

Stormwater

Design Considerations For Development:

- The Stream Setback Ordinance requires a preserved buffer adjacent to designated streams.
 - Are required stream setback buffers located on your site?
 - If so, determine the stream order and stream type, as defined by the Ordinance.
 - Setbacks utilized for design are general only and must be field verified prior to permit issuance.

- Proposed alterations to existing watershed system may require additional permits.
 - Are stream crossings, pond or wetlands removal proposed for your development?
 - If so, have necessary Corps of Engineers requirements / permits been identified?
 - Necessary KDHE requirements / permits must also be identified.
 - In addition to Local requirements, all State & Federal requirements must be addressed.
(This can sometimes require long lead times, we suggest investigating as soon as possible.)

- Other natural resources on your site may be protected through State or Federal agencies.

- Evaluate the multiple stormwater/watershed goals in relation to the overall site design.
 - Reduced flooding potential
 - Is FEMA regulated floodplain or a non-FEMA regulated 100-Yr (Base) floodplain present?
 - Has on site infiltration opportunities been examined?
 - Water and environmental quality
 - Does site design minimize cut and fill? (This minimizes sediment movement.)
 - Has existing tree vegetation been protected by the site design and building practices?
 - The City encourages the use of open/grass swales rather than piping where possible/feasible.
 - Are alternate Best Management Practices (BMPs) available for the site design?
 - Aesthetic Quality
 - The City encourages more natural solutions (bio) and reduced hard armoring (rock & concrete).
 - Can detention requirements be made into positive site features? (Amenity Opportunities)
 - Are there public education opportunities created or preserved through the site design?

- Early consideration of the following issues facilitates the design and approval process:
 - Site Grading
 - Will structures be placed such that natural flow is directed at or away from the structures?
 - What localized grading modifications will be required to re-direct flow so that this is not a problem?
 - Piping & Swales
 - What storm event will they be required to carry? What storm event will they carry?
 - For piping, if not carrying the 100-Yr flow, how will the emergency overflow be accounted for?
 - Streets & Parking Lots
 - What are the inlet spacings, and do they provide for appropriate gutter spread?
 - What are the inlet capacities, and are they appropriate to minimize by-pass?
 - Does the storm system cross under the streets at right angles?
 - What is the maximum water depth (both collected and overflow) on streets or parking lots?
 - Is water generated by private improvements collected rather than flowing onto a public street.
 - Basins
 - Have all of the components (i.e. primary outlet, emergency overflow, top of berm, etc.) been appropriately designed and routed? Appropriate release rates?
 - Is there appropriate free-board?
 - Does the retaining berm actually classify as a dam, with need for appropriate dam design?
 - Receiving System
 - Has the receiving system been analyzed to the point the site is 10% of the tributary watershed?
 - Does the receiving system have capacity? Does the site utilize all of the remaining system capacity?
 - Are there any downstream constrictions or impacts?
 - Structures
 - Minimum floor elevations (MFE's) are required for structures/property adjacent to water bodies/ways.
 - Minimum low openings (MLO's) are required for structures/property adjacent to engineered features.
 - For residential structures, water resistant window wells (WRWW's) are permissible for MLO's.
 - Surveyed certifications are required for all structures with MLO's or MFE's.
 - (Based upon footing and foundation construction, prior to any further construction on structure.)

Watershed

Design Considerations For Development:

- Minimize disturbance of natural grades and vegetation (tree preservation) and utilize existing topography for natural drainage systems.
- Infiltration is preferred. Minimize impervious surfaces and maximize infiltration of cleansed runoff to appropriate soils. Use grassed or vegetated swales and infiltration systems.
- Alternative site designs techniques including narrowed streets, pervious pavement, curb stops in parking lots, ribbon curb with open drainage and increase density to preserve open space, utilized singly or in conjunction, should be evaluated and discussed with Staff.
- Address water quality as well as water quantity. Water quality can be addressed through the use of techniques that promote infiltration and settling of pollutants, like catch basins, sediment basins, porous pavement, vegetated filter strips, ponds and wetlands.
- Reduce reliance on single solution (detention ponds) for stormwater management.
- Reduce peak flow to minimize the likelihood of soil erosion stream channel instability, flooding and habitat destruction. Consider other facilities release rates and timing.
- Use wetlands and water bodies to receive or treat runoff only when it is assured that these natural systems will not be overloaded or degraded. Consider other developments and practices used in the vicinity.
- Provide a maintenance schedule for management practices including designation of maintenance responsibilities.
- Additional information related to development and watershed protection can be found at the following sites:

Center for Excellence for Sustainable Development www.sustainable.doe.gov

Center for Watershed Protection www.cwp.org

Mid-America Regional Council (MARC) <http://www.marc.org/Community/usersguide.pdf> and <http://www.marc.org/cqp.htm>

Environmental Protection Agency <http://www.epa.gov/livability/>

Green Building Certification <http://www.usgbc.org/>

Kansas Urban Water Quality Protection Initiative
http://www.oznet.ksu.edu/urbanwater/smart_growth.html

Kansas Department of Agriculture, Division of Water Resources
<http://www.accesskansas.org/kda/dwr/index.html>

Federal Emergency Management Agency (FEMA) – National Flood Insurance Program
<http://www.fema.gov/nfip>

Kansas Department of Health & Environment (KDHE), Bureau of Water
<http://www.kdhe.state.ks.us/water/index.html>