



- 3-01.1 PURPOSE.** A survey is made to physically establish the location in the field in accord with the approved location. The survey includes the location of all man-made features in relation to the established centerline in such a manner that these features can be accurately indicated on the plans. The survey also includes elevations on National Geodetic Survey (NGS) or United States Geodetic Survey (USGS) datum necessary to locate grades, culverts, bridges, and to compute excavation quantities.
- 3-01.2 METHODS.** Two methods are used to obtain this information. One method, referred to in this section as conventional surveys, is to obtain all of the information in the field. Conventional surveys may be conducted by traditional means or electronically. Traditional means include differential leveling, taping manually scribed data, cross sections and baseline referenced topography. Electronic surveys utilize total station, data collector and computer technologies for the gathering, transfer and manipulation of field data. The choice of conventional survey method utilized is the design survey party chief's decision. The other, referred to in this section as photogrammetric surveys, is done by aerial photography with horizontal-vertical control and supplementary information provided by field surveys. The photogrammetry section will furnish a topographic map (planimetric features and contours), cross sections, if needed, or a digitized mass point file for use with the CADD system. The present practice is to use field methods to obtain culvert sections for photogrammetric surveys along with underwater and subsurface details not visible on aerial photographs.
- 3-01.3 PUBLIC RELATIONS**
- 3-01.3 (1) GENERAL.** Survey personnel are in an excellent position to promote good public relations for the Missouri Department of Transportation. The survey personnel are usually the first representatives of the department to contact people affected by highway improvements. In view of this, it is the responsibility of the survey party chief to see that the personnel in the party present a good appearance. The survey party chief also acquires general information regarding the improvement being planned so that this information can be passed on to people encountered during the survey.
- 3-01.3 (2) CONTACTS WITH PROPERTY OWNERS.** Prior to a request for a survey a letter shall be sent, by the designer in responsible charge, to property owners. See [Figures 3-01.4, 3-01.5 and 3-01.6](#) for examples of these type of letters. The list of property owners addresses will be supplied by the Right of Way Division. The survey party chief contacts property owners and/or occupants, if conveniently possible, prior to entering a property as a matter of respect and to promote good public relations. The survey party chief explains in general the improvement being planned, explains in layman language something of how the survey will proceed, and requests the consent of the owner and/or occupant to proceed with the survey. If the owner and/or occupant refuses to allow the survey party chief to enter the property the project development engineer is advised immediately and will handle the case beyond this point. The survey party does not enter any property when consent to enter has been refused until advised further by the project development engineer. The survey party chief advises the owner and/or occupant that a survey is made a step at a time and that the party will be passing through the property several times so that the property owner will understand that mistakes are not being made. If the survey is a photogrammetric survey the owner and/or occupant should understand the placement and purpose of ground control targets. Doubtful or questionable information is never given to the public by the survey party. It is much better to say "I do not know" than to impart false information. A letter may be sent to property owners in lieu of other means of contact
- 3-01.3 (3) SURVEY PROPERTY DAMAGE.** During the process of making surveys, it may become necessary to cut crops or trees; or other circumstances may involve property damage related to obtaining survey information. When property damage does result, it will be the responsibility of the survey party chief to complete the property damage release and report form A-472, and obtain the necessary signature if possible. If the circumstances of the property damage are questionable, a letter of explanation should be sent to the Design Division prior to submitting the property damage release and report form to fiscal services. The A-472 forms are stocked in the Support Center garage and may be requisitioned in the usual manner. The property owner should be contacted

prior to the cutting of crops or trees, informing the property owner of the need for, and the extent of, the required damage.

- 3-01.3 (4) SUMMARY.** The impressions created by the survey party on the people encountered by them are their impressions of the Missouri Department of Transportation and the importance of this cannot be over-emphasized. In summary, the survey party can perform a service to the department by being courteous, presenting a good appearance, conducting themselves properly, and by properly advising the people that they contact during the performance of their work.
- 3-01.4 SURVEY PARTY TRAFFIC SAFETY.** Survey parties are to utilize the equipment and procedures available to provide the maximum safety for personnel and the traveling public. When working on the road, [Figure 3-01.3](#) is to be used as a minimum guide for traffic safety. When working on the outside shoulder one "Survey Crew" sign is placed on that shoulder, preceding the work by 200 ft. [60 m] in urban areas and 500 ft. [150 m] in rural areas. When working in the median, "Survey Crew" signs are used facing both directions. When working outside the outside shoulder line signing is not normally used. The major factors bearing on the protection to be used in each situation are: speed, volume of traffic, highway geometrics, duration of operation, exposure to hazards, and weather (or road conditions). Minimum distances and dimensions are shown on [Figure 3-01.3](#) and field conditions should control the actual placement of signs and cones. The individual in charge of the survey party has the responsibility to see that the necessary safety precautions are taken. Safety vests are to be worn by all members of the survey party while working on the road or shoulder or in the median. Where signs are used they are to be placed prior to beginning work and at locations having adequate approach visibility. Traffic cones (28 in. [700 mm] in height) are to be used as needed. Personnel using stop-slow paddles are positioned as needed to provide the best direction of traffic and safety for working personnel. Personnel should be instructed about the importance of staying alert, being courteous to motorists, and the fact that the responsibility for the lives of the party and traveling public are in their hands. The department publication "Safety Rules and Regulations" gives additional traffic control information. Trucks with top mounted flashers operating may be used to provide additional protection for personnel by blocking the lane or parking on the shoulder. Two way radios should be used in handling traffic where two way operation over a single lane is maintained without visible contact between personnel.
- 3-01.5 EQUIPMENT.** To help insure proper operation, periodic calibration checks of survey instruments should be conducted. These checks should be done at least once a year and should be performed at an official DNR EDM range. All total stations should be sent in to a service center for calibration at least every five years. All equipment used by the survey party is kept in good condition, clean and in good adjustment, including the carry-all or transportation used. Equipment stored in the vehicle is kept in neat order. This is in keeping with the policy of presenting a good appearance at all times. Worn equipment is salvaged and replaced as it wears out.
- 3-01.6 PROCEDURE**
- 3-01.6 (1) GENERAL.** In all cases, prior to proceeding with a survey, the survey party chief is furnished with a copy of the location study and is informed of the type of improvement planned, the plan for improving or relocating intersections, interchange locations and type, and all other information necessary to complete the survey.
- 3-01.6 (2) NOTEBOOKS.** Survey notes should be kept in either bound notebooks or electronic data collectors. Electronically gathered survey data should be referenced in the field book. The data files themselves are to be maintained in accordance with prescribed file management policy and should be kept in such a manner as they are readily retrieved and easily understood. This includes the proper archiving of files to the designated computer drives diskette and hard copy. Standard practices of neatness, uniformity and continuity are exercised in the field notebooks. Erasures are not made. Notes are not kept on scrap paper and later copied into notebooks. The notes are entered with bold open figures and letters without crowding. Recording of items is not scattered. The field notebooks become a permanent record and the notes are kept with this in mind. A good practice is to record alignment and man-made features in one book or a series of books, record bench levels and miscellaneous surveys in another book or series of books, and record profiles, cross sections and culvert sections in another book or series of books. On photogrammetric surveys, a separate notebook is used to record targeted points and vertical controls. Two or more of the above items are recorded in a single notebook when the improvement is short, or where a single item will not fill more than a few pages of the book. The

recording of more than one item in a book is used with discretion because of the inconvenience in handling the notebooks in the office. The field notebook is identified and numbered on the front cover of the book and also on the inside flyleaf similar to the illustration on [Figure 3-01.1](#). The field notebook also includes a complete index of the contents of the book on the first page similar to the illustration on [Figure 3-01.1](#). Each district will catalog their field notebooks to allow ready access to survey information.

- 3-01.6 (3) DIARY.** A daily diary is kept in a bound field notebook by the survey party chief. A separate notebook is used for the diary except where the improvement is short. The diary includes a daily record of the personnel assigned to the party, their work assignment, the names and addresses of people contacted by the party and their reaction to the contact, the work performed by the party that day, and a record of any other information that will be beneficial as a part of the permanent record of the survey. An example for the diary is illustrated on [Figure 3-01.2](#).