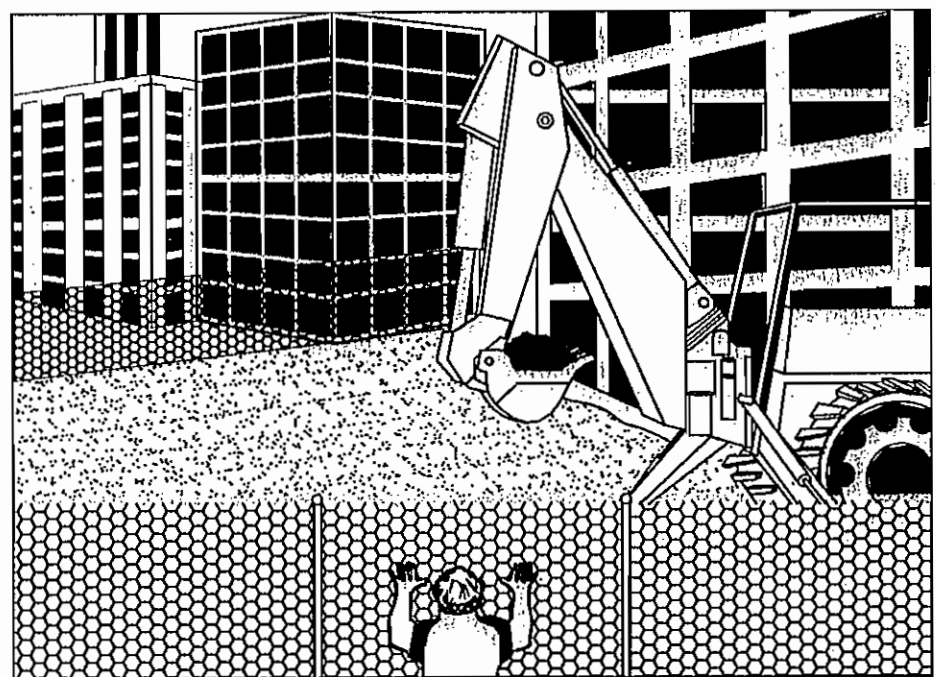


Printed By: Kuzenski, John Sheet Set: ROANOKE, VA Layout: C11 EROSION CONTROL DETAILS June 11, 2013 01:25:25pm K:\RAL\DESIGN\05FCB\011737195 - Roanoke VA\15 CAD Files\05FCB\C11 EROSION CONTROL DETAILS.dwg K:\RAL\DESIGN\05FCB\011737195 - Roanoke VA\15 CAD Files\05FCB\C11 EROSION CONTROL DETAILS.dwg This document, together with the concepts and designs presented herein, is intended only for the specific purpose and use of the client for which it was prepared. No use or improper reliance on this document without written authorization and approval by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

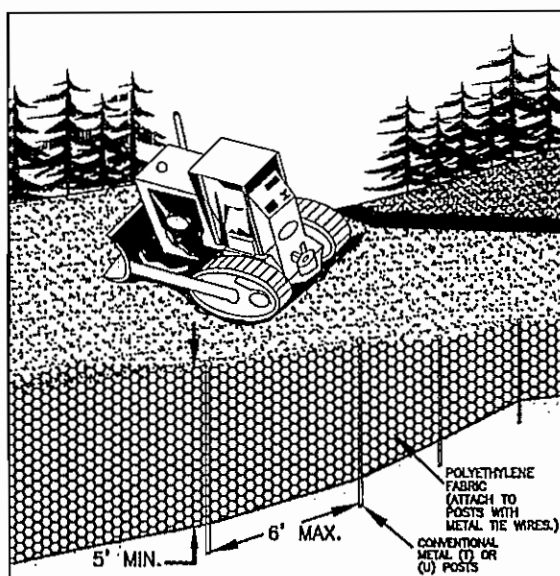
SAFETY FENCE

STANDARD AND SPECIFICATION 3.01

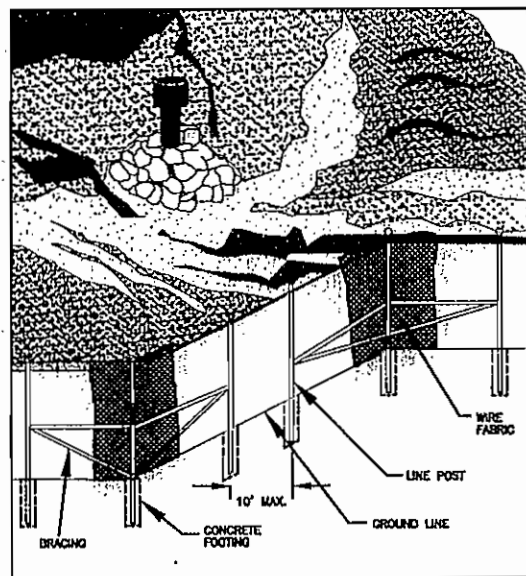
SAF



PERSPECTIVE VIEW



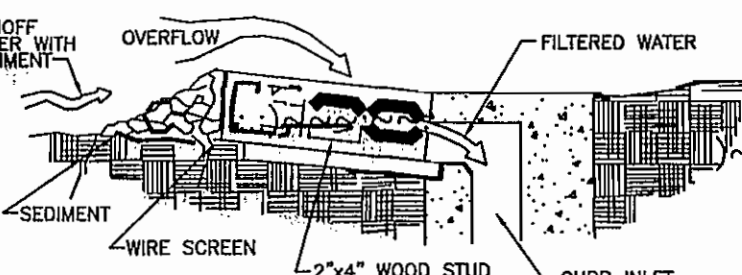
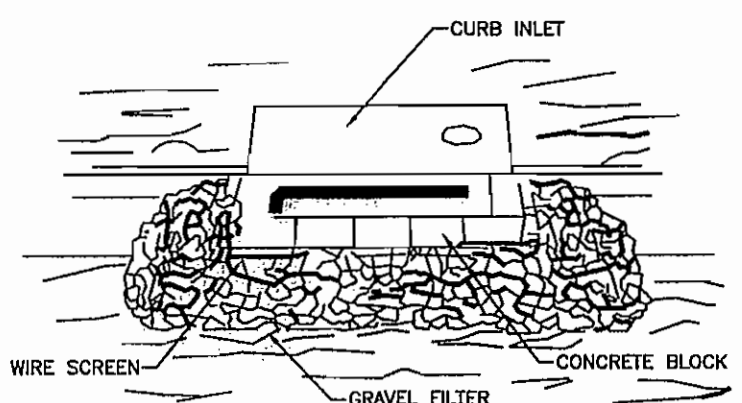
PERSPECTIVE VIEW
PLASTIC FENCE



PERSPECTIVE VIEW
METAL FENCE

BLOCK & GRAVEL CURB INLET SEDIMENT FILTER

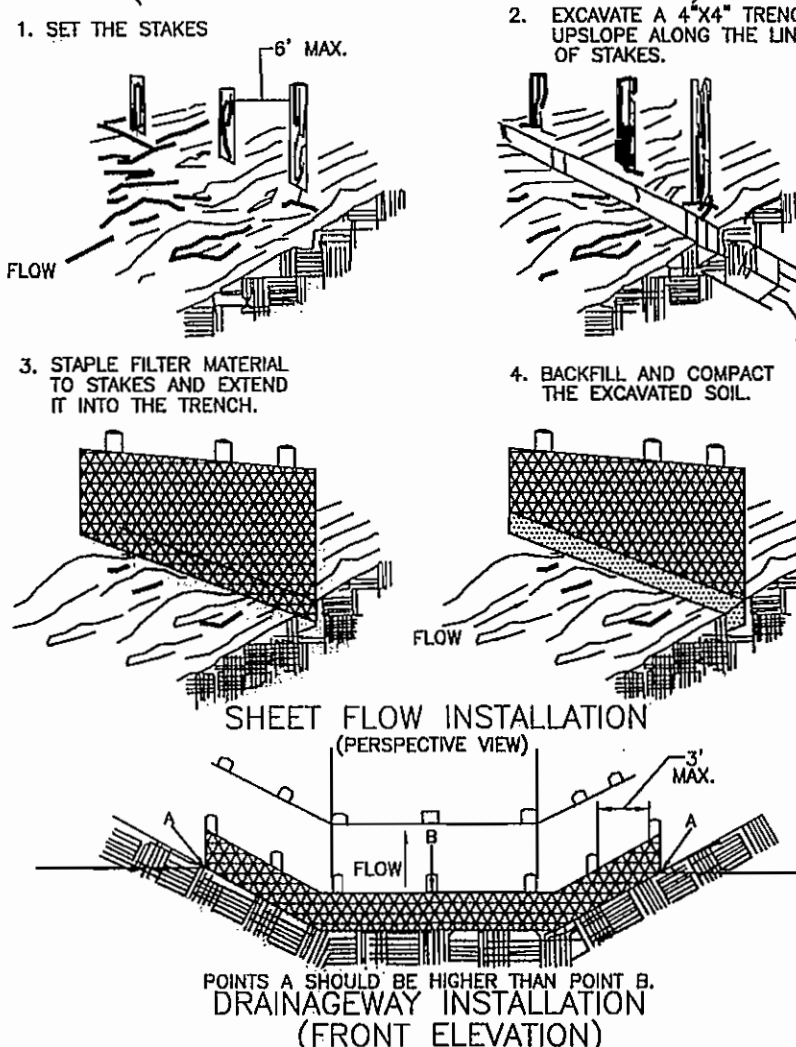
IP



SPECIAL APPLICATION:
THIS METHOD OF INLET PROTECTION IS APPLICABLE AT CURB INLETS WHERE AN OVERFLOW CAPABILITY IS NECESSARY TO PREVENT EXCESSIVE PONDING IN FRONT OF THE STRUCTURE

* GRAVEL SHALL BE VDOT #3, #357 OR #5 COARSE AGGREGATE

CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)



SF

§4VACS0-30-40 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.

Response: Permanent stabilization shall be applied to all disturbed areas per the specifications listed on this sheet. Temporary stabilization is not anticipated due to the short duration of the project. However, if temporary stabilization is required, areas shall be seeded with fast germinating temporary vegetation immediately following grading. The temporary seeding mixture will vary depending on the time of year it is to be applied. Temporary stabilization will be applied to areas that will remain dormant for longer than 14 days.

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.

Response: Soil stockpiles and borrow areas are not anticipated for this project since the proposed site will be built upon an existing facility.

3. 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.

Response: Permanent vegetative cover shall be provided per the specifications listed on this sheet.

4. Sediment basins and traps, prefilter 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.

Response: The construction sequence listed on the Demolition Plan (C03) calls for erosion control measures to be in place prior to the commencement of site work.

5. Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.

Response: Earthen structures are not anticipated for this project.

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.

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-five 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.

Response: Sediment basins and/or sediment traps are not proposed for this project.

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.

Response: Due to the flat to moderate slopes in the pre-development and post development condition, erosion from cut and fill slopes is not anticipated. If erosion does occur, appropriate stabilization measures will be employed.

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.

Response: Concentrated runoff is not anticipated for this project since the existing curb and gutter will be used to maintain the drainage to the existing inlets until the proposed curb and gutter is installed.

9. Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.

Response: This is not anticipated for the project, however, if water seepage occurs, appropriate protection measures shall be employed.

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.

Response: The project does not propose any new storm sewer inlets; however, the existing storm sewer inlets will have inlet protection installed prior to the commencement of site work.

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 in both the conveyance channel and receiving channel.

Response: There are no proposed stormwater conveyance channels or proposed pipes associated with this project.

12. 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 causeways and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials.

Response: This is not applicable to this project.

13. 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.

Response: This is not applicable to this project.

14. All applicable federal, state and local regulations pertaining to working in or crossing live watercourses shall be met.

Response: This is not applicable to this project.

15. The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed.

Response: This is not applicable to this project.

§4VACS0-30-40 Minimum Standards - Continued.

16. 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.

Response: Underground utilities shall be installed in accordance with the above requirements.

17. 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 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.

Response: Based on the pre-conference meeting, the existing entrance can be used as a construction entrance in-lieu of a gravel construction entrance. Roadway cleaning shall take place immediately and as often as necessary.

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.

Response: Temporary erosion and sediment control measures shall be removed within 30 days after the site has been stabilized and approval from the City of Roanoke has been received.

§4VACS0-30-40 Minimum Standards - Continued.

19. 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:

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 outfall of the pipe or pipe system shall be performed.

Response: Due to the reduction in impervious surface for the drainage area, the post development peak runoff from the site is less than in the pre-development condition. The stormwater runoff will enter the existing storm sewer system near the southeast corner of the site. An adequate outfall analysis was conducted analyzing from the upstream drainage area to 150' downstream of the receiving channel. Based on hydraulic grade line calculations for the 2- and 10-year storm event, the receiving channel is adequate to handle the runoff from the proposed development.

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 is 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 ten-year storm to verify that stormwater will be contained within the pipe or system.

Response: Due to the reduction in impervious surface for the drainage area, the post development peak runoff from the site is less than in the pre-development condition. The stormwater runoff will enter the existing storm sewer system near the southeast corner of the site. An adequate outfall analysis was conducted analyzing from the upstream drainage area to 150' downstream of the receiving channel. Based on hydraulic grade line calculations for the 2- and 10-year storm event, the receiving channel is adequate to handle the runoff from the proposed development. No natural or previously man-made channels exist on-site. The ultimate drainage basin for the outfall of the receiving stormwater system is approximately 121 acres, which is more than 100 times greater than the project site drainage area. Refer to the Stormwater and Erosion Control Analysis report for further calculations and maps.

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 ten-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 pre-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.

Response: Based on the adequate outfall calculations, the existing storm sewer system is adequate to handle the runoff from the proposed development, therefore, improvements to the existing system will not be required and are not proposed.

d. The applicant shall provide evidence of permission to make the improvements.

Response: No improvements are proposed for this project.

e. All hydrologic analyses shall be based on the existing watershed characteristics and the ultimate development of the subject project.

Response: The adequate outfall analysis took into consideration the existing upstream drainage area as well as the ultimate development of the project site. Based on this analysis, the outfall is adequate to handle the runoff from the proposed development.

f. 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.

Response: This project does not propose any stormwater detention devices.

g. Outfall from a detention facility shall be discharged to a receiving channel, and energy dissipaters shall be placed at the outfall of all detention facilities as necessary to provide a stabilized transition from the facility to the receiving channel.

Response: This project does not propose any stormwater detention devices.

h. All on-site channels must be verified to be adequate.

Response: Based on the adequate outfall analysis, all on-site channels have been 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.

Response: Due to the reduction in impervious surface, the post development runoff will be less than in the predevelopment condition. The drainage pattern in the post development minimizes that of the predevelopment and an adequate outfall analysis has been conducted to verify the adequacy of the receiving stormwater system. Adjacent properties will not be adversely affected.

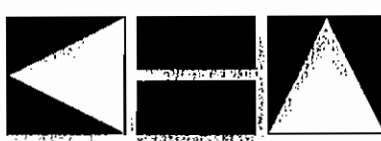
j. In applying these stormwater runoff criteria, individual lots or parcels in a residential, commercial or industrial development shall not be considered to be separate development projects. Instead, the development, as a whole, shall be considered to be a single development project. Hydrologic parameters that reflect the ultimate development condition shall be used in all engineering calculations.

Response: Based on the pre-submittal meeting, the drainage area for the on-site stormwater analysis is the project disturbed area. The adequate outfall analysis took into consideration the entire upstream drainage area to the receiving channel 150' downstream.

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.

Response: Due to the reduction in impervious surface area for the proposed development, the nutrient runoff from the site will be reduced. The ultimate downstream receiving channel is Cretan Creek which has a drainage area substantially larger than 100 times the site drainage area. Therefore, the physical, chemical and biological impacts from the proposed development shall be minimal.

APPROVED
SER 11/1/13



Kimley-Horn
and Associates, Inc.

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KHA PROJECT
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DATE
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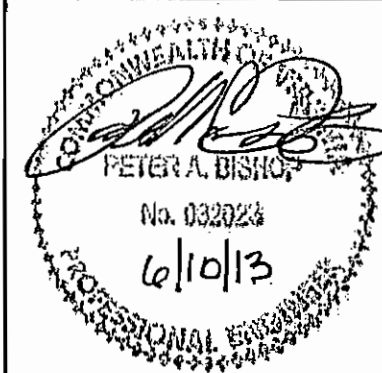
SCALE AS SHOWN

DESIGNED BY JDK

DRAWN BY DAW

CHECKED BY PAB

ROANOKE, VA
PREPARED FOR
FIRST CITIZENS BANK



EROSION CONTROL DETAILS

C11

SHEET NUMBER

No.	REVISIONS	DATE	BY
2	REVISED PER 2ND ROUND CITY COMMENTS	5/1/13	JDK
1	REVISED PER 1ST ROUND CITY COMMENTS	4/2/13	JDK