The computation of water surface profiles requires cross-sections at representative locations throughout the river reach. When a river reach is fairly straight and uniform, cross-sections may be taken at regular intervals not exceeding 500 feet. Cross-sections should fully define transitional elements of a stream such as; the cross-sectional area increasing or decreasing, channel or overbank roughness changes, or marked breaks in bottom slope. When an abrupt change in cross-section occurs, such as at bridges, dams or other manmade or natural restrictions, several cross-sections should be used to describe the change, regardless of the distance.

Cross-sections should be taken perpendicular to the direction of the estimated center of mass of the flood flow. This direction, in some instances, may differ materially from that of the normal flow in the channel. Every effort should be made to obtain cross-sections that accurately represent the river geometry at all stages.

Each cross-section should be plotted at a reasonable scale with the left and right corresponding to that when viewed in the direction of flow (i.e. looking downstream). For each plotted point, the distance measured from a reference point on the left, and elevation should be shown. The water surface elevation and date taken should be included on each of the plotted cross-sections.

Each cross-section should be located on a topographic map of sufficient detail in order that the channel and overbank distances between sections can be measured accurately.

A profile of the channel bottom and water surface should be plotted from the cross-section data. The plotted distance between cross-sections being that measured along the main channel during normal flow.

The following are some typical examples to serve as an aide in determining the proper location for cross-sections.
CONTRACTION
of overbank
flow area

cross sections
spaced in proportion
to abruptness of change

EXPANSION
of channel
BREAK in channel bottom slope

severe break

number of cross sections taken in proportion to severeness of break

mild break

waterfall

normal water surface

channel bottom

DISTANCE ALONG CENTER LINE OF NORMAL CHANNEL

NOTE: profiles should be plotted on grid paper; indicate horizontal and vertical scales
BRIDGE
restricting
flood flows

adjacent to bridge
excluding any
roadway embankment

through bridge and
along crown of roadway

show distance and
elevation of
each of the
plotted points

show top of road and
low chord elevations

plot on grid paper

SCALE: HOR 1" = 20'
VER 1" = 10'

show water surface elevation
and date taken; also, known
high water marks and
date of occurrence

NOTE: cross sections taken
at same locations
for culverts; include
up and downstream
invert elevations

section 4
NOTE: Valley cross-sections are located as previously described.

Each valley cross-section is plotted on grid paper at a reasonable scaly and oriented so that the left and right overbanks are those viewed when looking downstream.

The distance and elevation are shown for each of the plotted points to facilitate the computation of flow areas.

A brief description of the channel material and overbank vegetation is given to aid in the selection of roughness coefficients.

The water surface elevation and date taken is shown. Any high water marks and date of occurrence should be included.