“Dig Once” includes policies and/or practices that minimize the number and scale of excavations when installing telecommunications infrastructure in highway rights-of-way.

- Federal Highway Administration

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Introduction

California Legislation (AB 1549) requires the Department of Transportation to notify companies working on broadband deployment of Department-led highway construction projects and authorizes those companies to coordinate with the Department on conduit installation. By January 1, 2018 the Department must develop guidelines to facilitate the installation of broadband conduit on state highway rights-of-way.

Many other states have policies and/or practices to facilitate joint highway and utility planning. One such policy, Dig Once, is used to minimize the number and scale of excavations when installing telecommunications infrastructure. The two main benefits are lower costs of infrastructure deployment when completed in conjunction with other infrastructure improvements, and promoting and facilitating integration of broadband infrastructure as part of local and regional economic development initiatives.

Interpretation of this policy varies widely from vague coordination initiatives to strict requirements for conduit deployment in street excavation projects. Most states which have enacted this policy lean toward providing coordination guidelines, however, some cities have explicit ordinances to combine broadband deployment efforts with transportation and utility projects in roadways. This report analyzes city and state implementation of Dig Once policies and practices, as well as, provides information from the Federal Highway Association’s (FHWA) research on best practices and other policies accompanying Dig Once. This report aims to inform where and how dig once policies are implemented and how they are successful.
Current Policy

Maryland

Summary: Maryland DOT coordinates with internet providers and local utilities to install conduit for future use and provides ROW access without charge to certain entities. Through resource sharing, the state has been able to achieve interoperability and reduce capital costs for communications infrastructure.

- Reduce capital costs for communications infrastructure
- The private entity installs and maintains the conduit.
- Agreements with Private ISP’s
  - Majority of private ISP’s install and maintain the conduit
- Sharing highway ROW’s for monetary or in-kind compensation may include communications or IT equipment provided to Maryland State Highway Administration (MSHA) or exclusive allocation of fiber optic cables to MSHA
- ROW available without charge (until 2020)
- ROW valuing:
  - The fair market value or rent of ROW was not easy to quantify; generally fiber exchanged for use of fiber has worked best for the state
- Recommendations provided by the State
  - Encourage the use of trenchless technologies (e.g. Maryland uses horizontal directional drilling methods for most construction projects).
  - Install conduit for future use
  - If the conduit is installed and owned by a private entity, leasing rates remain competitive - may request the private entity install additional conduit to be owned by the city/state (as in the Boston approach), so that the public entity may rent out the conduit at competitive rates
  - Identify environmentally-sensitive areas early

Minnesota

Summary: The state promotes broadband conduit coordination between the DOT and private entities, connects broadband infrastructure to ITSs and co-locates fiber/conduit in the same trench with other utilities. Their policy includes a competitive process which allows providers to install infrastructure when the ROW is open for utility work.
• Coordination of Broadband Infrastructure Development (2013)
  o “The office shall, in collaboration with the Department of Transportation and private entities, encourage and coordinate "dig once" efforts for the planning, relocation, installation, or improvement of broadband conduit within the right-of-way in conjunction with any current or planned construction, including, but not limited to, trunk highways and bridges.”
  o Encourage and assist local units of government to adopt and implement policies similar to those.
  o One trench may include conduit/fiber for city, county, state, school levels and additional unused strands for future use.
  o Connects fiber infrastructure to city/county ITS
  o Dakota County installs fiber for State’s network backbone
    ▪ State provides maintenance and operations

Illinois
Summary: Illinois DOT and ISPs collaborates to install fiber in new state-funded construction which includes trenching. The DOT issues public bidding notices explicitly citing the need for conduit or cable. The state has also successfully combined water and broadband projects to reduce costs.

  • Public bidding notices must describe the need for fiber-optic conduit or cable
  • Either department may permit a third party to manage the fiber and conduit leasing¹
  • Water and broadband combined projects:
    o See Chicago below

Nevada
Summary: Nevada promotes the policy through local model guidelines and recently passed legislation which allows the DOT to enter into agreements with telecoms and establishes procedures for the valuation of in-kind compensation paid by telecoms to the department for the ROW access they receive.

Nevada passed SB 53 on May 25, 2017²:


• Authorizes the DOT to grant longitudinal access to ROW for telecoms
• Telecoms required to fairly compensate DOT
  o In-kind compensation for ROW access
  o DOT agreements for telecoms to use spare conduit

*New policy has not been implemented and no agreements have been made to date.

Previous collaboration between DOT and broadband:
• Digital 395 Project – California Broadband Cooperative (CA and NV)

Utah

Summary: UDOT has facilitated cooperative fiber and conduit trades with broadband service providers to expand its communications network across the state without major capital investment. UDOT's approach to deploying broadband has also advanced ITS initiatives in the state, as well as promoted economic growth by enabling access to broadband in both urban and rural areas. Through frequent meetings with telecoms, creating open ROW’s, extensive information sharing and trading assets with telecoms, the state has doubled their network, which now includes 900 miles of conduit owned by the DOT and about 1,000 miles obtained through trades. These public-private partnerships have saved the state and taxpayers millions of dollars. Regional Broadband Planning councils were created to develop strategic plans to address local needs and provided recommendations.

DOT guidelines/policies:
• Install empty conduit along major routes
• Cooperative planning with telecoms
• Telecoms have access to highway ROW for build-outs
• DOT can enter into fiber trades with telecoms
  o Telecommunications Advisory Council reviews and approves trades and valuations, and discusses issues relating to deployment barriers
• Extensive mapping of fiber locations
• Receives annual “wish list” from telecoms
• Meets with the telecoms every 2 months about broadband projects. The state has a single point of contact for all telecoms in the state.
• ROW is open at all times, allowing for easy access to complete continuous build-outs, and ensuring that no single company has exclusive access and used to reduce permit processing times
- **Policy on Monetary Damages**
  - If a construction company hits a fiber optic line, monetary damages imposed by the telecom should be reasonable.

- **Information sharing with telecoms**
  - Fiber and conduit locations, plans for economic development, contact information and web links are also available online to provide the telecom with information about the area they are servicing.

- **How they trade:**
  - Utah DOT installs conduit for its own network—sometimes coordinating conduit installation with road construction—and allows private companies to use excess state-owned conduit in exchange for the use of company-owned conduit in areas where the state does not have broadband infrastructure. UDOT trades existing or planned fiber/conduit/circuit on a foot by foot basis for 30 years with automatic 5-year renewals. Ownership and maintenance of fiber varies between DOT and telecoms. Resulted in large cost savings since they were able to extensively expand their infrastructure without major investment.
Success

- **Yes** - UDOT has a much better traffic system today because of the state's' success in working with the telecoms
- Trading assets with the telecommunication companies has resulted in significant payback for the state.
  - Coordination with rural telephone associations and education networks
  - Utah DOT, in comparing two rural broadband deployment projects, estimated cost savings of roughly 15.5 percent per mile when conduit and fiber were installed during a road project rather than being installed independent of a road project.

Projects to reference

- Logan – Syringa Networks (completed)
- Big and Little Cottonwood Canyon – Crown Canyon (completed)
- Fiber drop conduit to Cedar City District Office (in construction)
Boston

Summary: Boston’s 1994 “joint build” policy successfully reduced costs, number of excavations and project delivery times through information sharing, micro-trenching, and sharing costs between all companies involved in the build-out. They implemented a “shadow conduit policy” where the first company to request a trench takes a lead role and invites other entities to add additional conduit for future use by the city or other later entrants. These procedures worked well in Boston’s highly urban setting, however, may be difficult to replicate success in a rural setting.

- Mandated all telecoms to install their underground conduits “in the same trench, at the same time on a shared-cost basis”.
- Requires lead company and participants to install, at their own expense, extra conduit referred to as “city shadow” alongside the private conduit network, and becomes the property of the City to be used for City purposes.
  - Can rent conduit to private telecoms if conduit space is needed.
- City and telecoms collaborate to draft engineering plans, estimate costs, and submit build-out application for review and approval
- Shared Costs
  - Construction costs, including digging the trench, installing the conduit and repaving, are shared by all companies participating in the build-out.
- Micro-trenching successful in reducing costs and number of excavations
- Sharing of information successful in speeding up project delivery
  - Obtained advance notice of private utility projects
  - Incorporated specifications for conduit in design phase

Chicago

Summary: The City of Chicago’s Project Coordination Office coordinates weekly meetings and utilizes a database for scheduled utility work to find opportunities to combine work. The City’s initiatives resulted in faster, more complete repairs and $10 million in DOT savings during the first year (2012).

3 “Joint deployment can materially reduce the cost of fiber deployment.” National Broadband Plan, Chapter 6.2. [http://www.broadband.gov/plan/6-infrastructure/](http://www.broadband.gov/plan/6-infrastructure/)
• Office of Underground Coordination (within DOT) is the distribution agency for all requests regarding existing utility information and the review/approval of construction work in or adjacent to the public way. They process the projects before permits are issued.

• Public and private utilities enter their scheduled work into a Project Coordination Office database geocoded onto the street grid.
  
  o Cross-departmental reports are generated nightly.
  
  o Weekly meetings sort out conflicts and find opportunities to combine work.

• 2012 initiative to replace city water lines requested that internet providers install conduit at the same time.

San Francisco

Summary: The City and County of San Francisco requires the installation of City-owned communications infrastructure in excavation projects when technically and financially feasible (Ordinance 220-14). A moratorium on road excavation exists for five years after project completion. This is the most stringent policy and may not be feasible at the state level due to inflexibility.

• Criteria to define eligible Dig Once opportunities:\(^4\)
  
  o Supports ICT (Information and Communication Technology) Goals. When determining which Dig Once opportunities to seek, the City must consider potential utilization for our City’s Fiber Network. It will prioritize projects by taking into account existing fiber and conduit routes available to the City; the cost of constructing alternative fiber paths (e.g. attaching to utility poles or directional boring); and current and future needs of the City and public.

  o Market Demand. When determining which Dig Once opportunities to seek, the City must consider potential market demand that supports efficient delivery of telecommunications services for the public.

• Moratorium on street excavation to preserve new roadway construction for 5 years after road repaving
  
  o Caution: Could impede broadband deployment in future circumstances\(^1\)

• Reduces the cost of conduit installed from $128,000 per street mile for the first installation (including excavation of the trench) to $71,000 for the second.
• Only applies to a street or sidewalk excavations that is 900 linear feet or longer.

Santa Monica

Summary: Santa Monica built a municipal fiber network resulting in a successful example for Dig Once policy. The city coordinates water and power utilities with transportation project schedules for fiber installs and shares a single documentation software. The incremental process identified key locations for fiber and over time coordinated multiple capital projects which laid extra fiber for future use. This resulted in $700,000 per year in ongoing savings.

• Outreach to rural utility districts
• Coordination with water and power utilities
• Gives recommendations for State and Federal agencies:
  o Designate one agency or vendor to manage national fiber cable operations
  o Coordinate timelines for fiber installs with transportation project schedules
  o Share a single documentation software
  o Hold firms accountable for their use of City infrastructure
  o Plan fiber installations on roadways in proximity to regional data centers

Federal Highway Administration Guidelines

The USDOT-FHWA does not have a dig once policy for federally-aided highway projects, it has policies and procedures that support installation practices that minimize excavation. The agency also strongly encourages states to work collaboratively with service providers on joint highway and utility planning and development.

FHWA Successful Practices Report 2013
• Initiatives that are favored support approaches that encourage cooperation and efficiency, but do not prevent excavation when needed.

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• When involving below-ground, wireline installations in the highway ROW, three main approaches by states and local areas have been identified as the following:
  o **Publicly-owned and operated network**: The conduit is installed, owned and maintained by the state, and in some cases, fiber optic lines are state-owned and operated.
  o **Privately-owned and operated network**: The conduit is installed, owned and maintained by a private entity, and fiber optic lines are also privately-owned and operated with minimal involvement by the public entity. In certain cases, as part of the agreement for using public ROW, the private entity may install extra conduit for the public entity to have for its own use.
  o **Network via public-private partnership**: Through a cooperative agreement between public and private entities to expand the network, stretches of conduit are installed, owned and maintained by either the state or the private company providing the service. Fiber optic lines are most often privately-owned and operated and resource sharing is often involved.

**Pros**

• Possible savings on costs incurred by repeated excavation in areas where the entire ROW is paved or developed.
• Reduced deployment time by preventing the need to acquire duplicative reviews and permits for work done at the same location
• Key cost components that can be avoided or reduced through coordinated construction efforts include:
  o Overall reduction in incremental labor and material costs through reduced crew mobilization expenses and through larger bulk material purchases.
  o Trenching or boring costs, particularly when coordination enables lower cost methods (trenching as opposed to boring) or allows multiple entities to share a common trench or bore for their independent purposes
  o Traffic control and safety personnel, particularly when constructing along roadways requiring lane closures
  o Engineering and survey costs associated with locating existing utilities and environmental impact studies and approvals
  o Lease fees for access to private easements, such as those owned by electric utilities
  o Railroad/bridge crossing permit fees and engineering
Cons

- Implementing Dig Once policies at the local level could be more effective given the complexities of implementing a policy that spans jurisdictions.
- Savings are highest in densely populated areas (25%-33%) where construction costs are highest.\(^7\)
  - Dig once could result in little savings in rural areas
  - Increased administrative costs for state DOTs
  - Unused conduit

Policies Compatible with Dig Once

- Resource Sharing
  - State DOTs make agreements with service providers for the exchange of the use of ROW or existing infrastructure, such as conduit, for the use of fiber optic services.
- Subsurface Utility Engineering (SUE)
  - Uses 3D modeling to collect subsurface information on utilities, which can be integrated into the planning and implementation of highway projects.
- Joint-trench agreements (a.k.a. “joint use”)
  - Requiring that all providers of broadband services (in some cases, all utilities) install their infrastructure at the same time, in the same trench, or in the same conduit, and in most cases, share the cost of installing the infrastructure.
- Moratoriums on street excavation to preserve new roadway construction
  - San Francisco - 5 years after project
- Use of trenchless technologies, such as:
  - Horizontal directional drilling: a trenchless method of installing underground pipes, conduits and cables along a prescribed bore path by using a surface-launched drilling rig, with minimal impact on the surrounding area.
  - Micro-trenching: digging a small trench just inches under the road surface along the curb line to install fiber optic lines.

Contacts

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Terms

Dark Fiber
- Dark fiber is unused optical fiber that has been laid but is not currently being used

Digital Divide
- The gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to both their opportunities to access information and communication technologies (ICTs)

Joint Use Policy
- Mandating that broadband utilities install at the same time, in the same trench, or in the same conduit(s). It may also mean the first utility in places extra conduits, and subsequent utilities must negotiate with that utility to occupy one or more of the empty conduits.

Last mile
- Streets or driveways that connect back through the hierarchy of routes and connects individual households and businesses to the internet

Middle Mile
- Main arteries that connect to the interstates