

Standard Operating Procedure

Subject: Mississippi River Low Water Slope Profile

09 February, 2000

General Scope of Work:

A low water slope profile along the water surface of the Mississippi River shall be developed. The profile shall be accomplished through conventional techniques or through the use of GPS as specified by the C.O.R. The slope shall be developed from approximate Mississippi River mile 963=972 on the Ohio River to approximate River Mile 599 AHP on the Mississippi River. Due to low stages, access to boat ramps and launching facilities will require particular consideration by the A-E.

General Procedures (Conventional):

The Memphis District will be divided into four reaches. Reach 1 will start at the upstream limits and proceed downstream to river mile 877.0R. Reach 2 will begin at 877.0R and proceed downstream to 782.9R. Reach 3 will begin at 782.9R and proceed downstream to 689.5R. Reach 4 will begin at 689.5R and proceed downstream to 599.1R.

The locations for water surfaces to be run are listed in the attachment. A water surface differential elevation shall be run at each listed point. The differential shall be run from the water surface to a stake set approximately 22'-25' above the existing surface. The time of the differential run shall be recorded in a standard fieldbook. Each temporary stake shall be well flagged so the tie-in crew will be able to locate the points with minimal effort. At the beginning of each day, the last water surface from the previous day shall be repeated.

After all differentials have been run, a single tie-in crew will begin at the upper limits of the District. The tie-in crew will tie the temporary stake elevations to an existing benchmark and reduce the elevations. At the time of the tie-in, the water surface elevation shall be compared to historical data at that location. Obvious elevation errors of 10' or more shall be noted and rectified prior to the completion of the survey.

Resources Required (Conventional):

1. Four, 3-man survey crews, each with a skiff suitable for use on the Mississippi River.
2. Historic data and benchmark information to be used as reference material.

Note: Crew size requirements will vary depending on Corps personnel availability. Historically, Corps personnel have been used in a Quality Assurance role and have been assigned to each crew as they develop data along the River. Safety of personnel is of the utmost importance, and as such, proper precautions shall be taken in the areas of communications and resources to ensure safe operation of the plan.

General Procedures (GPS):

In order to develop a low water slope profile through the use of GPS, a network of control points has been set throughout the District. The location of the control points is listed in the attachment. The general scenario for this operation is that base station GPS receivers will be deployed to four consecutive control points beginning at the upper limits of the District. A hydrographic survey boat equipped with a GPS receiver will begin collecting data as it proceeds downstream. As the vessel moves out of the 10 km range of a base station, the base station is moved to the next downstream control point. Dual frequency carrier phase data is collected at 2 second intervals with a minimum of 5 SVs during the entire operation. During data collection, it will be necessary to know the approximate location of the boat in order to move base station receivers at the proper time. At the start of each day, the boat crew shall determine a differential elevation from the water surface to the GPS antenna phase center. The same shall be repeated at mid-day and at the end of the day. At the end of the day, a differential shall also be run from the water surface to a temporary stake. To begin subsequent days, the same differential shall be run prior to beginning GPS data collection. These water surface/GPS differentials shall be recorded in a standard field book with the date, time, and geodetic location. Vertical computations shall be submitted in both NGVD29 and NAVD88 datums.

Resources Required (GPS):

- 4-Dual frequency Carrier Phase receivers to be used as base stations.
- 1-Dual frequency Carrier Phase receiver to be used on the hydrographic survey boat.
- 1-Hydrographic survey boat to perform river operations.
- 4-Personnel with vehicles to man base stations.
- 2-Personnel to perform boat operations
- Computer equipment to download base and rover units at least twice daily.

Deliverables:

1. All field books used in the survey development. Field books shall be submitted in both hardcopy and as scanned Adobe Acrobat pdf format.
2. All monument recovery forms. Monument recovery forms are to be completed at the time of monument recovery. All field documentation forms shall be scanned and submitted as Adobe Acrobat pdf files.
3. Excel spreadsheet completed with updated reduced water surface elevations. Original spreadsheet to be supplied to the AE. In the event the Excel spreadsheet is unavailable, the AE shall reproduce the attachment for submittal.
4. If GPS is used, an ASCII text file shall be submitted containing all adjusted 3-D positions. Processed and adjusted GPS data shall be incorporated in the Excel spreadsheet.
5. If GPS is used, all raw and processed data files shall be submitted along with hardcopy printouts of the GPS message files. (Trimble)

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