

COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION
DIVISION OF PUBLIC UTILITY REGULATION

Guidelines for Transmission Line Applications
Filed Under Title 56 of the Code of Virginia

August 10, 2017

INTRODUCTION

The purpose of this document is to identify the information that should be included in applications for approval of electric transmission line projects filed with the State Corporation Commission ("SCC" or "Commission"). Each application should be filed so as to provide the Commission ample time to review and rule on the application well in advance of the proposed in-service date of the project. All applications shall comply with the Commission's Rules of Practice and Procedure, latest edition. These guidelines supersede the May 10, 1991 guidelines issued by the SCC Staff and are effective for applications filed on and after January 1, 2018. To the extent the information requested in these guidelines is not currently available or is not applicable, the Applicant will clearly note and explain this in the appropriate location in each such application.

GUIDELINES

I. NECESSITY FOR THE PROPOSED PROJECT

The necessity statement should include but need not be limited to the following:

- A. State the primary justification for the proposed project (for example, the most critical contingency violation including the first year and season in which the violation occurs). In addition, identify each transmission planning standard(s) (of the Applicant, regional transmission organization ("RTO"), or North American Electric Reliability Corporation) projected to be violated absent construction of the facility.
- B. Detail the engineering justifications for the proposed project (for example, provide narrative to support whether the proposed project is necessary to upgrade or replace an existing facility, to significantly increase system reliability, to connect a new generating station to the Applicant's system, etc.). Describe any known future project(s), including but not limited to generation, transmission, delivery point or retail customer projects, that require the proposed project to be constructed. Verify that the planning studies used to justify the need for the proposed project considered all other generation and transmission facilities impacting the affected load area, including generation and transmission facilities that have not yet been placed into service. Provide a list of those facilities that are not yet in service.
- C. Describe the present system and detail how the proposed project will effectively satisfy present and projected future electrical load demand requirements. Provide pertinent load growth data (at least five years of historical summer and winter peak demands and ten years of projected summer and winter peak loads where applicable). Provide all assumptions inherent within the projected data and describe why the existing system cannot adequately serve the needs of the Applicant (if that is the case). Indicate the date by which the existing system is projected to be inadequate.
- D. If power flow modeling indicates that the existing system is, or will at some future time be, inadequate under certain contingency situations, provide a list of all these contingencies and the associated violations. Describe the critical contingencies including the affected elements and the year and season when the violation(s) is first noted in the planning studies. Provide the applicable computer screenshots of single-line diagrams from power flow simulations depicting the circuits and substations experiencing thermal overloads and voltage violations during the critical contingencies described above.

- E. Describe the feasible project alternatives, if any, considered for meeting the identified need including any associated studies conducted by the Applicant or analysis provided to the RTO. Explain why each alternative was rejected.
- F. Describe any lines or facilities that will be removed, replaced, or taken out of service upon completion of the proposed project, including the number of circuits and normal and emergency ratings of the facilities.
- G. Provide a system map, in color and of suitable scale, showing the location and voltage of the Applicant's transmission lines, substations, generating facilities, etc., that would affect or be affected by the new transmission line and are relevant to the necessity for the proposed line. Clearly label on this map all points referenced in the necessity statement.
- H. Provide the desired in-service date of the proposed project and the estimated construction time.
- I. Provide the estimated total cost of the project as well as total transmission-related costs and total substation-related costs. Provide the total estimated cost for each feasible alternative considered. Identify and describe the cost classification (e.g. "conceptual cost," "detailed cost," etc.) for each cost provided.
- J. If the proposed project has been approved by the RTO, provide the line number, regional transmission expansion plan number, cost responsibility assignments, and cost allocation methodology. State whether the proposed project is considered to be a baseline or supplemental project.
- K. If the need for the proposed project is due in part to reliability issues and the proposed project is a rebuild of an existing transmission line(s), provide five years of outage history for the line(s), including for each outage the cause, duration and number of customers affected. Include a summary of the average annual number and duration of outages. Provide the average annual number and duration of outages on all Applicant circuits of the same voltage, as well as the total number of such circuits. In addition to outage history, provide five years of maintenance history on the line(s) to be rebuilt including a description of the work performed as well as the cost to complete the maintenance. Describe any system work already undertaken to address this outage history.
- L. If the need for the proposed project is due in part to deterioration of structures and associated equipment, provide representative photographs and inspection records detailing their condition.
- M. In addition to the other information required by these guidelines, applications for approval to construct facilities and transmission lines interconnecting a Non-Utility Generator ("NUG") and a utility shall include the following information:

1. The full name of the NUG as it appears in its contract with the utility and the dates of initial contract and any amendments;
 2. A description of the arrangements for financing the facilities, including information on the allocation of costs between the utility and the NUG;
 3. a. For Qualifying Facilities ("QFs") certificated by Federal Energy Regulatory Commission ("FERC") order, provide the QF or docket number, the dates of all certification or recertification orders, and the citation to FERC Reports, if available;

b. For self-certificated QFs, provide a copy of the notice filed with FERC;
 4. Provide the project number and project name used by FERC in licensing hydroelectric projects; also provide the dates of all orders and citations to FERC Reports, if available; and
 5. If the name provided in 1 above differs from the name provided in 3 above, give a full explanation.
- N. Describe the proposed and existing generating sources, distribution circuits or load centers planned to be served by all new substations, switching stations and other ground facilities associated with the proposed project.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

1. Provide the length of the proposed corridor and viable alternatives.
2. Provide color maps of suitable scale (including both general location mapping and more detailed GIS-based constraints mapping) showing the route of the proposed line and its relation to: the facilities of other public utilities that could influence the route selection, highways, streets, parks and recreational areas, scenic and historic areas, open space and conservation easements, schools, convalescent centers, churches, hospitals, burial grounds/cemeteries, airports and other notable structures close to the proposed project. Indicate the existing linear utility facilities that the line is proposed to parallel, such as electric transmission lines, natural gas transmission lines, pipelines, highways, and railroads. Indicate any existing transmission ROW sections that are to be quitclaimed or otherwise relinquished. Additionally, identify the manner in which the Applicant will make available to interested persons, including state and local governmental entities, the digital GIS shape file for the route of the proposed line.

3. Provide a separate color map of a suitable scale showing all the Applicant's transmission line ROWs, either existing or proposed, in the vicinity of the proposed project.
4. To the extent the proposed route is not entirely within existing ROW, explain why existing ROW cannot adequately service the needs of the Applicant.
5. Provide drawings of the ROW cross section showing typical transmission line structure placements referenced to the edge of the ROW. These drawings should include:
 - a. ROW width for each cross section drawing;
 - b. Lateral distance between the conductors and edge of ROW;
 - c. Existing utility facilities on the ROW; and
 - d. For lines being rebuilt in existing ROW, provide all of the above (i) as it currently exists, and (ii) as it will exist at the conclusion of the proposed project.
6. Detail what portions of the ROW are subject to existing easements and over what portions new easements will be needed.
7. Detail the proposed ROW clearing methods to be used and the ROW restoration and maintenance practices planned for the proposed project.
8. Indicate the permitted uses of the proposed ROW by the easement landowner and the Applicant.
9. Describe the Applicant's route selection procedures. Detail the feasible alternative routes considered. For each such route, provide the estimated cost and identify and describe the cost classification (e.g. "conceptual cost," "detailed cost," etc.). Describe the Applicant's efforts in considering these feasible alternatives. Detail why the proposed route was selected and other feasible alternatives were rejected. In the event that the proposed route crosses, or one of the feasible routes was rejected in part due to the need to cross, land managed by federal, state, or local agencies or conservation easements or open space easements qualifying under §§ 10.1-1009 – 1016 or §§ 10.1-1700 – 1705 of the Code (or a comparable prior or subsequent provision of the Code), describe the Applicant's efforts to secure the necessary ROW.
10. Describe the Applicant's construction plans for the project, including how the Applicant will minimize service disruption to the affected load area.

Include requested and approved line outage schedules for affected lines as appropriate.

11. Indicate how the construction of this transmission line follows the provisions discussed in Attachment 1 of these Guidelines.
12. a. Detail counties and localities through which the line will pass. If any portion of the line will be located outside of the Applicant's certificated service area: (1) identify each electric utility affected; (2) state whether any affected electric utility objects to such construction; and (3) identify the length of line(s) proposed to be located in the service area of an electric utility other than the Applicant; and
- b. Provide three (3) color copies of the Virginia Department of Transportation "General Highway Map" for each county and city through which the line will pass. On the maps show the proposed line and all previously approved and certificated facilities of the Applicant. Also, where the line will be located outside of the Applicant's certificated service area, show the boundaries between the Applicant and each affected electric utility. On each map where the proposed line would be outside of the Applicant's certificated service area, the map must include a signature of an appropriate representative of the affected electric utility indicating that the affected utility is not opposed to the proposed construction within its service area.

B. Line Design and Operational Features

1. Detail the number of circuits and their design voltage, initial operational voltage, any anticipated voltage upgrade, and transfer capabilities.
2. Detail the number, size(s), type(s), coating and typical configurations of conductors. Provide the rationale for the type(s) of conductor(s) to be used.
3. With regard to the proposed supporting structures over each portion of the ROW for the preferred route, provide diagrams (including foundation reveal) and descriptions of all the structure types, to include:
 - a. mapping that identifies each portion of the preferred route;
 - b. the rationale for the selection of the structure type;
 - c. the number of each type of structure and the length of each portion of the ROW;

- d. the structure material and rationale for the selection of such material;
 - e. the foundation material;
 - f. the average width at cross arms;
 - g. the average width at the base;
 - h. the maximum, minimum and average structure heights;
 - i. the average span length; and
 - j. the minimum conductor-to-ground clearances under maximum operating conditions.
- 4. With regard to the proposed supporting structures for all feasible alternate routes, provide the maximum, minimum and average structure heights with respect to the whole route.
 - 5. For lines being rebuilt, provide mapping showing existing and proposed structure heights for each individual structure within the ROW, as proposed in the application.
 - 6. Provide photographs for typical existing facilities to be removed, comparable photographs or representations for proposed structures, and visual simulations showing the appearance of all planned transmission structures at identified historic locations within one mile of the proposed centerline and in key locations identified by the Applicant.
- C. Describe and furnish plan drawings of all new substations, switching stations, and other ground facilities associated with the proposed project. Include size, acreage, and bus configurations. Describe substation expansion capability and plans. Provide one-line diagrams for each.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL, AND HISTORIC FEATURES

- A. Describe the character of the area that will be traversed by this line, including land use, wetlands, etc. Provide the number of dwellings within 500 feet, 250 feet and 100 feet of the centerline, and within the ROW for each route considered. Provide the estimated amount of farmland and forestland within the ROW that the proposed project would impact.

- B. Describe any public meetings the Applicant has had with neighborhood associations and/or officials of local, state or federal governments that would have an interest or responsibility with respect to the affected area or areas.
- C. Detail the nature, location, and ownership of each building that would have to be demolished or relocated if the project is built as proposed.
- D. Identify existing physical facilities that the line will parallel, if any, such as existing transmission lines, railroad tracks, highways, pipelines, etc. Describe the current use and physical appearance and characteristics of the existing ROW that would be paralleled, as well as the length of time the transmission ROW has been in use.
- E. Indicate whether the Applicant has investigated land use plans in the areas of the proposed route and indicate how the building of the proposed line would affect any proposed land use.
- F. Government Bodies
 - 1. Indicate if the Applicant determined from the governing bodies of each county, city and town in which the proposed facilities will be located whether those bodies have designated the important farmlands within their jurisdictions, as required by § 3.2-205 B of the Code.
 - 2. If so, and if any portion of the proposed facilities will be located on any such important farmland:
 - a. Include maps and other evidence showing the nature and extent of the impact on such farmlands;
 - b. Describe what alternatives exist to locating the proposed facilities on the affected farmlands, and why those alternatives are not suitable; and
 - c. Describe the Applicant's proposals to minimize the impact of the facilities on the affected farmland.
- G. Identify the following that lie within or adjacent to the proposed ROW:
 - 1. Any district, site, building, structure, or other object included in the National Register of Historic Places maintained by the U.S. Secretary of the Interior;
 - 2. Any historic architectural, archeological, and cultural resources, such as historic landmarks, battlefields, sites, buildings, structures, districts or objects listed or determined eligible by the Virginia Department of Historic Resources ("DHR");

3. Any historic district designated by the governing body of any city or county;
 4. Any state archaeological site or zone designated by the Director of the DHR, or its predecessor, and any site designated by a local archaeological commission, or similar body;
 5. Any underwater historic assets designated by the DHR, or predecessor agency or board;
 6. Any National Natural Landmark designated by the U.S. Secretary of the Interior;
 7. Any area or feature included in the Virginia Registry of Natural Areas maintained by the Virginia Department of Conservation and Recreation (“DCR”);
 8. Any area accepted by the Director of the DCR for the Virginia Natural Area Preserves System;
 9. Any conservation easement or open space easement qualifying under §§ 10.1-1009 – 1016, or §§ 10.1-1700 – 1705, of the Code (or a comparable prior or subsequent provision of the Code);
 10. Any state scenic river;
 11. Any lands owned by a municipality or school district; and
 12. Any federal, state or local battlefield, park, forest, game or wildlife preserve, recreational area, or similar facility. Features, sites, and the like listed in 1 through 11 above need not be identified again.
- H. List any registered aeronautical facilities (airports, helipads) where the proposed route would place a structure or conductor within the federally-defined airspace of the facilities. Advise of contacts, and results of contacts, made with appropriate officials regarding the effect on the facilities' operations.
- I. Advise of any scenic byways that are in proximity to or that will be crossed by the proposed transmission line and describe what steps will be taken to mitigate any visual impacts on such byways. Describe typical mitigation techniques for other highways' crossings.
- J. Identify coordination with appropriate municipal, state, and federal agencies.

- K. Identify coordination with any non-governmental organizations or private citizen groups.
- L. Identify any environmental permits or special permissions anticipated to be needed.

IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS ("EMF")

- A. Provide the calculated maximum electric and magnetic field levels that are expected to occur at the edge of the ROW. If the new transmission line is to be constructed on an existing electric transmission line ROW, provide the present levels as well as the maximum levels calculated at the edge of ROW after the new line is operational.
- B. If the Applicant is of the opinion that no significant health effects will result from the construction and operation of the line, describe in detail the reasons for that opinion and provide references or citations to supporting documentation.
- C. Describe and cite any research studies on EMF the Applicant is aware of that meet the following criteria:
 - 1. Became available for consideration since the completion of the Virginia Department of Health's most recent review of studies on EMF and its subsequent report to the Virginia General Assembly in compliance with 1985 Senate Joint Resolution No. 126;
 - 2. Include findings regarding EMF that have not been reported previously and/or provide substantial additional insight into findings; and
 - 3. Have been subjected to peer review.

V. NOTICE

- A. Furnish a proposed route description to be used for public notice purposes. Provide a map of suitable scale showing the route of the proposed project. For all routes that the Applicant proposes to be noticed, provide minimum, maximum and average structure heights.
- B. List Applicant offices where members of the public may inspect the application. If applicable, provide a link to website(s) where the application may be found.
- C. List all federal, state, and local agencies and/or officials that may reasonably be expected to have an interest in the proposed construction and to whom the Applicant has furnished or will furnish a copy of the application.

- D. If the application is for a transmission line with a voltage of 138 kV or greater, provide a statement and any associated correspondence indicating that prior to the filing of the application with the SCC the Applicant has notified the chief administrative officer of every locality in which it plans to undertake construction of the proposed line of its intention to file such an application, and that the Applicant gave the locality a reasonable opportunity for consultation about the proposed line (similar to the requirements of § 15.2-2202 of the Code for electric transmission lines of 150 kV or more).

ATTACHMENT 1

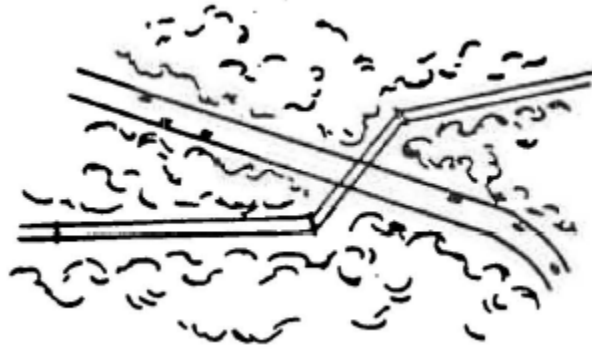
Guidelines for the Protection of Natural, Historic, Scenic, and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities

It is intended that these guidelines provide an indication of the basic principles and elements of good practice which, if applied in a reasonable manner to planning and design of particular facilities, will provide the most acceptable answers from an environmental standpoint taking account also of such factors as safety, reliability of service, land use planning, economics and technical feasibility.

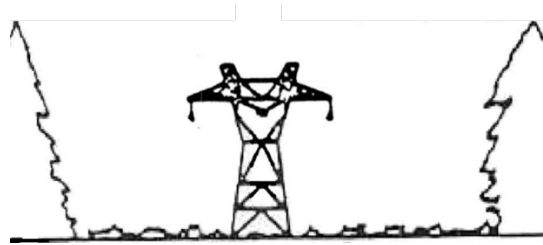
The Selection and Clearing of Rights-of-Way Routes

1. To the extent permitted by the property interest involved, rights-of-way should be selected with the purpose of minimizing, conflict between the rights-of-way and present and prospective uses of the land on which they are to be located. To this end, existing rights-of-way should be given priority as the locations for additions to existing transmission facilities, and the joint use of existing rights-of-way by different kinds of utility services should be considered.
2. Where practical, rights-of-way should avoid the national historic places listed in the National Register of Historic Places and natural landmarks listed in the National Register of Natural Landmarks maintained by the Secretary of the Interior and parks, scenic, wildlife and recreational lands, officially designated by duly constituted public authorities. If rights-of-way must be routed through such historic places, parks, wildlife or scenic areas, they should be located in areas or placed in a manner so as to be least visible from areas of public view and as far away as possible in a manner designed to preserve the character of the area.
3. Rights-of-way should avoid prime or scenic timbered areas, steep slopes and proximity to main highways where practical. In some situations scenic values would emphasize locating rights-of-way remote from highways while in others where scenic values are less important, rights-of-way along highways in timbered areas would achieve desirable conservation of existing forest lands.
4. Where the transmission rights-of-way cross areas of land managed by Government agencies, State agencies or private organizations, these agencies should be contacted early in the planning of the transmission project to coordinate the line location with their land-use planning and with other existing or proposed rights-of-way.
5. In scenic and residential areas, clearing of natural vegetation should be limited to that material which poses a hazard to the transmission line. Determination of a hazard in critical areas such as park and forest lands should be a joint endeavor of the utility company and the land manager in keeping with the National Electric Safety Code, state or other electric safety and reliability requirements.

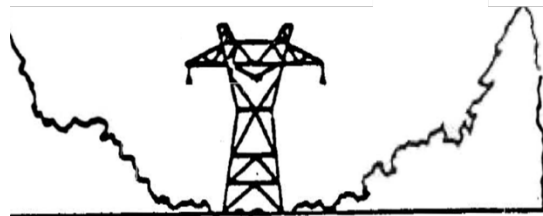
6. Long tunnel views of transmission lines crossing, highways in wooded areas, down canyons and valleys or up ridges and hills should be avoided. This can be accomplished by having the lines change alignment in making the crossing, or in other situations by concealment of terrain or by judicious use of screen planting.



7. Rights-of-way clearings should be kept to the minimum width necessary to prevent interference of trees and other vegetation with the proposed transmission facilities. In scenic or urban areas, trees which would interfere with the proposed transmission facilities and those which could cause damage if fallen should be selectively cut and removed.



Poor Example

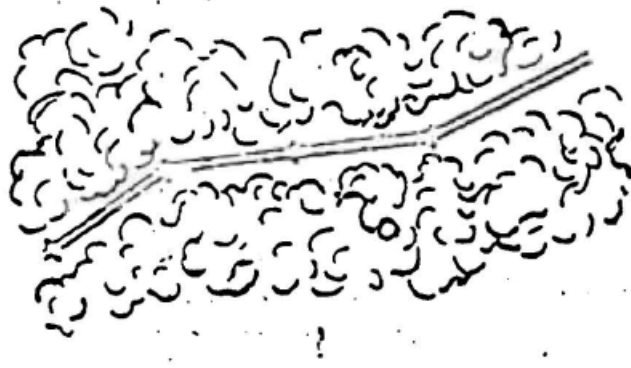


Preferred

8. The time and method of clearing rights-of-way should take into account matters of soil stability, the protection of natural vegetation and the protection of adjacent resources.
9. The use of helicopters for the construction and maintenance on rights-of-way should be considered in mountainous and scenic areas where consistent with reliability of service.

This would permit rights-of-way to be located in more remote areas and would reduce disturbance of the ground and the number of access roads.

10. Trees and other vegetation cleared from rights-of-way in areas of public view should be disposed of without undue delay. If trees and other vegetation are burned, local fire and air pollution regulations should be observed. Unsightly tree stumps which are adjacent to roads and other areas of public view should be cut close to the ground or removed.
11. Trees, shrubs, grass, and top soil which are not cleared should be protected from damage during construction.
12. Rights-of-way should not be cleared to the mineral soil where possible. Where this does occur in scattered areas of the right-of-way, the top soil should be replaced and stabilized without undue delay by the planting of appropriate species of grass, shrubs and other vegetation which are properly fertilized.
13. Soil which has been excavated during construction and not used should be evenly filled back onto the cleared area or removed from the site. The soil should be graded to comport with the terrain and the adjacent land, and the top soil should then be replaced and appropriate vegetation should be planted and fertilized.
14. Scars on the surface of the ground should be repaired with top soil and replanted with appropriate vegetation or otherwise conformed to local, natural conditions. Grading generally should not be done on slopes where the scars cannot be repaired without creating an erosion problem.
15. Terraces and other erosion control devices should be constructed where necessary to prevent soil erosion on slopes on which rights-of-way are located.
16. Where rights-of-way cross streams or other bodies of water, the banks should be stabilized to prevent erosion. Construction on rights-of-way should not damage shorelines, recreational areas or fish and wildlife habitats.
17. When necessary, cofferdam techniques to lay pipe or cable across streams should be used in order to permit full flow in one part of the stream while construction work is being performed in another part.
18. Care should be taken to avoid oil spills and other types of pollution while work is performed in streams.
19. In scenic areas visible to the public, rights-of-way strips through forest and timber areas should be deflected occasionally and should follow irregular patterns or be suitably screened to prevent the rights-of-way from appearing as tunnels cut through the timber.



20. At road crossings or other special locations of high visibility rights-of-way strips through forest and timber areas should be cleared with varying alignment to comport with the topography of the terrain. In such locations also where rights-of-way enter dense timber from a meadow or other clearing, trees should be feathered in at the entrance of the timber for a distance of 150-200 yards. Small trees and plants should be used for transition from natural ground cover to larger areas.



Poor Example

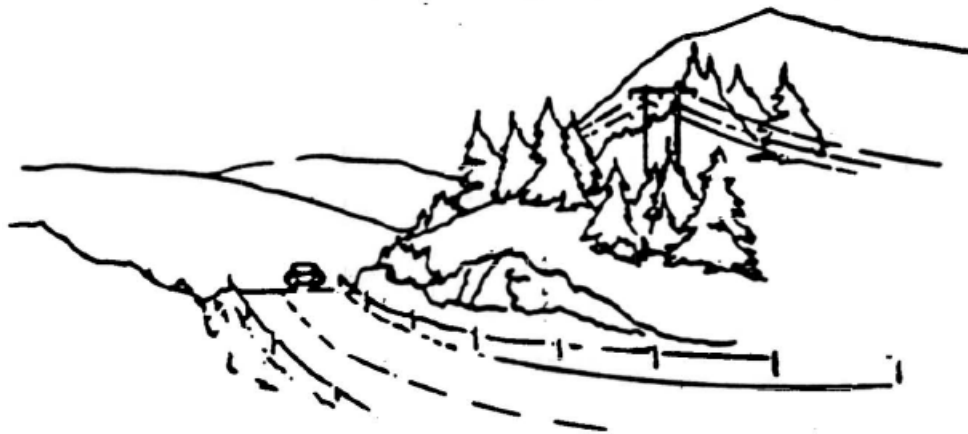
Preferred

21. If underground transmission lines must be located near the crests of hills or other high points, trenching should be done with small equipment in order to minimize the width of the rights-of-way clearings.
22. Roads used during construction should be stabilized without undue delay by erosion control measures and the planting of appropriate grass and other vegetation. These roads should be designed for proper drainage, and water bars to control soil erosion should be installed.

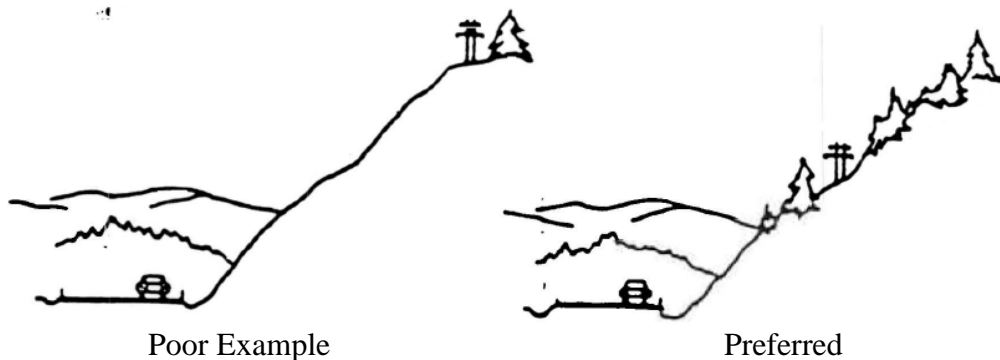
23. Access roads should not be constructed on unstable slopes. Where feasible, service and access roads should be used jointly.

The Location of Transmission Towers and Overhead Lines

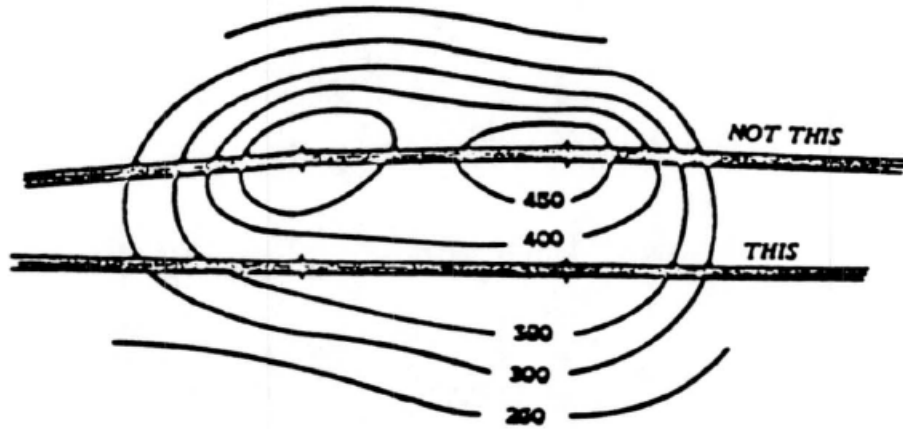
24. If an overhead line must be routed across uniquely scenic, recreational or historic areas or rivers, the feasibility of placing the lower voltage line underground should be considered. If the line must be placed overhead, it should be located on a right-of-way least visible from areas of public view.
25. Transmission facilities should be located with a background of topography and natural cover where possible. Vegetation and terrain should be used to screen these facilities from highways and other areas of public view.



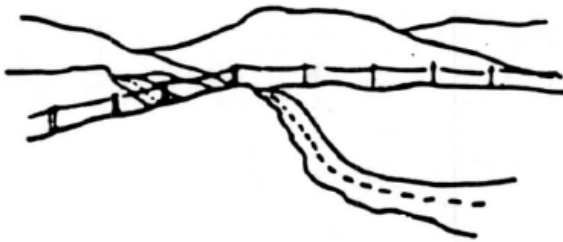
26. Where transmission facilities must be placed on slopes which parallel highways or other areas of public view, they should be located approximately two-thirds the distance up the slopes where feasible. With the slopes as background, the presence of the facilities would be less noticeable.



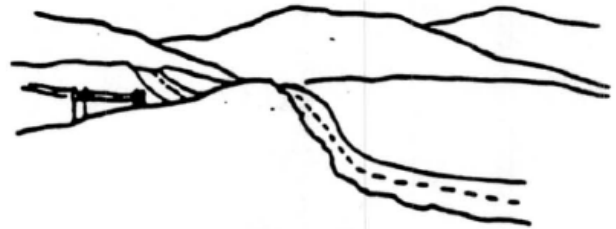
27. Transmission line rights-of-way should not cross hills and other high points at the crests and when possible should avoid placing a transmission tower at the crest of a ridge of hill. Towers should be spaced below the crest to carry the line over the ridge or hill, and the profile of the facilities should present a minimum silhouette against the sky.



28. Transmission lines should not cross highways at the crest of a road.

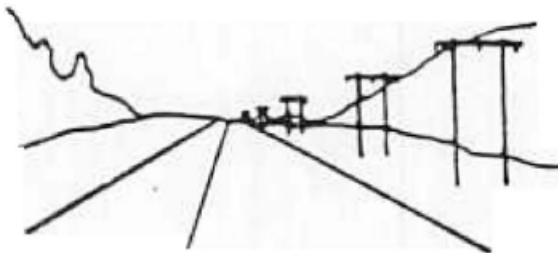


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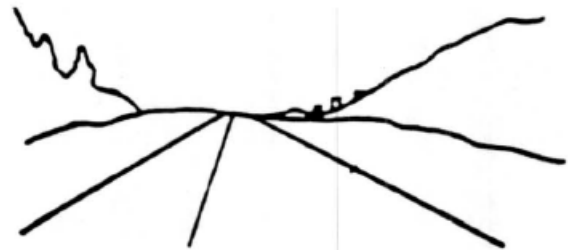


Preferred

29. Long views of transmission lines parallel to highways should be avoided where possible. This may be accomplished by overhead lines being placed beyond ridges or timber areas.



Poor Example

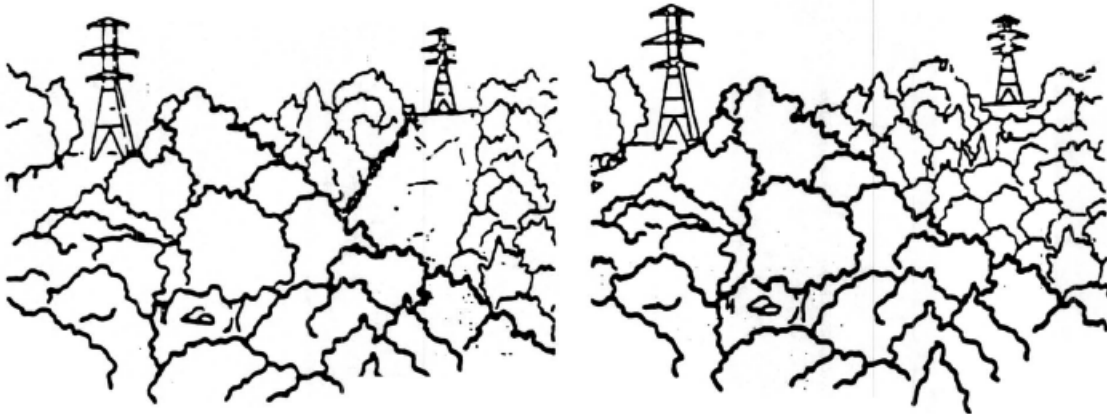


Preferred

30. Transmission lines should cross canyons up slope from roads which traverse the canyon basins if the terrain permits.



31. When crossing canyons in a forest, high, long-span towers should be used to keep the power lines above the trees and to eliminate the need to clear all vegetation from below the lines. Only as much vegetation as is necessary to string the line should be cut.



Poor Example

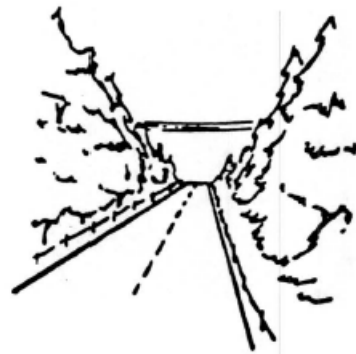
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32. Where ridges or timber areas are adjacent to highways or other areas of public view, overhead lines should be placed beyond the ridges or timber areas.

33. In forest or timber areas, high, long-span towers should be used to cross highways in order to retain much of the natural growth along the highways.



Poor Example



Preferred

34. Native shrubs and trees should be left in place or planted at random, with the necessary allowance for safety, near the edges of rights-of-way adjacent to roads.



Poor Example



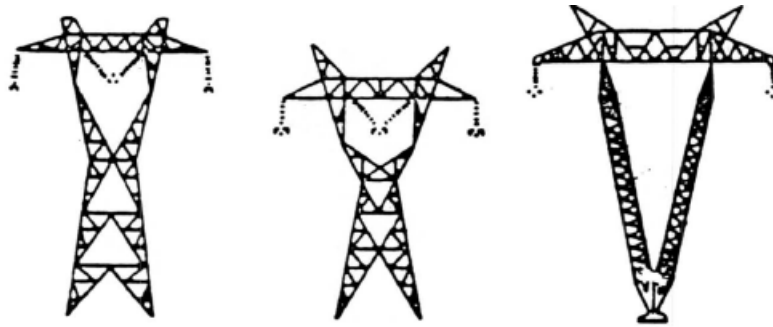
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35. Transmission lines should not be located or cross at road intersections or interchanges where possible.

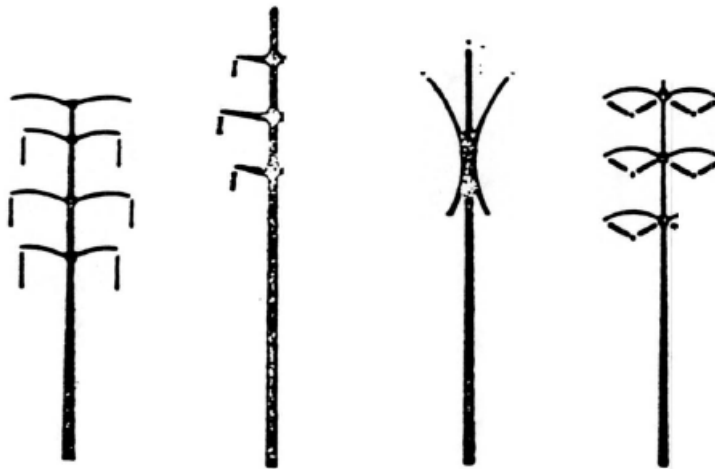
36. The Federal Highway Administration and the State Highway Department should be consulted with respect to any applicable guidelines or regulations that they might have to govern transmission lines which cross highways.

The Design of Transmission Towers

37. The size of transmission towers should be kept to the minimum feasible.

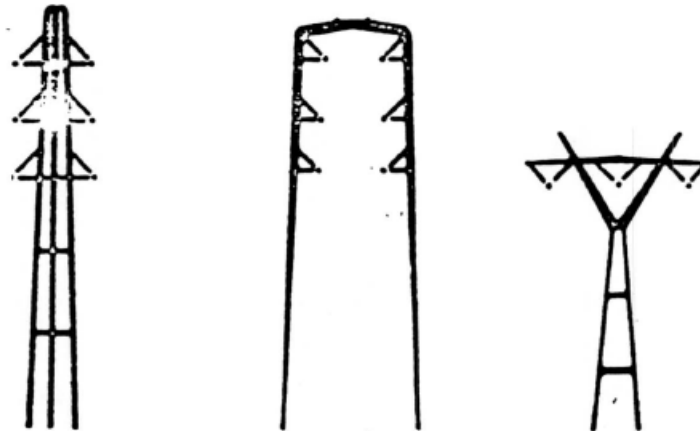


Standard Tower Designs



Newer Tower Designs

38. Simple, but functional, designs of towers and poles should be used. Illustrations of these kinds of structures can be found in the book **ELECTRIC TRANSMISSION STRUCTURES**, sponsored by the Electric Research Council.



39. The use of poles designed without cross-arms for electric transmission lines of 138 kV and below and communications cables should be considered.



40. The materials used to construct transmission towers and the colors of the towers should comport with the natural surroundings.

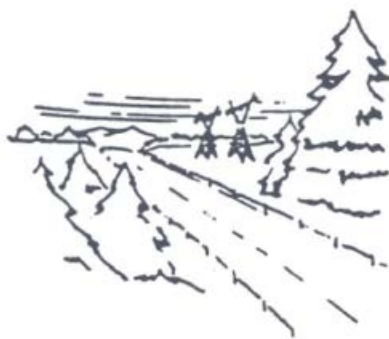
41. In addition to steel and aluminum transmission towers, the use of towers constructed of fiberglass, reinforced plastic, laminated wood, concrete, and other materials should be considered.

42. The use of treated single or double wood poles should be considered in forest or timber areas.

43. The use of weathered galvanized steel structures should be considered when transmission towers are to be silhouetted against the sky.

44. The design and color of the insulators should be compatible with the design of the tower.

45. Where two or more circuits are required at high crossings, the use of multiple circuit towers should be considered where it is consistent with adequate reliability.



Poor Example



Preferred

The Maintenance of Transmission Line Rights-of-Way

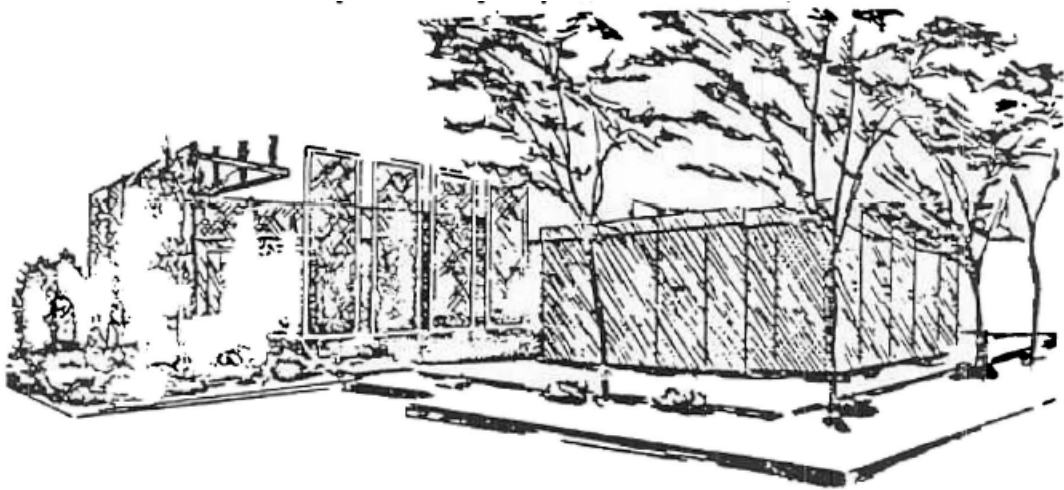
46. Once a cover of vegetation has been established on a right-of-way, it should be properly maintained.
47. Chemicals, when used, should be carefully selected to have a minimum effect on desirable indigenous plant life. Selective application should be used wherever appropriate to preserve the natural environment. In scenic areas, the impact of temporary discoloration of foliage should be considered; and where this factor is critical, either mechanical means of vegetative control should be used, or the work should be scheduled in early spring or late fall. It is essential that chemicals be applied in a manner fully consistent with the protection of the entire environment, particularly of the health of humans and wildlife.
48. Access roads and service roads should be maintained with suitable natural cover, water bars, and the proper slope in order to prevent soil erosion.
49. Aerial and ground maintenance inspection activities of the transmission line facility should include observations of soil erosion problems, fallen timber and conditions of the vegetation which require attention. The use of aircraft to inspect and maintain transmission facilities should be encouraged.

Possible Secondary Uses of Rights-of-Way

50. One of the potential benefits of transmission line routes is that clearings at safe distances adjacent to transmission facilities may be used for secondary purposes. Consistent with general safety factors the following should be considered as possible secondary uses of rights-of-way to the extent permitted by the property interests involved:
 - Cultivation of Christmas trees, elderberry and huckleberry bushes, and other nursery stock
 - Parks
 - Golf courses
 - Equestrian or bicycle paths
 - Picnic areas
 - Game refuges
 - Hiking trail routes
 - General agriculture
 - Winter sports
 - Orchards

The Location of Appurtenant Aboveground Facilities

51. The proposed designs and locations of electric substations, and other aboveground facilities, including communication towers, should be made available to local agencies which have jurisdiction over these matters sufficiently in advance of construction deadlines to permit adequate review.
52. Unobtrusive sites should be selected where possible for the location of substations and like facilities.
53. Potential noise should be considered when the locations for turbines, substations, and like facilities are being determined. Such facilities should be located in areas where sound will not be resonated.
54. The size of substations and like facilities should be kept to the minimum feasible.
55. The designs of the exteriors of substations and like facilities should comport with the surroundings and other buildings in the area all in keeping with local control and applicable local zoning ordinance. For example, if a substation is to be located in a residential area, its design should comport with the designs of nearby residences.
56. If substations are located in residential and/or scenic areas, the appurtenant transmission conductors adjacent to the substation should be placed underground where economically and technically feasible.
57. Trees and other landscaping appropriate to the site should be placed around substations to present a pleasing view to the public.



58. Storage tanks in scenic areas should be placed below ground where feasible. If storage tanks must be placed above ground, they should be concealed in part by appropriate plantings of trees and shrubs.

59. The materials used to construct substations, storage tanks, and like facilities and the colors of these materials should comport with the surroundings.

