CHAPTER 3

Project Design Coordination

NOTE: This chapter is currently being re-written and its content will be included in Chapter 102 in the future.

Design Memorandum	Revision Date	Sections Affected
13-01	Jan. 2013	3-2.01

TABLE OF CONTENTS

LIST OF FIGURES 3

3-1.0 INTERNAL INDOT ENTITIES 4
3-1.01 Production Management Division 4
3-1.01(01) Office of Environmental Services [Rev. Jan. 2011] 4
3-1.01(02) Office of Aerial Engineering's Survey Team 6
3-1.01(03) Office of Structural Services [Rev. Jan. 2011] 7
3-1.01(04) Office of Real Estate 9
3-1.02 Contract Administration Division 11
3-1.02(01) Office of Contracting 11
3-1.02(02) Office of Contracting Consulting Services Team 12
3-1.03 Construction Management Division's Office of Materials Management 12
3-1.04 Public Information Division 13
3-1.05 District Offices 13

3-2.0 EXTERNAL ENTITIES 14
3-2.01 Federal Agencies 14
3-2.01(01) Federal Highway Administration (FHWA) [Rev. Jan. 2013] 14
3-2.01(02) United States Forest Service (USFS) 16
3-2.01(03) United States Postal Service (USPS) 16
3-2.01(04) Federal Aviation Administration (FAA) 16
3-2.01(05) National Park Service (NPS) 16
3-2.01(06) Department of Defense (DOD) 16
3-2.02 Local Public Agency 17

3-3.0 SPEED 17
3-3.01 Definitions 17
3-3.02 Design Speed Selection 19
3-3.02(01) Geometric Design Considerations 19
3-3.02(02) Regulatory Speed vs. Design Speed 20
3-3.02(03) Legal Speed Limits 21

FIGURES 23

LIST OF FIGURES

Figure **Title**

3-3A Legal Speed Limits

CHAPTER 3

PROJECT DESIGN COORDINATION

During the development of a road or bridge design project, the designer must coordinate with many entities which are both internal and external to the Production Management Division. Chapter 1 discusses the functional responsibilities of the various entities within the Indiana Department of Transportation. Chapter 2 provides a network which describes the project-development sequence for the design process. This Chapter discusses specific coordination responsibilities between the designer and other entities. Together, the three chapters will provide an understanding of the necessary interaction among the various entities in project development.

3-1.0 INTERNAL INDOT ENTITIES

This Section discusses the specific coordination responsibilities between the designer and other INDOT entities.

3-1.01 Production Management Division

3-1.01(01) Office of Environmental Services [Rev. Jan. 2011]

The Office of Environmental Services is responsible for a variety of activities related to project scoping, environmental impacts and environmental procedures. The following summarizes the coordination between the designer and the Office of Environmental Services:

1. Project Scope of Work. The Office of Environmental Services determines for all expansion and some preservation projects the overall Project Scope of Work; i.e., the basic highway improvement parameters (e.g., number of lanes, warrants for truck-climbing lanes, level of access control). The road or bridge designer is responsible for developing the detailed project design within the Scope of Work established by the Office of Environmental Services. In some cases, the designer may need to contact the division for clarification or if, for some reason, it is necessary to revisit the Project Scope of Work. The designer must secure concurrence from the division for fundamental, consequential changes to the scope of work.

2. NEPA/IDEM Requirements. The designer may work with the Office of Environmental Services to ensure that the project meets environmental requirements pursuant to the National Environmental Policy Act and Indiana Department of Environmental Management regulations. This includes environmental documentation, water quality impacts, biological impacts, historical impacts, and archeological impacts. In general, the Office of Environmental Services makes its environmental determination of impacts based on the Engineer's Report or Scope of Work Report.

3. Section 4(f). A Section 4(f) approval is required from the Federal Highway Administration if a project will use land from a publicly owned park, recreational area, wildlife/waterfowl refuge, or from a significant historic site. An approval will be granted only if there is no feasible and prudent alternative to the use of land from the property. Where a Section 4(f) approval is required, the Office of Environmental Services will secure the approval. If a change in scope occurs in the design phase, the designer should notify the Office of Environmental Services so that a proper evaluation can be made.

4. Section 6(f). Federal law places restrictions on the use of land acquired with funds authorized by the Land and Water Conservation Fund Act of 1965 as administered by the U.S. Department of Interior, Section 6(f) of the 1965 Act. Where a Section 6(f) approval is required, the Office of Environmental Services will secure the approval.

5. Mitigation Features. The Office of Environmental Services and designer work together on the plan for mitigation of environmental impacts.

6. Early Coordination. The Office of Environmental Services determines the need for early coordination on environmental issues with other State, Federal, or public entities and makes all direct contacts. The designer receives copies of the early coordination results so that the designer is aware of the comments from the various entities, and that problems may be resolved early in the design process.

7. Contaminated Sites. The Office of Environmental Services identifies known contaminated sites. The Office will provide the Indiana Department of Environmental Management with information on each site with the intent that IDEM will remediate the site before INDOT purchase. The Office will provide the designer with any necessary special provisions. The designer is responsible for incorporating these special provisions into the contract documents if the contamination removal or site remediation is to be accomplished by the highway contractor.

8. Section 106. For each Federally-funded project, INDOT must identify archeological and historic sites in the project vicinity. The identified sites must be evaluated to determine if

they are eligible for the National Register of Historic Places (NRHP). INDOT submits information to the State Historic Preservation Officer (SHPO) for review and comment. If a site is considered eligible by SHPO for the NRHP and if the project will affect the site, the Department is required to follow the proper Federal procedures. The Office of Environmental Services is responsible for the Section 106 process.

9. Stormwater Pollution Prevention Plan. The designer has the primary responsibility to develop the plan for Best Management Practices (BMPs) for temporary erosion and sediment control. The designer has the primary responsibility for specifying design elements of post-construction BMPs for stormwater-pollution prevention. The designer has the primary responsibility for preparing and submitting the Stormwater Pollution Prevention Plan to the Office of Environmental Services as soon as applicable, using the elements of the construction and post-construction stormwater-quality BMPs. Once approval is attained, INDOT will be responsible for submitting NOI and NOT.

3-1.01(02) Office of Aerial Engineering's Survey Team

The Survey Team is responsible for conducting route survey work for the Division, including all in-house design and some consultant-design work. The following summarizes the coordination with the road or bridge designer:

1. Field survey. The Survey Team performs the route survey work using its own field survey crews, typically after the Engineer's Report, or Scope of Work Report, is complete but occasionally sooner if the information is needed to adequately define the project scope. The Survey Team reviews and processes the raw data for transmittal to the designer in electronic format. If the designer determines that additional survey data is needed, the designer must make a request for and coordinate with the Survey Team as needed.

2. Route Plat. If the project requires purchase of right of way, the Survey Team will locate all physical evidence of property lines and corners in the field. The Team then prepares a route survey plat in electronic format suitable for inclusion in the project plans and for use by the Office of Real Estate for recording the route survey at the county courthouse.

3. Control Traverse Diagram. The Survey Team will perform the control traverse survey to establish the existing centerline or survey baseline for the project and will provide that information in electronic format to the designer for inclusion in the project plans.

4. Aerial Survey. The Survey Team does not perform an aerial survey. If the scope of the project or schedule is such that an aerial survey is needed, the designer must coordinate with

the Public Information Division's Office of Graphic Arts as needed, or obtain the services of an aerial surveying consultant. The Survey Team may, if feasible, perform the ground control survey to provide the aerial targets and other needed ground survey information. However, the aerial surveyor will be responsible for integrating the ground survey data and the aerial data into a finished survey in an electronic format suitable for use by the designer.

3-1.01(03) Office of Structural Services [Rev. Jan. 2011]

1. Hydraulics Team. The Hydraulics Team is responsible for hydrologic and hydraulic analyses for both roadway drainage appurtenances and bridge waterway openings. The coordination between the designer and Hydraulics Team is summarized as follows:

   a. Bridge Waterway Openings. In coordination with the designer, the Hydraulics Team performs the hydrologic/hydraulic analyses for bridge waterway openings. This includes the following:

      (1) selecting the design storm frequency;

      (2) selecting the hydrologic method;

      (3) coordinating with agencies external to the Department (e.g., Indiana Department of Natural Resources);

      (4) performing all hydraulic analyses; and

      (5) determining the size of the bridge waterway opening subject to any structural constraints.

   b. Culvert. For a box culvert or pipe culverts, the Hydraulics Team will perform all hydraulics work on the culvert design for an in-house project or a small-structure replacement consultant project. This includes the following:

      (1) hydrological analysis to calculate design flow rate based on the drainage basin characteristics;

      (2) hydraulic analysis to select culvert dimensions and layout (e.g., longitudinal slope); and

(3) selection of culvert options (e.g., smooth or corrugated) or material (e.g., reinforced concrete, corrugated metal) as appropriate.

c. Roadway Drainage. The designer is responsible for the hydrologic/hydraulic analysis of an open channel and pavement surface drainage. This includes determining a design discharge, selecting a channel lining, determining allowable ponding on the roadway, determining inlet locations, etc.

d. Closed Drainage System. The designer will provide the proposed roadway design to the Hydraulics Team, documenting, for example, pavement width, cross slopes, longitudinal grades, location of intersecting roads and approaches, location of inlets, etc. Based on this information, the Hydraulics Team is responsible for the design of the closed drainage system for an in-house project only. This includes the following:

(1) flow calculations in the system;
(2) hydraulic grade line calculations;
(3) pipe size and material;
(4) pipe slopes; and
(5) outfall location and design.

e. Permanent BMPs. The designer has the primary responsibility to develop the permanent BMPs. Where necessary, the designer may seek technical guidance from the Hydraulics Team.

f. FEMA Regulations. The Hydraulics Team is responsible for determining that the project design is consistent with regulations promulgated by the Federal Emergency Management Agency (e.g., development within delineated floodplains).

g. Documentation. The following will apply to each drainage appurtenances or bridge waterway opening.

(1) The Hydraulics Team will submit the necessary information documenting its recommendations for the hydraulic design.

(2) The designer will incorporate all details into the road or bridge design plans.

(3) The designer will calculate all quantities for the roadway drainage appurtenances.

h. Coordination with County Surveyor Regarding Legal Drain. The Hydraulics Team will usually make initial contact during the hydraulic analysis, but the designer is responsible for coordination during the grade review stage of the design process.

See Chapter 28 for more information on the relative responsibilities of the designer and the Hydraulics Team.

2. Bridge Rehabilitation and Ratings Team. The Bridge Rehabilitation and Ratings Team is primarily responsible for the design of bridge-rehabilitation projects.

For a bridge rehabilitation project, the Bridge Rehabilitation and Ratings Team is typically the lead team. However, this group may coordinate with the Office of Roadway Services for any work on the roadway approaches (e.g., alignment, guardrail-to-bridge-railing transitions).

A project may require the development of a Transportation Management Plan (TMP). See Chapter Eighty-one. The designer and Bridge Rehabilitation and Ratings Team, among other entities, will coordinate in the preparation of a TMP.

3-1.01(04) Office of Real Estate

The Office of Real Estate is responsible for all activities related to the legal right of way for the State highway system. This includes appraisals, acquisitions, relocation, and property management.

1. Right-of-Way Acquisition Procedure. The following summarizes the coordination between the designer and Office of Real Estate.

a. Coordination. The designer provides the Office with the needed design information to determine the right-of-way impacts.

b. Plan Preparation. In coordination with the Office of Real Estate requirements in Chapter Eighty-five, the designer is responsible for initiating the right-of-way design. The designer prepares a separate set of right-of-way plans for each project where right-of-way impacts exist and submits the plans to the Office of Real Estate where the plans are modified to become Final Right-of-Way Plans. See Part IX for information on the preparation of right-of-way plans.

c. Acquisition. The Office of Real Estate performs all right-of-way work and procures all takings and easements needed for the project. The division notifies the designer of any design considerations resulting from negotiations with the property owners.

2. Utilities and Railroads Teams.

a. Utilities Team. The Utilities Team is the lead team for contacts with utility companies. The designer should place all utility topography on the plans. Coordination with utility companies typically begins at the preliminary field check stage. The designer sends field-check notification and plans to all affected utility companies and to the Utilities Team. If the utility conflicts are significant, the designer may choose to contact the Utilities Team at an earlier stage in the plan development process. After design approval is obtained, the Utilities Team will request plans from the designer for transmittal to the utility companies. Using these plans, the utility companies will develop their own relocation plans, which are then sent to the Utilities Team for approval. The designer, as needed, incorporates utility information into the design features, plans, and specifications. The Utilities Team will obtain agreements and cost estimates as needed from the utility companies for reimbursable utility work and authorize them to proceed with design or construction activities as needed.

b. Railroads Team. The Railroads Team is the lead unit for contacts with railroad companies. The designer should place all railroad facilities (tracks, bridges, drainage structures, trackside equipment, communication and signal systems, warning devices, electrical/mechanical housings, etc.) and railroad right-of-way information on the plans. The Railroads Team must review each project that impacts railroad facilities, that encroaches on railroad-company right of way, or that potentially affects railroad operations (such as highway construction operations or traffic maintenance, etc.). The designer initiates the railroad-company coordination process by providing the Railroads Team with a set of plans denoting the project impacts on railroad facilities. Typically, this is done at the preliminary field check stage. However, a project that involves significant alteration of or encroachment upon railroad facilities (e.g., altering horizontal or vertical track profile, construction of an overpass or underpass) should be evaluated during the Scoping phase of the project. The designer, as needed, incorporates railroad information into the design features, plans, and specifications. The Railroads Team will obtain agreements, plans, and cost estimates as needed from the railroad company and authorize it to proceed with design or construction activities as needed.

Where a railroad crossing is located within the project limits, coordination between the designer and the Railroads Team will be necessary to ensure that an agreement with the railroad company for signing/signalization at the crossing is secured.

3-1.02 Contract Administration Division

3-1.02(01) Office of Contracting

The Office of Contracting is responsible for preparing the construction contract documents and administering the highway contract lettings. The designer will coordinate with the Office as follows.

1. Plans. After the plans have been finalized, the designer submits the final tracings to the project manager who then submits them to the Planning Division's Research and Documents Library Team. The Team will use the tracings for the printing of the contract plans. The prints are forwarded to the Office of Contracting by the Team for sale to interested potential contractors. The original final tracings are maintained permanently in the Research and Documents Library Team files.

2. Special Provisions. The designer is responsible for the development of any necessary special provisions. The Office ensures that these are included in the final contract document.

3. Engineer's Estimate. The designer is responsible for preparing the estimated construction cost for each pay item. The Office will review the designer's estimate and check it for errors or omissions. If significant discrepancies are noted, the two entities will resolve any differences. The Office will prepare the final Engineer's Estimate for the bid opening.

4. Contract Proposal Book Certification. Within one week after receipt, the designer should review the plans and proposal book for each contract for which the designer is signing and sealing some or all of the plan sheets. The designer should complete the Contract Proposal Book Certification form (see www.in.gov/dot/div/contracts/design/dmforms/ for an editable version), and transmit the original to the appropriate district construction engineer with copies to the Contract Administration Division's Office of Contracting and the Production Management Division's project manager. If errors are noted, the designer should also contact the appropriate district construction engineer to determine how the errors should be handled (revision before opening bids, construction change after bids opened, etc.). This determination should be documented in a memorandum to the appropriate district construction engineer with copies to the Office of Contracting and the project manager.

3-1.02(02) Office of Contracting Consulting Services Team

The Department may use a consultant for design work. If a consultant is used, the Consulting Services Team is the primary contact for scheduling plan submittals. The Production Management Division will be the primary contact for technical support, and will review the plans prepared by the consultant.

***** PRACTICE POINTER *****

A consultant with a question regarding the *Indiana Design Manual* or design policy in general should contact its INDOT reviewer and not the FHWA.

3-1.03 Construction Management Division's Office of Materials Management

The Office of Materials Management is responsible for testing and certifying all materials used in project work. This includes geotechnical analyses and materials for pavements and structures. The district-office materials-management personnel perform the field sampling. The coordination between the designer and the Office of Materials Management is summarized as follows.

1. Geotechnical. The Office of Geotechnical Services prepares a Geotechnical Report for each road or bridge project when necessary. The Report provides the soil and rock types, recommended foundation type (e.g., pile type, spread footings), boring logs, bearing capacities, slope stability, rock-cut recommendations, peat excavation, subsurface drainage needs, waste products, etc. The designer comments on the Report and works with the Office of Geotechnical Services to resolve any conflicts. The designer incorporates the geotechnical recommendations into the plans.

2. Pavement Design. The Planning Division's Office of Pavement Engineering determines the pavement type (concrete or bituminous) and rehabilitation treatments (e.g., recycling, crack and seat) and designs the pavement structure and subsurface drainage. The designer incorporates the pavement design into the plans.

3. Walls. Where needed, the designer is responsible for preparing the design of cast-in-pace retaining walls, mechanically stabilized earth walls, binwalls, and gabions. The designer, if necessary, will seek technical assistance from the Office of Materials Management.

4. Special Provisions. For those special provisions related to material requirements, the designer should coordinate with the Office of Materials Management in their preparation.

5. New Material or Experimental Work. The use of any new material or experimental work may be initiated by several sources (e.g., the designer, the traffic engineer, the New Products Evaluation Committee). Depending upon the type of new material or experimental work, the Office of Materials Management may be responsible for monitoring the post-construction performance. Coordination is required between the designer and the Office.

3-1.04 Public Information Division

The Public Information Division is responsible for providing project-related CADD services. The designer must coordinate with the Division in the preparation of all CADD-generated project plan sheets.

3-1.05 District Offices

The Department's District Offices (Crawfordsville, Fort Wayne, Greenfield, LaPorte, Seymour, and Vincennes) provide the field services needed within each assigned geographic area. Their responsibilities include maintenance of the State highway system, construction inspection services, and contacts with county and city governments.

The district Office of Design begins project oversight and guidance once the Preliminary Engineering/Environmental Phase begins. The project manager is responsible for ensuring that a schedule is agreed to and that project development maintains the schedule throughout the project development process. If, during the development phase, a scope or design change is required, any proposed corresponding schedule changes must be approved by the district Office of Design. Proposed schedule changes are not automatic.

Specifically for preconstruction activities, the coordination between the designer and appropriate district office is summarized as follows:

1. Coordination. The Central Office will maintain a steady contact with the district office. The district office, for example, will be invited to all field reviews and may receive some project-related correspondence.

2. Aerial Survey. If an aerial survey is conducted, the district office may provide the control traverse and pick-up field survey to locate items which may be missed by the aerial survey

(e.g., underground utilities). The district office conveys this information to the Public Information Division's Office of Graphic Arts or to an aerial survey consultant for inclusion in the aerial survey.

3. Soils. The district office is responsible for testing soils and determining soil characteristics to be used in each embankment. Its report is submitted to the Construction Management Division's Office of Materials Management. The district office may also provide recommendations for shrink or swell factors. The designer must reflect this information in the project design.

4. Transportation Management Plan (TMP). If a TMP is prepared, the district's Traffic, Development, and Construction offices, and the designer, among other INDOT entities, may collaborate on the design and implementation of the TMP.

3-2.0 EXTERNAL ENTITIES

This Section discusses the specific coordination activities between the designer and entities which are external to INDOT.

3-2.01 Federal Agencies

3-2.01(01) Federal Highway Administration (FHWA) [Rev. Jan. 2013]

The FHWA administers the Federal-aid program which funds eligible highway improvements. Its basic responsibility is to ensure that INDOT complies with all applicable Federal laws and regulations in the expenditure of Federal funds and to ensure that INDOT's policies and procedures are in accordance with the applicable engineering requirements for each proposed highway project. FHWA maintains a Division Office within the State. This is the primary point of contact for INDOT. See the FHWA Division Office website for staffing and contact information.

The 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), in addition to a realignment of the Federal-aid system, revised the role of FHWA for each individual project. The Transportation Equity Act for the 21st Century (TEA-21) of 1998 further revised such role. The Map 21 legislation of 2012 has not made any additional significant changes to FHWA's role in administering the Federal –Aid Program. FHWA project involvement is specifically defined in the INDOT-FHWA Stewardship and Oversight Agreement and seeks to target high risk projects. Projects selected for FHWA Oversight include the following:

1. Major projects (cost greater than $500 million)
2. Congressional interest projects
3. Demonstration and pilot projects
4. Interstate Projects:
    a. With anticipated design exceptions to the 13 controlling criteria
    b. New or modified access points
    c. Major reconstruction and widening
5. Projects using innovative contracting techniques, such as Design-Build or Construction Management General Contractor (CMGC)
6. Public Private Partnerships
7. Special Experimental Projects
    a. Projects requiring SEP-14 approval for alternative contracting methods
    b. Projects requiring SEP-15 approval for public-private partnerships
8. Projects requiring an EIS
9. Unusually complex or controversial projects
10. Major unique and/or unusual structures

Where a project meets any of the above criteria and is not currently designated as FHWA Oversight in SPMS, the Project Manager should contact FHWA to discuss the project and Oversight Determination.

If a project is not subject to FHWA oversight (most projects), FHWA will not be involved with the normal day-to-day project activities and approvals, including field reviews, design exception approvals, and PS&E approvals, etc. In these instances, the project is designated "State oversight" and INDOT acts on behalf of the FHWA to deliver the project and insure compliance with applicable federal regulations. If a project is subject to FHWA oversight, then the INDOT project manager should initiate coordination with the applicable FHWA Transportation Engineer as early as possible in the project development process. Each Federally-funded project should be designed and constructed in accordance with the appropriate criteria in this Manual, regardless of the oversight designation.

The oversight determination is made by FHWA on every project early shortly after the project is programmed. INDOT may request FHWA oversight on any Federal-aid project. Locally-sponsored projects may be designated as FHWA oversight. In addition, FHWA may review or investigate any phase of the Federal-aid program including control documents or any Federal-aid project regardless of oversight designation. Further information on FHWA's role is provided in the Indiana FHWA-INDOT Stewardship and Oversight Agreement.

3-2.01(02) United States Forest Service (USFS)

The USFS is responsible for the management of all national forests. The USFS and INDOT currently have a Memorandum of Understanding (MOU) and approved procedures that describe the coordination between the two agencies for the planning and the development of each project having USFS involvement. If a proposed project will impact a national forest, the designer must coordinate the project development with the USFS. The USFS should be invited to any field reviews and should receive copies of project reports. Some project actions will require USFS approval (e.g., right-of-way acquisition).

3-2.01(03) United States Postal Service (USPS)

Coordination with the USPS may be necessary to determine location of mail delivery points and mailbox turnouts and to ensure that crash-tested mailboxes are installed.

3-2.01(04) Federal Aviation Administration (FAA)

Coordination may be necessary with the FAA if a project is located in the vicinity of an airport. The anticipated development of the airport and existing traffic patterns which involve the airport should be considered during the design process.

3-2.01(05) National Park Service (NPS)

Coordination with the NPS will be necessary if a project is in the vicinity of land under the jurisdiction of the NPS. Although the Department has no formal agreement with the NPS, the level of involvement will be similar to that between INDOT and the USFS.

3-2.01(06) Department of Defense (DOD)

Coordination with the DOD and concurrence by the Military Traffic Management Command Transportation Engineering Agency (MTMCTEA) is required where the vertical clearance over Interstate roadways does not meet applicable standards.

3-2.02 Local Public Agency

The coordination between the designer and a local public agency is descried as follows.

1. Design. The designer, through the district office, solicits input from the affected local agency, and keeps it up-to-date on any current or planned activities regarding an INDOT-route project. For example, the decision on whether to provide open or closed drainage on an urban street is significantly influenced by input from the locality. In addition, a larger municipality may have its own design criteria, which must be considered during the design process.

2. Coordination. The designer typically invites the local agency to any field reviews and provides it with copies of major project reports.

3. Local Transportation Project. The designer is usually a consultant under contract to the local public agency. Coordination with the local agency is administered by the Contract Administration Division's Local Program Assistance Team. An INDOT designer performs only limited review of local-transportation-project plans.

3-3.0 SPEED

3-3.01 Definitions

1. Design Speed. Design speed is the maximum safe speed that can be maintained over a specified section of highway if conditions are so favorable that the design features of the highway govern. A design speed is selected for each project which will establish criteria for several design elements including horizontal and vertical curvature, superelevation, and sight distance. Section 3-3.02 discusses the selection of design speed in general. Chapter Fifty-three discusses specific design-speed criteria for a new-construction or reconstruction project. Chapters Fifty-four through Fifty-six provide the design-speed criteria for a project on an existing highway.

2. Low Speed. For geometric design purposes, low speed is defined as 70 km/h or lower.

3. High Speed. For geometric design purposes, high speed is defined as 80 km/h or higher.

4. Average Running Speed. Running speed is the average speed of a vehicle over a specified section of highway. It is equal to the distance traveled divided by the running time (the time

that the vehicle is in motion). The average running speed is the distance summation for all vehicles divided by the running time summation for all vehicles.

5. Average Travel Speed. Average travel speed is the distance summation for all vehicles divided by the total time summation for all vehicles. Average running speed only includes the time that the vehicle is in motion. Therefore, on an uninterrupted-flow facility which is not congested, average running speed and average travel speed are equal.

6. Operating Speed. Operating speed, as defined by AASHTO, is the highest overall speed at which a driver can safely travel a given highway under favorable weather conditions and prevailing traffic conditions while at no time exceeding the design speed. Therefore, for a low-volume condition, operating speed equals design speed. This term has little or no usage in geometric design.

7. 85th-Percentile Speed. The 85th-percentile speed is the speed below which 85 percent of vehicles travel on a given highway. The most common application of the value is its use as one of the factors, and usually the most important factor, for determining the posted, regulatory speed limit of a highway section. Field measurements for the 85th-percentile speed will most often be conducted during off-peak hours when drivers are free to select their desired speed.

8. Posted Speed Limit. If needed, the INDOT district traffic office conducts the traffic engineering studies on a State route to select a posted speed limit. When a study is performed, on either a State or local route, the posted speed limit is based on the factors as follows:

   a. the 85th-percentile speed;

   b. the design speed used during project design;

   c. road surface characteristics, shoulder condition, grade, alignment, and sight distance;

   d. functional classification and type of area;

   e. type and density of roadside development;

   f. the accident experience during the previous 12 months; and

   g. parking practices and pedestrian activity.

On a new-construction or reconstruction project, the posted speed limit will typically be equal to the design speed used in design, if this does not exceed the legal limit. A traffic engineering study may be conducted for various reasons to assist in the determination of the posted speed limit. This procedure applies to either a State or local facility.

9. Legal Speed Limit. A legal speed limit is that set by the Indiana Statutes which applies, in general, to each portion of a public road which does not have a posted speed limit. Section 3-3.02 describes specific legal speed limits adopted by the State.

3-3.02 Design Speed Selection

3-3.02(01) Geometric Design Considerations

From a geometric design perspective, the selected design speed is based on the road design elements as follows.

1. Functional Classification. A more-important facility should be designed with a higher design speed than a less-important facility.

2. Urban/Rural. The design speed in a rural area is generally higher than that in an urban area. This is consistent with the typically fewer constraints in a rural area (e.g., less development).

3. Terrain. The flatter the terrain, the higher the selected design speed will be. This is consistent with the typically higher construction costs as the terrain becomes more rugged.

4. Traffic Volume. Design speed may vary by traffic volume. As traffic volume increases, a higher design speed should be used. For example, the design speed on a rural collector will vary according to traffic volume.

5. Project Scope of Work. A higher design speed is more applicable to a new-construction or reconstruction project than to a 3R project.

For geometric design application, the relationship between these road design elements and the selected design speed reflects general cost-effective considerations. For example, the higher the traffic volume, the more benefits to the traveling public from a higher design speed.

3-3.02(02) Regulatory Speed vs. Design Speed

Each public road is controlled by a regulatory speed limit, either through posted speed-limit signs or with a legal speed limit shown in the *Indiana Code*; see Section 3-3.02(03). The relationship between the project design speed and the regulatory speed limit is summarized as follows:

1. General. The design speed should equal or should exceed the anticipated posted speed limit after construction, or the State legal speed limit on a non-posted highway.

2. Non-Posted Facility (Rural). The maximum legal speed limit is 55 mph. A project must be designed for 55 mph, or a traffic engineering study must be conducted to determine if a lower design speed is appropriate. If the project is designed for lower than 55mph, the road must be posted at the selected design speed between logical termini.

3. Non-Posted Facility (Urban). The maximum legal speed limit and corresponding minimum design speed are as follows:

    a. State route: maximum legal speed limit 30 mph, with 30 mph minimum design speed; or

    b. non-State route: maximum legal speed limit 55 mph, day, and 50 mph, night, with 55 mph minimum design speed.

    As in a rural area, the minimum design speed must meet these criteria, unless a traffic engineering study indicates otherwise.

To avoid a potential conflict, the Office of Environmental Services should, early in project development, coordinate the design-speed selection with the district office to assist in establishing the anticipated posted speed limit of the completed facility. If the proposed design speed from the Geometric Design Tables included in this *Manual* is lower than the established posted speed limit, one of the methods must be selected as follows:

1. increase the design speed to equal or exceed the established or anticipated posted speed limit; or

2. seek a design exception for the individual geometric design element (e.g., a horizontal curve) which does not meet the established speed limit.

3-3.02(03) Legal Speed Limits

This Section summarizes the legal speed limits established by the *Indiana Code*. Figure 3-3A, Legal Speed Limits, Non-Interstate Facility, lists the legal limits for a rural or urban area and for a State or non-State facility.

1. Maximum Speed Limit. *Indiana Code* IC 9-21-5-2 and IC 9-21-5-6 set the maximum speed limit which applies to vehicular speeds on each public road in the State. This maximum limit does not establish the upper limit for geometric design speed. The speed limits are as follows:

   a. 70 mph on an Interstate route, except within an urbanized area;

   b. 65 mph for a vehicle (other than a bus) having a gross mass greater than 13,000 lb when operating on an Interstate route outside of an urbanized area;

   c. 60 mph on a rural divided facility with four or more lanes;

   d. 55 mph on a rural two-lane two-way facility;

   e. 30 mph on a State highway in an urban area*;

   f. 30 mph on a non-State highway in an urban area, with absolute maximum of 55 mph, day, and 50 mph, night*; and

   g. 15 mph in an alley, with absolute maximum 30 mph*.

   * Requires an engineering and traffic investigation study to establish a maximum speed limit that is different from the value shown.

2. Minimum Speed Limit. *Indiana Code* IC 9-21-5-6 sets the minimum speed limit for a facility which is not posted with a regulatory speed-limit sign. The minimum speed limits are as follows:

   a. Rural Area. 30 mph, except as noted in Item c **.

   b. Urban Area. 20 mph, except as noted in Items c and d **.

c. School Zone. A local authority may establish a school-zone speed limit, if the conditions are met as follows:

(1) the limit is not lower than 20 mph;

(2) the limit is imposed only in the immediate vicinity of the school;

(3) children are present;

(4) the speed zone is properly signed; and

(5) if on a State route, the Department has been notified by certified mail of the limit imposed.

d. Park or Playground. A local authority may establish a speed limit of not lower than 5 mph on an urban street, if the conditions exist as follows:

(1) the street is located within a park or playground established under IC 36-10. The board established under IC 36-10-3, the board established under IC 36-10-4, or the park authority established under IC 36-10-5, requests the local authority to decrease the limit; and

(2) the speed zone is properly signed.

e. Alley. The minimum speed limit is 5 mph **.

** Requires an engineering- and traffic-investigation study to establish a speed limit that is below the maximum. However, the lower limit cannot be below the minimum value shown.

Geographic Location	System	Maximum	Minimum
Rural	State Highway	60 mph	n/a
	Non-State Highway	55 mph	30 mph
Urban	State Highway	30 mph	n/a
	Non-State Highway	Day: 55 mph Night: 50 mph	20 mph

Note: See Section 3-3.02(03) for exceptions.

LEGAL SPEED LIMITS
NON-INTERSTATE FACILITY

Figure 3-3A

Back