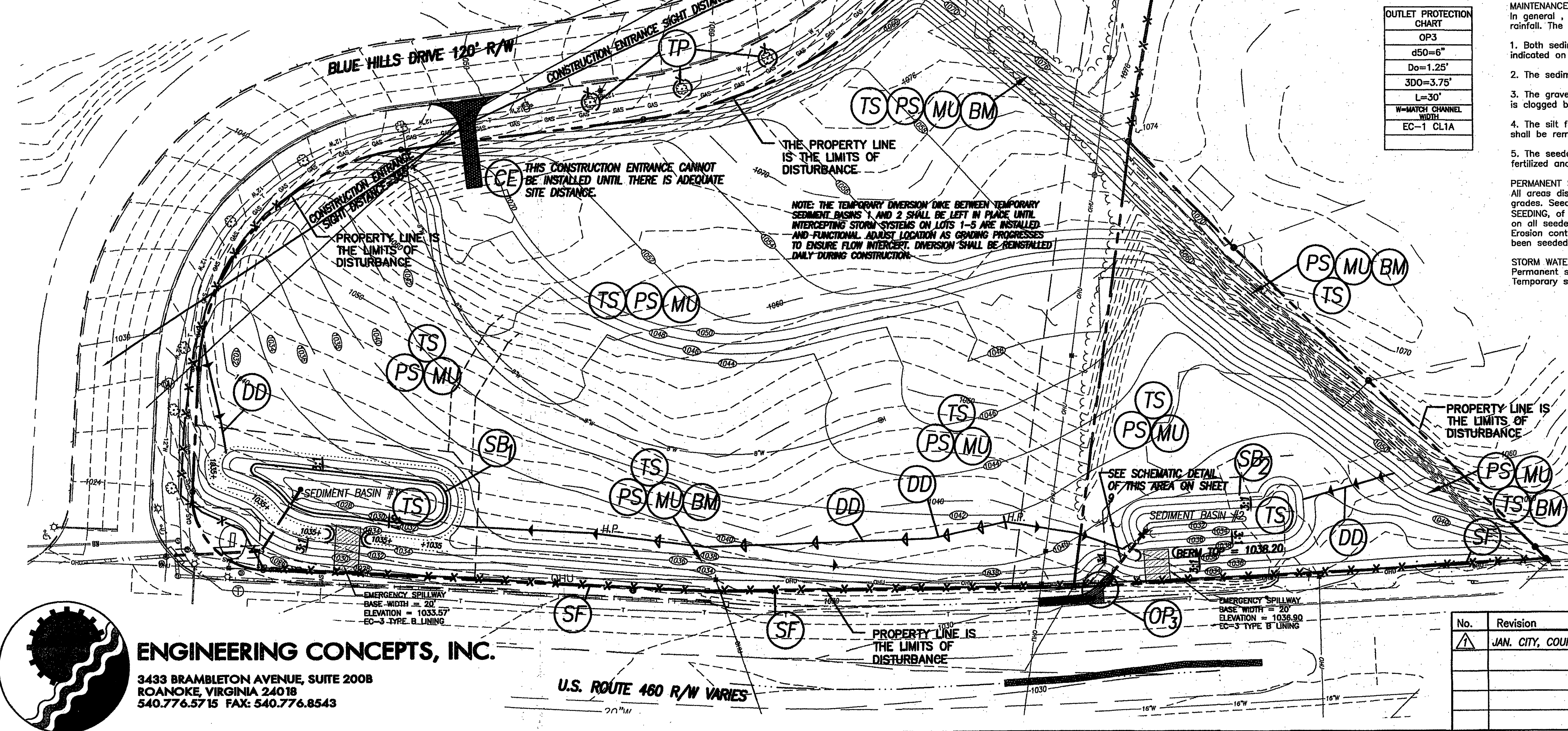


EROSION CONTROL PHASING NOTES

1. INSTALL ALL PERIMETER CONTROLS.
2. INSTALL CONSTRUCTION ENTRANCE.
3. BEGIN DEMOLITION OPERATIONS.
4. CONSTRUCT TEMPORARY SEDIMENT BASINS AND OUTLET PROTECTION.
5. BEGIN MASS GRADING OPERATIONS.
6. CONTRACTOR SHALL REMOVE EROSION CONTROL MEASURES ONLY AFTER CITY OF ROANOKE INSPECTORS APPROVAL MEASURES FOR MASS GRADING WILL REMAIN IN PLACE AS NECESSARY FOR THE DEVELOPMENT OF THE COMMERCIAL SUBDIVISION.

EROSION AND SEDIMENT CONTROL NOTES

1. THE EROSION CONTROL NARRATIVE BY ENGINEERING CONCEPTS, INC. SHALL BE ADHERED TO AS A PART OF THE CONTRACT. ALL EROSION CONTROL DEVICES SHALL BE INSTALLED PER THE NARRATIVE AND PLAN.
2. UNLESS OTHERWISE INDICATED ALL VEGETATIVE AND STRUCTURAL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VA. EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.
3. THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION.
4. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED AS THE FIRST STEP IN GRADING.
5. SCHEDULE OPERATIONS SO THAT GROUND SURFACE WILL BE DISTURBED FOR THE SHORTEST POSSIBLE TIME BEFORE PERMANENT CONSTRUCTION IS INSTALLED.
6. A COPY OF THE APPROVED EROSION CONTROL PLANS SHALL BE KEPT ON SITE AT ALL TIMES.
7. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE CITY OF ROANOKE INSPECTOR.
8. ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL DEVICES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND UNTIL FINAL STABILIZATION IS ACHIEVED.
9. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DISTURBED AREAS WITHIN SEVEN DAYS OF REACHING FINAL GRADES. TEMPORARY, DENuded AREAS THAT ARE TO BE EXPOSED LONGER THAN THIRTY DAYS SHALL BE SEEDED WITH TEMPORARY VEGETATION.
10. DURING CONSTRUCTION, SOIL STOCKPILES SHALL BE STABILIZED AND PROTECTED WITH SEDIMENT TRAPPING MEASURES AND STABILIZED WITH TEMPORARY VEGETATION IF UNUSED FOR 30 DAYS OR LONGER.
11. THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH MAJOR RAINFALL EVENT - ANY REPAIRS NECESSARY SHALL BE MADE IMMEDIATELY TO ENSURE THE PROTECTION OF OFFSITE PROPERTIES.
12. THE CONTRACTOR IS REQUIRED TO REMOVE ALL SILT FROM STREAMS AND DRAINAGE WAYS PRIOR TO BOND RELEASE.
13. TEMPORARY AND PERMANENT SEEDING SHALL ADHERE TO THE SPECIFICATIONS SHOWN HEREON.
14. MAINTAIN LARGE SURFACE AREAS AS FLAT AS PRACTICAL TO MINIMIZE SOIL TRANSFER THROUGH SURFACE FLOW.
15. SLOPES AREAS STEEPER THAN 3:1 SHALL BE SUPPORTED WITH SLOPE STABILIZATION BLANKETS.
16. REFER TO THE MINIMUM STANDARD REFERENCES FOR STATE SPECIFIC REFERENCES TO EROSION SEDIMENT CONTROL REQUIREMENTS.
17. FLUSH ALL STORM DRAIN LINES PRIOR TO REMOVAL OF SEDIMENT TRAPPING MEASURES.
18. AS GRADING OPERATIONS PROGRESS, THE CONTRACTOR SHALL ENSURE THAT THE DIVERSION DIKE ALONG 460, BETWEEN TEMPORARY SEDIMENT BASINS IS REINSTALLED AT THE END OF EACH DAYS OPERATION. ENSURE THAT DIVERSION DIKES ARE PLACED TO PROVIDE POSITIVE FLOW TOWARD BASINS.
19. THE GRADING SHOWN FOR THE SEDIMENT BASINS IS PERMANENT. BOTH BASINS WILL BE CONVERTED TO PERMANENT STORM WATER MANAGEMENT FACILITIES UPON STABILIZATION OF UP-GRADIENT AREAS. SEE DEVELOPMENT PLANS FOR DETAILS.
20. A REGISTERED LAND DISTURBER WILL NEED TO BE SELECTED BEFORE A LAND DISTURBANCE BEFORE A LAND DISTURBANCE PERMIT WILL BE ISSUED FROM ROANOKE CITY.
21. THE LAND DISTURBANCE PERMIT AND A COPY OF THE STAMPED/SIGNED APPROVED SET OF PLANS WILL BE ISSUED AT AN EROSION AND SEDIMENT CONTROL MEETING TO BE HELD AT THIS OFFICE. BOTH OF THESE DOCUMENTS ARE REQUIRED PRIOR TO ANY CONSTRUCTION AND BOTH MUST BE KEPT ON SITE AT ALL TIMES. THE EROSION AND SEDIMENT CONTROL MEETING CAN BE SCHEDULED WITH ADRIAN GILBERT 853-2733. THIS MEETING WILL BE NEED TO INCLUDE THE RLD AND THE GENERAL CONTRACTOR.
22. ALL SEDIMENT TRAPS AND SEDIMENT BASINS ARE TO BE DEWATERED IN ACCORDANCE WITH DCR REQUIREMENTS BEFORE THEY ARE REMOVED.



EROSION AND SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION

The purpose of this project is mass grading and erosion control for a future 8 lot commercial subdivision. The total disturbed area will be 1.6 Acres in Roanoke County and 8.2 Acres in Roanoke City. No utilities are planned for this development during mass grading of the site. The amount of disturbance to the ground surface will be confined to within the site. No grading will be permitted within the right of way of Blue Hills Drive or U.S. Route 460 during mass grading of this site. Excess out material will need to be hauled from the site. The contractor shall provide a separate erosion and sediment control plan for offsite borrow area prior to permit issuance.

EXISTING SITE CONDITIONS

The middle of the upper development area slopes to the existing detention facility to the northwest of the site property. The remainder of the site slopes to the south and southeast direction. The site area has well established grass with minimal trees along the northeast property line. An existing gravel area is located on the county portion of the property.

ADJACENT PROPERTY

Roanoke county adjoiners are zoned R1 & C1. Roanoke City adjoiners are zoned R1 and CG. U.S. Route 460 is located to the east and Blue Hills Drive is located along the southern portion of the site.

OFF-SITE DRAINAGE

This site will receive runoff from an area located to the northeast of the site. This runoff will be diverted into sediment basin #2 during the mass grading phase of this development.

SOILS

The proposed site is underlain by the Rome Formation of the Cambrian Age. It consists of shale, limestone and dolomite. The onsite soils have a low shrink swell potential. The soil on-site with more shale material is readily compacted. The soils on-site with more clay material may require drying before compaction.

CRITICAL EROSION AREAS

Critical erosion areas include any disturbed 2:1 slopes and ditch linings. All 2:1 slopes will receive turf reinforcement matting. Ditch linings will receive turf reinforcement matting and vegetation.

EROSION AND SEDIMENT CONTROL MEASURES

Unless otherwise indicated, all vegetative and structural erosion and sediment control practices shall be constructed and maintained according to minimum standards and specifications of the 1992 Virginia Erosion and Sediment Control Handbook. The minimum standards of the Virginia Erosion and Sediment Control Regulations shall be adhered to unless otherwise waived or approved by a variance.

STRUCTURAL PRACTICES

1. CE-TEMPORARY CONSTRUCTION ENTRANCE-3.02  
A temporary construction entrance shall be installed where the access area intersects with Blue Hills Drive. A second construction entrance is planned when adequate sight distance can be obtained.

2. SF-SILT FENCE BARRIER-3.05

Silt fence barriers will be installed down slope of areas with minimal grade to filter sediment runoff from sheet flow.

3. DD-DIVERSION DIKE-3.09

A temporary ridge construction at the top or base of a sloping disturbed area to divert sediment runoff to the sediment trap and sediment basins as shown on the plans.

4. FD-FILL DIVERSION-3.10

A channel with a supporting slope ridge of soil along the top of fill areas. Fill diversion diverts water away from the fill slope and into the sediment traps.

5. ST-SEDIMENT TRAP-3.13

A sediment trap shall be installed to intercept sediment laden runoff.

6. SB-SEDIMENT BASIN-3.14

A temporary barrier or dam with controlled stormwater release. The purpose of the sediment basins as shown on the plans is to detain sediment laden runoff until the majority of the sediment settles out.

7. SCC-STORMWATER CONVEYANCE CHANNEL-3.17

A stormwater conveyance channel allows for surface runoff water to go to a receiving channel without damage from erosion.

8. OP-OUTLET PROTECTION-3.18

A stone lined apron will be placed at the outlet of the pipe at the ponds and at the outlet of the pipe at the temporary sediment basin to prevent scour.

9. CD-ROCK CHECK DAMS-3.20

A rock check dam is a small temporary stone dam constructed across a drainage ditch. Its purpose is to reduce the velocity of flow which reduces erosion in the ditch.

VEGETATIVE PRACTICES

1. TS-TEMPORARY SEEDING-3.31

All denuded areas, which will be left dormant for more than 30 days, shall be seeded with fast germinating temporary vegetation immediately following grading.

2. PS-PERMANENT SEEDING-3.32

All final -graded areas where permanent cover is desired or rough-graded areas that will not be brought of final grade for a year or more shall be seeded with perennial vegetation within 7 days of reaching final grade.

3. MU-MULCH-3.35

Mulching prevents erosion and increases moisture for new plant growth.

4. BM-BLANKET MATTING-3.36

Soil stabilization mat applied to slopes 3:1 or greater to promote new vegetation.

MAINTENANCE

In general, all erosion and sediment control measures will be checked daily and after each significant rainfall. The following items will be checked in particular:

1. Both sediment basins will be cleaned out when the level of sediment buildup reaches the cleanout point indicated on the riser pipe.
2. The sediment trapping device will be checked regularly for sediment cleanout.
3. The gravel outlets will be checked regularly for sediment buildup that may prevent drainage. If the gravel is clogged by sediment, it shall be removed and cleaned, or replaced.
4. The silt fence barriers will be checked regularly for undermining or deterioration of the fabric. Sediment shall be removed when the level of sediment deposition reaches half way to the top of the barrier.
5. The seeded areas will be checked regularly to ensure that a good stand is maintained. Areas shall be fertilized and re-seeded as needed.

PERMANENT STABILIZATION

All areas disturbed by construction shall be stabilized with permanent seeding within 7 days of reaching final grades. Seeding shall be done with Kentucky 31 tall Fescue according to Std. on Spec. 3.32. PERMANENT SEEDING, of the 1992 Virginia Erosion and Sediment Control Handbook, Mulch (straw or fiber) will be used on all seeded areas. In all seeding operations, seed, fertilizer and lime will be applied prior to mulching. Erosion control blankets may be installed over fill slopes, which have been brought to final grade and have been seeded to protect the slopes properly.

STORM WATER MANAGEMENT

Permanent stormwater management will be installed during final development of the overall subdivision. Temporary sediment basins are installed as part of the mass grading.

TS TEMPORARY SEEDING MIXTURE

ACCEPTABLE TEMPORARY SEEDING PLANT MATERIALS

PLANTING DATES	SPECIES	RATE LBS/ACRE
SEPT 1-FEB15	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

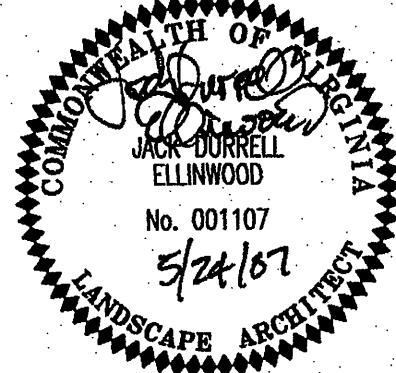
FERTILIZER: 10-20-10 14 LBS / 1000 SF.  
INCORPORATE LIME AND FERTILIZER IN TO THE TOP 2-4 INCHES OF SOIL.

SURFACE ROUGHENING: IF THE AREA HAS BEEN RECENTLY LOOSENED OR DISTURBED, NO FURTHER ROUGHENING IS REQUIRED. WHEN THE AREA IS COMPACTED, CRUSTED, OR HARDENED, THE SOIL SURFACE SHALL BE LOOSENED BY DISKING, RAKING, HARROWING, OR OTHER ACCEPTABLE MEANS.

AVACSO-30-40 Minimum Standards.

An erosion and sediment control program adopted by a district or locality must be consistent with the following criteria, techniques and methods:

1. 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 30 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year. SHOWN ON PLANS.
2. During construction of the project, soil stockpiles 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. SHOWN ON PLANS.
3. A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall be considered established with a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion. SHOWN ON PLANS.
4. Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to keep sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upland land disturbance takes place. SHOWN ON PLANS.
5. Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation. SHOWN ON PLANS.
6. Sediment traps and sediment basins shall be designed and constructed based upon the total drainage area to be served by the trap or basin. SHOWN ON PLANS.
  - a. 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.
  - b. 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 twenty-four hour 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.
7. 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. MAXIMUM SLOPE FOR THIS PROJECT IS 2 TO 1.
8. Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure. AS SHOWN ON PLANS.
9. Whenever water seeps from a slope face, adequate drainage or other protection shall be provided. IF ENCOUNTERED DURING CONSTRUCTION THEN APPROPRIATE MEASURE WILL BE PROVIDED.
10. 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. NO STORM SEWER INLETS ARE TO BE INSTALLED WITH MASS GRADING.
11. 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 to both the conveyance channel and receiving channel. FOR SEDIMENT BASINS.
  - a. No more than 500 linear feet of trench may be opened at one time.
  - b. Excavated material shall be placed on the uphill side of trenches.
  - c. 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.
  - d. Material used for backfilling trenches shall be properly compacted in order to minimize erosion and promote stabilization.
  - e. Reinstatement shall be accomplished in accordance with these regulations.
  - f. Applicable safety regulations shall be complied with.
17. Where construction vehicle access routes intersect paved or public roads, provisions shall be made to minimize the transport of sediment by vehicles lacking onto the paved surface. Where sediment is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual development lots as well as to larger land-disturbing activities. PREVENT DEBRIS FROM ENTERING BLUE HILLS DRIVE.
18. 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. CONTACT ROANOKE COUNTY AND ROANOKE CITY PRIOR TO REMOVAL MEASURES.
19. Properties and waterway 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 for the stated frequency storm of 24-hour duration in accordance with the following standards and criteria. FINAL DESIGN WILL SHOW POND 1 OUTFALLING INTO AN EXISTING STORM DRAIN SYSTEM AND POND 2 INTO AN EXISTING DITCH ALONG ROUTE 460.
  - a. 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 outlet of the pipe or pipe system shall be performed.
  - b. Adequacy of all channels and pipes shall be verified in the following manner:
    - (1) 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
    - (2) (a) Natural channels shall be analyzed by the use of a two-year storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks; and
    - (b) All previously constructed man-made channels shall be analyzed by the use of a ten-year storm to verify that stormwater will not overtop 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
    - (c) Pipes and storm sewer systems shall be analyzed by the use of a two-year storm to verify that stormwater will be contained within the pipe or system.
- c. If existing natural receiving channels or previously constructed man-made channels or pipes are not adequate, the applicant shall:
  - (1) Improve the channel to a condition where a two-year storm will not overtop the banks and a two-year storm will not cause erosion to the channel bed or banks; or
  - (2) Improve the pipe or pipe system to a condition where the ten-year storm is contained within the appurtenances; or
  - (3) Develop a site design that will not cause the pre-development peak runoff rate from a two-year storm to increase when runoff outfalls into a natural channel or will not cause the re-development peak runoff rate from a ten-year storm to increase when runoff outfalls into a man-made channel; or
  - (4) Provide a combination of channel improvement, stormwater detention or other measures which is satisfactory to the plan-approving authority to prevent downstream erosion.
- d. The applicant shall provide evidence of permission to make the improvements.
- e. All hydrologic analyses shall be based on the existing watershed characteristics and the ultimate development of the subject project.
- f. If the applicant chooses an option that includes stormwater detention he/she shall obtain approval from the locality 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.
- g. Outfall from a detention facility shall be discharged to a receiving channel, and energy dissipaters shall be placed at the outlet of all detention facilities as necessary to provide a stabilized transition from the facility to the receiving channel.
- h. All on-site channels must be verified to be adequate.
- i. 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.
- j. 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.
- k. 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.



FOR EROSION AND SEDIMENT CONTROL ONLY

BLUE HILLS VILLAGE  
MASS GRADING PLAN

EROSION CONTROL PLAN  
ROANOKE, VIRGINIA

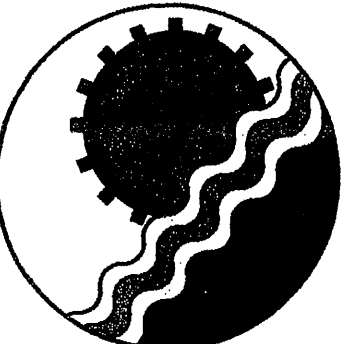
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FEB. 5, 2007

PROJECT: 08067

MASS GRADING-7

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ENGINEERING CONCEPTS, INC.

3433 BRAMBLETON AVENUE, SUITE 200B  
ROANOKE, VIRGINIA 24018  
540.776.5715 FAX: 540.776.8543

U.S. ROUTE 460 R/W VARIES