



- 2-06.1 PURPOSE.** A preliminary plan is developed to show preliminary geometric details, and includes design criteria, proposed alignment, profile, tentative grade, tentative right of way, schematic intersection or interchange layouts, bypasses and pertinent topographic features.

The preliminary plan is a design tool and is prepared to develop and convey basic design criteria, basic geometric details and recommendations on which the detail plans are to be developed.

- 2-06.2 PROCEDURE.** Preliminary plans are prepared for all projects by the district. The preliminary plan should be prepared once horizontal and vertical alignment and tentative right of way limits have been established. Where the horizontal alignment is to tie into existing roadways or alignments, the tie location should be based on field survey measures and verifications. The districts should obtain property ownerships at the earliest possible date and if possible the ownership should be obtained while the preliminary plan is being prepared. The soil survey should be started as soon as possible so as not to delay the completion of the preliminary plan. This should be done with a minimum of field survey staking until the preliminary plan has been completed. Basic design criteria and major geometric details shown on the preliminary plan are not changed during the development of detail plans without coordination with the Design Division. Completion of the preliminary plan allows the district to proceed with the public hearing.

A preliminary plan showing topographic features, including major overhead and underground utilities, basic design criteria, proposed horizontal and vertical alignment, proposed geometric details including interchanges, intersections, bypasses, geological features that have a significant effect on location or design, major drainage features, traffic data and proposed typical sections are prepared. For conventional surveys, the survey centerline and profile is shown on the preliminary plans. On photogrammetric surveys the proposed centerline is drawn on the preliminary plan utilizing targets or existing topography. The centerline is not precisely computed or staked in the field until after approval of the preliminary plan. For photogrammetric surveys, preliminary plan profiles are taken from the digital map models.

Property lines and owners, soils information, and other required details are also shown. If limited access or fully limited access right of way is involved, points of access are shown. Points of access should be developed in coordination with district Right of Way and Legal staff, particularly in regard to the adequacy of any remaining access and to potential economic consequences of limiting or removing access. For fully limited access right of way projects where construction will be staged and the ultimate facility will not be completed for a number of years, careful consideration is given to providing temporary access points for the initial project. For urban projects more detail including proposed width and percent grade for entrances may be desirable.

Minimum design standards are given in [Figures 4-04.1](#) and [4-07.1](#). For variances from design standards, a Design Exception Information form must be prepared and submitted as discussed in [Subsection 2-01.8](#).

- 2-06.2 (1) COORDINATION.** Design Division Technical Support Engineers and other personnel are available to review, advise and assist the district during the preparation of the preliminary plan.
- 2-06.2 (2) TRAFFIC OPERATIONS.** Close liaison with the District Traffic is extremely important for traffic considerations. Throughout the development of the preliminary plan and the design plans, the district traffic engineering personnel are consulted to ensure proper traffic operations. Careful consideration is given to the recommendations made by traffic personnel and those recommendations agreed upon are incorporated into the design plans.
- 2-06.3 PREPARATION.** The preliminary plans may be prepared in plan sheet format (22" x 34" [560 mm x 865 mm]) or on roll plan profile tracings plotted to a scale of 1" = 200' [1:2000] for rural areas, and 1" = 100' [1:1000] or 1" = 50' [1:500] for urban areas. A vertical scale of 1" = 10' [1:100] or 1" = 20' [1:200] is used for the profile of both urban and rural areas. The length of roll plans should be held to a maximum length of 30 ft. [9 m]. If a project requires a

longer preliminary plan, the plan should be broken into two sections. When a photogrammetric survey is made, the district will be furnished a plan and profile tracing or a reproducible base map to the proper scale along with the electronic model data to be used in preparing the preliminary plan. For short projects, such as bridge replacements, the use of plan sheets is recommended for the preliminary plan.

- 2-06.3 (1) **METHODS.** The plotting of alignment and profiles is planned to minimize the number of breaks. Sufficient room is reserved at the beginning and end of the preliminary plan for title, typical sections and basic design criteria. CADD generated preliminary plans should be developed when feasible. Neatness is encouraged and good legibility is required.
- 2-06.3 (2) **TOPOGRAPHY.** All important topographic features are indicated so that alignment controls are evident in reviewing the preliminary plan. Cemeteries, Section 4(f) or 6(f) land, major utilities (underground and overhead), buildings, quarries and other such features are indicated along with the meander and direction of flow of streams, creeks and lesser draws. Land lines and descriptions are indicated along with village and city limits.
- 2-06.3 (3) **NORTH POINTS AND PROFILE ELEVATION DATUM.** North points properly orientated to the centerline are indicated on each sheet, or at the beginning and end of the preliminary plan, at approximately one-mile [one-kilometer] intervals, and adjacent to all breaks in the centerline. The elevation datum on which the profile is plotted is also indicated on each sheet, or at the beginning and end of the preliminary plan, at approximately one-kilometer (one-mile) intervals, and in both directions at all breaks in the profile.
- 2-06.3 (4) **RIGHT OF WAY.** Tentative right of way lines are included on the preliminary plan, along with property owners and property lines. The right of way lines are approximations of those which will be required to construct the improvement in accord with the details recommended on the preliminary plan. The following note is placed near the typical section on the preliminary plan: **"THE DESIGN GUIDE FOR THE WIDTH OF RIGHT OF WAY FOR THIS PROJECT WILL BE _____ FEET [METERS]. MORE OR LESS RIGHT OF WAY AS WELL AS OTHER PROPERTY INTERESTS MAY BE SECURED TO SATISFY THE REQUIREMENTS OF THE DESIGN FEATURES OF THIS PROJECT."** When controlled access right of way is to be acquired, the note shall include the statement: **"CONTROLLED ACCESS RIGHT OF WAY IS TO BE ACQUIRED FOR THIS PROJECT"** or **"PARTIAL CONTROLLED ACCESS RIGHT OF WAY IS TO BE ACQUIRED FOR THIS PROJECT"**. When fully controlled access right of way is to be acquired, the note shall include the statement: **"FULLY CONTROLLED ACCESS RIGHT OF WAY IS TO BE ACQUIRED FOR THIS PROJECT"**.
- 2-06.3 (5) **TYPICAL SECTIONS.** The typical section for the main line roadway should be shown at the beginning of the preliminary plan. A typical section showing a superelevated section will not be necessary. The typical section is drawn to scale and in sufficient detail to plainly indicate the standard to which the roadway is being planned. Where more than one typical section is required, the limits to which each section is applicable is plainly indicated. The typical sections are complete except for surface and base types and thicknesses. This information is determined in accordance with methods outlined in Chapter VI. The district may recommend a surface type and type of stabilized shoulder (see [Subsection 2-06.3 \(13\)](#)), but notations on the preliminary plan are restricted to light, medium or heavy duty.

Typical sections for other than the main line roadway, such as ramps, crossroads, supplementary routes, service roads, outer roadways, bypasses, etc., should be shown on the preliminary plan in the vicinity of the proposed road or ramp.

- 2-06.3 (6) **TITLE.** The preliminary plan is properly titled on the title sheet if prepared on plan sheets, or at both ends if prepared on a roll. If the preliminary plan includes revisions or modifications to a previously approved preliminary plan, it should be marked and titled "Revised". The design speed, design traffic data and functional classification are indicated adjacent to the title.
- 2-06.3 (7) **GRADES.** The tentative grade line is indicated on the profile section. Those topographic features and improvements which establish elevation controls are taken into consideration. The grade line should provide balanced earthwork insofar as it is practical to estimate a balanced grade line with the profile information and a

knowledge of the location. In general, no attempt is made to establish precisely a balanced grade line, such as by measuring the areas between the profile and the proposed grade. Where the complexity of the work requires, the earthwork may be processed through the computer for use in establishing the tentative grade line, and the typical section is used without modification for special ditches, cut classification, etc. The vertical P.I. stations and elevations, as well as the rates of grade, are indicated. The length of all vertical curves, stopping sight distance at crest, and the "K" value at sag vertical curves are included. Grade and vertical alignment controls are given in Chapter IV. Passing sight distance controls and data are given in the letter of transmittal and are not noted or indicated on the preliminary plan.

- 2-06.3 (8) INTERSECTED ROADS.** All intersected road-ways are shown, and those that are to remain open as grade intersections, separations, or interchanges are represented by centerline and profile. The stationing of the crossroad proceeds from left to right unless the crossroad is a state route on which the stationing has already been established. Schematic details are included for all intersections in sufficient detail to indicate generally the plan for developing the intersection. The crossroad profile is plotted on the profile section of the map, and the proposed grade is shown. Grade controls for intersected roads are given in Chapter IV. The type of surface, surface width, and roadway width for the existing road are shown. The same information for proposed replacement is necessary for all intersected roads which are to remain open.
- 2-06.3 (9) RAILROADS.** Paralleling railroads are shown where the survey is close enough that a common right of way line will be used, or where the proposed work will encroach upon the railroad right of way. Where the survey crosses a railroad, the location of the railroad, the railroad profile and railroad stationing are shown.
- 2-06.3 (10) INTERCHANGES.** A schematic drawing showing general details for all interchanges is included. Ramp profiles and tentative grades are shown on the profile portion of the preliminary plan, or may be shown on supplemental profile sheets. The location of ramp base lines and the direction of ramp stationing are given in Chapters III and IV. The proper identification of ramps is given in Chapter IV. Preliminary plans include geometric details for all diamond interchanges. For other interchange types, additional details may be necessary as covered in [Section 4-06](#). Acceptable preliminary plan details for interchanges are illustrated on [Figure 2-06.1](#). Precise computation of ramp base lines and ramp stationing is not required at the preliminary plan stage. The central angles for ramp curvature are scaled from the drawings, as is the ramp stationing.
- 2-06.3 (11) DESIGN TRAFFIC.** In addition to the main roadway design traffic volume required with the preliminary plan title, design traffic volumes are shown for interchanges and for all at-grade intersections if either or both of the crossroads have over 400 average daily traffic (ADT). If design traffic volumes indicate auxiliary turning lanes may be warranted, the district will request design turning movements from the Office of Transportation Management Systems. Discretion should be used in requesting design turning movements. Design traffic movements (ADT) and design hourly volume (DHV), or percentage of ADT for peak hour volume, are shown as a schematic diagram on the interchange layout or intersection layout.

When the preliminary plan is completed, the district requests from the Office of Transportation Management Systems the flexible and rigid equivalent single axle loads (ESAL's) for the mainline and any other roadways associated with the project requiring a pavement structural design. The request should include instructions to furnish the Design and Construction and Materials Divisions a copy of the traffic information.

- 2-06.3 (12) SOILS INFORMATION.** A soils survey should be requested from the district geologist as soon as the roadway template, alignment and tentative grades have been established with a reasonable degree of certainty during development of the preliminary plan.
- 2-06.3 (13) PAVEMENT THICKNESS DETERMINATION.** A pavement thickness determination request should be submitted on all applicable jobs to the Construction and Materials Division with a copy to the Design Division during preliminary design. The request should be submitted in a separate letter. See [Subsection 6-03](#) for details of pavement thickness determination requests and alternate pavements.

All projects that contain paving should be considered for alternate pavement bids. If there is a need to specify one pavement type over another on any project, the core team is responsible for making the decision. The Project Manager is responsible for documenting the reasons for the decision in the Project Scoping

Memorandum (See [Subsection 1-02.7](#)).

- 2-06.3 (14) HANDLING TRAFFIC.** Consideration is given to the manner of handling traffic during construction, particularly at the ends of the project or where the location crosses more important existing roads. The locations of necessary bypasses and proposed profiles are indicated on the preliminary plan.
- 2-06.3 (15) HIGH WATER DATA.** The design high water elevation at major stream crossings is indicated on the preliminary plan since this elevation will usually control the grade in the area of the stream crossing.
- 2-06.3 (16) SOIL TYPES AND CUT CLASSIFICATION.** The soil types are indicated by note at the top of the profile portion of the preliminary plan. The approximate strata of various cut classifications are also shown on the profile portion.
- 2-06.3 (17) TERMINI CONTROLS.** The alignment and profile of the existing road at each end of the proposed improvement are indicated for a sufficient distance, generally at least 1000 ft. [300 m] from the ends of the improvement, to allow a proper review of the connecting alignment and grade.
- 2-06.3 (18) EXAMPLES.** Examples showing necessary details and methods for showing details on preliminary plans are shown on [Figure 2-06.1](#).
- 2-06.4 PROJECT LIMITS.** It is desirable to designate limits on federal aid projects eligible for 100% federal funding and for "Bridge Fund" limits at the preliminary plan stage. Project items eligible for 100% federal funding include highway-railroad grade separations, traffic signals, highway signing, highway lighting, guardrail and impact attenuators. Costs for guardrail and impact attenuators should total \$25,000 or more to be eligible for 100% federal funding. At the time of preliminary plan approval the district establishes these project limits. These limits should be indicated as approximate because final determination of grade line can result in minor adjustments.
- 2-06.5 FIELD CHECKS.** When a trial grade line has been roughed in on the preliminary plan, the designer should make a field check to familiarize themselves with the job and to visually check the data displayed on the preliminary plan. Other necessary field checks should be made as design progresses.

A preliminary field check should be made by the project manager and the design team (including the district right of way agent) prior to completion of the preliminary plan. The purpose of this preliminary field check is to ensure that the preliminary plan reports the district's recommended design and conforms with the environmental document.

- 2-06.6 APPROVAL OF PRELIMINARY PLAN.** The preliminary plan for a full oversight project, as defined in [Subsection 1-04.2](#), is submitted to and approved by the FHWA. The district should submit the preliminary plan directly to the FHWA for approval. The district should provide the Design Division with a copy of the transmittal letter. Attach an updated cost estimate of the project to the transmittal letter and request the FHWA to provide GHQ Design with a copy of the approval letter.

For "exempt" projects (all other projects), the District Engineer may approve the preliminary plan for these projects, as long as design standards and policy established by the Central Office are followed.

In both situations, the district will provide GHQ Design with three (3) copies of the approved preliminary plan.

Two copies of a written request for environmental services should be submitted with the approved preliminary plan. A form for this use (see [Figure 2-02.2](#)) can be found in the Environmental/Cultural Resources category of the Design forms on the computer system. Submission of a request for environmental services at this stage will enable earlier initiation of cultural resource compliance procedures and possibly prevent future delays.

The letter of transmittal shall contain the following information:

- Passing sight distance controls and data.
- Existing pavement type with thicknesses of surfacing and base at the connecting ends of the project.
- Brief statements on borrow or waste requirements.

- Utility concerns.
- Results of capacity studies.
- Ideas for traffic control.
- Any information necessary to explain items not self-explanatory on the preliminary plan itself.

2-06.7 DISTRIBUTION OF PRELIMINARY PLANS. Prints of preliminary plans, which are furnished by the district, are to be stamped "PRELIMINARY PLANS - SUBJECT TO CHANGE." Originals of approved preliminary plans are retained in the district. Neither reproducibles or originals shall be loaned out for printing by others. Complete preliminary plan prints are released only to local government. There is no charge for a reasonable number of prints for use by these agencies. Prints are furnished to anyone desiring coverage of individual properties, including isolated tracts at interchange areas. This includes oil companies and possible land speculators, but it is not our intent to supply them with prints of entire preliminary plans. The charge for prints to other than local subdivisions of government will be in accordance with established pricing information.

2-06.8 AIRPORTS. If a highway improvement is located within 2 miles [3 km] of an existing airport, a letter should be submitted to the Design Division after preliminary plan approval. If the direction of the runways, or the elevations of the surrounding terrain, indicate there is obviously no conflict with the glide clearance (see [Figure 2-06.3](#)) at the highway crossing, a statement to this effect should be made in the letter. No further information will be required to handle the matter with the proper authorities. However, if the direction of the runways, the proximity of the airport to the highway or the elevations of the surrounding terrain are such that the glide clearance (see [Figure 2-06.3](#)) at the highway crossing is questionable, a section of a county map of scale 1" = 2 miles [1:50 000] showing the location of the airport in relation to the limits of the proposed highway improvement (see [Figure 2-06.2](#)) should be submitted with the letter. Particular attention should be given to overhead signs and light poles. This sketch does require the signature of the airport manager. The names and locations of civil and private airports in Missouri can be obtained from the "Missouri Aeronautical Chart" available from Multimodal Operations.

2-06.9 PROJECT SCOPING MEMORANDUM. Following approval of the preliminary plan and the public meeting/hearing the Project Scoping Memorandum should be completed by the project manager and submitted to the GHQ Design Technical Support Engineer for review and comment. The details of the Project Scoping Memorandum can be found in [Subsection 1-02.7\(2\)](#).