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<b><u>14-1A</u></b>	<b><u>Sheet Preparation Responsibilities for Road, Bridge, or Traffic Project</u></b>
<b><u>14-1B(h)</u></b>	<b><u>Editable Field Check Notification Letter — INDOT-Designed Project</u></b>
<b><u>14-1B(c)</u></b>	<b><u>Editable Field Check notification Letter — Consultant-Designed Project</u></b>
<b><u>14-1B0</u></b>	<b><u>Contract Preparation Documents</u></b>
<b><u>14-1B(1)</u></b>	<b><u>Editable Asbestos Certification Form</u></b>
<b><u>14-CIB</u></b>	<b><u>Contract Proposal Book Certification Form</u></b>
<b><u>14-1C</u></b>	<b><u>Worksheet for Construction Change Order</u></b>
<b><u>14-1D</u></b>	<b><u>Shop Drawing Review Responsibility (Traffic-Related Work)</u></b>
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<b><u>14-3A</u></b>	<b><u>Recommended Plan Legend</u></b>
<b><u>14-3B</u></b>	<b><u>Plan Abbreviations</u></b>
<b><u>14-3C</u></b>	<b><u>Title Sheet Information Block</u></b>
<b><u>14-3D</u></b>	<b><u>Horizontal Curve Data, Accuracy to be Shown on Plans</u></b>

## CHAPTER FOURTEEN

# PLAN PREPARATION

Other Parts of this *Manual* provide the designer with uniform criteria and procedures for the design of a highway facility. These designs must be incorporated into the construction plans so that they can be clearly understood by contractors, material suppliers, and Department personnel assigned to inspect the construction of the project. To ensure a consistent interpretation of the construction plans, individual sheets should have a standard format and content, and the sequence of plan assembly should generally be the same. This Chapter provides the general information and details necessary to prepare a complete set of construction plans for a road, bridge, traffic-signs, signalization, or lighting project. Chapter Eighty-five discusses criteria for the preparation of right-of-way plans. In addition to the information provided in this Chapter, the *INDOT Typical Plan Sheets* provides sample construction plans sheets and guidance on what information should appear on each sheet.

### 14-1.0 PLAN DEVELOPMENT

#### 14-1.01 Responsibilities

Figure 14-1A, Road, Bridge, or Traffic Project (Sheet Preparation Responsibilities), illustrates who is responsible for preparing the various details of an in-house designed project. For consultant-designed plans, the consultant will be responsible for the preparation of all plan sheets. For a project that is longer than 1.5 km, or an interchange, rest-area, or weigh-station project, separate traffic-signs and lighting plans will typically be required.

The designer will initially complete all plan sheets, computation sheets, quantity estimates and cost estimates. A second qualified individual will independently review these documents. The qualifications of the checker should be commensurate with the item to be reviewed. For example, a second drafter would be qualified to check the preliminary drafting, but an engineer will generally be required to review the structural details and computations for a bridge design.

At several design stages the plans will be submitted to various Department units for review. Section 14-2.0 identifies the construction plan sheets that should be completed at the various design stages.

Prior to any of these submissions, the project manager is responsible for ensuring that all appropriate information has been incorporated onto the plans or is included with the plans; the

plans are consistent; all comments from previous submittals have been addressed; all calculations have been checked; and the overall content meets the Department's criteria.

**\*\* PRACTICE POINTER \*\***

If a consultant submits full-size plans for distribution and review, the plans must be clearly labeled on the outside of the roll.

## **14-1.02 Project Development**

Chapter Two illustrates the steps the designer should follow when preparing a set of construction plans. Using this process will ensure that all appropriate information will be addressed in the construction documents. The following briefly discusses the project development relative to the plan sheets.

### **14-1.02(01) Project Initiation**

The Office of Environmental Services is responsible for preparing the Engineer's Report. This Report provides the scoping information the designer needs to initiate the project design. Chapter Five discusses the typical contents of an Engineer's Report.

Prior to beginning design on an existing facility, the designer should review the as-built plans or the final design plans for that previous work. Final design plans are on file, on microfilm, in the Planning Division's Research and Documents Library. The actual as-built plans or microfilm are located in the appropriate district office. The district office is responsible for correcting the final design plans to reflect the as-built conditions.

Although the as-built plans are an important resource, the designer will typically conduct a field review or have a survey conducted for each road or bridge project. Section 14-3.0 discusses how to incorporate the survey data into the construction plans. For most traffic signing, signalization, or lighting work, a survey will generally not be performed. However, a field review will still be required.

If the design requires a deviation from an INDOT *Standard Drawing*, it may be handled by either of the methods as follows.

1. Inclusion of a detail in the plans.

2. Reference made to an INDOT *Standard Drawing*, which is not applicable to the situation, but is warranted anyway. For example, Standard Drawing 610-DRIV-05 is applicable if the mainline shoulder is paved and 2.4 m or greater in width. In a restricted situation, it may be appropriate to have the drive constructed in accordance with 610-DRIV-04 instead. In this situation, it will be sufficient to add a note in the Pavement Quantities and Approach Table's Remarks column as follows: Construct in accordance with Standard Drawing 610-DRIV-04.

The designer of a mother project should coordinate the combining of multiple projects into one contract. Attention should be given to the pay items (i.e., if one has QC/QA pavement, the other must also use QC/QA pavement even if not otherwise warranted). If there is no mother project (i.e., two independent bridge replacement projects), the INDOT designer or project manager should coordinate the combining of the projects into one contract.

#### **14-1.02(02) Field Check Stage**

The project manager, or consultant, if one is involved, is responsible for preparing and distributing plans for each field check. This will consist of the following:

1. Scheduling and INDOT Review. For a Department-designed project, the project manager will schedule the field check. Prior to the field review of a consultant-designed project, the consultant is required to forward one set of plans to the Central Office. If the plans are satisfactory for a field check, INDOT will notify the consultant to schedule the field check. If the plans are not satisfactory, marked-up plans will be returned to the consultant for re-submittal.
2. Meeting Date. For a Department-designed project, the INDOT project manager is responsible for arranging a mutually agreeable field check date with the district construction area engineer. For a consultant-designed project, the consultant has this responsibility with the INDOT project manager and the district construction area engineer. The field check should be scheduled at least three weeks in advance.
3. Plans Distribution. The INDOT project manager, or consultant, if one is used, is responsible for preparing field check notification letters and plans so that they are received by all parties on the distribution list at least two weeks prior to the field check. Plans distributed within the Central Office may be delivered to the Contract Administration Division's Document Control Team leader. All other plans and letters should be sent directly to the necessary individuals. See Figure 14-1B(h), Field Check Notification Letter, INDOT-Designed Project, or Figure 14-1B(c), Field Check Notification Letter, Consultant-Designed Project. Editable versions of these forms may also be found on the Department's website at

**\*\* PRACTICE POINTER \*\***

For work in Gibson, Posey, Vanderburgh, or Warrick counties, a copy of the plans and notification letter should be sent to EUTS (Evansville Urban Transportation System). This information is shown on the distribution list on the Designer Forms webpage, at [www.in.gov/dot/div/contracts/design/dmforms/](http://www.in.gov/dot/div/contracts/design/dmforms/).

4. Field Check Report. After the field check has been completed, the INDOT project manager, or consultant, if one is used, will be responsible for preparing the report of meeting and listing the comments from all individuals involved in the field check. Copies of this report will be distributed to all those involved in the field check and to those individuals listed in the distribution in Figures 14-1B(c) and 14-1B(h).

#### **14-1.02(03) Final Tracings Submittal**

The construction project number should be shown in the box in the upper left hand corner of the Title Sheet and the lower right hand corner of all other plan sheets. For right-of-way plans, the right-of-way project number should be shown.

The project manager will submit the final tracings to the project manager. The project manager will submit the plans to the Research and Documents Library Team. This submittal will include the following:

1. one set of final tracings (mylar) and cross sections (reproducible vellum or mylar);

**\*\* PRACTICE POINTER \*\***

Prior to submitting the final tracings, the designer should contact the Planning Division's Research and Documents Library Team to obtain the contract number, for transmittal purposes and placement onto each sheet of the final tracings, excluding cross sections.

2. set of marked-up final check prints;

3. two sets of prints;
4. a diskette or CD-ROM including the following:
  - a. final cost estimate (on Estimator), with a separate estimate prepared for each Des number, using the most recent bid history and pay item list files;
  - b. one Recurring Special Provisions Menu in Microsoft Excel, covering all Des numbers in the contract. The Menu may be found on the Department's website, at [www.in.gov/dot/div/contracts/standards/rsp/index.html](http://www.in.gov/dot/div/contracts/standards/rsp/index.html).
  - c. modified recurring special provisions and unique special provisions in Microsoft Word.
5. three hardcopies of the final cost estimate and four hardcopies of the special provisions;
6. two copies of Figure 14-1B0, Contract-Preparation Documents to Contract Administration Division Office of Estimating memorandum which includes information on the status of permits, right-of-way, etc. An editable version of this document may be found on the Department's website, at [www.in.gov/dot/div/contracts/design/dmforms/](http://www.in.gov/dot/div/contracts/design/dmforms/).
7. four copies of permits or permit information. See Section 9-1.03 for additional information;
8. subsurface investigation, or geotechnical summary;
9. Scope/Environmental Compliance Certification/Permit Application Certification form. An editable version of this document may be found on the Department's website, at [www.in.gov/dot/div/contracts/design/dmforms/](http://www.in.gov/dot/div/contracts/design/dmforms/).
10. one bound copy of the design computations and two copies of the quantity calculations;
11. project correspondence files;
12. original survey book(s) and electronic survey files on diskette or CD-ROM;
13. Bridge Search Data form. An editable version of this document may be found on the Department's website, at [www.in.gov/dot/div/contracts/design/dmforms/](http://www.in.gov/dot/div/contracts/design/dmforms/).
14. Quality Assurance form. An editable version of this document may be found on the Department's website, at [www.in.gov/dot/div/contracts/design/dmforms/](http://www.in.gov/dot/div/contracts/design/dmforms/).

15. Figure 14-1B(1), Asbestos Certification Form (for new bridge construction, bridge replacement, or bridge rehabilitation project), with original to the appropriate district bridge inspector; a copy to the Environmental Services Office's Environmental Policy Team leader; and a copy to be placed in the design calculations document. An editable version of the Asbestos Certification may be found on the Department's website, at [www.in.gov/dot/div/contracts/design/dmforms/](http://www.in.gov/dot/div/contracts/design/dmforms/);
16. Geotechnical Review of Final Check Prints form. An editable version of this document may be found on the Department's website, at [www.in.gov/dot/div/contracts/design/dmforms/](http://www.in.gov/dot/div/contracts/design/dmforms/); and
17. Limited Review Certification. An editable version of this document may be found on the Department's website, at [www.in.gov/dot/div/contracts/design/dmforms/](http://www.in.gov/dot/div/contracts/design/dmforms/).

The map of the official detour route, where applicable, as developed by the district Office of Traffic, should be provided to the Contract Administration Division's Office of Contracting for incorporation into the Contract Information book. Maps of unofficial detour routes should not be provided. Also, the output from the pipe material selection program should not be provided.

The Scope/Environmental Compliance Certification/Permit Application Certification form, design computations, quantity calculations, project correspondence files, and survey books are maintained by the Research and Documents Library Team as a reference file for the project. Two sets of Final Plans prints, the disk, cost estimate, special provisions, copies of permits or permit information, Federal Fiscal Management Form (completed by the Research and Documents Library Team), and the Memorandum to Contracts Services Section are submitted to Contract Administration Division's Office of Contracting.

The Contract-Preparation Documents to Contract Administration Division Office of Estimating memorandum should be completed by the project manager. The project manager or designer should transmit plans and environmental permits, along with right-of-way, utilities, and other pertinent information to the appropriate district construction engineer so that the construction engineer can assist in completion of the Contract Requirements Worksheet portion. The plans, permits, and information should be sent to the construction engineer in a timely manner such that the construction engineer can provide information including possible new or revised pay items or quantities. Once completed, the entire memorandum should be transmitted to the Planning Division's Research and Documents Library Team with the final tracings submittal. The construction engineer's recommendations should be incorporated into the final tracings submittal.

The ERMS I.D. required on the memorandum should preferably be the contract number. If the contract number is not yet assigned, the I.D. should be the Des number.

It is the responsibility of the designer handling a mother project to be certain that the tracings for all included projects are brought together and submitted to the Production Management Division's Research and Documents Library Team in time for processing.

The Research and Documents Library Team enters the preliminary data on the project into BAMS at this time. The information is processed by the Des number. If there is more than one Des number, the data must be entered for each Des number and the cost estimates segregated by the Des number.

The Research and Documents Library Team prepares the original tracings for letting. Contract numbers and project numbers are checked, reference points are checked, Des numbers are checked, and a memorandum is prepared for the signer of the plans. The plans are signed and dated by the project designer and the Production Management Division director.

The designer should review the plans and Contract Information book received of the Contract Administration Division's Office of Contracting within one week after such receipt. The designer should complete the Contract Information Book Certification form and return it to the project manager. An editable version of this document may be found on the Department's website, at [www.in.gov/dot/div/contracts/design/dmforms/](http://www.in.gov/dot/div/contracts/design/dmforms/).

#### **14-1.02(04) Plan Revision Prior to Letting**

Any change made to the tracings after a project is turned in to the Research and Documents Library Team, but before bids are opened, should be handled as follows:

A change is made to the tracings with a revision note placed in the revision block on the title sheet (bridge project) or index sheet (road project). This revision note should include the date of the revision, the revised sheet numbers, and a short explanation of the change. A note should also be placed on the revised sheet or sheets in a location that will not restrict its visibility.

1. Erasures are permitted from the time the tracings are turned in to the Research and Documents Library Team until the plans are printed for distribution to potential bidders or others. This is approximately 5 weeks before the letting date. Within this 5-week period, revisions may only be made to the tracings with the approval of the appropriate district construction engineer. Such revisions are to be shown in clouds. Although with electronic drafting it is common for the designer to delete a sheet and substitute a new one in its place, the designer should still use clouds to assist plans users in finding the changes on the new sheet.
2. Revise the special provisions, noting all changes, if needed.

3. Revise quantities and construction cost estimate if needed.
4. Submit the revised tracings, special provisions package, quantity computations, construction cost estimate using Estimator, and diskette or CD-ROM containing the unique special provisions and construction cost estimate.
5. No changes are permitted within the week prior to the letting date.

The letting date, and not the plan signing date, controls when and how revisions can be made to the plans.

#### **14-1.02(05) Contract Information Book Certification**

Within one week after receipt, the designer should review the plans and Contract Information book if the designer is signing and sealing some or all of the plan sheets. The designer should complete Figure 14-CIB, Contract Proposal Book Certification Form, and send the original to the appropriate district construction engineer with copies to the Contract Administration Division's Office of Contracting. An editable version of this document may be found on the Department's website, at [www.in.gov/dot/div/contracts/design/dmforms/](http://www.in.gov/dot/div/contracts/design/dmforms/). If errors are noted, the designer should also contact the appropriate district construction engineer to determine how the errors should be handled (as revisions before the letting date, construction changes after the letting date, etc.). This determination should be documented in a memorandum to the appropriate district construction engineer with copies to the Office of Contracting and project manager.

#### **14-1.02(06) Construction Change**

A change made after a project is let and awarded must be processed as a construction change. A construction change is processed as follows:

1. Plan Sheets. Where a change is made to the tracings, a revision note should be placed in the revision block on the Title Sheet for a bridge project, or the Index Sheet for a road project. This revision note should contain the date of the revision, the revised sheet numbers and a short explanation of the change. A note should also be placed on the revised sheet or sheets in a location that will not restrict its visibility. No erasures may be made to the original tracings as they are considered a legal contract document at the time of letting.

If space allows, the original item to be revised should be hatchmarked through and the revision should be made on the same sheet. The revision should be placed on the sheet in

a location that will not restrict visibility, and should be shown in a cloud. If the revision is too large to be shown on the original sheet, the deleted sheet number should be noted in the revision block. This deleted sheet should remain in the original set of plans. A new sheet should be added to the original set of plans with the same sheet number as the deleted sheet followed by an alpha character (e.g., Delete Sheet 7, Add Sheet 7A). Revisions on the new sheet should also be shown in clouds.

2. Research and Documents Library Team. A memorandum will be prepared by the Research and Documents Library Team to the district construction engineer (see Figure 14-1C, Worksheet for Construction Change Order.) An editable version of this form may also be found on the Department's website at [www.in.gov/dot/div/contracts/design/dmforms/](http://www.in.gov/dot/div/contracts/design/dmforms/). Six sets of full-size plans should accompany this memorandum to the district Office of Construction. Any quantity revisions are computed and transmitted by the designer with the memorandum for use by the project's field personnel in preparing Form IC-626.
3. Distribution. A half-size set of plans and a copy of the memorandum should be distributed to the following:
  - a. the Federal Highway Administration, if applicable;
  - b. the contractor;
  - c. the project engineer;
  - d. Contract Administration Division's Office of Contracting;
  - e. Office of Real Estate, if right of way is revised;
  - f. project manager;
  - g. consultant, if applicable;
  - h. Planning Division's Bridge Inventory Team, if a bridge project; and
  - i. Planning Division's Research and Documents Library Team.

#### **14-1.02(07) Shop Drawings**

The contractor will often be required to submit shop drawings to the Department for review and approval. It is recommended that the original plans and contract documents be used in reviewing shop drawings. For shop drawings, the following will apply.

1. Cover Memorandum. The cover memorandum accompanying the shop drawings should include the following:
  - a. contract number;
  - b. des number;
  - c. route/road location;

- d. district; and
  - e. exact description of the item(s) being submitted.
2. Structure. For concrete structural members, structural steel members, or expansion joints, the procedure for reviewing shop drawings will be as follows:
- a. The fabricator will provide the shop drawings to the designer for review and approval.
  - b. After the shop drawings have been reviewed and approved, the designer will forward the approved drawings to the Highway Operations Division for distribution.
  - c. The designer will provide one set of prints to the Research and Documents Library Team for filing.
  - d. After fabrication is completed, the fabricator will submit one set of mylar prints directly to the Research and Documents Library Team. The mylars are stored in the vault until they are microfilmed.
  - e. The microfilm will then be stored in the Research and Documents Library.
3. Pipe, Guardrail, Handrail, or Bridge Railing. Shop drawings for these items are to be reviewed by the district's project engineer.
4. Traffic Project. For signing, lighting, or traffic-signals work, Figure 14-1D, Shop Drawing Review Responsibility (Traffic-Related Work), indicates the responsible review entity for shop drawings. After the shop drawings have been approved, the designer should distribute two copies of the approved drawings as noted in Item 7 below.
5. Local-Agency Project. Shop drawings for a local-agency project should be submitted to the local agency for review and approval.
6. Other Shop Drawings. For all shop drawings other than those listed above, the fabricator will provide the shop drawings to the designer for review and approval. After the shop drawings have been approved, the designer will distribute the approved drawings to individuals listed in Item 7.
7. Distribution. After shop drawings have been approved, they should be distributed to the individuals as follows:
- a. designer (traffic – see Item 4);

- b. fabricator;
- c. contractor (traffic – see Item 4);
- d. shop inspector;
- e. Research and Documents Library Team; and
- f. construction engineer (traffic drawings only – see Item 4).

## **14-2.0 PLANS SUBMISSIONS**

The designer should submit a Level One Checklist, including computations, with each submission, for the mainline, each S-line, and each traffic-maintenance phase. In addition, the designer should include computations for the required intersection sight distance at each public road, including each local-service road or frontage road within the project limits. The designer should also submit documentation of the intersection sight distance provided at each public road. This requirement also applies to the traffic maintenance phases. The designer should submit a completed Limited Review Certification form at the Final Check Prints and Final Tracings stages.

The computations for the Level One items and intersection sight distance are to be initialed and dated by the designer and reviewer before submission.

If there are no changes to the plans which affect Level One criteria since the prior submission, it is acceptable to copy the previous Level One Checklist and add a statement that no changes have been made to the plans that affect Level One criteria. The statement should be initialed and dated for the current submission.

### **14-2.01 Road Design Plans (New Construction or Reconstruction Project)**

#### **14-2.01(01) Grade Review Submission/Hydraulic Review Submission**

It is not necessary to submit a Level One checklist for an S-line that does not exceed the work necessary to build the appropriate public road approach, including the required taper distance to account for transitioning to the existing pavement width. This does not relieve the designer of making the project meet all Level One design elements in this area, e.g., maximum grade, vertical stopping sight distance, and intersection sight distance.

The proposed design information for this submittal should be plotted in Microstation. However, the plans need not be in final form. The designer is encouraged to add notes on the plans explaining special situations or items which are not readily apparent which may influence the

proposed design. These notes are to be removed in later submissions. The following sheets and information must be reviewed for Quality Assurance and included with this submission:

1. Conformance. Review the plans for conformance with the Level One controlling design criteria listed in Section 40-8.02(01) and note any apparent or possible design exceptions. Also note any discrepancies from the Level Two design criteria listed in Section 40-8.02(02).
2. Title Sheet. At this project stage, information on the Title Sheet should include the following:
  - a. project number;
  - b. project Des number;
  - c. county location map;
  - d. project location map including north arrow and scale;
  - e. description of the project work type and location;

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The location description should be simple and should follow the description on the schedule. For example, "Bridge replacement on State Road 67 over Fall Creek, located 12.86 kilometers southwest of the south junction with State Road 39, in Section 13, T-11-N, R-2-W, Ray Township, Morgan County, Indiana." A legal description should not be used.

- f. reference points at the beginning and end of the project (not required for a local-agency project);
- g. gross and net project lengths, not including incidental construction or lengths along S-lines;
- h. design data including design speed, project design criteria, functional classification, terrain, traffic data, rural or urban, etc.; and

- i. signature block(s); these blocks will not be filled in at this stage.
3. Index and General Notes Sheet. The Index and General Notes Sheet should provide a list of utility owners and addresses. The index blocks should be completed to indicate the sheet numbers for the plans at this stage. Note that the sheet numbers will change for future submittals.
4. Typical Cross Sections. Typical cross sections should only show basic configuration and design features. This will typically include the following:
  - a. lane and shoulder widths;
  - b. profile grade, construction centerline, survey line, and paper-relocation line locations;
  - c. cross slopes;
  - d. curbs;
  - e. sidewalk locations and widths;
  - f. bicycle facilities;
  - g. side slopes;
  - h. shoulder corrugations if warranted; and
  - i. ditches.
5. Plan and Profile Sheets. At this stage, the plan and profile will generally only include the preliminary design information. Plotting of the existing topography should be complete. The details that should be addressed include the following:
  - a. horizontal alignment (e.g., horizontal curve data, PC, PI, PT, bearings);
  - b. vertical alignment and its relationship to grade-controlling features;
  - c. all alignment controlling features (e.g., high-water levels, existing crossroads and bridges, regulated drains, drainage structures, railroads, underdrain criteria, traffic maintenance considerations, cemeteries, historical buildings, parks, ADA requirements, etc.); and
  - d. preliminary drainage details, e.g., bridges or mainline culverts.
6. Interchange. If the project includes at least one interchange, the general layout of the interchange should be shown, including preliminary ramp gradients, horizontal alignment, vertical alignment, etc.
7. Cross Sections. Provide sample cross sections through critical areas.

8. Design Information. In addition to the plans, the designer should include copies of the preliminary hydraulic analysis for each mainline culvert, if applicable, and results of any economic analysis that may have been completed for alternative grade lines.
9. Certification. Include an up-to-date copy of the Scope/Environmental Compliance Certification/Permit Application Certification form.

#### **14-2.01(02) Interchange Geometrics Submission**

For a project which includes at least one interchange, a separate submittal of the proposed horizontal alignment for the interchange may be required prior to the Grade Review. The following elements must be reviewed for Quality Assurance and included with this submission:

1. Conformance. Review the plans for conformance with the Level One controlling design criteria listed in Section 40-8.02(01) and note any apparent or possible design exceptions. Also note any discrepancies from the Level Two design criteria listed in Section 40—8.02(02).
2. Geometrics. The plan sheets for the interchange geometrics should be graphically completed including stationing, curve data, bearings, etc. The design speeds for ramps should be noted.
3. Ramp Grades. Investigate ramp grades in as much detail as required to determine their effect on the proposed horizontal alignment.
4. Traffic Elements. The traffic elements to be reviewed to determine their effect on the interchange alignment are as follows:
  - a. traffic counts and turning movements;
  - b. consideration of signing;
  - c. consideration of signals at ramp terminals; and
  - d. consideration of illumination (high mast or conventional).
5. Design Information. Include all applicable design information with this submission (e.g., economic analysis, drainage analysis).

#### **14-2.01(03) Preliminary Field Check Plans**

Plans should be approximately 40% complete at this stage. The following sheets and information must be reviewed for Quality Assurance and included with this submission.

1. Previous Reviews. The marked-up plans from the previous submittal should be included with this submission, i.e., Grade Review and/or Interchange Geometrics.
2. Conformance. The plans should be reviewed for conformance with the Level One controlling design criteria listed in Section 40-8.02(01). Any apparent or possible design exceptions should be noted. Also, any discrepancies from the Level Two design criteria listed in Section 40-8.02(02) should be noted. The required documentation for all Level One and Level Two design exceptions should be submitted.
3. Plat Sheet. A preliminary Plat No. 1 should be included if the project is on a Department-maintained route and requires right of way. See Section 85-2.0.
4. Plan and Profile Sheets. Elevations and grades of ditches should be shown so that accurate right-of-way requirements can be determined. In addition to the criteria required for prior submittals, the plan and profile sheets should include the following:
  - a. project limits;
  - b. drainage features (e.g., pipe structures, ditch grades, preliminary inlet spacing for storm-sewer trunk line design, etc.) and proposed drainage notes;
  - c. public road approach and drive locations;
  - d. construction limits;
  - e. proposed right of way;
  - f. approximate roadside-barrier locations;
  - g. permanent erosion protection, including paved side ditches, riprap, and sodding limits; and
  - h. new sidewalks, bicycle lanes, etc., if not shown on the details sheets.
5. Details Sheets. Preliminary layouts or sketches should be included as follows:
  - a. major intersections, including turning movements, turn lanes, and pavement markings;
  - b. signals;

- c. signs, including sign structures;
- d. lighting;
- e. retaining walls;
- f. special drainage structures;
- g. superelevation transition diagrams;
- h. weigh stations and associated facilities; and
- i. rest areas and associated facilities.

If shoulder corrugations are warranted, and the plans include details for a non-standard public road approach, driveway, etc., each detail should show the extent of corrugations installation required in conjunction with the construction illustrated by the detail. If applicable, the INDOT *Standard Drawings* should be used as a guide when determining the limits of corrugations installation related to the feature shown in the detail.

- 6. Traffic Maintenance Details. The proposed traffic maintenance scheme and phasing should be outlined.
- 7. Approach Table. The preliminary information to be included is as follows:
  - a. location (station);
  - b. approach type;
  - c. radii;
  - d. approach width;
  - e. approach length;
  - f. approach grades;
  - g. surface materials; and
  - h. distance beyond right-of-way line.
- 8. Structure Data Table. The preliminary information to be included for each structure is as follows:
  - a. location;
  - b. size;
  - c. type;
  - d. approximate elevations and grades where necessary for clarity; and
  - e. type of end section.

9. Cross Sections. The preliminary draft for the cross sections should include the following:
  - a. profile grade elevations;
  - b. templates of the proposed typical section placed on the existing cross sections;
  - c. drainage structures;
  - d. approaches or drives; and
  - e. buildings.
10. Design Information. Include the preliminary draft of the Design Summary and the draft Fish and Wildlife Review, if applicable. The preliminary storm-sewer analysis should also be included with this submittal. Unique special provisions should be initiated with this submittal.

#### **14-2.01(04) Design Hearing Plans and Preliminary Right-of-Way Plans Submission**

Plans for this submittal should be close to their final form. The construction plan sheets for this submittal should be legible and consistent with the quality desired for public viewing. If one or more ramps are to be closed for 7 days or longer, a public information meeting will be required. The procedure for such meeting should be in accordance with Section 14-02(02). The right-of-way plans should be consistent with the requirements described in Chapter Eighty-five. The designer should review the *INDOT Typical Plan Sheets* document to determine what information should be included on each sheet. Review the following sheets and information for Quality Assurance and include them with this submission.

1. Previous Reviews. Include the marked-up plans from the previous submittal with this submission.
2. Title Sheet. Finalize the Title Sheet for right-of-way plans.
3. Index and General Notes Sheet. Prepare the right-of-way index.
4. Plat Sheets. All plat sheets, if required, should be consistent with the plans.
5. Plan and Profile Sheets. Right of way should be finalized and consistent with the detail sheets. Storm-sewer design should be complete and should be included in the plans.
6. Design Information. In addition to the construction plans, this submittal should include an updated cost estimate for the project and a copy of the draft Design Summary. The Department's cost-estimating procedures should be used for the preliminary construction cost estimate; see Chapter Twenty. Quantities will generally consist only of major items

with a percentage added to consider smaller items. If practical, the traffic-related items should be segregated.

7. Certification. Include an up-to-date copy of the Scope/Environmental Compliance Certification/Permit Application Certification form.

#### **14-2.01(05) Right-of-Way Tracings Submission**

Chapter Eighty-five provides the criteria and information that should be included with a set of right-of-way plans. In addition, the designer should review the instructions for Quality Assurance as follows:

1. include the marked-up preliminary right-of-way plans with this submission, if requested to do so;
2. incorporate all revisions made during the Preliminary Right-of-Way Plans Submission review;
3. complete all sheet cross references;
4. complete all project-information boxes, including right-of-way project number and sheet numbers; and
5. complete the checklist shown in Figure 85-2F.

#### **14-2.01(06) Final Design Summary Submission**

Submit a request for the final pavement design to the Planning Division's Office of Pavement Design at this time. Include and review these elements for Quality Assurance as follows:

1. plans revisions resulting from the Design Hearing comments;
2. environmental requirements satisfied by one of the following:
  - a. the Environmental Impact Statement is complete and the Record of Decision (ROD) has been issued;
  - b. the Environmental Assessment is complete and a Finding Of No Significant Impact (FONSI) is made by the Federal Highway Administration; or

- c. the Categorical Exclusion is complete. If there is a line on which the Federal Highway Administration is to sign, it must be signed;
3. a final Design Summary, including the resolution of hearing comments;
4. permit information as required; and
5. updated Scope/Environmental Compliance Certification/Permit Application Certification form.

#### **14-2.01(07) Final Field Check Plans Submission**

If a Final Field Check is required, the designer should complete the following and review these elements for Quality Assurance.

1. Previous Reviews. Include the marked-up plans from the previous submittal with this submission.
2. Plan Sheets. The plans should be nearly complete. Changes from the Design Hearing, soils recommendations, and pavement-design recommendations should be incorporated. Legends should be completed and checked for accuracy and consistency with Section 14-3.04. In addition, the designer should consider the following.
  - a. Title Sheet. Complete the Design Data Block.
  - b. Index and General Notes Sheet. Check the general notes to ensure they are up-to-date and accurate. Revise the index as necessary.
  - c. Plan and Profile Sheets. Ensure that structure notations are completed; sodding, riprap, and paved sodded ditch locations are indicated; earthwork balances are shown; and removal items noted.
  - d. Details Sheets. Ensure that all details are completed and included with this submission. This includes details for temporary erosion control, traffic maintenance details, and traffic design elements (e.g., intersections, signals, signing, and lighting).
  - e. Tables. Complete all data tables including the following:
    - (1) Structure Data Table;
    - (2) Approach Table;

- (3) Underdrain Table;
- (4) Paved Side Ditch and Sodding table;
- (5) Guardrail Table; and
- (6) Sign Summary Table.

- f. Cross Sections. Design information should be essentially complete. This includes final structure notations, earthwork areas and volumes, and benching areas and volumes.

The Contract Administration Division's field engineers will require the elevations for existing cross sections in order to calculate final earthwork quantities.

If the project was designed from an electronic survey, the design calculations should include a data table created from the electronic cross sections which indicates all existing cross-section elevations.

An example data table is shown as Figure 14-2A.

3. Preliminary Cost Estimate. An updated preliminary construction cost estimate is required at this time. Quantities for all major items should be included in the cost estimate. Miscellaneous pay items previously accounted for as a percentage of the cost estimate and which are not required to complete tables in the plans need not be quantified at this time.
4. Computations and Miscellaneous Documents. Include the computations, quantities, and other documents with this submission as follows:
  - a. final drainage design;
  - b. structure quantities;
  - c. underdrain quantities;
  - d. sodding, riprap, and paved side ditch quantities;
  - e. preliminary earthwork quantities;
  - f. paving quantities for the approach table;
  - g. signing, traffic signals, lighting, and pavement markings quantities; and
  - h. preliminary special provisions.
5. Underground Storage Tanks Removal. If this work is required, the designer should coordinate such activity with the Office of Environmental Services' Environmental Policy Team. The designer should complete Figure 14-2B, the Underground Storage Tanks Removal Memorandum. An editable version of this document may be found on the Department's website, at [www.in.gov/dot/div/contracts/design/dmforms/](http://www.in.gov/dot/div/contracts/design/dmforms/). If a final

field check is not required, the coordination should take place six months prior to the Ready for Contracts date.

This coordination is to ensure that required pay items such as excavation and handling of contaminated soil are included in the contract.

#### **14-2.01(08) Final Check Prints Submission**

The purpose of this submittal is to ensure that the plans are complete and meet the criteria shown in the Engineer's Report and the Design Summary. The following should be completed and reviewed for Quality Assurance.

1. Previous Reviews. Include the marked-up plans from the previous submittal with this submission.
2. Conformance. Review the plans for conformance with the Level One controlling design criteria listed in Section 40-8.02(01) and note any approval dates for any design exceptions.
3. Pavement Design. Incorporate the final pavement design into the typical cross sections and quantities.
4. Quantities. Finalize all quantities and include a bound copy.
5. Reports. Ensure that the recommendations from the Geotechnical Report and other reports regarding peat, hazardous waste, special waste, etc., have been incorporated into the plans, specifications, and cost estimate.
6. Cost Estimate. Conduct a detailed review to ensure that all necessary items have been included. Finalize the construction cost estimate by using Estimator.
7. Certification Form. Include a copy of the Scope/Environmental Compliance Certification/ Permit Application Certification form.
8. Special Provisions. Complete the special provisions including special provisions for non-standard pay items.
9. Erosion Control Plans. Include the completed set of erosion control plans.
10. Rule 5. If required, and not previously submitted in accordance with Section 9-1.02, complete the Rule 5 Submission as described in Chapter Thirty-seven.

11. Road and Bridge Summary Sheets. The content and requirements are described below. For a large project for which the standard-sized summary tables cannot accommodate all of the items, multiple custom Summary sheets should be used to accommodate all the necessary information. The Summary sheet frames, in DXF format, can be downloaded from [www.in.gov/dot/div/design](http://www.in.gov/dot/div/design).

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The word “bituminous” which has appeared in pay item names and where it still may appear for asphalt materials should be changed to “HMA.”

- a. Road Summary. The Pavement Quantities and Approach Table, Structure Data, Paved Side Ditch Summary, Riprap Ditch and Sodding Table, Underdrain Table, Guardrail Summary Table with guardrail-related pay items, and mailbox approaches information including required HMA quantities should be completed. The Structure Data tables should be updated to include Service Life, Site Designation, and pH for pipes.
- b. Bridge Summary. The Summary of Bridge Quantities table should be completed and necessary miscellaneous information should be shown. Each bridge project will have a Bridge Summary sheet and a Road Summary sheet.

#### **14-2.01(09) Final Tracings Submission**

Complete the following and review these instructions for Quality Assurance.

1. Previous Reviews. Include the marked-up plans from the previous submittal with this submission.
2. Identification Numbers. Ensure that the proper contract, project, and sheet numbers are included on all sheets. The designer should contact the Research and Documents Library Team to obtain the contract number.
3. Signatures. Have the appropriate individuals complete the signature blocks on the appropriate sheets.

4. Submittal. Review the procedures in Section 14-1.02(03) for guidance on submitting the final tracings to the project manager and Research and Documents Library Team.

## **14-2.02 Road Rehabilitation Plans for Project with No Additional Right of Way Required**

### **14-2.02(01) Grade Review Submission/Preliminary Field Check**

For a 4R project with realignment, a separate Grade Review Submission and a Preliminary Field Check Submission will be required. For information on Grade Review Submission, see Section 14-2.01(01). For a 4R project with no realignment or for a 3R project, only a Preliminary Field Check Submission will be required.

The designer should invite a representative from each affected local public agency (county, city, or town) to the field check. If one or more local agencies are not represented at the field check, the designer should contact them and meet with them independent of the field check.

It is not necessary to wait until the preliminary field check to initiate the geotechnical investigation. As soon as possible, the designer should provide the Production Management Division's Office of Geotechnical Services with the information as follows:

1. Location [(route number or road name) from \_\_\_\_\_ to \_\_\_\_\_ ];
2. Anticipated pavement treatment, i.e., resurface, rubblize, etc., from the scope or mini-scope; and
3. Locations where the pavement will be widened.

If there is a change in scope after the above information is provided to the Office of Geotechnical Services, the designer should immediately notify it.

The proposed design information for this submittal should be plotted in Microstation. The designer is encouraged to add notes on the plans explaining special situations or items which are not readily apparent which may influence the proposed design. These notes must be removed in later submissions. The following sheets and information must be reviewed for Quality Assurance and included with this submission.

1. Conformance. Review the plans for conformance with the Level One controlling design criteria listed in Section 40-8.02(01) and note any apparent or possible design exceptions. Also note any discrepancies from the Level Two design criteria listed in Section 40-

8.02(02). Submit the required documentation for all Level One and Level Two design exceptions.

2. Title Sheet. At this stage, the Title Sheet should include the information as follows:
  - a. project number;
  - b. Des numbers
  - c. county location map;
  - d. project location map including north arrow and scale;
  - e. description of the project work type and location;
  - f. reference points at the beginning and end of the project (not required for a local-agency project);
  - g. project length;
  - h. design data including design speed, project design criteria, functional classification, terrain, traffic data, etc.; and
  - i. signature block(s), though not to be completed at this stage.
3. Index and General Notes Sheet. The Index and General Notes Sheet should provide a list of utility owners and addresses. Include any general notes that are known at this time. The index blocks should be completed to indicate the sheet numbers for the plans at this stage. The sheet numbers will change for future submittals.
4. Typical Cross Sections. Typical cross sections should show typical configuration and design features. This will typically include the following:
  - a. lane and shoulder widths;
  - b. profile grade, construction centerline, survey line, and paper-relocation line locations;
  - c. detailed pavement design, if available from the Engineer's Report. At a minimum, note whether the design will consist of resurfacing, crack and seating, rubblizing, or pavement replacement;

- d. roadway cross slopes;
  - e. curbs;
  - f. underdrains, with location shown relative to pavement;
  - g. side slopes;
  - h. ditches;
  - i. shoulder corrugations if warranted; and
  - j. clear zones if a 4R project.
5. Plat Sheet. If right-of-way acquisition is required, include a preliminary Plat No.1. See Section 85-2.0. A plat sheet is not required for a local agency project.
6. Plan and Profile Sheets. At this stage, the plan and profile design information will generally be completed. Some of the details that should be addressed include the following:
- a. plotting of the existing topography;
  - b. project and construction limits;
  - c. proposed or existing right-of-way limits;
  - d. horizontal alignment (e.g., horizontal curve data, superelevation, PC, PI, PT, bearings);
  - e. vertical alignment and its relationship to grade controlling features;
  - f. any alignment controlling features (e.g., high-water levels, existing crossroads and bridges, regulated drains, drainage structures, railroads, underdrain criteria, maintenance of traffic considerations);
  - g. drainage features (e.g., storm sewers, pipe structures, structure end treatments, ditch grades) and proposed drainage notes;
  - h. approximate roadside-barrier locations;

- i. permanent erosion protection, including whether paved side ditches, riprap, or sodding will be required;
  - j. temporary erosion control details; and
  - k. permanent median crossovers. For approved locations, see Chapter Fifty-four.
7. Interchange. If applicable, the general layout of each interchange should include ramp gradients, horizontal alignment, vertical alignment, etc.
8. Details Sheets. The preliminary layouts or sketches to be included are as follows:
- a. major interchanges and/or ramp intersections, including turning movements, turn lanes, and pavement markings;
  - b. signals;
  - c. signs, including sign structures;
  - d. lighting;
  - e. pavement markings;
  - f. retaining walls;
  - g. special drainage structures;
  - h. spot elevations;
  - i. superelevation-transition diagrams;
  - j. weigh stations; and
  - k. rest areas.

If shoulder corrugations are warranted, and the plans include details for a non-standard public road approach, driveway, etc., each detail should show the extent of corrugations installation required in conjunction with the construction illustrated by the detail. If applicable, the INDOT *Standard Drawings* should be used as a guide when determining the limits of corrugations installation related to the feature shown in the detail.

9. Traffic Maintenance Details. The proposed traffic maintenance scheme and phasing should be outlined including traffic crossovers, ramp closures, number of through lanes maintained in each direction, etc.
  
10. Approach Table. The preliminary information to be included if a crossroad is present is as follows:
  - a. location (station);
  - b. approach type;
  - c. radii;
  - d. approach width;
  - e. approach length;
  - f. approach grades;
  - g. pavement thickness;
  - h. surface materials; and
  - i. distance beyond right-of-way line.
  
11. Structure Data Table. The preliminary information to be included for each structure is as follows:
  - a. location;
  - b. size;
  - c. type;
  - d. approximate elevations and grades where necessary for clarity; and
  - e. type of end section.
  
12. Sign Summary Table. The sign location (station) and type (sign code) should be shown. However, the sign size, Summary columns, and post size need not be completed at this project stage.
  
13. Guardrail Summary Table. Complete the applicable information.
  
14. Cross Sections. The preliminary draft should include the following:
  - a. profile grade elevations in each area with new full depth pavement;
  - b. templates of the proposed typical section placed on the existing cross sections;
  - c. drainage structures;
  - d. any embankment widening;
  - e. benching and widening for guardrail; and
  - f. ditch cross sections.

15. Design Information. In addition to the plans, the designer should include the preliminary draft of the Design Summary. Unique special provisions should be initiated with this submission.
16. Certification. Provide an up-to-date copy of the Scope/Environmental Compliance Certification/Permit Application Certification form with this submission.

#### **14-2.02(02) Public Information Meeting**

A Public Information Meeting will be held as soon as practical after the field check, and will allow time for review of traffic maintenance plans. If an affected local public agency was not represented at the field check, the designer should meet with that which did not attend to describe the project and proposed traffic maintenance plan. The designer should prepare minutes of each of these meetings. If significant additional right of way is required, a Public Hearing will be required as described in Section 14-2.01(04). A Public Information Meeting will be held if any ramp within the project limits will be closed for 7 days or longer. After a Public Information Meeting is held, the designer will be required to document the concerns raised by the public at the meeting. If a meeting is required, review the following sheets and information for Quality Assurance and include them with this submission.

1. Maintenance of Traffic Plans. In preparation for a Public Information Meeting, the designer may be asked to perform the following activities.
  - a. Displays. Prepare displays that can be used in a coordination meeting or a Public Information Meeting. This will include, but not necessarily be limited to, sketches of the typical cross section for each phase of the construction and composite drawings showing all ramp closures with traffic flow arrows indicating the number of lanes open during each construction phase.
  - b. Transportation Management Plan (TMP). Address the requirements of any TMP that has been developed for the project.
  - c. Queues. Analyze the capacity constraints due to lane closures, including anticipated queues and user costs. This can be done using the QUEWZ software discussed in Chapter Eighty-one.
2. Plan Sheets. These plans should be close to their final form. All revisions from previous submittals should have been incorporated into the plans. The construction plan sheets for this submittal should be legible and consistent with the quality desired for public viewing and reproduction for right-of-way plans. The designer should review the *INDOT Typical*

*Plan Sheets* document to determine what information should be included on each sheet. This submittal should include the following.

- a. Title Sheet. Include the written description of the project work type and location and other pertinent data and finalize all previous information. However, the signature blocks will still be incomplete. If necessary, finalize the Title Sheet for right-of-way plans.
- b. Index and General Notes Sheet. The information should be essentially complete. However, the sheet numbering on the index may change.
- c. Typical Sections. Typical sections should include all necessary details and be finalized.
- d. Plan and Profile Sheets. Include all necessary information. Right of way should be consistent with the details.
- e. Details. All necessary information should be provided. However, changes may be made at a later date.
- f. Interchange. If one or more interchanges are present, the plans should include the layout of each interchange including ramp gradients, horizontal alignment, vertical alignment, etc.
- g. Traffic Maintenance Details. The proposed traffic maintenance scheme and phasing should be outlined including traffic crossovers, ramp closures, number of through lanes, etc.
- h. Tables. Approach and Structure Data tables may be preliminary but should be neat and legible.
- i. Cross Sections. Cross sections are generally not included. However, one set should be made available for public viewing.
- j. Design Information. In addition to the construction plans, this submittal should include an updated cost estimate and a copy of the draft Design Summary. The Department's cost-estimating procedures should be used for the preliminary construction cost estimate; see Chapter Twenty. Quantities will generally consist only of major pay items with a percentage added to consider minor items. If practical, the traffic-related items should be segregated.

3. Design Summary. For a road rehabilitation project which requires a Public Information Meeting, provide a draft copy of the Design Summary at the time the meeting is scheduled, even if the project has not yet reached the Design Approval stage.

The Design Summary format for a road rehabilitation project should be as follows.

- a. **Title Block.** Use the guidelines for full Design Summary shown in Chapter Seven.
- b. **Location and Project Description.** Describe the project location by showing the beginning and ending points in kilometers from a State-maintained route. Identify the project length and the county. Briefly describe the type of pavement-rehabilitation treatment that is being specified. Do not discuss the bridge rehabilitation work, as it is included in the Bridge Inspection Report. It is also unnecessary to address any signing or lighting requirements.
- c. **Maintenance of Traffic During Construction.** Indicate whether the mainline traffic will be maintained by means of crossovers or lane closures. Discuss any ramp closures that will occur. Address situations where staging of ramp closures may be required so that adjacent interchanges are not closed simultaneously. Include the approximate duration of each ramp closure and provide the proposed marked detour route. Describe any improvements that will be made to local roads or streets that will be used as a marked or unmarked detour. Determine if a formal agreement with the local government agency will be required.

If the project is located near a large urban or other heavily congested area, discuss any capacity constraints due to lane closures. Include the anticipated delays to the motoring public during peak traffic periods. Provide the approximate length of the queue and discuss user costs. Indicate whether a transportation management plan (TMP) was utilized in developing the traffic control plan (TCP) for the project. Discuss whether A plus B bidding would be beneficial.

The items discussed above are most often not required, unless ramp closures or long delays are anticipated.

- d. **Resolution of Field Check Items or Scope Changes.** Discuss any items which may have been left unresolved in the field check minutes or attach memoranda which may indicate how field check issues were resolved. Provide brief written documentation of any changes from the original project scope.
- e. **Design Exceptions.** If applicable, list any critical design elements for which a design exception was obtained. Also include the date of the design exception.

- f. Attachments. The Design Summary should include any field check minutes, the pavement design letter, and the cost estimate.

#### **14-2.02(03) Final Design Summary Submission**

The request for final pavement design must be submitted to the Planning Division's Office of Pavement Engineering prior to this stage if the desired pavement treatment is different than that shown in the Engineer's report. For this submission, include and review for Quality Assurance the following:

1. any revisions to the plans resulting from the Public Information Meeting;
2. environmental requirements satisfied by one of the following:
  - a. the Environmental Impact Statement is complete and the Record of Decision (ROD) has been issued;
  - b. the Environmental Assessment is complete and a Finding Of No Significant Impact (FONSI) is made by the Federal Highway Administration; or
  - c. the Categorical Exclusion is complete. If there is a line on which the Federal Highway Administration is to sign, it must be signed;
3. the final Design Summary, with all required attachments;
4. necessary permit information, including Rule 5 as required; and
5. an up-to-date copy of the Scope/Environmental Compliance Certification/Permit Application Certification form.

#### **14-2.02(04) Final Field Check Plans Submission**

If a final field check is required, see the requirements listed in Section 14-2.01(07).

#### **14-2.02(05) Final Check Prints Submission**

The purpose of this submittal is to ensure that the plans are complete and meet the criteria presented in the Engineer's Report and the Design Summary. The following should be completed and reviewed for Quality Assurance.

1. Previous Reviews. Include the marked-up plans from the previous submittal with this submission.
2. Conformance. Review the plans for conformance with the Level One controlling design criteria listed in Section 40-8.02(01) and note approval dates for any design exceptions.
3. Plan Sheets. The plans should be nearly complete. Changes from the Design Hearing, soils recommendations, and pavement-design recommendations should be incorporated. Legends should be completed and checked for accuracy and consistency with Section 14-3.04. In addition, the designer should consider the following.
  - a. Title Sheet. Complete the Design Data Block.
  - b. Index and General Notes Sheet. Check the general notes to ensure they are up-to-date and accurate. Revise the index as necessary.
  - c. Plan and Profile Sheets. Ensure that structure notations are completed; sodding, riprap, and paved sodded ditch locations are indicated; earthwork balances are shown; and removal items are noted.
  - d. Details Sheets. Ensure that all details are completed and included with this submission. This includes details for temporary erosion control, traffic maintenance details, and traffic design elements (e.g., intersections, signals, signing and lighting).
  - e. Tables. Complete all data tables including the following:
    - (1) Structure Data Table,
    - (2) Approach Table,
    - (3) Underdrain Table,
    - (4) Paved Side Ditch and Sodding Table,
    - (5) Guardrail Table, and
    - (6) Sign Summary Table.
  - f. Cross Sections. Design information should be essentially complete. This includes final structure notations, earthwork areas and volumes, and benching areas and volumes.

4. Computations and Miscellaneous Documents. Include the following computations, quantities, and other documents with this submission.
  - a. final drainage design;
  - b. structure quantities;
  - c. underdrain quantities;
  - d. sodding, riprap, and paved sodded ditch quantities;
  - e. preliminary earthwork quantities;
  - f. paving quantities for the approach table;
  - g. signing, traffic signals, lighting, and pavement-markings quantities; and
  - h. preliminary special provisions.
5. Pavement Design. Incorporate the final pavement design into the typical cross sections and quantities.
6. Quantities. Finalize all quantities and include a bound copy of the computations.
7. Cost Estimate. Conduct a detailed review to ensure that all necessary items have been included. Finalize the construction cost estimate using Estimator.
8. Certification Form. Include a copy of the Scope/Environmental Compliance Certification/ Permit Application Certification form.
9. Special Provisions. Complete the special provisions including special provisions for non-standard items.
10. Erosion Control Plans. Include the completed set of erosion control plans.
11. Rule 5. If required, complete the Rule 5 Submission as described in Chapter Thirty-seven.

#### **14-2.02(06) Final Tracings Submission**

Complete the following and review these instructions for Quality Assurance.

1. Previous Reviews. Include the marked-up plans from the previous submittal with this submission.
2. Identification Numbers. Ensure that the proper contract, project, and sheet numbers are included on all sheets.

3. Signatures. Have the appropriate individuals complete the signature blocks on the appropriate sheets.
4. Submittal. Review the procedures in Section 14-1.02(03) for guidance on submitting the final tracings to the project manager and Research and Documents Library Team.

### **14-2.03 Bridge Plans (New Bridge Construction or Bridge Replacement)**

#### **14-2.03(01) Hydraulics Review Submission**

A submittal for hydraulics review will be required prior to or concurrent with the Grade Review and Structure Type and Size Selection submittal. When preparing this submission, consider the following:

1. All preliminary plotting should be completed and checked.
2. For a new bridge over a waterway, a structure replacement, or a bridge on a new alignment, provide a Layout sheet with the contours plotted on the plan view and cross sections of the T-line.
3. For a crossing with roadway overflow, include the Road Plan and Profile sheets so that the road profile can be determined.
4. For a larger-waterway crossing, include a Details sheet of the plan view with the contours plotted to the survey limits. This information will be used by the Department for the hydraulic analysis.
5. If the project is a local public agency project, include the hydraulic analysis computations and recommendations for review.
6. The plans sheets will be for information purposes only except for the Layout sheet which will include the preliminary structure geometrics.

#### **14-2.03(02) Grade Review and Structure Type and Size Selection Submission**

Place the proposed design information for this submittal in Microstation. However, the plans need not be in final form. The designer is encouraged to add notes on the plans explaining special situations or items which are not readily apparent which may influence the proposed design. These notes should be removed for later submissions. The following sheets and information must be reviewed for Quality Assurance and included with this submission.

1. Conformance. Review the plans for conformance with the Level One controlling design criteria listed in Section 40-8.02(01) and note approval dates of any design exceptions. Also note any discrepancies from the Level Two design criteria listed in Section 40-8.02(02).
2. Computations. Include the computations as follows:
  - a. design computations for determining the structure size and geometrics; and
  - b. project length computations including guardrail lengths and other contributing factors.
3. Economic Analysis. Include a copy of any structural economic analysis that may have been conducted to determine the most economic structural alternative.
4. Index and Title Sheet. At this stage, the Index and Title Sheet should include the information as follows:
  - a. project number;
  - b. Des number;
  - c. bridge file number;
  - d. county location map;
  - e. project location map including north arrow and scales;
  - f. description of the project work type and location;
  - g. design data including design speed, project design criteria, functional classification, terrain, and traffic data;
  - h. applicable reference point (does not apply to local-agency project);
  - i. signature block(s); these blocks will not be completed at this stage; and
  - j. an index of plan sheets at this stage. Sheet numbers will change for future submittals.

5. Typical Cross Sections. Typical cross sections should only show basic configuration and design features. This will typically include the following:
  - a. lane and shoulder widths;
  - b. profile grade, construction centerline, survey line, and paper-relocation line locations; and
  - c. basic design features including curbs, sidewalks, pavement and shoulder cross slopes, side slopes, ditches, shoulder corrugations if warranted, etc.
  
6. Road Plan and Profile Sheets. At this stage, these will generally only include the preliminary design information. The details that should be addressed include the following:
  - a. plotting of existing topography;
  - b. beginning and end of project;
  - c. horizontal alignment (e.g., horizontal curve data, PC, PI, PT, bearings);
  - d. vertical alignment and its relationship to grade-controlling features;
  - e. preliminary drainage design including mainline culverts;
  - f. preliminary public road approach or drive locations;
  - g. approximate construction limits; and
  - h. proposed guardrail limits.
  
7. Layout Sheet. This should include the preliminary design information for the following:
  - a. existing-ground contours;
  - b. horizontal alignment;
  - c. vertical alignment;
  - d. drainage structures;
  - e. public road approach or drive locations;

- f. approximate construction limits;
- g. plan view showing bridge centerline station and skew;
- h. proposed structure geometrics (span lengths and clear roadway widths in the Title Block);
- i. channel protection;
- j. utility owners;
- k. existing structure data; and
- l. hydraulic data.

\*\* *PRACTICE POINTER* \*\*

The scour elevation to be shown on the Layout sheet  
should be the scour elevation for  $Q_{500}$ .

- 8. Channel Change Layout Sheet. Include this sheet if the extent of the channel change is beyond the general layout. This sheet should include the preliminary design information for the following:
  - a. stream profile;
  - b. new channel geometrics;
  - c. channel typical cross section; and
  - d. slope protection.
- 9. Cross Sections. The preliminary cross sections should include the following:
  - a. templates of the proposed typical section placed on the existing cross sections;
  - b. profile grade elevations; and
  - c. drainage structures.
- 10. Certification. Provide an up-to-date copy of the Scope/Environmental Compliance Certification/Permit Application Certification Form with this submission.

### **14-2.03(03) Preliminary Field Check Plans**

Plans should be approximately 40% complete at this stage. The following sheets and information must be reviewed for Quality Assurance and included with this submission.

1. Previous Reviews. Include the marked-up plans from the previous submittal with this submission.
2. Conformance. Review the plans, including temporary runaround or other traffic maintenance plans excluding detours for conformance with the Level One controlling design criteria listed in Section 40-8.02(01) and note any apparent or possible design exceptions. Also note any discrepancies from the Level Two design criteria listed in Section 40-8.02(02). Submit the required documentation for all Level One and Level Two design exceptions.
3. Plat Sheet. Include a preliminary Plat No. 1 (does not apply to local-agency project).
4. Road Plan and Profile Sheets. In addition to the information in Section 14-2.03(02), show the following:
  - a. elevations and grades of ditches so that accurate right-of-way requirements can be determined;
  - b. construction limits;
  - c. proposed right of way including temporary right of way;
  - d. public road approach and drive locations;
  - e. drainage features (e.g., storm sewers, pipe structures, ditch grades); and
  - f. permanent erosion protection, including paved side ditches, riprap, or sodding limits.
5. Details Sheets. Include the preliminary layouts for the details as follows:
  - a. roadway or shoulder layout for guardrail;
  - b. special elements where applicable (e.g., modified approaches, signs, signals);
  - c. intersection layout details including right- and left-turn lanes with the turning movements indicated; and

- d. superelevation transition diagrams.

If shoulder corrugations are warranted, and the plans include details for a non-standard public road approach, driveway, etc., each detail should show the extent of corrugations installation required in conjunction with the construction illustrated by the detail. If applicable, the INDOT *Standard Drawings* should be used as a guide when determining the limits of corrugations installation related to the feature shown in the detail.

6. Traffic Maintenance Details. The proposed traffic maintenance scheme and phasing should be outlined.
7. General Plan Sheet. This sheet should include the information as follows:
  - a. plan view;
  - b. elevation view;
  - c. typical bridge cross section;
  - d. design data. A note should be included which reads as follows: “Designed for HS 25 loading, in accordance with the 2006 AASHTO *Load Resistance Factor Design Specifications* and its subsequent interims;” and
  - e. suggested substructure type.
8. Road Summary Sheet. This sheet should include the following:
  - a. approach table with type, location, geometric data, and types of materials; and
  - b. Structure Data Table with location, size, and type for each structure.
9. Cross Sections. See Section 14-2.03(02). Finalize the cross sections according to the revisions from the Grade Review plans. Also show the public road approaches and drives.
10. Design Information. In addition to the plans, the designer should include the preliminary draft of the Design Summary, the draft Fish and Wildlife Review and a request for preliminary woody revegetation determination, if applicable.

#### **14-2.03(04) Design Hearing Plans and Preliminary Right-of-Way Plans Submission**

Plans for this submittal should be close to their final form. The construction plan sheets for this submittal should be legible and consistent with the quality desired for public viewing. The right-of-way plans should be consistent with the requirements of Chapter Eighty-five. The designer

should review the *INDOT Typical Plan Sheets* document to determine what information should be included on each sheet. The following sheets and information must be reviewed for Quality Assurance and included with this submission.

1. Previous Reviews. Include the marked-up plans from the previous submittal with this submission.
2. Index and Title Sheet. Finalize the Title Sheet for right-of-way plans and include the right-of-way index.
3. Plat Sheets. Finalize all plat sheets, if required.
4. Road Plan and Profile Sheets. Finalize the right of way.
5. Layout Sheet. This sheet should be essentially complete.
6. General Plan Sheet. This sheet should be essentially complete.
7. Design Information. In addition to the construction plans, this submittal should include an updated cost estimate and a copy of the draft Design Summary. The Department's cost estimating procedures should be used for the preliminary construction cost estimate; see Chapter Twenty. Quantities will generally consist only of major pay items with a percentage added to consider minor items. If practical, the traffic-related items should be segregated.
8. Certification. Provide an up-to-date copy of the Scope/Environmental Compliance Certification/Permit Application Certification form with this submission.

#### **14-2.03(05) Right-of-Way Plans Submission**

Chapter Eighty-five provides the criteria and information that should be included with a set of right-of-way plans. This submission is not required for a local agency project. In addition to completing the following, the designer should review the following instructions for Quality Assurance.

1. Include the marked-up preliminary right-of-way plans with this submission, if required to do so.
2. Incorporate all revisions made during the Preliminary Right-of-Way Plans Submission review.

3. Complete all sheet cross references.
4. Complete all project information boxes in the right-of-way plans, including right-of-way project number and sheet numbers.
5. Complete the checklist shown in Figure 85-2F.

#### **14-2.03(06) Preliminary Plans for Final Approval Submission**

Submit a request for the final pavement design to the Planning Division's Office of Pavement Engineering at this time. Include the and review these elements for Quality Assurance as follows

1. plan revisions resulting from the Design Hearing comments;
2. any revisions to the plans due to the Geotechnical Report recommendations;
3. Soil Borings sheets (prepared by the Production Management Division's Office of Geotechnical Engineering for an in-house project or by the consultant for a consultant-designed project);
4. Foundation Review form;
5. a final Design Summary including resolution of hearing comments;
6. environmental requirements satisfied by one of the following:
  - a. the Environmental Impact Statement is complete and the Record of Decision (ROD) has been issued;
  - b. the Environmental Assessment is complete and a Finding Of No Significant Impact (FONSI) is made by the Federal Highway Administration; or
  - c. the Categorical Exclusion is complete. If there is a line on which the Federal Highway Administration is to sign, it must be signed;
7. permit information as required; and
8. updated Scope/Environmental Compliance Certification/Permit Application Certification form.

### **14-2.03(07) Final Check Prints Submission**

For this submittal, finalize the plans and include all roadway, traffic, and bridge details, and check the computations. Complete the following and review these elements for Quality Assurance.

1. Previous Reviews. Include the marked-up plans from the previous submittal with this submission.
2. Conformance. Review the plans for conformance with the Level One controlling design criteria listed in Section 40-8.02(01) and note approval dates of any design exceptions.
3. Pavement Design. Incorporate the final pavement design into the typical cross section and final quantities.
4. Computations and Quantities. Include the computations and quantities as follows:
  - a. final approach drainage design;
  - b. superstructure design;
  - c. end bent or abutment design;
  - d. interior substructure design;
  - e. bridge seat elevations;
  - f. screeds (at copings, profile grade, each beam line, and each construction joint);
  - g. superstructure quantities;
  - h. end bent or abutment quantities;
  - i. interior substructure quantities;
  - j. pavement, curb, and sidewalks quantities;
  - k. drainage structure quantities;
  - l. riprap, sodding, and seeding quantities;
  - m. earthwork quantities;
  - n. traffic-related items and designs as discussed and revised from Field Check Plans;
  - o. traffic maintenance quantities;
  - p. miscellaneous roadway quantities;
  - q. updated construction cost estimate; and
  - r. completed special provisions.
5. Reports. Ensure that the recommendations from the Geotechnical Report and other reports regarding peat, hazardous waste, special wastes, etc., have been incorporated into the plans, specifications, and cost estimate.
6. Plans. The plans should be nearly complete at this stage and should include the following.

- a. Title Sheet. Complete the Design Data Block and update the index as necessary.
- b. Typical Cross Sections. Add the final pavement design information.
- c. Plan and Profile Sheets. Ensure that structure notations are completed; sodding, riprap, and paved sodded ditch locations are indicated; earthwork balances are shown; and removal items noted.
- d. Details Sheets. Ensure that all details are completed and included with this submission. This includes details for the following:
  - (1) reinforced concrete bridge approach bill of materials and/or details;
  - (2) temporary erosion control;
  - (3) traffic maintenance details; and
  - (4) traffic designs elements (e.g., intersections, signals, signing, or lighting).
- e. Bridge-Related Sheets. Finalize the design for these sheets as follows.
  - (1) Soil Borings Sheet. Ensure that the information is accurate from the Geotechnical Report. Each boring log should include an elevation at each break in the soil strata. The elevations should be shown along the vertical grid so that the elevation of each soil sample can be ascertained. Logs for roadway borings should not be included.

**\*\* PRACTICE POINTER \*\***

Copies of the boring logs included in the Geotechnical Report may be scanned and placed onto the Soil Borings sheet, provided they are still legible once the plans are reduced to half-size.

- (2) Layout Sheet. Ensure that the riprap and slopewall quantities are shown and the earthwork summary is completed.
- (3) General Plan Sheet.
- (4) End Bent or Abutment Details.

- (5) Interior Substructure Details.
  - (6) Superstructure Details.
- f. Tables. Complete all data tables including the following:
- (1) Bridge Summary Table;
  - (2) Structure Data Table;
  - (3) Approach Table;
  - (4) Underdrain Table;
  - (5) Paved Side Ditch and Sodding Table;
  - (6) Guardrail Table; and
  - (7) Sign Summary Table.
- g. Cross Sections. Design information should be essentially complete. This includes final structure notations, earthwork areas and volumes, and benching areas and volumes.
7. Certification Forms. Include a copy of the Scope/Environmental Compliance Certification/Permit Application Certification form.
8. Rule 5 Submission. If required and not previously submitted, submit in accordance with Section 9-1.02.
9. Bridge Load Rating. The project manager will submit a copy of the bridge plans, excluding cross sections, with a cover letter indicating the designer's name, design firm (if applicable), telephone number and/or e-mail address, and any other necessary information to the Planning Division's Bridge Inventory Team. The Team will run the available bridge-load-rating program and provide the project manager with the bridge load rating analysis and output results, not later than four weeks from the date of plans submittal.

If the analysis shows an inventory rating less than that required by Section 60-3.02, the project manager will transmit the information to the designer to revise the design and plans or resolve any input errors.

The Production Management Division should submit to the Bridge Inventory Team a copy of any changes or revisions to the bridge plans, including those due to a cost-reduction proposal that may affect the load capacity rating after the load rating is completed.

The Production Management Division will provide the Bridge Inventory Team with the structural calculations including computer output if the bridge is one of the types as follows:

- a. post-tensioned concrete beams; \*
- b. segmental concrete; \*
- c. three-sided structure; \*\*
- d. oversized box culvert; \*\* or
- e. other as requested by the Bridge Inventory Team.

\* The designer will notify the Bridge Inventory Team of this structure type as soon as practical after receipt of design approval.

\*\* No submission of final check prints will be made for this structure type. Calculations will be furnished after shop plans are approved.

#### **14-2.03(08) Final Tracings Submission**

Complete the following and review these instructions for Quality Assurance.

1. Previous Reviews. Include the marked-up plans from the previous submittal with this submission.
2. Sheet Number. Ensure that the proper sheet and project numbers are included on all sheets.
3. Signatures. Have the appropriate individuals complete the signature blocks on the appropriate sheets.
4. Submittal. Review the procedures in Section 14-1.02(03) for guidance on submitting the final tracings to the project manager and Research and Documents Library Team.
5. Memorandum to Contract Services and Bridge Search Data Forms. These forms should be completed and submitted at this stage. Editable versions of these documents may be found on the Department's website, at [www.in.gov/dot/div/contracts/design/dmforms/](http://www.in.gov/dot/div/contracts/design/dmforms/).

#### **14-2.03(09) Bridge within Limits of Road Project**

Plans for a bridge which is complementary to plans for road work must be developed as described below. Each structure which is assigned a bridge file number must also be assigned a Des number.

1. INDOT-Route Project.

- a. New or Replacement Beam or Slab Bridge. A separate set of plans should be developed for each bridge. However, plans for an overflow structure may be included in the set for the main-channel structure.
- b. New or Replacement Three-Sided, Box, or Pipe Structure. These may be incorporated into the road plans. The structure file number and Des number for each such structure included in the road plans should be shown on the title sheet.

A separate set of plans with just one title sheet may be developed for one or more of these structures.

2. Local-Public-Agency Project. Bridge plans may be incorporated into road plans or developed as a separate set per the requirements of the local public agency. However, the structure file number and Des number for each structure included in the road plans should be shown on the road title sheet.

#### **14-2.04 Bridge-Rehabilitation Project**

##### **14-2.04(01) Preliminary Field Check and Inspection Report**

Based on the initial inspection of the structure, prepare the Inspection Report. The Report should include but not be limited to the following:

1. existing condition status;
2. rehabilitation recommendations;
3. a tabulation of design criteria;
4. a cost estimate;
5. quantity computations;
6. color photographs; and
7. environmental-permit requirements.

The Report may also include a detailed account of past repairs, a design exception request, and justification for a consultant survey to verify geometric information.

Section 72-2.05 provides the Department's procedures for the initial Field Inspection and the suggested format and content of the Bridge Inspection Report.

If potential scour problems were noted on the initial inspection, the Hydraulics Team should be contacted.

#### **14-2.04(02) Design Approval of Report**

Once the Inspection Report has been determined by the reviewer to be satisfactory, Design Approval of the Report is recommended. The designer will be requested to make a Preliminary Plans Submission upon Design Approval of the Report.

#### **14-2.04(03) Preliminary Plans Submission**

After receiving Design Approval, begin preparation of the preliminary plans. Information on these plans will include the following.

1. Index and Title Sheet. At this stage, this sheet should include the information as follows:
  - a. project number, bridge file number, and Des number;
  - b. project description;
  - c. county location map;
  - d. project layout map including north arrow and scale;
  - e. design data including design speed, project design criteria, functional classification (rural or urban setting), type of terrain, and traffic data;
  - f. signature block(s); these blocks will not be completed at this stage; and
  - g. an index of plan sheets at this stage. Sheet numbers may change for future submittals.
2. Maintenance of Traffic Details. The proposed traffic maintenance scheme and phasing should be outlined.
3. Layout. A Layout Sheet is not required unless the rehabilitation project is significant enough to warrant a full survey.

4. General Plan. This sheet should include the following:
  - a. plan view;
  - b. elevation view;
  - c. typical bridge cross section;
  - d. design data relative to structural elements;
  - e. related general notes; and,
  - f. general rehabilitation recommendations (e.g., legend, material notes).

Preliminary plans will be sent to the Production Management Division's Railroads and Utilities teams for their use. Preliminary Plans may be utilized in the application of any relevant environmental permits. Upon approval of the Preliminary Plans, the designer will be requested to submit the Final Plans.

#### **14-2.04(04) Final Plans Submission**

This submittal will include the following:

1. any revisions to the Preliminary Plans;
2. all necessary plans details required to adequately define the required repairs;
3. final quantities computations;
4. final design computations;
5. special provisions; and
6. final construction cost estimate.

The Final Plans should also include any specific measures proposed by the Railroads, Utilities, or Hydraulics team.

#### **14-2.04(05) Final Field Check**

After reviewing the Final Plans and finding them substantially complete and correct, the Bridge Rehabilitation and Ratings Team will schedule a Final Field Check. The purpose of this Field Check will be as follows:

1. confirm the condition of the structure and appropriateness of the plans; and
2. allow the district representative to review the traffic maintenance scheme and construction procedures.

#### **14-2.04(06) Tracings Submission**

Any revisions resulting from the Final Field Check and Final Plans review will be completed for this submission.

#### **14-2.04(07) Bridges within Limits of Road Project**

Plans for multiple bridge rehabilitations which are complementary to plans for road work may be combined into one set of bridge plans. The structure file numbers and Des numbers for all such structures should be shown on the title sheet.

#### **14-2.05 Traffic-Signs Plans**

Separate traffic-signs plan sheets, including Title Sheet, Index, and General Notes Sheet, etc., are provided for each road project where a separate Des number is used for the traffic-signs portion of the project. This typically occurs if the project is 1.5 km or longer, or for a major project including an interchange.

**\*\* PRACTICE POINTER \*\***

Existing traffic-sign plans for a non-Interstate route are not required unless instructed otherwise.

#### **14-2.05(01) Preliminary Plans**

Preliminary plans will consist of plan sheets with the information as follows:

1. mainline geometry and all intersecting roadways;
2. North arrow on each sheet; and
3. mainline and each intersecting roadway labeled, and centerline stationing.

#### **14-2.05(02) Preliminary Field Check Plans Submission**

For this submittal, the plans should include the sheets as follows.

1. Title Sheet. Include the layout map and show the project location on the location map.

2. Index and General Notes Sheet. The index blocks should be completed to indicate the sheet numbers for the plans at this stage. The sheet numbers will change for future submittals.
3. Signs Plans Sheets. These sheets should include the information as follows:
  - a. plan view of the roadway;
  - b. route numbers and street names;
  - c. right-of-way limits;
  - d. north arrow;
  - e. stationing, identification number, and message of all existing sheet signs, ground-mounted panel signs, and overhead panel signs;
  - f. stationing and identification number of each proposed sign;
  - g. proposed panel-sign messages; and
  - h. the applicable legend; see Section 14-3.04.
4. Sign Summary Table. The sign location (station) and type (sign code) should be shown. However, the sign size, summary, and post size need not be completed at this stage.

#### **14-2.05(03) Final Field Check Plans Submission**

The plans should be in their final form. However, some changes still may occur. Plans should include the following.

1. Title Sheet. This sheet should be essentially complete except for signatures.
2. Index and General Notes Sheet. This sheet should include a list of all utilities and a complete list of general notes.
3. Existing Signs Plans Sheets. These sheets will provide the stationing, identification number, and message for each existing sign.

4. Proposed Signs Plans Sheets. In addition to the criteria for Preliminary Field Check plan sheets, these sheets should include the information for overhead-sign lighting as follows:
  - a. service point;
  - b. cable duct;
  - c. cable duct marker; and
  - d. handhole.
  
5. Sign Layout Sheets. These sheets should include the following:
  - a. size of sign;
  - b. sign border;
  - c. corner radii;
  - d. height of message or legend;
  - e. stationing and identification number;
  - f. code for route shield;
  - h. size of arrow and degree of slant; and
  - g. notation for special color combinations (e.g., black copy on yellow background).
  
6. Cross-Section Sheets. These sheets should include the following:
  - a. for each box truss, monotube span, tri-cord, or cable-span structure, the full roadway cross section;
  - b. for each cantilever structure, half cross section from the lane lines for a multilane facility or the centerline for a 2-lane facility to the front slope;
  - c. for each ground-mounted panel sign, the cross section from the edge of the traveled way to the right-of-way line;
  - d. Cross section sheets for each ground-mounted panel sign will include the following:
    - (1) size of sign;
    - (2) sign message;
    - (3) size and length of posts;
    - (4) horizontal clearance from the edge of traveled way;
    - (5) vertical clearance from the edge of traveled way or ground line;
    - (6) footing dimensions;
    - (7) identification number; and
    - (8) stationing.

- e. Cross section sheets for each overhead-sign structure will include the following:
  - (1) size of sign;
  - (2) legend;
  - (3) luminaire and spacing, if required;
  - (4) structure dimensions;
  - (5) identification number;
  - (6) stationing; and
  - (7) type of roadside protection.

7. Details Sheets. The details sheets to be included are as follows:

- a. completed Sign Summary Table;
- b. proposed route-marker-assembly details;
- c. sheet sign details;
- d. traffic sign details;
- e. foundation details; and
- f. any special design details.

8. Other Documents. Other documents that should be included with this submission may include structure and foundation calculations, special provisions, and cost estimates.

#### **14-2.05(04) Final Check Prints Submission**

The purpose of this submittal is to ensure that the plans are complete. Those items which were revised at the Final Field Check should have been addressed. All quantities should be finalized and a bound copy of the computations should be included with the submittal. Conduct a detailed review to ensure that all necessary pay items have been included and special provisions are provided for all non-standard pay items. A finalized cost estimate should also be included.

#### **14-2.05(05) Final Tracings Submission**

The Final Plans submittal will include any necessary revisions from the Final Check Prints submittal. Section 14-1.02(03) discusses what is required for the Final Tracings submission.

#### **14-2.06 Signalization Plans**

##### **14-2.06(01) Preliminary Plans**

Preliminary plans will consist of plan sheets with the information as follows:

1. mainline geometry and all intersecting roadways;
2. north arrow on each sheet;
3. outline of signalized intersections; and
4. centerline stationing.

#### **14-2.06(02) Preliminary Field Check Plans Submission**

For the Preliminary Field Check submittal, the plans should include the following.

1. Title Sheet. Include the layout map and show the project location on the location map.
2. Index and General Notes Sheet. The index block should be completed to indicate the sheet numbers for the plans at this stage. The sheet numbers will change for future submittals.
3. Signalization Plan Sheets. These sheets should include the information as follows:
  - a. plan view of the intersection including intersection geometrics, curbs, shoulders, and building lines;
  - b. route numbers and street names;
  - c. right-of-way limits;
  - d. north arrow;
  - e. commission number for signal (State highway only);
  - f. all existing features (e.g., controller cabinets, signal poles, mast arms, foundations, sidewalks, curbs, pavement markings, utilities, etc.);
  - g. proposed signal installations (e.g., types of signal supports, location of controller cabinet, pavement markings, lane restrictions, intersection dimensions, roadway width, position and direction of signal heads, phase diagram, detector locations, conduit locations, number of wires in each cable run, power service location, detector housing, hand holes, disconnect hangers, etc.);

- h. other applicable information includes the location of any pertinent signs, panel sign messages, approaches near the intersection, bus stops and loading zones, drainage structures, curb ramps, and utilities;
- i. the applicable legend; see Section 14-3.04; and
- j. posted speed limit.

#### **14-2.06(03) Final Field Check Plans Submission**

For this submittal, the plans should be in their final form. However, some changes still may occur. Plans will include the following.

1. Title Sheet. This sheet should be essentially complete except for signatures.
2. Index and General Notes Sheet. This sheet should include a list of all utilities and a complete list of general notes.
3. Signalization Plan Sheets. Include all revisions from the Preliminary Field Check and finalize the sheets.
4. Details Sheets. All necessary details sheets should be included with this submission.

#### **14-2.06(04) Final Check Prints Submission**

The purpose of this submittal is to ensure that the plans are complete. Those items which were revised at the Final Field Check should have been included. All quantities should be finalized in the Estimate of Quantities, with a bound copy of the computations included in the submittal. Conduct a detailed review to ensure that all of the necessary pay items have been included, and special provisions provided for all non-standard items. A finalized cost estimate should also be included.

The Details sheets should include the following:

1. intersection alignment and proper number of lanes;
2. all approaches with posted speeds clearly identified;
3. all private drives;
4. all property lines;
5. all right-of-way lines;
6. all edges of pavement and shoulders;

7. locations of curbs, sidewalks, and curb ramps;
8. all pertinent pavement markings, including lane lines, crosswalk lines, and stop lines;
9. all existing and proposed guardrail locations;
10. underground and overhead utilities locations;
11. Legend, Phase Diagram, and Loop Tagging Table; and
12. route number including street name, if any.

Traffic diagrams should not be included.

#### **14-2.06(05) Final Tracings Submission**

The Final Plans submittal will include any necessary revisions from the Final Check Prints submittal. Section 14-1.02(03) discusses what is required for the Final Tracings submission.

#### **14-2.07 Lighting Plans**

The lighting-plans portion to accompany plans for a road or bridge project should be submitted as a separate set of plans, including the Title Sheet, Index and General Notes Sheet, etc.

#### **14-2.07(01) Preliminary Plans**

Preliminary plans will consist of plan sheets with the information as follows:

1. mainline geometry and all intersecting roadways;
2. north arrow on each sheet;
3. mainline and all intersecting roadways labeled; and
4. centerline stationing.

#### **14-2.07(02) Preliminary Field Check Plans Submission**

For the Preliminary Field Check submittal, the plans should include the following.

1. Title Sheet. Include the layout map and show the project location on the location map.
2. Index and General Notes Sheet. This sheet should include a list of all utilities and a complete list of general notes. The index block should be completed to indicate the sheet numbers for the plans at this stage. The sheet numbers will change for future submittals.

3. Plan Sheets. These sheets should include the information as follows:
  - a. plan view of the roadway;
  - b. route numbers and street names;
  - c. right-of-way limits;
  - d. north arrow;
  - e. stationing and identification number of proposed light standards;
  - f. identification of overhead-sign lighting, if required;
  - g. applicable legend; see Section 14-3.04; and
  - h. service point location and type.
  
4. Design Data. The following design data to be included is as follows:
  - a. initial lamp lumens;
  - b. average maintained illumination;
  - c. lamp lumens depreciation factor;
  - d. luminaire dirt depreciation factor;
  - e. uniformity ratio;
  - f. mounting height;
  - g. luminaire classification; and
  - h. pavement classification.

#### **14-2.07(03) Final Field Check Plans Submission**

For this submittal, the plans should be in final form. However, some changes still may occur. Plans will include the following.

1. Title Sheet. This sheet should be essentially complete except for signatures.
  
2. Index and General Notes Sheet. This sheet should include a list of all utilities and a complete list of general notes. The index block should be completed to indicate the sheet numbers for the plans.
  
3. Lighting Plans Sheets. In addition to the criteria for Preliminary Field Check plans sheets, these sheets should include the following:
  - a. cable duct;
  - b. circuit number;
  - c. cable duct marker, if required;
  - d. handhole, if required; and
  - e. main breaker and circuit breaker rating.

4. Summary Table. This should include the following:
  - a. luminaire or tower number;
  - b. connection type;
  - c. circuit connection;
  - d. pole set-back distance from edge of traveled way, taper, or ramp;
  - e. mast-arm length (conventional lighting);
  - f. luminaire effective mounting height (E.M.H.); and
  - g. top foundation elevation with respect to the edge of traveled way.
  
5. High-Mast Tower Plans. These should include the details as follows:
  - a. pole data schedule;
  - b. highway illumination tower detail;
  - c. high-mast tower miscellaneous details;
  - d. external winch concrete pad;
  - e. lightning rod typical details; and
  - f. tower retrofit details, if required.
  
6. Other Documents. Other documents may include the following:
  - a. voltage drop and breaker rating calculations;
  - b. design calculations;
  - c. special provisions; and
  - d. cost estimates.

#### **14-2.07(04) Final Check Prints Submission**

The purpose of this submittal is to ensure that the plans are complete. Those items which were revised at the Final Field Check should have been included. All quantities should be finalized and a bound copy of the computations should be included with the submittal. Conduct a detailed review to ensure that all of the necessary pay items have been included, and special provisions provided for all non-standard items. A finalized cost estimate should also be included.

#### **14-2.07(05) Final Tracings Submission**

This submittal will include any necessary revisions from the Final Check Prints submittal. Section 14-1.02(03) discusses what is required for this submission.

## **14-2.08 Partial 3R Project Plan Development**

### **14-2.08(01) Preliminary Plans**

1. Title Sheet. This is the first page and should include the information as follows:
  - a. contract and Des numbers;
  - b. traffic data;
  - c. design data as follows:
    - (1) design speed;
    - (2) project design criteria: Partial 3R (non-freeway);
    - (3) functional classification;
    - (4) rural or urban setting;
    - (5) terrain; and
    - (6) access control;
  - d. project description information as follows:
    - (1) route number;
    - (2) county name and congressional township, range, and section;
    - (3) limits described from Department-maintained route intersections and by Reference Post system; and
    - (4) length (gross and net);
  - e. location map, including information as follows:
    - (1) civil boundaries;
    - (2) county, township lines, corporate limits;
    - (3) nearby Department-maintained routes and major local roads;
    - (4) north arrow; and
    - (5) project limits, with stations and highlighted graphics;
  - f. paving exceptions, with stations;
  - g. station equations;
  - h. current INDOT *Standard Specifications* effective year;
  - i. certification block; and
  - j. state location map.
2. Construction Plans Index. The Construction Plans Index is a tabulation and description of the numbered design drawings to be included in the plans document.

3. Strip Map. This is usually a line drawing showing the following:
  - a. route number;
  - b. beginning and ending stations and reference posts and station equations.  
Consistent units should be used throughout the plans;
  - c. stations and reference posts for intersecting streets, county roads, city or town limits, and intersecting county lines and railroad crossings, bridges, and paving exceptions;
  - d. north arrow;
  - e. location of all recommended construction signs;
  - f. existing utility lines within construction limits; and
  - g. civil townships.
  
4. Typical Cross Sections. These are composed of the basic parts as follows.
  - a. Illustration.
    - (1) existing conditions and dimensions (i.e., pavement width, material type, thickness cross-slope, curb, shoulder, ditches, etc.); and
    - (2) proposed construction and dimensions (i.e., HMA courses with binder grading, overlay cross-slope, widening, curb shoulders, ditches, shoulder corrugations if warranted, etc.).
  - b. Legend showing labels and corresponding items. The descriptions shown in the pay item names should be used where applicable.
  - c. Title block.
    - (1) Route number; and
    - (2) limits of section and exceptions.
  - d. Supplemental information block (i.e., curve data for superelevation).
  
5. Typical Approach Details. The INDOT *Standard Drawings* should be used. Existing field conditions not in accordance with the details shown on the *Standard Drawings* will require details to be shown on the plans.
  
6. Miscellaneous Details. These include all other details not covered by the strip map, typical section, or INDOT *Standard Drawings*.

7. Special Provisions. The designer should follow the guidelines for preparing special provisions described in Section 19-2.0. The designer should not specify the use of proprietary or experimental products or construction methods.

#### **14-2.08(02) Assessing Preliminary Pavement Design**

Once the project has been assessed to be a partial 3R project, the designer should determine an approximate pavement thickness for developing preliminary typical cross sections.

#### **14-2.08(03) Preliminary Field Check**

The preliminary field check should occur at some point before development of preliminary plans. The preliminary field check should be scheduled with the district-office entities involved with plan development. The arrangements for scheduling the preliminary field check should be made while plan development is still proceeding, if possible. Copies of preliminary plan documentation should be made available for review prior to the preliminary field check.

Persons who typically should attend the preliminary field check are as follows:

1. District Personnel.
  - a. Design Team leader;
  - b. Office of Construction area engineer;
  - c. Office of Construction field engineer;
  - d. subdistrict manager and/or unit foreman;
  - e. designer;
  - f. traffic engineer; and
  - g. utilities/railroads engineer.
2. Other Personnel.
  - a. local government agency if applicable;
  - b. local utilities if applicable; and
  - c. Planning Division's Office of Pavement Engineering manager, if AADT  $\geq$  5000 or trucks percentage  $\geq$  10%.

#### **14-2.08(04) Right of Way**

Right-of-way acquisition is not normally required. If it is required, the designer should return to the Engineering Assessment phase to consider the project as full 3R, 4R, or possibly new construction.

#### **14-2.08(05) Public Hearing**

Public involvement is not normally required. If it is, the designer should see Chapter Eight.

#### **14-2.08(06) Utilities and Railroads**

The portions of the project limits which may affect existing utilities should also be addressed early in the PPD phase. The designer should stay in close contact with the district Utilities/Railroads Team leader to ensure that existing utilities are relocated to avoid delays in the project development. To accomplish this, the district Utilities/Railroads Team leader should have final check prints as early as possible.

If one or more railroad crossings are within the project limits, the district Utilities/Railroads Team leader should be advised. See Chapters Eleven and Forty-seven.

#### **14-2.08(07) Calculations**

The calculations must follow a systematic and logical methodology. All calculations should be reviewed for accuracy. Systematic calculations make review and verifying quantities considerably more efficient. All calculations should be submitted with the final documents and should remain the property of the Department.

#### **14-2.08(08) Returned Correspondence**

Once input from the district offices of Highway Management, Roadway Services, Construction, and Traffic has been received with suggested changes following the preliminary field check, it may be necessary to arrange and conduct a final field check. See Section 14-2.08(02) for the personnel list who should attend this field check.

#### **14-2.08(09) Final Pavement Design**

If the current AADT  $\geq 5,000$  or the trucks percentage  $\geq 10\%$ , a request for a final pavement design should be submitted to the Planning Division's Office of Pavement Engineering. If the AADT  $< 5,000$  or the trucks percentage  $< 10\%$ , the designer performs the final pavement design.

#### **14-2.08(10) Final Check Prints**

The final check prints should now be completed. These documents are outlined below.

1. Transmittal Letter. This document should include the following:
  - a. date;
  - b. To, Thru, From personnel;
  - c. contract number;
  - d. route number;
  - e. county;
  - f. Des number;
  - g. project description and location;
  - h. estimated contract completion date or number of work days;
  - i. estimated costs; and
  - j. letting date.
2. Proposal Book Cover Sheet. This sheet should include the contract number and letting date.
3. Contract Information Book Cover Sheet. This sheet should include the following:
  - a. contract number;
  - b. letting date; and
  - c. certifications (approved signatures and stamps).
4. Contract Requirements Worksheet. The designer should place project identification information on this sheet. The designer should coordinate with the district construction engineer to acquire appropriate necessary information. The designer will then transmit it the Contract Administration Division's Office of Contracting. The identification information should be that as follows:
  - a. contract number;
  - b. letting date;
  - c. district;
  - d. project number;
  - e. route number;

- f. description, including work type;
  - g. location;
  - h. county; and
  - i. effective dates of Supplemental Specifications and List of Approved Materials.
5. Table of Contents. This should indicate the documents to be identified as follows:
  - a. contract number;
  - b. map of official detour;
  - c. Proposal;
  - d. Schedule of Pay Items;
  - e. construction plans and number of pages; and
  - f. special provisions.
6. Estimate of Quantities and Cost Estimate. All pay items, including undistributed items, should be referenced in the plans. All pay items are to be worded using the nomenclature shown in the INDOT *Standard Specifications* and authorized-estimating-software listing. The sequence, or order of the pay items, should be numerical by INDOT *Standard Specifications* reference number.

#### **14-2.08(11) Review of Final Check Prints**

After the designer has assembled the final check prints, a copy may be circulated among other designers for review and comment. The final check prints are then forwarded to the district Design Office manager for additional review and comments. Upon completion, the designer will make the appropriate revisions.

A copy of the final check prints is to be sent to the appropriate district offices of Program Management, Construction, Roadway Services, or Traffic, as required. They are expected to review and return the copy to the district Office of Design within one to two weeks. A cover letter should be sent with the copy indicating what is expected and when it should be returned.

1. Program Development Review. A copy of the contract documents is supplied for their use in coordinating local-agency agreements and detours, and updating the production schedule.
2. Construction Review. The area engineer should review the contract documents and indicate errors, inconsistencies, and constructability. The area engineer completes the remaining information required on the Contract Requirements Worksheet such as the field office requirements or the need for a profilograph, and also establishes the earliest date to begin work and the contract completion time.

3. Roadway Services Review. The Office of Roadway Services reviews the contract documents and suggests additional changes or corrections. The areas of review usually pertain to small drainage structures/pipes, wedge and level, patching, guardrail, and ditch work.
4. Traffic Review. The Office of Traffic reviews the contract documents and suggests additional changes or corrections pertaining to traffic maintenance or traffic safety. It also verifies and coordinates the locations and impacts to signal loops, detector housings, no-passing zones, pavement markings, etc.
5. Discussion with Design Office manager. After the other Offices have reviewed the contract documents and have offered suggested changes, the designer is to meet with the Design Office manager to discuss the changes and suggestions. The Design Office manager will then decide which corrections are to be made. The designer will then make the appropriate changes.
6. Office of Program Management Review. After all changes are made, a copy of the contract documents is sent to the Office of Program Management for final review. The manager may suggest more changes.
7. Office of Testing Review. The materials engineer may suggest changes to the Plant Laboratory recurring special provision.

#### **14-2.08(12) Shelf-Ready Project**

The final check prints are considered shelf-ready after they have been reviewed by the Design Office manager. The documents, now final plans, are to be kept on file until funds are appropriated and a letting date has been established.

#### **14-2.08(13) Signatures and Stamps**

Once funds are appropriated and a letting date has been established, the final plans should be reviewed and updated. The final plans should then be stamped and/or signed by the appropriate individuals as shown in Section 14-1.02(03).

#### **14-2.08(14) Contract Documents Package**

Upon receipt of the approved final plans by the Office of Program Management, they are ready to be transmitted as contract documents to the Contract Administration Division's Office of Contracting for processing. The package should consist of the following.

1. Plans.
  - a. 279 mm x 216 mm Plans Sheets Format. The original construction plans and cross sections with one photocopied set should be transmitted. If the cross sections are in the 915 mm x 610 mm format, only the originals of the cross sections should be sent.
  - b. 915 mm x 610 mm Plan Sheets Format. The original construction plans and cross-sections and two sets of prints of the construction plans without cross-sections prints should be transmitted.
2. Estimate of Quantities and Cost Estimate. The estimate of quantities and cost estimate should be generated using the authorized estimating software. The transmittal should consist of a diskette and one hard copy of both the estimate of quantities and cost estimate.
3. Special Provisions. One hardcopy of the prepared Special Provisions Menu with completed recurring special provisions and unique special provisions should be transmitted. A diskette including the unique special provisions should be provided.
4. Detour Maps. A map of the official detour and a map of an unofficial local detour, if required, with the approved unofficial-local-detour documents should be transmitted.

The approved package should be sent to the Contract Administration Division's Office of Contracting, where the documents will be processed and prepared for letting. This step should be completed at least 14 weeks prior to the contract letting date.

#### **14-2.08(15) Review Process**

1. Pre-Letting. The Office of Contracting may require additional information or further corrections to be made in order for the contract documents to be properly processed. The designer should promptly address these concerns. All responses from the designer should be directed to the district construction engineer.
2. Post-Letting. Following the contract award, a preconstruction conference will be held. The designer should be available upon request to answer any questions.

## **14-2.09 Bridge Plans Complementary to Road Work**

Plans for each bridge which are complementary to plans for road work must be developed as described below. Each structure which is assigned a structure file number must also be assigned a Des number.

### **14-2.09(01) INDOT-Route Project**

1. New or Replacement Beam or Slab Bridge. A separate set of plans should be developed for each bridge. However, plans for an overflow structure may be included in the set for the main-channel structure.
2. New or Replacement Three-Sided, Box, or Pipe Structure. These may be incorporated into the road plans. The structure file numbers and Des numbers for all such structures included in the road plans should be shown on the title sheet.

A separate set of plans with just one title sheet may be developed for one or more of these structures.

3. Bridge Rehabilitation. Multiple bridge rehabilitations may be combined into one set of bridge plans. The structure file numbers and Des numbers for all such structures should be shown on the title sheet.

### **14-2.09(02) Local-Public-Agency Project**

Plans may be developed in any manner the local public agency desires. However, the structure file numbers and Des numbers for all structures should be shown on the title sheet.

## **14-3.0 DRAFTING GUIDELINES**

### **14-3.01 Drafting Methods**

All project drafting will typically be performed using Microstation. The *INDOT CADD System User Guide* provides information on the Department's Microstation system. For a consultant not using INDOT's Microstation system, Chapter Sixteen, once developed, will provide the Department's criteria for translating these CADD files to the Department's system.

The Department's preferred practice is to only use Microstation drafting; however, for a small in-house or consultant-designed project, manual drafting may be acceptable. For a manually-

drafted project, the designer/drafter should use the criteria described in the *INDOT CADD System User Guide*, and Chapter Fifteen, once it is developed, for line weights, topography symbols, plotting accuracy, etc.

Where manual plotting is used, the drafter must consider line weights and text sizes to ensure that, once the plans size is reduced, the plans will still be readable. The minimum text should be at least 2.5 mm in height. Letters should always be open and formed with a dense but not wide line.

### **14-3.02 Plotting Survey Data**

The designer is responsible for plotting all survey data received as an electronic file. The *INDOT CADD System User Guide* discusses how to plot the survey data. Each consultant should plot the survey data according to the procedures provided with the CADD software package.

When plotting survey data, the following accuracies should be used to show elements on the construction plans sheets.

1. Show horizontal alignment data (e.g., curve information, equations, reference-point tie-ins, section corner tie-ins) to the nearer 0.001 m.
2. Show existing roadway elevations used for pavement tie-ins and vertical clearance computations to the nearer 0.01 m. Show benchmark elevations to the nearer 0.001 m.
3. All horizontal pluses, offsets, physical feature dimensions, and locations, etc., may be shown to either the nearer 0.1 m or 0.01 m. The nearer 0.01-m accuracy is preferred.
4. Desirably, the survey should be plotted for 100 m beyond the project limits. At a minimum, the survey should be plotted for 50 m beyond the project limits.

### **14-3.03 Working Sheets**

The sheet sizes generally used for plans development are as follows:

1. 915 mm x 610 mm (A1). This sheet size is considered a full-size sheet and should be used for the design layout for each major project. A border around the sheet should be provided with a 70-mm left-binding margin, a 6-mm right margin, and 17-mm top and bottom margins. This provides a working area of 839 mm x 576 mm.

2. 432 mm x 279 mm. This sheet size is approximately half the scale of the A1 sheet described in Item 1 above. This size corresponds to the ledger size shown on most photocopiers. It is used for construction plan reviews, bid advertising, construction, and project archives.
3. 279 mm x 216 mm. This sheet size corresponds to the letter size shown on photocopiers. It is generally only used for a project that does not require a significant amount of detail (e.g., partial 3R project). This type of project typically includes only a plan view with no profile view. If more-significant information is required to be shown, the A1 sheet size should be used instead.

All submittals, except for the Final Tracings submission and the Final Plans submission for a project using 279 mm x 216 mm size sheets, will be printed on white paper. Section 14-1.02(03) discusses the Final Tracings submission requirements.

#### **14-3.04 General Guidelines**

The following provides general guidelines for plotting survey data and design details on the plan sheets.

##### **14-3.04(01) Dimensions**

When dimensioning, the following should be considered.

1. Measurement Units. Show all dimensions in metric measure. Do not use dual metric and english units. Each unit symbol should be lettering-cased and exponential, if required, in accordance with International System practice.
2. Bridge Plans. Show all bridge-plans detail dimensions including span lengths, floor slab widths, etc., in millimeters. Show all non-structure dimensions on the General Plan and Layout sheets in meters.
3. Road Plans. Road plans sheets will typically be prepared using meters. However, if the large majority of the dimensions of a drawing or detail are either in meters or millimeters, show all dimensions using the same symbol unit.
4. Traffic Plans. Traffic plans sheets will use either meters or millimeters, depending upon the element shown. However, if the large majority of the dimensions of a drawing or detail are all in one unit or the other, show all dimensions using the same unit.

5. Common Units. Where all or most of the units are shown in one set of dimensions (e.g., either meters or millimeters), a footnote may be added to the sheet stating this fact. For example, “*All dimensions are in millimeters (mm) except as noted.*” Remove the m or mm symbol from the plans to improve the sheet clarity.
6. Spaces. Provide a space between the number and symbol (e.g., 3.6 m).
7. Decimals. Only use decimals, not fractions, to denote values of less than 1. Place a zero before the decimal marker (e.g., 0.75 m).
8. Large Numbers. For numbers larger than four digits, use a space to separate blocks of three digits (e.g., 12 000 m<sup>2</sup>). For numbers of four digits or smaller, do not use a space (e.g., 3600 mm). For plan dimensions, it will be satisfactory to either insert or omit the space as desired.

#### **14-3.04(02) Symbols and Legends**

Chapter Fifteen, once it is developed, will provide the Department’s electronic-drafting symbol library. These symbols should be used in the preparation of manually- or electronically-drafted plans. To obtain a copy of this library, the designer should contact the CADD Support Team.

Figure 14-3A, Recommended Plan Legends, provides the legends that may be used on plans. Chapter Fifteen will describe traffic symbols and legends that should be used within a set of plans. A circle with either a letter or number inside it may be used to indicate various construction items or materials. Where additional items are similar but with different thicknesses, layers, weights, etc., use an alphanumeric combination [e.g., (A1) 350 mm Plain Cement Concrete Pavement, (A2) 250 mm Plain Cement Concrete Pavement]. The legend should be consistent throughout a set of plans (i.e., each number or letter applies to an individual item throughout a set of plans). Do not renumber the legends on each sheet to account for the unused legends. List the legends used on a sheet in an open area on the sheet.

#### **14-3.04(03) Text**

Chapter Fifteen, once it is developed, will provide the Department’s criteria for text sizes, fonts, and line weights. For each sheet type, use uniform text sizes and line weights. For example, all of the text for notations in the plan view should be of the same size and weight. However, the text for the summary table may be in a different text size. The font type should be uniform throughout the plans.

Words should not be abbreviated so should therefore be completely spelled out. However, this is not always practical. Figure 14-3B, Plan Abbreviations, provides the common abbreviations that should be used where it is necessary to abbreviate words. Spell out the words for those terms not listed in Figure 14-3B.

For metric units, all symbols should be shown in lower case except for liter (L), mega- (M) derivations, and those derived from proper names [e.g., newton (N)]. A period should not follow the symbol.

#### **14-3.04(04) Plan Notes**

Specific plan notes (e.g., dimensions, clarifications) should be placed directly on the applicable sheet. General notes which apply to the whole project or several sheets should be placed on the Index and General Notes Sheet. The types of notes that are acceptable for placement in the plans are as follows:

1. a specific reference to a drawing on a sheet;
2. a note with an arrow drawn to a part of a drawing it complements;
3. utility owners;
4. soil-borings information;
5. cross references to other plan sheets or *INDOT Standard Drawings*;
6. hydraulic data;
7. earthwork table or balance information;
8. bridge seat calculation procedure;
9. legends;
10. screed instructions;
11. benchmark data;
12. traffic signal diagram description;
13. Sign Summary description notes;
14. all tables; and
15. Structure Data Sheet remarks.

Notes which describe the particular work, material requirements, construction requirements, method of measurement, or basis of payment are considered to be specifications and should not be included on a set of plans. These notes should be included in the *INDOT Standard Specifications*, recurring special provisions, or unique special provisions. Chapter Nineteen provides guidance on the use and preparation of these specifications.

#### **14-3.04(05) Miscellaneous**

The following provides guidelines which the designer should consider when preparing a set of plans:

1. Stationing. A metric stationing of 1 km is used, which is shown to three decimal places (e.g., 1 + 000.000). Show tic marks at 100-m intervals. These tic marks are shown on the survey left side of the centerline. Indicate a full station at every 500-m interval with plus stations at 100-m intervals. For an example, see *INDOT Typical Plan Sheets*.

For example, Sta. 12+273.96 indicates a point 273.96 m forward of kilometeric Sta. 12+000. The Production Management Division's Survey Team has adopted the practice of using an equivalent conversion from English to metric units when re-establishing points from an english-units survey. For example, P.I. Sta. 456+35 from a 1965 english-units survey would be defined as kilometeric P.I. Sta. 13+909.548 ( $456.35 \text{ eng sta} \times 0.03048 \text{ km/eng sta} = 13.909548 \text{ km}$ ) in a metric-units survey. The location of the first even-kilometer station on a new alignment is arbitrary.

2. Cross-Section Intervals. Use 20-m cross-section intervals where the alignment is maintained over existing embankments and through rolling terrain. A larger interval may be used where uniform templates are used over flat terrain. Provide additional cross-section intervals where there are abrupt changes in either the typical section or the existing ground.
3. Angles. Express angles in degrees, minutes, and seconds.
4. North Arrow. Provide a uniform north arrow on the finished set of plans. Chapter Fifteen will illustrate the appropriate north arrow that should be used.
5. Reduction. A full-sized set of mylar (reproducible) plans is required for construction and contract letting. Section 14-3.03 discusses the sheet sizes that are used by the Department. Scales used for drafting the full-size sheets are no longer accurate when the plans are reduced. When the plans are reduced, readability of the plans may become critical. The minimum text sizes that should be used are provided in the *INDOT CADD System User Guide*, and Chapter Fifteen, once it is developed.
6. Limits. The limits of plan coverage on a typical road-project plans sheet will vary according to the plan and profile scale selected and type of plans sheet selected. Section 14-3.05 discusses the various scales that should be used.
7. Plans Sheets. The Department's typical plans sheets can be obtained from the INDOT CADD library.

8. Alignment Placement. Where the horizontal alignment is on tangent, the centerline or survey line should parallel the top border and be centered vertically in the plan-view space. Where the horizontal alignment is on a curve, tangents should be angled to produce reasonable balance. Desirably, keep an entire curve on the same sheet.
9. Soil-Boring Logs. When plotting soil-boring logs for a bridge project, elevations should be shown along the vertical grid for each boring log so that the elevation of each soil sample can be ascertained. Road-boring logs should not be included in the plans.

Boring logs may be scanned and placed onto the Soil Borings sheet, provided such logs are legible when reduced to half-size.

10. Project Block. Each sheet will have a project block along the bottom of the sheet. The project block will vary from sheet to sheet. These are illustrated in the *INDOT Typical Plan Sheets* document published separately from this *Manual*. The following information, from left to right, should be included in the project block.
  - a. Design Information. In the lower left-hand corner of each plan and profile sheet, include the horizontal alignment references. For most other sheets, this area will be left blank.
  - b. Engineer's Stamp. The engineer's stamp is required on each sheet along with the signature of the engineer and date signed. The stamp location may vary within the plans sheet depending on which engineer prepared the sheet.
  - c. Signatures. The signature block will include the signatures for the design engineer, designer, drafter, and checkers.
  - d. Sheet Title. Each sheet should be labeled.
  - e. Scales. Where applicable, note the scales used on the drawing in the lower right-hand corner.
  - f. File Numbers. Note all applicable file and references including contract number, bridge file, Des number, survey book number, etc., in the lower right-hand corner.
  - g. Sheet Number. Provide the sheet number and the total number of sheets for the set in the lower right-hand corner of each sheet. Number all sheets sequentially including the Title Sheet. Sheets that are added after the sheet numbers have been placed should be designated with A, B, C, etc., following the last numbered sheet and identified in the index. For example, a sheet to be inserted between sheets 17 and 18 would be numbered 17A. These additional sheets are not included in the

total number of sheets. The sheet numbering should be the last thing the designer does prior to submitting the final tracings to the Research and Documents Library Team.

- h. **Survey Lines.** If there are multiple survey lines, indicate the line designation with the sheet title (e.g., Plan and Profile Line “S-1-A”).

#### **14-3.04(06) Title Sheet Information Block**

The information block on the title sheet should be in accordance with the format shown in Figure 14-3C. Part V includes geometric design tables which reflect the scope of project construction. The applicable design criteria in such tables are based not only on traffic volume characteristics, but also on road classification, rural or urban setting, type of terrain, and access control. The information block will have all of these design controls defined in one location. Anyone looking at the plans will immediately know which geometric design table and what design criteria were used in the project development.

#### **14-3.05 Scales**

The following provides the recommended drawing scales that should be used in developing a set of plans. The selected scales should be shown in the project block on every sheet. Where scales are not used, this should be shown in the project block.

#### **14-3.05(01) Road Project**

For a road project, use the following scales.

1. **Title Sheet.** For the location map, a 1:25 000 scale should be used. A location map for an urban area may use a 1:10 000 scale for better clarity. For a longer project, a scale of 1:50 000 may be necessary.
2. **Typical Sections.** The scale for the typical-section figures, commonly 1:50, is at the designer’s discretion. The scale selected should adequately show the necessary features. Although not desirable, the scale may vary from typical section to typical section. The vertical scale may be exaggerated to adequately show the pavement cross section.
3. **Right-of-Way Sheets.** The appropriate scale for the right-of-way sheets will depend on the plat sheet used. The following will apply.

- a. Route Survey Plat. Use a scale of 1:2500.
  - b. Plat No. 1. For a rural area, use a scale of 1:5000. For an urban area, use 1:1000. For a spot improvement project (e.g., small structure replacement, sight distance improvement, etc.), a scale of 1:2500 may be used.
  - c. Plat No. 3. For a rural area, use a scale of 1:5000. For an urban area, use 1:1000. For an intermediate area, a scale of 1:2500 may be used.
4. Plan and Profile Sheets. Plan and profile views will typically be shown together on one sheet, with the plan view on top and profile view on the bottom. The following scales are typically used.
- a. Plan View, Rural. A scale of 1:500 should most often be used. For a longer rural project, a 1:1000 scale may be used.
  - b. Plan View, Urban. Depending upon the complexity of the location and work to be accomplished, a scale of 1:200 or 1:500 should most often be used.
  - c. Profile View, Horizontal. This will be the same scale as the plan view.
  - d. Profile View, Vertical. The vertical-profile scale will be 1:50 or 1:100 depending on the complexity of the project and the plan-view scale selected. A 1:100 scale will be used with a plan-view scale of 1:1000. A 1:50 scale will be used with a plan-view scale of 1:500 or 1:200.

Other scales, as necessary, may be used to provide better clarity or more practical layouts. If a detail can not be adequately viewed in the selected scale, show the element on a Details sheet.

5. Superelevation-Transition Sheet. The selected scale is left to the designer's discretion. Select a scale which will adequately show the necessary features.
6. Details Sheet. The selected scale will vary based on the complexity of the detail and room available on the sheet. The following provide the typical scales that are commonly used.
  - a. Construction Details. Use a plan-view scale of 1:200.
  - b. Intersection or Approach Details. Use a plan-view scale of 1:200.
  - c. Spot-Elevation Sheet. Use a plan-view scale of 1:200.

- d. Signing Details. The plan-view scale will be 1:500 for an urban area or 1:1000 for a rural area.
- e. Signal Details. The plan view scale will be 1:200.
- f. Pavement Markings. The preferred plan-view scale is 1:500. Where significant detail is required, use a plan-view scale of 1:200.
- g. Traffic-Maintenance Details. Use a plan-view scale of 1:500 or 1:1000.

The designer may select an alternative scale for any of the above details based on the complexity of the detail and space available on the sheet. For those details not listed, the designer will determine the scale as required.

- 7. Cross Sections. The horizontal and vertical cross-section scales will typically be 1:100. A larger scale may be used where a greater cross-section width or height is required.

#### **14-3.05(02) Bridge Project**

Many of the sheets for a bridge project (e.g., Index and Title sheet, Typical Cross Sections, Right-of Way Plat, Plan and Profile sheets, cross sections) will use the same scales as listed in Section 14-3.05(01) for a road project. The scales for the structural details will vary according to the complexity of the drawing and space available on the sheet. The designer should select a scale which will adequately show the necessary detail and still allow the detail to be readable at a reduced scale. The scale for the Layout sheet should be 1:300, 1:400, or 1:500. For a complex urban project or a project in a steep rural area, a 1:200 scale may be used.

#### **14-3.05(03) Traffic Project**

For a traffic-signs, signalization, or lighting project, the following scales should be used.

- 1. Title Sheet. For the location map, a 1:25 000 scale should be used. The location map for an urban area may use a larger scale for better clarity. For a longer project or for a project scattered throughout a district, it may be necessary to use a scale of 1:50 000 or smaller.
- 2. Plans Sheets. The selected scale will depend upon the type of project selected:

- a. **Traffic-Signs Sheets.** The plan-view scale will be 1:500 for an urban area. For a rural area, depending on the project complexity, the scale will be 1:1000 or 1:2000.
  - b. **Signalization Sheets.** The plan-view scale for signalization at an intersection will be 1:200. Where details are required for work between intersections (e.g., interconnect details), the scale may be 1:1000 or 1:500.
  - c. **Lighting Sheets.** The plan-view scale will be 1:500 in an urban area. For a rural area, depending on the project complexity, the scale will be 1:1000 or 1:2000.
3. **Details Sheets.** The selected scales will be determined depending on the complexity of the detail and space available on the sheet.
  4. **Cross Sections.** Where cross sections are required, the horizontal and vertical cross-section scales will typically be 1:100. A larger scale may be used where a greater cross-section width or height is required.

#### **14-3.06 Plans-Dimensions Accuracy**

The accuracy of plan dimensions should be consistent with data upon which they are based. Accuracy for dimensions to be shown on plans is as follows.

##### **14-3.06(01) Road or Traffic Plans**

The following accuracies should be observed.

1. **Stationing.** Show all stationing to the nearest thousandth of a meter (i.e., 0 + 000.001). This will include PVI, PC, PI, PT, equation stations, etc.
2. **Angle.** An angle or bearing should be shown to the nearest second (i.e., 0° 00' 01").
3. **Horizontal-Alignment Data.** Figure 14-3D, Horizontal-Curve-Data Accuracy to be Shown on Plans, provides the order and rounding accuracy that should be used to describe curve data.
4. **Vertical-Profile Data.** The following vertical-alignment accuracies should be used.
  - a. **PVI. Stationing.** Show PVIs at even 10-m stations.

- b. Vertical-Curve Length. Round the length to the nearer tenth meter.
  - c. PVI Elevation. Show the elevation to the nearer 0.001 m.
  - d. Grades. Show each vertical grade to the nearer 0.001%.
  - e. Vertical Clearance. Show each vertical clearance to the nearer 0.005 m.
5. Elevation. The following elevation accuracies should be used.
- a. Bench Mark. Show the elevation to the nearer 0.001 m.
  - b. Flow-Line Elevation. Show each elevation to the nearer 0.01 m.
  - c. Pavement Elevation. For existing pavement, show each elevation to the nearer 0.01 m.
  - d. Ground Line. Show the existing ground line to the nearer 0.01 m.
  - e. Other. Show all other vertical elevations, breaks in ditch grades, pipe invert elevations, etc., to the nearer 0.01 m.
6. Contour Interval. The contour interval will be in 0.2-m increments. Each fifth contour representing an even-meter elevation should be emphasized and annotated. Intermediate contours will not be noted unless they represent a high or low contour. In rugged terrain or on a steep slope, the intermediate contour lines may be removed for clarity.
7. Topography Features. Show the location of all proposed features to the nearer 0.1 m where practical.
8. Typical Cross Section Elements. The following will apply.
- a. Width. Show all typical cross-section elements in increments of 0.1 m. This includes lane or shoulder widths, ditch widths, bench widths, median widths, sidewalks, etc.
  - b. Cross Slope. Show each cross slope to the nearer 0.1%, including superelevation rates.
  - c. Pavement Depth. HMA pavement-course density should be shown to the nearer 5 kg/m<sup>2</sup>. Show all other pavement elements (e.g., concrete pavement thickness,

aggregate or subbase depth, special subgrade treatment depth, underdrain dimensions, etc.) to the nearer 0.01 m.

8. Cross-Sections Elements. Show the profile grade elevation to the nearer 0.001 m.
9. Miscellaneous Features. For the following features, show the dimensions to nearer increment indicated as follows:
  - a. drive location to the nearer 1.0 m;
  - b. culvert location to the nearer 1.0 m;
  - c. guardrail to the nearer 0.1 m; or
  - d. ditch-grade break to the nearer 1.0 m.

### **14-3.06(02) Bridge Plans**

In addition to the plan accuracies discussed for road plans, use the following accuracies on bridge plans.

1. Bridge Elements. Bridge elements should be shown in increments of 100 mm (e.g., footing length, span length, beam spacing, pier height, etc.). Where increments of 100 mm are not practical, use 50-mm or 10-mm increments.
2. Reinforcing Bars. Where practical, show the length of each straight bar to the nearer 100 mm. For a bent bar, show the individual dimensions to the nearer 5 mm. The total length of a bent bar should be rounded to the higher 20 mm. Show spacing of reinforcing bars to the nearer 100 mm.
3. Dimensions. Use the following accuracy.
  - a. Concrete Details. These should be shown in increments of 10 mm (e.g., deck thickness, column section, wall thickness, cap dimension, footing width, pile spacing, etc.). Where increments of 10 mm are not practical, use 5-mm increments.
  - b. Camber and Deflection Details. Show these to the nearer 1-mm increment.
  - c. Structural Steel Details. For designations, dimensions, and properties of structural shapes, see ASTM A 6M and the AISC metric-shape tables. Other dimensions on Details sheets (e.g., plate width, plate length, splice detail, hole spacing, steel-shoe-assembly size, etc.) should be dimensioned to the nearer 5 mm. Plate thickness may be shown to the nearer 1-mm increment.

- d. Precast Prestressed-Concrete Members. Show all cross-section dimensions for these elements to the nearer 1 mm.
  - e. Manufactured Items. Accuracy for detailed dimensions for these items (e.g., expansion joints, bearing devices, etc.) should be in accordance with industry standards.
  - f. Horizontal Alignment Tie-Up. Show these dimensions to the nearer 1 mm.
4. Elevation. Show each structure elevation, including top-of-bearing-plate elevation, to the nearer 0.001 m, except as follows.
- a. Top-of-Pile Elevation. Where a pile is encased in a concrete cap, show the top-of-pile elevation to the nearer 0.01 m. Where superstructure beams are attached to the piling, show the top-of-pile elevation to the nearer 0.001 m.
  - b. Existing Structure. Show each existing-structure elevation or concrete-removal-line elevation to the nearer 0.01 m.
  - c. Ground Elevation. Show each of these (e.g., berm, channel clearing, upper limit of wet excavation, etc.) to the nearer 0.01 m.
5. Bridge Quantities. Chapter Seventeen provides the rounding criteria for bridge quantities that are also shown on bridge plans.

### **14-3.07 Plan-Sheets Organization**

To provide consistency from project to project, the plans sheets should be assembled in the sequence listed below for the applicable project type. Not all plans sets will include all sheets, and several sheets can be combined together (e.g., Details sheets). For a project type not listed below, the sequence shown for a road project should be used.

#### **14-3.07(01) Road Project**

The recommended plans-sheets sequence is as follows:

- 1. Title sheet;
- 2. Index and General Notes;

3. Typical Cross Sections;
4. Plat No. 1 or Plat No. 3;
5. Geometric Tie-Up sheet;
6. Traffic Maintenance Details. A sheet is not required for an official-detour route. A diagram thereof should be included in the Contract Information book;
7. Plan and Profile;
8. Superelevation-Transition Diagram
9. Details sheets, in the order as follows:
  - a. Construction Details;
  - b. Intersection Details;
  - c. Spot Elevation Details;
  - d. Channel Details;
  - e. Geometric Details;
  - f. Right-of-Way Details;
  - g. Grading Plan;
  - h. Drainage Details;
  - i. Erosion Control Details (plan view);
  - j. Retaining Wall Details; and
  - k. Wetland Mitigation Details.
10. Traffic-Work Details, in the order as follows:
  - a. Signs (where separate traffic-sign plans are not required);
  - b. Signals;
  - c. Lighting (where separate lighting plans are not required); and
  - d. Pavement Markings.
11. miscellaneous tables;
12. Approach Table;
13. Underdrain Table;
14. Guardrail Summary Table;

15. Structure Data Table;
16. Pipe Materials sheet; and
17. cross sections.

### **14-3.07(02) Bridge Project**

The recommended plans-sheets sequence is as follows:

1. Index and Title sheet;
2. Typical Cross Sections;
3. Traffic Maintenance Details. A sheet is not required for an official-detour route. A diagram thereof should be included in the Contract Information book;
4. Road Plan and Profile;
5. Superelevation-Transition Diagram;
6. Roadway Details, in the order as follows:
  - a. Construction Details;
  - b. Intersection Details;
  - c. Spot-Elevation Details;
  - d. Geometric Details;
  - e. Right-of-Way Details;
  - f. Grading Plan;
  - g. Drainage Details; and
  - h. Erosion-Control Details (plan view);
7. Traffic-Work Details, in the order as follows:
  - a. Signs (where separate traffic-sign plans are not required);
  - b. Signals;
  - c. Lighting (where separate lighting plans are not required); and
  - d. Pavement Markings.
8. Soil Borings;

9. Channel Change Layout;
10. Layout;
11. General Plan;
12. Structure-details sheets, in the order as follows:
  - a. Coping Offsets and Tie-up Dimensions;
  - b. Abutment/Bent/Pier Details and Bill of Materials;
  - c. Framing Plan and Girder Elevation;
  - d. Structural Steel Details/Precast-Concrete Beam Details;
  - e. Jacking Frames;
  - f. Bearing Details;
  - g. Floor Details;
  - h. Corner Details and Floor Bill of Materials;
  - i. Railing Details;
  - j. Expansion Joint Details; and
  - k. Screeds (optional).
13. Reinforced Concrete Bridge Approach Details;
14. Bridge Summary;
15. miscellaneous tables;
16. Approach Table;
17. Underdrain Table;
18. Guardrail Summary Table;
19. Structure Data Table;
20. Pipe Materials sheet; and
21. cross sections.

**14-3.07(03) Traffic-Sign Project**

The recommended plans-sheets sequence is as follows:

1. Title Sheet;
2. Index and General Notes;
3. Signing Plan;
4. Sign Layout;
5. Cross Sections;
6. Footing Details; and
7. Structural Details.

#### **14-3.07(04) Signalization Project**

The recommended plans-sheets sequence is as follows:

1. Title Sheet;
2. Index and General Notes;
3. Signal Plan; and
4. Signal Details.

#### **14-3.07(05) Lighting Project**

The recommended plans-sheets sequence is as follows:

1. Title Sheet;
2. Index and General Notes;
3. Lighting Plan; and
4. Cross Sections.

SHEET	Road, Bridge, or Traffic Project Manager	Traffic Signs Team	Traffic Signals Team	Highway Lighting Team
Title	X			
Index and General Notes	X			
Typical Sections	X			
R/W Plats	X			
Geometric Tie-Up Sheet	X			
Plan and Profile	X			
Superelevation Transition	X			
Details	X			
Construction Details	X			
Intersection Details	X			
Spot Elevation Details	X			
Channel Details	X			
Geometric Details	X			
Right-of-Way Details	X			
Grading Plan	X			
Drainage Details	X			
Erosion Control Details	X			
Traffic Details				
Signs	X	X		
Signals			X	
Lighting				X
Pavement Markings	X	X		
Traffic-Maintenance Details	X	X	X	X
Soil Borings	X			
Layout	X			
Bridge Structure Details	X			
Bridge Summary	X			
Miscellaneous Tables	X	X	X	X
Approach Table	X			
Underdrain Table	X			
Structure Data Table	X			
Pipe Materials	X			
Sign Structure Table	X			
Guardrail Summary Table	X			
Cross Sections	X			

**SHEET-PREPARATION RESPONSIBILITIES  
FOR ROAD, BRIDGE, OR TRAFFIC PROJECT**

**Figure 14-1A**

**FIELD CHECK NOTIFICATION**

Date \_\_\_\_\_

Preliminary      Final      Field Check Notification

Work Type: \_\_\_\_\_

Route \_\_\_\_\_

Des No. \_\_\_\_\_

PE Project No. \_\_\_\_\_

R/W Project No. \_\_\_\_\_

CN Project No. \_\_\_\_\_

Bridge File: \_\_\_\_\_

Over \_\_\_\_\_

Location: \_\_\_\_\_ of \_\_\_\_\_, in \_\_\_\_\_ County

A Preliminary      Final      Field Check for this project has been scheduled for \_\_\_\_\_ . The meeting will be held at \_\_\_\_\_ at the project site. Anyone wishing to provide input into the design of this project should plan to attend.

Utilities with facilities within the limits of this project should review the plans to determine if their existing facilities are accurately shown. Utilities that believe that their facilities will need to be adjusted should attend this meeting. This meeting could provide opportunities for design changes that could eliminate some utility conflicts. Utilities will be contacted by the INDOT Production Management Division's Utilities Team leader at a later date concerning the project schedule and relocation coordination. The Utilities Team leader may be contacted at (317) 232-5308.

Name \_\_\_\_\_  
Project Manager

The distribution of this notification is as follows:

INDOT CENTRAL OFFICE DISTRIBUTION					
Recipient	PFC	FFC	Letter	Plans	X- Sec.
Environmental Policy Team Leader, Production Management Div. (1)	X	X	X	X	
Geotechnical Engineering Mgr., Production Management Div.	X	X	X	X 2 sets	X 2 sets
Project Manager, Production Management Div. (C)	X	X	X	(2)	(2)
Railroads Team Leader, Production Management Div. (C)	X		X	X	
Real Estate Acquisition Team Leader, Production Mgmt. Div.	X	X	X	(3)	
Real Estate Administrative Services Team Leader, Production Management Div.	X	X	X		
Real Estate Property Mgmt. Team Leader, Production Mgmt. Div.	X		X	X (4)	
Utilities Team Leader, Production Management Div. (C)	X	X	X	X	X
Field Engineer, Construction Management Div.	X		X		
Research and Documents Library Team Leader, Planning Div.	X	X	X		
INDOT DISTRICT DISTRIBUTION					
Construction Engineer	X	X	X	X 2 sets	
Design Team Leader (D) (5)	X	X	X	X	X
Environmental Scoping Mgr. (D)	X	X	X	X	
Operations Manager	X	X	X		
Planning and Programming Director	X	X	X		
Production Director	X	X	X		
Program Coordinator	X	X	X		
Railroads Team Leader (D)	X		X	X	
Real Estate and R/W Pgm. Dir. (D)	X	X	X	X	
System Assessment Mgr. (D)	X	X	X		
Testing Office Mgr. (D)	X	X	X	X	X
Traffic Engineer	X	X	X	(6)	
Utilities Team Leader (D)	X	X	X	X	X
NON-INDOT DISTRIBUTION					
City officials (7)	X	X	X		
County Road Spvsr. or Hwy. Engr.	X	X	X	(8)	
FHWA Area Engineer	X	X	X	(9)	
U.S. Fish and Wildlife Service	X	X	X		
Utility companies	X	X	X	X	X

Notes:

(C) Central-Office-developed project only

(D) District-developed project only

(1) only for project other than Interstate-route bridge rehabilitation

(2) only if plans do not change from initial submittal

(3) only if additional right of way is required

(4) 2 sets plans if additional right of way is required

(5) only if district-developed, or if signs, pavement markings, signals, or lighting are involved

(6) only if traffic project

(7) only if metropolitan area is affected

(8) only if legal drains, etc., are involved

(9) only if project requires FHWA oversight

[CONSULTANT LETTERHEAD]

Date \_\_\_\_\_

Preliminary      Final      Field Check Notification

Work Type: \_\_\_\_\_

Route \_\_\_\_\_

Des No. \_\_\_\_\_

PE Project No. \_\_\_\_\_

R/W Project No. \_\_\_\_\_

CN Project No. \_\_\_\_\_

Bridge File: \_\_\_\_\_

Over \_\_\_\_\_

Location: \_\_\_\_\_ of \_\_\_\_\_, in \_\_\_\_\_ County

Our firm is under contract with the Indiana Department of Transportation for the design of the referenced project. A Preliminary      Final      Field Check for this project has been scheduled for \_\_\_\_\_. The meeting will be held at \_\_\_\_\_ at the project site. Anyone wishing to provide input into the design of this project should plan to attend.

Utilities with facilities within the limits of this project should review the plans to determine if their existing facilities are accurately shown. Utilities that believe that their facilities will need to be adjusted should attend this meeting. This meeting could provide opportunities for design changes that could eliminate some utility conflicts. Utilities will be contacted by the INDOT Production Management Division's Utilities Team leader at a later date concerning the project schedule and relocation coordination. The Utilities Team leader may be contacted at (317) 232-5308.

Name \_\_\_\_\_

Project Manager

The distribution of this notification is as follows:

INDOT CENTRAL OFFICE DISTRIBUTION					
Recipient	PFC	FFC	Letter	Plans	X- Sec.
Environmental Policy Team Leader, Production Management Div. (1)	X	X	X	X	
Geotechnical Engineering Mgr., Production Management Div.	X	X	X	X 2 sets	X 2 sets
Project Manager, Production Management Div. (C)	X	X	X	(2)	(2)
Railroads Team Leader, Production Management Div. (C)	X		X	X	
Real Estate Acquisition Team Leader, Production Mgmt. Div.	X	X	X	(3)	
Real Estate Administrative Services Team Leader, Production Management Div.	X	X	X		
Real Estate Property Mgmt. Team Leader, Production Mgmt. Div.	X		X	X (4)	
Utilities Team Leader, Production Management Div. (C)	X	X	X	X	X
Field Engineer, Construction Management Div.	X		X		
Consulting Services Team Leader, Contract Administration Div.	X	X	X		
Research and Documents Library Team Leader, Planning Div.	X	X	X		
INDOT DISTRICT DISTRIBUTION					
Construction Engineer	X	X	X	X 2 sets	
Consultant Services Mgr.	X	X	X		
Design Team Leader (D) (5)	X	X	X	X	X
Environmental Scoping Mgr. (D)	X	X	X	X	
Operations Manager	X	X	X		
Planning and Programming Director	X	X	X		
Production Director	X	X	X		
Program Coordinator	X	X	X		
Railroads Team Leader (D)	X		X	X	
Real Estate and R/W Pgm. Dir. (D)	X	X	X	X	
System Assessment Mgr. (D)	X	X	X		
Testing Office Mgr. (D)	X	X	X	X	X
Traffic Engineer	X	X	X	(6)	
Utilities Team Leader (D)	X	X	X	X	X
NON-INDOT DISTRIBUTION					
City officials (7)	X	X	X		
County Road Spvsr. or Hwy. Engr.	X	X	X	(8)	
FHWA Area Engineer	X	X	X	(9)	
U.S. Fish and Wildlife Service	X	X	X		
Utility companies	X	X	X	X	X

Notes:

(C) Central-Office-developed project only

(D) District-developed project only

(1) only for project other than Interstate-route bridge rehabilitation

(2) only if plans do not change from initial submittal

(3) only if additional right of way is required

(4) 2 sets plans if additional right of way is required

(5) only if district-developed, or if signs, pavement markings, signals, or lighting are involved

(6) only if traffic project

(7) only if metropolitan area is affected

(8) only if legal drains, etc., are involved

(9) only if project requires FHWA oversight



**Right of Way.** Additional R/W required? YES NO Existing  
Is R/W clear and Certification Letter included? YES NO  
ERMS: YES ERMS I.D.: \_\_\_\_\_  
If not clear, number of parcels remaining is \_\_\_\_\_  
Expected R/W clear date is \_\_\_\_\_.  
R/W contact person is \_\_\_\_\_

**Utility Coordination.** Complete? YES NO  
If not complete, what is status? \_\_\_\_\_  
Utilities special provision included? YES  
ERMS: YES ERMS I.D.: \_\_\_\_\_  
Utility contact person is \_\_\_\_\_

**Coast Guard Permit.**  
Not Required Applied For Received \_\_\_\_\_.  
ERMS: YES ERMS I.D.: \_\_\_\_\_

**Corps of Engineers Permit.**  
[Individual] Not Required Applied For Received \_\_\_\_\_  
ERMS: YES ERMS I.D.: \_\_\_\_\_  
[Regional General] Not Required Applied For Received \_\_\_\_\_  
ERMS: YES ERMS I.D.: \_\_\_\_\_

**DNR Permit for Construction in a Floodway.**  
Not Required Applied For Received \_\_\_\_\_  
ERMS: YES ERMS I.D.: \_\_\_\_\_

**FAA Indiana Tall-Structures Permit.**  
Not Required Applied For Received \_\_\_\_\_  
ERMS: YES ERMS I.D.: \_\_\_\_\_

**401 Water Quality Permit.**  
Not Required Applied For Received \_\_\_\_\_  
ERMS: YES ERMS I.D.: \_\_\_\_\_

**Rule 5.**  
Not Required Applied For Received \_\_\_\_\_  
ERMS: YES ERMS I.D.: \_\_\_\_\_

Are all Permits included? Yes No  
If No, why not? \_\_\_\_\_

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**Summary of Commitments** (from environmental document, regulatory agencies, context-sensitive items, purchasing agreements, etc.) as related to project design and construction.

Attached? YES NO If No, why not?

---

**Design Exceptions Summary.** Attached? YES NO If No, why not?

---

**Design Summary.** Approval date \_\_\_\_\_

**Proprietary Materials.** Are any specified which are not listed in *Design Manual* Chapter 17?

YES NO

If Yes, has the justification been submitted and approved for each item? YES NO

**Unique Pay Items.** Are any listed in the Schedule of Pay Items? YES NO

If Yes, has a unique special provision been drafted and a unique pay item number been requested for each in accordance with *Design Manual* Chapter 20? YES NO

Unique special provisions authenticated by: Testing Design Construction

**Coordination with District Construction Engineer.**

Field Office, \_\_\_\_\_ MOS

Type A 400 SFT (37 m2)

Type B 500 SFT (51 m2)

Type C 650 SFT (60 m2)

Field office computer (105-C-056) YES NO

Advanced fax machine (105-C-071b) YES NO

Construction engineering (105-C-071b) YES NO

Cellular telephone (105-C-164), # \_\_\_\_\_ YES NO

Anytime minutes, # \_\_\_\_\_

Radio, # \_\_\_\_\_ YES NO

Traffic maintenance (104-C-112) (provide details) YES NO

Profilograph as pay item for HMA pavement YES NO

Profilograph as pay item for PCCP pavement YES NO

Partnering (108-C-078) YES NO

Incentive/Disincentive (108-C-043) YES NO

if YES, attach Justification form.

Latest date to begin work: \_\_\_\_\_ Liquidated damages: \_\_\_\_\_  
(108-C-090)  
Restriction time: \_\_\_\_\_ Liquidated damages: \$ \_\_\_\_\_  
(108-C-091 or -092) (provide details)  
Closure time: \_\_\_\_\_ Liquidated damages: \$ \_\_\_\_\_  
(108-C-093)  
Intermediate completion date: \_\_\_\_\_ Liquidated damages: \$ \_\_\_\_\_  
(108-C-094)  
Calendar completion date: \_\_\_\_\_ Liquidated damages: \$ \_\_\_\_\_  
(108-C-095)  
Earliest date to begin work: \_\_\_\_\_ Liquidated damages: \$ \_\_\_\_\_  
(108-C-127)

Designer: \_\_\_\_\_

Construction information provided by: \_\_\_\_\_ Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_

**ASBESTOS CERTIFICATION**

Route: \_\_\_\_\_

Des. No.: \_\_\_\_\_

Contract No.: \_\_\_\_\_

Project No.: \_\_\_\_\_

Structure No.: \_\_\_\_\_

Over: \_\_\_\_\_

County: \_\_\_\_\_

I hereby certify that no asbestos-containing material was specified as a building material in any construction document for this project.

\_\_\_\_\_  
(signed) Designer

\_\_\_\_\_  
Date

\_\_\_\_\_  
INDOT location or consulting firm

\_\_\_\_\_ : \_\_\_\_\_

cc: \_\_\_\_\_, \_\_\_\_\_ District Bridge Inspection Engineer  
\_\_\_\_\_, Environmental Policy Administrator  
Project design calculations document

**CONTRACT INFORMATION BOOK CERTIFICATION**

(Return to INDOT in 48 hours)

INDOT contact person, \_\_\_\_\_, Project Coordinating Engineer,  
Office of Estimating, Contract Administration Division

Letting Date:

Contract No.:

Route:

Des. No.:

County:

I certify that I have reviewed the plans and the Contract Information book (CIB), and have verified that they are correct as compiled, based on design submittals received by Contract Administration prior to the compilation of the CIB.

\_\_\_\_\_  
(signed) project designer

INDOT location or consulting-firm name

Date,

**OR**

The plans or CIB include errors. The designer is responsible for documenting the errors, and for noting which errors were caused by omissions or misinterpretations by INDOT based upon the original material, or based upon new material. The designer shall transmit the documentation to the contact person identified above.

\_\_\_\_\_  
(signed) project designer

INDOT location or consulting-firm name

Date,

**CONSTRUCTION CHANGE**

Date: \_\_\_\_\_

Contract No.: \_\_\_\_\_ Work Type: \_\_\_\_\_  
Route: \_\_\_\_\_ Des No.: \_\_\_\_\_ Location: \_\_\_\_\_ of \_\_\_\_\_  
Structure No.: \_\_\_\_\_ Project No.: \_\_\_\_\_

TO: \_\_\_\_\_  
\_\_\_\_\_ District Deputy Commissioner

ATTN.: \_\_\_\_\_  
District Construction Office Manager

FROM: \_\_\_\_\_  
Roadway Services Manager, Production Management Division  
Structural Services Manager, Production Management Division  
District Design Office Manager

Transmitted herewith are copies of revised Sheet Nos.: \_\_\_\_\_  
for the above-referenced contract. These sheets were revised on \_\_\_\_\_  
The revision involved the following:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Please have the Project Engineer or Supervisor prepare a Change in Plans, Form IC-626, covering any revised pay quantities, if applicable.

Two sets of these plans are for your files and two sets each are to be delivered to the Contractor and Project Engineer or Supervisor. The FHWA is being provided with a half-size set of these revised sheets for their files (if applicable).

Note: Quantity revisions are to be computed and transmitted by the designer with this memorandum to the Project Engineer or Supervisor for aid in preparing Form IC-626.

PROJECT TYPE	DEVICES REQUIRING SHOP DRAWINGS	TEAM RESPONSIBLE FOR REVIEW
State Highway (INDOT)	Signing and Lighting (Sign Supports, Signs, Light Standards, Luminaires, Service Point Controls, etc.)	Sign Design Lighting Design
	Signals (Signal Supports, Structures, Cantilevers, Cable, etc.)	Signal Design
Federal-Aid (Local-Agency Route)	Signing and Lighting (see above)	Sign Design Lighting Design
	Signals	Signal Design
Non-Federal-Aid (Local-Agency Route)	Signing, Lighting, and Signals	Local Agency
State Highway (INDOT) By Permit	Signing and Lighting	Sign Design Lighting Design
	Signals	Signal Design

**SHOP-DRAWING REVIEW RESPONSIBILITY  
FOR TRAFFIC-RELATED WORK**

**Figure 14-1D**

DATE: 14JUN04. TIME: 08:58:37

MOSS

REPO SECTIONS

DESIGN

MODELNAME	RECORD	SECURITY	LAST UPDATED
Sections	195	Free	14 Jun 04, 08:11:52
Design	194	Free	14 Jun 04, 08:37:04

LABEL	SUBREF	CONTENTS	NO. PTS.	X-MIN	Y-MIN	X-MAX	Y-MAX
G001	MBRA	7705	24	4843	4801	4936	4874

CHAINAGE 2100.000

Point	---X---	---Y---	---Z---	OFFSET	LABEL CUT
1	4843.480	4873.250	783.566	-58.220	BNDR
2	4843.597	4873.159	783.578	-58.072	TRIA
3	4849.094	4868.863	783.709	-51.096	BNDR
4	4857.378	4862.390	783.784	-40.582	*TR*
5	4865.662	4855.916	783.858	-30.068	BNDR
6	4870.090	4852.456	783.252	-24.449	DLL1
7	4870.323	4852.274	783.292	-24.153	TRIA
8	4870.603	4852.055	783.322	-23.798	TRIA
9	4873.658	4849.668	783.634	-19.921	TRIA
10	4878.029	4846.253	784.052	-14.374	ESL1
11	4881.321	4843.680	784.194	-10.196	TRIA
12	4881.836	4843.277	784.211	-9.542	TRIA
13	4881.930	4843.204	784.214	-9.423	EPL1
14	4890.246	4836.705	783.901	1.131	TRIA
15	4890.299	4836.664	783.899	1.199	RC01
16	4890.359	4836.617	783.895	1.274	TRIA
17	4899.115	4829.774	783.278	12.387	EPR1
18	4900.460	4828.724	783.283	14.093	TRIA
19	4902.977	4826.756	783.239	17.288	ESR1
20	4904.728	4825.389	782.875	19.510	BNDR
21	4913.940	4818.190	782.961	31.202	BNDR
22	4919.066	4814.184	784.485	37.707	TRIA
23	4933.653	4802.785	784.324	56.219	TRIA
24	4935.277	4801.516	784.460	58.281	BNDR

LABEL	SUBREF	CONTENTS	NO. PTS.	X-MIN	Y-MIN	X-MAX	Y-MAX
G002	MBRA	7705	21	4854	4814	4958	4898

CHAINAGE 2125.000

Point	---X---	---Y---	---Z---	OFFSET	LABEL CUT
1	4854.682	4897.293	782.607	-64.367	BNDR

**EXISTING ELEVATIONS FROM  
ELECTRONIC CROSS SECTIONS DATA**

**Figure 14-2A**

**UNDERGROUND STORAGE TANKS REMOVAL**

, 20

**MEMORANDUM**

**TO:**

Environmental Services Office Administrator  
Production Management Division

**THRU:**

- Roadway Services Manager, Production Management Division
- Structural Services Manager, Production Management Division
- District Design Manager

**FROM:**

Project Manager

**SUBJECT:** Underground Storage Tanks Removal

Route: Des. No.:  
 Project No.: : PE County:  
 Description and Location:

Transmitted herewith is one set of plans for the above-referenced project.

This project has underground storage tanks to be removed at the locations as follows:

Station:	Offset:	left	right
Station:	Offset:	left	right
Station:	Offset:	left	right

Please provide the list of pay items and required special provisions. Also provide us with additional details that may be needed to accomplish the task.

If you need further information, please contact me at or e-mail.

Attachments/Enclosures

- 1.
- 2.

:

cc:

- (A)  (thickness)  mm Plain PCCP
- (A1)  (thickness)  mm Plain PCCP
- (C)  (thickness)  mm PCCP for Driveways
- (D) \_\_\_\_\_ kg/m<sup>2</sup> HMA for Approaches  (type)  on \_\_\_\_\_ mm  
Compacted Aggregate Base  (type) ,  (size)
- (D1) \_\_\_\_\_ kg/m<sup>2</sup> HMA Surface  (type)  on  
\_\_\_\_\_ kg/m<sup>2</sup> HMA Base  (type)  on  
\_\_\_\_\_ mm Compacted Aggregate Base  (type) ,  (size)
- (D2) \_\_\_\_\_ kg/m<sup>2</sup> HMA Surface  (type)  on  
\_\_\_\_\_ kg/m<sup>2</sup> HMA Base  (type)
- (F) Concrete Sidewalk
- (J) \_\_\_\_\_ kg/m<sup>2</sup> HMA Shoulder
- (J1)  (thickness)  mm Plain PCCP Shoulder
- (J2) \_\_\_\_\_ mm Compacted Aggregate for Shoulder
- (K) Full Depth HMA Pavement
- (K1) Breakdown of Quantities, e.g., \_\_\_\_\_ kg/m<sup>2</sup> HMA Surface on  
\_\_\_\_\_ kg/m<sup>2</sup> HMA Intermediate on  
\_\_\_\_\_ kg/m<sup>2</sup> HMA Base on  
\_\_\_\_\_ mm Compacted Aggregate Base  (type)
- (N) \_\_\_\_\_ mm Compacted Aggregate for Surface  (size)
- (O) \_\_\_\_\_ mm Compacted Aggregate Base  (type) ,  (size)
- (P) \_\_\_\_\_ Prime Coat
- (P1) \_\_\_\_\_ Seal Coat
- (P2) \_\_\_\_\_ Tack Coat
- (R) \_\_\_\_\_ kg/m<sup>2</sup> HMA Overlay Tack Coat
- (R1) \_\_\_\_\_ kg/m<sup>2</sup> HMA Surface on  
\_\_\_\_\_ kg/m<sup>2</sup> HMA Intermediate on  
\_\_\_\_\_ kg/m<sup>2</sup> HMA Base
- (R4)  (thickness)  mm PCCP for Resurface
- (U)  (size)  Underdrain
- (X) Construction Sign, Type A

- (X1) Construction Sign, Type B
- (X2) Construction Sign, Type \_\_\_\_\_
- (Y) Barricade, Type \_\_\_\_\_
- (Y1) Barricade, Type \_\_\_\_\_
- (1) 840 mm Concrete Barrier
- (2) 1145 mm Concrete Barrier
- (2A) Modified Concrete Barrier
- (3) Longitudinal Joint
- (5) Butt Joint
- (6) Construction Joint
- (7) Keyway Joint
- (8) 25 mm Expansion Joint with Load Transfer
- (9)     (width)     mm Preformed Joint Filler
- (12) Impact Attenuator, Type \_\_\_\_\_
- (13) Concrete Curb
- (14) Integral Concrete Curb
- (15) Concrete Curb and Gutter
- (16) Concrete Curb Type B
- (18) Integral Concrete Curb and Gutter, Type \_\_\_\_\_
- (20) Contraction Joint, Type \_\_\_\_\_
- (21) Longitudinal Construction Joint
- (22) Concrete Center Curb, Type \_\_\_\_\_
- (23) Asphalt Curb
- (24) Ear Construction, Type A
- (25) Ear Construction, Type B
- (26) Sodding

- (27) Cement Concrete Header, Type \_\_\_\_\_
- (28) Retrofitted Tie Bar
- (31) Temporary Concrete Barrier
- (32) Impact Attenuator, CZ, Type \_\_\_\_\_
- (33) Snowplowable Raised Pavement Marker
- (34)     (width)     mm Solid White Paint Line
- (35)     (width)     mm Solid Yellow Paint Line
-  Concrete Curb Ramp  
(Type is indicated by letter inside hexagon)
- (36)     (message)     Preformed Plastic Pavement Message Marking
- (37)     (message)     Thermoplastic Pavement Message Marking
- (38)     (width)     mm     (type)         (color)     Thermoplastic Transverse Marking
- (39)     (width)     mm     (type)         (color)     Preformed Plastic Transverse Marking
- (40)     (width)     mm Solid White Preformed Plastic Line
- (41)     (width)     mm Solid Yellow Preformed Plastic Line
- (42)     (width)     mm Broken White Preformed Plastic Line
- (43)     (width)     mm Broken Yellow Preformed Plastic Line
- (44) 600 mm Solid White Preformed Plastic Line
- (45) 600 mm White Stop Line, Preformed Plastic
- (46)     (width)     mm Solid White Thermoplastic Line
- (47)     (width)     mm Solid Yellow Thermoplastic Line
- (48)     (width)     mm Broken White Thermoplastic Line
- (49)     (width)     mm Broken Yellow Thermoplastic Line
- (50) No Change Required to Existing Sign and Supports
- (51) Remove Existing Panel Sign from Ground Mounted Supports
- (52) Remove Existing Sheet Sign from Supports
- (53) Remove Existing Panel Sign from Overhead Sign Structure

- (54) Remove Existing Sheet Sign from Overhead Sign Structure
- (55) Remove Existing Sign Foundation
- (56) Remove Existing Sheet Sign and Supports
- (57) Remove Existing Ground Mounted Panel Sign, Supports and Foundations
- (58) Remove Existing Overhead Sign, Supports and Foundations
- (59) Existing Sheet Sign on New Supports
- (60) Existing Panel Sign on New Supports
- (61) Existing Panel Sign on New Overhead Structure

### **RECOMMENDED PLANS LEGENDS**

**Figure 14-3A**

&	And	B.S.T.	Bituminous Surface Treatment
@	At	Bur.	Buried
$\Delta$	Delta or Deflection Angle	Calc.	Calculated
=	Equals	C.A.P.	Corrugated Aluminum Pipe
	Fish	C.A.T.	Crash Cushion/Attenuating Terminal Guard Rail End Treatment
	Parallel		
%	Percent	Cb.	Curb
$\perp$	Perpendicular	C.B.	Catch Basin
$\emptyset$	Phase or Diameter	Cb.In.	Curb Inlet
$\overline{E}$	Begin L.A. R/W	Cb.L.	Curb Line
$\overline{E}$	End L.A. R/W	C.B.W.	Concrete Block Wall
A.A.D.T.	Annual Average Daily Traffic	C.C.	Corn Crib
AASHTO	American Association of State Highway and Transportation Officials	C-C	Center to Center
		Cdtn.	Condition
Ab.	Abrupt	Cem.	Cemetery
Abut.	Abutment	C.G.M.P.	Corrugated Galvanized Metal Pipe
A.C.	Aluminum Cap/Asphalt Cement	Ch.	Channel or Chain
A.C.L.	Access Control Line	Chan. Chg.	Channel Change
Add. Exc.	Additional Excavation	Chd.	Chord
Adj.	Adjusted	C.I.	Cast Iron
Aggr.	Aggregate	C.I.P.	Cast Iron Pipe
Ah.	Ahead	Cir.	Circle
Alum.	Aluminum	$\text{\textcircled{C}}$	Centerline
A.P.	Anchor Plate	Cl.	Class or Clearance
App. Exist. R/W	Apparent Existing Right-of-Way	C.L.	Corporation or City Limits
App. P. L.	Apparent Property Line	C.L.T.F.	Chain Link Type Fence
Appl.	Application	C.M.B.	Concrete Median Barrier
Appr.	Approach	C.M.P.	Corrugated Metal Pipe
Approx.	Approximate	Co.	County or Company
Art.	Article	C.O.	Clean Out
Asph.	Asphalt	Col.	Column
ASTM	American Society for Testing Materials	Comp.	Compacted or Composite
		Conc.	Concrete
Ave.	Avenue	Conc. P.	Concrete Pipe
Avg.	Average	Conn.	Connection
AWG	America Wire Gauge	Const.	Construction or Construct
Az.	Azimuth	Cont.	Continuous
B.	Barn	Cor.	Corner
B.E.	Bridge End	Corr.	Corrugated
Beg.	Begin	Cov.	Cover
B.I.P.	Boiler Iron Pipe	C.P.	Catch Point
Bit.	Bituminous or Bitumen	Cr.	Crushed or Creek
Bk.	Back or Bank	Crs.	Course
$\text{\textcircled{B}}$	Baseline	C. Stn.	Crushed Stone
Bldg.	Building	Ct.	Court
Blk	Block	Ctr.	Center
Blktp.	Blacktop	Cu.	Cubic
Blvd.	Boulevard	Cul.	Culvert
Bm.	Beam	C.Z.	Clear Zone or Construction Zone
B.M.	Bench Mark	D	Distribution of Traffic
Bndry.	Boundary	Dbl.	Double
Bot.	Bottom	Defl.	Deflection
Br.	Bridge	Desc.	Description
Brg.	Bearing	Dest.	Destroyed
Brk.	Brick	Det.	Detour or Detail
Br. S.	Bridge Seat	Detc.	Detector
B.S.	Backsight	D.H.	Drill Hole
B. Spk.	Boat Spike	D.H.V.	Design Hourly Volume

Dia.	Diameter	Gdr.	Girder
Diaph.	Diaphragm	Geod.	Geodetic
Dim.	Dimension	G.L.	Gas Line
Dist.	Distance or District	G.P.	Guy Pole
Dn.	Down	G.P.S.	Global Positioning System
Dp.	Deep	G.R.	Guard Rail
Dr.	Drain or Drive	Grav.	Gravel
Dt.	Ditch	G.R.E.A.T. ___	GREAT Unit (Bays)
Drwg.	Drawing	G.R.E.T.	Guard Rail End Treatment
E	East	Grnd.	Ground
Ea.	Each	Gr.Sep.	Grade Separation
E.B.	Eastbound	G.S.	Gravel Surfacing
E.B. L.	Eastbound Lane	G.S.P.	Galvanized Steel Pipe
E.F.	Each Face	Gut.	Gutter
E.G.	Edge of Gutter	G.V.	Gas Valve
Elec.	Electric	ha	Hectare
El.	Elevation	H.H.	Hand Hole
E.M.	Edge of Metal (surface)	Hdw.	Headwall
Emb.	Embankment	H.I.	Height of Instrument
Eq.	Equation	H.	House
Esmt.	Easement	Horiz.	Horizontal
E.T.L.	Edge of Traveled Lane	H.P.S.V.	High Pressure Sodium Vapor
E.T.W.	Edge of Traveled Way	H.S.	High Strength
Exc.	Excavation	Ht.	Height
Exist.	Existing	H.W.	High Water
Exp.	Expansion	H.W.L.	High Water Line
Ext.	Extension	Hwy.	Highway
Fa.	Face	I	Interstate
F.A.	Federal Aid	I.C.	Incidental Construction
F.B.C.P.C.S.	Fully Bituminous Coated Perforated Corrugated Steel	I.D.	Inside Diameter
F.Div.	Field Division	I.F.	Inside Face
Fdn.	Foundation	IMSA	International Municipal Signal Association
Fe.	Fence	In to In	Inside to Inside
Fert.	Fertilizer	Inc.	Incorporated
F-F	Face to Face	Incl.	Included
F.F.	Front Face	Inlt.	Inlet
F.F.T.F.	Farm Field Type Fence	Instr.	Instrument
F. Hyd.	Fire Hydrant	Inters.	Intersection
Fig.	Figure	Intch.	Interchange
Fin.	Finish	Inv.	Invert
Fix.	Fixed	I.P.	Iron Pipe
Fl.	Flush	I.P.B.	Iron Pipe Buried Below Plow Depth
F.L.	Flow Line	I.P.F.	Iron Pin Flush
Flg.	Flange	I.P.L.	Iron Pin Lightly Buried
F.O.	Fiber Optic	I.P.N.F.	Iron Pin Not Found
F.P.	Fence Post	Jct.	Junction
F.R.	Frontage Road	Jt.	Joint
F.S.	Far Side or Foot of Slope	kg	Kilogram
F.T.	Farm Tile	km	Kilometer
Ftg.	Footing	L	Length of Curve, Liter or Loop
Fut.	Future	L.A.	Limited Access
Fwy.	Freeway	L.A.R/W.	Limited Access Right of Way
G.	Garage	L.C.	Long Chord
g	Gram	L <sub>C</sub>	Length of Circular Curve
Galv.	Galvanized	L.D.	Loop Detector
G.B.A.	Gravel Barrel Array Impact Attenuator	Leng.	Length or Lengthen
G.B.E.S._ _	Grated Box End Section (Pipes)	Ln.	Lane

LRFD	Load Resistance Factor Design	P.C.	Point of Curve (Beginning of Curve)
L.S.	Land Surveyor	P.C.C.	Point of Compound Curve or Portland Cement Concrete
L.S.R.	Local Service Road	Ped.	Pedestrian
Lt.	Left	Pen.	Penetration
Lt. P.	Light Pole	Perf.	Perforated
L.W.	Low Water	P.G.	Profile Grade
m	Meter	P.I.	Point of Intersection
mm	Millimeter	Pl.	Place or Plate
m <sup>2</sup>	Square Meter	P.L.	Property Line
m <sup>3</sup>	Cubic Meter	Plas.	Plastic
mm <sup>2</sup>	Square Millimeter	P.M.P.	Perforated Metal Pipe
Mac.	Macadam	P.O.C.	Point on Curve
Matl.	Material	Pos.	Positive
Max.	Maximum	P.O.S.T.	Point on Semi-Tangent
Mbox.	Mailbox	P.O.T.	Point on Tangent
Mdwl.	Mudwall	P.O.V.C.	Point on Vertical Curve
Meas.	Measured	Pp.	Pages
Med.	Median	P.P.B.	Pedestrian Push Button
Mh.	Manhole	P.R.C.	Point of Reverse Curve
Min.	Minimum, Mineral or Minute	Prest.	Prestressed
Misc.	Miscellaneous	Priv.	Private
Mkr.	Marker	Proc.	Processing
ML.	Mainline	Proj.	Project or Projected
Mncpl.	Municipal	Prot.	Protect, Protector or Protection
M.O.	Mid Ordinate	P.S.D.	Paved Side Ditch
Mom.	Moment	Pt.	Point
Mon.	Monument	P.T.	Point of Tangent (End of Curve)
M.P.C.	Mid-Point of Curve	Pub.	Public
N	North	Pv.C.	Polyvinyl Chloride
N.B.	Northbound	P.V.C.	Point of Vertical Curve
N.B.L.	Northbound Lane	P.V.I.	Point of Vertical Intersection
N.C.	Normal Crown	Pvm't.	Pavement
N.E.	Northeast	P.V.T.	Point of Vertical Tangent
Neg.	Negative	Pwp.	Powerpole
NEMA	National Electrical Manufacturers Association	Pwr.	Power (Lines)
N.E.P.L.	No Evidence of Property Line	Q	Peak Discharge (Water)
N.F.	Near Face	R.	Range or River
N.G.	Natural Gas	Rad. or R.	Radius
N.G.S.	National Geodetic Survey	R.C.	Rapid Curing, Reinforced Concrete or Remove Crown
Nl.	Nail	R.C.P.	Reinforced Concrete Pipe
Nly.	Northerly	Rd.	Road
No. or #	Number	Rdl.	Radial
N.S.	Near Side	Rd. N.	Road Nail
N.W.	Northwest	Rd NF.	Road Nail Flush
O.C.	On Centers or Overhead Crossing	Rd NL.	Road Nail Lightly Buried
O.D.	Outside Diameter	Rdwy.	Roadway
O.F.	Outside Face	Rec.	Record or Recommended
Off.	Offset	Ref.	Reference
Oh.	Overhang or Overhead	Reinf.	Reinforcement, Reinforcing, Reinforced
O-O	Out to Out	Req'd.	Required
O.P.O.C.	Offset Point on Curve	Ret.	Retaining
O.P.O.S.T.	Offset Point of Semi-Tangent	Rev.	Revised
O.P.O.T.	Offset Point on Tangent	R.M.	Reference Monument
Out.	Outlet	R.P.	Reference Point
P	Power Cable or Pipe		
P. or Pg.	Page		
P.B.	Pull Box		

R.P.M.	Raised Pavement Marker	t	Metric Ton
R.R.	Railroad	Tan.	Tangent
R.R. Spk.	Railroad Spike	T.B.	Test Boring
Rt.	Right or Route	T.B.M.	Temporary Bench Mark
Rte.	Route	Tbr.	Timber
R/W	Right-of-Way	Tel.	Telephone
R/W Mkr.	Right-of-Way Marker	Tel.C.	Telephone Cable
Rwy.	Railway	Tgp.	Telegraph Pole
S	South	Tfp.	Telephone Pole
S.	Shed	Temp.	Temperature or Temporary
San.	Sanitary Sewer	T.O.	Top of Opening
S.B.	Southbound	T.O.B.	Top of Bank
S.B.L.	Southbound Lane	T.O.P.	Top of Pipe
Sched.	Schedule	T.O.S.	Top of Slope
Sdwk.	Sidewalk	Topog.	Topographic
S.E.	Southeast	T.P.	Turning Point
Sec.	Section or Second	Trans.	Transmission Line or Transition
Sec. Line	Section Line	Trav.	Traverse
Ser. Rd.	Service Road	T.T.	Transmission Tower
S.G.	Subgrade	Twp.	Township (as Center Township)
Sht.	Sheet	T.W.L.T.L.	Two-Way Left-Turn Lane
Shldr.	Shoulder	Typ.	Typical
Sig.	Signal	U.	Unit
S.L.D.	Sea Level Datum	Ug.	Underground
Sly.	Southerly	Uncl.	Unclassified
Spa.	Spaces, Spacing	U'pass.	Underpass
Spec. Prov.	Special Provision	U.S.C. & G.S.	U.S. Coast & Geodetic Survey
Spk.	Spike	U.S.Co.E.	U.S. Corps of Engineers
Spl.	Special or Splice	U.S.F.S.	U.S. Forest Service
Sq.	Square	U.S.G.S.	U.S. Geological Survey
S.R.	State Road or State Route	U.S.P.L.S.	U.S. Public Land Survey
S.S.	Stainless Steel	V	Design Speed or Velocity
St.	Street	V.C.	Vertical Curve
Sta.	Station	Veh.	Vehicle, Vehicular
Std.	Standard	Vert.	Vertical
Std. Spec.	Standard Specifications	W	West, Wide Flange Beam or Water
Stiff.	Stiffener	W/	With
Stk.	Staked or Stake	W.B.	Westbound
Stl.	Steel	W.B.L.	Westbound Lane
Str.	Structure, Structural	Wd.	Wood
Subd.	Subdivision	W.L.	Water Line
Subgr.	Subgrade	Wly.	Westerly
Supstr.	Superstructure	W.P.	Working Point
Surf.	Surface or Surfacing	Wt.	Weight
Surv.	Survey	W.T.	Water Table
S.W.	Southwest or Sidewalk	W.V.	Water Valve
Sym.	Symmetrical	W.W.	Wing Wall or Woven Wire Crossing
T.	Tangent Length or Township (as T-6-N)	Xing.	Crossing
		Xsec.	Cross Section

## PLAN ABBREVIATIONS

**Figure 14-3B**

TRAFFIC DATA	
A.A.D.T. (20___) ①	V.P.D.
A.A.D.T. (20___) ②	V.P.D.
D.H.V. (20 ___) ②	V.P.H.
DIRECTIONAL DISTRIBUTION ③	%
TRUCKS ④	% A.A.D.T
	% D.H.V.
DESIGN DATA	
DESIGN SPEED	km/h
PROJECT DESIGN CRITERIA	⑤
FUNCTIONAL CLASSIFICATION	⑥
RURAL / URBAN	(7)
TERRAIN	(8)
ACCESS CONTROL	(9)

① Current year and count

② Design year and count

③ Current year figure

④ Design year figures

⑤ is ONE of the following:

NEW CONSTRUCTION (FREEWAY)  
 NEW CONSTRUCTION (NON-FREEWAY)  
 COMPLETE RECONSTRUCTION (FREEWAY)  
 PARTIAL RECONSTRUCTION (4R) (FREEWAY)  
 RECONSTRUCTION (NON-FREEWAY)  
 3R (FREEWAY)  
 3R (NON-FREEWAY)  
 PARTIAL 3R (NON-FREEWAY)

⑥ is ONE of the following:

PRINCIPAL ARTERIAL  
 MINOR ARTERIAL  
 STATE COLLECTOR  
 LOCAL AGENCY COLLECTOR

LOCAL ROAD  
LOCAL STREET  
RECREATIONAL ROAD

(7) is ONE of the following:

RURAL  
URBAN (SUBURBAN)  
URBAN (INTERMEDIATE)  
URBAN (BUILT-UP)

(8) is ONE of the following:

LEVEL  
ROLLING

(9) is ONE of the following:

FULL  
PARTIAL  
NONE

**TITLE SHEET INFORMATION BLOCK**

**Figure 14-3C**

Simple-Curve Data	Accuracy
PI Station	0 + 000.001
$\Delta$	00° 00' 01"
R, existing alignment	0.001 m
R, new alignment	5 m
T	0.001 m
L	0.001 m
E	0.001 m
SE	0.1%

**HORIZONTAL-CURVE-DATA ACCURACY  
TO BE SHOWN ON PLANS**

**Figure 14-3D**