

EXECUTIVE ORDER: ACCELERATING BROADBAND INFRASTRUCTURE DEPLOYMENT

**United States Department of Transportation, Federal Highway Administration,
Office of Policy and Governmental Affairs
Background Paper and Work Plan Strategy
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INTRODUCTION

In the past decade, there has been significant public and private investment in the expansion of broadband networks and capabilities. From 1996 to 2011, overall spending by telecommunication companies on networks was nearly \$1.2 trillion dollars.¹ Public investment in expansion projects has also been evident in many states, local areas, and at the national level. The American Recovery and Reinvestment Act (ARRA) of 2009 directed \$7.2 billion dollars towards increasing broadband deployment in underserved and rural areas.² Funding under ARRA has also supported the National Telecommunication and Information Administration (NTIA)'s State Broadband Initiative, which funds an entity in every state to facilitate the integration of broadband into regional and local economies, and the Broadband Data Improvement Act, which supports local data collection efforts to increase the availability and speed of services.

Furthermore, nationwide efforts by the Federal Communications Commission (FCC) and NTIA have included extensive work in the development of a National Broadband Map³, which provides details on the availability of broadband services by one's personal address, and the National Broadband Plan⁴, which shows the availability of spectrum and wireless services by state, county and tribal lands.⁵ NTIA and the FCC have also developed a 10-year plan for expanding wireless coverage by making available 500 megahertz of federal and non-federal spectrum by 2020 for expanded wireless broadband use.⁶

As a result of these initiatives, the United States has become a global leader in the deployment of broadband services. Today, more than 95 percent of the U.S. population has access to robust and diverse wired broadband infrastructure, including fiber to the home, cable and DSL, capable of supporting average download speeds (4Mbps).⁷

Although there has been great progress in the expansion of broadband, there are areas of the country that still continue to be underserved. These areas are primarily rural, and may be viewed as less profitable for service expansion, and/or are economically-depressed areas where many households might not be able to afford an Internet connection. A robust broadband infrastructure that connects businesses and institutions in these areas also serves as a strong economic development incentive.

In addition to expanding coverage, society's ever-evolving reliance on web-based technologies has increased the capacity demands of the broadband network. "Up to 50 percent of daily U.S.

¹ *US Telecom Association comments to the FCC*, GN Docket No., 12-228, iii, September 20, 2012

² *Planning and Broadband: Infrastructure, Policy and Sustainability*, American Planning Association, pg. 29, 2012

³ <http://www.broadbandmap.gov/>

⁴ <http://www.broadband.gov/>

⁵ <http://reboot.fcc.gov/spectrumdashboard/searchMapTribal.seam>

⁶ Third Interim Progress Report on the Ten-Year Plan and Time Table, U.S. Department of Commerce, October 2012

⁷ *US Telecom Association comments to the FCC*, GN Docket No., 12-228, iii, September 20, 2012

commercial Internet activity is absorbed by digital videos alone such as those on YouTube,” according to the International Center for Advanced Internet Research (iCAIR) at Northwestern University.⁸ Continued growth in online shopping and e-commerce activities also rely on the availability of a high-speed Internet connection.

A reliable broadband network is needed in this day and age to accommodate large amounts of data being collected and transmitted through Global Positioning System (GPS) and sensor-related technologies. Many of these technologies have been integrated into the day-to-day operations of the present transportation system through Intelligent Transportation System (ITS) initiatives. Some examples include the deployment of video cameras, variable message signs and advanced surveillance systems. Today, many traffic signals, which were once connected to an operations center via standard telephone lines, rely on a broadband connection. GPS is used to track freight movement and assist in vehicle routing, and many people now rely on their phones to access traveler information via a wireless broadband connection. Furthermore, a robust wireless connection is needed to support continuing research in the area of highway automation.

Access to broadband is essential to the Nation’s global competitiveness in the 21st century.⁹ Pursuant to the directives in the President’s Executive Order on Accelerating Broadband Deployment, this summary paper presents background information and initiatives by the USDOT, specifically the Federal Highway Administration (FHWA), that will be used in discussion to help facilitate the deployment of broadband in highway rights of way (ROW) within the agency and with other federal agencies and stakeholders involved in decisions related to access to Federal property.

Currently, there is no federal requirement for states to develop a broadband plan or to deploy broadband infrastructure. States and local agencies determine where and which utilities are allowed to use public right of way, which includes transportation facilities. The FHWA’s role in this effort will be to coordinate, communicate, identify and promote best practices in the field, and help facilitate the deployment of broadband in states, local areas and on tribal lands.

EXECUTIVE ORDER

⁸ *Planning and Broadband: Infrastructure, Policy and Sustainability*, APA, Report 569

⁹ *Executive Order: Accelerating Broadband Infrastructure Deployment*, June 2012

On June 14, 2012, President Barak Obama signed an Executive Order to facilitate the deployment of broadband technology on Federal lands, buildings, rights of way, federally-assisted highways and tribal lands. This Executive Order has created a working group composed of representatives from various federal agencies, including the USDOT, involved in decisions related to access to Federal property and rights of way. The goal is to reduce barriers to the expansion of broadband services in underserved communities. Like the other agencies involved, the USDOT is required to facilitate the deployment of broadband. Directives specific to the USDOT are identified below:

- **Review “dig once” requirements** in existing programs and identify a flexible set of best practices that can accommodate changes in broadband technology and minimize excavations.
- Work with State and local governments to **implement best practices** in the following: dig once requirements, using private investment in State ITS infrastructure, determining fair market value for rights of way on federally-assisted highways, and reestablishing any highway assets disturbed by installation.
- **Revise policies, procedures and requirements** with regard to dig once and similar policies to encourage the deployment of broadband infrastructure.
- After outreach to relevant nonfederal stakeholders, **review and if necessary, revise guidance to State DOTs** on allowing for-profit and other entities to accommodate or construct, safely and securely maintain, and utilize broadband facilities on State and locally-owned ROW.
- In consultation with the Working Group and AASHTO [American Association of State Highway and Transportation Officials], identify **an online platform** that States and counties can use to make their information available on ROW laws, joint occupancy guidelines and agreements.

In September 2012, a USDOT working group was created by the FHWA that includes representatives from various offices within the agency that have an interest and expertise in highway ROW planning and telecommunications. The offices include the following: Policy, Planning-Realty, Program Administration, Freight Management and Operations, Chief Counsel, Federal Lands, the Research and Innovative Technology Administration (RITA)-ITS Joint Program Office, and the Turner Fairbank Highway Research Center. The Working Group is lead by the Associate Administrator on policy. The group meets on a regular basis to review and provide input on the tasks and policy recommendations related to the Executive Order.

BACKGROUND ON THE NATIONAL HIGHWAY SYSTEM (NHS)

Currently, there are 4.05 million road miles in the United States. Seventy-five percent of these roads are owned and maintained by local governments; twenty percent are owned and maintained by States. Only about three percent are federally owned and maintained.

The nation's **Interstate System** is made up of 46,720 miles of highways, which accounts for only one percent of highway mileage but carries twenty-five percent of all highway traffic. The **enhanced National Highway System** is a 220,000 mile network that includes the Interstate System, all principal arterials, intermodal connectors and other roads important to strategic defense. The NHS carries the most highway freight and generates the most traffic in the U.S.

The figure below shows a general breakdown of road system categories.

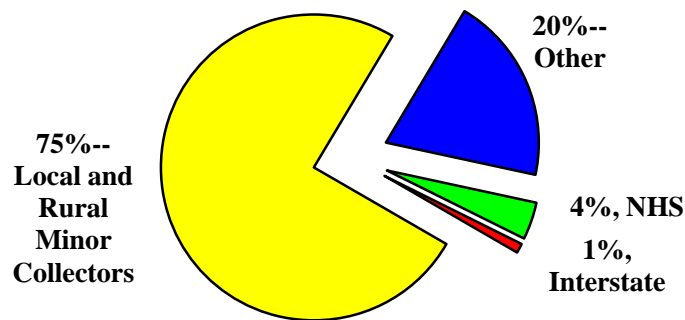


Figure 1 Road System Categories in the U.S.

Most road projects eligible to receive Federal-Aid Highway funding are on the NHS, with the exceptions of bridge projects and projects that involve safety improvements. The Federal Aid Highway Program (FAHP) is authorized by Congress (for a specified period of years) and is administered by the FHWA. It is funded through the Highway Trust Fund and functions as a reimbursable program in which states can incur costs and be reimbursed for eligible activities that are described in the legislation. Most funds are apportioned to states through a formula provided in the law. There are many program areas that fall under the FAHP that include activities related to road construction and maintenance, safety, transportation planning issues and research. The current legislation was signed into law by the President in 2012, *Moving Ahead for Progress in the 21st Century Act* (MAP-21), <http://www.fhwa.dot.gov/map21/summaryinfo.cfm>

Additional statistics that may be of interest include the following:

- About forty-three percent of total highway spending on construction is funded by the FAHP.

- Annually, reconstruction projects that use FAHP funding cover approximately 3300 route-miles on the NHS, which is approximately 2.0% of the entire NHS.
- About fifty-percent of all highway projects result in some kind of utility work.
- Most roads in urban areas are paved; however, about one-third of all road miles in the U.S. are still unpaved gravel or dirt roads.

BACKGROUND ON HIGHWAY RIGHT-OF-WAY

Highway rights-of-way (ROW) are typically highway agency-owned or leased land that is most often used to create a clear zone or travel lane within the roadway. AASHTO defines the clear zone as *a region around the roadway of sufficient width to allow 80 percent of vehicles that inadvertently leave the roadway to safely recover to the roadway*. The clear zone concept is recognized in FHWA policy and by state transportation officials.¹⁰ A State may restrict how often construction can be performed in a clear zone area for safety reasons.

Other than traffic lanes, the amount of ROW on the NHS is estimated to be approximately 5300 square miles (an area about the size of Connecticut). This estimate was calculated using a GIS analysis for the FHWA Carbon Sequestration Pilot Program (2008) to assess the impact of offsetting carbon emissions by adding native vegetation to highway ROW.¹¹ Another estimate was derived by FHWA in 2011 using Highway Performance Monitoring System (HPMS) data, which produced an average very close to the sequestration estimate.

Federal regulations essentially require that ROW acquired with federal dollars must be used for *transportation purposes*; however, an exception can be made by the Administrator (USDOT) to approve the ROW for other uses, as long as the uses are determined to be in the public interest and will not interfere with highway operations or impair the safety of the roadway.¹²

Over the past 30 years, federal regulations and guidance from the FHWA and guidance and best practices supported by AASHTO have been relatively consistent in protecting ROW from non-transportation uses, except for the accommodation of utilities. Utility accommodation has been a long-standing practice in the United States. Guidance on how these uses are accommodated within the ROW can be found in both federal and state codes, State DOT ROW Manuals and State Utility Accommodation Policies.

Use of ROW for Utilities

¹⁰ *Background Guidance on Longitudinal Telecommunications Installations on Limited Access Highway Right-of-Way*, RITA-ITS, 2000

¹¹ http://www.fhwa.dot.gov/environment/climate_change/mitigation/resources_and_publications/carbon_sequestration/index.cfm

¹² See 23 C.F.R. § 1.23(c).

States have their own rules and regulations pertaining to the use of the highway ROW. Maintaining the safety of the roadway is a priority, as well as sufficient access to the roadway. It should be noted that the majority of the utilities that are accommodated in the public ROW are not under the roadway, mainly to avoid costs and impact issues related to installation and maintenance. Only in densely populated areas, where space is limited, are utilities more commonly located under the roadway.

Freeway ROW is often sought by telecommunication companies and other types of utility companies because of its linearity, and permits can generally be obtained relatively quickly. Acquiring Interstate ROW requires less negotiation than privately-owned land; it connects cross-State and regional corridors that are prime markets for telecommunication services, has fewer crossing roads and provides open areas for construction. Also, companies would like to use freeway ROW because it significantly lowers their costs with obtaining and paying for easements to use private property or lease space on other rights of way (such as railroad ROW).

State DOT and AASHTO Policy generally limit utility placement within the highway ROW due to operational, safety and maintenance costs associated with utility placement; however, utility accommodation is permitted by some States where the financial risk is borne by the utility being accommodated.

Many states allow utilities to place their infrastructure on highway ROW at no charge. Others require some kind of compensation which can be in the form of cash through a fee or lease payment to the public agency, or through an in-kind arrangement. In the case of broadband utilities, this could be the use of conduit, dark fiber, lit fiber, communication service, or a combination of the above.

Private, for profit utilities may engage in a **shared-resource arrangement** with the public agency to install their facilities. Under this arrangement, the public agency charges the utility for the use of the ROW and allows them to access it as needed. The private company also bears most of the construction and maintenance costs.

In cases where States may not have legal authority to enter into a public-private partnership, barter arrangements can be set up as procurements rather than partnerships. Shared resource arrangements cannot be used if (1) State laws and policies restrict the accommodation of utilities or restrict private utilities on certain types of transportation facilities; (2) State law mandates free access for utilities; or (3) if public agencies cannot discriminate among utilities (e.g., allow access for telecommunications, but not gas and sewerage).

A 2002 summary on resource sharing involving broadband services for each State is available on the FHWA Realty web page: <http://www.fhwa.dot.gov/realestate/utillsr.htm>

Key Legislation and Guidance

Prior to 1988, Federal policy did not permit States to allow utilities to install their infrastructure on Interstate highway ROW. Recognizing that utility services were in the public interest, in 1988, amendments were made to **23 CFR, Part 645, Subpart B—Accommodation of Utilities** to allow States to expand their utility accommodation policies to include utility installation, as long as the installation did not adversely affect traffic or highway safety, or impair the use and aesthetic quality of the highway. Although the FHWA would still approve each State’s freeway utility accommodation plan, the State would determine whether to permit specific utility installations, consistent with its policy. While this Federal policy change opened the door to shared resource telecommunications projects, some States have not changed their laws and policies and still restrict the accommodation of utilities or restrict private utilities on certain types of transportation facilities.

In reference to telecommunication projects, current authority permits States to accommodate broadband conduit in highway ROW, **23 CFR 645 Part B** and **23 CFR Part 710, Subpart D**. States incorporate their policies for deploying broadband into their own utility accommodation plan, and FHWA approves the plan. In addition to federal highway policy and guidance, the **Telecommunications Act of 1996** (which was enacted to deregulate telecommunication services) requires telecommunication providers to allow competing vendors to have access to facilities for deploying broadband and mandates the removal of state and local barriers to telecommunication competition. State and local agencies are responsible for ensuring that projects that receive federal funding comply with the requirements of the Telecommunications Act.

Funding

State DOTs determine when and where to program Federal-Aid Highway Program (FAHP) funding on specific highway segments and projects as long as they are eligible. FAHP funding can be used for broadband deployment activities in the highway ROW under very limited conditions.

The installation of broadband within the highway ROW may be an eligible expenditure if the technology is used to meet a transportation-related purpose, such as connecting traffic control devices to an operations facility. Eligibility can also be related to projects that improve traffic flow, such as “channelization of traffic [and] traffic controls systems . . .” **23 U.S.C. § 101 (a)(4)(g)**. The U.S. Code defines transportation systems management and operations as a program, “to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system.” *Id.* **§ 101(a)(30)(A)**.

Use of ROW for Telecommunications

As the Internet and intranets have evolved over the years, increasing requirements for bandwidth intensive applications such as peer-to-peer file sharing and teleworking, as well as next generation TV and video services, have resulted in increasing demands for greater bandwidth and provisioning.¹³ This has led to numerous competing technologies to provide the bandwidth required to deliver broadband services. The two major communications project types installed within the ROW include wireline and wireless projects. Wireline projects include the construction of a physical network that provides a direct “wired” connection from the customer to the service supplier. Wireless projects use radio or microwave frequencies to provide a connection between the customer and the operator’s network, such as mobile phone connectivity.¹⁴ Optical fiber is superior to other broadband technologies relative to its bandwidth capabilities and reliability; however, because optical fiber is costly to install, wireless service is the preferred option when providing services in rural areas or in areas with more difficult terrain.

Telecommunication infrastructure is typically installed in public ROW that includes aboveground pole attachments on telephone and power lines and below ground in ROW for roads or water and sewer easements. Often the most expensive part of deploying a fiber network is the trenching required to bury cables. Coordinating this activity with other work in the ROW can result in significant cost savings,¹⁵ which will be covered in more detail in the next section on *Dig Once* policies/practices.

Increased competition in the telecommunications industry has resulted in transportation agencies leasing rather than purchasing communication infrastructure. Although owning telecommunications infrastructure had been the standard practice with transportation agencies, leasing has proven, in some cases, to be less costly. By leasing, a transportation agency can keep up with the technology without the burden of new purchases. In addition, certain states are accommodating fiber optic lines and/or wireless telecommunications facilities on freeway ROW through an in-kind arrangement, in exchange for use of the lines or facilities.¹⁶

Dig Once

Federal Policies/Guidance

¹³ *Broadband Technology Overview White Paper*, Corning, June 2005

¹⁴ *Broadband Technology Overview White Paper*, Corning, June 2005, pg 2

¹⁵ *Planning and Broadband: Infrastructure, Policy and Sustainability*, APA Report 569, July 2012, pg. 17

¹⁶ *Utility Relocation and Accommodation on Federal-Aid Highway Projects*, Chapter 2: Utility Accommodation

Dig Once requirements, as defined by the Executive Order, refer to “requirements designed to reduce the number and scale of repeated excavations for the installation and maintenance of broadband facilities in rights of way.” Although this definition provides a basis for understanding the concept of *dig once*, there are various interpretations of what may constitute a *dig once* policy and/or policies and practices to facilitate broadband deployment.

The USDOT-FHWA does not have a *dig once* policy, but has policies and procedures for accommodating utility facilities and private lines on federally-aided highway projects¹⁷ which support installation practices that minimize excavation. For matters of safety, related especially to utility projects deployed in the highway ROW clear zone area,¹⁸ the FHWA recommends restricting the installation of fiber optic facilities to only one time within the useful life of the facility, or to a point in time when the existing capacity of the conduit is full.¹⁹ The FHWA also has policies that encourage states, in the design of new highway facilities, to consider the utility service needs of the area and to identify the location of these services. They also strongly encourage states to work collaboratively with service providers on joint highway and utility planning (see Appendix).

In addition, the FHWA has had a number of initiatives over the years that have promoted the use of innovative practices and technologies that align with the *dig once* concept. In 2000, an initiative developed by the FHWA called Subsurface Utility Engineering (SUE)²⁰, promotes the use of industry standards for processes and practices to identify, verify, locate, inventory, map, analyze (using 3D modeling) subsurface information on utilities and integrate this information into the planning, development and implementation of highway projects. Other initiatives have included the support of federal demonstration projects on minimizing street cuts for utilities and mitigating the impacts of the construction on traffic operations, safety, pavement performance and maintenance.²¹

As a result of the Telecommunications Act, the Federal Communications Commission (FCC) has also provided guidance to States on installing fiber optic facilities that involve a competitive procurement process while minimizing excavation. The guidance indicates that States should notify third-party telecommunication providers regarding the opportunity to install their facilities in the ROW, and give adequate time to respond. In addition, the FCC guidance recommends that States should require the selected Contractor(s) to install spare fiber and empty conduit to accommodate reasonably anticipated

¹⁷ 23 CFR, Part 645, Subpart B.

¹⁸ Per AASHTO, the clear zone has been defined as a region around the roadway of sufficient width to allow 80 percent of vehicles that inadvertently leave the roadway to safely recover to the roadway.

¹⁹ *Utility Relocation and Accommodation on Federal-Aid Highway Projects, Chapter 2: Utility Accommodation, Guidance on Access Issues*, 2000.

²⁰ <http://www.fhwa.dot.gov/programadmin/sueindex.cfm>

²¹ Jon Obenberger, FHWA, 2012

future demand, and connection points (i.e. manhole or cabinets) where third parties can access the conduit.²²

Federal Lands

The Federal Lands Highway Office has a stewardship role to assure that lands acquired or incorporated within one of its projects, or work required that involves accommodating railroad or utility interests within project ROW, comply with prevailing Federal and State laws and regulations. Federal guidance is provided on utility accommodation in the ROW on Federal Lands and Tribal Trust Lands (which includes telecommunication services) in the FHWA Federal Lands Highway Project Design and Development Manual, updated in July 2012,

http://flh.fhwa.dot.gov/resources/manuals/pddm/Chapter_12.pdf

State Policies/Guidance

Each state is required by the FHWA to have a policy for the accommodation and relocation of utilities on Federal-Aid Highways. Once a State's policy is approved by the FHWA²³, any utility installation proposed on Federal-Aid highway projects in accordance with the State policy may be approved by the State without referral to the FHWA.²⁴ It should be noted that certain states restrict the installation of utilities within the ROW of certain types of facilities (e.g., freeways), and others have state laws which prohibit state funding to be spent on the accommodation or relocation of utilities which may be impacted by a highway project.

The FHWA recommends *A Guide for Accommodating Utilities Within Highway Right-of-Way and Roadside Design Guide*, published by the American Association of State Highway and Transportation Officials (AASHTO) as guidance on good practices; however, it is not mandated that provisions contained in these documents be included in a State's policy.

State utility accommodation policies apply to all Federal-Aid Highways, including the National Highway System (NHS) and non-NHS highways. Each state must submit a statement to the FHWA on 1) the state's legal authority of utilities to use and occupy State highway ROW, 2) the States' power to regulate such use, and 3) the policies the State proposes for accommodating utilities within the ROW.²⁵

²² *Utility Relocation and Accommodation on Federal-Aid Highway Projects, Chapter 2: Utility Accommodation, Guidance on Competitive Issues*, 2000

²³ A State's proposed utility accommodation plan is submitted to the FHWA Division Administrator, who reviews and approves it.

²⁴ *Utility Relocation and Accommodation on Federal-Aid Highway Projects, Chapter 2: Utility Accommodation, State Utility Accommodation Policies, Overall Process* (23 CFR 645.211)

²⁵ *Utility Relocation and Accommodation on Federal-Aid Highway Projects, Chapter 2: Utility Accommodation, State Utility Accommodation Policies, Criteria* (23 CFR 645.211).

A State may deny a utility's request to occupy highway ROW based on State law, regulations or practices.²⁶

Links to the State Department of Transportations' Utility Offices, utility coordination policies, and Utility Accommodation Policies are available on the FHWA website, http://www.fhwa.dot.gov/programadmin/utility_links.cfm

Examples of State *Dig Once* Initiatives

Most State DOTs do not have a *dig once* policy per se; however, there are various statewide and local initiatives and practices that promote the *dig once* concept.

It first should be noted that requests for utility permits to install or conduct work on existing facilities are primarily the responsibility of counties and cities, which may result in *dig once* initiatives having more applicability at the local level.

In addition, certain states do not have *dig once* initiatives because the utility infrastructure does not generally require it. For example, the majority of Vermont's telecommunications infrastructure is aerial- running on telephone poles. As a result, the state has a policy and comprehensive guidelines on pole attachments. However, the state currently has a project underway which includes the installation of six conduits in the Interstate ROW that would hold fiber for both long haul and in-state purposes.²⁷

There are also very few states that have required the installation of conduit as part of a road construction project. Most state and local strategies involve 1) formal coordination between state DOTs and utility companies and/or 2) barter arrangements that involve the trading of use of conduit for telecommunications services. The following states have been identified as having *dig once* policies, practices and/or legislation:

ARIZONA

On April 5, 2012, the Governor of Arizona signed the **Arizona Digital Highway Bill (SB1402)** to promote high-speed Internet access to citizens statewide for the purpose of advancing economic growth, education, public safety, healthcare and digital government in Arizona. The law allows the state to install broadband conduit in connection with rural highway construction if funds are received to cover the cost. The installation would not be paid for with existing highway or state general funds, but through a federally-funded, state program managed by the Arizona Strategic Enterprise Technology (ASET)'s Digital Arizona Project. The Arizona Department of Transportation (ADOT) would be

²⁶ *Utility Relocation and Accommodation on Federal-Aid Highway Projects*, Chapter 2: Utility Accommodation, State Utility Accommodation Policies, Agricultural Lands (23 CFR 645.211).

²⁷ This information provided by the Vermont Agency of Transportation, by a request from the League of Cities

requested to bury multiple empty fiber-optic conduits along specified state highways using existing ROW wherever possible. The conduit would be leased to broadband providers by the Project on a cost recovery basis. The providers would be expected to agree to install fiber before the conduits were constructed. The outcome of the work would result in significantly lower costs to providers for constructing long-distance capacity to reach rural communities. Expectations are that lower costs would encourage new investments in broadband services by providers, thus accelerating and improving the availability of high-capacity digital services in underserved areas in Arizona. It is expected to take a number of years to fully implement this program throughout the rural areas of the state.

UTAH

The Utah DOT (UDOT) has been instrumental in facilitating the expansion of broadband infrastructure in remote areas of the State through their efforts in installing and trading access to fiber conduit. For the past five years, UDOT has been facilitating cooperative fiber and conduit trades with broadband service providers and has established best practices for laying conduit for fiber during road construction projects. These practices have greatly expanded the State's communications infrastructure without major capital investment, resulting in real cost-savings for Utah taxpayers. The UDOT model has given the State a competitive advantage by enabling the development of next-generation broadband services available in both urban and rural areas.

VIRGINIA

The Virginia DOT (VDOT) is engaged in a fiber optic resource sharing agreements with private companies to install conduit and/or fiber in its Interstate right-of-way in exchange for the use of company-owned conduit and/or fiber in areas where the state does not have broadband infrastructure. Under the terms of the agreement, the private sector is granted access to Interstate and primary road ROW to deploy a commercial fiber optic network. In exchange, VDOT receives fiber optic telecommunications infrastructure and services necessary to support ITS on a statewide basis.²⁸

Although Virginia does not have a *dig once* policy, long-term plans for the state include a recommendation for VDOT to integrate the installation of underground fiber conduit into the construction and reconstruction of transportation infrastructure by requiring the installation of broadband conduit.²⁹

In addition, there have been many efforts locally in communities across the state to promote broadband deployments which have been supported by an IT program based at Virginia Tech, called *eCorridors*, <http://www.ecorridors.vt.edu/>.

²⁸ <http://trid.trb.org/view.aspx?id=507644>

²⁹ <http://www.virginiadot.org/projects/vtrans/Chapter5.pdf>, pg. 76

MINNESOTA

The Minnesota DOT has an extensive policy on the accommodation of fiber optic facilities on Interstate ROW that includes an open and competitive process which allows providers to install their infrastructure at the time the ROW is open for other utility work.³⁰

In November 2011, Minnesota Governor, Mark Dayton, created the Task Force on Broadband. The task force was created to develop policies to promote the expansion of broadband access in Minnesota. In 2012, a sub group of the task force (Coordination Across all Levels of Government Subgroup), focused on *dig once* policy and how it might be applied in Minnesota to advance broadband services in underserved areas. The sub group examined ROW and permitting issues in the state with input from experts at the county and state level governments.

The Task Force's next action on Dig Once will be to convene conversations with the state ROW managers to determine where there may be opportunities to encourage broadband construction in underserved areas of the state. The Task Force is currently working with the state broadband office and with Connect Minnesota to identify and map where state ROW coincide with areas that have the greatest need for broadband.³¹

Cities

Baltimore has made conduit installation an integral part of road construction and repair. The City owns and maintains a system of underground conduits to encase electric, fiber optics, and telecommunication cables and is now in the process of completing a comprehensive survey of the system using state-of-the-art GIS mapping technology. Mayor Rawlings-Blake personally inspected survey work conducted by the Department of Transportation and City contractors at one of the City's 14,000 manhole structures. "Baltimore is the best city in America to invest in with a new blazing fast internet infrastructure," Mayor Rawlings-Blake said. "There is no doubt that our commitment to maintaining and enhancing our City's conduit system makes Baltimore a very attractive choice for Google and other potential providers of broadband infrastructure."

Further examples of policies and/or practices related to *dig once* have been identified by the FCC in the National Broadband Plan.³² For example, the city of **San Francisco** was recognized for having a "trench once" policy, whereby a 5-year moratorium is placed on opening up a road bed once the trench along that road bed has been closed.⁴⁷ San Francisco's notification process ensures that all interested parties have the opportunity to install conduits and cabling in the open trench. The city of **Boston** was also

³⁰ *Rural Interstate Corridor Communications Study*, pg. 8-6

³¹ <http://mn.gov/commerce/topics/Broadband/Governors-Broadband-Task-Force.jsp>, pg. 9

³² <http://www.broadband.gov/plan/6-infrastructure/>, Chapter 6

recognized for implementing a “Shadow Conduit Policy,” which establishes a coordination process that requires the first company that requests a trench to invite other companies to add additional empty (or “shadow”) conduits for future use by either the city of Boston or a later entrant. As a part of **Chicago’s Broadband Strategy**, the city promotes a process that includes the following elements: 1) deploying excess conduit when streets are opened for other infrastructure and public works projects, 2) incorporating specifications for conduit in the design phase 3) obtaining advance notice of private utility projects, and 4) making conduit available for use by government agencies and Internet service providers.³³

Outcomes of *Dig Once* Policies

The FHWA has indicated that ninety percent of the cost of deploying broadband is when the work requires significant excavation of the roadway. This means that it is 10 times more expensive to add broadband after a road is already built.³⁴ The cost is minimal; however, if the installation is not underground or if the conduit only need be placed 2-3 feet (or less) under the ground. In addition, most private utility infrastructure is installed outside of the highway ROW.

The FCC has indicated that the largest cost element for deploying broadband via fiber optic cable is the cost of placement, such as burying the fiber in the ground, rather than the cost of the fiber itself. The cost savings in limiting the number of times a road must be opened up to deploy broadband is noted as the greatest advantage of implementing *dig once* practices and policies. These advantages, however, apply primarily to areas of high density, such as urban environments, where the entire ROW is paved and the only option to install cable is below ground. In addition, if utilities are installed underground within the ROW, but are not under the roadway, it is easier to install and less costly.

Disadvantages of *dig once* policies include the possibility that empty conduit may remain unused. This has been the case in projects in Virginia and California. In Virginia, there were certain restrictions on telecommunication providers not being able to lease infrastructure when providing services to government agencies. The Virginia DOT ended up having to sell portions of the conduit system, which took years. Additionally, it could take years for companies to develop a need for the use of the conduit. With no active fiber inside the conduit to provide incentive for states and companies to protect conduit from road work and other hazards, conduit might become damaged and unusable. Other noted disadvantages include additional administrative costs to state DOTs and local governments for maintenance and leasing.

It also should be noted that due to the limited the number of new, federally-funded roadway and reconstruction projects that are undertaken annually the NHS, a federal *dig once* policy tied to FAHP funding may have a negligible impact.

³³ http://www.broadband.gov/docs/ws_state_local_governments/bhatt.pdf

³⁴ <http://blandinonbroadband.org/2012/06/14/klobuchar-warner-initiative-to-dig-once-for-broadband-infrastructure-advanced-by-presidents-executive-order/>

When considering *dig once* policy development, a recent GAO report on *Broadband Conduit Deployment* emphasized that “flexibility is needed to accommodate states’ and localities’ existing laws, policies and broadband deployment programs, including the ability to set their own conduit access and leasing rates.”

Planning and coordination with local officials is a critical step to address a number of considerations that should be taken into account in determining the current and future need for broadband services. Considerations should include whether it is in the public interest to accommodate broadband in the ROW, the location of access points and the appropriate number and size of conduits, and how to make the installed conduit more useful for telecommunication companies.

Pursuant to the Executive Order, the USDOT will support State and local government efforts in identifying, developing and implementing best practices for *dig once*. USDOT is currently in the process of identifying and reviewing best practices to help facilitate the deployment of broadband within the highway ROW.

Fair Market Value of ROW

Section 5507 of the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) directed the Secretary of Transportation, in cooperation with the Secretary of Commerce, State Departments of Transportation, and other appropriate State, regional and local officials, to assess the feasibility of installing fiber optic cable and wireless communication infrastructure along three multistate Interstate System route corridors. This directive included the task of identifying the monetary value of rights of way necessary for the installation of high-speed telecommunications infrastructure.

White papers that have been completed as a result of the directive have concluded that although Interstate ROW may offer unique advantages for broadband deployment, assessing the value of ROW is difficult as corridors have disparate characteristics that are often hard to compare;³⁵ furthermore, the valuation of highway land should be managed under unique state laws and constitutional provisions, as the process for determining the value of the ROW is site specific, and best assessed by an experienced appraiser with knowledge of the conditions of the specific area.

It is generally accepted in the appraisal profession that the basis of corridor valuation lies in the sales comparison approach, which is derived by comparing the property being appraised to similar properties that have been sold recently. The “across the fence” or “ATF” value forms the basic building block of the corridor valuation process, which is the value of the land through which the corridor passes. The second element of value is the “corridor” or “enhancement” factor which is applied to the ATF value to arrive at an estimated value of the transportation/utility corridor.³⁶

Levels of compensation to the state should be based on valuation of **access** to the public right of way, including consideration of support costs, and valuation of the resource provided by the private partner.³⁷ Questions that might be asked are: what is the ROW worth to the user? And what is the user willing to pay for it in a competitive environment?³⁸

Defining the value of access means taking into account the costs of installing the infrastructure, particularly differences among alternative ROW, and variations in context and the monetized value of any perceived advantages or disadvantages of highway ROW over the next best alternative. Timing is

³⁵ *Rural Interstate Corridor Communications Study: Report to States, 2009*

³⁶ Information provided by Arnold Feldman, FHWA Planning-Realty

³⁷ *Shared Resources: Sharing Right-of-Way for Telecommunications, 1996, pg. 12*

³⁸ *Rural Interstate Corridor Communications Study: Report to States, 2009*

an important factor because demand for ROW of any kind strengthens or weakens as market situations shift, competition changes and technology advances.³⁹

Valuation of the private resources provided in barter arrangements helps the public sector determine whether it is receiving a fair market price for its resource. There are four ways to gauge public value: public sector avoided cost, out-of-pocket cost to the private partner, market value or use value.

It should be noted that some flexibility may be allowed in leasing or disposing of real property at less than fair market value. Although 23 CFR section 710.403(d) states: “Acquiring agencies shall charge current fair market value or rent for the use or disposal of real property interests...”, section 710.403(d)(1) states that exceptions to this requirement may be allowed with FHWA approval, when the [State DOT] clearly shows that an exception is in the overall public interest for social, environmental, or economic purposes; nonproprietary governmental use; or uses under 23 U.S.C. 142 (f), Public Transportation.” A State DOT’s ROW manual may include criteria for evaluating leases and disposals at less than fair market value.

Reestablishing Highway Assets

If a highway project requires work to restore the construction site to its original condition, such work would generally be considered an eligible expense under the Federal-Aid Highway Program if the work is the result of a transportation project. The laws and policies of a State DOT, in addition, determine if the work would be eligible for reimbursement. It should be noted that any work in addition to restoring the site to its original condition is not an eligible expense under the FAHP. The agreement between the State or local agency and the utility would determine the details of reestablishing highway assets disturbed by installations.

Allowing For-Profit and Other Entities to Accommodate or Construct Broadband Facilities on State and Locally-Owned ROW

The Telecommunications Act (TCA) of 1996 ended an era of dependency on monopolistic providers and fostered the expansion of high-quality telecommunications suppliers in most major urban areas of the country. As a result, the costs of services have been reduced and the kinds of services offered have been expanded.⁴⁰

When a state decides to allow the installation of telecommunications on the freeway ROW by a commercial entity that will sell telecommunications in one form or another, the State then has the

³⁹ *Shared Resources: Sharing Right-of-Way for Telecommunications*, 1996, pg. 12, 13

⁴⁰ *Getting More for Your Money*, Public Roads, March/April 2001.

added responsibility to ensure that its actions are consistent with the competition concerns addressed in Section 253 of the TCA.⁴¹

States have the right to manage their ROW, which includes determining the time, place manner, etc., of the installation of telecommunications. The FHWA requires States to deal with a broad range of issues in their exercise of ROW management, including competition-related issues. Further guidance recommends that states should allow a third party's fiber to be installed when the ROW is open for construction, and provide reasonable notice to other competitors about the opportunity to install fiber.

Over the years, a number of states have altered their utility accommodation policies to allow longitudinal access to their limited access highway ROW for telecommunications, which is usually fiber optic cable.⁴² Many projects developed by the states have been implemented through public-private partnerships in the form of **shared resource agreements**. As noted previously, under this arrangement, the public agency allows the private company to install its infrastructure on the ROW and to access it as needed, and the private company bears most of the construction and maintenance costs. The USDOT has worked closely with the FCC in the past to develop guidance for States that wish to engage in a shared resource project that involves telecommunications (Appendix B).

Public private partnerships are encouraged by the USDOT.

Use of Private Investment in State ITS Infrastructure

Shared Resource agreements can be a cost-effective means for State DOT's to obtain telecommunications infrastructure necessary for Intelligent Transportation Systems (ITS). Telecommunications infrastructure capacity is essential for the integration of both equipment and data components required for State and metropolitan traffic operation systems. Such systems may include traffic control devices, closed circuit television, radar detectors, pavement sensors, etc.⁴³ A complete list of systems and their applications has been included in this report (Appendix C).

In addition, a common framework for planning, defining, and integrating ITS has been provided by the USDOT which will assist agencies in the development of regional ITS architectures, and to further the understanding of how an individual project, such as a traffic signal control project fits into a larger regional transportation management context. Materials are available through the USDOT-RITA, <http://www.iteris.com/itsarch/>

⁴¹ *Background and Guidance on Longitudinal Telecommunications Installations on Limited Access Highway Right of Way*, ITS JPO, December 2000.

⁴² *Telecommunications Guidance on Longitudinal Telecommunications Installations on Limited Access Highway Right-of-Way*, 2000.

⁴³ *Background and Guidance on Longitudinal Telecommunications Installations on Limited Access Highway Right of Way*, ITS JPO, December 2000.

Private compensation to the public sector may be in the form of goods (in-kind), cash or combinations of both. In-kind services may include fiber-optic conduit or strands, towers/poles, antennas, electronic equipment, software, operations and maintenance.⁴⁴

As most shared resource arrangements are essentially public private partnerships, states must have legislation that allows for such agreements.

USDOT Directed Broadband Studies

Section 5507 of SAFETEA-LU directed the Secretary of Transportation, in cooperation with the Secretary of Commerce, State Departments of Transportation, and other appropriate State, regional and local officials, to assess the feasibility of installing fiber optic cable and wireless communication infrastructure along three multistate Interstate System route corridors, including Interstate Routes 90, 20 and 91, for improved communication services to rural communities along these corridors. The *Rural Interstate Corridor Communications Study Report to Congress*, released in 2007, is available online at: http://ops.fhwa.dot.gov/int_its_deployment/rural/congrpt0807/report_to_congress.pdf

A second study, available online at:

<http://www.ops.fhwa.dot.gov/publications/fhwahop09021/index.htm>), is the 2009 “Report to the States,” providing a summary that includes more of the technical information uncovered during the Rural Interstate Corridor Communications Study.

Conclusion

In response to the directives outlined in the Executive Order, the USDOT-FHWA Office of Policy, with assistance from the agency’s internal working group, has provided the information presented in this paper as an overview of the deployment of broadband in highway ROW from a federal perspective. The intent of this compilation is for it to be used internally for discussion purposes and to be shared with other federal agencies involved in decisions related to access to Federal property and rights of way, with the goal to reduce barriers to the expansion of broadband services in underserved communities.

⁴⁴ *Shared Resources: Sharing Right of Way for Telecommunications, Guidance on Legal and Institutional Issues*, pg. 10, 1996

Work Plan to Implement the Executive Order on Accelerating Broadband Infrastructure Deployment

USDOT-FHWA Work Plan, October 2012

The USDOT Work Plan identifies various tasks that will be undertaken over the next year by the working group to address the directives outlined in the Executive Order.

Questions that will be further addressed by the working group through the tasks outlined in the work plan include the following:

- How can the USDOT utilize highway ROW to facilitate broadband services?
- What is the federal role in a “dig once” policy?
- What are best cases in broadband deployment among the states and local areas?
- What model tools are in place to facilitate broadband deployment?
- What incentives or changes in federal policy may be needed to encourage states to deploy broadband in the ROW?
- How does the USDOT communicate and disseminate information to states and local entities?

GOAL

Reduce barriers to the expansion of broadband services in underserved communities by facilitating the deployment of broadband within highway rights of way (ROW).

OBJECTIVES

- A. Generate ideas on how the Federal Highway Administration (FHWA) can facilitate broadband deployment within the highway right of way (ROW) in state and local areas.

- B. Make recommendations and/or implement ideas with respect to Department of Transportation (DOT) policy.
- C. Publish best cases and share information related to the facilitation of broadband deployment within highway ROW using an existing online platform.

TASKS

1. Review and summarize federal policies pertaining to broadband deployment within the ROW
2. Identify and review literature on the deployment of broadband within the ROW, to include information on the following:
 - Facilitation of deploying broadband in the ROW
 - Dig Once requirements
 - Use of private investment in State ITS infrastructure
 - Determining fair market value for ROW on federally-assisted highways
 - Reestablishing any highway assets disturbed by installation
 - Allowing for-profit and other entities to accommodate or construct broadband facilities on State and locally-owned rights of way

Deliverable: A summary paper, to include the DOT work plan, to be provided to the Interagency Working group for the development of a strategy for deploying broadband (due in mid-December 2012).

3. Obtain case studies and identify effective practices through the following:
 - Phone calls and information requests to stakeholder Associations
 - An AASHTO/FHWA domestic scan on broadband deployment in the ROW
--Selection of applications for scanning projects to occur in December 2012

Deliverable: A summary paper that presents best cases and effective practices in the deployment of broadband in the highway ROW (due at the end of February 2013).

4. Hold a workshop to engage stakeholders in a structured conversation.
 - a. Identify and invite stakeholders

- b. Prepare an agenda which may include:
 - A discussion of best cases
 - Identification of issues and barriers to implementation
 - Identification of incentives
 - Discussion of mitigation strategies
 - Development of recommendations for policy

Deliverable: Workshop notes

5. Identify recommendations, which may include:
 - A communication from the Federal Highway Administrator to the Division Offices about deploying broadband in highway ROW and dig once policies
 - A communication from FHWA to the States about deploying broadband in highway ROW
 - Holding a webinar for FHWA Divisions Offices and/or State DOTs
 - Collaboration with AASHTO, the National Association of Development Officials, National Association of Counties, National League of Cities to implement activities that will facilitate Broadband deployment.

Deliverable: A List of recommendations

6. Use an existing online platform to publish best cases and share information about the Order
 - Make available online information, presentations, and/or other materials relevant to the implementation of the Order
 - Explore the possibility of adding information on deploying broadband in the ROW to the Federal-Aid Essentials site, for local public agencies:
<http://www.fhwa.dot.gov/federal-aidessentials/catmod.cfm?category=rightofw>
 - Use the FHWA Realty site (links to state ROW manuals), or Association sites/links, as a place for information
7. Prepare a status report

Deliverable: A status report on the FHWA efforts to facilitate broadband deployment per the Executive Order (1st week of June)

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Appendices

Appendix (A)

The Federal Highway Administration has policies and procedures for accommodating utility facilities and private lines on the right-of-way of Federal-aid or direct Federal highway projects⁴⁵ (23 CFR, Part 645, Subpart B).

Policies include the following (645.205):

- Utility facilities may be accommodated on the right-of-way of a Federal-aid or direct Federal highway project when such use and occupancy of the highway ROW does not adversely affect highway or traffic safety, or otherwise impair the highway or its aesthetic quality, and do not conflict with the provisions of Federal, State or local laws or regulations.
- Since by tradition and practice highway and utility facilities frequently coexist within common right-of-way or along the same transportation corridors, it is essential in such situations that these public service facilities be compatibly designed and operated. In the design of new highway facilities consideration should be given to utility service needs of the area traversed if such service is to be provided from utility facilities on or near the highway. Similarly the potential impact on the highway and its users should be considered in the design and location of utility facilities on or along highway right-of-way. Efficient, effective and safe joint highway and utility development of transportation corridors is important along high speed and high

⁴⁵ Federal funding for highways is provided to the states primarily through grant programs collectively known as the Federal-Aid Highway Program. In a joint federal-state partnership, FHWA, a division within the U.S. DOT, administers the Federal-Aid Highway Program and distributes most of the funding to the states through annual apportionments established by statutory formulas. Once apportioned, the funds are available for obligation for construction, reconstruction, and improvement of highways on eligible routes, GAO Report-12-687R , pg. 3

volume roads, such as major arterials and freeways, particularly those approaching metropolitan areas where space is increasingly limited. Joint highway and utility planning and development efforts are encouraged on Federal-aid highway projects.

- The manner in which utilities cross or otherwise occupy the right-of-way of a direct Federal or Federal-aid highway project can materially affect the highway, its safe operation, aesthetic quality, and maintenance. Therefore, it is necessary that such use and occupancy, where authorized, be regulated by highway agencies in a manner which preserves the operational safety and the functional and aesthetic quality of the highway facility. This subpart shall not be construed to alter the basic legal authority of utilities to install their facilities on public highways pursuant to law or franchise and reasonable regulation by highway agencies with respect to location and manner of installation.
- When utilities cross or otherwise occupy the right-of-way of a direct Federal or Federal-aid highway project on Federal lands, and when the right-of-way grant is for highway purposes only, the utility must also obtain and comply with the terms of a right-of-way or other occupancy permit for the Federal agency having jurisdiction over the underlying land.

Requirements include the following (645.209):

- *Safety.* Highway safety and traffic safety are of paramount, but not of sole, importance when accommodating utility facilities within highway right-of-way. Utilities provide an essential public service to the general public. Traditionally, as a matter of sound economic public policy and law, utilities have used public road right-of-way for transmitting and distributing their services. The lack of sufficient right-of-way width to accommodate utilities outside the desirable clear zone, in and of itself, is not a valid reason to preclude utilities from occupying the highway right-of-way. However, due to the nature and volume of highway traffic, the effect of such joint use on the traveling public must be carefully considered by highway agencies before approval of utility use of the right-of-way of Federal-aid or direct Federal highway projects is given. Adjustments in the operating characteristics of the utility or the highway or other special efforts may be necessary to increase the compatibility of utility-highway joint use. The possibility of this joint use should be a consideration in establishing right-of-way requirements for highway projects. In any event, the design, location, and manner in which utilities use and occupy the right-of-way of Federal-aid or direct Federal highway projects must conform to the clear roadside policies for the highway involved and otherwise provide for a safe traveling environment as required by 23 U.S.C. 109 (l)(1).
- *New above ground installations.* On Federal-aid or direct Federal highway projects, new above ground utility installations, where permitted, shall be located as far from the traveled way as possible, preferably along the right-of-way line. No new above ground utility installations are to be allowed within the established clear zone of the highway unless a determination has been made by the transportation department that placement underground is not technically feasible or is unreasonably costly and there are no feasible alternate locations. In exceptional situations

when it is essential to locate such above ground utility facilities within the established clear zone area of the highway, appropriate countermeasures to reduce hazards shall be used. Counter-measures include placing utility facilities at locations which protect or minimize exposure to out-of-control vehicles, using breakaway features, using impact attenuation devices, using delineation, or shielding.

- *Installations within freeways.*
 1. Each State transportation department shall submit an accommodation plan in accordance with §§ 645.211 and 645.215 which addresses how the State transportation department will consider applications for longitudinal utility installations within the access control lines of a freeway. This includes utility installations within interchange areas which must be constructed or serviced by direct access from the main lanes or ramps. If a State transportation department elects to permit such use, the plan must address how the State transportation department will oversee such use consistent with this subpart, title 23 U.S.C., and the safe and efficient use of the highways.
 2. Any accommodation plan shall assure that installations satisfy the following criteria:
 - a. The effects utility installations will have on highway and traffic safety will be ascertained, since in no case shall any use be permitted which would adversely affect safety.
 - b. The direct and indirect environmental and economic effects of any loss of productive agricultural land or any productivity of any agricultural land which would result from the disapproval of the use of such right-of-way for accommodation of such utility facility will be evaluated.
 - c. These environmental and economic effects together with any interference with or impairment of the use of the highway in such right-of-way which would result from the use of such right-of-way for the accommodation of such utility facility will be considered.
 - d. [Reserved]
 - e. A utility strip will be established along the outer edge of the right-of-way by locating a utility access control line between the proposed utility installation and the through roadway and ramps. Existing fences should be retained and, except along sections of freeways having frontage roads, planned fences should be located at the freeway right-of-way line. The State or political subdivision is to retain control of the utility strip right-of-way including its use by utility facilities. Service connections to adjacent properties shall not be permitted from within the utility strip.
 3. Nothing in this part shall be construed as prohibiting a transportation department from adopting a more restrictive policy than that contained herein with regard to longitudinal utility installations along freeway right-of-way and access for constructing and/or for servicing such installations.

- *Uniform policies and procedures.* For a transportation department to fulfill its responsibilities to control utility use of Federal-aid highway right-of-way within the State and its political subdivisions, it must exercise or cause to be exercised, adequate regulation over such use and occupancy through the establishment and enforcement of reasonably uniform policies and procedures for utility accommodation.
- *Private lines.* Because there are circumstances when private lines may be allowed to cross or otherwise occupy the right-of-way of Federal-aid projects, highway agencies shall establish uniform policies for properly controlling such permitted use. When permitted, private lines must conform to the provisions of this part and the provisions of 23 CFR 1.23(c) for longitudinal installations.
- *Direct Federal highway projects.* On direct Federal highway projects, the FHWA will apply, or cause to be applied, utility and private line accommodation policies similar to those required on Federal-aid highway projects. When appropriate, agreements will be entered into between the FHWA and the transportation department or other government agencies to ensure adequate control and regulation of use by utilities and private lines of the right-of-way on direct Federal highway projects.
- *Projects where State lacks authority.* On Federal-aid highway projects where the State transportation department does not have legal authority to regulate highway use by utilities and private lines, the State transportation department must enter into formal agreements with those local officials who have such authority. The agreements must provide for a degree of protection to the highway at least equal to the protection provided by the State transportation department's utility accommodation policy approved under the provisions of § 645.215(b) of this part. The project agreement between the State transportation department and the FHWA on all such Federal-aid highway projects shall contain a special provision incorporating the formal agreements with the responsible local officials.
- *Scenic areas.* New utility installations, including those needed for highway purposes, such as for highway lighting or to serve a weigh station, rest area or recreation area, are not permitted on highway right-of-way or other lands which are acquired or improved with Federal-aid or direct Federal highway funds and are located within or adjacent to areas of scenic enhancement and natural beauty. Such areas include public park and recreational lands, wildlife and waterfowl refuges, historic sites as described in 23 U.S.C. 138, scenic strips, overlooks, rest areas and landscaped areas. The State transportation department may permit exceptions provided the following conditions are met:
 1. New underground or aerial installations may be permitted only when they do not require extensive removal or alteration of trees or terrain features visible to the highway user or impair the aesthetic quality of the lands being traversed.
 2. Aerial installations may be permitted only when:
 - a. Other locations are not available or are unusually difficult and costly, or are less desirable from the standpoint of aesthetic quality,
 - b. placement underground is not technically feasible or is unreasonably costly, and

- c. The proposed installation will be made at a location, and will employ suitable designs and materials, which give the greatest weight to the aesthetic qualities of the area being traversed. Suitable designs include, but are not limited to, self-supporting arm-less, single-pole construction with vertical configuration of conductors and cable.
 3. For new utility installations within freeways, the provisions of paragraph (c) of this section must also be satisfied.
- *Joint use agreements.* When the utility has a compensable interest in the land occupied by its facilities and such land is to be jointly occupied and used for highway and utility purposes, the transportation department and utility shall agree in writing as to the obligations and responsibilities of each party. Such joint-use agreements shall incorporate the conditions of occupancy for each party, including the rights vested in the transportation department and the rights and privileges retained by the utility. In any event, the interest to be acquired by or vested in the transportation department in any portion of the right-of-way of a Federal-aid or direct Federal highway project to be vacated, used or occupied by utilities or private lines, shall be adequate for the construction, safe operation, and maintenance of the highway project.
- *Traffic control plan.* Whenever a utility installation, adjustment or maintenance activity will affect the movement of traffic or traffic safety, the utility shall implement a traffic control plan and utilize traffic control devices as necessary to ensure the safe and expeditious movement of traffic around the work site and the safety of the utility work force in accordance with procedures established by the transportation department. The traffic control plan and the application of traffic control devices shall conform to the standards set forth in the current edition of the "Manual on Uniform Traffic Control Devices" (MUTCD) and 23 CFR part 630, subpart J. This publication is available for inspection and copying from the FHWA Washington Headquarters and all FHWA Division Offices as prescribed in 49 CFR part 7.
- *Corrective measures.* When the transportation department determines that existing utility facilities are likely to be associated with injury or accident to the highway user, as indicated by accident history or safety studies, the transportation department shall initiate or cause to be initiated in consultation with the affected utilities, corrective measures to provide for a safer traffic environment. The corrective measures may include changes to utility or highway facilities and should be prioritized to maximum safety benefits in the most cost-effective manner. The scheduling of utility safety improvements should take into consideration planned utility replacement or upgrading schedules, accident potential, and the availability of resources. It is expected that the requirements of this paragraph will result in an orderly and positive process to address the identified utility hazard problems in a timely and reasonable manner with due regard to the effect of the corrective measures on both the utility consumer and the road user. The type of corrective measures is not prescribed. Any requests received involving Federal participation in the cost of adjusting or relocating utility facilities pursuant to this paragraph shall be subject to the provisions of 23CFR part 645, subpart A, Utility Relocations, Adjustments and Reimbursement, and 23 CFR part 924, Highway Safety Improvement Program.

- *Wetlands.* The installation of privately owned lines or conduits on the right-of-way of Federal-aid or direct Federal highway projects for the purpose of draining adjacent wetlands onto the highway right-of-way is considered to be inconsistent with Executive Order 11990, Protection of Wetlands, dated May 24, 1977, and shall be prohibited.
- *Utility determination.* In determining whether a proposed installation is a utility or not, the most important consideration is how the STD views it under its own State laws and/or regulations.

State Transportation Department Accommodation Policies (645.211)

The FHWA should use the current editions of the AASHTO publications, "A Guide for Accommodating Utilities Within Highway Right-of-Way," and *Roadside Design Guide* to assist in the evaluation of adequacy of STD utility accommodation policies. These publications are available for inspection from the FHWA Washington Headquarters and all FHWA Division Offices as prescribed in 49 CFR part 7. Copies of current AASHTO publications are available for purchase from the American Association of State Highway and Transportation Officials, Suite 225, 444 North Capitol Street, NW., Washington, DC 20001, or electronically at <http://www.aashto.org/>. At a minimum, such policies should make adequate provisions with respect to the following:

- Utilities must be accommodated and maintained in a manner which will not impair the highway or adversely affect highway or traffic safety. Uniform procedures controlling the manner, nature and extent of such utility use should be established.
- Consideration should be given to the effect of utility installations in regard to safety, aesthetic quality, and the costs or difficulty of highway and utility construction and maintenance.
- The State transportation department's standards for regulating the use and occupancy of highway right-of-way by utilities must include, but are not limited to, the following:
 1. The horizontal and vertical location requirements and clearances for the various types of utilities must be clearly stated. These must be adequate to ensure compliance with the clear roadside policies for the particular highway involved.
 2. The applicable provisions of government or industry codes required by law or regulation must be set forth or appropriately referenced, including highway design standards or other measures which the State transportation department deems necessary to provide adequate protection to the highway, its safe operation, aesthetic quality, and maintenance.
 3. Specifications for and methods of installation; requirements for preservation and restoration of highway facilities, appurtenances, and natural features and vegetation on the right-of-way; and limitations on the utility's activities within the right-of-way including installation within areas set forth by § 645.209(h) of this part should be prescribed as necessary to protect highway interests.

4. Measures necessary to protect traffic and its safe operation during and after installation of facilities, including control-of-access restrictions, provisions for rerouting or detouring traffic, traffic control measures to be employed, procedures for utility traffic control plans, limitations on vehicle parking and materials storage, protection of open excavations, and the like must be provided.
 5. A State transportation department may deny a utility's request to occupy highway right-of-way based on State law, regulation, or ordinances or the State transportation department's policy. However, in any case where the provisions of this part are to be cited as the basis for disapproving a utility's request to use and occupy highway right-of-way, measures must be provided to evaluate the direct and indirect environmental and economic effects of any loss of productive agricultural land or any impairment of the productivity of any agricultural land that would result from the disapproval. The environmental and economic effects on productive agricultural land together with the possible interference with or impairment of the use of the highway and the effect on highway safety must be considered in the decision to disapprove any proposal by a utility to use such highway right-of-way.
- Compliance with applicable State laws and approved State transportation department utility accommodation policies must be assured. The responsible State transportation department's file must contain evidence of the written arrangements which set forth the terms under which utility facilities are to cross or otherwise occupy highway right-of-way. All utility installations made on highway right-of-way should be subject to written approval by the State transportation department. However, such approval will not be required where so provided in the use and occupancy agreement for such matters as utility facility maintenance, installation of service connections on highways other than freeways, or emergency operations.
 - The State transportation department should set forth in its utility accommodation plan detailed procedures, criteria, and standards it will use to evaluate and approve individual applications of utilities on freeways under the provisions of § 645.209(c) of this part. The State transportation department also may develop such procedures, criteria and standards by class of utility. In defining utility classes, consideration may be given to distinguishing utility services by type, nature or function and their potential impact on the highway and its user.
 - The means and authority for enforcing the control of access restrictions applicable to utility use of controlled access highway facilities should be clearly set forth in the State transportation department plan.

Approvals:

- Each State transportation department should submit a statement to the FHWA on the authority of utilities to use and occupy the right-of-way of State highways, the State transportation department's power to regulate such use, and the policies the State transportation department employs or proposes to employ for accommodating utilities within the right-of-way Federal-aid

highways under its jurisdiction. Statements previously submitted and approved by the FHWA need not be resubmitted provided the statement adequately addresses the requirements of this part. When revisions are deemed necessary the changes to the previously approved statement may be submitted separately to the FHWA for approval. The State transportation department should include similar information on the use and occupancy of such highways by private lines where permitted. The State should identify those areas, if any, Federal-aid highways within its borders where the State transportation department is without legal authority to regulate use by utilities. The statement should address the nature of the formal agreements with local officials required by § 645.209(g) of this part. It is expected that the statements required by this part or necessary revisions to previously submitted and approved statements will be submitted to FHWA within 1 year of the effective date of this regulation.

- Upon determination by the FHWA that a State transportation department's policies satisfy the provisions of 23 U.S.C. 109, 111, and 116, and 23 CFR 1.23 and 1.27, and meet the requirements of this regulation, the FHWA will approve their use on Federal-aid highway projects in that State.
- Any changes, additions or deletions the State transportation department proposes to the approved policies are subject to FHWA approval.
- When a utility files a notice or makes an individual application or request to a STD to use or occupy the right-of-way of a Federal-aid highway project, the STD is not required to submit the matter to the FHWA for prior concurrence, except when the proposed installation is not in accordance with this regulation or with the STD's utility accommodation policy approved by the FHWA for use on Federal-aid highway projects.
- The State transportation department's practices under the policies or agreements approved under § 645.215(b) of this part should be periodically reviewed by the FHWA.

APPENDIX (B)

Guidance on Competitive Issues

To assist States in meeting the intent of the TCA with regard to maintaining a competitively neutral position in the process of developing and implementing a Shared Resource or other telecommunications installations project, the FCC Common Carrier Bureau suggests the following principles in the development of these projects. These principles should be considered whenever a State decides to limit further installations of fiber optic facilities on its ROW, whether in or out of the clear zone.

- The contractor should be selected through an open, fair, nondiscriminatory, competitive process.
- Having selected a contractor, other interested third-party telecommunications companies should be allowed the opportunity to have their fiber optic facilities installed in conjunction with any installation of fiber optic facilities by the contractor. The State may make the contractor the sole party responsible for all installation work done at such times, and require that other third party telecommunications companies contract with that contractor for installation of their fiber optic facilities when their facilities are installed in conjunction with those of the contractor. In such cases, the contractor's charges, terms and conditions for installation should be fair, reasonable, and nondiscriminatory and may include a reasonable profit. The State should give potentially interested third parties reasonable notice of the anticipated or planned opening of the right-of-way. The notice period should reflect the time

reasonably required by third parties to develop business plans and obtain financing. Notice can be accomplished through publication and dissemination of a construction schedule for the project. Such publication and dissemination should be reasonably calculated to provide potentially interested third parties with actual notice of the schedule.

- The contractor should install spare fiber and empty conduit, adequate to accommodate reasonably anticipated future demand, whenever fiber optic facilities cannot be installed outside the clear zone. Each section of fiber/conduit within the clear zone should have connection points (manhole or cabinets) at each end outside the clear zone where third parties can access the conduit or interconnect with facilities in the conduit at their option. All rates, terms and conditions for interconnection and/or use of space in the conduit should be fair, reasonable, and nondiscriminatory and may include a reasonable profit.
- The contractor should be required to *sell* fiber on an "Irrevocable Right of Use" (IRU)⁽⁵⁾ basis at rates and subject to terms and conditions that are just, reasonable, and nondiscriminatory. The contractor's charges for such facilities may include a reasonable profit.
- The contractor should be required to offer facilities and services for resale at rates and subject to terms and conditions that are just, reasonable, and nondiscriminatory and may include a reasonable profit.
- The agreement with the contractor should require that the contractor comply with the terms defined above, and give third parties the right to challenge the contractor's compliance with the appropriate elements of these terms dealing with third party access before an independent entity which does not benefit directly from the arrangement with the contractor. The independent entity should have the authority to order the contractor to comply with these terms. A State public utilities commission, or independent arbitrator, might serve in this capacity. In this regard, prompt resolution of such issues can be critically important to the development of competition.
- It is substantially preferable that the contractor be a wholesaler of telecommunication in order to minimize competitive concerns, as opposed to being a retail telecommunications services and facilities provider either directly or through an affiliated entity. This reduces the potential for anti-competitive pricing that could violate section 253 of the TCA. However, if the contractor does provide retail telecommunications service directly or through an affiliated entity, all rates, terms and conditions for its retail service should be fair, reasonable, and nondiscriminatory.

(The provision of retail service by a contractor creates the potential for a "price squeeze" with the contractor overcharging competitors, and its retail arm, for wholesale services and facilities, while competing vigorously on price for retail services. Thus, if the contractor provides retail services, the contractor's charges for services and facilities used by potential retail competitors may require careful scrutiny to avoid potential violations of the TCA.)

Appendix (C)

Application areas of ITS: http://www.itsdocs.fhwa.dot.gov/application_areas.htm

Arterial Management Arterial management systems manage traffic along arterial roadways, employing traffic detectors, traffic signals, and various means of communicating information to travelers. These systems make use of information collected by traffic surveillance devices to smooth the flow of traffic along travel corridors. They also disseminate important information about travel conditions to travelers via technologies such as dynamic message signs (DMS) or highway advisory radio (HAR).

Freeway Management There are six major ITS functions that make up freeway management systems: Traffic surveillance systems use detectors and video equipment to support the most advanced freeway management applications. Traffic control measures on freeway entrance ramps, such as ramp meters, can use sensor data to optimize freeway travel speeds and ramp meter wait times. Lane management applications can address the effective capacity of freeways and promote the use of high-occupancy commute modes. Special event transportation management systems can help control the impact of congestion at stadiums or convention centers. In areas with frequent events, large changeable destination signs or other lane control equipment can be installed. In areas with occasional or one-time events, portable equipment can help smooth traffic flow. Advanced communications have improved the dissemination of information to the traveling public. Motorists are now able to receive relevant information on location specific traffic conditions in a number of ways, including dynamic message signs, highway advisory radio, in-vehicle signing, or specialized information transmitted only to a specific set of vehicles.

[Crash Prevention & Safety](#) Crash prevention and safety systems detect unsafe conditions and provide warnings to travelers to take action to avoid crashes. These systems provide alerts for traffic approaching at dangerous curves, off ramps, restricted overpasses, highway-rail crossings, high-volume intersections, and also provide warnings of the presence of pedestrians, and bicyclists, and even animals on the roadway. Crash prevention and safety systems typically employ sensors to monitor the speed and characteristics of approaching vehicles and frequently also include environmental sensors to monitor roadway conditions and visibility. These systems may be either permanent or temporary. Some systems provide a general warning of the recommended speed for prevailing roadway conditions. Other systems provide a specific warning by taking into account the particular vehicle's characteristics (truck or car) and a calculation of the recommended speed for the particular vehicle based on conditions. In some cases, manual systems are employed, for example where pedestrians or bicyclists manually set the system to provide warnings of their presence to travelers.

[Road Weather Management](#) Road weather management activities include road weather information systems (RWIS), winter maintenance technologies, and coordination of operations within and between state DOTs. ITS applications assist with the monitoring and forecasting of roadway and atmospheric conditions, dissemination of weather-related information to travelers, weather-related traffic control measures such as variable speed limits, and both fixed and mobile winter maintenance activities.

[Roadway Operations & Maintenance](#) ITS applications in operations and maintenance focus on integrated management of maintenance fleets, specialized service vehicles, hazardous road conditions remediation, and work zone mobility and safety. These applications monitor, analyze, and disseminate roadway and infrastructure data for operational, maintenance, and managerial uses. ITS can help secure the safety of workers and travelers in a work zone while facilitating traffic flow through and around the construction area. This is often achieved through the temporary deployment of other ITS services, such as elements of traffic management and incident management programs.

[Transit Management](#) Transit ITS services include surveillance and communications, such as automated vehicle location (AVL) systems, computer-aided dispatch (CAD) systems, and remote vehicle and facility surveillance cameras, which enable transit agencies to improve the operational efficiency, safety, and security of the nation's public transportation systems.

[Traffic Incident Management](#) Traffic incident management systems can reduce the effects of incident-related congestion by decreasing the time to detect incidents, the time for responding vehicles to arrive, and the time required for traffic to return to normal conditions. Incident management systems make use of a variety of surveillance technologies, often shared with freeway and arterial management systems, as well as enhanced communications and other technologies that facilitate coordinated response to incidents.

[Emergency Management](#) ITS applications in emergency management include hazardous materials management, the deployment of emergency medical services, and large and small-scale emergency response and evacuation operations.

[Electronic Payment & Pricing](#) Electronic Payment & Pricing Electronic payment systems employ various communication and electronic technologies to facilitate commerce between travelers and transportation agencies, typically for the purpose of paying tolls and transit fares. Pricing refers to charging motorists a fee or toll that varies with the level of demand or with the time of day.

[Traveler Information](#) Traveler information applications use a variety of technologies, including Internet websites, telephone hotlines, as well as television and radio, to allow users to make more informed decisions regarding trip departures, routes, and mode of travel. Ongoing implementation of the designated 511 telephone number will improve access to traveler information across the country
Benefits.

[Information Management](#) Information Management ITS information management supports the archiving and retrieval of data generated by other ITS applications and enables ITS applications that use archived information. Decision support systems, predictive information, and performance monitoring are some ITS applications enabled by ITS information management. In addition, ITS information management systems can assist in transportation planning, research, and safety management activities.

[Commercial Vehicle Operations](#) Commercial Vehicle Operations ITS applications for commercial vehicle operations are designed to enhance communication between motor carriers and regulatory agencies. Examples include electronic registration and permitting programs, electronic exchange of inspection data between regulating agencies for better inspection targeting, electronic screening systems, and several applications to assist operators with fleet operations and security.

[Intermodal Freight](#) Intermodal Freight ITS can facilitate the safe, efficient, secure, and seamless movement of freight. Applications being deployed provide for tracking of freight and carrier assets such as containers and chassis, and improve the efficiency of freight terminal processes, drayage operations, and international border crossings.

Intelligent Vehicles

[Collision Avoidance](#) To improve the ability of drivers to avoid accidents, vehicle-mounted collision warning systems (CWS) continue to be tested and deployed. These applications use a variety of sensors to monitor the vehicle's surroundings and alert the driver of conditions that could lead to a collision. Examples include forward collision warning, obstacle detection systems, and road departure warning systems.

[Collision Notification](#) Collision Notification In an effort to improve response times and save lives, collision notification systems have been designed to detect and report the location and severity of incidents to agencies and services responsible for coordinating appropriate emergency response actions. These systems can be activated manually (Mayday), or automatically with automatic collision notification (ACN), and advanced systems may transmit information on the type of crash, number of passengers, and the likelihood of injuries.

[Driver Assistance](#) Numerous intelligent vehicle technologies exist to assist the driver in operating the vehicle safely. Systems are available to aid with navigation, while others, such as vision enhancement and speed control systems, are intended to facilitate safe driving during adverse conditions. Other systems assist with difficult driving tasks such as transit and commercial vehicle docking.