

Tennessee Envirothon 2012 Presentation Special Problem

Clyde York 4-H Center

May 1-2, 2012

Introduction:

Part of your team's overall score for the state-wide Envirothon competition is based on an oral presentation of this year's current issue: Low Impact Development and Non-Point Source Pollution. This presentation will consist of the review and study of a typical scenario with environmentally related aspects and features. Your team will review the scenario, determine appropriate solutions and/or actions, organize and compile the information for a team presentation, and give the presentation to a panel of judges for a score. The scenario and related components are presented below.

Background:

A local developer has proposed to construct a new development consisting of twenty five (25) high-density condominium units, fifty (50) single unit residential homes, a commercial retail shopping center and restaurant, a golf course, and common areas with amenities including hiking trails, picnic pavilions, restroom facilities, horse stable and riding trails. This development is to be located on a 600 acre parcel of property within the city limits of Green City, Tennessee.

This 600 acre property is composed of forested areas with mature hardwood trees, pastures that are currently maintained for forage, two streams that converge together within the property, various wetlands that are adjacent to both the streams and also pasture areas, and several sinkholes located within a limestone, karst area. Local relief contains various slopes and foothills on the northern boundary that transition to gently rolling terrain towards the southern boundary. The two streams move from the upper reaches of the property in and converge together in the lower reaches of the property in the gently rolling terrain in a north to south overall direction. Drainage generally goes towards the center of the property in a north to south direction overall.

Natural Resources Present at the Proposed Area of Development

Both of the streams present on the property are first order, headwater tributaries that flow into a larger stream that ultimately drains into the Tennessee River basin. As headwater streams they are greatly influenced by stormwater flows including the intensity and volume of stormwater and the pollutant loads of stormwater. Other influences to these headwater streams include the amount and duration of baseflow from the groundwater table. It has been noted in previous

stream surveys that a healthy population of various benthic organisms are present in the streams. Additionally, fish populations including darters (*Etheostoma* spp.) and shiners (*Luxilus* spp.) have been noted in the two streams on the property. Populations of rainbow trout (*Oncorhynchus mykiss*) are stocked below the project area in the larger stream.

The wetlands that are located adjacent to the streams consist of forested, hardwood trees that provide a buffer protection to the streams. The wetlands that are located adjacent to the pasture areas consist of broad areas of emergent, herbaceous vegetation. These areas are somewhat depressional and are typically flooded during the rainy parts of the year.

Recent dye trace studies have demonstrated that the sink holes and limestone, karst area are hydrologically connected with a cave system located a quarter mile downgrade from the proposed development. This cave contains several threatened and endangered species including the Tennessee Cave Salamander (*Gyrinophilus palleucus*), Indiana Bat (*Myotis sodalis*), and the Tennessee Cave Crayfish (*Orconectes incomptu*).

Soil mapping indicates that soils located on the upland slopes are typically shallow with frequent rock outcrops. These soils are poorly drained and are highly erosive. Those soils located within the pasture areas have a moderate depth to bedrock and typically have a silty loam texture. They have a moderate capacity to hold water and are moderately erosive.

The soils encountered in the wetlands next to the pastures have a moderate depth to bedrock and have a clayey silt texture. They are much reduced in color being strongly grey and have a moderate to high capacity to hold water and are often inundated with flood waters in certain times of the year. Soils in the riparian areas next to the two streams and within the wetlands adjacent to the streams consist of silty loam textures and are somewhat reduced in color, being slightly grey with some mottles and orange streaking.

Plant communities within the forested wetland areas are dominated by Red Maple (*Acer rubra*), Willow Oak (*Quercus phellos*), and Flowering Dogwood (*Cornus florida*). Plant communities within other forested areas are dominated by Tulip Poplar (*Liriodendron tulipifera*) and Flowering Dogwood (*Cornus florida*) on the lower slopes and Southern Red Oak (*Quercus falcata*) and Mockernut Hickory (*Carya tomentosa*) on the upper slopes.

Site Constraints, Environmental Regulatory Requirements, and Other Factors

Green City is a community that is currently experiencing financial duress because of a weakened local economy and local leaders consider the development an opportunity to increase local revenues for the city. It is anticipated that the development will bring in increased property taxes, more jobs, and recreational dollars to the community. In general, the citizens of Green

City are in favor of environmental protection, reduced flooding, and more greenspace for greater recreational opportunities. They are also in favor of maintaining property values and low taxes.

Green City has passed local ordinances that require the following stormwater management practices are implemented for new development within the city limits:

1. Construction site stormwater runoff controls will be utilized to protect streams, rivers, wetlands, and other water related resources.
2. Post-construction detention/treatment strategies that are designed to infiltrate, evapotranspire, harvest and/or use the first flush of stormwater will be implemented.

Other local ordinances of Green City include the following landscaping/urban forestry requirements:

1. All roadway frontages of commercial development have streetyards that include the installation of plant material for aesthetics, providing of shade, and screening of buildings/parking areas for noise reduction.
2. Parking areas have yards that meet with the same requirements of the streetyards described previously.
3. Development activity on forested areas also requires that a certain amount of tree canopy be maintained on developed property. The amount of canopy required is dependent on the amount of impervious surfaces that are constructed on a developed property but as a minimum require at least 10% of a developed area be maintained with a tree canopy.

The proposed high density development will require the construction and operation of a wastewater treatment facility on the property. Currently there is no infrastructure available in the region to collect and transport wastewater to a city operated wastewater treatment facility. Green City is currently unable, because of budgetary constraints, to construct and provide wastewater treatment services for the proposed development. Any proposed wastewater treatment facility constructed by the developer must be properly sited and designed to minimize environmental impacts to the area.

Assignment:

Your team is to assume that you have been hired by the developer to produce a site plan to be presented to the Green City Planning Commission, the local Stormwater Management Board, and State Environmental officials for review and approval of the proposed development. One of the responsibilities of the Green City Planning Commission is to ensure that applicable ordinances regarding landscaping, urban forestry, and flood control requirements are met. A primary duty of the local Stormwater Management Board is to ensure that minimal requirements

of local ordinances regarding stormwater management and control are met by new development activity. State environmental officials are responsible for regulating state laws and rules regarding the protection of threatened and endangered species, the protection of all water resources, and the control of pollution to state waters.

This site plan should generally address various requirements in place for development activity, the management of stormwater, and the protection of other natural resources on the property and within the region. This site plan will also be presented to the public prior to a public hearing to allow for public comment on any proposed impacts to natural resources and/or other environmental concerns. A common concern of the general public is that the proposed development be protective of the environment and natural resources while not requiring the expenditure of significant public funds to provide services to the newly developed area.

IMPORTANT NOTE:

This site sketch shown on the following page should be considered as a general approximation of the project area for the scenario. Extensive details of the location of various environmental features are minimized so that more attention and focus can be given to the development of ideas and concepts and not the interpretation of map features. It is suggested that any site sketch presented by your team likewise be simple, easy to understand, and serve to show approximate locations of the various environmental features.

