



POLICIES AND ORDINANCES THAT FACILITATE BROADBAND DEPLOYMENT

Policies and ordinances can be adopted by local governments to reduce the capital costs of broadband deployment. This paper discusses the best practices and impacts of implementing a dig once and/or shadow conduit policy, as well as other policies to consider for advancing broadband deployment.

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Implement Policies and Ordinances that are Broadband Friendly

Municipalities and Counties have the power to significantly reduce the capital costs of broadband infrastructure deployment. Whenever possible, cities and counties can put in place policies and ordinances to help encourage broadband investment. These policies can be implemented to facilitate investment from the private sector and can also be used to gain substantial assets that can be leveraged for broadband deployment.

Sixty to eighty percent of a fiber optic network's capital costs are in opening a trench, or in directional boring or in burying conduit that will house fiber optic cable. Policies that encourage placement of conduit or fiber optic cable when a trench is open eliminate much of the capital costs for network deployment. By coordinating with other City, County, or State capital projects, additional conduit can be placed within an open trench when other work is being performed in the right of way. Types of projects where additional conduit could be installed might include - sidewalk improvements, street light and trails construction and maintenance, road construction and road widening projects, and any underground utility project.

INCREMENTAL COST TO INSTALL SHADOW CONDUIT
IS \$2 - \$7 PER FOOT.

COST TO INSTALL NEW CONDUIT AS A STANDALONE
PROJECT IS \$25 - \$35 PER FOOT.

TYPICALLY, SHADOW CONDUIT REPRESENTS 1-2% OF A
ROAD IMPROVEMENT'S TOTAL PROJECT BUDGET.

A *"Dig Once" Policy* or a *Shadow Conduit Policy* typically has the following components:

- All public works or installation of other telecom, cable or utility infrastructure allows for conduit to be placed on behalf of the local or State government and any other entities that want to participate. If there is an open trench, the policy provides for coordination of street cuts and excavations with utilities, public works, developers, and other interested parties. This maximizes the opportunity for broadband-specific conduit installation, while minimizing cost, community disruption and damage to existing infrastructure.
- A notice period informing other entities that an open trench will be available for placement of their conduit and/or fiber optic facilities.

- Allows for shadow conduit to be placed on behalf of the local and/or State government. The installation of empty and/or spare conduit by a public agency when excavations occur in the public right of way, with the local government agency's costs limited to the incremental costs of the conduit only.

A standard, conduit-specification document can be developed that addresses capacity, separation of facilities, proper sizing and placement. The specification document also addresses access to the conduit with detailed provisions for vaults and all access points. Cost sharing or cost recovery stipulations can be put in place for materials and labor assignment. Engineering specifications and drawings that address conduit sweeps, bend radius and physical placement requirements can be provided with the standard conduit specification.

Additionally, various government agencies can establish *Joint Trench Agreements* and *Joint Build Agreements* with other telecommunications, cable or utility providers. Cost for placement of conduit or fiber will be shared amongst all entities, allowing each to take advantage of the other's trenching. Standardization of agreements for potential owners of underground infrastructure, can be established to ensure all parties are aware of joint trenching opportunities.

Examples of Government Agencies that have Implemented a “Dig Once” Policy and the Results

There are hundreds of examples of municipalities, counties, states, and federal initiative that are using smart conduit construction, “Dig Once” policies and/or shadow conduit policies to gain assets and attract potential partners to improve broadband services within the community.

Municipal Examples

The Cities of Santa Cruz, San Francisco, and Gonzales, California have all implemented “Dig Once” policies. Codes in each City now provide for improved communication with potential stakeholders, as well as mandatory installation requirements for excavators. In Santa Cruz the policies mandate that City Staff communicate with all excavators in the City, and coordinate trench access for interested parties. Further, City Staff are directed to work with the construction contractors to create cost-effective upgrades in the City's Public Right of Way (PROW). The City of Santa Cruz has also identified the importance of maintaining the integrity of the PROW, and will suspend standalone construction in the PROW.

Taking a somewhat differing approach, the City of San Francisco's “Dig Once”/joint trench policy amends the City's Public Works Code to guarantee participation and coordination by utility contractors. Approval by the Public Works Department and the Department of Technology are required for all applications. Acceptance of plans is

contingent on compatibility with installation requirements, and with technical specifications. City projects are evaluated with a right of way management system, and by close cost-benefit analysis, to identify, coordinate, and prioritize PROW construction efforts. The policy also includes a 5-year moratorium on excavating streets that have been reconstructed, repaved, or resurfaced.¹ The ultimate outcome of these policy amendments is that contractors collaborate with the Department of Technology, which covers all incremental costs, to install conduit for use by the Department, and also for future leased facilities.

The City of Gonzales, CA requires all excavators in the Public Right of Way to install telecommunications conduit, and has instituted common engineering specifications for these projects. All material and installation specifications are determined by these policies, and costs are covered by Public Works. Additionally, the City scrutinizes each potential project for cost benefit and suitability, prior to approval.

The City of Brentwood, CA has had a conduit policy in place since 1999, and has extended conduit to over 8,000 homes and businesses. The process began with installations in new home developments, and has expanded across the city footprint. In 2015, the City began offering Gigabit services in partnership with Sonic.net, a Santa Rosa-based, service provider. Sonic has a lease agreement with the City to install fiber throughout City conduit and to provide residential and commercial services. In addition to providing a lease revenue stream to the City, Sonic will also provide Gigabit Services to the City at no charge, saving around \$15,000 per year.² Additionally, in those neighborhoods with subscription rates over 30%, the local school will also receive Gigabit Internet at no charge.³

In Centennial, CO, the City began a fiber optic and conduit initiative in 2008 as a public works effort connecting city buildings, traffic signals and other public facilities. The City implemented a “Dig Once” policy that required additional conduit be installed when work was being done in the right of way. To date, the City has installed more than 60 miles of conduit and fiber optic infrastructure suitable for broadband deployment while spending less than \$600,000. This network is currently valued well over \$6 Million. The City recently engaged in a formal process to incent providers to deploy a Gigabit-enabled fiber network to every home and business within the city limits. The City announced an agreement with Ting, an Internet Service Provider. Ting is now using existing City conduit and fiber to roll out its Gigabit services to the community.

¹ <http://www.sfpublishworks.org/sites/default/files/Moratoriumstreetsbrochure-6.29.2016.pdf> Accessed 11/07/2017.

² <https://muninetworks.org/content/sonicnet-lights-brentwood-ca> Accessed 11/11/2017

³ <http://www.mercurynews.com/2015/05/20/sonic-partners-with-brentwood-to-bring-high-speed-internet-to-town/> Accessed 11/11/2017

The City of Arvada implemented shadow conduit implementation policies in 2017. The City has placed a priority on connecting its key government facilities, several smart city applications, its schools, parks and recreation and emergency first responder locations with fiber optic cable. The total cost to implement this network is estimated at \$13 Million; of which, \$9 Million is in the form of directional boring and conduit installation. As a way to reduce these capital costs, the City is working with the private sector to share in the cost of installation of conduit on key routes throughout the City.

As the community of Mesa, Arizona, began to grow, community leaders recognized that telecommunications would be a key element to its success. Mesa was an early adopter of “Dig Once” policy, placing conduit whenever streets were excavated for any other infrastructure purpose. Mesa has also taken advantage of non-traditional existing infrastructure, planting fiber in abandoned conduit that had been used for other utility purposes. This resulted in a network of 150 - 200 miles of fiber throughout the community. The investment has paid off in numerous ways over time and helped the city establish a broadband-friendly environment for economic development, allowing private sector companies to use the existing conduit and fiber to reduce their overall costs of infrastructure deployment.

Bozeman, MT invested in multi-duct conduits, making it possible for nonprofit Bozeman Fiber, who leases the conduit, to reach more residences and businesses with service. Lincoln, Nebraska invested \$700,000 to install a conduit system in 2012. Since then, their conduit network has grown to more than 300 miles, and has attracted six private carrier providers who lease the conduit, and who are helping to pay off the initial investment.

County Examples

In California, neighboring Santa Cruz and San Benito Counties have both adopted “Dig Once” Policies. Santa Cruz County has implemented ordinances that provide for conduit installation during all underground and repaving construction. The language of the ordinance states, in part: *All construction, reconstruction or repaving of a County right-of-way will include provisions for the installation of telecommunications cable, conduit and other related equipment wherever practical and feasible...If a project includes excavation in or adjacent to a County right-of-way, installation of or upgrades to telecommunications cable, conduit or other infrastructure will be included as needed.*⁴ San Benito County has incorporated similar ordinances as part of its multi-use streets policy. County roadway construction projects involving more than surface pavement work are required to include underground utility conduit.

⁴ <http://www.tellusventure.com/blog/santa-cruz-supervisors-look-at-mandatory-broadband-upgrades> - Accessed 11/03/2017

Minnesota's Dakota County is the third largest county in the state, and has realized significant cost and service benefits in maintaining a "Dig Once" policy. Close partnerships between the County and municipalities since the 1980's have been fundamental in expanding infrastructure and delivering services. Since beginning fiber installs in 1998, the County has connected government offices, traffic lights, schools, parks, and many other public institutions with more than 350 miles of fiber. Estimated cost avoidance for the County due to the conduit and existing network so far has been over \$10 million.⁵ And by installing conduit in trenches that are already open, they have reduced the capital costs of connecting their communities by roughly 80%. Furthermore, application of the policy has increased infrastructure reach into rural areas.

Reaching the County's, roughly 400,000 citizens with broadband is expensive since two thirds of the County is rural. Dig-once policies combined with collaborative solutions are a key part of the County's broadband philosophy. Expansion is guided by a strategy of collaborative development, and cost sharing with any, and all partners. Working relationships with local utilities, school districts, and local service providers reduce upfront and operating costs, while joint efforts with the cities reduce cost, dilute risk, and increase benefits. Furthermore, with shared ownership and access to this valuable asset, local governments are now far better positioned to take advantage of future opportunities.

State Initiatives

Another great example of "Dig Once" policy and infrastructure management can be seen in the efforts made by the Utah Department of Transportation (UDOT). In 1999 Utah changed its state law to allow for access to the Right of Way (ROW) on Interstate Highways. UDOT has since collaborated in many public-private-partnerships, and now uses this newly accessible ROW for installation of conduit and fiber, to support their Intelligent Transportation System (ITS).

Since that time, UDOT has increased its partnership portfolio, in a successful effort to decrease capital costs for ITS projects. Private partner assets have been leveraged to take advantage of fiber resource sharing and conduit trading opportunities. Best practices have been integrated across the board, and include the mandatory installation of conduit on all road construction projects, the creation of a service provider and partners list, bi-monthly review meetings with telecom providers, and a wish list from service providers for future joint efforts.

The State of California passed legislation in 2016 that enacts a "Dig Once" policy for the State Department of Transportation (DOT). The DOT is required to develop guidelines to facilitate the installation of broadband conduit on state highway rights-of-way by

⁵ http://ilsr.org/wp-content/uploads/downloads/2014/09/all_hands_on_deck_mn.pdf Accessed 11/13/2017.

January 1, 2018. The bill (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.”⁶

Federal Government Initiatives

In 2011 and 2012, the U.S. Government Accountability Office examined proposed federal “Dig Once” policies that would require the deployment of broadband conduit in conjunction with federally funded highway construction projects. Their research was meant to determine the value of such policies in decreasing deployment costs and eliminating the need for multiple excavations.⁷ Their findings revealed that such policies would likely have several advantages. Along with increasing access to, and reliability of broadband networks, other advantages of these policies would include decreasing construction costs, as well as the frequency of construction on major highways. Building on this earlier work, the 2015 “Broadband Opportunity Council Report and Recommendations” document further validated the added value of “Dig Once” policies. The U.S. Department of Commerce and U.S. Department of Agriculture promoted “Dig Once” policies as best practices for Local and State Governments. The report describes “Dig Once” policies as providing important cost benefits, “by coordinating infrastructure projects and allowing conduit to be laid alongside transportation, water and other projects”. Additionally, they highlight that such policies “promote broadband competition, reduce costs for broadband providers and decrease road-related costs from repeated excavation”.⁸

Other Policies to Consider

Along with comprehensive “Dig Once” policies, additional best practices include streamlining the permitting and make-ready processes, creating policies to manage abandoned underground facilities, redefining broadband “utility” codes and construction standards, and managing a set aside fund to support “Dig Once” practices. Fundamental to all the efforts detailed in this white paper, is the establishment of a comprehensive GIS database. This resource provides real time information on current and proposed infrastructure and capacity, and is a mission-critical tool for planning, budgeting, and collaboration.

⁶ http://www.dot.ca.gov/hq/tpp/offices/omsp/system_planning/docs/DigOnceWhitePaper.docx. Accessed on 11/07/2017.

⁷ https://www.tellusventure.com/downloads/bank/gao_report_federal_dig_once_policies_27jun2012.pdf. Accessed on 11/07/2017.

⁸ https://obamawhitehouse.archives.gov/sites/default/files/broadband_opportunity_council_report_final.pdf. Pages 16 & 19. Accessed on 11/10/2017.

Streamlined Permitting & Make Ready Processes

A slow permitting process can add uncertainty in the construction timeline as well as significant costs. Crews sit idle while waiting for permitting approvals and this adds to the overall cost of construction. **Streamlined Permitting** can be implemented by using an encroachment permit process. This can place the approval of projects solely in purview of the public works department. Limiting this process to one department can significantly reduce costs, miscommunication, and delays in the approval process. Additionally, a bulk permitting process can enable a single approval for multiple activities, further streamlining the overall process.

Dakota County Minnesota has developed an award-winning software to manage project permitting called the One Stop Roadway Permit Shop. The system provides users with access to twelve different permits, including utilities and rights of way permits, and notifies them when a project of interest is being planned.⁹ This system incorporates the “Dig Once” and Shadow Conduit Policy components discussed above. It has been tremendously successful and saves approximately \$4,000 per year for each agency involved.¹⁰

One of the most unpredictable and costly components of fiber optic construction is the “make-ready” process. “Make-Ready” refers to the inspections, engineering, and rearrangements necessary to accommodate the installation of multiple cables on a utility pole. Make-ready engineering for placement of fiber optic cables needs to comply with the National Electric Safety Code (NESC). Compliance may include moving existing fiber optic cable, increasing the load bearing ability of poles, and/or the transfer or replacement of existing poles required to accommodate the attachment of new cables.

At times, the make-ready process can require multiple companies to dispatch crews with specialized equipment and bucket trucks to move their physical attachments on the communications portion of utility poles, causing slowdowns and duplicate expense for deployments. **One-Touch Make-Ready** or **One Truck-Roll Procedures & Policies** will enable and encourage all work to be completed by a single company, in one service trip. Streamlining this time-consuming and high-cost activity will save significant amounts of time and money.

Policies for Abandoned Fiber and Conduit

Create an **Abandoned Fiber and Conduit Policy** to regain control of abandoned facilities. Any abandoned fiber and/or conduit that is left vacant, and is not claimed by the owner within a designated time period, would revert to the local government agency. Additionally, abandoned water and sewer lines can be repurposed to house fiber and

⁹ <https://muninetworks.org/content/transcript-community-broadband-bits-episode-117>. Accessed 11/09/17

¹⁰ http://ilsr.org/wp-content/uploads/downloads/2014/09/all_hands_on_deck_mn.pdf Accessed 11/09/17

conduit. Communities must make sure to create a process to identify, inventory and manage potential assets.

Encourage Standards for Placement of Conduit and/or Fiber in New Developments.

The integration of broadband “utility” codes into land development policies and city ordinances ensures uniform and standardized placement of conduit and/or fiber optic facilities. These land development codes would require all new commercial and residential developments to install fiber optic infrastructure. New building codes could describe the specific and compatible communications components and architectures of all new construction. Further, these codes could describe the development and use of City/County rights-of-way for communications connectivity, and could specify standardized wiring requirements for new buildings.

Standardize Pole Attachment Rates for Placement of Aerial Fiber

Pole attachment rates vary dramatically across jurisdictions and among utility companies. Rates are typically charged per pole per year, for attaching aerial fiber on existing utility poles, and can range from \$4 to \$26 per pole. Lowering and standardizing pole attachment rates will eliminate uncertainty and reduce operating expenses.

Set up funding mechanisms or Set-Asides to allow for adoption of these policies.

Conduit is not expensive, but without a funding mechanism to cover installation costs, valuable joint build and open-trench opportunities can be lost. A funding set-aside or budget process must be put in place to allow for implementation of these policies. The funding mechanism will allocate monies to build broadband infrastructure when opportunities arise and the fund would maintain a reserve or set-aside for unanticipated projects.

Keep a GIS database of all infrastructure, and provide for a process to submit plans.

Develop a policy that all construction permits issued would require the submission of final as-built drawings. This policy would define all planning and construction documentation requirements for utilities, developers, contractors and others in an appropriate GIS format. Policies can then be implemented to facilitate investment from the private sector, and can also be used to leverage assets owned by the county or municipality. Removing roadblocks and creating efficiencies are key municipal contributions to facilitate, encourage, and support investment.

Use of Existing Assets. Existing assets can include tower facilities, water towers, land, rights of way, existing conduit and existing fiber. Sixty to eighty percent of a fiber optic

network's capital costs are in opening a trench or in burying conduit that will house fiber optic cable. Using existing conduit substantially reduces the capital costs of network deployment. If a municipality has existing conduit or fiber, these assets can be leveraged to entice further deployment of investment by the private sector. New networks can and are built on the foundation a community's already existing fiber and/or conduit as well as available land.

Economic Incentives. Economic incentives as well as logistic assistance from a city can help pave the way for more powerful broadband service. Most tax incentives are implemented at the State-level, but the City could influence the State's consideration of providing tax incentives in the form of accelerated depreciation, reduced property taxes and reduced sales taxes.

Conclusion

The good news for local governments looking to provide their constituents with next-century broadband is that they have the power to generate revenue and mitigate costs. By implementing "Dig Once" policies, streamlined permitting processes, and creating "make-ready" and conduit standards, your community can lay a solid foundation for a robust, fiber-optic, broadband network.