

## CHAPTER 3 - STORMWATER MANAGEMENT PLAN REVIEW AND APPROVAL

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### 3.0 STORMWATER MANAGEMENT PLAN REVIEW AND APPROVAL

In order to maintain the character and integrity of neighborhoods, to promote excellence of development, to prevent undue traffic and environmental hazards, and to encourage the most harmonious development and use of land, a development plan is required for commercial and residential development and shall be submitted to the Administrator. Subdivision Site Plans, as required for the development of 3 or more residential lots; and Comprehensive Development Plans, shall both be referred to as “development plans” within the context of this document.

The submitted development plan will be distributed to the appropriate City departments and divisions for review and approval. When required, the applicant is responsible for submittals to the Virginia Department of Health, DEQ, and other appropriate regulatory agencies for their review and approval. When applicable, all of these entities must approve the development plan prior to the issuance of any permits for all types of developments as required by the Chapter 36.2, Zoning, of the Code of the City of Roanoke (1979), as amended; and Chapter 11.1, Erosion and Sediment Control, of the Code of the City of Roanoke (1979), as amended.

In cases where jurisdictional waters exist on the proposed site, the applicant may need to obtain approval and/or permits from any or all of the following agencies: DEQ, DCR, FEMA, USACE and VMRC.

#### 3.1 Overview of the Review and Approval Process

No building, zoning, grading, site development, or land disturbance permit will be issued without first meeting the requirements of Chapter 11.6, Stormwater Management, of the Code of the City (1979), as amended., as shown in the approved stormwater management plan; which shall be contained within the development plan for the project.

The applicant shall submit a development plan based on the requirements set forth in the City of Roanoke Preparation and Procedural Review of a Comprehensive Development Plan document. This document is available from the City’s website at [www.roanokeva.gov](http://www.roanokeva.gov). A stormwater pollution prevention plan (SWPPP) shall be required as a part of the development plan submittal and will be required for all site development projects unless otherwise exempted under the provisions of the Stormwater Management Ordinance, as listed in

Chapter 1 of the Design Manual, Section 1.4, Applicability.

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Submittal of a stormwater management concept plan prior to submittal of a development plan (including stormwater management plan) is strongly recommended by the City in certain situations and may be submitted for any project, as deemed appropriate by the applicant. A stormwater management concept plan is intended to provide initial stormwater design information to the City for a site with specific environmental concerns or where advanced or innovated technology is proposed to be used to meet the stormwater management requirements.

The submittal, review, and approval of a development plan, including stormwater management concept plans, if required, and final stormwater management plans will follow the guidelines as set forth in the City of Roanoke Preparation and Procedural Review of a Comprehensive Development Plan document as follows:

- 1) If required by Section 3.2, the applicant shall submit three (3) copies of a stormwater management concept plan. The stormwater management concept plan shall include all items indicated in Section 3.2 and in the checklist from Appendix 3A. The stormwater management concept plan should be accompanied by a completed checklist.
- 2) The City, upon receipt of the stormwater management concept plan shall have twelve (12) business days to review and comment upon the stormwater management concept plan. At the end of this period, the City shall either accept or reject the stormwater management concept plan. Acceptance or rejection of the stormwater management concept plan will be in writing to the applicant and will be based on the adequacy of the concept to meet the requirements of Chapter 11.4, Stormwater Management, of the Code of the City (1979), as amended. Full and final approval of the stormwater management plan will occur with the approval of the formal development plan.
- 3) Prior to the formal submission of a development plan for review and approval, the City requires a pre-submittal conference where the applicant meets with the Administrator and other reviewing departments to confirm what information must be provided. Furthermore, to discuss any comments and concerns from the stormwater management concept plan review.
- 4) Following the acceptance of a stormwater management concept plan, the applicant shall submit ten (10) copies of the formal development plan as required

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by the City of Roanoke Preparation and Procedural Review of a Comprehensive Development Plan. Submittal of a formal development plan shall be within six (6) months of the approval of the stormwater management concept plan. The stormwater management plan shall include all items indicated in Section 3.3.1 and the checklist in Appendix 3A. The stormwater management plan shall be accompanied by the Checklist for Stormwater Management Plan Submittal. This checklist can be found in Appendix 3A, pages 1-3.

- 5) The City upon receipt of the comprehensive development plan, including the stormwater management plan, shall review the site development plan for completeness. If the plan is rejected for incompleteness, the City shall provide written comments of the deficiencies to the applicant.
- 6) Upon acceptance of the complete development plan, the City shall have twelve (12) business days to review and either approve or disapprove the development plan, including the stormwater pollution prevention plan (SWPPP). Approval or disapproval of the plan will be in writing to the applicant. Approval or disapproval of the SWPPP component of the development plan will be based on the adequacy of the design to meet the requirements of the Chapter 11.6, Stormwater Management, of the Code of the City (1979), as amended.
- 7) The applicant may correct and resubmit the development plan, including the SWPPP, within six (6) months of a disapproved plan. When resubmitting, the resubmittal will include a review comments response letter addressing how all review comments were addressed in the resubmitted plan. A new application is not required. Additional resubmission review fees are not required.

After six months, the applicant must resubmit a new application, complete with new review fees.

The City, upon receipt of a resubmitted development plan, shall have twelve (12) business days to review and approve or disapprove the resubmitted plan. Approval or disapproval of the plan will be in writing to the applicant.

- 8) Upon City approval of a development plan and its accompanying SWPPP, should a land-disturbing activity associated with the approved plan not begin within a 180-day period following approval or cease for more than 180 days, the

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City may evaluate the existing approved SWPPP to determine whether the plans still satisfy the local program requirements and to verify that all design factors are still valid. If the City finds the previously approved plan to be inadequate, a modified plan shall be submitted and approved. Site work shall proceed at the discretion of the Administrator.

- 9) An approved development plan expires and becomes null and void unless a building permit has been issued or use of the land has commenced within five (5) years from the date of approval.

### 3.2 Stormwater Management Concept Plan Submittal

Prior to submitting any SWPPP, the applicant may submit a concept plan to the Administrator for the proposed design of the stormwater management plan. Applicants are recommended to consult with the City to discuss the conceptual stormwater management design and to determine if they are subject to additional stormwater design requirements, prior to submittal.

A stormwater management concept plan is recommended to be submitted, when the proposed development meets any of the following conditions:

- The project includes a jurisdictional wetland (subject to regulation by DEQ, USACE, VMRC, etc.), perennial stream or intermittent stream on the development property.
- The project includes 25% or greater slopes in the area of land disturbance.
- Runoff from the project has the potential to inundate or otherwise adversely impact downstream properties.
- Runoff from the project will be discharged to a City owned storm drain system.

A submittal for concept plan review shall include three (3) copies of the stormwater management concept plan, which document adequate planning for management of stormwater runoff from new development and/or redevelopment. To accomplish this goal, the following information shall be included in the submittal:

- 1) Checklist for Stormwater Management Concept Plan Submittal (from Appendix 3A).

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- 2) A map (or maps) indicating the location of existing and proposed buildings, roads, parking areas, utilities, stormwater management and sediment control facilities. The map(s) will also clearly show proposed land use with tabulation of the percentage of surface area to be adapted to various uses; drainage patterns; locations of utilities, roads and easements; the limits of clearing and grading; and a written description of the site plan and justification of proposed changes in natural conditions.
- 3) Sufficient engineering analysis to show that the proposed stormwater management measures are capable of controlling runoff from the site in compliance with Chapter 11.6, Stormwater Management, of the Code of the City (1979), as amended and the requirements of this Design Manual.
- 4) A written or graphic inventory of the natural resources at the site and surrounding area as it exists prior to the commencement of the project and a description of the watershed and its relation to the project site. This description should include a discussion of soil conditions, forest cover, topography, wetlands, and other native vegetative areas on the site. Particular attention should be paid to environmentally sensitive features, including but not limited to steep slopes, highly erodible soils, existing wetlands, and stream buffers, that provide particular opportunities or constraints for development.
- 5) A written description of the anticipated maintenance for any proposed stormwater management facility.

### **3.3 Stormwater Pollution Prevention Plan (SWPPP) Submittal**

An approved development plan, where applicable, including a SWPPP, is required prior issuance of a Land Disturbance Permit, Building Permit or a Zoning Permit.

The SWPPP shall be appropriately sealed and signed by a professional engineer.

A SWPPP is comprised of the following:

- a. An erosion and sediment control plan;
- b. A stormwater management plan;

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- c. A pollution prevention plan; and
- d. Any additional control measures necessary to address a TMDL.

### 3.3.1 Stormwater Management Plan Requirements

The final stormwater management plan submittal, as a part of the development plan, shall include the following information, as a minimum:

- (1) Information on the type and location of stormwater discharges; information on the features to which stormwater is being discharged including surface waters or karst features, if present, and the predevelopment and postdevelopment drainage areas;
- (2) Contact information including the name, address, and telephone number of the owner and the tax reference number and parcel number of the property or properties affected;
- (3) A narrative that includes a description of current site conditions and final site conditions;
- (4) A general description of the proposed stormwater management facilities and the mechanism through which the facilities will be operated and maintained after construction is complete;
- (5) Information on the proposed stormwater management facilities, including:
  - i. The type of facilities;
  - ii. Location, including geographic coordinates;
  - iii. Acres treated; and
  - iv. The surface waters or karst features, if present, into which the facility will discharge.
- (6) Hydrologic and hydraulic computations, including runoff characteristics;
- (7) Documentation and calculations verifying compliance with the water quality and quantity requirements of the City of Roanoke's stormwater management ordinance.
- (8) A map or maps of the site that depicts the topography of the site and includes:
  - i. All contributing drainage areas;

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- ii. Existing streams, ponds, culverts, ditches, wetlands, other water bodies, and floodplains;
- iii. Soil types, geologic formations if karst features are present in the area, forest cover, and other vegetative areas;
- iv. Current land use including existing structures, roads, and locations of known utilities and easements;
- v. Sufficient information on adjoining parcels to assess the impacts of stormwater from the site on these parcels;
- vi. The limits of clearing and grading, and the proposed drainage patterns on the site;
- vii. Proposed buildings, roads, parking areas, utilities, and stormwater management facilities; and
- viii. Proposed land use with tabulation of the percentage of surface area to be adapted to various uses, including but not limited to planned locations of utilities, roads, and easements.

### 3.3.2 Pollution Prevention Plan Requirements

The pollution prevention plan submittal, as a part of the development plan, shall include the following information, as a minimum:

- (1) How to minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
- (2) How to minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater; and
- (3) How to minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.

The pollution prevention plan shall include effective best management practices to prohibit the following discharges:

- (1) Wastewater from washout of concrete, unless managed by an appropriate control;
- (2) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials;

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- (3) Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;  
and
- (4) Soaps or solvents used in vehicle and equipment washing.

Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls.

### 3.3.3 Submittal of Stormwater Calculations

Calculations shall be submitted to the City supporting the stormwater management and storm drainage design. Calculations shall be well organized and coordinated with the design to allow for efficient review by the City. Calculations shall be bound together in a booklet or stapled together with pages numbered. Calculations shall follow the following general format:

- Cover Sheet – The cover sheet shall contain the project name, property tax parcel(s) number(s), applicant’s name, design professional’s name, calculations date, and the seal and signature of the design professional.
- Table of Contents – A table of contents shall be provided assist the reviewer in locating information in the calculations. All pages must be sequentially numbered.
- Introduction – A general description of the project providing information to assist the reviewer in understanding the nature and scope of the project and of the storm drainage and stormwater management facilities that are proposed.
- Criteria and Methodology – A listing of the basic design criteria and of the methodologies that the calculations will follow to demonstrate that the basic design criteria are met.
- References – A listing of references that are used in the calculations
- Assumptions – A listing of all assumptions, and justification of the assumptions that are used in the calculations.
- Analysis – The body of the calculations shall be clearly labeled as to which storm water management facility or storm drainage system the calculations pertain. The calculations shall be step-by-step to ensure that a reviewer that is not familiar with the project can follow the progression of the calculations. Provided, input and output information shall be clearly identified, if highlighted only in yellow, to ensure that the input information is clearly supported in the calculations, and that the output is properly evaluated in the summary and conclusions. All calculation

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parameters must be fully supported and documented and include the design storm frequency, intensity and duration, times of concentration, soil curve numbers or runoff coefficients; calculations identifying total runoff volumes for each watershed area, infiltration rates (where applicable), culvert, storm drain, and open channel capacities, flow velocities, data on the increase in rate and volume of runoff for the specified design storms, pre- and post-development phosphorous loadings, downstream channel analysis and all other calculations needed to support the proposed design, as identified in the Virginia Stormwater Management Handbook, the Virginia Erosion and Sediment Control Handbook and the City's Stormwater Management Design Manual.

- Summary and Conclusions – A summary of the results, preferably in tabular or chart form for each storm drain system and stormwater management facility to indicate that the land disturbing project meets the requirements of the Design Manual with conclusions.
- Appendices and Attachments – Any supporting information such as drainage area maps, soils maps, USGS quadrangle maps, design nomographs, and computer printouts.

Calculations that are not well organized and coordinated with the design shall be rejected and the submittal shall not be reviewed until proper calculations are submitted.

### 3.4 Changes and Modifications to an Approved Plan

Changes to an approved development plan, including an approved SWPPP, may only be made with the approval of the Administrator. The Administrator, upon receipt of the resubmittal of an approved development plan, shall have up to twelve (12) business days to review and approve or disapprove the resubmitted plan. Proposed changes may be submitted in PDF format via email. Changes which significantly impact function and design shall come through the design professional. Location and other minor changes may come from the contractor. The Administrator has sole discretion over how a particular change must be submitted. Approval or disapproval of the resubmitted plan shall be made in writing to the applicant. All changes shall be submitted, reviewed, and approved BEFORE action is taken on the change in the field.

**APPENDIX 3A- STORMWATER MANAGEMENT PLAN CHECKLISTS**

Stormwater Management Concept Plan Submittal Checklist

Final Design Stormwater Management Plan Submittal Checklist

**Checklist for  
Stormwater Management Concept Plan Submittal  
City, Virginia  
Page 1 of 2**

Project Name: \_\_\_\_\_

Applicant: \_\_\_\_\_

Property Owner: \_\_\_\_\_

\_\_\_\_\_ Copy of completed checklist

\_\_\_\_\_ Existing and Proposed Site Maps

- \_\_\_\_\_ Project limits and property lines, extending 100 feet beyond
- \_\_\_\_\_ Perennial and intermittent streams
- \_\_\_\_\_ Boundary of 100 year flood plain and floodway
- \_\_\_\_\_ Boundaries of existing predominant vegetation and limits of proposed clearing
- \_\_\_\_\_ Boundaries for protection areas such as wetlands, lakes, ponds, stream buffers, well and septic setbacks
- \_\_\_\_\_ Existing and proposed pavements and buildings
- \_\_\_\_\_ Existing and preliminary proposed stormwater conveyance channels, culverts, and storm drains, or modifications to existing structures
- \_\_\_\_\_ Stormwater drainage divides and flow paths
- \_\_\_\_\_ Preliminary location, size, access, and limits of disturbance of proposed structural stormwater management practices

\_\_\_\_\_ Mapping of predominant soils from USDA soil surveys

\_\_\_\_\_ Hydrologic and Hydraulic Analysis

- \_\_\_\_\_ Runoff rates, volumes, and velocities for the existing (pre-construction) conditions, showing methodologies used and supporting calculations
- \_\_\_\_\_ Runoff rates, volumes, and velocities for the proposed (post-construction) conditions, showing methodologies used and supporting calculations
- \_\_\_\_\_ Preliminary analysis of downstream impacts/effects of the project, where necessary. Verification of downstream adequate channel.
- \_\_\_\_\_ Preliminary selection and rationale for structural stormwater management practices
- \_\_\_\_\_ Preliminary sizing calculations for structural stormwater management practices including, contributing drainage area, surface area, storage, and outlet configuration

**Checklist for  
Stormwater Management Concept Plan Submittal  
City of Roanoke, Virginia  
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\_\_\_\_\_ Preliminary Erosion & Sediment Control Plan

\_\_\_\_\_ Summary of Natural Resources

- \_\_\_\_\_ Soil survey
- \_\_\_\_\_ Forest and vegetation
- \_\_\_\_\_ Wetlands
- \_\_\_\_\_ Environmental impacts
- \_\_\_\_\_ Steep Slopes
- \_\_\_\_\_ Flood Plains

\_\_\_\_\_ Maintenance Requirements Summary

\_\_\_\_\_ Variance Requests

**Checklist for  
Stormwater Management Plan Submittal  
City of Roanoke, Virginia  
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Project Name: \_\_\_\_\_

Applicant: \_\_\_\_\_

Property Owner: \_\_\_\_\_

\_\_\_\_\_ Signature/stamp of Professional Engineer/Surveyor registered in Virginia

\_\_\_\_\_ Completed checklist

\_\_\_\_\_ Existing and Proposed Site Maps (Scale 1"=50 feet or larger, 2' topographic contours)

\_\_\_\_\_ Project limits and property lines, owner and tax map parcel numbers of all properties under development and adjoining properties

\_\_\_\_\_ Perennial and intermittent streams

\_\_\_\_\_ Boundary of 100 year flood plain

\_\_\_\_\_ Boundaries of existing predominant vegetation and limits of proposed clearing

\_\_\_\_\_ Boundaries for protection areas such as wetlands, lakes, ponds, stream buffers, well and septic setbacks

\_\_\_\_\_ Existing and proposed pavements and buildings

\_\_\_\_\_ Existing and proposed utilities and their easements

\_\_\_\_\_ Existing and preliminary proposed stormwater conveyance channels, culverts, and storm drains, or modifications to existing structures

\_\_\_\_\_ Stormwater drainage divides and flow paths

\_\_\_\_\_ Location, size, access, and limits of disturbance of proposed structural stormwater management practices

\_\_\_\_\_ Tabulation of elevation/storage volume for all stormwater management facilities that provide storage (maximum 2-foot elevation intervals)

\_\_\_\_\_ Mapping of predominant soils from USDA soil surveys

\_\_\_\_\_ Same scale as Site Plan

\_\_\_\_\_ Property Lines

\_\_\_\_\_ Perennial and intermittent streams

\_\_\_\_\_ Existing and proposed pavements and buildings

\_\_\_\_\_ Existing and proposed stormwater conveyance channels, culverts, and storm drains, or modifications to existing structures, and stormwater management facilities

\_\_\_\_\_ Stormwater drainage divides and flow paths

**Checklist for  
Stormwater Management Plan Submittal  
City of Roanoke, Virginia  
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- \_\_\_\_\_ Soil names and boundaries
- \_\_\_\_\_ Hydrologic soil classifications
- \_\_\_\_\_ Location of slopes 2:1 or greater, or highly erodible soils
- \_\_\_\_\_ Soil boring locations, boring logs, and geotechnical reports, if required
  
- \_\_\_\_\_ Hydrologic and Hydraulic Analysis and Calculations and Water Quantity Control
  - \_\_\_\_\_ Narrative outlining assumptions and methodologies used in calculations
  - \_\_\_\_\_ Design storm frequency, duration, and intensity
  - \_\_\_\_\_ Time of concentration and flow paths
  - \_\_\_\_\_ Peak runoff rates, volumes, and velocities for each watershed drainage area under the existing (pre-construction) conditions, showing methodologies used and supporting calculations
  - \_\_\_\_\_ Peak runoff rates, volumes, and velocities for each watershed drainage area under the proposed (post-construction) conditions, showing methodologies used and supporting calculations
  - \_\_\_\_\_ Verification of downstream adequate channel as outlined in Technical Bulletin No. 1 – Virginia Department of Conservation and Recreation – Stream Channel Erosion Control
  - \_\_\_\_\_ Sizing calculations for structural stormwater management practices including, contributing drainage area, surface area, storage, and outlet configuration
  - \_\_\_\_\_ Analysis of potential downstream impacts/effects of project, where necessary
  
- \_\_\_\_\_ Stormwater Design Details and Calculations (Culverts, Channels, Inlets, Drains)
  - \_\_\_\_\_ Hydraulic calculations showing each structure is adequately sized
  - \_\_\_\_\_ Plan view, existing and proposed structural elevations
  - \_\_\_\_\_ Profile drawings of channels, pipes (12 inch diameter and larger) and culverts showing all utility crossings
  - \_\_\_\_\_ Typical cross sections for open channels and storm drain outfalls showing bottom width, height, water level for the design storms, side slopes and stabilization used
  - \_\_\_\_\_ Size, type, class, length and slope of all pipes and culverts
  - \_\_\_\_\_ Inlet and outlet pipe invert elevations at all structures
  - \_\_\_\_\_ Existing and proposed grades for all channels
  - \_\_\_\_\_ Water surface elevations, velocities and discharge for the design storm
  - \_\_\_\_\_ 10 and 100-year water surface elevations at culvert entrances and outfalls
  - \_\_\_\_\_ Outfall protection details
  - \_\_\_\_\_ Grading at outflows, inlets and headwalls
  - \_\_\_\_\_ Hydraulic grade line calculations

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**Checklist for  
Stormwater Management Plan Submittal  
City of Roanoke, Virginia  
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- \_\_\_\_\_ Stormwater BMP Design Details and Calculations
- \_\_\_\_\_ Hydraulic calculations showing each structure to be adequately sized
  - \_\_\_\_\_ Stage-discharge or outlet rating curves and inflow/outflow hydrographs for storage facilities
  - \_\_\_\_\_ Water quality calculations showing pre-development conditions, and removal rate using performance-based or technology-based BMPs. Provide Water Quality Worksheets from the Virginia Stormwater Management Handbook.
  - \_\_\_\_\_ Plan view, existing and proposed structural elevations
  - \_\_\_\_\_ Design water surface elevations and depth, and discharge velocity
  - \_\_\_\_\_ Delineation and 2, 10, and 100-year pools in detention stormwater facilities
  - \_\_\_\_\_ Cross-section of through dam showing existing and proposed grades, dam sidewall slopes and top width, top of dam crest elevation, emergency spillway crest, inlet, outlet and level control, and inverts of orifices and weirs
  - \_\_\_\_\_ Principal and emergency spillway design, profile, and outlet details
  - \_\_\_\_\_ Riser structure detail, materials, orifice dimensions, anti-vortex device, structural details, maintenance access and trash rack if needed
  - \_\_\_\_\_ Outfall protection details showing rip-rap size, thickness, bottom width, side slope and filter cloth
  - \_\_\_\_\_ Flow paths in extended detention basins and stormwater wetlands to avoid short circuiting
  - \_\_\_\_\_ Dam breach analysis, where necessary
- \_\_\_\_\_ Final landscaping plan showing any re-vegetation or buffers used as a stormwater management practice
- \_\_\_\_\_ Project construction schedule
- \_\_\_\_\_ Operation and maintenance manual
- \_\_\_\_\_ Executed maintenance agreement
- \_\_\_\_\_ Easement plat/ exhibit to be recorded with the Stormwater Management Maintenance Agreement
- \_\_\_\_\_ Evidence of acquisition of all applicable local, state, and federal permits
- \_\_\_\_\_ Variance Requests