

220.1 EKU MS4 Storm Water Control Requirements

Requirements

EKU has been designated by the Commonwealth of Kentucky as a Municipal Separate Storm Sewer System (MS₄) and operates under KPDES Permit KYG200000. The following regulation stipulates the storm water controls required on land owned by Eastern Kentucky University at the main campus site on Lancaster Avenue, within the corporate boundaries of the City of Richmond.

Storm water which discharges from construction disturbing one acre or greater, or construction activity disturbing less than one acre if the construction is part of a larger common plan of development that would disturb one acre or more, must provide storm water runoff treatment to produce the level of water quality necessary to protect existing in-stream water uses that, at a minimum, shall be as protective as Kentucky's General Permit for Storm Water Construction sites (KYR100000). A single construction project is defined by the University and can include a multiplicity of locations. Non-contiguous sites that are part of the same project must meet this requirement individually, unless specifically designed to work in concert to accomplish no increase in storm water flow within a common, on-campus, drainage basin.

Storm water runoff from a site shall not adversely impact natural drainage from an uphill drainage basin or to a downhill drainage basin, or adjacent non-EKU properties. Storm water drainage facilities must collect runoff within the site and be minimally discharged over a larger area before the storm water naturally drains off-site, unless a large drainage basin exists or is being planned. Storm water drainage easements shall be required prior to construction if storm water is discharging directly from a pipe to an adjoining non-EKU property and being dispersed on that property.

Storm water infrastructures shall be designed and built so as to produce a post-development amount of storm water runoff from any single construction project that is equal or less than the pre-development amount.

No storm water control structures shall be constructed until approved by EKU Capital Construction & Project Administration. All storm water infrastructure components shall be inspected and certified by a Professional Engineer from the contractor.

All construction site development of one (1) acre or more must provide the following information before commencement of construction activities:

1. Provide EKU Capital Construction & Project Administration with a signed copy of the completed Notice of Intent (NOI) form, KPDES Form NOI-SW, within forty-eight (48) hours prior to the initiation of site work.
2. Provide a completed copy of the site-specific Best Management Practices Plan at a scale not greater than 1"= 50 feet to EKU Capital Construction & Project Administration at the time of request for a development plan review of potential water quality impacts.
3. Provide EKU Capital Construction & Project Administration with any updates to the Best Management Practices Plan made during the actual construction process, within twenty-four (24) hours of final design.

4. Provide ECU Capital Construction & Project Administration with a signed copy of the Notice of Termination (NOT) within forty-eight (48) hours of submittal to the state.

ECU retains the right to:

1. Enter and inspect construction sites with any land disturbances for the presence of properly installed and functioning sediment control Best Management Practices and to assure compliance with the BMP site specific plan;
2. Review the records of the permittee and/or his contractor at both on-site and off-site locations that pertain to the development, installation, maintenance, and operation of the BMP Plan, and;
3. Require modification and re-approval of the BMP Plan, along with the correlating physical placement of the modifications at the site, when, in the opinion of the University, the current BMPs are not functioning to the degree necessary to prevent or minimize erosion, or to provide proper sediment control.

All expense for modifications required by the University shall be borne by the permittee and/or his contractor. No expense for proper maintenance or operation shall be borne by the University.

Where the permittee and/or his contractor is found to be in non-compliance, each non-compliance item shall be corrected within seven (7) working days of notification. The first occurrence of non-compliance shall result in an issue of Notice of Violation; the second occurrence or continued non-compliance shall result in a stop work order; the third occurrence or continued non-compliance shall result in a five hundred dollar (\$500) fine per calendar day of non-compliance along with a filing of a complaint with the Kentucky Division of Water. The University has the right to take civil action against any permittee and/or contractor that consistently and persistently fails to comply with the requirements of this regulation.

Construction Sites

1. Appropriate best management practices (BMPs), must be provided, including but not limited to:
 - a. Erosion Control
 - b. Sediment Control
 - c. Waste Management
 - d. Periodic employee storm water quality training that addresses the subjects above
2. Non-storm water illicit discharge pollutants, including but not limited to the following, are strictly prohibited:
 - a. litter
 - b. silt/sediment/sand
 - c. fuel, oil and grease
 - d. floatables
 - e. discarded building materials
 - f. concrete truck washout
 - g. industrial waste
 - h. sanitary waste
 - i. chemicals

Storm Water Pollution Prevention Plan

To achieve a post-development amount of storm water runoff that is equal or less than the pre-development amount, new construction site designs must include a Storm Water Pollution Prevention plan (SWPP or SWPPP) that utilizes appropriate storm water Best Management Practices (BMP's) to the maximum extent practical (MEP). BMP's are chosen relative to the intended water-quality protection function, ease of maintenance and overall landscape acceptability, and include, but are not limited to:

1. Structural
 - a. grass swales
 - b. filter strips
 - c. infiltration basins
 - d. sand filters
 - e. bio-retention areas
 - f. storm water wetlands, and
 - g. dry, wet, and extended-wet detention ponds
2. Non-structural
 - a. porous pavements
 - b. downspout disconnection
 - c. rain barrels
 - d. cisterns
 - e. rain gardens
 - f. green roofs
 - g. water harvesting devices
 - h. disconnection of impervious areas from riparian zones
 - i. open space
 - j. stream buffers
 - k. vegetated conveyance (such as grassy swales, promoting shallow, low velocity flow in a manner that facilitates sedimentation, infiltration and increased travel time to the discharge point)
 - l. natural infiltration
 - m. natural filtration, and
 - n. low-impact development

"First Flush"

In urban areas, the first flush of runoff pollutants carries a heavy load of pollutants, altering the water chemistry and water quality. Capturing this "first flush" of pollutants is one way to improve water quality leaving ECU.

This regulation requires capture of the equivalent surface depth of runoff produced from an 80th percentile precipitation event; the amount of precipitation, based on daily rainfall records, that is greater than 80 percent of all daily rainfall events for the chosen period of record, with a minimum record of 30 years.

Daily precipitation records from the UK Ag Weather Station website between 1971 and 2010 for the Lexington climatology station, with zero or trace amounts removed, were sorted and the total number of rainfall events was multiplied by 0.8 to determine the event depth at which 80%

of the total number of events equal or less. The resulting depth was 0.6 inches.

The water quality volume (WQ_v) is then calculated using the formula below:

$$WQ_v = \left(\frac{A \times d}{43,560 \text{ ft}^2 \times 12 \text{ in}} \right)$$

Where:

WQ_v = Acre-feet

A = Impervious area (ft²)

d = 0.6 (in)

The calculated WQ_v shall be treated, in combination or alone, by management measures that are designed, built, and maintained to treat, filter, flocculate, infiltrate, screen, evapotranspire, harvest and reuse storm water runoff, or otherwise manage the storm water runoff quality.

Peak Runoff

Each portion of the storm water drainage collection system shall be capable of handling the peak flow of runoff. In order to minimize runoff damage to downstream properties, sediment pollution of waters of the State, and hydraulic overloading of existing drainage facilities, the storm water runoff from a development site shall not exceed the pre-development discharge from that site, as calculated by the "Rational Method."

"Rational Method;" Q = CIA, where:

Q = peak runoff quantity in cubic feet per second

C = runoff coefficient varying with perviousness of the drainage area

I = average intensity of precipitation in inches per hour, varying with frequency of storm occurrence, duration or concentration time, and area of the tributary watershed

A = area in acres of tributary watershed

Runoff Coefficients: The runoff coefficient is the portion of the precipitation, expressed as a decimal, that will reach a given storm water facility. Weighted coefficients shall be used with the impervious areas C = 0.95, and all other areas C = 0.40.

Intensity of Precipitation: The "point" values of average precipitation intensity, in inches per hour at ECU, can be extrapolated from Exhibit #2-504.5 Kentucky Bureau of Highways "Rainfall Intensity-Duration-Frequency Curves" for Lexington. For any given storm duration (concentration time to runoff) the curves show the average precipitation intensity of storms having 2, 5, 10, 25, 50, and 100 year frequencies.

Concentration Time (TC): The time of concentration (TC) in minutes, is the estimated time it will take the storm runoff from the most remote part of the area to reach the point of the storm drainage system under consideration. This includes the time for water to flow over roofs, through roof gutters and downspouts, over ground, turfed areas, streets, through street gutters to the nearest inlet of the drainage system plus the time of flow in sewer pipes to the point under consideration. Unless otherwise determined by overland flow charts or nomographs, the Time of Concentration (TC) for inlets of storm water collection systems may be used as follows:

<u>Characteristic</u>	<u>Concentration Time</u>	
	Flat	Steep
Undeveloped	15 min.	10 min.
Developed	10 min.	8 min.

At no time shall the Time of Concentration be greater than 30 minutes for design of storm inlets.