Standards for Right-of-Way Plans

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A PERSON is often able to understand what he sees more clearly and easily than what he only hears and reads. Pictures and drawings have been used for thousands of years to develop, explain, sell, and spread ideas. Demonstration through the use of pictures or drawings is one of the oldest methods of visual education.

The combination of developing, selling, explaining, and spreading ideas is of vital concern to those engaged in the acquisition of highway rights-of-way. The appraiser must develop his appraisal of fair market value and subsequently explain and sell his opinion of value to the negotiator. The negotiator must be able to explain and sell this opinion to the property owner. The attorney must do the same in a condemnation case to satisfy the jury.

In each of these situations, right-of-way plans are used as a visual aid. This raises a question as to how this plan should present the facts. Should it be in the form of a construction plan and profile sheet with its many notes and technical details that make it difficult to find those facts relating to the land being taken or to damages to any remainder lands? Should it be in the form of a parcel plat originally prepared for recording purposes and containing only the limited amount of information required by law? Or should it be presented in a continuous format, similar to a highway plan showing those elements that affect value and are of interest to all concerned? Perhaps the following remarks will provide a satisfactory answer to these questions.

Over the past forty years, many visual aids have been successfully used in the highway field, such as miniature models, charts, graphs, diagrams, photographs, and maps. However, those responsible for the planning, location, design, construction, and maintenance of highways and their structures have come to realize that engineering plans, perhaps more than any other visual aid, are the indispensable tools of their profession.

A general framework of standard procedure, form, and arrangement has been developed for highway engineering plans that is now generally accepted and used by most all highway agencies. An example of such development may be illustrated by the widespread acceptance and use of the several traditional sheets that are now common to virtually all highway construction plans; namely, the title page, typical section, quantity or summary, cross-section, and plan and profile sheets. Nearly all highway agencies now prepare these several plan sheets on original drawings having an over-all width from top to bottom of 22 in. and an over-all length of 36 in. In many instances, the final or contract plans are reduced to one-half size during reproduction printing in order to facilitate subsequent use and filing. Such plans generally contain a legend of conventional signs and symbols that clearly identify the data shown thereon. Many of these conventional signs and symbols are now accepted by the highway agencies as standard. In view of these and similar developments, there is ample evidence that much has been accomplished in providing a standard format for highway construction plans that has been generally accepted and successfully utilized by those who are directly engaged in highway construction activities.

PAST PRACTICES

The same cannot be said regarding the development and acceptance of similar standards for the preparation of plans for the acquisition of highway rights-of-way. This is understandable considering some of the circumstances surrounding the growth and development of highway systems and the agencies that control them. Until recent years, many State highway departments required local political subdivisions to furnish the...
necessary rights-of-way needed to accommodate any improvements to or construction of highways on a State highway system. In most instances, such rights-of-way were furnished at no cost to the State, being considered as the local political subdivision's contribution or proportionate share in the total costs of such improvements or construction.

Under these circumstances, where the total burden of right-of-way acquisition was carried by a local political subdivision, the State highway departments were free to concentrate their efforts on such matters as highway planning, location, design, construction, and maintenance. There was little need on the part of the State for concern about such matters as appraisals, negotiations, and other related right-of-way activities, so long as local subdivisions acquired the right-of-way without cost to the State.

During this period of growth and development a major portion of the highway effort was being directed toward improving free access highways on old locations by widening them and correcting certain deficiencies in vertical and horizontal alignments. Under these conditions, right-of-way acquisition was relatively simple when compared to the present-day task of acquiring the lands necessary to accommodate the 41,000 mi of Interstate highways, particularly when the major portion of this mileage is to be constructed on new location. This comparison is most significant inasmuch as the Interstate design standards require the construction of multi-lane divided highways with separated cross streets and railroad crossings; appropriate traffic interchange structures, frontage roads, and land service structures for pedestrian, equipment, and livestock passes; and full access control with rights-of-way averaging about 300 ft wide in rural areas and 250 ft wide in cities.

In dealing with today's problems of right-of-way acquisition for Interstate highways, some States continued to take the position, as they have in the past, that the traditional plan and profile sheets of construction plans are adequate to serve as a substitute for right-of-way plans. In some instances, these sheets are slightly modified by adding certain additional data pertaining to the properties being acquired. In other instances, no changes are made to the original drawings. The principal reasons given for such practices are that it is more economical or the drafting room squads are too busy with other work.

It is recognized there will be instances where one set of plans, combining both right-of-way and construction features, may adequately serve the needs of both phases of work. This is particularly true on highway projects involving narrow strip widenings of nominal value through rural areas where there is no appreciable effect on the remainder lands. However, where conditions are warranted, especially within or near cities and their suburbs, the additional cost and drawing board time required to produce a separate system of plans for each phase of work should be more than offset by the savings in time and costs of appraisals and acquisitions.

While the foregoing conditions may serve to demonstrate why more attention has not been given to the development of appropriate standards for the preparation of right-of-way plans, there is one other element worth mentioning. The statutes of some States have provided that the filing of parcel plats or maps and legal descriptions with designated recording officers shall precede the transfer of title of private property for highway purposes. Also, if such property cannot be acquired through negotiations and must be condemned in court proceedings, the preparation of such parcel plats or maps is a necessary first step in this action.

When the fundamental purpose of preparing such plats emanates from a legal requirement imposed by a State statute, there is good reason to expect that the method used for presentation of essential data and the extent and availability of information delineated on the plats may be primarily directed toward what is needed for recording purposes or what is required in condemnation proceedings. Under the variable requirements of each individual statute, it is understandable why there is a decided lack of uniformity in the size and arrangement of such plats and abundant variations in the methods of presentation of essential data, legends of conventional signs, and nomenclature. On the other hand, though such plats or maps may be required for recording purposes or court proceedings, it is necessary to provide a right-of-way plan for the entire project; a plan containing all of the essential data needed in connection with
appraisal and negotiation activities; a plan that shows all of the parcels and ownerships and their relative locations to one another and to the right-of-way limits and highway centerline; and a plan that will be helpful in establishing efficient and economical land acquisition practices.

It is not intended here to suggest elimination of such local practices and variations as are necessary to fulfill local need and law. Rather, it is intended to call attention to certain aspects that clearly demonstrate there is a need for establishing a general framework of standard procedure, form, and arrangement for the preparation of right-of-way plans similar to what has already been accomplished for construction plans. Stated otherwise, it is intended to call attention to the several useful purposes that right-of-way plans must serve and to suggest basic objectives and desirable minimum standards for their preparation.

OBJECTIVES

The basic objectives to keep in mind in developing standards for the preparation of right-of-way plans are (a) to provide such plans at the earliest possible date in advance of the contemplated acquisition, (b) to improve the completeness and clarity of the right-of-way plans, and (c) to establish a reasonable uniformity in the form and arrangement of such plans.

In order to meet these objectives, certain minimum criteria should be prescribed regarding the essential elements to be shown on the plans, subject to appropriate revision reflecting any subsequent changes in design requirements. These elements should be shown by the use of reasonable and practical methods, such as symbols, legend, sketches, or any other suitable manner. Also, such plans, or pertinent portions thereof, should be available for use in connection with appraisal and negotiation activities.

Attainment of these objectives permits the right-of-way plan to be used in connection with several essential operations. It allows the engineer to demonstrate his determination of necessity for the lands needed to accommodate the highway construction. It serves as a guide in obtaining title information and permits the preparation of accurate and concise legal description of the land to be taken. It is the surveyor's means of locating and staking the boundaries of the taking lines. Where required by law, it serves as a recording instrument or a supplement thereto. It is a valuable aid to the appraiser in establishing the fair market value of the land to be taken, including any damages to remainder lands. It helps the negotiator in his transaction with the property owner by translating highly technical engineering plans into layman's language. It shows the affected property owner exactly what land is to be taken, the reasons why, and the relative effect on his remainder land if only a partial taking is contemplated. It serves as a visual aid to all approving officials, attorneys, and others involved in court proceedings for condemnation cases and related hearings. It is used extensively by the auditor in his review of claims for payment or reimbursement. Finally, it is the most practical method to measure and record the progress and final completion of the project-wide right-of-way acquisition. In other words, the right-of-way plan, when presented in a continuous format similar to a highway plan, showing the necessary data conducive to good land acquisition practices, becomes the base upon which the entire right-of-way operation gradually develops and finally results in a continuous strip of publicly owned land, precisely as needed to accommodate the construction of the highway facility.

In this manner, attention can be directed toward the need for early preparation and release of right-of-way plans. The concept of delaying the start of right-of-way activities until after the final highway design is fully completed can be corrected by establishing a closer liaison between design and right-of-way operations, thus providing more lead-time for right-of-way operations by permitting the start of preliminary right-of-way activities, such as title searches, description writing, and appraisals, well ahead of the completion of final design.
ATTAINMENT OF OBJECTIVES

As previously indicated, the acquisition of rights-of-way for the National System of Interstate and Defense Highways has presented a tremendous undertaking for those responsible for such matters in the several State highway departments and the Bureau of Public Roads. Following passage of the 1956 Federal-Aid Highway Act, it was realized that such a task would require the acquisition of an estimated 750,000 parcels of land, which, when placed together in a continuous strip, would provide the 41,000 miles of rights-of-way needed for the complete network of Interstate highways.

Such a task becomes almost overwhelming, considering the many associated actions that must be undertaken and completed and repeated again and again for each parcel of land that is to be acquired. The precise areas of each taking within the right-of-way limits must be determined and described. Exacting ownership data must be gathered and compiled. Fair market value including the costs of any damages to remainder lands must be established. Negotiations must be undertaken and completed for each parcel or individual cases must be prepared for condemnation. Claims for payment or reimbursement of costs incurred must be carefully audited and certified by responsible officials. In addition, several other related activities encountered on such highway projects must be accomplished, including right-of-way clearance, utility relocations, railroad adjustments, and property management operations.

After a period of operating experience under the accelerated Interstate acquisition program, several State highway departments realized there was need for improving the completeness and clarity of their right-of-way plans, including establishment of a reasonable uniformity in the form and arrangement of such plans on a State-wide basis. Although many States have subsequently adopted new procedures and written instructions governing the preparation of right-of-way plans, some have made greater progress than others. In the limited time allowed for this presentation, it seems appropriate to concentrate on the detailed aspects of what has been accomplished in one State as opposed to presenting only a general description of such improvements accomplished within many State highway agencies.

Standards

Let us first observe and then discuss how one State recently developed and put into operation new procedures and specifications governing the preparation of right-of-way plans. Appendices A and B and Figures 1 through 4 show several of the steps undertaken by this State in accomplishing improvements to their right-of-way plans.

Appendix A is a copy of the written procedure furnished to both design and right-of-way personnel in that State. It is repeated here in its entirety except for the deletion of matters of interest to only this particular State. This procedure is considered to be an excellent example of establishing an effective liaison between design and right-of-way operations.

Figure 1 illustrates the manner in which the foregoing procedure will work under actual operating conditions. It establishes a schedule for preparing, processing, and distributing right-of-way plans. It also illustrates the advantages of a close working relationship between design and right-of-way personnel.

Appendix B sets forth the specifications for the preparation of the right-of-way plans. These instructions have been well prepared and the reader should readily understand them. No further explanation about them seems to be needed.

Figure 2 establishes a legend of conventional signs and symbols to be used on all right-of-way plans.

Figure 3 is a sample copy of the vicinity map, which is also well described under the specifications shown in Attachment B.

Figure 4 is a copy of a final right-of-way plan sheet that has been prepared in accordance with the procedures and instructions contained in Appendices A and B and Figures 1 and 2. The grades and profiles are shown on another sheet not included here.

After a thorough examination and review of what this State has accomplished, it should be of interest to comment on several of the essential elements delineated on the final right-of-way plan sheet shown in Figures 5, 6, and 7.
SAMPLE SCHEDULE FOR PREPARATION OF RIGHT-OF-WAY PLANS

Normal Time Allowed

Design Division

1. Survey notes received

2. Preliminary Vicinity Maps 5 prints only (no tracings) Prints to Right-of-Way

   Final ROW Plans (1st Submission)

3. ROW Tracings prepared by reproduction from Plotted Plans

4. Squad to extend X-Rds, Section Lines, P.L.'s and draw in proposed ROW not later than for plans-in-hand grade inspection

5. Send Tracing to ROW Division (Upon request from ROW) Include Title Sheet

   Final ROW Plans (2nd Submission)

6. Plot parcel limits from title searches Owners names Inserts Description Box

7. Return to Design

8. Send Tracings to ROW Division after plans-in-hand grade inspection

9. All detailed ROW work to be completed by Squad - with slope lines

10. Send Tracings to ROW Division after plans-in-hand grade inspection

11. Distribution

   Approved by Chief Engineer Numbers Parcels

   Chief Engr. Office

   Dist. Engr. & Others

   Utilities (Const. Plans)

12. Revisions

   Approved by Chief Engineer

   Chief Engr. Office

   District Engineer

13. Distribution

   Approved by Chief Engineer

   20. Revises ROW Tracing and

   Chief Engr. Office

   District Engineer

   21. Distributes to ROW Dist...

   and BFR

Note: All submissions of Plans to ROW Division to be routed through ROW Engr-Design Division

Figure 1.
CONVENTIONS

STANDARD ROW SIGNS AND SYMBOLS

- Section Corner
- Quarter Corner
- State Line
- County Line
- Section Line, 1/4 or 1/8 Line
- Existing ROW Line
- Proposed ROW Line
- Proposed ROW Line Limited Access
- Line Separating Limited From Free Access (ROW Fence)
- Property Line
- Fenced Property Line
- Existing Bridge or Separation Structure
- Existing Culvert
- Proposed Culvert
- Proposed Bridge or Separation Structure
- Existing Drive
- Acquired ROW Dimension
- Proposed ROW Dimension
- Small Stream
- Proposed Drainage or Channel Change
- Large Stream
- Lake or Pond
- Deciduous Trees
- Evergreen Trees
- Telephone Poles
- Power Poles
- Power Tower
- Railroad
- Fence (Except Stone or Hedge) Fenced ROW Line
- Stone Fence
- Hedge Fence
- North Arrow
- Traffic Direction Arrow
- Roadway or Lane
- House
- Church
- Shed
- Business Building
- Barn
- School
- Town Hall

Figure 2. Legend of conventional signs and symbols.
TAKING (Darker shading)

REMAINDER (Lighter shading)
**LEGEND**

- Access To Be Prohibited Shown Thus
- Property Ownership Numbers
- Property Lines

**Coordinate System Used**
Lambert North Zone

**ACCESS NOTES**

Traffic movement will be permitted under the highway structure at Box Culvert Station 153+35.

Type A approach is an off and on approach in legal manner, not to exceed 16 feet in width for sole purpose of serving a single family residence. It may be reserved by abutting owner for specified use at a point satisfactory to the states or between designated highway stations.

Type B approach is an off and on approach in legal manner, not to exceed 20 feet in width, for one necessary to the normal operation of a farm but not for retail marketing. It may be reserved by abutting owner for specified use at a point satisfactory to the states or between designated highway stations.

Type C approach is an off and on approach in legal manner for special purpose and width to be agreed upon. It may be reserved with the width and for the use specified at a point satisfactory to the states or between designated highway stations.

This approach is to be used to travel on right of way and enter property as specified.

This approach is to be used only for the operation, maintenance and repair of the existing utility specified. The approach shall not exceed 20 feet in width and shall be gated and locked when not in use.

This approach may be increased to 30 feet in width.
ES:
Right of way plans shall be prepared on standard linen tracing cloth sheets (22" x 36"), in ink to a scale of one inch equals 100 feet.

The required notes for access control shall be placed in the margin, and shall follow the standard form of notes for access control as provided for in Standard Plan M-19.

Along the right of way, the access control drawing shall be placed at the center line with the width of a lane.

Directional traffic flow arrows shall be placed on the road with appropriate identification numbers appended when necessary.

Traffic flow arrows shall be used to indicate all traffic movements including frontage roads, ramps, etc.

Ownership-plans, road alignment data and shape data shall be placed on the plan. Right of Way widths shall be included as shown hereon if access control is to be obtained.

Existing drainage structures and bridges shall be shown along with all proposed large drainage structures and bridges.

The coordinates of all control points shall be shown. If preferable, the Lambert Conformal Conic System be used.

Access control features shall be included as shown hereon if access control is to be obtained.

The ten station figures on the centerline shall be placed in the left and right tangent points.

The minimum height of lettering shall be 1.0. The beginning and ending stationing for the project shall be indicated, and on each sheet the station format to each end of the project shall be shown.

When interchanges are included in the project, it is desirable that they be placed on one sheet similar to the preceding sheet with the interchange number at the top of the sheet.

The ownership surveying on the right of way shall be performed in the headquarters office. When forwarded, the tracings shall be accompanied by a set of white prints on which all owners are shown in colored pencil.

Ownership surveying not yet shown on this sheet, except 15608 & 15609.

Sample insert showing total parcel when ownership extends beyond edge of sheet.

Do Not ink these Lines.
The showing of slope lines or lateral limits of construction has a distinct advantage in that it provides the appraisers, negotiators, attorneys, reviewing officials, and property owners with a clear understanding and interpretation of the degree the entire ownership will be affected by the taking. It also provides understanding to the extent of damages that may occur to the remainders of partial takings. It clearly demonstrates that the widths of right-of-way proposed for acquisition are necessary and are not in excess of highway needs by showing the relative position of the lateral limits of construction, the control of access lines, and the right-of-way lines.

The lines and areas of two special easement areas are shown, one for a grading permit and the other for a channel change.

The plan shows the land ownership in its entirety and in a manner that indicates the shape and size of the land taken and of the remainder lands. Where the size of the entire ownership made it impossible for plotting to plan scale, a small scale insert sketch has been provided that clearly shows the effect of the right-of-way taking lines across each ownership.

The size, form, and arrangement of the plan conforms to the general requirements for highway plans. Sufficient dimensional and angular data are shown to permit ready identification and correlation with the legal descriptions of all parcels and easement areas. Both the access control lines and the right-of-way lines are clearly shown. All pertinent data affecting the cost of the right-of-way (e.g., improvements, frontage road, fences) are shown.

Parcel identification numbers, property ownership lines, names of the property owners, and the area in acres of the part to be taken are also shown. Some of these data are included in the tabulation in the lower right hand corner of the plan sheet. Space has also been provided here to include other land areas, such as the area of remainders of partial takings.

It may also be of interest to discuss briefly the Bureau of Public Roads' experience in these matters. When any new procedure is adopted by the Bureau, the attainment of its objectives is allowed to be made in a gradual but progressive manner, whereby each of the several States is given adequate time and a reasonable tolerance for adapting their operations, if necessary, to comply with the new procedure. Such a procedure for the purpose of prescribing the standards for preparation of plans and specifications, referred to as Policy and Procedure Memorandum 40-3.1, was issued on October 1, 1959. Subsection 4h of this Memorandum prescribes the standards for the preparation of right-of-way plans for Federal-aid highway projects.

For the benefit of those who are not familiar with these standards, said paragraph 4h is repeated here in its entirety:

Right-of-way plans shall show the right-of-way lines, the widths to be acquired, the proposed limit of slope, centerline and stationing with appropriate ties to intersecting property lines and changes in right-of-way widths. The lines and areas of any additional easement areas, either temporary or permanent, that are required to accommodate intersecting roads and streets, land service, access and temporary roads, drainage areas, material storage areas, slope widenings, utilities, railroads and for any other special uses, shall also be clearly designated and shown. For each parcel to be acquired the plans shall show (1) a parcel identification number, (2) the property ownership lines, (3) the name of the property owners, and (4) the area in square feet or acres of the part to be taken and of each remainder of a partial taking. All pertinent data affecting the cost of the right-of-way such as structures, land service or access roads, improvements, and fences shall be shown.
On projects where the access rights have been or are to be acquired, the access control lines and all approved points of entry to or exit from the traffic lanes shall also be shown, even where the right-of-way lines and access control lines are coincident. The size, form, and arrangement of right-of-way plans shall conform to the general requirements for highway plans and shall contain sufficient dimensional and angular data to permit ready identification and correlation with the legal descriptions of all parcels and easement areas that are required by the associated highway project.

It is evident that the foregoing provisions are not as complete in detail as those provided by the examples shown in Appendices A and B and Figures 1 through 4. However, this is as it should be, for the Bureau's procedures must provide a reasonable latitude, sufficient flexibility and adaptability for effective but practical application within the framework of the variable operating conditions, methods, and practices that are encountered in the various States.

The examples selected for this presentation illustrate the efforts made by one State in establishing adequate standards for the preparation of right-of-way plans. However, because each highway department must give special consideration to its own organizational structure, operational procedures, regulations, and law, it is extremely doubtful if any two State right-of-way plan systems or specifications would be identical in content and format. An example of this may be found in Figure 8, which shows another State's manner of presenting a right-of-way plan.

Appendix A

PROCEDURE

The following procedure and attached specifications for right-of-way plans shall apply on projects shown below which are not on the board and have not reached a stage appreciably beyond that of title search submission to the Right-of-Way Division and on all new projects:

1. Expressways - both rural and urban.
2. Relocated sections on free access routes whenever relocation is of an appreciable length.

Vicinity Map

A vicinity map and final right-of-way plans, similar to the sample sheets herewith, are to be prepared for each project. The vicinity map takes the place of section maps which we have been submitting to the Right-of-Way Division and is used by them for title searches and other purposes. This map may be prepared immediately after receipt of the survey notes and should be transmitted to the Right-of-Way Division at that time. The index of plan sheets and the lines designating the roadways and ramps are to be added to the vicinity map at the time of submitting the final right-of-way. The alignment must be plotted as accurately as possible on this map.

Final Right-of-Way Plans

1. Final right-of-way plans are to be separate from our contract plans and will not be included in the bidding plans; however, they will be furnished to the district office and project engineer.
2. The right-of-way lines and all dimensions of these lines are to be shown on the contract plans as well as the right-of-way plan. The basic right-of-way sheets are to be prepared by reproduction and not by tracing. This means that it will be necessary to have reproductions made of the plotted plans as soon as all topography, including utilities, has been plotted. Property owner names shown in the survey notes are not to be placed on the plans as this may be different from that shown by the title search. Property lines and owners' names will be placed on the right-of-way plans by the Right-of-Way Division. They shall be later transferred to contract plans by the squad.

3. You will note that the plan part is centered on the right-of-way sheets and that the profiles are shown on separate sheets. Sixty stations of profile can be shown on one sheet by placing thirty stations on the upper half of the sheet and thirty on the lower half. The Reproduction Section can take care of these details.

4. After receiving the reproduction, it will be necessary for the squad to extend the crossroads, section lines, and property lines as much as possible in order to show complete parcels. The proposed right-of-way is to be drawn in as soon as it can be determined with a fair degree of accuracy but no computations made at this time. Limited access and free access right-of-way lines are to be shown as given in the legend. This work must be accomplished by G.I. time, or earlier. The right-of-way tracings will then be transmitted to the Right-of-Way Division.

5. They will plot the parcel descriptions as given in their title searches, show name of owner, plot the necessary inserts, prepare the description box, and do any other work along this line. Prints may be drawn by them for more detailed title searches, or other use. Following this, they will return the tracings to Design for completion.

6. The right-of-way tracings, including vicinity map and plan index, plan sheets and profile sheets, are to be completed as soon as possible, or by the assigned completion date, and transmitted to the Right-of-Way Division through the customary channels. (The R.O.W. checker will fill in first line of revision box.) As they will have work to do on the tracings, no prints are to be transmitted with them but the necessary prints for the utility companies are to be made at this time from construction plans. Slope stake lines are to be shown on right-of-way plans. The Right-of-Way Division will retain the tracings in their files from this time on, so a set of paper sepia prints is to be made for squad files before transmitting to the Right-of-Way Division.

**Revisions**

When revisions are required, the incorrect is to be marked out on the sepia and the revised right-of-way shown. A print is then to be made from the sepia and the revision circled in color. This print will be transmitted to the Right-of-Way Division through the regular channels. They will then revise the tracing and make the proper distribution of prints. Revisions, after the contract is let, are to be handled in a similar manner.

**Summary**

1. Design Division prepares vicinity map and plan index, draws right-of-way plans, draws profile sheets, lays out right-of-way requirements, and initiates revisions.

2. Right-of-Way Division plots title search descriptions, draws inserts, numbers parcels, prepares parcel information box, computes areas, makes tracing revisions, and writes descriptions.
Appendix B

SPECIFICATIONS FOR RIGHT-OF-WAY PLANS

1. Right-of-Way plans will be reproduced from construction plan tracings, and any additions will be drawn in India ink on standard 22 x 36 in. linen tracing sheets.

2. Horizontal scale will be one inch equals one hundred feet. Exceptions on horizontal scale to one inch equals forty feet will be permitted in urban areas where details are so numerous that a smaller scale would create confusion.

3. All lines, lettering, signs, and symbols shall be in accordance with the attached legend sheet and sample plans.

4. All lettering should be clear, open hand lettering in India ink with the desirable minimum height of letter of one-twelfth inch. Size of lettering and weight of lines should vary in size in relation to their importance on the map and/or in accordance with the standard right-of-way signs and symbols.

5. Plans should be drawn with stationing running from left to right.

6. The sheets carrying the right-of-way alignment and detail should be centered as nearly as possible in the center of the tracing sheets. Profiles and grade lines will be carried on separate sheets. Provision shall be made on each tracing sheet for a revision block as shown on the attached sample alignment sheet.

7. All construction centerlines, ramp centerlines, county road connections, etc., which require right-of-way, or which will affect the descriptions of right-of-way to be acquired, should be completely stationed with every fifth and tenth station numbered on 100 scale sheets and each station on 40 scale sheets.

8. All changes in width, angle points, etc., of a right-of-way line shall be stationed for the purpose of writing descriptions.

9. Curve data for all curves shall be placed on the plan as near as possible to the curve to which the data applies.

10. The right-of-way lines should be indicated as shown in the legend.

11. The line of access control over which no access will be allowed from abutting properties or between frontage roads, ramps, etc., and the main alignment should be clearly indicated on the plan. This access control line will, in most instances, be the same as the construction fence line. At separation structures, the plan should be augmented by notations showing that travel will be allowed over or under the main facility.

12. All acquired right-of-way and platted streets, shall be clearly indicated on the plan as shown in the legend. The widths of such right-of-way shall be indicated by arrows and dotted figures and labeled as: "Acquired Right-of-Way," "Platted Street," or "Acquired Limited Access Right-of-Way." All streets and roads should be labeled with their names as most commonly used in the area.

13. All section corners and quarter section corners should be shown by the standard sign and symbol whenever they fall within the right-of-way plan. Bearing and distance ties should be made between the nearest section corner, or quarter section corner, and the right-of-way centerline at all such intersections. Section corners which will fall off the plan sheet, but which are used as a tie, should be shown by a broken line.

14. All section lines, quarter section lines, and sixteenth lines should be shown on the plan as completely as possible, considering the limitations of the sheet size. All legal subdivisions should be identified on the plan. The bearings of all section lines and quarter section lines shown in survey notes should also be indicated on the plan. (No approximate lines are to be shown.)

15. Recorded subdivision plats which are affected by the right-of-way, or are in reasonable proximity thereto, should clearly indicate the title of the subdivision, the block numbers, lot numbers, and the platted streets and alleys, with their dimensions.

16. Right-of-way widths will be marked on the plan adjacent to an arrow from the right-of-way centerline to the exterior right-of-way line. If the right-of-way line is parallel to, or describable from, a centerline other than the main alignment center-
line, the distance from such centerline to the exterior right-of-way line shall be indicated. Limited access right-of-way is to be indicated as shown in the legend.

17. All right-of-way lines which do not run parallel to a centerline shall give the bearings and length of each segment.

18. Directions of travel on through lanes, frontage roads, ramps, etc., shall be indicated by arrows depicting the directions of travel to be allowed.

19. All man-made topography in the vicinity of the right-of-way shall be shown accurately and to scale. Any building, structure, improvement, well, etc., lying outside of, but within one hundred feet of any right-of-way line, should be tied to either the right-of-way line proper or the centerline by right angle measurements from that line to the closest corner of the building or structure. Any private water lines, sewage lines, septic tanks, etc., affected by the right-of-way shall be shown on the plan if such location is known.

20. Existing drainages, creeks, etc., should be shown on the plan, together with an arrow indicating the flow direction of such drainage. In addition, any existing bridges or major drainage culverts, through or across existing roads, should be shown by a dashed line as indicated on the standard signs and symbols.

21. Proposed drainage alterations, channelizations, etc., which will be a part of the construction, should be shown on the plan. The location of proposed culverts, bridges, or other structures such as grade separation, should also be shown and delineated from existing structures by the use of solid lines as shown on standard signs and symbols.

22. Trees, brush, orchards, etc., should be shown on the plan. Orchard areas, or thick brush, may be indicated by a symbol of trees around the perimeter of such area and appropriately labeled.

23. All existing private driveways and roads should be indicated on the plan by a dashed line drawn free hand.

24. Ground profile and construction grade will be carried on separate profile sheets. The grade profile sheet should contain as many profiles as can conveniently be shown and, in some cases, a smaller horizontal scale can be used than is used on the right-of-way plan. In all cases, the vertical scale on the profiles shall be one-tenth of the horizontal scale. The right-of-way sheets should carry a note cross referencing the sheet number which shows the grade for that portion of the alignment, and grade sheet should carry a notation cross referencing it to the right-of-way alignment plan.

25. When plans for right-of-way for a project are prepared, uniform order in assembling the sheets is to be observed. Plan sheets in order of continuous alignment throughout the project shall be first followed by any plan detail sheets, or ownership detail sheets, that may be required. The grade and profile sheets shall follow these detail sheets in the same order as the plan sheets are arranged. The vicinity map and plan index sheet is considered a part of the cover sheet and should precede the alignment sheets.

26. It is desirable that right-of-way for interchanges be shown completely on one sheet insofar as possible, even if this necessitates the incomplete use of the previous sheet. If the interchange area required more space than is available on one sheet, it should be broken at a logical match point and cross referenced to the plan sheet which will show the balance of the interchange.

27. A vicinity map and the plan index sheet should be prepared for each right-of-way project. This sheet will be drawn on a scale of one inch equals one thousand feet. It should show the centerline survey of the project accurately, with the approximate right-of-way lines over the length of the construction sections. All county roads, cities, etc., should be shown together with notations on how such roads will be affected by the plan. Although it need not be in detail, the vicinity map should also show the traffic movements along the highway and particularly frontage roads, ramp lines, and interchanges. It is not necessary to show topography extensively on this plan, although obvious features such as rivers, streams, lakes, etc., should be shown.

A vicinity map has several purposes: (1) It can be used by appraisers in gathering comparable sales data in the vicinity of the right-of-way to be acquired. (2) It will be
used as a negotiation aid when consultants discuss the acquisition of the property with land owners, and it will show the effect of the proposed highway on the local road system. (3) It will enable lay persons the opportunity to see visually the over-all purpose of the highway improvement. (4) It can serve as a plan index sheet to assist persons in locating the detail alignment sheet for a particular portion of the alignment.

Work to be Performed by Right-of-Way Division

1. The total contiguous ownerships of all properties affected by the right-of-way should be ascertained and plotted on the plans correctly, using a narrow thin line for the ownership boundary. The entire perimeter of the boundary of each individual ownership should be shown on the plan. When this is impossible because of the size of the ownership, a reduced scale insert should be placed on the plan outlining the entire ownership and showing the effect of the proposed right-of-way across that ownership. This insert is for informative purposes only and may be drawn to any scale necessary to meet that requirement. If the requirements for such inserts are so numerous as to clutter the plan sheet, a separate detail sheet may be set up containing these small scale ownership plats with appropriate cross references. If an ownership is described by metes and bounds, each call and distance of the description should be shown on the plans. Ownership descriptions containing definite widths, lengths, or other distances, should have the various dimensions likewise indicated on the plans.

2. Each ownership on the project shall be given its own parcel number which shall be shown on the plan by placing that number in a small rectangular box. The parcel numbers should be assigned numerically, beginning at the first ownership on the alignment and continuing in order to the end of the alignment. Selloffs, or parcels, which were originally missed or overlooked, may be given an "A", "B", etc., designation, preceded by the same number of the closest adjacent parcel.

3. Since other right-of-way needs such as rest areas, borrow areas, waste areas, grade areas, etc., affect the appraisal and purchase of the main alignment right-of-way, they should be shown on the same plan and labeled accordingly.

4. Provision should be made on each plan sheet for an ownership block. This block will show the parcel number, the apparent owner's last name, the total area of the ownership, and the amount of right-of-way being taken from each parcel. This block should be of sufficient size to provide for additional parcel numbers should any separate ownerships be discovered at a later date due to selloffs, unrecorded contracts, etc. (Only Design provides this space.)