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CE 5338

Hydrologic Engineering,

Professor Martin Pierson

HW 1

First the quiz: Just answer the questions. This is all full credit. Don't use resources like the internet or your book.

a) If I give you flow and channel geometry etc, can you tell me the normal depth?

Flow (Q) and geometry (A) relates to Normal Depth (z) by dividing the flow by area, which obtains depth of flow per second.

b) What is Sub-critical?

Sub-critical relates the regime of flow condition.

c) What is the control direction if water is flowing sub-critical?

In the gravitational direction.

d) If I give you appropriate geometry and flowrate, can you tell me the depth of water going into an inlet?

Yes, by dividing the flowrate by geometry you get the velocity of fluid in the inlet.

e) Have you done reservoir routing?

No.

Now the HW:

1:

Please read Chapter 1 of the Springfield MO "Flood Control and Water Quality Protection Manual" and write a one paragraph summary of what this chapter is about.

Section 1 covers an overview of storm water system design and management. Section 2 are the principals of the do's and don'ts, and includes the scope of systems and subsystems. Section 3 is for relevant data collection. Section 4 works off of section 3 and how to plan for events. Section 5 covers hazard areas often the critical factor for design. Lastly, section 6 covers references beyond Missouri taken into account.

2:

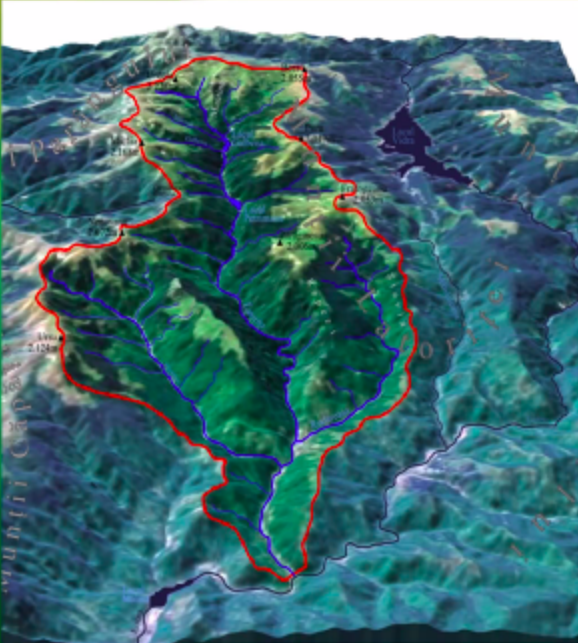
Please choose one of the subtopics in Chapter 1 (i.e. 2.1 or 3.3 etc) and summarize "Why that subtopic is important" in one paragraph. Note: I'm not looking for you to restate the paragraph here. Draw on your own knowledge or other resources to make your case.

Section 3.3 states "Geographical data useful for developing stormwater runoff models should be continually gathered and maintained to improve model accuracy and increase the efficiency of designs. These data include aerial photos, elevation contours, soils, land cover, land use, zoning, karst features, etc."

This is important because geographical data directly affects flow and flowrates that are used for design. If the incoming parameters are inaccurately assessed, then poor engineering decisions can be made for design. Take following image for example where a watershed is estimated from a natural terrain.

Microsoft PowerPoint - [PowerPoint Slide Show - JCE 6106 - Introduction 2022.pptx]

HYDROLOGY | watershed | characteristic factors



Topography
Topography determines the **speed** with which the runoff will reach a river. Clearly rain that falls in **steep** mountainous areas will **reach the river faster** than flat or gently sloping areas.

Shape
Shape will contribute to the **speed** with which the runoff reaches a river. A **long thin catchment** will take **longer** to drain than a circular catchment.

Size
Size will help determine the **amount** of water reaching the river, as the **larger the catchment** the **greater** the potential for **flooding**.

Soil type
Soil type will help determine **how much** water reaches the river. **Sandy soils** are very **free draining** and rainfall on sandy soil is likely to be **absorbed** by the ground. **Clayey soils** can be almost **impermeable** and therefore rainfall on clay soils will **runoff** and contribute to flood volumes.

Land use
Land use can contribute to the **volume** of water reaching the river, in a similar way to clay soils. For example, rainfall on roofs, pavements and roads will be collected by rivers with almost no absorption into the groundwater.

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3:

Please read Chapter 2 of the Springfield MO "Flood Control and Water Quality Protection Manual" and write a one paragraph summary of what this chapter is about.

Section 1 is an overview of regulation subject to municipal, state, and federal laws. Section 2 relates to federal water acts and permits for Springfield, MO and Army Corp of Engineers. Section 3 relates to state law. Section 4 is for municipal law governed by the city of Springfield codes. Section 5 are references for federal, state and permit codes taken into account.

4:

Please choose one of the subtopics in Chapter 2 (i.e. 2.1 or 3.3 etc) and summarize "Why that subtopic is important" in one paragraph. Note: I'm not looking for you to restate the paragraph here. Draw on your own knowledge or other resources to make your case.

In the references, fema.gov is mentioned. Every year the federal government sets aside a budget to address storm hazards. I have an acquaintance who works for FEMA and during the spring and fall months when there is heavy hurricane or tropical storms, she is on call to tend to financial relief and even physical aid of necessities for areas that are hard hit. The national government has measures in place to look after its citizens for folks who encounter natural disasters such as flood storms.

In []: