TABLE OF CONTENTS

CHAPTER TEN 3
10-1.0 UTILITY PROCEDURES 3
10-1.01 Joint Occupancy 3
10-1.02 Adjustment/Relocation Plan 4
10-1.02(01) Survey 4
10-1.02(02) Review 4
10-1.03 Reimbursement 5
10-1.04 Subsurface Utility Engineering 6
10-1.05 Utility Coordination 7
10-2.0 UTILITY COORDINATION 7
10-2.01 Introduction 7
10-2.02 Utility Coordination Factors 8
10-2.03 Utility Coordinators 9
10-2.04 Certification 9
10-2.05 Utility Coordination Process, Design Timeframe of 12 Months or Longer - Design Phase 9
10-2.05(01) Responsibilities 10
10-2.05(02) Process Steps 10
10-2.06 Utility Coordination Process, Design Timeframe of Shorter than 12 Months (Short-Term Project) - Design Phase 12
10-2.06(01) Responsibilities 12
10-2.06(02) Process Steps 12
10-2.07 Utility Coordination Process, Design Timeframe of Shorter than 12 Months (Short-Term Project) - Traffic Signal Project Design Phase 14
10-2.08 Complete Waiver of Process 15
10-2.09 Level of Effort 16
10-2.09(01) Process Steps 16
10-3.0 UTILITY ACCOMMODATION POLICY 20
10-3.01 Introduction 20
10-3.01(01) Purpose 20
10-3.01(02) Application 21
10-3.01(03) Scope 21
10-3.01(04) Other Requirements 21
10-3.01(05) Exceptions 21
10-3.01(06) Prior Instructions 22
10-3.02 Definitions 22
10-3.03 General 23
10-3.03(01) Permits 23
10-3.03(02) Driveway Conflicts 24
10-3.03(03) Private Lines 24
10-3.03(04) Service Lines 25
10-3.03(05) Access Control 25
10-3.03(06) Location 26
10-3.03(07) Design 27
10-3.04 Structures 28

10-3.04(01) Utility Structures 28
10-3.04(02) Highway Structures 29
10-3.05 Pipelines 31
10-3.05(01) General 31
10-3.05(02) High-Pressure Gas and Liquid Petroleum Lines 33
10-3.05(03) Low-Pressure Gas 34
10-3.05(04) Water Lines 35
10-3.05(05) Sanitary Sewer Lines 35
10-3.06 Overhead Power and Communication Lines 36
10-3.06(01) General 36
10-3.06(02) Telecommunication Towers 37
10-3.07 Underground Power Lines 39
10-3.08 Underground Communication Lines 41
10-3.09 Irrigation and Drainage Pipes, Ditches and Canals 42
10-3.10 Miscellaneous 43
10-3.10(01) General 43
10-3.10(02) Trenching and Backfill 44
10-3.10(03) Underground Plant Protection 45
10-3.10(04) Pavement Cuts 46

LIST OF FIGURES

Figure **Title**

10-2A Sample Utility Special Provision
10-2B Editable Utility Coordination Certification
10-2C Editable Utility Coordination Certification for Short-Term Project
10-2D Editable Utility Coordination Certification Waiver
10-3A Priority 1 Access
10-3B Priority 2 Access
10-3C Priority 3 Access

CHAPTER TEN

UTILITIES

Chapter Ten includes step-by-step procedures for utility agreements and coordinating with utility companies. The chapter also presents the INDOT policies, procedures and criteria for the accommodation of utilities within highway right-of-way.

10-1.0 UTILITY PROCEDURES

10-1.01 Joint Occupancy

Transportation and utility networks are growing in number and complexity. As a result, the frequency of two or more networks occupying a common right-of-way or intersecting one another has increased. Therefore, problems may arise due to the construction, maintenance and operations of one network as it affects another. Each transportation agency has the responsibility to maintain the highway right-of-way under its jurisdiction and to preserve the operation, safety, integrity and function of the highway facility. Generally, utilities have a qualified right to install their lines and facilities on the right-of-way of most public roads and streets. Because the manner in which utilities cross or otherwise occupy highway right-of-way can materially affect the safe operation, maintenance and appearance of the highway, it is necessary that such use and occupancy be authorized and reasonably regulated. Likewise, it is important that utilities are not unnecessarily impacted by highway construction projects, because it is generally in the public interest to accommodate utility facilities on highway right-of-way when such use and occupancy do not adversely affect highway safety, construction, maintenance or operations.

Generally, Utilities have a qualified right to free occupancy of the public right-of-way. Utilities are allowed to occupy the right-of-way assuming they do not unreasonably restrict the highway agency's ability to construct, maintain, modify, improve or otherwise operate its highway network. Additional restrictions and limitations apply to limited-access facilities. Because utilities do not pay for a right to occupy the public right-of-way, they usually have to pay the costs of any relocations/adjustments. When total project costs are being considered, utility relocation/adjustment costs should also be included, regardless of who is responsible for the cost. Like roadways, utilities are important to public health, safety and welfare; therefore, they should not be unnecessarily impacted by a construction project. The utility service needs of current and future customers adjacent to the project area should be considered by the designer.

Highway and utility facilities frequently co-exist within or along the same corridors. Therefore, it is essential that these public service facilities be compatibly designed and operated. Joint highway and utility planning and development efforts should be encouraged. Highway safety is important when accommodating utility facilities within highway right-of-way. The design and location of the utilities' use and occupancy of highway right-of-way must conform to the policies of the highway agency to provide and maintain an adequate roadside clear zone. However, safety should be balanced with other factors such as constructability, operations and maintenance.

10-1.02 Adjustment/Relocation Plan

The utility owner is responsible for the design of its facility including depth, clearance and separation between lines, and the work must meet the highway agency's utility accommodation policy (see Section 10-3.0 for INDOT Policy). The utility owner must ensure that its proposal is designed, installed, operated and maintained properly.

10-1.02(01) Survey

Utility adjustment/relocation plans should be developed using the INDOT survey stationing and offsets. This will allow for ease in reviewing the proposed utility work. All utility facilities within the proposed right-of-way should be addressed, especially facilities located within the proposed construction limits.

10-1.02(02) Review

Developing the utility adjustment/relocation plans on copies of the highway agency construction plans will aid in reviewing the proposed adjustment/relocation work relative to the proposed construction activities. The adjustment/relocation plans should show the alignment and profile of the proposed relocation work.

The adjustment/relocation plan will be reviewed to determine if reasonable efforts are being made to resolve potential conflicts with the proposed construction project. The timing of the proposed work will also be reviewed to determine if there will be a potential impact to the contractor's work phasing and schedule.

Material acquisition time frames, budgetary constraints, utility seasonal demands and proposed utility construction time frames all must be identified to properly coordinate the utility adjustment/relocation work with the proposed construction project.

Although utility adjustment/relocations are generally performed by the utility company forces or a contractor hired by the utility, in some cases it may be in the best interest of all involved parties to allow the highway contractor to perform some of the utility work. Where it can be demonstrated that total project costs can be reduced and the inclusion of additional work will not unduly interfere with the contractor's scheduling of work, utility adjustment/relocation work may be added to the contract. Note that this will not affect the responsibility for paying for the work.

10-1.03 Reimbursement

Generally, a utility company is eligible for reimbursement when the utility facility is located on land for which the utility has a properly recorded property right, such as an easement. In certain circumstances, utilities involved within an Interstate-route project may also be eligible for reimbursement. Relocation of service facilities which are customer owned may be eligible for reimbursement. In addition, for INDOT projects only, not local public agency projects, where it can be shown that a utility will incur an extraordinary cost to relocate, the utility may be eligible for partial reimbursement. Reimbursement of extraordinary costs must be approved by the INDOT Chief Engineer.

In these cases, the utility is entitled to reimbursement for costs incurred for the adjustment/relocation of the facility within the documented property right. Eligible costs are those associated with replacement in kind for the affected facility. Any costs which can be accredited to betterment or for relocation which goes beyond what is reasonable to accommodate the project are not eligible for reimbursement. The utility company must enter into an agreement with the Department prior to incurring costs to be eligible for reimbursement.

On local public agency projects, eligibility for reimbursement is the same with the addition that municipal utility companies may also qualify for reimbursement. However, in all cases, a reimbursement agreement must be executed before incurring costs.

To enter into an agreement with the Department, the utility company must present a plan and cost estimate to INDOT. This information is attached to a Utility Agreement and, therefore, must be developed to clearly identify proposed work and associated costs. Costs should be identified on a unit basis which can be readily verified in the field and which can be audited. Because costs incurred prior to entering into the Agreement are not eligible for reimbursement and because it can require considerable time to execute the Agreement, it is important to initiate utility coordination early in the project cycle to avoid unnecessary delay in the project. Documentation of the property right must also be submitted.

Expenses eligible for reimbursement need to be clearly identified as the following:

1. labor;
2. material;
3. overhead;
4. transportation;
5. contract engineering;
6. contract construction;
7. property acquisition; and/or
8. other costs.

Identified rates must be supported and able to withstand an audit by the Department.

Where affected utility facilities are located on both land for which the utility holds a recorded property right and land for which the utility does not have a recorded property right, such as public right-of-way, a reimbursement ratio will be established to identify the portion of work eligible for reimbursement. Generally, this ratio should reflect the extent of work eligible for reimbursement to total adjustment/relocation work.

Generally, eligibility for reimbursement is determined based on where the anticipated construction conflict is located. If the point of conflict is on public right-of-way, the adjustment/relocation work is generally not eligible for reimbursement. Conflict points outside of public right-of-way are eligible for reimbursement. When the conflict is an area, as opposed to a point, eligibility is generally determined by the area in conflict outside of the public right-of-way to the total area of conflict.

If federal funding will be used to reimburse a utility, then these funds must be obligated prior to the utility incurring expenses.

Where the utility company has a documented property right to property which the Department has acquired as public right-of-way, the utility company must subordinate its property right to the State through a Subordination Agreement. The Subordination Agreement identifies which rights have been subordinated and which rights have been retained by the utility company.

10-1.04 Subsurface Utility Engineering

Subsurface utility engineering represents a more thorough investigation of the horizontal and vertical alignment of underground utility facilities. This information can be used to eliminate unnecessary utility adjustments/relocations and, therefore, minimize total project costs.

Subsurface utility engineering is especially useful where the right-of-way is limited, and it is expected that the underground may be congested by a variety of different facilities, such as in high-density urban areas. Benefits are usually gained in construction phases of the project by the utility company and by the project contractor.

However, to gain the greatest benefit, the subsurface utility engineering needs to be done very early in the project design cycle. By utilizing the information from the subsurface utility engineering report, the designer can make reasonable adjustments to the proposed design which may eliminate the need to relocate/adjust utilities. Potentially, this process can help reduce total project costs and streamline some of the construction process because the contractor should have more definitive information on utility locations.

Subsurface utility engineering usually involves the three-step process as follows:

1. Utility records are reviewed to determine the extent and type of utilities that should be encountered during the designating phase;

2. Utility facilities are designated in the field. This involves a relatively precise location of the utility facility regardless of the materials or products used by the utility. These designations are then field surveyed so that the locations can be added to the highway plans; and

3. At certain points identified on the highway plans as potential conflict points, the utility facility is exposed so that the vertical alignment can be determined. From this information, determinations can be made on the necessary extent of utility adjustments/relocations and/or what, if any, design changes can be made to lessen the impact of the highway project on the utility facility.

10-1.05 Utility Coordination

Section 10-2.0 presents the Department's guidelines for coordinating with utilities.

10-2.0 UTILITY COORDINATION

10-2.01 Introduction

There are many factors that dictate the level of effort required to coordinate a specific utility relocation. These include the type and condition of utility facility, potential impact to the project and knowledge of the location.

Because of the many factors involved, the uniqueness of each project and their impact on utilities, it is not practical to provide exact definitions of the level of effort required for each project. However, this section provides general guidelines on what is expected. The intent of the coordination process is to resolve all utility issues during the design phase and, therefore, provide a better product for the contractors.

Responsiveness received from utility companies with respect to highway projects varies considerably. In general, most utilities respond in a timely manner. However, utilities have their own priorities and, unfortunately, sometimes it becomes necessary to contact a utility several times to receive the required response. Part of the intent of these guidelines is to establish general benchmarks on what is reasonably expected when the designer is faced with an "unresponsive" utility.

10-2.02 Utility Coordination Factors

When coordinating with the utility companies, the designer should consider the following factors.

1. Utility Types. The type of utility facilities encountered include electric, water, sanitary sewer, gas and petroleum (and other product lines), and communication (e.g., telephone, cable TV). Each utility type can present unique situations or conflicts.

2. Impacts. There are many types of potential utility impacts to a project because of poor coordination. These may include:

    a. The impact to the project schedule if a utility is in conflict with construction and the project is delayed because of this.

    b. The impact to construction workers who might strike a buried utility line.

    c. The impact to the users of the utility if a line is struck.

    d. Environmental consequences and disruption to essential (e.g., national defense, airport) communication links.

3. Location. The exact location of an underground utility has a direct correlation on the potential impact of that facility on the project. Utility relocation problems may delay the contract work if the right of way is set so tight that there is inadequate room for all the utilities. The designer should make sure that all utilities are shown on the plans as correctly as possible.

The type of facility, potential impact and knowledge of location are closely interrelated, and the combination of these factors are an indication of the level of effort is required to properly coordinate utilities.

10-2.03 Utility Coordinators

The utility coordinator for each type of work will be as follows:

1. The Design Division's Utilities Unit is responsible for State-route projects developed in house and by consultants.

2. The District Development section's design engineer is responsible for district-developed projects.

3. The designer is responsible for State-route traffic work in a separate contract from road or bridge work.

4. The design consultant is responsible for all local agency Federal-aid projects.

When filling out the utility coordination status question on the Memorandum to Contracts Services Section form, if the designer does not have responsibility for utility coordination, he or she should contact the person who is responsible in the Design Division's Utilities Unit. The designer should not contact the utility companies for this information if he or she is not responsible for the coordination.

10-2.04 Certification

The utility coordinator must complete a Utility Coordination Certification for all projects. The Certification must be transmitted with the final tracings, special provisions, estimates and other final documents. The Certification ultimately becomes the property of the Contracts and Construction Division's Contracts Section, which retains it in its contract file. Contracts will not be advertised for letting without a fully executed Utility Coordination Certification form.

10-2.05 Utility Coordination Process, Design Timeframe of 12 Months or Longer - Design Phase

The following coordination process should be used for all Department-let contracts, unless a waiver

is approved to use the process for short-term projects as described in Sections 10-2.06 and 10-2.07, or a complete waiver of process is approved as described in Section 10-2.08.

10-2.05(01) Responsibilities

For a State-route project, the typical assignment of responsibility for the steps in Section 10-2.05(02) is as follows:

1. Step 1: Party preparing project scope.

2. Step 2: Surveyor.

3. Steps 3 - 6: Designer. The INDOT Utilities Unit will participate in meetings and assist with follow-up.

4. Steps 7 - 11: INDOT Utilities Unit.

For Federal-aid LPA projects, the design consultant is responsible for all steps. The INDOT Utilities Unit will be available for advice.

10-2.05(02) Process Steps

The steps for long-term design projects are as follows:

1. Identify and include a complete list of all affected utilities in the preliminary project reports (e.g., engineers' reports). The locations of the utilities and all significant impacts should be included in the report. If the owner of the utility is evident from a field investigation, also include this information in the report.

2. Prior to conducting a field survey, prepare a list of all existing utilities including names, addresses and phone numbers. Contact these utilities and request that they field-locate their facilities. The field-located facilities will be picked up on the survey and shown on the plans. Ensure that each utility has actually field-located its facilities.

3. Send approved Grade Review Plans (25% complete) to each utility for the purpose of requesting verification that its facilities are accurately shown. All utility locations, types and sizes should be shown and verified.

4. Set-up a coordination meeting with the utilities early in the design phase (approximately 25% complete). This will allow the designer to work with the utility companies to develop alternatives where there are conflicts and to find the most cost-effective solution for all parties.

5. Distribute preliminary field check plans (43% complete) to the utilities and invite them to attend the field check.

6. Conduct field check with utilities participating. Discuss any right-of-way needs.

7. After design approval, distribute plans with a tentative project schedule to the utilities. Also, request submittal of relocation plans with an estimated relocation schedule. All revisions affecting utilities must be sent to the affected utilities.

8. Written documentation is required for all utilities whether relocations are required or not.

9. Review relocation plans and schedules to verify that all conflicts are resolved. At the appropriate time, the LPA or INDOT will provide written notice for the utility to proceed. Hold a meeting, if necessary, to resolve location or constructability issues.

10. Distribute two copies of utility written notice to proceed with approved utility relocation plans to the appropriate INDOT District.

11. Provide for all utilities within the project limits to the Contracts and Construction Division's Contracts Section along with contract documents no later than 90 days prior to the contract letting, the items as follows:

    a. utility contact with telephone number;

    b. utility relocation plans and/or verbal description of relocation if relocation is necessary;

    c. total schedule for relocation, if relocation is necessary, including material delivery, weather restraints, pre-work requirements, coordination issues, need for right-of-way staking and construction time; and

    d. Utility Coordination Certification.

The Utility Coordination Certification, signed by the designer or other person responsible for utility coordination, should state that all utilities within the project limits have been contacted and that the included relocation plans address the relocation of all facilities known to be in conflict with the project. Figure 10-2A shows a Sample Utility Special Provision. Figure 10-2B shows a Utility

Coordination Certification. An editable version of this form may also be found on the Department's website at www.in.gov/dot/div/contracts/design/dmforms/ .

10-2.06 Utility Coordination Process, Design Timeframe of Shorter than 12 Months (Short-Term Project) - Design Phase

The process in this section may only be used for projects which are granted a waiver by the district development engineer, the Design Division's Specialty Projects Group manager, or the Highway-Utility manager. Figure 10-2C shows a Utility Coordination Certification for Short-Term Project which includes the waiver request. An editable version of this form may also be found on the Department's website at www.in.gov/dot/div/contracts/design/dmforms/ .

10-2.06(01) Responsibilities

The typical assignment of responsibility for the steps in Section 1-2.06(02) is as follows:

- Step 1: Party preparing project scope.
- Step 2: Surveyor or designer.
- Steps 3 - 8: Designer. The Design Division's Utilities Unit will be available for advice.

The Utilities Unit is responsible for Steps 3-8 on INDOT bridge rehabilitation projects.

10-2.06(02) Process Steps

The steps for a short-term design project are as follows:

1. The district will identify and include a complete listing of all affected utilities in the project data sheets and preliminary project reports. The locations of the utilities and all significant impacts should be included in the report. If the owner of the utility is evident from field investigation, also include this information in the report.

2. At the time the field survey is being conducted, prepare a list of all existing utilities including names, addresses and phone numbers. Contact these utilities and request that they field-locate their facilities. The field-located facilities should be picked up on the survey and shown in the contract documents. Ensure that each utility has actually field-located its facilities. If a field survey is not conducted, then utility locations should be discussed and verified during the field check (Step 4.) Add verified locations to the plans as appropriate.

Calling the Indiana Underground Plant Protection Service and local utilities for locations prior to the field check may also be desirable when no field survey is conducted.

3. Distribute field check plans to the utilities and invite them to attend the field check(s). Also, see Section 10-2.06(03) for INDOT bridge rehabilitation projects.

4. Conduct field check with the participating utilities. At this time discuss possible conflicts, relocation and any right-of-way needs. Also, see Section 10-2.06(03) for INDOT bridge rehabilitation projects.

5. Distribute plans, after design approval, with tentative project schedule to the utilities, requesting submittal of relocation plans with estimated relocation schedule. Also, see Section 10-2.06(03) for INDOT bridge rehabilitation projects. All revisions affecting utilities must be sent to the affected utilities.

6. Written documentation is required for all utilities whether relocations are required or not.

7. Review relocation plans and issue notice for the utility to proceed.

8. Provide for all utilities within the project limits to the Contracts and Construction Division's Contracts Section along with contract documents prior to the contract letting, the items as follows:

   a. utility contact with telephone number;

   b. utility relocation plans, or verbal description of relocation if relocation is necessary;

   c. total schedule for relocation, if relocation is necessary, including material delivery, weather restraints, pre-work requirements, coordination issues, need for right-of-way staking and construction time; and

   d. Utility Coordination Certification.

   The Utility Coordination Certification, signed by the designer or other responsible person responsible for utility coordination, should state that all utilities within the project limits have been contacted and that the included relocation plans address the relocation of all facilities known to be in conflict with the project. Figure 10-2C shows a Utility Coordination Certification for Short-Term Project.

10-2.06(03) INDOT Bridge Rehabilitation Projects

Bridge rehabilitation projects have unique qualities and benchmarks that prevent them from exactly conforming to the sequence of steps for this process. For bridge rehabilitation projects, there is a field check held for the purpose of preparing an inspection report and there is a field check held near the very end of the plan development process. Neither of these meetings are appropriate times to perform the utility coordination outlined in Section 10-2.06(02), Steps 3 and 4. Once preliminary plans are developed, transmit these plans to the Design Division's Utilities Unit. The number of copies of plans sent for utility coordination must equal the number of utilities plus one copy for the Utilities Unit. The Utilities Unit will then set up a field check to be attended by the utility companies, the designer and a representative from the Utilities Unit. The preliminary plans distributed for the field check are also to be used by the utilities for development of relocation plans and schedule as outlined in Step 5. A second distribution of plans to the utilities as is indicated in Step 5 will not be required.

10-2.07 Utility Coordination Process, Design Timeframe of Shorter than 12 Months (Short-Term Project) - Traffic Signal Project Design Phase

Traffic signal projects have unique qualities and benchmarks that prevent them from exactly conforming to the sequence of steps for the Utility Coordination Process for Short Term Project in Section 10-2.06. Note that Figure 10-2C, Utility Coordination Certification for Short Term Project, will be used for traffic signal projects. The Design Division's Specialty Projects Group manager will sign the waiver.

The steps for a traffic signal project are as follows:

1. The district will identify and include a complete list of all affected utilities and the owners of the utilities in the project data sheets and preliminary project reports. The location of the utilities and all significant impacts should be included in the report.

2. The designer will contact the Indiana Underground Plant Protection Service and local utilities at least once before the preliminary field inspection for locating utilities prior to the field inspection. All utilities are responsible for field-locating their existing facilities. The designer is responsible for ensuring that this happens. Show all utilities on the preliminary field inspection plans. If, in the preliminary field inspection, a utility does not locate its facilities, location of said facilities should be discussed and verified at the final field inspection.

3. The designer will invite all utilities to attend the final field inspection. Send the letter of invitation at least two, and preferably three, weeks before the final field inspection. Provide the design plans to all utilities before or at the final field inspection.

4. Conduct final field inspection with utilities participating. At this time, discuss possible conflicts and relocations and verify locations of utilities. Utility companies must verify the location of their facilities and submit revisions to the designer no later than three weeks after the final field inspection.

5. The designer should request that all utilities needing to relocate facilities submit a utility relocation plan and estimated relocation schedule. The utility should be given at least 30 days to do this. All revisions affecting utilities will be sent to the affected utilities.

6. Written documentation is required for all utilities whether relocations are required or not.

7. Review relocation plans and issue notice for utility to proceed.

8. Provide for all utilities within the project limits to the Contracts and Construction Division's Contracts Section along with contract documents prior to the contract letting, the items as follows:

   a. utility contact with telephone number;

   b. utility relocation plans, or verbal description of relocation if relocation is necessary;

   c total schedule for relocation, if relocation is necessary including material delivery, weather restraints, pre-work requirements, coordination issues, need for right-of-way staking and construction time; and

   d. Utility Coordination Certification.

   The Utility Coordination Certification, signed by the designer, should state that all utilities within the project limits have been contacted and that the included relocation plans address the relocation of all facilities known to be in conflict with the project. Figure 10-2A shows a Utility Coordination Certification for Short Term Project.

10-2.08 Complete Waiver of Process

Projects for work such as herbicide, mowing, raised pavement markers, traffic striping, sweeping, etc., which normally have no utility involvement may be granted a complete waiver from the utility coordination processes. This waiver must be signed for approval by the district development engineer, the Design Division's Specialty Projects Group manager or the Highway-Utility manager. See Figure 10-2D, Utility Coordination Certification Waiver form. An editable version of this form may also be found on the Department's website at www.in.gov/dot/div/contracts/design/dmforms/ .

10-2.09 Level of Effort

10-2.09(01) Process Steps

The listed step number corresponds to the step number of the Utility Coordination Process for long-term design projects described in Section 10-2.05. Note that discussion can also be applied to Sections 10-2.06 and 10-2.07 for short-term projects. The level of effort required for each step is described below:

1. Step 1. Provide a general description of the location of all visible utilities in the report. If the owner of the utility facility is evident in the field, include this information in the report. Also, it might be obvious that there are other utilities in an area but there might not be visible appurtenances. In this case, contact the applicable local government unit, the appropriate district office or the Design Division's Highway-Utility Manager to obtain the name of the utility so that a description of the location of the facilities can be given in the report. All significant impacts or concerns involving utilities must be described. Research required beyond what can de done in the field to obtain utility locations and names should be kept to a reasonable minimum. The intent of this step is not to have the writer of the report spend a significant amount of office time doing utility research.

2. Step 2. All utility facilities must be located and shown on the plans. Compile a list of all existing utilities including names, addresses and phone numbers. Use the list of utility owners supplied in the preliminary project report as a starting point for this step. Contact the Underground Plant Protection Service (Holey Moley) for a list of underground utilities in the area. Not all utilities subscribe to this service, so the records at the county courthouse also must be checked. All underground utilities are listed with the county recorder. This listing is arranged by civil townships.

   All utilities identified must be contacted to field locate their facilities in order that they may be picked up by the survey crew. If, upon arrival at the site, it is discovered that a utility has not responded to the request, contact the utility immediately at least one more time to provide this service. If the utility's representative marks its facilities prior to the survey crew leaving the site, then the survey crew should note these markings. If the utility's representative does not mark its facilities prior to the survey crew leaving the site, then there is nothing else the survey crew must do. Unresponsive and uncooperative utilities or location providers should be documented.

3. Steps 3 and 4. All utilities must be sent plans and invited to attend the coordination meeting. It is up to the utility to attend or not. It is recommended, however, to contact by telephone and advise each utility that will have significant involvement in the project to attend the meeting.

4. Steps 5 and 6. All utilities should be sent plans and invited to attend the preliminary field check. It is up to the utility to attend or not. It is recommended to contact by telephone and advise each utility that will have significant involvement.

5. Steps 7-10. A response from each utility is required. The effort required for these steps are the hardest to define in terms of what is required to comply with the intent of the coordination process when there is an unresponsive utility. The level of effort required for coordination depends upon the factors as listed earlier. Because each situation can be unique, no specific guidelines have been established. However, Section 10-2.09(02) provides examples which show what levels of effort should be used to obtain a response from the utility.

   If an unresponsive utility is encountered, it will be up to the utility coordinator to assess the situation and determine what level of effort and what steps should be taken to meet the intent of these guidelines. The utility coordinator should also note the following:

   a. If unable to make contact with a utility, ensure the proper person is being contacted and that the telephone number is correct.

   b. If at least one other individual is known at the utility, consider contacting that individual to determine how to get cooperation from the unresponsive individual.

   c. Provide reasonable time frames for relocation plan return dates. For large road projects or other projects with major utility involvement, utilities should be sent plans to develop their relocation plans at least a year in advance of the ready-for-letting date. For all other projects (excluding short-term projects), plans should be sent at least six months in advance of the ready-for-letting date when asking for relocation plans. For short-term projects, because it is not possible to give the utilities a long advance notice, make every effort to provide the utility with a reasonable amount of time to respond to your request.

6. Step 11. The information to complete this step should have been obtained in the previous steps. Therefore, supply this information to the proper personnel.

10-2.09(02) Examples

The following examples are provided to show what level of effort should be used to address an unresponsive utility:

Example 10-2.1 Several power poles are located within the project limits. From field observations it is apparent that neither the poles nor the lines attached to them should conflict with the project. In this case, all facilities are visible and a reasonably accurate decision may be made that no conflict exists. Thus, if the utility does not respond to the letter sent, it would not be productive to try to contact it more than two or three times to elicit a reply. If no response is ever received from the utility, a letter should be sent to the utility notifying it that the assumption is being made that there is no conflict with its facilities and that it will be liable for any delay to the project if there is a conflict. Or, at a minimum, documentation of the attempted communication should be kept in case a problem later develops.

Example 10-2.2 A cable TV line is attached to poles owned by an electric company. The electric company will be moving its poles to accommodate construction of the project. The cable TV company has not provided relocation plans even though it has been contacted twice after the letter requesting relocation plans was sent. In this case, it appears fairly obvious that the cable company will have to move with the electric company, but it just will not respond to the request to submit a letter that this is what it intends to do. A notice to proceed with relocation should be sent to the utility. This notice should include a statement that the utility will be liable for any delay to the project if it does not relocate in a timely manner.

Example 10-2.3 An overhead telephone line is present within the project limits. It is apparent that the poles will be in conflict with the project. The utility has not submitted its relocation plans by the date requested. The utility has been called twice since that date and has not responded back with plans or reason on why its submission is late.

Because a conflict is evident, make every effort to contact the utility by telephone or other means. If after trying to contact the utility up to four or five more times over a period of a month, and a response has still not been received, a letter from the highway agency that owns the project should be sent notifying the utility that its facilities are in conflict with the project and that action will be taken against the utility if it does not proceed with developing its plans and relocating its facilities.

If no response is received after this, then the matter should be turned over to the highway agency (project owner) to pursue with its attorneys or however it deems necessary. At this point, the utility coordinator has fulfilled his/her obligations in this matter. The only further obligation would be if the utility does respond and submits plans. Then the coordinator would have to resume

his/her coordination per normal procedures. The Design Division's Highway-Utility Manager may also be contacted for advice in such matters.

Example 10-2.4

A water main exists within the limits of a road project. The line is known to run the length of the project either under or near where new pavement will be placed. No other details of location of the main or service lines are known. In this case, it is not known if there is a conflict or not. Whether there is a conflict or not would depend on the location and condition of the main and the service lines.

The utility has not submitted its relocation plans by the date requested. The utility coordinator has contacted the utility and was told that the utility "would get right on it and have plans submitted within two weeks." Three weeks have passed and relocation plans have still not been received. During the next three weeks, five telephone messages have been left with the utility, but none of the calls has been returned.

In this case, it is necessary to obtain a response from the utility due to the possible consequences if a conflict exists. A letter from the highway agency that owns the project must be sent notifying the utility that its facilities are likely in conflict with the project and action will be taken against the utility if it does not proceed with developing its plans and relocating its facilities. If no response is received, then the utility coordinator has fulfilled his/her obligation and this matter should be turned over to the highway agency (project owner) to pursue.

Example 10-2.5

A high-pressure gas transmission line crosses under the road at one location within the limits of a road project. It appears that there might not be a conflict because only minimal work is being done above the pipeline. However, there will be a need for heavy construction machinery to traverse over top of the area where these lines are located during construction.

The utility has been contacted but has indicated that it is too busy to spend the time to review the project plans and make an assessment of the situation. The utility has indicated that it will be at least 6 months before it will have a chance to do a review. Unfortunately, this is not in accordance with the schedule for the highway project.

Even though the utility's facility is present only at a spot location, due to the type of utility facility involved, a response would be necessary from this utility. Also, gas transmission and other pipeline utilities have stringent regulations that sometimes result in relocations where it might not be readily

apparent that there would need to be one. Pipeline relocations can also tend to be costly, take a considerable amount of time and be subject to seasonal constraints. Thus, it would be beneficial to receive an early response from the utility.

In this case, the utility is communicating, but it is not willing to meet the highway project schedule due to its own priorities. In this case, it would be best to inform the utility why it is to its advantage to spend some time to at least perform an analysis to see if a conflict exists or not. For instance, if a conflict is identified early enough, then the project plans or special provisions could be altered to accommodate the utility without the utility having to make any adjustment to its facilities. If the utility waits until the last minute, there will be much less flexibility to make changes. Therefore, a short amount of time spent now could save a large amount of time and hassle later. It is always best to try to demonstrate to the utility the advantages of coordinating in a timely manner. Giving the utility (or anyone for that matter) an incentive to do something is the best way to get cooperation.

If the incentive method doesn't work, then more forceful methods would need to be pursued as listed in the Examples 10-2.3 and 10-2.4.

10-3.0 UTILITY ACCOMMODATION POLICY

10-3.01 Introduction

10-3.01(01) Purpose

The policies and principles in this section should be used to control the utility occupancy of all public highway rights-of-way, including easements, under INDOT's jurisdiction. This includes local public agency projects which use Federal funds administered by INDOT.

INDOT has the responsibility to maintain highway right-of-way under its jurisdiction as necessary to preserve the integrity, operational safety and function of the highway facility. Because the manner in which utilities cross or otherwise occupy highway right-of-way can materially affect the appearance, safe operation and maintenance of the highway, it is necessary that this use and occupancy be authorized and reasonably regulated.

These policies are provided to develop and preserve a safe roadside and to minimize possible interference and impairment to the highway, its structures, appearance, safe operation, construction and maintenance.

10-3.01(02) Application

This policy applies to all public and private utilities including electric power, telephone, telegraph, cable television, water, gas, oil, petroleum products, steam, chemicals, sewage, drainage, irrigation and similar lines that will be located, adjusted or relocated within the rights-of-way of highways under the jurisdiction of INDOT. These utilities may involve underground, surface or overhead facilities, either singularly or in combination.

10-3.01(03) Scope

This policy is provided by INDOT for use in regulating the location, design and methods for installing, adjusting, accommodating and maintaining utilities on highway right-of-way. It is limited to matters which are the responsibility of highway authorities for preserving the integrity of the highway and its safe operation.

Where laws or orders of public authority (such as the Indiana Utility Regulatory Commission, the Indiana State Board of Health, or the requirements of the Federal Natural Gas Pipeline Safety Act of 1968), industry or governmental codes prescribe a higher degree of protection or standards than those described herein, then the higher degree will prevail.

10-3.01(04) Other Requirements

All utility installations and construction must comply with the requirements contained herein, the INDOT *Standard Specifications*, the *Manual on Uniform Traffic Control Devices*, and the clear zone requirements described in Chapter Forty-nine.

10-3.01(05) Exceptions

Throughout this policy, there are several instances where the phrase “exceptions may be permitted in accordance with Section 10-3.01(05)” is used. These denote where INDOT tends to receive the most requests for exceptions to this policy. However, exceptions to not only these provisions, but

any provision contained in this section may be authorized by the INDOT Chief Engineer, where it is demonstrated that extreme hardship or unusual conditions provide justification and where alternative measures can be prescribed to fulfill the intent of this policy. All requests for exceptions must include an evaluation of the direct and indirect design, environmental and economic effects, including impacts on agricultural lands, which would result if the installation is permitted and a comparison to the results if it is not permitted, plus any other pertinent information.

10-3.01(06) Prior Instructions

This policy supersedes and replaces all policies or portions of policies pertaining to the accommodation, location and methods of utility installations, adjustments and maintenance which are in conflict.

10-3.02 Definitions

The following definitions apply to utility accommodation.

1. Utility. This term applies to all publicly, privately or cooperatively owned lines and/or their accessories within the highway right-of-way except those used for highway-oriented needs. Such utilities may involve underground, surface or overhead facilities either singularly or in combination. The term utility, when capitalized, also includes the utility company, including any wholly owned or control subsidiary. Public utilities are generally considered those which convey a product, power or communication from the Utility to a customer. Private lines are generally considered those which are devoted exclusively to private use.

2. Low-Volume Highways. Any non-limited-access highway which carries traffic volumes of 750 vehicles per day or less and, if known, upon which the projected traffic volume at the design year is not anticipated to exceed 1300 vehicles per day.

3. Highway-Utility Unit. The unit in the Design Division responsible for identifying potential utility conflicts in highway projects and coordinating with those utility companies to make adjustments or relocations as needed.

4. Permits Unit. The unit in the Contracts and Construction Division responsible for issuing permits to Utilities for the construction, rebuilding or repair of utility lines and facilities on highway right-of-way.

5. Relocation Permit. The written permission provided to a Utility by the Highway-Utility Unit and/or district office which allows the Utility to relocate existing facilities to accommodate highway construction or maintenance.

6. Right-of-Way Permit. The written permission by INDOT which allows the use and occupancy of highway right-of-way for utility lines and/or facilities.

7. High- And Low-Pressure Gas. High-pressure gas lines are those which are generally operated at a pressure in excess of 60 psi. Low-pressure gas lines are those which operate at 60 psi or less.

8. Pavement Structure. The combination of the surface, intermediate, and base courses, subbase, and up to 8 in. of stabilized subgrade material which supports the traffic load and distributes it to the roadbed. A maximum of 8 in. of subgrade stabilization will be considered a part of the pavement structure.

9. Highway, Street or Road. A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

10. Roadway. The portion of a highway, street or road, including shoulders, intended for vehicular use. A divided highway has two or more roadways.

10-3.03 General

10-3.03(01) Permits

Public utilities have a qualified right to occupy public right-of-way, subject to the control of INDOT or other agencies with jurisdiction of the right-of-way. This control is exercised by requiring a right-of-way permit for each point or area of use by a utility facility. This will ensure compliance with the standards, policies and methods promulgated by INDOT and will make possible the safe control of traffic movement, safety and coordination of work with other utilities and highway maintenance or construction work.

INDOT procedures divide processing utility occupancy requests into two categories as follows:

1. Utility Initiated. When a Utility wants to install new facilities or adjust existing facilities within highway right-of-way. The Utility must obtain a permit through the appropriate district or subdistrict office. A fee is charged for the permit.

2. Highway Initiated. When a Utility must be relocated or adjusted to accommodate proposed highway construction, reconstruction or maintenance. This work is coordinated by the Highway-Utility Unit or the appropriate district office.

   Normally, all utility facilities within the existing and/or proposed right-of-way are identified while the highway project is in the design stage. All affected Utility companies receive plans of the proposed highway construction and are notified when relocation is necessary. The Utility must coordinate relocations with and obtain relocation permits from the Highway-Utility Unit or the appropriate district office. No fee is charged for these permits.

   If the Utility does not complete its adjustments or relocations in a timely manner, INDOT may claim damages from the Utility for delay of highway work. In the event of delay, INDOT may also perform the necessary work itself or through a contractor and bill the Utility for all costs associated with this work.

The Utility must identify and obtain any other necessary permits or authorizations for the installation, which may be required from the U.S. Army Corps of Engineers, the Indiana Department of Natural Resources, railroads or others. INDOT may require the Utility to produce satisfactory evidence that these permits and authorizations have been obtained.

10-3.03(02) Driveway Conflicts

Construction, reconstruction, modification or relocation of private drives on highway right-of-way may also require adjustment or relocation of utility facilities. Where the work on the drive is initiated by and/or incidental to a highway project, the adjustment or relocation of the utility will be treated like any other highway-initiated work.

Where the work on the drive is initiated by a private owner, subject to INDOT approval, INDOT is not responsible for identifying or resolving any conflicts between the drive and utilities. If a conflict exists and there is no other practical location for the drive, then the Utility must be adjusted or relocated. The division of costs, if any, for this work will be resolved between the Utility and the owner of the drive.

10-3.03(03) Private Lines

Because private lines serve only the owner, it is generally not in the public interest for them to be located within highway right-of-way. Longitudinal installations of private lines are not permitted. Exceptions may be made in accordance with Section 10-3.01(05) where a public interest can be

demonstrated. Crossings of highway right-of-way by private lines may be allowed subject to INDOT control. Private line installations must conform to all other applicable requirements contained herein.

10-3.03(04) Service Lines

Service lines are a special class of private lines. Whether the public utility facility is on or off highway right-of-way, the sole reason for a service line to be on highway right-of-way is to facilitate its connection with a public utility. Because it is in the interest of both the customer and Utility to have these connections, service lines are permitted on highway right-of-way whenever practical.

There is a wide variation among Utility companies on the division of ownership, costs and responsibility between the Utility and customer for the portion of the service line on highway right-of-way. INDOT neither seeks nor desires to regulate this relationship. However, because the Utility clearly benefits from these service lines and, as a practical consequence of effectively regulating utility occupancy of highway right-of-way, the Utility must at a minimum co-sign any service line permit. Each Utility must determine the proper division of costs, if any, with each customer.

10-3.03(05) Access Control

INDOT has the authority to control and regulate access to all highways under its jurisdiction. A large public investment has been made to construct and maintain a safe and efficient highway system. A major objective is to limit interference with vehicles or pedestrians which are entering, exiting or crossing the highway. Access control generally includes three categories as follows:

1. Non-Limited Access. INDOT has the authority to regulate the location and details of access which affect the safe operation of the highway, but the Department has not purchased access control rights from adjoining properties. This level is typical of most highways with frequent driveways and intersections.

2. Partial Limited Access. INDOT has declared or purchased access control from adjoining properties. Access is controlled to give preference to through traffic, but there may still be some intersecting streets at grade and some driveway connections. This level is typical of many divided highways with some intersections and driveways.

3. Full Limited Access. INDOT has purchased access control rights from adjoining properties. Access is controlled to give priority to through traffic by providing access only from selected

public roads, by prohibiting crossings at grade and by prohibiting driveway connections. This level is typical of Interstate highways and some divided highways.

The type of access control is not always apparent from visual inspection. The appropriate INDOT district office should be contacted to confirm the type of control in effect for specific locations. This determines the type and extent of utility installations which may be permitted. The access control line is the limit at which access is physically controlled for limited access right-of-way. The access control line is normally but not always the same location as the right-of-way line.

10-3.03(06) Location

The following applies to the location of utilities.

1. Utility lines must be located to avoid or minimize the need for adjustment for future highway improvements and to permit access to the utility lines for their maintenance with minimum interference to highway traffic. Full consideration must be given to the measures necessary to preserve and protect the maintenance, operation, safety and aesthetic characteristics of the highway.

2. Utility installations on urban streets with closely abutting improvements are special cases which must be resolved consistent with the prevailing limitations and conditions.

3. Utilities should cross roadways at right angles or as nearly as practical to right angles. Reasonable latitude may be exercised for existing utilities which are otherwise qualified to remain in place.

4. Underground utility crossings which are encased should be constructed in a manner that allows for replacement of the line within the existing encasement in case the existing line ruptures.

5. For utility crossings on limited access highways, all supporting structures and above ground appurtenances should be located outside the access control line and, preferably, outside the right-of-way line. Installation and maintenance must be from non-limited access frontage roads, crossroads and streets whenever practical or otherwise from outside the access control line and, preferably, outside the right-of-way line of the through traffic roadway. Occasional exceptions may be allowed in accordance with Section 10-3.01(05) for an unusually wide right-of-way or median.

6. Longitudinal installations must be located on uniform alignment as near as practical to the right-of-way line to provide space for future highway construction and for possible future

utility installations. Where irregularly shaped portions of the right-of-way extend beyond the normal right-of-way limits, variances in the location from the right-of-way line may be allowed as necessary to maintain a reasonably uniform alignment for longitudinal utility installations. Above ground longitudinal installations are not permitted in highway medians.

7. Longitudinal installations on highways with partial access control are generally discouraged. Occasional installations may be allowed in accordance with Section 10-3.01(05) and the following conditions:

   a. Individual service connections will be permitted only when no other reasonable alternative exists. Factors to be considered include distance between distribution points, terrain, cost and prior existence.

   b. Utility maintenance points, such as manholes, must be installed outside of the right-of-way whenever practical.

8. Longitudinal installations on highways with full access control are not permitted. Exceptions may be allowed in accordance with Section 10-3.01(05) and the following conditions:

   a. Individual service connections must not be permitted.

   b. The utility must not be installed or serviced by direct access from the limited access roadways or connecting ramps.

   c. The utility must not interfere with or impair the safety, design, construction, operation, maintenance, stability or future expansion of the highway.

2. Wireless telecommunication towers may be permitted in highway right-of-way with partial or full-access control in accordance with Section 10-3.06.

10-3.03(07) Design

The following applies to the design of utilities.

1. The Utility must be responsible for the design of the utility facility to be installed within the highway right-of-way or attached to a highway structure. Full consideration must be provided to the measures necessary to preserve and protect the maintenance, operation, safety and aesthetic characteristics of the highway.

2. Utility installations on, over, or under the highway right-of-way must, at a minimum, meet the requirements as follows:

   a. Electric power and communication facilities must conform with the currently applicable National Electric Safety Code;

   b. Water lines must conform with the currently applicable specifications of the American Water Works Association;

   c. Pressure pipelines must conform with the currently applicable sections of the American National Standards Institute (ANSI) Code for Pressure Piping; 49 CFR Parts 192, 193 and 195; and any applicable industry codes;

   d. Liquid petroleum pipelines must conform with the currently applicable recommended practice of the American Petroleum Institute for pipeline crossings under railroads and highways; and

   e. Any pipeline carrying hazardous materials must conform to the rules and regulations of the U. S. Department of Transportation governing the transportation of such materials;

3. All utility installations on, over or under highway right-of-way and attachments to highway structures should be of durable materials designed for a long service life expectancy and relatively free from routine servicing and maintenance.

4. On new installations or adjustments of existing utility lines, provisions should be made for known or planned expansion of the utility facilities, particularly those located underground or attached to bridges. They should be planned to minimize hazards and interference with highway traffic when additional overhead or underground lines are installed at some future date.

5. Utility lines which are attached to highway bridges and separation structures must have shut-off valves, automatic where practical, installed at or near the ends of the structure, unless segments of the lines can be isolated by other devices within a reasonable distance.

10-3.04 Structures

10-3.04(01) Utility Structures

Where it would be more economical to carry one or several utility lines across a highway in a tunnel or on a bridge rather than in separately trenched and encased crossings, consideration should be given to using a separate structure specifically for the utility crossing. Such a structure may serve a joint purpose as a utility and pedestrian facility and/or sign support structure.

The Utility companies must agree that any maintenance, servicing or repair of the utility lines will be their responsibility. Further, the cost of designing, constructing and maintaining the utility tunnel or bridge must be divided among the Utilities in an agreed, equitable manner. INDOT will participate in these costs only to the extent that the utility would otherwise normally be reimbursable for such work or to the extent that the structure is also used for highway purposes.

10-3.04(02) Highway Structures

The following applies to the attachment of utilities to highway structures.

1. The attachment of utility lines to highway bridges and separation structures is discouraged. Such attachments can materially affect the durability and load capacity of the structure, the safe operation of traffic, the ease of maintenance and the overall appearance.

2. Exceptions may be permitted in accordance with Section 10-3.01(05) and the following criteria. Each attachment will be considered individually and must not be considered a precedent for granting of any subsequent requests for attachment.

    a. Communication Lines. Where it is impractical to carry a communication line across a stream or other obstruction, INDOT may permit attachment of the line to its bridges. On existing bridges these lines must generally be carried in conduits and located so as not to interfere with stream flow, traffic or routine maintenance operations. When a request is made prior to construction of a bridge, suitable conduits will be provided in the structure if the Utility bears the cost of all additional work and materials involved and all other applicable requirements have been met.

    b. Gas and Petroleum Lines. Lines carrying these and other hazardous, explosive or highly pressurized or heated materials must not be attached to structures except in cases of extreme hardship. In no case will they be installed where they can be impacted by traffic on or under the bridge, nor where a leak could flood a roadway on or under the bridge.

    c. Power Lines. High voltage power lines must not be attached to structures except in cases of extreme hardship. Low voltage may be attached where the cost of other

solutions is prohibitive. Power lines will not be installed where they can be impacted by traffic on or under the bridge.

d. Water and Sewer Lines. These lines must not be installed where they can be impacted by traffic on or under the bridge nor where a leak could flood a roadway on or under the bridge.

e. Structural Analysis. All requests to attach pipelines to an existing bridge must be accompanied by sufficient information to determine the effect of the added load on the structure. If the bridge does not have sufficient strength to carry the loads with an adequate margin of safety, the request will be denied. Where the request is to attach lines within or to a new structure, the Utility will be responsible for any increase in the cost of the structure to support the extra loads of the pipeline, including any increase in the size or thickness of members necessary to contain lines or conduits installed within the structure.

f. Attachment Details. All requests for attachments must be accompanied by sufficient details of the manner and type of attachment to allow for adequate review and approval by INDOT.

g. Asbestos Materials. Materials contain asbestos shall not be used on any utility lines attached to a highway structure. Where a utility is located on a highway structure, the Utility company shall submit to INDOT on Utility letterhead, a signed, dated copy of the statement as follows:

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

In addition, the Contractor's contract should include the statement as follows:

> *Before final payment of the contract price, the Engineer will sign and submit to INDOT, on the Contractor's letterhead, a dated copy of the following statement:*
>
> *I hereby certify that to the best of my knowledge no asbestos containing material was used as a building material during this project.*

3. Any time that an attachment must be relocated to accommodate highway work or safety, the Utility must apply for a new attachment. Prior existence will not be a basis for reattachment.

10-3.05 Pipelines

10-3.05(01) General

1. Methods of Protection.

   a. General. All pipelines must provide sufficient strength to withstand internal design pressures and must be of satisfactory durability under the conditions to which they may be subjected and must meet any other applicable codes or industry standards for the type of pipeline and material being transmitted.

   b. Encased. Encasement must consist of a pipe or other separate structure around and outside the carrier line and should be designed to support the superimposed loads of the roadway, traffic and construction equipment. Casing strength must meet or exceed the structural requirements for drainage culverts. Casing materials must be of satisfactory durability under the conditions to which they may be subjected. Highway crossings must generally be encased in the interest of safety, protection of the highway and utility, and access to the utility.

      Where casing is used, it must be provided under center medians, from top of backslope to top of backslope for cut sections, 5 ft beyond the toe of slope under fill sections, 5 ft beyond face of curb in urban sections and 5 ft beyond any structure which the line passes under or through. Encasement may be omitted under medians which are substantially wider than normal standards for such roadways.

   c. Non-Encased. Non-encased pipelines must provide sufficient strength to withstand internal design pressures and the superimposed loads of the roadway and traffic, including that of construction equipment. Non-encased highway crossings must comply with the requirements herein for each type of utility.

2. Manholes, Vaults and Pits. This type of access must be limited to those necessary for installation and maintenance of underground lines. They must generally be directly in line with the utility facility and of the minimum width and length to accomplish their intended function and comply with any other necessary codes or requirements. They must generally not be placed or permitted to remain in place in the pavement or shoulders of any high-volume roadway. Exceptions in accordance with Section 10-3.01(05) may be permitted for roadways in urban areas in cases of extreme hardship. They may also be placed or permitted to remain in place under traffic lanes of low-volume roadways in urban areas provided steps are taken to minimize these installations and to avoid their location at intersections as practical. They must be installed flush with the roadway or ground surface and must be of

sufficient strength to withstand the superimposed loads of the roadway, traffic and construction equipment.

3. Depth. As used herein, depth of cover must be to the top of the pipe if non-encased or otherwise to the top of the casing. The depth of underground lines must be as specified herein for each type of utility. Where placements at these depths are impractical or where unusual conditions exist, exceptions to permit other types of protection may be approved as appropriate.

4. Methods of Installation. Underground lines to be installed across any existing roadway must be installed by boring, tunneling or jacking in accordance with INDOT specifications. When installed by jacking or boring, encasement may be required. Bore pits should generally be located at least 30 ft from the edge of the nearest through traffic lane and not less than 20 ft from the edge of pavement on ramps. On low-traffic roadways and frontage roads, bore pits should not be less than 10 ft from the edge of pavement or 5 ft from face of curb. Adequate warning devices, barricades and protective devices must be used to prevent traffic hazards. Where circumstances necessitate the excavation of a bore pit closer to the edge of pavement than established above, concrete barrier rail or other approved devices must be installed for protection of traffic in accordance with INDOT criteria (see Chapter Eighty-two). Bore pits must be located and constructed to not interfere with highway structural footings. Shoring must be used if necessary.

5. Locations. Unsuitable or undesirable locations must be avoided. These include locations as follows:

   a. deep cuts;

   b. near footings of bridges or other highway structures;

   c. across at-grade intersections or ramp terminals;

   d. at cross-drains where flow of water, drift or stream bedload may be obstructed;

   e. within basins or an underpass drained by a pump if the pipeline carries a liquid or liquefied gas; and

   f. in wet or rocky terrain where minimum depth of cover would be difficult to attain.

6. Clearances. Vertical and horizontal clearances between a pipeline and a structure or other highway or utility facility should be sufficient to permit maintenance of the pipeline and the other facilities.

7. Materials. All pipelines and casings must provide sufficient strength to withstand the internal design pressure and the dead and live loads of the backfill, pavement structure and traffic, including construction equipment.

10-3.05(02) High-Pressure Gas and Liquid Petroleum Lines

1. Depth of Cover. All lines that are not under or within 5 ft of the roadway must have a minimum depth of cover of 2.5 ft for encased lines and 3 ft for non-encased lines.

   All lines which are under or within 5 ft of the roadway must have a minimum depth of cover under the pavement surface of 2.5 ft for encased lines and 4 ft for non-encased lines. Further, all lines must be a minimum of 18 in. or one half the diameter of the pipe or casing beneath the pavement structure, whichever is greater.

   All lines must have a minimum depth of cover of 4 ft under ditches.

   Exceptions may be authorized for existing lines to remain in place with a reduction of 6 in. in the depths of cover specified above. Further reductions may be permitted if the pipeline is protected by a reinforced concrete slab which meets the following requirements.

   a. Width. Three times the pipe diameter but not less than 4 ft.
   b. Thickness. Minimum of 6 in.
   c. Reinforcing. Minimum of #4 bars on 12-in. centers, or equivalent.
   d. Cover. Minimum of 6 in. between the slab and top of pipe.

2. Crossings. These may be encased or non-encased. However, only welded steel lines with adequate corrosion protection may be used for non-encased highway crossings.

3. Vents. One or more vents must be provided for each casing or series of casings. For casings longer than 150 ft, vents should be provided at both ends. On shorter casings, a vent should be located at the high end with a marker placed at the low end. Vents must be placed at the right-of-way line immediately above the pipeline and situated to not interfere with highway maintenance and to not be concealed by vegetation. Ownership of the lines must be shown on the vents.

4. Markers. The Utility must place a readily identifiable and suitable marker immediately above any high-pressure gas or liquid petroleum line where it crosses the right-of-way line, except where marked by a vent.

10-3.05(03) Low-Pressure Gas

1. Depth of Cover. All lines that are not under or within 5 ft of the roadway must have a minimum depth of cover of 2.5 ft for encased lines and 3 ft for non-encased lines.

   All lines which are under or within 5 ft of the roadway must have a minimum depth of cover under the pavement surface of 2.5 ft for encased lines and 4 ft for non-encased lines. Further, all lines must be a minimum of 18 in. or one half the diameter of the pipe or casing beneath the pavement structure, whichever is greater.

   All lines must have a minimum depth of cover of 4 ft under ditches.

   Exceptions may be authorized for existing lines to remain in place with a reduction of 6 in. in depths of the cover specified above.

2. Crossings. These may be encased or non-encased. Non-encased crossings must be welded steel construction with adequate corrosion protection or plastic lines with no joints under or within 5 ft of the roadway.

3. Vents. One or more vents must be provided for each casing or series of casings. For casings longer than 150 ft, vents should be provided at both ends. On shorter casings, a vent should be located at the high end with a marker placed at the low end. Vents must be placed at the right-of-way line immediately above the pipeline and situated to not interfere with highway maintenance and to not be concealed by vegetation. Ownership of lines must be shown on the vents.

4. Markers. The Utility must place a readily identifiable and suitable marker immediately above any low-pressure gas line where it crosses the right-of-way line, except where marked by a vent.

5. Plastic Lines. The maximum size of plastic lines must not exceed industry standards, which is currently 6 in. to 8 in. Where plastic pipe is installed without a metallic casing, a metal wire must be installed concurrently or other means provided for detection purposes.

6. Location Exceptions. In urban areas, existing longitudinal lines which can be maintained without violating access control and which are not under the pavement or shoulder of any existing roadway or potential future improvements may remain in place provided that all other requirements are met and provided that measures are taken to minimize any future need for cutting the pavement to make service connections on any high-traffic roadway.

10-3.05(04) Water Lines

1. Depth of Cover. All lines that are not under or within 5 ft of the roadway must have a minimum depth of cover of 2.5 ft.

   All lines which are under or within 5 ft of the roadway must have a minimum depth of cover under the pavement surface of 4 ft. Further, all lines must be a minimum of 18 in. or one half the diameter of the pipe or casing beneath the pavement structure, whichever is greater.

   All lines must have a minimum depth of cover of 3 ft under ditches.

   Exceptions may be authorized for existing lines to remain in place with a reduction of 6 in. in the depths of cover specified above.

2. Crossings. All crossings must be encased, except service lines of 2 in. diameter or less. Encasement under entrances may be omitted in consideration of the type and amount of traffic and the depth, condition and maintenance responsibility.

3. Plastic Lines. Where plastic pipe is installed without a metal casing, a metal wire must be installed concurrently or other means provided for detection purposes.

4. Location Exceptions. In urban areas, existing longitudinal lines which can be maintained without violating access control and which are not under the pavement or shoulder of any existing roadway or potential future improvements may remain in place provided that all other requirements are met and provided that measures are taken to minimize any future need for cutting the pavement to make service connections on any high-traffic roadway.

5. Appurtenances. Meter pits, sprinkler pits, regulator pits and other such features must not be located within highway right-of-way. Exceptions may be allowed for existing facilities if they do not interfere with proposed highway construction, maintenance, operation or safety.

6. Drains. One or more drains must be provided for each casing or series of casings. The drains should outlet outside of the roadway area to a natural drainage feature or roadway ditch.

7. Markers. The Utility must place a readily identifiable and suitable marker immediately above any water line where it crosses the right-of-way line.

10-3.05(05) Sanitary Sewer Lines

1. Depth of Cover. All lines that are not under or within 5 ft of the roadway must have a minimum depth of cover of 2.5 ft.

   All lines which are under or within 5 ft of the roadway must have a minimum depth of cover under the pavement surface of 4 ft. Further, all lines must be a minimum of 30 in. or one half the diameter of the pipe or casing beneath the pavement structure, whichever is greater.

   All lines must have a minimum depth of cover of 3 ft under ditches.

   Exceptions may be authorized for existing lines to remain in place with a reduction of 6 in. in the depths of cover specified above.

2. Crossings. Lines to be operated under pressure or which do not conform to the material, strength or cover depths contained herein must be encased. Encasement under entrances may be omitted in consideration of the type and amount of traffic, depth, condition and maintenance responsibility.

3. Materials. New and relocated sewer lines may be of any material which has been proven to be of satisfactory strength and durability in local use, provided all other requirements are met.

4. Non-Metallic Lines. Where non-metallic lines are installed without a metallic casing, a durable metal wire must be installed concurrently or other means provided for detection purposes.

5. Location Exceptions. Except where relocation is necessary to clear existing lines from structures or other highway appurtenances or for other specific reasons, INDOT may permit existing lines to remain in place at any location except longitudinally under through traffic lanes or ramps of limited access highways, provided the line is of satisfactory quality and depth, manholes are adjusted as needed and provisions are made to ensure that any future service lines will not violate access control limits or disturb the roadway.

10-3.06 Overhead Power and Communication Lines

10-3.06(01) General

1. Type of Construction. Longitudinal lines shall be limited to single pole construction. Transverse lines shall be limited to single pole construction where practicable, but may also

be approved to use the same type of support as used on the portion of the line immediately adjacent to the highway right-of-way provided all other requirements herein are met.

2. Vertical Clearances. Except as noted in Item 3c below, the minimum vertical clearance for overhead communication and power lines above the highway shall be not less than 18 ft, or greater if required by the National Electric Safety Code or other laws and regulations.

3. Location.

   a. In rural areas and at uncurbed sections in urban areas, poles supporting longitudinal lines shall be located on a uniform alignment as far from the roadway as possible. Guy wires placed within the right-of-way shall be held to a minimum and should normally be in line with the pole line. Other locations may be permitted for guy poles and wires, but in no case shall they be located within the specified clear zone. At curbed sections, in urban areas, poles shall be located as far as practical behind the outer curbs and preferably adjacent to the right-of-way line, but in all cases shall provide at least 1.5 ft clearance behind the face of existing curbs and 2 ft behind the face of proposed curbs.

   b. At crossings, no poles will be permitted in the center median or more than 3 ft inside the right-of-way line where practical. Exceptions may be allowed where the cost of spanning an extreme width is excessive and where poles can be located in accordance with the intent and other provisions of this policy.

   c. The horizontal and vertical location of overhead power and communication lines relative to a highway bridge or other structure shall provide adequate clearance for construction and maintenance activities, wherever practical.

4. Clear Roadside. All new utility pole installations and other above ground obstructions shall be located outside of the appropriate clear zone (see Chapter Forty-nine). If the clear zone extends to the right-of-way line, then no installation will be permitted unless approved in accordance with Section 10-3.01(05). Existing installations must be relocated to outside of the clear zone (see Chapter Forty-nine) or obstruction-free zone (see Chapter Fifty-five), whichever is applicable, where they are found within the project limits.

   Guy wires to ground anchors and stub poles shall not be placed between a pole and the traveled way where they encroach upon the clear zone.

10-3.06(02) Telecommunication Towers

1. Applicability. This section applies specifically to telecommunication towers placed within highway right-of-way as part of resource sharing projects. These towers will typically occupy space within Interstate-route limited-access rights-of-way. Telecommunication towers that are not a part of a resource sharing project will not be permitted to occupy Interstate-route limited-access right-of-way. A resource-sharing project is herein defined as a project undertaken by the State of Indiana and a telecommunications provider to achieve a common goal of meeting each other's communication needs.

2. Location. All location sites must meet the following requirements.

   a. Adequate sight distance for safe ingress to and egress from the tower site;

   b. The tower shall be located outside the clear zone and where it is unlikely to be struck unless shielding already exists. Desirable distance is 80 ft; and

   c. There is an adequate pull-off area beyond the shoulder for construction and maintenance of the tower

   Listed below, in descending order of preference, are the site locations that INDOT will consider.

   a. Priority 1. Vehicle access to the tower site can be obtained from outside the limited access control roadway. This would include access from frontage or local roads. This also would include access from ramps to rest areas, weigh stations, etc. Where fencing exists, gates need to be placed at appropriate locations to provide controlled access to the towers. Gates should be sized to accommodate the type of maintenance traffic and equipment that will access the tower. All gates shall be secured with locks, with keys being distributed to appropriate personnel. A locked gate access requires an FHWA approval. See Figure 10-3A, Priority 1 Access.

   b. Priority 2. Within an interchange, vehicle access can be obtained from the right-hand side of the diagonal ramps. See Figure 10-3B, Priority 2 Access.

   c. Priority 3. Within an interchange, vehicle access can be obtained from the left-hand side of the diagonal ramps. See Figure 10-3C, Priority 3 Access.

   Installations within Interstate-route limited-access right-of-way that do not meet the criteria described above can be approved only through joint INDOT/FHWA concurrence.

3. Multiple Providers. Multiple telecommunication providers will be allowed on a tower. However, only one provider will maintain the tower structure and all attachments. The provider who will maintain the tower will be chosen through standard INDOT selection

procedures.

10-3.07 Underground Power Lines

1. Depth of Cover. All lines that are not under or within 5 ft of the roadway must have a minimum depth of cover of 2.5 ft for encased lines and 3 ft for non-encased lines.

   All lines which are under or within 5 ft of the roadway must have a minimum depth of cover under the pavement surface of 2.5 ft for encased lines and 4 ft for non-encased lines. Further, all lines must be a minimum of 18 in. or one half the diameter of the pipe or casing beneath the pavement structure, whichever is greater.

   All lines must have a minimum depth of cover of 4 ft under ditches.

   Exceptions may be authorized for existing lines to remain in place with a reduction of 150 mm in the depths of cover specified above. Further reductions may be permitted if the pipeline is protected by a reinforced concrete slab which meets the requirements as follows:

   a. Width. Three times the pipe diameter but not less than 4 ft.
   b. Thickness. Minimum of 6 in.
   c. Reinforcing. Minimum of #4 bars on 12-in. centers, or equivalent.
   d. Cover. Minimum of 6 in. between the slab and top of pipe.

2. Crossings. Underground power lines operating at 600 volts or less may be encased or non-encased provided the installation complies with the depths of cover specified herein. Lines operating above 600 volts must be encased. Consideration should be given to encasement or other suitable protection for any power lines near footings of bridges or other highway structures or near other locations where there may be hazards.

   Encasement, where used, may be metallic or nonmetallic. Such encasement must be designed to support the load of the highway and superimposed loads thereon, including that of construction equipment. The strength of the encasement must equal or exceed structural requirements for drainage culverts, and it must be composed of materials of satisfactory durability under conditions to which it may be subjected. Where used, encasement must be provided under center medians, from top of backslope to top of backslope for cut sections, 5 ft beyond toe of slope and under fill sections, 5 ft beyond face of curb in urban sections and all side streets, and 5 ft beyond any structure which the line passes under or through. Encasement may be omitted under medians which are substantially wider than normal standards for such roadways.

3. Markers. The Utility must place a readily identifiable and suitable marker immediately above any underground power line where it crosses the right-of-way line.

4. Location and Installation. Longitudinal lines may be placed by plowing or open trench method and must be located on uniform alignment as near as practical to the right-of-way line to provide space for possible future highway construction and/or utility installations. Distance from the right-of-way line will depend upon the terrain involved and obstructions such as trees and other existing underground or aerial utility lines. On highways with frontage roads, such installation will be located between the frontage roads and the right-of-way lines. Underground power lines must not be placed longitudinally beneath the median or beneath through traffic roadways including shoulders. Underground power lines placed longitudinally along a connecting roadway must not be placed under the median or beneath through traffic roadways, including shoulders, where that roadway connects with a State highway.

   Underground lines to be installed across any existing roadway must be installed by boring, tunneling or jacking in accordance with INDOT specifications. When installed by jacking or boring, encasement may be required. Bore pits should generally be located at least 30 ft from the edge of the nearest through traffic lane and not less than 20 ft from the edge of pavement on ramps. On low-traffic roadways and frontage roads, bore pits should not be less than 10 ft from the edge of pavement or 5 ft from face of curb. Adequate warning devices, barricades and protective devices must be used to prevent traffic hazards. Where circumstances necessitate the excavation of a bore pit closer to the edge of pavement than established above, concrete barrier rail or other approved devices must be installed for protection of traffic in accordance with Chapter Eighty-two. Bore pits must be located and constructed to not interfere with highway structural footings. Shoring must be used if necessary.

5. Appurtenances. Above ground pedestals or other appurtenances must be located at or near the right-of-way line, well outside the highway maintenance operation area.

6. Manholes, Vaults and Pits. In general this type of access point must be limited to those necessary to install and service the line and must be directly in line with the utility facility and of the minimum width to accomplish their intended function and comply with any other necessary codes or requirements. They must be installed flush with the roadway or ground surface and must be of sufficient strength to withstand the superimposed loads of the roadway and traffic, including that of construction equipment. In no case will they be placed or permitted to remain in the pavement or shoulders of high-volume roadways. Exceptions in accordance with Section 10-3.01(05) may be permitted on roadways in urban areas in cases of extreme hardship. Manholes may be placed or permitted to remain in place under traffic lanes of low-volume roadways in urban areas provided measures are taken to minimize these installations and to avoid their locations at intersections as practical.

10-3.08 Underground Communication Lines

1. Depth of Cover. All lines that are not under or within 5 ft of the roadway must have a minimum depth of cover of 2.5 ft.

   All lines which are under or within 5 ft of the roadway must have a minimum depth of cover under the pavement surface of 2.5 ft for encased lines and 4 ft for non-encased lines. Further, all lines must be a minimum of 18 in. or one half the diameter of the pipe or casing beneath the pavement structure, whichever is greater.

   All lines must have a minimum depth of cover of 3 ft under ditches.

   Exceptions may be authorized for existing lines to remain in place with a reduction of 6 in. in the depths of cover specified above.

2. Crossings. Lines crossing highways do not require encasement except where in the judgment of INDOT it is necessary for the protection of the highway or utility facility. Where encasement is not used, the Utility must specifically agree that the pavement will not be cut for repairs at any time in the future. Consideration should be given to encasement or other suitable protection for any communication facilities near footings of bridges or other highway structures or near other locations where there may be hazards.

   Encasement, where used, may be metallic or nonmetallic. Such encasement must be designed to support the load of the highway and superimposed loads thereon, including that of construction equipment. The strength of the encasement must equal or exceed structural requirements for drainage culverts, and it must be composed of materials of satisfactory durability under conditions to which it may be subjected. Where used, encasement must be provided under center medians, from top of backslope to top of backslope for cut sections, 5 ft beyond toe or slope and under fill sections, 5 ft beyond face of curb in urban sections and all side streets, and 5 ft beyond any structure which the line passes under or through. Encasement may be omitted under medians which are substantially wider than standard for such roadways.

3. Markers. The Utility must place a readily identifiable and suitable marker immediately above any underground communication line where it crosses the right-of-way line.

4. Non-Metallic Lines. Where non-metallic lines are installed without a metallic casing, a durable metal wire must be installed concurrently or other means provided for detection purposes.

5. Location and Installation. Longitudinal lines may be placed by plowing or open trench method and must be located on uniform alignment as near as practical to the right-of-way line to provide space for possible future highway construction and/or utility installations. Distance from the right-of-way line will depend upon the terrain involved and obstructions such as trees and other existing underground or aerial utility lines. On highways with frontage roads, such installation will be located between the frontage roads and the right-of-way lines. Underground power lines must not be placed beneath the center median or beneath through traffic roadways or connecting roadways, including shoulders.

   Underground lines to be installed across any existing roadway must be installed by boring, tunneling or jacking in accordance with INDOT specifications. When installed by jacking or boring, encasement may be required. Bore pits should generally be located at least 30 ft from the edge of the nearest through traffic lane and not less than 20 ft from the edge of pavement on ramps. On low-traffic roadways and frontage roads, bore pits should not be less than 10 ft from the edge of pavement or 5 ft from face of curb. Adequate warning devices, barricades and protective devices must be used to prevent traffic hazards. Where circumstances necessitate the excavation of a bore pit closer to the edge of pavement than established above, concrete barrier rail or other approved devices must be installed for protection of traffic in accordance with Chapter Eighty-two. Bore pits must be located and constructed to not interfere with highway structural footings. Shoring must be used if necessary.

6. Appurtenances. Above ground pedestals or other appurtenances must be located at or near the right-of-way line, well outside the highway maintenance operation area.

7. Manholes, Vaults and Pits. This type of access point must be limited to those necessary to install and service the line and must be directly in line with the utility facility and of the minimum width to accomplish their intended function and comply with any other necessary codes or requirements. They must be installed flush with the roadway or ground surface and must be of sufficient strength to withstand the superimposed loads of the roadway and traffic, including that of construction equipment. In no case will they be placed or permitted to remain in the pavement or shoulders of high-volume roadways. Exceptions in accordance with Section 10-3.01(05) may be permitted on roadways in urban areas in cases of extreme hardship. Manholes may be placed or permitted to remain in place under traffic lanes of low-volume roadways in urban areas provided measures are taken to minimize these installations and to avoid their locations at intersections as practical.

10-3.09 Irrigation and Drainage Pipes, Ditches and Canals

1. Irrigation and drainage facilities installed across any highway right-of-way must be designed and constructed in accordance with INDOT standards for culverts or bridges.

2. Longitudinal ditches and canals which would closely parallel the highway must not be permitted nor will any appurtenances be permitted within the clear zone which would constitute a hazard to traffic. See Chapter Forty-nine.

10-3.10 Miscellaneous

10-3.10(01) General

Various types of utility lines not specifically described herein must be considered with the provisions of this policy in accordance with the nature of the line. All lines carrying caustic, flammable or explosive, heated, or otherwise hazardous materials must be considered in the provisions for high-pressure gas and liquid petroleum lines.

1. Preservation, Restoration and Cleanup.

   a. Disturbed Areas. The area disturbed by utility installations or relocations should be minimized. Restoration methods must be in accordance with INDOT specifications and/or any special provisions contained in the utility use and occupancy agreements.

   b. Spraying, Cutting, and Trimming of Trees. The Utility should be prohibited from such activities unless written permission is provided by INDOT. Where permission is granted, only light trimming should be permitted. When the removal of a tree is permitted, the stump must either be cut to the ground or be removed and the hole properly backfilled as specified by INDOT. All debris, refuse and waste must be removed from the site. It is common that trees will need to be removed when a Utility is doing relocation work to accommodate an INDOT project. If the Utility wishes to do the removal, they must contact INDOT to see if there are any trees that must not be disturbed.

   c. Drainage. Existing drainage facilities should not be disturbed. Underground utility facilities must be backfilled with pervious material and outlets provided for entrapped water. Underdrains must be provided where necessary. No jetting or puddling will be permitted under the roadway.

2. Safety and Convenience.

a. Control of Traffic. Traffic controls for utility construction and maintenance operations must be in accordance with the *Manual on Uniform Traffic Control Devices*. All construction and maintenance operations must be planned with full regard to safety and to minimize traffic interference. On heavily traveled highways, construction operations interfering with traffic should not be allowed during periods of peak traffic flow. Any such work must be planned so that closure of intersecting streets, road approaches or other access points is minimized.

b. Servicing, Maintenance, and Repairs. All utility facilities must be maintained in good repair both structurally and aesthetically. The utility use and occupancy agreement will identify the maintenance operations which are permitted and indicate situations where prior notification to INDOT is required.

3. Records. The Utility must maintain records that describe the utility usage, size, configuration, material, location, height or depth and any special features such as encasement, manholes and valves. These records must include all service lines which enter or cross the highway right-of-way. The information must be in a reproducible form which is available to other Utilities and highway agencies.

4. Construction Identification of Utilities. When it is likely that construction or maintenance activities could involve existing utilities, it is often desirable to locate and identify these facilities well in advance of the initiation of the work as an aid to both design and construction. The location of each underground utility should be identified by the Utility with stakes, paint or other temporary surface markings color coded by utility type. The recommended uniform color code system is as follows:

a. Red: Electric power lines or conduits.
b. Yellow: Gas, petroleum, steam or other hazardous materials.
c. Orange: All types of communication lines.
d. Blue: Water systems and slurry pipelines.
e. Green: Storm and sanitary sewers.
f. Purple: Radioactive material.

10-3.10(02) Trenching and Backfill

The essential features for trench and backfill construction are as follows:

1. restoration of the structural integrity of entrenched roadbed;
2. security of the pipe against deformation likely to cause leakage; and
3. assurance against the trench becoming a drainage channel.

The integrity of the pavement structure, shoulders and embankment are of primary concern.

Trenched construction, bedding and backfill must be in accordance with the INDOT *Standard Specifications*. Other controls are as follows:

1. Trenches must be cut with vertical faces, where soil and depth conditions permit, with a maximum width of outside diameter of pipe plus 24 in. They must be shored where necessary.

2. Bedding must be provided to a depth of 6 in. or half the diameter of the pipe, whichever is less. For ducts not encased in concrete, not less than 3 in. of bedding must be placed under the lower ducts. Bedding must consist of pit run sand and gravel mixture or other suitable material approved by the permit inspector. The bottom of the trench must be prepared to provide the pipe with uniform bedding support throughout the length of the installation.

3. Backfill for trenches in the roadway, or within 5 ft of pavement, paved shoulders, sidewalks, curbs, gutters or similar structures, must consist of B borrow or other suitable material approved by the regulatory investigator and compacted in accordance with the INDOT *Standard Specifications*.

4. Backfill for trenches outside of the roadway may consist of the excavated material or other suitable material as approved by the permit inspector and compacted to a density comparable to that of the surrounding soil. The top 12 in. of fill must be topsoil.

10-3.10(03) Underground Plant Protection

Desirably, underground utilities should subscribe to the Underground Plant Protection (UPP) Service. Doing this ensures protection of the Utility's facilities because it is required by law that the UPP is called at least two days prior to any excavation work. This allows the Utility to mark its underground facilities before excavation work is started.

When surveys are done for proposed highway projects, surveyors should also call UPP. While Utilities are not required by law to locate their facilities for survey work, it is still desirable that this is done. If the facilities are marked for the survey, add this information to the project plans. This will allow the designer to design around these facilities, if possible, and allows the Utility to be notified in advance of an upcoming project and any potential impact to their facilities. The Utility also will have a chance to meet with the designer and discuss possible alternatives that might lessen any impact. Therefore, it is beneficial to all parties involved that Utilities subscribe to this service.

10-3.10(04) Pavement Cuts

Open cutting of the pavement to install utility facilities is highly discouraged because it adversely affects the structural integrity of the roadway. If it is not possible to install a facility without disturbing the pavement, the Utility will be required to provide written documentation and justification for an open cut. Where a longitudinal open cut is proposed or where several cuts are proposed to cross the pavement in the same area, the INDOT district office will inspect the roadway to determine the extent of road repair that will be required.

Normally, the Utility will be required to use patch materials at least equal in quality and thickness of layer as the original construction and placed in accordance with INDOT specifications. The limits of the pavement patch must extend at least 2 ft outside the limits of the trench. The edges of the trench must be beveled at least 6 in. The limits of the patch must have vertical faces and must be saw cut for a clean break. The restored surface must be flush with and sloped at the same rate as the existing surface.