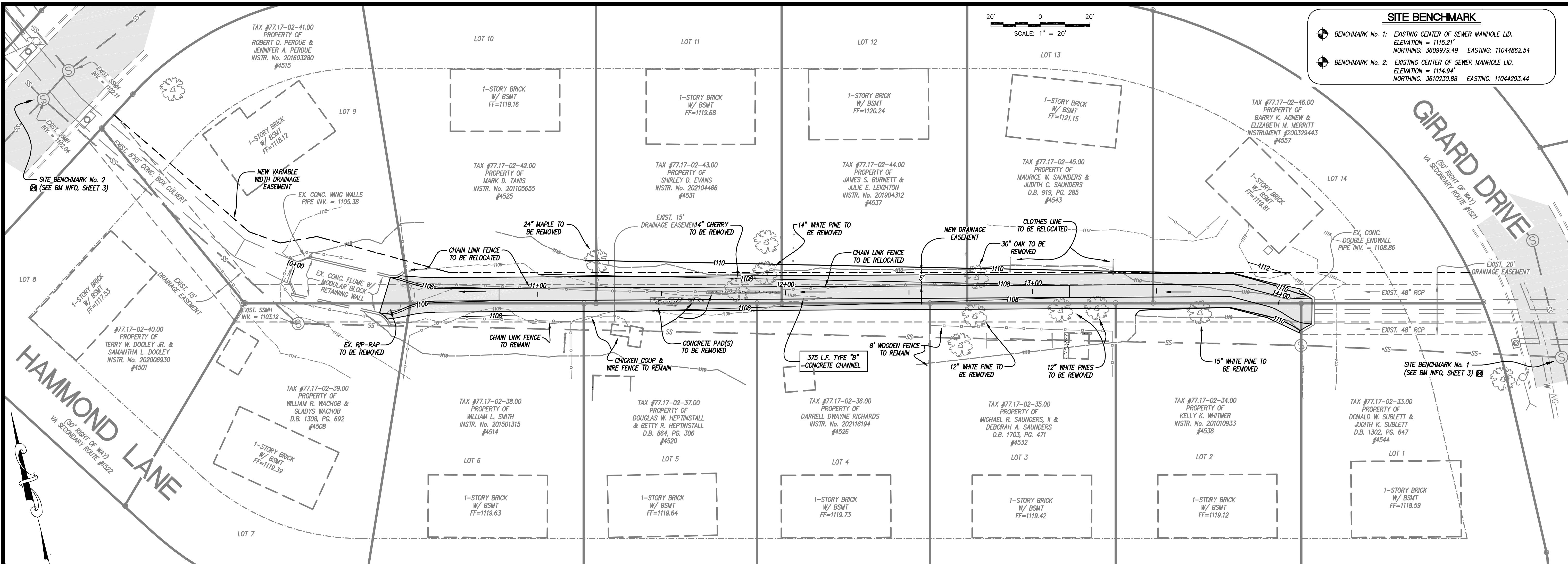
REVISIONS	DESCRIPTION
1	
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DATE: September 13, 2022
SCALE: AS SHOWN
COMMISSION NO: 22-106 & 05-088
SHEET 2 OF 5



Lumsden Associates, P.C.
ENGINEERS | SURVEYORS | PLANNERS
4664 BRAMBLETON AVENUE
P.O. BOX 20659
ROANOKE, VIRGINIA 24018





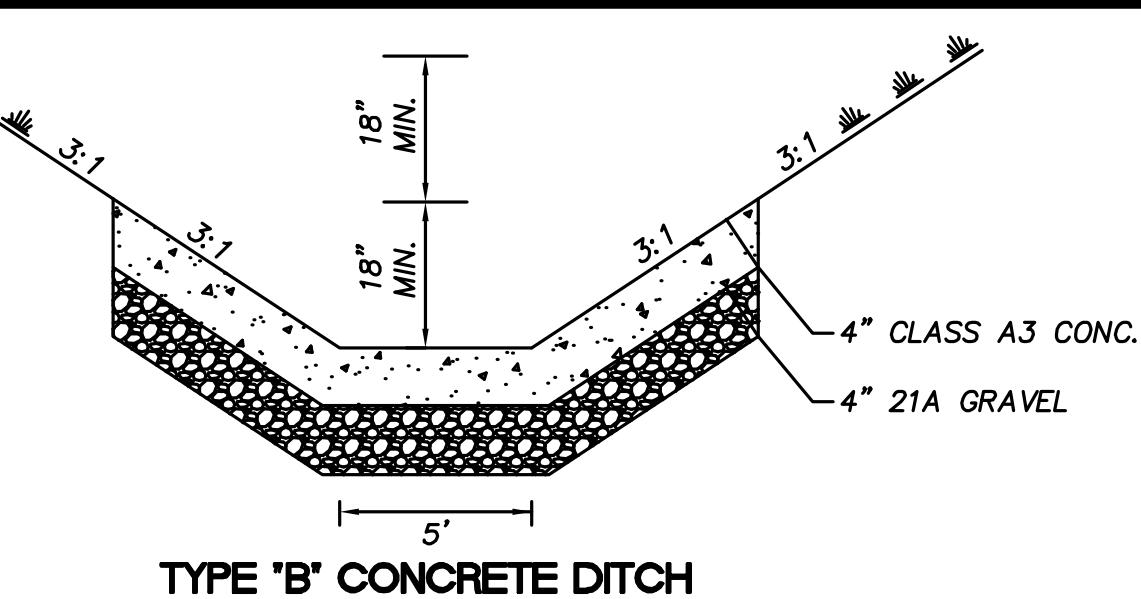
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ENGINEERS | SURVEYORS | PLANNERS

STORM DRAINAGE PLAN

ELGIN HILL STORM DRAINAGE IMPROVEMENTS

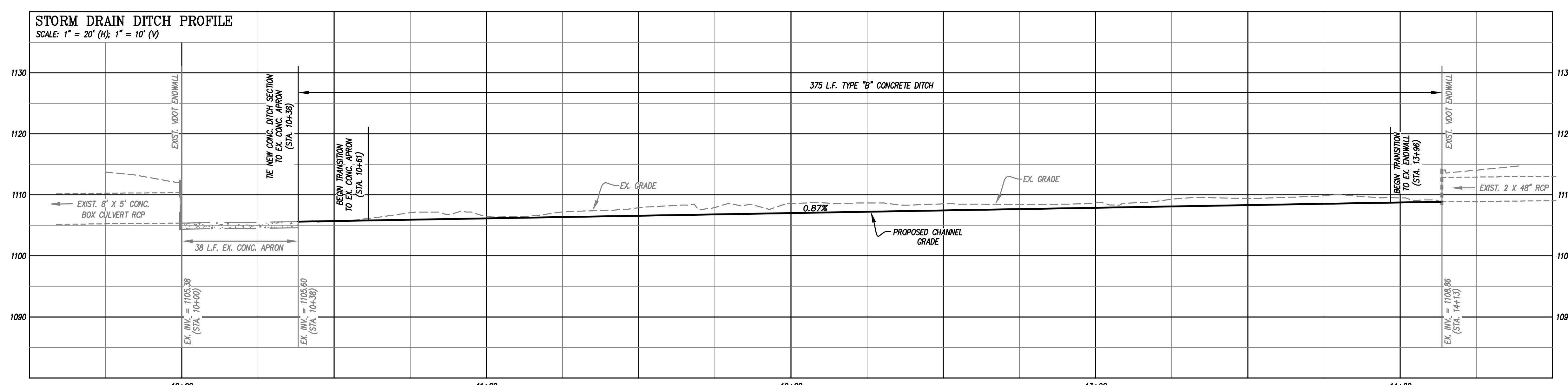
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**ROANOKE COUNTY
DEVELOPMENT SERVICES
CAVE SPRING MAGISTERIAL DISTRICT
ROANOKE COUNTY, VIRGINIA**

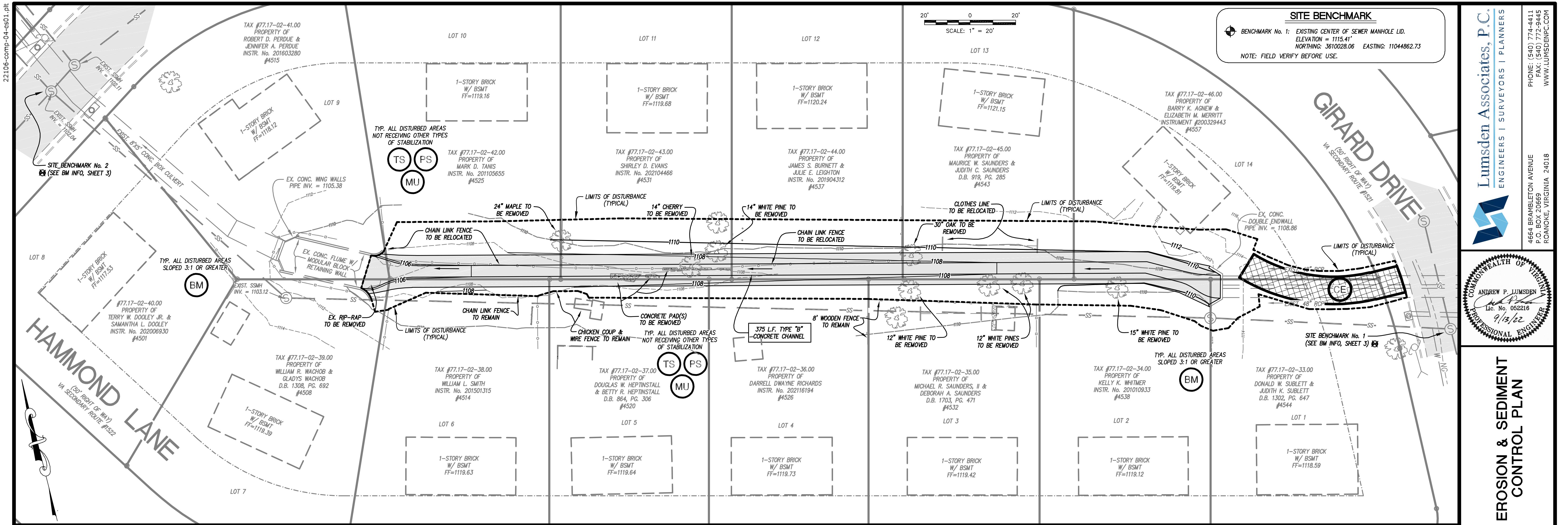


TYPE "B" CONCRETE DITCH

NOT TO SCALE



REVISIONS		DESCRIPTION				
NO.	DATE	1	2	3	4	5
DATE: September 13, 2022						
SCALE: 1" = 20'						
COMMISSION NO: 22-106 & 05-088						
SHEET 3 OF 5						

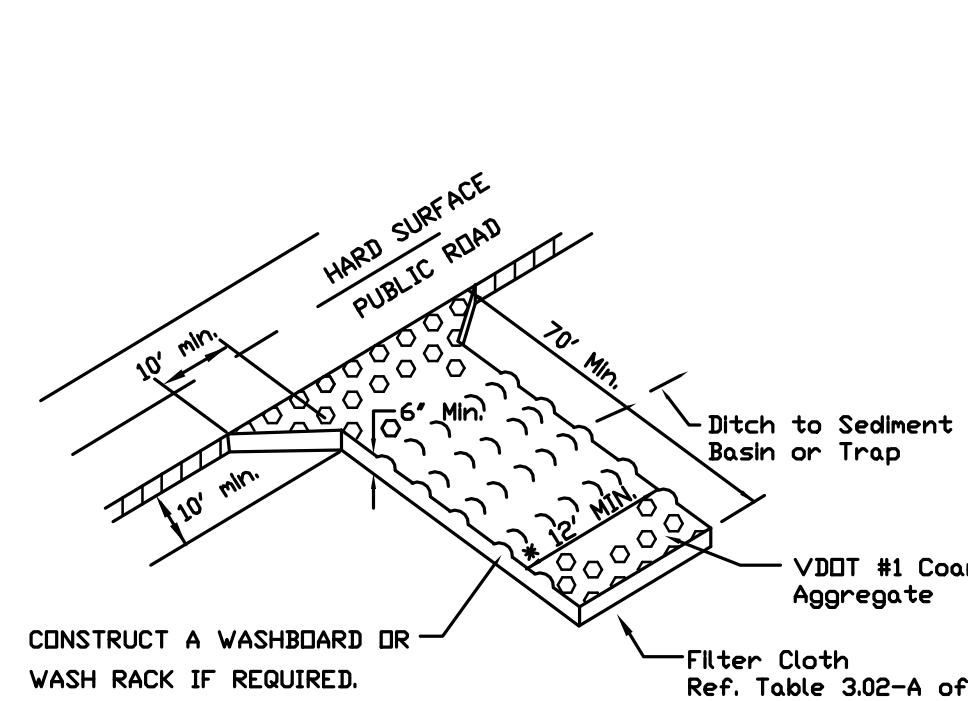


CONSTRUCTION SEQUENCE

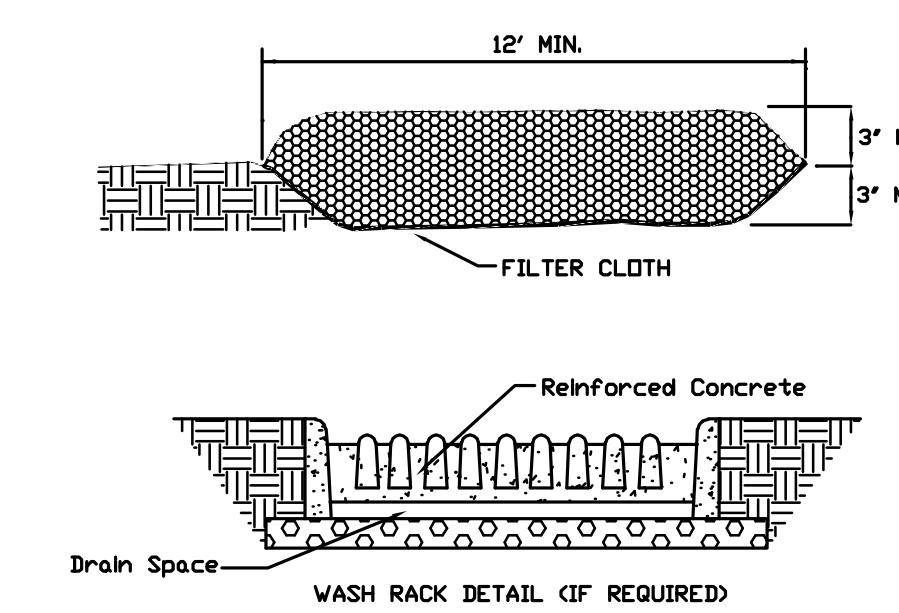
1. THE CONTRACTOR'S CERTIFIED RESPONSIBLE LAND DISTURBER (RLD) SHALL BE NAMED AND THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH ROANOKE COUNTY AND OBTAIN ALL REQUIRED PERMITS.
2. INSTALL TEMPORARY CONSTRUCTION ENTRANCE TO ENSURE PROPER MEANS OF SITE ACCESS AND AVOIDANCE OF MUD/SEDIMENT TRACKING ONTO ROADWAY.
3. CONTRACTOR SHALL WORK IN SEGMENTS AS BEST POSSIBLE, BEGINNING AT THE DOWN GRADIENT END OF THE PROPOSED CHANNEL AND WORK SHALL OCCUR DURING DRY PERIODS ONLY TO MINIMIZE POTENTIAL FOR DOWNSTREAM SEDIMENT TRANSPORT. TO THE EXTENT POSSIBLE, DITCH CONSTRUCTION SHALL BE STAGED SO THAT THE EXISTING DITCHES ARE EFFECTIVELY CONNECTED TO NEW, STABILIZED SECTIONS AT THE END OF EACH WORK DAY, AND PRIOR TO FORECASTED RAIN EVENTS.
4. AS CONCRETE SECTIONS ARE INSTALLED, CONTRACTOR SHALL ENSURE ADJACENT ESTABLISHED GRADED TIE-IN SLOPES ARE PROPERLY SEADED AND ADEQUATELY STABILIZED PRIOR TO BEGINNING WORK ON THE NEXT UPSTREAM CONCRETE CHANNEL SECTION.
5. CONTINUE WORK AS DESCRIBED PREVIOUSLY UNTIL INSTALLATION OF PROPOSED CHANNEL IS COMPLETED. PRIOR TO PROJECT COMPLETION, ADEQUATE STRONG STANDING OF VEGETATION/GRASS SHOULD BE CONFIRMED. ADDITIONALLY, CONTRACTOR SHALL COORDINATE MINOR LANDSCAPING REPLACEMENT NEEDS WITH INDIVIDUAL PROPERTY OWNERS.
6. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL REMAIN IN-PLACE AND FUNCTIONAL UNTIL ALL DISTURBED AREAS ARE FULLY STABILIZED. REMOVE TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES ONLY WITH THE PRIOR APPROVAL OF THE ROANOKE COUNTY INSPECTOR.

TOTAL PROPOSED
DISTURBANCE = 15,200 S.F.

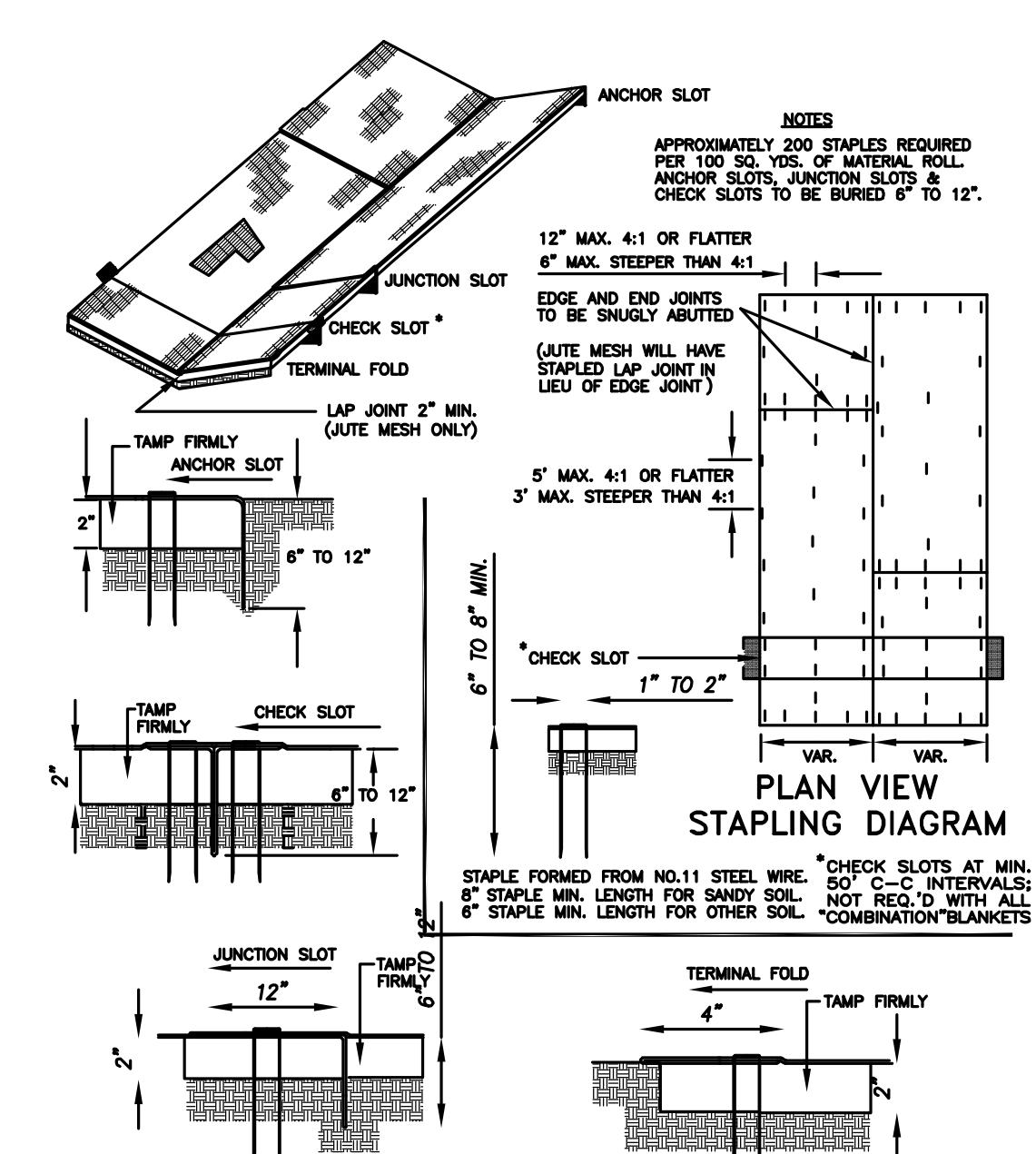
NO.	TITLE	KEY	SYMBOL
3.02	TEMPORARY GRAVEL CONSTRUCTION ENTRANCE	CE	
3.31	TEMPORARY SEEDING	TS	
3.32	PERMANENT SEEDING	PS	
3.35	MULCHING	MU	
3.36	SOIL STABILIZATION BLANKETS AND MATTING	BM	



* MUST EXTEND FULL WIDTH OF INGRESS & EGRESS OPERATION.



CE GRAVEL CONSTRUCTION ENTRANCE



SOIL STABILIZATION BLANKET AND MATTING

TYPICAL TREATMENT - 1
(SOIL STABILIZATION BLANKET)
INSTALLATION CRITERIA
Install on all slopes 3:1 or steeper.

TEMPORARY STABILIZATION

TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE IN FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 14 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

TS TEMPORARY SEEDING MIXTURE

PLANTING DATES	SPECIES	RATE (LBS./ACRE)
SEPT. 1 - FEB. 15	50/50 MIX OF ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) & CEREAL (WINTER) RYE (SECALE CEREALE)	50 - 100
FEB. 16 - APR. 30	ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM)	60 - 100
MAY 1 - AUG. 31	GERMAN MILLET (SETARIA ITALICA)	50
LIME: 90 LB / 1000 SF PULVERIZED AGRICULTURAL LIMESTONE FERTILIZER: 10-10-10 @ 10 LB / 1000 SF		

PERMANENT STABILIZATION

ALL AREAS DISTURBED BY CONSTRUCTION WILL BE STABILIZED WITH PERMANENT SEEDING WITHIN 7 DAYS. SEEDING IS ONLY TO BE DONE ON GRADED AREAS. SEEDING WILL BE DONE ACCORDING TO STANDARD AND SPECIFICATION 3.2.2 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. PERMANENTLY SEADED AREAS SHALL BE PROTECTED DURING ESTABLISHMENT WITH STRAW MULCH.

PS PERMANENT SEEDING MIXTURE

SEEDING AREA:	SEEDING RATE:
GENERAL TURF K-31 FESCUE (Optional) PERENNIAL RYEGRASS	200 lbs/Ac 20 lbs/Ac
GENERAL SLOPE (3:1 or less) K-31 FESCUE RED TOP GRASS SEASONAL NURSE CROP	128 lbs/Ac 2 lbs/Ac 20 lbs/Ac
STEEP SLOPE (Greater than 3:1) K-31 FESCUE RED TOP GRASS SEASONAL NURSE CROP CROWNFETCH	108 lbs/Ac 2 lbs/Ac 20 lbs/Ac 20 lbs/Ac
SEASONAL NURSE CROP SCHEDULE: March, April - May 15th May 16th - August 15th August 16th - September, October November - February	ANNUAL RYE FOXTAIL MILLET ANNUAL RYE WINTER RYE

LIME: 90 LB / 1000 SF PULVERIZED AGRICULTURAL LIMESTONE
FERTILIZER: 10-10-10 @ 12 LB / 1000 SF

MULCH: IS REQUIRED, SHALL BE USED OVER ALL SEADED AREAS AND SHALL BE APPLIED IN ACCORDANCE WITH SECTION 1.7 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.

SOIL CONDITIONING:
INCORPORATION OF LIME AND FERTILIZER, SELECTION OF CERTIFIED SEED, MULCHING, MAINTENANCE AND NEW SEEDINGS, AND RESEEDING SHALL BE IN ACCORDANCE WITH SPECIFICATIONS CONTAINED WITHIN THE VIRGINIA SOIL EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.

ADDITIONAL SEEDING TO BE PERFORMED AS REQUIRED BY THE INSPECTOR.

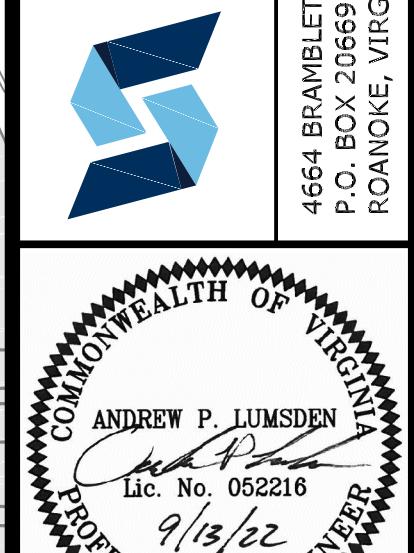
SEED APPLICATION: APPLY SEED UNIFORMLY WITH A CYCLONE SEEDER, DRILL CULTIPACKER SEEDER, OR HYDROSEEDER ON A FIRM, FLAT, SEADED, MAXIMUM SEEDING DEPTH SHALL BE 1/4 INCH.

ETON HILL STORM DRAINAGE IMPROVEMENTS

PREPARED FOR
ROANOKE COUNTY
DEVELOPMENT SERVICES
CAVE SPRING MAGISTERIAL DISTRICT
ROANOKE COUNTY, VIRGINIA

EROSION & SEDIMENT CONTROL PLAN

Lumsden Associates, P.C.
ENGINEERS | SURVEYORS | PLANNERS
PHONE: (540) 774-4411
FAX: (540) 772-8445
WWW.LUMSDENPC.COM



REVISIONS
NO. DATE DESCRIPTION
1 2
2 3
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4 5
5

DATE: September 13, 2022
SCALE: 1" = 20'
COMMISSION NO: 22-106 & 05-088
SHEET 4 OF 5

CONTRACTOR SHALL PAY PARTICULAR ATTENTION TO THE FOLLOWING MINIMUM STANDARDS:

- Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year. **APPLY SEEDING MIXTURES IN ACCORDANCE WITH SPECIFICATIONS 3.31 AND 3.32 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH) TO ALL AREAS THAT DO NOT HAVE A NON-ERODABLE SURFACE AS SHOWN ON THIS PLAN.**
- During construction of the project, soil stock piles and borrow areas shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site as well as borrow areas and soil intentionally transported from the project site. **ANY ON-SITE SOIL STOCKPILES SHALL HAVE STRAW FENCE ALONG THE DOWNSHILL PARAMETER. ALSO, A TEMPORARY SEED MIX IS TO BE APPLIED OVER THE SOIL STOCKPILE IF IT REMAINS AS-IS FOR LONGER THAN 14 DAYS.**
- A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion. **SEE MINIMUM STANDARD 1.**
- Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place. **INSTALL EROSION CONTROL MEASURES AS SHOWN ON THE PLAN AND OUTLINED IN THE CONSTRUCTION SEQUENCE.**
- Stabilization measures shall be applied to certain structures such as dams, dikes and diversions immediately after installation. **NOT APPLICATION. NO EARTHEN STRUCTURES ARE PROPOSED WITH THIS PLAN.**
- Sediment traps and sediment basins shall be designed and constructed based upon the total drainage area to be served by the trap or basin.
 - The minimum storage capacity of a sediment trap shall be 134 cubic yards per acre of drainage area and the trap shall only control drainage areas less than three acres.
 - Surface runoff from disturbed areas that is comprised of flow from drainage areas greater than or equal to three acres shall be controlled by a sediment basin. The minimum storage capacity of a sediment basin shall be 134 cubic yards per acre of drainage area. The outfall system shall, at a minimum, maintain the structural integrity of the basin during a 25-year storm of 24-hour duration. Runoff coefficients used in runoff calculations shall correspond to a bare earth condition or those conditions expected to exist while the sediment basin is utilized. **NOT APPLICABLE; NO SEDIMENT TRAPS OR BASINS ARE PROPOSED WITH THIS PLAN.**
- Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected. **AREAS TO RECEIVE PERMANENT SEEDING ARE TO BE INSPECTED PERIODICALLY. RESEED ANY AREAS THAT DO NOT HAVE AN ESTABLISHMENT OF A GOOD STAND OF GRASS AFTER INITIAL APPLICATION OF PERMANENT SEEDING. APPLY SLOPE STABILIZATION MATTING WHERE INDICATED ON PLANS. ADDITIONAL SLOPE STABILIZATION MEASURES ARE TO BE CONSIDERED AS CONDITIONS DICTATE.**
- Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure. **CONCENTRATED FLOW DOWN SLOPES IS TO BE AVOIDED WITH THIS PLAN. SHOULD CONCENTRATED FLOW OCCUR, CONTRACTOR SHALL REPAIR OR IMPROVE THE GRADE TO DISSEURSE FLOW ACROSS A BROAD AREA.**
- Whenever water seeps from a slope face, adequate drainage or other protection shall be provided. **NOT APPLICABLE. SEEPAGE THROUGH SLOPES ARE NOT ANTICIPATED TO BE ENCOUNTERED ON THIS PROJECT. SHOULD SEEPAGE OCCUR, APPROPRIATE DRAINKAGE SHALL BE ESTABLISHED TO CONVEY WATER TO A CONTROLLED POINT OF DISCHARGE AND PROTECT THE SLOPE.**
- All storm sewer inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment. **NOT APPLICABLE. NO NEW STORM SEWER INLETS ARE TO BE CONSTRUCTED WITH THIS PLAN.**
- Before newly constructed stormwater conveyance channels or pipes are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel and receiving channel. **CONSTRUCT THE PROPOSED CHANNEL IMPROVEMENTS AS OUTLINED WITH THIS PLAN.**
- Where work in a live watercourse is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the area to the greatest extent possible during construction. Nonerodible material shall be used for the construction of causeways and crossings, or when it may be used for these structures if armored by nonerodible cover material. **NOT APPLICABLE. NO LIVE WATERCOURSE IS ADJACENT TO THIS PROJECT AND NO WORK IN ANY LIVE WATERCOURSE IS ANTICIPATED WITH THESE PLANS.**
- When a live watercourse must be crossed by construction vehicles more than twice in any six-month period, a temporary vehicular stream crossing constructed of nonerodible material shall be provided. **NOT APPLICABLE. NO LIVE WATERCOURSE IS ADJACENT TO THIS PROJECT AND NO WORK IN ANY LIVE WATERCOURSE IS ANTICIPATED WITH THESE PLANS.**
- All applicable federal, state and local regulations pertaining to working in or crossing live watercourses shall be met. **NOT APPLICABLE. NO LIVE WATERCOURSE IS ADJACENT TO THIS PROJECT AND NO WORK IN ANY LIVE WATERCOURSE IS ANTICIPATED WITH THESE PLANS.**
- The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed. **NOT APPLICABLE. NO LIVE WATERCOURSE IS ADJACENT TO THIS PROJECT AND NO WORK IN ANY LIVE WATERCOURSE IS ANTICIPATED WITH THESE PLANS.**
- Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:
 - No more than 500 linear feet of trench may be opened at one time.
 - Excavated material shall be placed on the uphill side of trenches.
 - Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off-site property.
 - Material used for backfilling trenches shall be properly compacted in order to minimize erosion and promote stabilization.
 - Restabilization shall be accomplished in accordance with these regulations. **APPLICABLE safety regulations shall be complied with.**

UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE STANDARDS ABOVE.

- Where construction vehicle access routes intersect paved or public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a paved or public road, the surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shovel, broom, sweeping and transported to a sediment control disposal area. Shovel washing shall be allowed only after sediment is removed in this manner. **THESE REQUIREMENTS SHALL APPLY TO INDIVIDUAL DEVELOPMENT LOTS AS WELL AS TO LARGER LAND-DISTURBING ACTIVITIES. FOLLOW ABOVE REQUIREMENTS FOR ACCESS TO THE SITE.**
- All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the local program authority. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation. **REMOVE TEMPORARY MEASURES IN ACCORDANCE WITH ABOVE REQUIREMENTS, AND WITH THE PRIOR APPROVAL OF ROANOKE COUNTY.**

MINIMUM STANDARDS CONTINUED:

- Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff from the site. The proposed project consists of improvements to an existing watercourse which flows east to west through the center of the subdivision. Total disturbed area is approximately 15,200 S.F. (0.35 ACRES).
 - Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system. For those sites where runoff is discharged into a pipe or pipe system, downstream stability analyses at the outfall of the pipe or pipe system shall be performed.
 - Adequacy of all channels and pipes shall be verified in the following manner:
 - The applicant shall demonstrate that the total drainage area to the point of analysis within the channel is one hundred times greater than the contributing drainage area of the project in question; or
 - Natural channels shall be analyzed by the use of a two-year storm to verify that stormwater will not top over channel banks nor cause erosion of channel bed or banks; and
 - All previously constructed man-made channels shall be analyzed by the use of a ten-year storm to verify that stormwater will not top over its banks and by the use of a two-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and
 - Pipes and storm sewer systems shall be analyzed by the use of a ten-year storm to verify that stormwater will be contained within the pipe or system.
- If existing natural receiving channels or previously constructed man-made channels or pipes are not adequate, the applicant shall:
 - Improve the channel to a condition where a ten-year storm will not top over the banks and a two-year storm will not cause erosion to the channel bed or banks; or
 - Improve the pipe or pipe system to a condition where the ten-year storm is contained within the appurtenances; or
 - Develop a site design that will not cause the pre-development peak runoff rate from a two-year storm to increase when runoff outfalls from a 25-year storm from a ten-year storm to increase when runoff outfalls into a man-made channel; or
 - Provide a combination of channel improvement, stormwater detention or other measures which is satisfactory to the VESCP authority to prevent downstream erosion.
- The applicant shall provide evidence of permission to make the improvements.
- All hydrologic analysis shall be based on the existing watershed characteristics and the ultimate development of the subject project.
- If the applicant chooses an option that includes stormwater detention, he shall obtain approval from the VESCP of a plan for maintenance of the detention facilities. The plan shall set forth the maintenance requirements of the facility and the person responsible for performing the maintenance.
- Outfall from a detention facility shall be discharged to a receiving channel, and energy dissipater shall be placed at the outfall of all detention facilities as necessary to provide a stabilized transition from the facility to the receiving channel.
- All on-site channels must be verified to be adequate.
- Increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property shall be diverted to a stable outlet, adequate channel, pipe or pipe system, or to a detention facility.
- In applying these stormwater runoff criteria, individual lots or parcels in a residential, commercial or industrial development shall not be considered to be separate development projects. Instead, the development, as a whole, shall be considered to be a single development project. Hydrologic parameters that reflect the ultimate development condition shall be used in all engineering calculations.
- All measures used to protect properties and waterways shall be employed in a manner which minimizes impacts on the physical, chemical and biological integrity of rivers, streams and other waters of the state.
- Any plan approved prior to July 1, 2014, that provides for stormwater management that addresses any flow rate capacity and velocity requirements for natural or man-made channels shall satisfy the flow rate capacity and velocity requirements for natural and man-made channels if the practices are designed to:
 - detain and release over 24-hour period the expected rainfall resulting from the one year, 24-hour storm; and
 - reduce the 100-year peak flow rate resulting from the 1.5, 2, and 10-year, 24-hour storms to a level that is less than or equal to the peak flow rate from the site assuming it was in a good forested condition, achieved through multiplication of the forested peak flow rate by a reduction factor that is equal to the runoff volume from the site when it was in a good forested condition divided by the runoff volume from the site in its proposed condition, and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels as defined in any regulations promulgated pursuant to 10.1-562 or 10.1-570 of the Act.
- For plans approved on and after July 1, 2014, the flow rate capacity and velocity requirements of 10.1-561 A of the Act and this subsection shall be satisfied by compliance with water quantity requirements in the Stormwater Management Act (10.1-603.2 et seq. of the Code of Virginia) and attendant regulations, unless such land-disturbing activities are in accordance with 4VAC50-60-48 of the Virginia Stormwater Management Program (V SMP) Permit Regulations.
- Compliance with the water quantity minimum standards set out in 4VAC50-60-66 of the Virginia Stormwater Management Program (V SMP) Permit Regulations shall be deemed to satisfy the requirements of Minimum Standard 19.

THE PROJECT PROPOSES ADEQUATE CHANNEL DRAINAGE IMPROVEMENTS WITHIN THE SURROUNDING PROJECT AREA AS A RESULT OF NO INCREASE IN PROPOSED RUNOFF IS ANTICIPATED. MS19 SUBSECTION C(9) IS THEREFORE SATISFIED.

EROSION CONTROL NARRATIVE

PROJECT DESCRIPTION

THE PROJECT AREA IS LOCATED IN ROANOKE COUNTY WITHIN AN EXISTING RESIDENTIAL SUBDIVISION NAMED "ETON HILL" WHICH IS SERVED BY GIRARD DRIVE AND HAMMOND LANE. THE PROPOSED PROJECT CONSISTS OF IMPROVEMENTS TO AN EXISTING WATERCOURSE WHICH FLOWS EAST TO WEST THROUGH THE CENTER OF THE SUBDIVISION. TOTAL DISTURBED AREA IS APPROXIMATELY 15,200 S.F. (0.35 ACRES).

EXISTING SITE CONDITIONS

THE PROJECT AREA IS LOCATED BEHIND RESIDENTIAL HOUSES. DRAINAGE FROM THESE HOUSES SLOPES TOWARDS THE EXISTING DRAINAGE WATERCOURSE. THE FLOW OF THE WATERCOURSE IS CONVEYED FROM EAST TO WEST WITH THE DOWN GRADIENT DISCHARGE POINT BEING A RECENTLY CONSTRUCTED BOX CULVERT.

ADJACENT AREAS

THE PROJECT AREA IS BOUNDED IN ALL DIRECTIONS BY EXISTING SINGLE FAMILY RESIDENTIAL USES AND THE ROADWAYS OF GIRARD DRIVE AND HAMMOND LANE WHICH MAKE UP THE RESIDENTIAL SUBDIVISION.

OFFSITE AREAS

NO OFFSITE AREAS ARE ASSOCIATED WITH THIS PLAN. ALL MATERIAL THAT IS REMOVED FROM OR DELIVERED TO THIS SITE IN ASSOCIATION WITH THIS PROJECT SHALL BE FROM A PERMITTED CUT OR FILL SITE.

SOILS

SOIL INFORMATION IS BASED ON AN INSPECTION OF THE USDA WEB SOIL SURVEY AND HAS NOT BEEN FIELD VERIFIED. THE ONSITE SOILS ARE INDICATED TO BE CHISWELL-LITZ-URBAN LAND COMPLEX, 28 TO 15X SLOPES (MAP UNITS 6C).

THE CHISWELL-SOIL HYDROLOGIC SOIL GROUP D, POSSESSES THE FOLLOWING CHARACTERISTICS AND PROPERTIES:

DEPTH TO RESTRICTIVE FEATURE: 10 TO 20 INCHES TO PARALITHIC BEDROCK DEPTH TO WATER TABLE: MORE THAN 80 INCHES

PERMEABILITY: MODERATELY LOW TO MODERATELY HIGH AVAILABILITY: WATER CAPACITY: VERY LOW

RUNOFF CLASS: HIGH

TYPICAL PROFILE: 0 TO 2 INCHES - CHANNERY SILT LOAM, 2 TO 12 INCHES - VERY CHANNERY SILT LOAM, 12 TO 22 INCHES - BEDROCK

THE LITZ-SOIL HYDROLOGIC SOIL GROUP C, POSSESSES THE FOLLOWING CHARACTERISTICS AND PROPERTIES:

DEPTH TO RESTRICTIVE FEATURE: 20 TO 40 INCHES TO PARALITHIC BEDROCK DEPTH TO WATER TABLE: MORE THAN 80 INCHES

PERMEABILITY: MODERATELY LOW TO MODERATELY HIGH AVAILABILITY: WATER CAPACITY: VERY LOW

RUNOFF CLASS: HIGH

TYPICAL PROFILE: 0 TO 5 INCHES - CHANNERY SILT LOAM, 5 TO 24 INCHES - VERY CHANNERY SILT LOAM, 24 TO 34 INCHES - BEDROCK

CRITICAL AREAS

THE CONTRACTOR SHALL TAKE SPECIAL CARE TO MINIMIZE THE POTENTIAL FOR ANY SEDIMENT LEAVING THE PROJECT AREA AND INTO THE EXISTING DOWNSTREAM DRAINAGE CHANNEL AND/OR TO THE ADJOINING RIGHTS-OF-WAY OR ROADS.

MINIMUM STANDARDS

REFER TO DEQ MINIMUM STANDARDS.

EROSION AND SEDIMENT CONTROL MEASURES

CONSTRUCTION ENTRANCE (3.02) - A STONE CONSTRUCTION ENTRANCE WILL BE INSTALLED TO MINIMIZE THE AMOUNT OF MUD TRANSPORTED INTO EXISTING ROADS.

TEMPORARY SEEDING (3.31) - TEMPORARY SEEDING SHALL BE APPLIED TO TEMPORARY DIVERSION Dikes, TOPSOIL STOCKPILES, AND ALL AREAS TO BE ROUGH GRADED, BUT NOT FINISHED GRADED DURING THE INITIAL PHASE OF CONSTRUCTION. TEMPORARY SEEDING SHALL BE FAST GERMINATING, TEMPORARY VEGETATION AND INSTALLED IMMEDIATELY FOLLOWING GRAVING, OR INSTALLATION IF A TEMPORARY MEASURE. SEE ALSO MINIMUM STANDARDS.

PERMANENT SEEDING (3.32) - PERMANENT SEEDING SHALL BE INSTALLED ON ALL DISTURBED AREAS OF THE SITE NOT OTHERWISE STABILIZED.

MULCHING (3.35) - ALL DISTURBED AREAS SHALL BE MULCHED AFTER SEEDING. STRAW MULCH SHALL BE APPLIED AT A RATE OF TWO TONS PER ACRE AND ANCHORED WITH 750 LBS PER ACRE OF FIBER MULCH OVER THE SEEDED AREA.

SOIL STABILIZATION & MATTING (3.36) - SLOPES 3:1 OR GREATER SHALL HAVE A PROTECTIVE COVERING OR MAT INSTALLED TO MINIMIZE EROSION AND AID IN ESTABLISHMENT OF PERMANENT VEGETATIVE STABILIZATION.

PERMANENT STABILIZATION

ALL PROJECT AREAS NOT COVERED BY PROPOSED CONCRETE INSTALLATION OR OTHER PERMANENT HARD SURFACE SHALL BE STABILIZED WITH PERMANENT SEEDING. THE CONTRACTOR SHALL ENSURE THAT A STRONG STAND OF GRASS IS ESTABLISHED BEFORE THE REMOVAL OF EROSION CONTROL MEASURES.

MAINTENANCE

ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AT LEAST ONCE EVERY FOUR BUSINESS DAYS OR AT LEAST ONCE EVERY FIVE BUSINESS DAYS AND NO LATER THAN 24 HOURS FOLLOWING A MEASURABLE STORM EVENT. A LOG OF DATES AND INSPECTIONS SHALL BE KEPT. ANY DEFICIENCIES THAT ARE FOUND SHALL BE CORRECTED IMMEDIATELY. ACCUMULATED SEDIMENT AT TRAPPING MEASURES SHALL BE ROUTINELY REMOVED. THE CONTRACTOR AND RLD SHALL PAY PARTICULAR ATTENTION TO THE FOLLOWING:

ALL DITCHES, SWALES, AND NATURAL WATERCOURSES DOWNSTREAM OF THIS PROJECT SHALL BE FIELD INSPECTED DURING AND AFTER CONSTRUCTION BY THE RLD TO ENSURE COMPLIANCE WITH DCR'S MS-19. IF EROSION OR SCOUR IS OCCURRING THE DEVELOPER SHALL BE RESPONSIBLE FOR ALL CORRECTIVE MEASURES. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL AFTER ALL DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED AND THE TEMPORARY MEASURES PROPERLY REMOVED.

ALL SEDED AREAS WILL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND OF GRASS IS MAINTAINED. AREAS SHALL BE FERTILIZED AND RESEEDED AS REQUIRED TO ACHIEVE A GOOD STAND OF GRASS.

THE CONSTRUCTION ENTRANCE SHALL BE CHECKED REGULARLY TO ENSURE THAT MUD IS NOT TRANSPORTED ONTO THE ADJACENT ROADS. THE STONE SHALL BE REMOVED, CLEANED, OR REPLACED AS REQUIRED FOR THE CONSTRUCTION ENTRANCE TO FUNCTION PROPERLY.

STORMWATER MANAGEMENT CONSIDERATION

THIS MAINTENANCE PROJECT IS NOT SUBJECT TO STORMWATER MANAGEMENT REQUIREMENTS IN ACCORDANCE WITH SEC. 23-1.3(C)(4) OF THE ROANOKE COUNTY CODE OF ORDINANCES AS THE TOTAL PROPOSED LAND DISTURBANCE IS LESS THAN 1-ACRE.

NO.	TITLE	KEY	SYMBOL
3.02	TEMPORARY GRAVEL CONSTRUCTION ENTRANCE	CE	
3.31	TEMPORARY SEEDING	TS	
3.32	PERMANENT SEEDING	PS	
3.35	MULCHING	MU	
3.36	SOIL STABILIZATION BLANKETS AND MATTING	BT	

GENERAL EROSION AND SEDIMENT CONTROL NOTES

1. ALL SOIL EROSION & SEDIMENT CONTROL MEASURES SHALL BE ACCOMPLISHED IN STRICT ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS CONTAINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.

2. THE APPROVING AUTHORITY MAY ADD TO, DELETE, RELOCATE, CHANGE OR OTHERWISE MODIFY CERTAIN EROSION AND SEDIMENT CONTROL MEASURES WHERE FIELD CONDITIONS ARE ENCOUNTERED THAT WARRANT SUCH MODIFICATIONS.

3. ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES AS SHOWN ON THE PLAN SHALL BE PLACED IN ADVANCE OF THE WORK BEING PERFORMED, AS FAR AS PRACTICAL.

4. IN NO CASE DURING CONSTRUCTION SHALL WATER RUNOFF BE DIVERTED OR ALLOWED TO FLOW TO LOCATIONS WHERE APPROPRIATE PROTECTION HAS NOT BEEN PROVIDED.

5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LEAVE THE SITE ADEQUATELY PROTECTED AGAINST EROSION, SEDIMENTATION, OR ANY DAMAGE TO ANY ADJACENT PROPERTY AT THE END OF EACH DAY'S WORK.

6. FOR THE EROSION CONTROL KEY SYMBOLS SHOWN ON THE PLANS, REFER TO THE VIRGINIA UNIFORM CODING SYSTEM FOR EROSION AND SEDIMENT CONTROL PRACTICES CONTAINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION. THESE SYMBOLS AND KEYS ARE TO BE UTILIZED ON ALL EROSION CONTROL PLANS SUBMITTED TO ROANOKE COUNTY.

7. THE LOCATION OF ALL OFF-SITE FILL OR BORROW AREAS ASSOCIATED WITH THE CONSTRUCTION PROJECT WILL BE PROVIDED TO ROANOKE COUNTY DEPARTMENT OF COMMUNITY DEVELOPMENT. AN EROSION CONTROL PLAN OR MEASURES MAY BE REQUIRED FOR THIS AREA.

TOTAL DISTURBED AREA = 0.35 AC. = 15,200 SQ. FT.

Lumsden Associates, P.C.
ENGINEERS