



right of way **1**: an easement or servitude over another's land conferring a right of passage
2 a: the area over which a right of way exists **b**: the strip of land over which is built a public road
c: the land occupied by a railroad esp. for its main line **d**: the land used by a public utility
 Merriam-Webster's Dictionary of Law 1996

Projects characterized by linear rights-of-way (ROWs) include underground utilities such as pipelines, fiber-optic lines, water lines, sewage lines, and transmission lines, as well as above ground facilities such as trails/pathways, roads, railroads, and canals. There are no strict “rules of thumb” that guide the planning for and mitigation of linear projects; each linear project needs to be considered on an individual basis, as appropriate mitigation measures for a given site depend on many factors including site type, site significance and eligibility criterion(a), the nature and extent of proposed impacts, the integrity of the features and deposits at a site, and the research questions being asked of the data recovery program. As a result, appropriate measures to avoid, minimize or mitigate adverse effects to historic properties¹ may differ widely between similar types of linear projects, depending upon the above factors.

The following guidelines for projects with linear ROWs provide assistance in defining a project’s area of potential effect, as well as minimal mitigation measures for historic properties that cannot be avoided. The lead Agency makes these determinations as appropriate under state and federal legislation. As always, the Agency needs to ensure that these measures are reviewed and concurred with by the SHPO, approved by the land managers and permitting entities (e.g., Arizona State Museum), and show consideration of concerns raised by Indian tribes and other consulting parties.

How to Define the Area of Potential Effect

The area of potential effect (APE) for a linear project ROW involves more than just the physical space occupied by the facility that is placed within the ROW. Keep in mind that ROW width and depth also need to be clearly defined in the description of the APE. The APE may extend well beyond the zone of physical disturbance, or direct impact area, and should include surface and subsurface impacts, as well as indirect (visual and auditory) and cumulative impacts. For example, a new fiber-optic line may only be six inches in diameter, requiring a foot-wide plowed furrow in which the cable is placed, but the above-ground area of disturbance could be anywhere from six to nine feet wide, or more, due to the tracked vehicles used to lay the cable (**Figure 1**). Lateral displacement in subsurface deposits can also occur during the plowed installation of a fiber-optic line and this area of displacement should be included within the definition of the indirect impacts for the APE.

¹ The term “historic property” used throughout these guidelines is defined as a prehistoric or historical cultural resource that is eligible for or listed in the Arizona or National Registers of Historic Places. This term includes Traditional Cultural Properties (TCPs).



Figure 1. The area of potential effect for direct impacts associated with this fiber-optic installation includes the ripped area containing the conduit (lower left), areas crossed by construction equipment (center), and room for support vehicles, such as the all-terrain vehicle, to maneuver (left).

We strongly recommend that buffer zones are included as part of the APE and be placed along the edges of linear ROWs. For example, buffer zones are especially helpful along road ROWs, because utility companies often place utility lines within the shoulders of roads. Road ROWs have, by design, a direct impact area typically falling within the central portion of the road ROW and a buffer zone characterized by the “shoulders” of the road. Delineating the shoulder of a road as a buffer zone through a historic property is not always enough to ensure that subsurface remains will

be avoided, however. This is especially true when utility lines are placed within the shoulder of the roads – this placement usurps the margin of avoidance that you may have intended the road shoulders to serve. Thus, when planning a buffer zone for a historic property within a road ROW, this buffer zone should extend beyond the shoulders of the road.

Also, future foreseeable impacts may occur within a linear ROW, for example that of a road or a trail, when maintenance activities such as grading and blading take place. The cumulative effect of these actions on historic properties within the ROW can become significant over time, and this effect needs to be taken into consideration when planning how to avoid, minimize or mitigate the adverse effects of a linear undertaking to a historic property.

It is also important that any ancillary components of the project (e.g., staging areas, utility access vaults and manholes, regenerating stations, access roads, etc.) be included within the APE for linear ROWs. These project components need to be examined for the presence of cultural resources and TCPs, just as does the linear portion of the APE.

Typical Identification Efforts

As with most undertakings, a literature search is the first step in the identification effort. Next, a field survey of the ROW will usually also be needed; for example, if the ROW has never been surveyed before, or if it has been surveyed, but the survey was conducted over 10 years ago, then a new and/or current survey is required. Survey reports for projects characterized by a linear ROW need to clearly articulate the different types of impacts and how each site within or near the ROW will be affected by the project. Large (or long) complex projects such as interstate pipelines or fiber-optic lines, in particular, may impact a variety of site types to differing degrees and in different ways. As part of this process, sketch maps for sites located within or along these ROWs should show the limits of the ROW corridor relative to site boundaries and features. In this way, reviewing entities will have a better understanding of the nature and extent of the proposed impacts on historic properties, as well as the percentage of each site that will be impacted; this will, in turn, help lead to the development of an appropriate level of effort during the mitigation process, if the site(s) cannot be physically avoided. Documentation should also note those sites that are located within close proximity to the ROW (but may actually be outside of the ROW boundaries), so that consideration can be given to indirect impacts that may occur to these nearby sites from lateral displacement, vibration, and other secondary effects, such as increased visitation if the project involves the opening up of a new road or some type of access corridor.

Sometimes identification efforts may require testing of the “footprint” of the feature (i.e., pipeline, road, utility poles, etc.) being installed or built. Identification testing may be used as a technique of discovery within a linear ROW, such as in areas where deeply buried sites are anticipated, but are not visible on the ground surface. Identification testing is also used in areas where site boundaries may not be clear on the surface due to vegetative cover, erosion, or modern activities, such as agricultural plowing, road grading and/or paving.

Typical Treatment Options

In general, avoidance, protection and long-term management of historic properties are always the preferred alternative. If however, surface and/or subsurface impacts will be part of the proposed linear project and cannot be avoided through alternatives such as re-routing around a site or spanning over a site, then the following situations will serve as guidelines in defining when different

mitigation strategies may apply, depending upon the nature of the impacts and the types of historic properties involved.

Generally speaking, ROWs through sites in which only surface disturbance will occur (e.g., trail/pathway construction) may require less intensive mitigation measures than those projects that will impact sites containing subsurface deposits. Impacts to sites that do not have a subsurface component (i.e., surficial sites) may be mitigated through detailed site mapping, photography and collection and/or in-field analysis of surface artifacts, if appropriate. If surface features, such as agricultural rock piles, surface structures, sleeping circles, etc., are present and cannot be avoided and protected, however, then data recovery (e.g., surface collection, excavation, etc.) at these features may be necessary prior to the implementation of the project.

For linear projects that involve the placement of a subsurface trench for the installation of underground utilities, the depth of the archaeological investigation within a site should extend as far as needed to reach culturally sterile strata. Thus, even if the construction trench will only extend 12 inches below the ground surface within a historic property, archaeological exploration (usually in the form of a backhoe trench) should extend below that level in order to ascertain if cultural deposits are present below the base of the construction trench. In this way, the amount of information recovered from the site is maximized.

I. If a Linear Project will Indirectly Impact a Historic Property:

- a. If a linear ROW will be crossing in close proximity to a historic property and impacts from lateral displacement and/or vibration are not anticipated, then we recommend that an archaeologist monitor construction adjacent to the site. A monitoring and discovery plan should be generated that details the strategy that will be followed during monitoring if a cultural resource is identified during the construction process. A monitoring report discussing the results of this monitoring program should be prepared for the lead agency to submit for review by its consulting parties.
- b. If there is any reason to suspect that the site boundaries may not be accurate, then it might be preferable to conduct identification testing within the ROW adjacent to historic properties rather than just monitor construction. In such cases, it would be good judgment to develop a data recovery plan in case significant subsurface remains are encountered during testing.
- c. In addition to monitoring for direct impacts from construction that occur near a site, indirect impacts also need to be considered, such as increased visitation of collectors and/or vandals, that might be facilitated by new construction of roads or other surface, linear ROWs. If indirect impacts can be anticipated, mitigation of those impacts should be incorporated into a data recovery plan, such as the use of fencing, vegetative screening to “hide” a sensitive historic property, surface collection of diagnostic artifacts, interpretive signage, etc.
- d. For linear projects that require routine maintenance, such as the grading/blading of access roads along a transmission line, the responsible agency needs to plan for the long-term protection of historic properties located within the ROW. For instance, many historic properties extend beyond a utility corridor, to one or both sides of the ROW. In such a case, the agency needs to ensure that their maintenance personnel are informed

of the location of historic properties and are educated that these sites need to be avoided by maintenance activities and be protected.

II. If a Linear Project will Directly Impact a Historic Property:

- e. If a ROW has the potential to cut through the central portion, or core area, of a historic property, the Agency should consider the feasibility of re-routing the ROW to the edge of the site in order to minimize adverse effects. Such a practice would also decrease the cost of archaeological mitigation.
- f. If a linear ROW will directly impact a historic property, then a phased data recovery program that meets state and/or federal standards will need to be conducted. The first step is to develop a research design with research questions that are appropriate to the historic context for the site. Data recovery should include detailed recordation, surface artifact collection and/or in-field analysis (as appropriate), and Phase I or data testing (such as backhoe trenching) to determine the nature, extent and depth of deposits in the areas of direct impact. Phase I testing should also be designed to better define site boundaries based upon surface artifact distributions and subsurface features/deposits. If the only subsurface impacts that will result from the construction project involve the cutting of the utility trench, we recommend that archaeologists be the entity to cut the trench and the trench should be monitored during cutting. Monitoring of a fiber optic line or other type of communication line that is being laid simultaneously as the path is being plowed is not effective, because the width of the plowed furrow is not wide enough to allow subsurface observation. Thus, even communication lines impacting a historic property usually need to be opened up by an archaeologist using a backhoe trench. If features are encountered within the trench walls during this Phase I testing, then the features should be explored only enough to determine their nature, integrity, and extent. A final phase of data recovery will then be needed to excavate features that can provide data to address the research questions being asked.

SHPO Position

As can be seen from the above discussion, the definition of appropriate APEs for linear project ROWs should include both primary and ancillary project areas that will have direct, indirect and/or cumulative impacts in order to best anticipate the nature and extent of potential disturbances to a historic property. In addition, in order to minimize the chances of inadvertent discovery during project implementation, as well as to maximize the protection of historic properties, we encourage you to plan and design your mitigation strategy to accommodate the worst-case scenario by thoroughly documenting sites within and near the ROW, incorporating buffer zones into your APE definition, and appropriately designing your data recovery programs to best address the nature of impacts and the types of sites involved. Agencies maintaining facilities (e.g., fiber optic lines, pipelines, transmission lines, etc.) within linear ROWs need to plan for the long term management and protection of the historic properties that are located within those ROWs.