

**EROSION CONTROL NARRATIVE****PROJECT DESCRIPTION**

THIS PROJECT IS LOCATION IN THE FRONT PORTION (SOUTHERN AREA) OF THE BRANDON OAKS NURSING AND REHABILITATION CENTER WHICH IS LOCATION ON THE NORTH SIDE OF BRANDON AVENUE IN THE CITY OF ROANOKE. THE PROPOSED DEVELOPMENT CONSISTS OF THE RELOCATION OF EXISTING UTILITIES FOR A FUTURE BUILDING EXPANSION. APPROXIMATELY 0.6 ACRES WILL BE DISTURBED WITH THIS PROJECT.

**EXISTING SITE CONDITIONS**

THIS SITE IS CURRENTLY USED AS A NURSING HOME AND REHABILITATION FACILITY AND HAS AN EXISTING BUILDING IN THE CENTER OF THE SITE WITH PARKING TO THE EASTERN SIDE OF THE BUILDING. THE CURRENT SITE TOPOGRAPHY GENERALLY DRAINS RUNOFF AWAY FROM THE EXISTING BUILDING TO EITHER THE NORTH OR SOUTH. THE NORTHERN PORTION OF THE DRAINAGE SHED CONTAINS AN EXISTING DETENTION POND WHILE THE SOUTHERN DRAINAGE SHED CONVEYS RUNOFF TO THE EXISTING STORMDRAIN SYSTEM ALONG BRANDON AVENUE.

**ADJACENT AREAS**

THIS SITE IS BORDERED BY BRANDON AVENUE TO THE SOUTH, STRATFORD PARK DEVELOPMENT (ZONED RMF AND MX) TO THE NORTH AND EAST, AND EXISTING COMMERCIAL LOTS (ZONED MX) TO THE WEST. ALSO, A PRIVATE ROAD AND PARKING LOT BORDERS THE PROPOSED SITE TO THE NORTH AND EAST SEPARATING THE STRATFORD PARK DEVELOPMENT FROM THE BRANDON OAKS FACILITY.

**OFFSITE AREAS**

NO OFFSITE AREAS ARE COVERED WITH THIS PLAN SET. IF MATERIALS ARE TO BE WASTED OFFSITE THE LOCATION MUST BE PROVIDED TO THE CITY OF ROANOKE. A SEPARATE EROSION & SEDIMENT CONTROL PLAN MAY BE REQUIRED.

**SOILS**

SOILS INFORMATION IS BASED ON AN INSPECTION OF THE USDA SOIL SURVEY OF ROANOKE CITY AND HAS NOT BEEN FIELD VERIFIED. A SOILS MAP IS ATTACHED WHICH SHOWS THE LOCATION OF VARIOUS SOILS WITHIN THE CONSTRUCTION AREA. THE FOLLOWING SYMBOLS CORRESPOND WITH SOIL TYPES ON THE MAP. SEE THE DRAINAGE & STORMWATER MANAGEMENT CALCULATIONS FOR A MORE DETAILED DESCRIPTION OF THE SOILS PRESENT.

SYMBOL	SOIL TYPE
60	CHISWELL-LITZ-URBAN LAND COMPLEX, 15 TO 35% SLOPES
57A	WHEELING-URBAN LAND COMPLEX, 0 TO 2% SLOPES, RARELY FLOODED

**CRITICAL AREAS**

THE CONTRACTOR SHALL TAKE SPECIAL CARE TO INSURE THAT SEDIMENT IS NOT ALLOWED TO FLOW INTO EITHER THE NEW STORM DRAIN OR THE EXISTING DOWNSIDE DRAIN. INSURE THAT ALL ESC MEASURES ARE STABILIZED AND FUNCTIONING TO MINIMIZE THE POTENTIAL FOR ANY SEDIMENT LEAVING THE SITE.

**MINIMUM STANDARDS**

REFER TO DCR 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.

**SILT FENCE (3.08)** – SILT FENCE WILL BE INSTALLED AT THE LOWER ENDS OF THE PROJECT SITE TO INTERCEPT SEDIMENT LAIDEN RUN-OFF PRIOR TO EXITING THE SITE.

**DIVERSION DIKE (3.09)** – A RIDGE OF COMPACTED SOIL WHICH DIVERTS OFF SITE RUNOFF.

**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 GRADING, 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.

**PERMANENT STABILIZATION**

ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED WITH PERMANENT SEEDING WITHIN 7 DAYS OF REACHING FINAL GRADES. SEEDING SHALL BE DONE IN ACCORDANCE WITH DCR SPECIFICATION 3.32 (PERMANENT SEEDING), OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION AND WITH THE DETAILS SHOWN ON THIS PLAN. MULCH (STRAW OR FIBER) SHALL BE USED ON ALL SEEDING AREAS. IN ALL SEEDING OPERATIONS, SEED, FERTILIZER, AND LIME SHALL BE APPLIED PRIOR TO MULCHING.

**MAINTENANCE**

ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED BY WEEKLY AND AFTER EVERY RUNOFF PRODUCING RAINFALL. 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.

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-18. 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 THEN TEMPORARY MEASURES PROPERLY REMOVED.

**STORMWATER MANAGEMENT CONSIDERATION**

BASED ON THE CALCULATIONS PROVIDED WITH THIS PLAN SET AND ROANOKE CITY'S STORMWATER MANAGEMENT REQUIREMENTS, NO INCREASE IN STORMWATER RUNOFF VOLUME OR VELOCITY IS EXPECTED WITH THESE PLANS. IN ADDITION, THE POST-DEVELOPMENT IMPERVIOUS SURFACE COVERAGE PERCENTAGE OF THE DISTURBED AREA IS LESS THAN 16%. THEREFORE, NO ADDITIONAL STORMWATER MANAGEMENT FACILITIES ARE REQUIRED FOR THIS PROJECT.

**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 14 days to denuded areas that may not be at final grade but will remain denuded for longer than 30 days. Permanent stabilization shall be applied to areas that are to be left denuded for more than one year. *APPLY SEEDING MEASURES IN ACCORDANCE WITH SPECIFICATIONS 3.31 AND 3.32 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (YES) TO ALL AREAS THAT DO NOT HAVE A NON-ERODIBLE SURFACE AS SHOWN ON THIS PLAN.*
- During construction of the project, soil stock piles and borrow areas shall be stabilized or protected with temporary trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site or borrow areas and not intentionally transport soil from the project site. *ANY ONSITE SOIL STOCKPILE SHALL HAVE SALT PENCE ALONG THE DOWNHILL PERIMETER. ALSO, A TEMPORARY SEED MIX IS TO BE APPLIED OVER THE SOIL STOCKPILE IF TO REMAIN AS-IS FOR LONGER THAN 30 DAYS. NO ONSITE STOCKPILE IS CURRENTLY PLANNED FOR THIS PROJECT.*
- 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 STANDARDS.*
- 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 upsize land disturbance takes place. *INSTALL EROSION CONTROL MEASURES AS OUTLINED IN THE CONSTRUCTION SEQUENCE.*
- Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation. *TEMPORARY SEEDING IS TO BE APPLIED TO TEMPORARY DIVERSION DIKES ONCE INSTALLED.*
- 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. *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 stabilization measures until the problem is corrected. *RESERVE ANY AREAS THAT DO NOT HAVE AN ESTABLISHMENT OF A GOOD STAND OF GRASS AFTER INITIAL APPLICATION OF PERMANENT SEEDING. 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. *NO CUT OR FILL SLOPES ARE PROPOSED WITH THIS PLAN. FINAL GRADES SHALL MATCH EXISTING GRADE.*
- Whenever water seeps from a slope face, adequate drainage or other protection shall be provided. *NOT APPLICABLE. SEEPAGE THROUGH SLOPES IS NOT ANTICIPATED TO BE ENCOUNTERED ON THIS PROJECT.*
- 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 INLET PROTECTIONS ARE REQUIRED FOR 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. *NO NEW CHANNELS ARE PROPOSED WITH THIS PLAN.*
- When work in a live watercourse is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction. Nonerodible material shall be used for the construction of cofferdams and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials. *NOT APPLICABLE. NO LIVE WATERCOURSES EXIST WITHIN OR ADJACENT TO THIS PROJECT.*
- 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 WATERCOURSES EXIST WITHIN OR ADJACENT TO THIS PROJECT.*
- All applicable federal, state and local regulations pertaining to working in or crossing the watercourse shall be met. *NOT APPLICABLE. NO LIVE WATERCOURSES EXIST WITHIN OR ADJACENT TO THIS PROJECT.*
- The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed. *NOT APPLICABLE. NO LIVE WATERCOURSES EXIST WITHIN OR ADJACENT TO THIS PROJECT.*
- 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.
  - Rehabilitation shall be accomplished in accordance with these regulations.
  - Applicable safety regulations shall be complied with.
- 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 surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by blowing 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. *FOLLOW ABOVE REQUIREMENTS FOR ACCESS TO SITES. SEE CONSTRUCTION SEQUENCE.*
- All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after the temporary measure is 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. *EROSION & SEDIMENT CONTROL MEASURES SHALL NOT BE REMOVED WITHOUT ROANOKE CITY PERMISSION AND SHALL BE IN ACCORDANCE WITH ABOVE REQUIREMENTS.*
- 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 for the stated frequency storm of 24-hour duration in accordance with the following standards and criteria:
  - 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 outfalls within the channel is one hundred times greater than the contributing drainage area of the project in question; or
    - (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 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 overtop the banks and a two-year storm will not cause erosion of channel bed or banks; or
    - Improve the pipe or pipe system to a condition where the ten-year storm is contained within the apertures; or
    - Develop a site design that will not cause the pre-development peak runoff rate from a two-year storm to increase when runoff outside into a natural channel or will not cause the pre-development peak runoff rate from a ten-year storm to increase when runoff outside into a man-made channel; or
    - Provide a combination of channel improvement, stormwater detention or other measures which is satisfactory to the plan-approving authority to prevent downstream erosion.
- The applicant shall provide evidence of permission to make the improvements.
- All hydrologic analyses 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 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.
- Outfall from a detention facility shall be discharged to a receiving channel, and energy dissipator 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 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 integrity of rivers, streams and other waters of the state. *INCREASES IN STORMWATER VOLUME, VELOCITY, AND PEAK RUNOFF ARE NOT EXPECTED WITH THIS EROSION & SEDIMENT CONTROL PLAN. RESPONSIBLE LAND DISTURBER SHALL PAY PARTICULAR ATTENTION TO OFF-SITE AREAS CONTRIBUTING RUNOFF TO THE SITE AND OFF-SITE LOCATIONS RECEIVING RUNOFF FROM THIS PROJECT, AND PROPER OPERATION OF STORMWATER MANAGEMENT PRACTICES ON-SITE.*

**GENERAL EROSION AND SEDIMENT CONTROL NOTES**

ROANOKE CITY, VIRGINIA

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

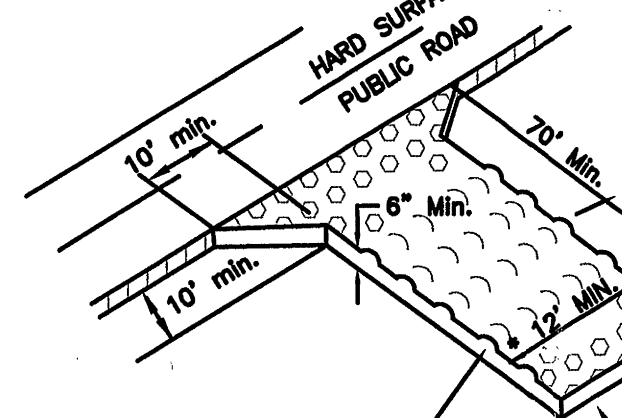
ES-4- A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN AND NARRATIVE, AS WELL AS A COPY OF THE LAND DISTURBING PERMIT, SHALL BE MAINTAINED ON THE SITE AT ALL TIMES. THE EROSION AND SEDIMENT CONTROL ADMINISTRATOR WILL DELIVER THESE MATERIALS AT THE ONSITE PRECONSTRUCTION CONFERENCE.

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.

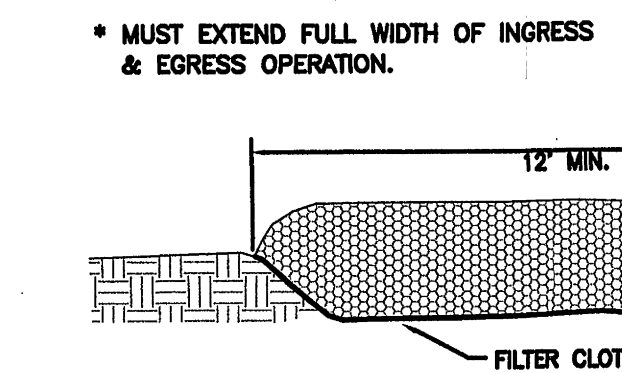
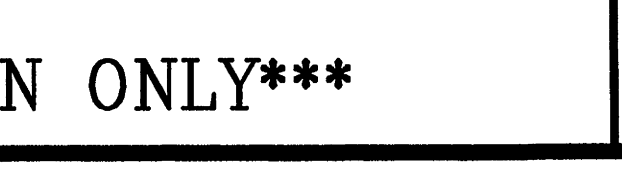
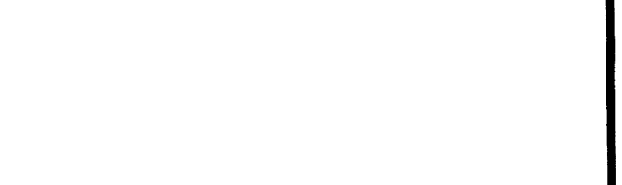
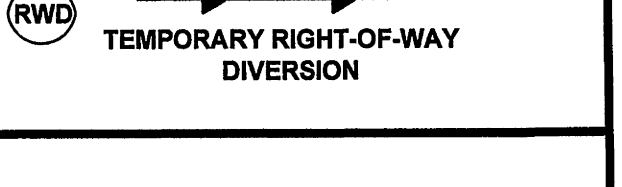
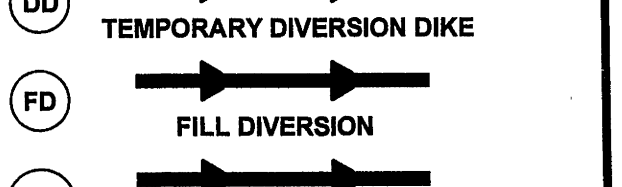
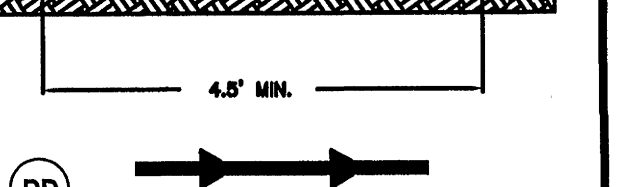
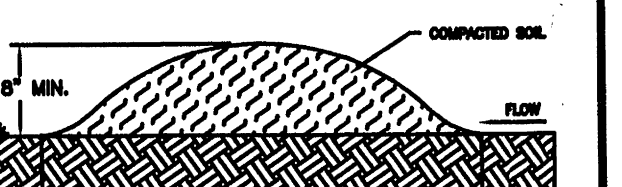
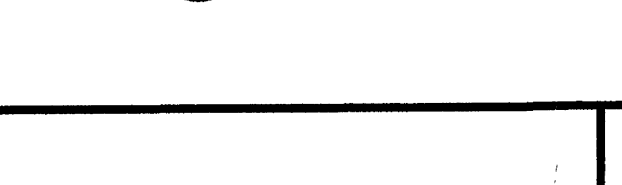
ES-7- ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING THE LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.

ES-8- 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.



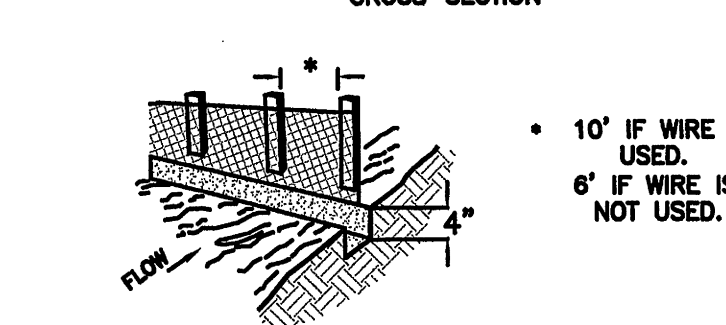
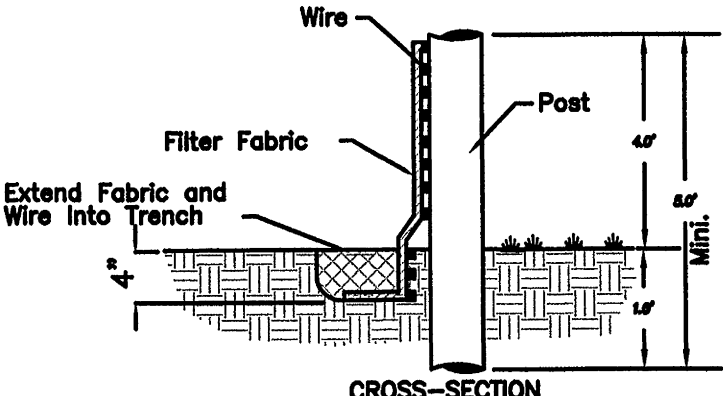
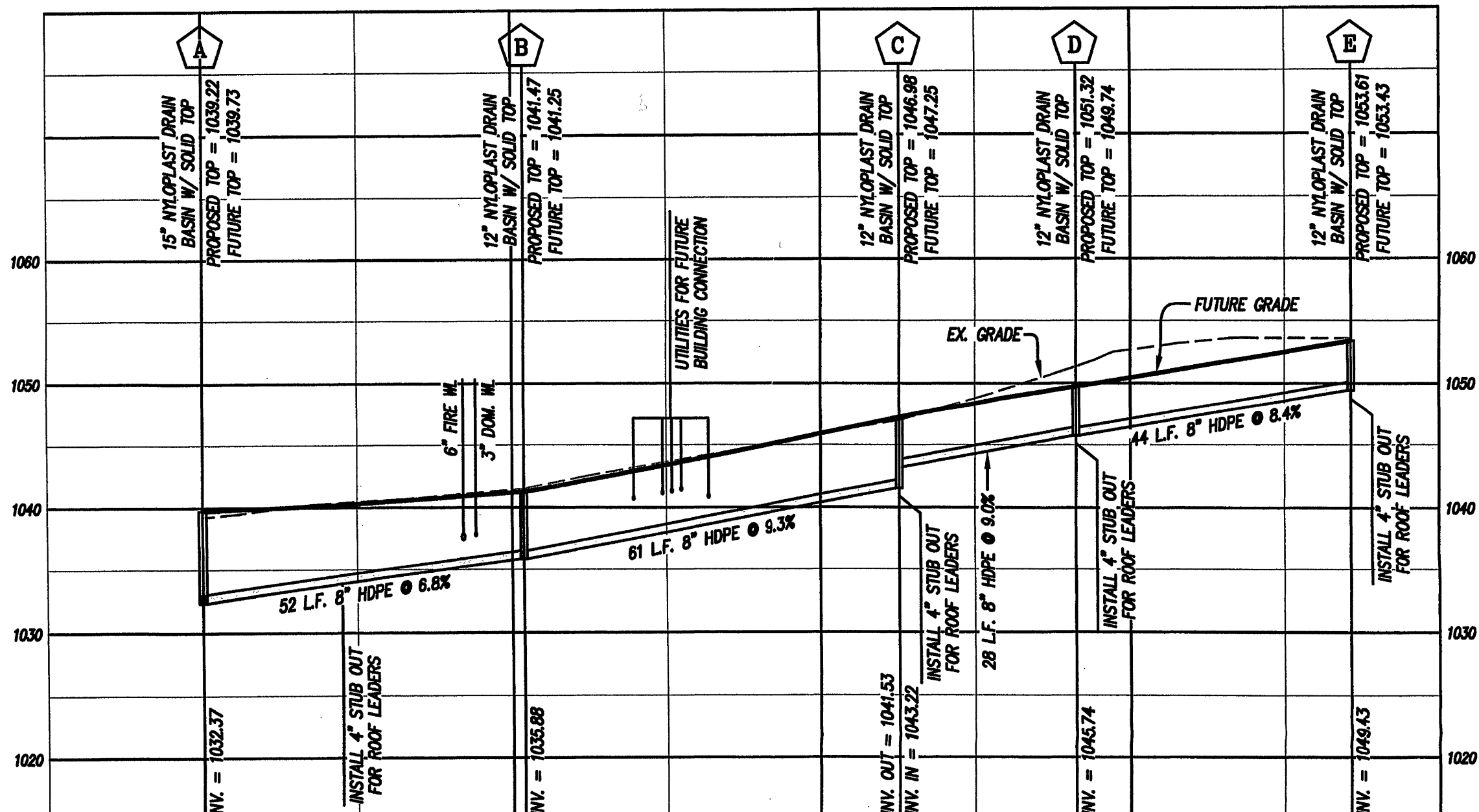
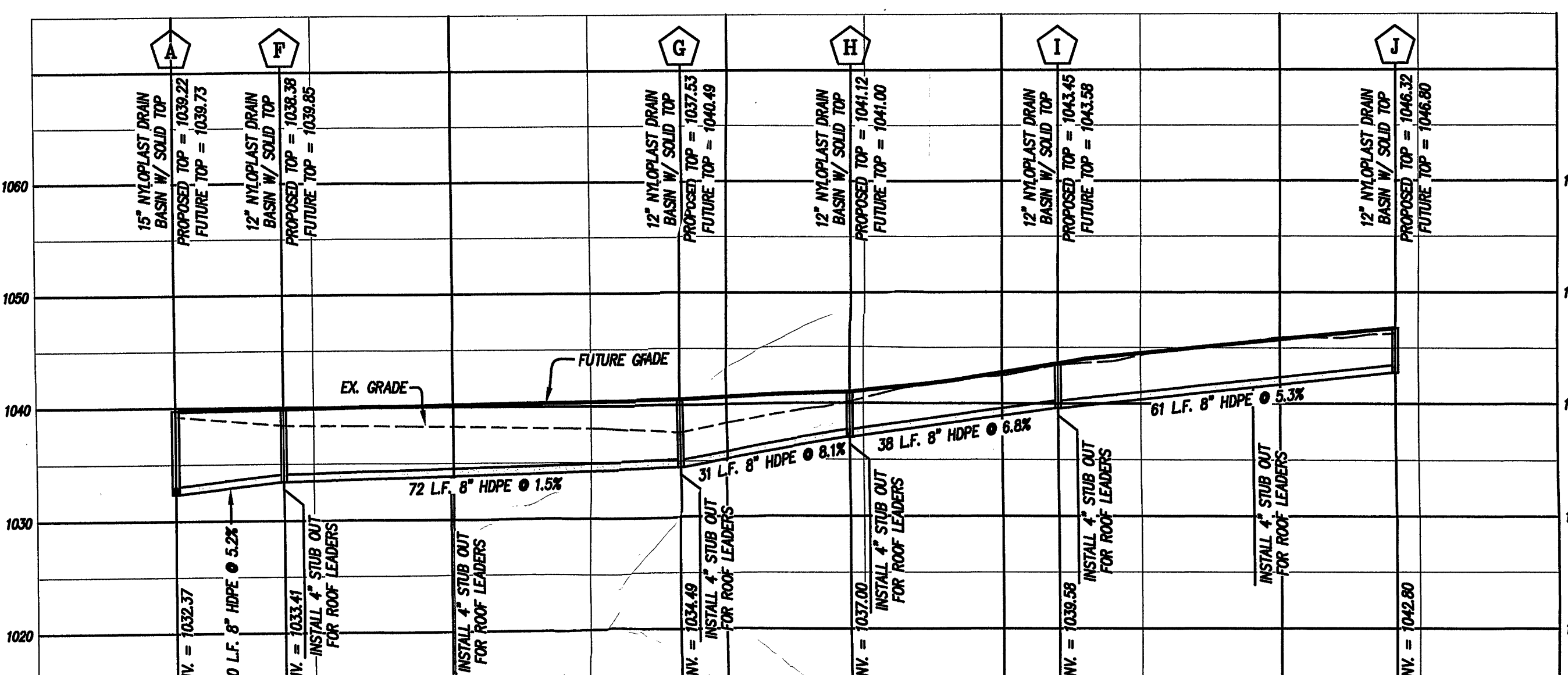
CONSTRUCT A WASHBOARD OR WASH RACK IF REQUIRED.

\* MUST EXTEND FULL WIDTH OF INGRESS & EGRESS OPERATION.

**TEMPORARY GRAVEL CONSTRUCTION ENTRANCE****TEMPORARY SEEDING MIXTURE**

PLANTING DATES	SPECIES	RATE (LBS./ACRE)
SEPT. 1 - FEB. 15	50/50 MIX OF ANNUAL RYEGRASS (LOLIUM MULTIFLORUM) CEREAL (WINTER) RYE (SECALE CEREALE)	50 - 100
FEB. 16 - APR. 30	ANNUAL RYEGRASS (LOLIUM MULTIFLORUM)	60 - 100
MAY. 1 - AUG. 31	GERMAN MILLET (SETARIA ITALICA)	50

TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

**CONSTRUCTION OF A SILT FENCE****STORMDRAIN FOR FUTURE WEST ROOFDRAINS****STORMDRAIN FOR FUTURE EAST ROOFDRAINS**

\*\*\*THIS PLAN IS FOR UTILITY RELOCATION ONLY\*\*\*

LUMSDEN ASSOCIATES, P.C.  
ENGINEERS-SURVEYORS-PLANNERS  
ROANOKE, VIRGINIA

COMMONWEALTH OF VIRGINIA  
THOMAS C. DALE  
Lic. No. 033002  
6-27-13  
PROFESSIONAL ENGINEER

EROSION & SEDIMENT  
CONTROL DETAILS AND  
UTILITY PROFILES

UTILITY RELOCATION PLAN  
FOR  
BRANDON OAKS NURSING &  
REHABILITATION CENTER EXPANSION  
SITUATED AT  
3837 BRANDON AVENUE, S.W.  
THE CITY OF ROANOKE, VIRGINIA

APPROVED  
AUG 06 2013

NO.	DATE	DESCRIPTION
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DATE: June 27, 2013  
SCALE: NO SCALE  
COMMISSION NO: 12-098  
SHEET 4 OF 4